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Small firms and industrial districts

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Sebastiano Brusco

**SMALL FIRMS
AND INDUSTRIAL DISTRICTS**

a collection of essays

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Editor's notes

Margherita Russo

Sebastiano Brusco's collection of essays Piccole imprese e distretti industriali (Torino, Rosenberg & Sellier, 1989) was translated in English by Tim Keats in 1990, unless three chapters that were already available in English and chapter 7 that was too long for a publication as a book chapter. Having abandoned the project of publishing a volume in English, Sebastiano Brusco asked me to share a photocopy of the English translation with scholars who requested it, and so several copies arrived in the hands of researchers in various countries: South Africa, Norway, Denmark, the United States, France and the United Kingdom.

Twenty years after Sebastiano Brusco passed away, and me approaching to retirement, a working paper edition - in the DEMB Working Paper Series - will make the document freely available online.

This digital document has been created, in 2012, drawing on a folder of Sebastiano Brusco's digital archive "Backup of EnglishBook" that contained Lotus MS files. These files have been converted by Patrizio Magagni in a txt format and then inserted by me in a single Word file:

"Backup of EnglishBook_from files converted by Patrizio_22.01.2012

Some graphs and tables have been added as images, taken from the Italian edition. The text is all flag-formatted, whereas in the Italian edition only the main introduction, chapter introduction and afterword were flag-formatted. The text is not justified because, in the conversion of the original files, a manual line break was automatically inserted at the end of each line.

To differentiate those parts of the text written by Brusco specifically for the publication of the 1989 collection of essays, they are reproduced here in two columns, with a smaller font.

A complete list of Sebastiano Brusco's publication is available online at:

<https://www.economia.unimore.it/site/home/dipartimento-di-economia---sebastiano-brusco-web-page.html>

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INTRODUCTION

The essays in this volume were written over a period of nearly twenty years, between 1971 and 1987. They differ as regards their length, their depth of interest, the occasion for which they were written. Many were done in collaboration with other authors and bear witness, I trust, to the usefulness of joint effort so severely frowned upon by Italian custom and law. Many are little known. Among the more recent ones, some have been published only in English.

I have preferred to introduce the essays one by one, with a brief account of the occasion for which they were written and the academic debate in which they intervene. One after another, these short introductory notes trace out a path of research and record important occasions in my own personal life, as well as in my studies. For a long time I was uncertain whether, in a book, I should tell, not only of results as they were one by one achieved, but also of myself, of Sardinia, of Modena, of my work with the trade unions and a host of younger colleagues. But at length I decided that at my age - and in times when the relation between public and private is at last becoming less rigid, more nuanced - I could afford to divest myself of the severely impersonal academic garb and take the liberty of assisting the reader to understand the where, how, when and why of each article. And while, in so doing, I realised that there were dangers in thus infringing the rules, it also provided some good opportunities for reflection and amusement.

The list of acknowledgements must of necessity be a very long one; for it involves retracing the path along which I have travelled in my studies of the industrial structures characterized by the presence of a multitude of small enterprises and, more generally speaking, of the factors determining this or that productive structure. Among the first on the list are certain of my pupils; and here of so many I can only mention Paola Mengoli, Margherita Russo, Giovanni Solinas, Paolo Bertossi, Mario Forni, Mario Pezzini, Enrico Giovannetti, Tamara Levi, Sergio Paba, Werter Malagoli, Saverio di Ciommo, Anselma Bacchelli. With them, through the nineteen-seventies, I came to understand that there can be no substitute for direct relation with the workers, technicians and entrepreneurs themselves; and, at the same time, how difficult it is to extract an overall pattern and a correct interpretation from the mass of data so collected. But I have learnt a great deal, too, from working with younger pupils: from Andrea Tosi,

Gianni Gualdi, Lorella Marchesini, Pietro Gennari and Roberto Righetti. Over the years my colleagues in Modena's Faculty of Economics have discussed with me - sometimes very animatedly - the lines along which the Faculty was developing; but I have also had the great benefit of discussing my own work with them. Among the closest of these colleagues let me name Nando Vianello, Andrea Ginzburg, Paolo Bosi and Salvatore Biasco. Again in the Faculty, Daniela Giacobazzi and Michele Lalla helped me to make friends with the computer. Massimo d'Alessandro and Gabriella Zangrandi cooperated in studying the construction sector, in order to verify several of the hypotheses set forth in these articles. For years now, Franco Carinci has been a coworker, and our discussions of the labour market are often only an excuse to pass on to more important themes. Vittorio Capecchi's studies on Emilia have sometimes clarified things that were still obscure to me and I value highly his ability to understand - and exploit - data that may appear obvious and of scant interest until they come under his scrutiny. With Charles Sabel and Danielle Mazzonis I have had innumerable discussions over these last ten years, to the point where I sometimes have difficulty in distinguishing their ideas from my own. Frank Wilkinson, Jill Rubery, Roger Tarling and Paola Villa have accompanied me through all my thinking about the segmentation of the labour market; and I fancy that Frank Wilkinson's notion of "productive system" was decisive in convincing me that the most important problem, today, is that of comparing the performance of industrial districts with that of the large enterprises. The notes to the present volume testify again and again to the decisive role played by Giacomo Becattini and the esteem in which I hold Arnaldo Bagnasco and Carlo Trigilia. More than anyone else, Gianetto Patacini and Lidia Goldoni have taught me, in their different roles and responsibilities, to appreciate the virtues that befit a militant in the Italian Communist Party.

Heartfelt thanks also go to the friends who allowed me to reprint the essays written jointly, and to their original publishers: De Donato, Modena Economica, Problemi della Transizione, Academic Press, Politica ed Economia, Croom Helm.

Paradoxical as it may appear, the essays were selected and gathered together not by me but by Margherita Russo and Mario Pezzini; to my longstanding affection for them must be added my sincerest thanks. With them, and with Cristina Mar-

cuzzo, I have discussed, one by one, the introductions to the essays.

Gratitude goes to Patrizia Gozzi who has been ever ready to turn my notes into orderly transcript.

And lastly I cannot omit Francesco Cavazzuti and Angela Remaggi, who enabled me to write the commentaries to these essays while overlooking a splendid sea-

scape framed in pines, eucalyptus, cypress, oleander, myrtle and lentiscus.

Isola del Giglio, Le Caldane, August 1988.

Chronology of the essays collected in this volume

1973

Prime note per uno studio del lavoro a domicilio in Italia, <<Inchiesta>>, anno III, n. 10, pp. 33-49.

1975

Organizzazione del lavoro e decentramento produttivo nel settore metalmeccanico, in FLM di Bergamo (ed.), Sindacato e piccola impresa: Strategia del capitale e azione sindacale nel decentramento produttivo, Bari, De Donato, pp. 7-67 and 203-233.

1979

a. Sebastiano Brusco, Enrico Giovannetti, Werter Malagoli), La relazione tra dimensione e saggio di sviluppo nelle imprese industriali: una ricerca empirica, Studi e ricerche dell'Istituto economico, n. 5, Modena.

b. Decentramento, costi di produzione e condizione operaia nel settore della maglieria, intervento al convegno "La maglieria del futuro del tessile abbigliamento" (Modena, 18 aprile 1979), published in <<Modena economica>>, n. 4 and 5, pp. 58-60.

1980

Il modello Emilia: disintegrazione produttiva ed integrazione sociale, <<Problemi della transizione>>, n. 5, pp. 86-105.

1981

Sebastiano Brusco, Charles Sabel, "Artisan production and economic growth", in F. Wilkinson (ed.) The Dynamics of Labour Market Segmentation, London, Academic Press, pp. 99-113.

1983

Adriano Baldassarre, Sebastiano Brusco, Struttura e sviluppo di un distretto industriale: La meccanica agricola a Reggio Emilia, Centro Servizi PMI, Reggio Emilia, 98 pagine.

1984

Quale politica industriale per i distretti industriali?, <<Politica ed Economia>>, anno XV, n. 6, pp. 68-72.

1985

Sebastiano Brusco, Ezio Righi, Enti locali, politica per l'industria e consenso sociale. Oecd/Italy Seminar Opportunities for urban economic development, Venezia 25-27 giugno, 47 pagine.

1986

Small firms and industrial district: the experience of Italy, in D. Keeble and E. Wever (ed.), New firms and regional development, London, Croom Helm, pp. 184-202

1.

The Economics Faculty of Modena University opened in 1968. Like many important initiatives in Emilia, it grew out of a compromise between the Communist Party, represented first and foremost by Modena's mayor, Rubes Triva, and the Christian Democratic Party, which Dario Mengozzi represented as president of the Chamber of Commerce. All were concerned that Modena should have a school to train cadres for industry. But it was owing to the Communist Party that the Faculty was an "untypical" one - if not in the statute by which it was established, at least in the criteria by which it was run. The implication here was that, alongside the usual business courses, a course in Political Economy should also be offered. By way of guaranteeing this agreement, the Ministry included Siro Lombardini and Pierangelo Garegnani in the technical committee. And it was thus that two years later, Nando Vianello, Andrea Ginzburg, Michele Salvati, Salvatore Biasco, Massimo Pivetti and the writer of these pages found themselves together in Modena. All of us had been pupils of Sylos Labini or Garegnani, and nearly all had spent at least a year together at Cambridge in the late 'sixties. Indeed, of that group who at Cambridge had followed together the lessons of Kahn, Kaldor and Jean Robinson, and had a thorough knowledge of the classical economist, Sraffa, and the polemic against the marginalists, only Marcello de Cecco - who declined our invitation - and Mario Nuti were missing. Gastone Cottino, who represented the jurists on the technical committee - added Francesco Cavazzuti and Renzo Costi to the group. Very soon, about 1969, Giorgio Mori was appointed to the Chair of Economic History. And some years later there arrived Marco Lippi, from Rome, and Paolo Bosi, transferred from Bologna.

The town viewed this group of teachers as directly emanating from the Communist Party. The Resto del Carlino newspaper talked obsessively of the "faculty of reds" and saw us all as manipulated from Via Ganaceto, where the secretariat of the local party branch was then situated. But as a matter of fact, our relations with the party were fraught, at times frankly awful.

What the Communist Party expected of us was, I think, somewhat contradictory: we were to represent a centre for Marxist studies taking an active part in the discussions then going on at national level, and at the same time we were to produce

applied analyses that would enable the quality and incisiveness of the local government to be improved.

And we did indeed play our part in the debate on Marx, Sraffa, the theory of value: aside from more extensive writings, witness also a discussion conducted in the weekly *Rinascita*, the contributions to which were afterwards collected in a small volume. The response to the second expectation, however, was not half so encouraging. For the group's main interest was directed, rather, towards a dialogue with the unions, discussion of the relation between wage levels and growth or between wage levels and the export of capital. In the early seventies, on behalf of the unions we conducted several courses in all the towns up and down Italy. In 1973, we taught a Short Course in Political Economy for "those whose political commitment requires a moment of reflection on the present economic situation in Italy". This six-day course was followed by 400 young people from all over Italy; the teachers, apart from ourselves, were Giovanni Mottura, Paolo Santi and Vittorio Foa. The newspapers even began to speak of the "Modena School".

All this activity was not welcomed by the Communist Party. Nor was our independent behaviour in the matter of appointments and invitations to posts, in which the party would have liked to exercise some influence.

In the years that followed the rules of the game were clarified and relations with the local government thawed; the political climate changed, and the less we had of a common aim to pursue, so our group began to split up and subsequently its members began to move to larger or more central universities.

But at the earlier time I have mentioned, working relations with the Municipality, the Province and the Region, were almost non-existent. And so when I was asked to take part in a conference on home-working by the regional authority of Emilia, this at least represented, so to speak, the opening of a credit, for myself and the Faculty, which had up till then been denied us.

The conference had a precise aim. Parliament was just then debating the new bill on home-working intended to replace the law of 1958. Osanna Menabue, who was at the time commissioner of the regional government, claimed that the regional governments should have a share in establishing the new norms, and intended pro-

posing to the unions, the employers' associations and all the social groups involved the line of action the region of Emilia should follow.

There was much concern in Emilia about the problems connected with home-working. Our region had seen much activity on the part of the first organizations of home workers, and all students of the subject made ample reference to the enquiries into home-working carried out by the municipality of Nonantola and the "Madonnina" district of Modena.

There was no doubt that these workers were underpaid and often worked in appalling conditions. For example, certain devices were in use by which the loom was enabled to go on working even at night and a bell would ring an alarm each time the yarn became tangled or broke. And that such things were current then is all the more credible when one learns that even now, in Naples, young workers in slum districts are often affected with serious neuritis from using poisonous glue stuffs.

Yet, though the government was aware that the existing law needed changing, they hesitated to take a firm line. In the Christian Democrat camp, home working was often justified as enabling the mother to look after her children better; and did not home working exalt the family as a nucleus of production, of consumption, reproduction, education, everything? In sum, it was argued that while working conditions should be brought under control, home working must not be penalized with excessively cramping regulations but, rather, people should be left at liberty to choose the working relation they preferred. A "supply side" position, therefore, with no compromise. Which was, of course, very welcome not only to theorists of the role of the family but also to the entrepreneurs.

At that time the logic of these arguments escaped me. My reaction was one of indignation: I was convinced that the arguments could only be founded on bad faith and bad conscience. Only little by little did I come to understand what for years had led me to think that the worker's expectations and desires counted for

nothing in the labour market. The basic underlying idea was that it would never occur to anyone to turn down a regular factory job with no time limit. And what convinced me of this was, of course, the period of my youth in Sardinia.

It took me several years to see that the demand for work played a role not half so all-embracing and exclusive as I had thought. And in this connexion let me mention a highly instructive conference Luigi Trey and I held at Mestre, where we were invited to discuss part-time working - together with a secretary of the UDI (Unione Donne Italiane), maybe Margherita Repetto - by a group of delegates of FULTA (Federation of Textile and Garment Workers). The three of us - the experts - argued that part-time work ran counter to union practice and allowed for greater exploitation. The others - the women factory shop stewards - argued that at certain periods in their lives full-time working would be impossible and there would be nothing for it but to leave their jobs. Part-time, on the contrary, would enable them to preserve their relations with the unions, with jobs and work mates. Both Trey and I conceded nothing to their argument. But this episode, more than any amount of discussions held with fellow economists, led me to reflect on the fact that in situations of full employment things might turn out different from the way they did in my native Sardinia.

Anyway, at that meeting I spoke my strictly "demand side" piece. My friend and colleague at Modena, Leonardo Tomasetta, was preoccupied with understanding the historical logic of home working and described a progressive transfer of power from industrial capital to financial capital. I took part with great interest in the meetings aimed at getting information, organized by the regional officers, and I conducted several interviews myself, with the help of my friends in the unions in Modena. And thus it was, at that time, that I began to discover, and to write, that the production apparatus is much more dishomogeneous than it appears and that sophisticated technology can even be used in the kitchen.

NOTES FOR A STUDY OF HOME WORK IN ITALY*

I. The characteristics and diffusion of home work

The characteristics of home work

It is extremely hard to single out with precision the characteristics of home work; perhaps it is even impossible, if we take as our point of reference the norms of legislation currently in force in Italy.

To begin with, it will be appropriate to describe "home working" with reference to the meaning attaching to this term as used in the regions where the phenomenon is most widespread (Lombardy, Emilia, the Veneto, etc.). On this basis we can define the home worker as a person who:

- a) on commission from the producer of a good, produces a component (e.g. the ironing or the plastic packaging of the finished sweater); the commission is often entrusted to the home worker by an intermediary of the producer. This intermediary is normally referred to by the name of "gruppista", since he controls a "group" of home workers;
- b) the home worker does the job he has been entrusted with on his own premises and using machines of his own, or more precisely, in his possession;
- c) he is paid at simple piece rates, i.e. he receives a certain payment, established with each job, for each component produced or for each operation performed.*

After stating the constant features of what is commonly denominated "home work", it will be as well to list those other features which - although not invariably present - are very often found in this type of work contract.

- a) Almost always the home worker is a woman - only occasionally a man.
- b) As a rule, the home worker does not employ wage-earning assistants; instead, other members of the family collaborate, at least part of the time.
- c) The home worker often works in premises where daily family life goes on; the kitchen is the most frequently used place. However, the work is not seldom done in premises specially fitted out as a workroom.
- d) The value of the machinery employed by the home worker generally lies in the range between Lit 300,000 and 3,000,000. But there are cases where the working implements are of negligible value (e.g. brushes for the decoration of so-called "artistic ceramics") or run to a value of around 15-20 million Lire (e.g. "circular" looms).
- e) The home worker does not always work for the same producer. Indeed, a home worker may often receive commissions from two, three or four "gruppisti". A "gruppista", on his part, may work for more than one producer.
- f) The overall earnings of a home worker range around Lit 60,000 per month for eight hours of work per day. Sometimes the monthly earnings may reach much higher figures. Such cases almost always involve workers who use exceptionally complex or expensive machines. Or the wages may actually represent the earnings of all those components of the family who, by taking turns at the work, keep the machines busy for 16 or even 24 hours per day.

The diffusion of home work

As is often the case with important phenomena in the structure of the Italian economy, ISTAT (the Italian Institute of Statistics) provides no reliable data on the diffusion of home work, since it greatly underestimates the phenomenon. L. Bergonzini gives a very convincing proof of this in the article already cited and reproduced in this number of Inchiesta. In the four municipalities studied, ISTAT's data show a number of home workers between 22%

and 32% of those actually operating.

Even less reliable are the data of the "provincial registers", on which, according to law no. 264 of March 13 1958, all homeworkers should be enrolled. The fact that throughout Italy, at December 31 1969, less than 60,000 were enrolled testifies, not to the scarcity of home work, but rather to the utter ineffectiveness of a law that is supposed to regulate this kind of work relationship.

L. Frey has attempted to make an indirect estimate, essentially based on the variations in the female population engaged in agricultural labour. According to this, home workers in Italy range from a minimum of 1,015,000 to a maximum of 1,505,000. This evaluation, as can be seen, leaves a very wide margin of uncertainty, but it would seem to be relatively reliable. According to S. Garavini, who concurs with these figures, homeworkers number about 1,000,000.

Lastly, it would appear that an estimate of home workers, broken down by job and sector, has since 1969 been made by the provincial labour inspectorates. It is not known whether these evaluations are based on direct investigations carried out on a sample of firms or on personal estimates made by functionaries of the labour inspectorate. Certain it is, however, that they are kept secret - however absurd this may seem.

Still, these assessments probably lie at the origin of the evaluations published by Lotta Continua, April 28, 1973, and reproduced in the table below.

Home workers	Sector	Region or Area
480.000	Knitwear	Carpi, Modena, Siena, Emilia, Veneto, Marche and Puglia
150.000	Textiles	Districts of Biella and Prato
150.000	Footwear	Brenta district (provinces of Padoua and Venice), Vigevano and Castelfranco di Pisa
155.000	Toys	Liguria, Florence, Como
100.000	Car accessories	Piedmont, Lombardy
90.000	Mass-produced clothing	Tuscany, Emilia, Lombardy, Puglia and Lazio
80.000	Leather goods	Milan (Porta Ticinese), Modena, Veneto, Tuscany and Lazio
68.000	Gloves	Naples, Caserta
30.000	Aesthetic products (wigs, artificial eyelashes)	Sicily, Calabria
40.000	Plastics	Milan, Turin, Florence
25.000	Ceramics	Veneto, Umbria, Abruzzo, Sicily
20.000	Electrical engineering	Provinces of Milan and Brescia
15.000	Bicycles and mopeds	Milan, Como, Marche
15.000	Glassware	Tuscany
12.000	Straw-plaiting	Tuscany
170.000	Various (furnishings, plumbers' fittings, weapons, cutlery, radiograms, TV sets)	Veneto, Lombardy, Lazio and elsewhere
1.600.000	(equal to about one tenth of the working population)	

To conclude: trade unionists, militants and academics engaged in the closest study of the matter agree that homeworkers in Italy presently range between over one million and under two million, though the elements necessary

for a preciser estimate are lacking. For this we must wait until data are collected over the whole of Italy and in accordance with a methodology that can be checked. For the time being, as far as we know, a census of home workers is under way in Tuscany alone, under the auspices of the Regional authority, based on a sample prepared by Bruno Chiandotto.

II. Production relationships in sectors where home work is widespread and the reasons for decentralizing production outside the factories

Study of the productive role of homework requires analysis of production relationships throughout the sector in which home work is widespread

The production relationships that link the home worker to the firms producing components and finished goods, and also link these firms with consumers, are more complex than they are often made out to be. Drastic simplification may serve to identify certain important connexions but risks blurring some contradictions which are of great political importance.

However difficult it may be, it is necessary to investigate how these production relationships are articulated if, instead of confining oneself to merely describing working conditions, one seeks to clarify the role assumed by the home worker in the Italian system of production. To put it more simply and more brutally: study of the entire sector where home working is present is necessary in order to identify which are the elements availing themselves of the low wages, bad working conditions and lack of welfare benefits from which, as we shall presently see in detail, home workers suffer.

Before going on to analyze the real production relationships in each class of activity, a series of different answers - by way of working hypotheses derived from a first look at these sectors - can be offered to the question: "whom does it benefit?"

a) First hypothesis

In the sector there are only three groups of people: large firms, intermediaries and homeworkers.

There are no small firms. The intermediaries perform no immediately productive activity and have the mere function of purchasing from the home workers, on behalf of the large firms, an amount of the labour force necessary for the production process.

b) Second hypothesis

In the sector there are large and small firms, intermediaries and home workers. Firms, both large and small, produce the finished product. The small firms, like the large ones, make ample use of home work. But they operate only on commission from the large firms and themselves have no access to the market. Their autonomy is thus only fictitious.

c) Third hypothesis

This is a variation of the second hypothesis: the large firms are the only ones having access to the market and the tendency is for them to perform no further productive activity in the true sense of the term.

Their activity is solely a financial one: commissioning products from the small firms and artisans, and selling to retailers (sometimes these large firms may actually coincide with the large firms that dominate the distribution sector).

d) Fourth hypothesis

There are large and small firms, intermediaries and home workers. The small firms are divided into two categories: the "subordinate" ones who work for the large firms in a relationship of the type described in (b) and (c), and the "autonomous" ones which have direct access to at least a section of the market.

The "gruppisti" distribute work to the home workers on behalf of the large firms, the "subordinate" small firms and the "autonomous" small firms.

Note that in the first three hypotheses homework, in the last analysis, is entirely dependent on the large monopolistic firms, who exploit it either

directly or through the "gruppisti" or through the intermediation of the small firms.

In the last hypothesis, on the contrary, home work depends on the large firms only in part, the remainder being utilized by the small firms.

Hypothesis (c) is shared by, among others, Tomasetta, who supports it with a lucid argument in the work already referred to. The present article argues in favour of hypothesis (d). All four hypotheses - though with a clear preference for (a) and (b) - emerge from time to time from the ongoing discussion in the PCI and the unions. Naturally, none of these hypotheses can be preferred in the abstract. One must refer, instead, to the concrete reality and study in detail how it is articulated.

In order to reach conclusions on the role of home work which can be verified by what actually happens, it will therefore be necessary to study sector by sector: and first of all, in view of their importance in terms of work force hired at home, the textile, garment, knitwear and footwear sectors. Only this type of analysis will enable evaluation of the relative importance of each of the groups of operators mentioned above: large firms, small "autonomous" firms, small "subordinate" firms, intermediaries. The ultimate aim, though highly problematic, is to ascertain the turn-over for each group and the quantity of work force employed at home and in the factory. This would enable us to identify with precision the opposing sides in the political struggle to do away with home working, and what power they have.

The present article - which, as we said, argues in favour of hypothesis (d) - does not provide this quantitative analysis: moreover, our investigations have been carried out largely in the fields of knitwear and leather goods, although some attempt has been made to extend them to at least the most important sectors in which home working features widely. Thus the article can offer no more than the first findings of an ongoing research.

Production relations between consumer, large firms, small "autonomous" firms, small "subordinate" firms, "gruppisti" and home workers

In what follows reference will be made, as noted, above all to the knitwear and leather goods sectors. Yet the arguments would appear to be applicable also to other sectors where home working is widespread.

The establishment of product models, from one season to another, is the result of a complex interweaving of proposals, suggestions, decisions. The great national and international fashion houses, while accounting for only a very small share of the total turnover, are responsible for giving an overall orientation to production. This function is performed by fashion shows in Paris or Florence which are organized well in advance of the season.

Following the launching of the new fashion, the "autonomous" firms in the sector - i.e. those having direct relations with the retailers - work on these suggestions through an infinite series of variations and make up their sample catalogues. The retailers - especially important among them the "buyers" of the large stores - choose certain models from the wide range offered and place their orders. Production is then begun, so that, at the outset of the season, stocks of almost all the goods to be sold over the following three months are ready. Some models will lag behind in selling; others, for which there has been more demand, will be put into second production during the season itself, made up with frenetic haste and immediately placed on the market.

The way in which "autonomous" firms organize production is fairly complex and does not alter according to their size. Whether large or small - and our general impression is that, judged by volume of turnover, the small firms predominate over the large - "autonomous" firms carry out certain processes on their premises and commission the remainder outside. Sometimes the subdivision of the work between internal and external is organized on horizontal lines (certain stages inside the factory, others outside), sometimes on vertical lines (a portion of the entire process is commissioned outside the factory, the remainder being performed inside the factory). The first of these patterns is

probably the commoner of the two.

Outside work is normally commissioned from artisans - or at any rate to smaller firms. Note that the artisan usually receives commissions from more than one source, while the industrialist commissions components from more than one artisan.

The artisan, in turn, performs certain processes and subcommissions the remainder to "gruppisti", the large majority of whom are enrolled on the register of artisans even though they may themselves not pursue any productive activity in the strict sense.

The relation between artisan and "gruppista" has the feature of continuity. Despite which, even in cases where a single "gruppista" would suffice, the artisan often has recourse to more than one; and vice versa, a "gruppista" will often use more than one artisan. Lastly, the "gruppisti" share out work among the home workers.

Going from house to house, they explain the technical requirements of the work to be done, deliver the raw materials, establish the deadlines, fix the piece rates, and return at the agreed times to collect the components and pay the home workers, after checking that the work has been properly carried out. The relation between "gruppista" and home worker has the same features as that between "gruppista" and artisan producer: the "gruppista" is under no obligation to provide the home worker with sufficient work to keep her occupied all the year round; the home worker, on her part, can accept commissions from more than one "gruppista".

This scheme, as here described, represents one of the highest levels of complexity in the sector. It is by no means rare, indeed, for "autonomous" firms - above all small ones - to commission directly from home workers. Nor are hybrid figures infrequently found: common, for example, is the "gruppista" who - alongside his main activity - operates as an "autonomous" firm, i.e. producing his own models (partly in his own small factory, partly using home workers).

Four basic reasons for home working: low economies of scale, low cost and high flexibility of labour, very low investment per worker

The organization of labour we have just described is characterized by a decentralizing of the work force outside of industrial premises. Four basic reasons lie behind this:

- a) In home working economies of scale are either non-existent or of very small entity (i.e. the average cost of the product does not fall as the volume of production increases);
- b) home working costs much less than factory labour;
- c) home working involves very low investments and reduces risks;
- d) decentralization of production outside the factory enables very high flexibility in the use of the work force. These four points will be examined in detail in the paragraphs that follow.

The characteristics of the stages of production commissioned in home working. The machinery employed: the small importance of economies of scale in these stages of production

The textile industries, and especially knitwear and hosiery, the garment industry, the footwear industry, and lastly the leather goods industry, belong among those sectors where home working plays its most important role.

Within these industries, almost all the production stages in which the "series" of articles required is relatively small are handed over to home workers. For instance, in the knitwear and hosiery sector home working deals with a large part of the operations necessary in the production of "outer" knitwear, since this is produced in fairly small runs, owing to the pressures of changing fashions or the need to differentiate one's product from that of

competitors. The majority of underwear, on the contrary, is much more homogeneous and is made in the factory.

Similar examples are not hard to find in other sections. In the garment industry the materials are almost always cut in the factory but sewn at home. So, too, in footwear, where the leathers are cut in the factory while the shoes are made up by home workers on commission. And, lastly, the leather goods sector, where the tanning and working of the leathers is carried out on industrial premises, but the making up into handbags, etc. is done outside the factory. Closely connected with the small-run production is the fact that the operations commissioned from home workers are performed with relatively simple, relatively cheap machinery: knitting machines cost less than Lit. 3 million; to make up garments requires sewing machines not very different from those normally used for domestic purposes; machines for cutting, sewing and assembling footwear and leather articles seldom cost more than Lit. 1 million.

It is most important to note that these machines - fairly simple and cheap, as we said - are often identical with those used to perform the same operations in the factory, including the most technologically sophisticated machines. This holds true, for instance, for the electronically controlled knitting machines widely employed by home knitters; as also for the sewing machines used to make garments and the presses for the preparation of leather articles. This striking affinity between the machines used outside the factory and those used inside should not, however, lead one to conclude that machinists capable of stepping up the productivity of labour in the above-mentioned operations do not exist or are very costly.

In the knitwear sector, for example, such machines are already available, and are very similar to those employed for the production of underwear and hosiery. Indeed, it is worth focusing attention on a typical and well known case in the sector which takes on the value of a paradigm: namely, the knitting machine capable of "fare il puntino", i.e. to collect together the individual stitches of the body of a sweater and knit the neck. A machine of this kind costs 20 or 30 times more than the ordinary electronically controlled machine normally used, but can increase productivity tenfold. If the norms regarding the wage rates laid down in the national contract for textile workers were respected for home workers as well, this machine would be commonly used in the large firms in the sector for the production of traditional knitwear which, given the stability of the market, is based on very long runs.

Continuing the hypothesis, however, this machine would not be used for producing all the "outer" knitwear that is subject to changes in fashion from one season to another. A machine capable of using only two or three types of yarn and enabling only slight variations in the model is ill suited to production of this kind, where short runs predominate and the market imposes frequent changes of model. To put it more clearly, in production aimed at the non-traditional market, this machine could yield very high profits when the prevailing fashion is for sweaters - or T shirts - of the type the machine is able to produce; whereas it would be literally useless, and so idle, throughout seasons in which consumers request other kinds of sweaters.

Cost of home work is only about 25%-40% of cost of factory labour

To attempt a comparison between the cost of factory labour and that of home work, we shall refer to two real cases, chosen, as being especially representative, from the large number investigated in the province of Modena. This will give some idea of how difficult it is to make a calculation; and it will be seen, above all, how home working affects the pattern of family life.

Patrizia F., age 40, from Carpi, lives with husband, two children, a daughter, age 12, a son, age 6. Her father, retired, and mother also live with them. The husband works in an engineering factory and takes no part in the home work.

Up to August 1972, Patrizia F. was employed in a knitwear factory as a skilled worker. Since then she has been working at home, directly employed by

the same firm which, this year, employs 40 women on its premises and about 40 home workers.

In the period when work is available - for example, from October to March, though not April - she works about 27 days per month, resting more often than not on Mondays rather than Sundays, after delivering the results of the week's work to the firm. Every day she works from 6.30 to 12.00 p.m., when there is the midday meal to prepare, then from 2.30 to 7.00, when her husband comes home from work, and after supper from 9.00 till 10.30 p.m., when she has to stop because the noise would disturb the other inmates of the block.

Her mother helps her: in the morning only from 10 to 11, since she has to do the shopping and the housework; but in the afternoon from 2.30 to 7.00 p.m.

Generally speaking, Patrizia performs the more difficult operations, her mother the easier ones.

All told, the working time adds up to 17 hours per day, a total of about 450 hours per month. The pay is on piece rate (from 60 to 100 lire per telo tagliato) and ranges round Lit. 250,000 per month. This works out at about Lit. 550 for each hour worked.

The second case is that of Francesco M., age 35. He grew up in Campania where he was a tailor's apprentice, moving to Nonantola 9 years ago with his widowed mother. He and his mother employ a flat-bed loom to make teli di maglia. According to the national contract, the work is classified as skilled. From October to February, together with his mother he worked 480 hours per month, for an average rate of Lit.150,000, equivalent to Lit.312 per hour. However, since he receives commissions from a "gruppista", his work probably costs the entrepreneur about Lit. 180,000, equivalent to Lit. 375 per hour.

If Patrizia F. and her mother worked in a factory, one hour of their labour would cost the employer much more. The sum can be precisely calculated if we assume that, out of the 450 hours of work per month, 250 were paid as for a female worker of group 2 (skilled) and the other 200 as for an unskilled female worker, thus:

250 hours x 478.50 L. basic pay for group 2 workers	= L.	119.625
200 hours x 457,95 L. basic pay for group 3 workers	= L.	95.700
450 hours x 111,37 L. escalator clause benefit at February 1 1973	= L.	55.685
450 hours x 110 L. productivity bonus contracted at municipality level	= L.	49.500
450 hours x 3.75 L. meal benefits	= L.	1.690
	Totale	= L. 322.200

For Francesco M. and his mother, the corresponding figure, calculated on the same parameters, works out at Lit. 327.875.

According to the National Collective Work Contract for workers in companies making knitwear and hosiery, 1970, these figures should be increased by 10% for "no piecework bonus" (this, like the meal benefits in the calculation above, is a bonus contracted at company level; even the name of the bonus may have only local currency), by 22% for "benefits including Christmas bonus, annual holiday and national and weekday holidays", and by 4% for "seniority benefits in case of dismissal or resignation". This 36% increase would take the above figures to about Lire 439.000, representing the gross wage earned for the above total of hours worked by Patrizia F. and her mother, if they were employed in the factory; and Lit. 445.900 for Francesco M. and his mother in the same conditions.

In this way we can draw a first conclusion: assuming these cases to be representative and leaving aside the unpaid welfare and pension benefits, home workers earn a wage ranging from 33% to slightly over 54% of what they would

earn if they did the same work in a factory.

There are various reasons why home workers have such difficulty in reacting against such serious discrimination, and, indeed, are sometimes unaware of the level of exploitation to which they are subjected. First and foremost, the difficulty of working out a line of political action and the problem of organization, of which more will be said later on.

Other factors also play an important role. Francesco M. simply has no alternative but to work as he does. After being made redundant from a firm undergoing restructuring, home working offered him the only chance of making a living.

The case of Patrizia F. is somewhat different. In a factory, she and her mother would work much shorter hours but would earn appreciably less than Lit. 250.000 per month. Her relatively high monthly earning effectively prevents her from realising that the amount of labour she daily sells to the entrepreneur is a very high one indeed. Moreover, what we said of Francesco M. also applies to Patrizia F., at least in part: namely, that under the conditions laid down in the national contract, there would be no demand for the six and a half hours of work contributed by her mother.

To complete the comparison between the cost of labour inside the factory and that of home work, we must note that what the entrepreneur saves is much more than the earnings lost by the worker. For the firm, the cost of labour is much greater than the gross wage. On the employer's side, the figure must be increased as follows:

- a) by at least 5% to make allowance for possible absences from work (bearing in mind that, in the event of illness or accident, over and above the sick benefit recognised by INAM, the national contract for knitwear workers allows for welfare benefits varying from 30% to 100%, and assuming a 10% absence rate, this percentage roughly represents the cost of absence from work borne by the employer);
- b) by 51.25% to allow for contributions to INAM, INPS, INAIL, GESCAL, wage integration fund, etc.) which the employer has to pay to the various welfare and pension authorities.

We now have available all the data necessary for comparing the cost of labour in the factory with that of home work. In order for the work to be done in the factory, the employer, instead of paying Lit. 250,000 to Patrizia F. and Lit. 180,000 to Francesco M.'s "gruppista", would have to spend respectively

Lit. 439,000 x 1.56 = 684.840

and

Lit. 445,900 x 1.56 = 695.600

In conclusion: home work costs the employer roughly between 25% and 40% of the cost of labour in the factory.

The fact that home workers work on their own premises using their own machinery, enables the employer to save up to at least Lit. 40-50 per hour worked

Replacing work inside the factory with home work offers the employer a further advantage: it enables the firm commissioning home work to cut out a goodly part of the investment that would be necessary in order for production to be performed inside the factory. As we said above, exploiting the labour of home workers involves no investment either in building premises or buying plant.

If in these sectors with widespread home working the conditions guaranteeing free competition were maintained, the reduction in the outlay necessary to acquire fixed capital would be offset by an increase in the amount of circulating capital required by the firm. To put it another way, the wages of home workers would have to be higher than those of workers performing the same tasks in the factory: the gross profit on the investments made by home

workers in premises and plant would thus be represented by this further difference in their favour. But since, as we have seen, home working costs much less than factory labour, the reduction in fixed capital is not offset by any increase in the amount of the circulating capital required to run the production process, and the fact that the machines are owned by the home worker represents a net saving for the employer.

Even allowing for very rough approximation, we can attempt to calculate the wage difference that would have to be paid to home workers to compensate them for the investments they make, in effect, on behalf of their employers. The calculation is not without importance, since, following the analysis of the cost of labour in the previous section, it enables us to evaluate the amount of extra saving that the employer makes by decentralization. To this end, reference is made to a contract, stipulated at Carpi in 1961, between the entrepreneurs in the garment sector and the trade unions; in the contract, the wage difference in favour of the home workers is calculated at around 25 or 35 lire per hour worked, according to the type of home work done. Allowing for the 60% rise between 1961 and 1973 in the index of prices of "plant, machinery and implements", these figures can be updated respectively to 40 and 56 lire per hour worked.

It would be natural to assume that the result of this bargaining between unions and entrepreneurs association represented nothing more than an evaluation of the respective strengths of the two sides: in which case the figures quoted would be meaningless. And to some extent this is the case. But it can be argued that there are reasons for thinking that these figures undervalue the burdens borne by home workers when they themselves make the investments necessary for the production process.

In particular, we may recall that:

- a) in 1961 the unions were not in a very strong position;
- b) in taking the initiative for a contract to regulate this matter, the trade union branch in Carpi (camera del lavoro) was relatively isolated, and this is shown by the fact that the municipality of Carpi was one of the very few in which a contract was signed;
- c) the norms laid down in the contract were never applied.

In conclusion, it seems possible to say that, at least as regards the knitwear sector, the use of home working, over and above what was said in the previous section, enables the employer to realise an additional saving equal to at least 40-56 lire per hour of labour.

Home working offers no job stability and involves no control over working timetable. This makes the work force easier to manipulate, a highly important feature in certain sectors

Reducing dismissals, by the principle of the "just cause"; fixing the working timetable and limiting the number of hours of overtime; controlling the application of shifts; appreciably increasing wages for overtime, night work, and work on Sundays and holidays; obtaining leave of absence for trade union activity; regulating discontinuous work, regulating the duration and periods of holidays; obtaining honeymoon leave and the preservation of one's job during military service: with the attainment of all these goals, through very hard struggles, the labour movement has managed to guarantee job stability to the individual worker and to restrict the power of the employer to do just as he pleases with the work force he employs.

Looked at from the employers' point of view, these achievements of the labour movement appear as an expensive series of constraints that reduce what is customarily referred to as the flexibility of the work force. Nor are these the only regulations that stand in the way of a free exploitation of the work force. Suffice it to recall the resistance that the workers of a factory can put up, over and above the norms provided by contract, against an eventual process of restructuring or against a simple innovation involving a reduction in manpower. The entrepreneur can get round all these "impasses" by

decentralizing his production outside the factory through the use of home workers. And home workers are not covered by any regulations: their work can be suspended in the idle periods between one season and another or when the volume of turnover drops; on the contrary, when necessity drives - for instance, when during the season a model that has already sold out must be produced quickly - the home workers can be compelled to deliver in very short times involving amounts of overtime and holiday work that would be unthinkable in a factory context. Nor can the home worker object to this: owing to the kind of relationship, on a personal basis, that links him with the "gruppista" or the employer, he is subject to pressure and blackmail that could never occur in a factory situation.

This malleability of the work force is especially important in the sectors of knitwear, garments, hosiery and leather goods. In these sectors, as we have seen, the volume of turnover of a firm depends on what success the sample range, prepared by the firm itself, has found among retailers. Since it is highly unlikely for a firm to make up a sample range that exactly meets with their requirements season after season, it follows that the volume of goods produced by each firm will, over a certain period of time, undergo much greater variation than is usually the case in other sectors.

To put it another way, when it is a question of fulfilling orders, it is not uncommon for a small firm employing a score or so of workers on its premises, to commission work from 40 home workers in one season and from 120 in the following season. And in these sectors above mentioned, it is the very presence of such wide variations in turnover that confers especial importance on the flexibility of manpower offered by home working. In a structure based on work in the factory, considerable variations in the volume of production could only be dealt with by frequent dismissals and rapid hiring of employees. This solution would be, on the one hand, extremely painful, on the other very difficult to operate; but, in any case, always less manageable than the one offered by a complex and decentralized structure like that substantially based on home working.

With this system, in fact, shifting the product from one firm to another merely means that, in the complex web of commissions we have described, the flow of orders reaching artisans, "gruppisti" and, lastly, home workers, originates from one firm rather than another. When a firm increases its production, it will simply step up the volume of orders from the artisans or "gruppisti" with whom it is already working, or has worked in the past on similar occasions; and it will thus fill the area left empty by firms that have had to reduce their production schedules owing to lack of orders.

All this, at least initially, can occur without any repercussions on the distribution of the work force employed in the factory. Indeed, when a firm steps up its production in an emergency situation, it has no need to increase the number of workers employed in its factory, not even by the extra amount of manpower required, since all the stages of production can be commissioned from home workers.

As long as the overall volume of turnover remains constant - and over the last ten years the turnover has actually shown a regular increase - the very high flexibility in the use of the work force offered by this type of structure will guarantee constant levels of employment with no damage to anyone.

Though of less importance in this connexion, the other sectors, where turnover is not subject to such a wide variation, also enjoy the great advantage of the extra flexibility of home work.

Generally speaking, and to conclude, it may be said that the employers will tend to decentralize production whenever there are no economies of scale such as to offset the higher cost and lower flexibility of factory labour.

To explain the diffusion of home working in sectors that appear to be devoid of this feature, note that, taking the whole of a complex production process, it is possible to decentralize only certain stages of production necessary to the achievement of the finished product: i.e. only those in which large scale production does not substantially differ, at technological level, from production on smaller scales.

III. The role of the small "autonomous" firms, i.e. those with direct outlets on the market, in sectors with highly decentralized production

The reasons why small firms emerge and prosper in these sectors: low investment per employee, low level of risk, small starting capital, frequent relations with the sales market

One of the characteristics peculiar to all sectors where the production structure is based on home working is the important role played by medium-small firms and artisans.

This opinion is certainly supported by a distortion partly of judicial origin, partly of statistical: these sectors feature a large number of entrepreneurs who, in order to exploit the advantages the law offers to artisans, artificially split their firms into several smaller firms, using various legal devices. For instance, it often happens that an entrepreneur enrolls his own relatives on the register of artisans and then subdivides his employees among the fictitious artisan firms thus constituted. However, there can be no question but that - leaving aside legal fictions of this kind, which are anyway hard to quantify in statistical sampling - the firms in this sector are often very small. The few entrepreneurs having 200 workers in the factory and commissioning work outside through artisans to a thousand or so home workers are greatly outnumbered, as regards turnover, by the many small entrepreneurs who make up a small sample range (by themselves or with the help of family members) and commission a considerable part of their production to between twenty and a hundred or so home workers.

The small importance of economies of scale and the low cost of the machines used - as said above - by and large constitute the reasons that lie behind these structural features. It should be noted, however, that the dearth of economies of scale goes hand in hand with conditions that greatly facilitate entry into these sectors of production. Viz:

- a) The ratio of investments to employees, calculated over the whole work force hired is extremely low. Never high at the outset, for technological reasons it is further reduced by decentralizing certain production stages to home working, where no investment is required.
- b) The section is so constituted that entrepreneurs can operate with a very low margin of risk.

The small entrepreneur who manages to make up a sample range and obtain orders is in a position to predict his profit margin with relative certainty and is practically sure of realizing it, if able to manage his subcommissioning efficiently. A relatively short time elapses between the first estimates of what materials, or yarns, or leathers will be required, and the delivery of the products and receipt of payment: this rarely exceeds six months, at most eight months. In these conditions anyone able to give personal guarantees of capability and trustworthiness can get loans from credit institutions.

- c) For someone having a "first try", it is not necessary to have factory premises available, at least in the first period of the life of the firm: as we have seen, all stages of production can be commissioned from home workers, the "new" entrepreneur has no need to borrow the capital for building a factory, nor need he commit himself to a fixed outlay by hiring a certain number of workers.
- d) Access to the sales market - which for the entrepreneurs consists of the retailers - is not especially difficult. Indeed, it frequently happens that while the goods for the coming season are being produced, direct contact takes place between the retailers and those to whom the work has been subcontracted, i.e. the artisans and "gruppisti". After some years of such contact the latter will have acquired considerable knowledge of the market, and it is quite natural for them to seek to increase their margin of profit by making themselves independent of the entrepreneur and producing their

own range of samples.

In advance distribution of the models that will be in fashion and thus in assisting artisans to attempt their own entrepreneurial venture an important role is played by the market-fairs.

To conclude: the way in which these sectors are articulated - with their scant amount of economies of scale - guarantees survival conditions for the small and artisan firms; and not only that: the emergence and prosperity of these firms with few employees are stimulated by the highly particular way in which the sector functions.

The fractioning of the sector is - at least in part - a source of strength, but involves overexploiting workers, which can perhaps be eliminated

Small firms with direct outlets on the market are present in great number. As we said in the previous sections, this is a typical feature of these sectors based on home working. It is time to examine in detail certain implications of this massive presence.

To start with, there can be no doubt but that the presence of a relatively high number of entrepreneurs who are technically skilled and capable of producing good and quite cheap imitations of the models designed by the leading designers, represents a source of strength for the sector.

This large number of small entrepreneurs, strongly motivated towards profit making and by the desire to rise in the social scale, makes these sectors especially capable of seizing the opportunities offered by the international market and correctly interpreting the tastes and whims of consumers.

Splitting the production apparatus into a myriad small firms enables a fairly large number of people - i.e. all the small entrepreneurs - to assume personal risk and responsibility within the production process, and this to operate at maximum commitment and productivity.

To put it another way: if the structure of the sector centred round a large factory, all these small entrepreneurs would be employed as workers or intermediaries, carrying out the orders of others, and their capabilities would remain unexploited and unprofitable; whereas in this extremely fractioned structure they are in every way stimulated to interpret the needs of the market and satisfy them.

That same abundance of personal energies we have described - just because, of course, it is employed in the service of the firms in every possible direction - also manages to create levels of exploitation that would be hard to achieve in sectors with a different organization.

The means by which these small entrepreneurs exploit these capacities are several. Very often they keep wages and classifications low, demand a very large amount of overtime and shirk, at least in part, their obligations to pay social benefits, with the excuse that the needs of the firm are paramount and it is therefore in the interests of all those concerned in the production process to give them priority. Very often, too, the entrepreneur will act in such a way as to provoke discord between the workers: for example, by granting personal allowances individually contracted, by personal promises of promotion, or even by small loans that represent a real assistance to the employee who benefits from them but which subsequently turn out to be a means of blackmail. Of course there are exceptions and differences from one region to another, but these firms are wont to use all forms of pressure - partly of the paternalistic sort, but more often based simply on direct personal relations - that confuse the essential buying and selling relation of the labour force into one of partnership between equals.

By its very nature, the relation between "gruppisti" and home workers also enables very strong pressure to be put on the home workers. Most important is the weakness of the working relationship - based, as we said, on single commissions - which allows for ample possibilities of blackmail.

Both the home workers and the employees of these firms find it very hard

to withstand the pressure coming from the "grupppisti" and entrepreneurs respectively; very arduous, too, are wage claims and union disputes: that same fractioning that lends the sector its high flexibility and brings out considerable entrepreneurial abilities has, as its reverse side, the effect of destroying the solidarity of the workers to such an extent that even expert union activity finds it hard to restore compactness.

The importance of sectors with low industrial concentration and highly decentralized production in Italy. The characteristics of their products and their relations with large-scale oligopolistic industry

The following complex framework of:

- a) low importance of economies;
- b) decentralization of production outside the factories, even outside the small ones, and
- c) the very large number of small firms having direct relations with the market;

and as a result

- a) the considerable entrepreneurial abilities;
- b) great exploitation of labour, and
- c) striking flexibility of labour characterize wide sectors of Italian industry and are a distinguishing feature of industry in Emilia-Romagna.

To give a rough evaluation of this phenomenon, it is worth recalling that, according to estimates by the Confederation of Italian Industry, in 1972 about 42% of all Italy's exports came from medium-sized and small industries. Home working is not an essential datum in this type of organization. A similar function is often performed by small artisan workshops (this is the case, for example, with certain departments of the engineering industry).

These sub-industries are united by

- a) the type of product, and
- b) their relationship with the large industry operating in the sector to which the sub-industry belongs.

The production of these subsectors has unmistakable features, in some sense lying midway between industrial production and artisan production.

The consumer goods are always highly differentiated, often perishable - at least from the commercial point of view - in the majority of cases destined for a very complex market: the production of hosiery, footwear, leather goods, ranges from exclusive models for the boutiques - aimed at customers in the high and very high income brackets - to cheap models for sale in open-air markets. The same features are exhibited by pleasure boats, musical instruments, crockery, toys.

Less frequently this industry is involved solely with the section of the market aimed at the very high income bracket: suffice it to consider the GT cars and the artistically designed furniture and lighting fixtures that have enjoyed great international success despite their very high prices.

The "semi-artisan" features remain even when these subsectors of industry produce investment goods. Machine tools for working in wood and metal, machines based on hydraulic devices (for small earth-moving, fruit picking, elevators of various kinds, etc.), lorries with special features - all these are produced by artisans with very high technical skills, using several of the precision machines employed in big industry. Only one element of this latter is lacking: the organization of work based on the production line.

These subsectors enjoy a special relationship with big industry, in as much as they are integrated with it, are regarded with good-natured tolerance and are not subjected to fierce competition. Big industry is always present further back along the line, as supplier of raw materials - and thus able to exert, if not blackmail, at least a minimum of control; it is compelled to allow these areas to be occupied by smaller firms just because it is unable to exploit the areas for its own profit. From its own point of view, too much commitment would be necessary to project the myriad "one-off" products; it

would be impossible to gear the whole company to such an end in the long or even middle term. Besides, big industry has available a simpler solution, i.e. to open a "special department" for the production of these goods; for, if the small firms show that the area in which they operate is susceptible of exploitation with more nearly industrial systems, big industry will find it easy to re-establish its own supremacy in the sector by takeover bids or offers of participation.

The analysis hitherto conducted suggests certain considerations which must be spelt out.

- a) The firms in these subsectors, with the special features we have described, do not aim to become alternatives to, let alone adversaries of, the big industries that control the sectors they belong to. Essentially, the small firms manage to enjoy an autonomous role only in so far as they occupy areas that remain vacant among the vast areas of the market controlled by big industry.
- b) The attempt to associate these small industries in larger groups is very probably doomed to fail. Examined in the light of what has been said above, the perspective would be a highly contradictory one. If it is true that the small size of the firms is one of the sources of strength of the sector and that these firms take advantage of those areas that big industry is unable to exploit, it would be absurd to argue that economic units appreciably larger than those currently operating would be stronger. Any forms of association of small firms must therefore be used only to increase their bargaining power in dealing with suppliers of raw materials and credit institutes or to ensure easier contacts with purchasers.

One last remark in conclusion: these small firms, depending as they do on exports, have special features that make them extremely sensitive to the vicissitudes of international trade and less so to the recurrent crises of the Italian economy. For this very reason, over these last few years, and especially from 1969 to the time of writing, they have actually managed, at least partly, to keep Emilia-Romagna immune from the effects of the general stagnation of the Italian economy.

IV. Some proposals for eliminating the decentralization of production from factories to home working

A strategy for phasing-out the decentralization of production outside the factory. The probable consequences for the sectors of an increase in the cost of labour and a reduction in the flexibility of labour

The foregoing analysis has shown that home working is only one particular instance of the decentralization of production outside the large factory; since 1969 this has assumed more and more importance even in sectors, like the engineering industry, which would hardly appear to be in a position to modify their organization of production in this way.

It has also been shown that the spread of home working and of the decentralization of production in general represents, in all cases, a way of reducing the cost of labour: this, both by lowering direct and indirect wages, and by ignoring the norms laid down in union laws and in the national contracts regarding this sector.

It will therefore be necessary to tackle this whole series of phenomena if the working conditions of home workers and of a great part of the full-time workers in these firms are to be improved and they are guaranteed the application of the labour laws currently in force.

There can be no doubt but that the pursuit of this aim will require heavy commitments and this can only be achieved in the relatively long term. One possible strategy might involve bringing all the workers concerned back into the factory. A point in favour of such a strategy is the fact that, among all the lines of action proposed, a return to the factory would further reunification of the working class. This has recently been stimulated by events

in the unions, but is complicated by the relations of production and the labour relations we have described above.

If all "external" workers returned to the factory, this would have a series of consequences of which the most important can be described and evaluated as follows:

- a) An increase in wages and therefore, from the employers' point of view, an increase in the cost of labour. A regrouping within the factory of those workers who are at present scattered would inevitably lead to greater unionization and thence a rise in wages.
- b) Greater job stability and therefore, from the employers' point of view, a sharp fall in the flexibility of use of manpower. As we have described in detail, the decentralization of production outside the factory towards home working and artisan production "for third parties" enables a flexibility in the use of labour far greater than is possible with factory labour.
- c) The state would have to provide the social services indispensable for the transfer to the factory of the large number of home workers; in the light of the recent trend towards the socialization of the education process, this would also seem to be a positive effect.

The key points for evaluating a strategy involving a return of all workers to the factory would seem to be a) and b). Their implications are worth examining in detail.

A rise in the cost of labour of the order of 30% - 50%* would be needed in order to bring home workers' wages into line with those of factory workers. If gradually achieved over some years, it is our opinion that firms could bear this burden. The product should manage to retain its supremacy and ability to penetrate into foreign markets thanks to its special features. Nor does it appear reasonable to suppose that a rise in the labour costs of firms currently operating - and thus, presumably, a rise in prices - would open the door to the large firms. Indeed, as we have seen, the reasons why the large oligopolistic firms leave this area to the smaller ones must be sought rather in the diversification of production than in the small firms' ability to keep prices low.

In saying this, however, we do not mean that an increase in the cost of labour of the order above mentioned would not have important repercussions. The intention is merely to emphasize the fact that the sector can adapt itself to these new conditions. It will be up to the employers to tackle these problems, in whatever way they choose and in whatever way the working class allows them to adopt.

A different attitude might seek to save the sector by consenting on principle to privilege the factory workers at the expense of the others; but this would imply choosing in favour of an economic development of the Japanese type, which would not find favour with workers and unions.

Reduced flexibility in the use of labour would lead to different problems. In certain industries the variations in turnover are "middling" to "normal". Here, this reduced flexibility would transform into a rise in labour costs but would not involve any extra effort in organization necessary for the smooth running of the firm, nor frequent dismissals and rehiring of workers. For those industries that absorb a much larger share of home working than is commonly supposed, job stability represents a real achievement for the workers; there is no particular reason to replace it with special agreements, and thus what was said in the previous paragraphs regarding labour costs holds true here.

In other industries, on the contrary, the volume of turnover of a firm depends on the success of its sample range and is thus much more subject to change than is the rule; in this case a reduced flexibility in the use of labour would lead to almost insoluble problems. In other words, the normal factory organization, in our opinion, is scarcely compatible with industries where a firm's turnover - in contrast to the relatively consistent turnover of the sector taken as a whole - shows seasonal variations of the order of 100% to 200%.

In these cases, therefore, - since the homeworkers, who are obviously

dependent workers, must be guaranteed equal pay and treatment with the factory workers - it would be possible to devise contracts and forms of work organisation of a much more complex nature than those normally used in the factory.

To begin with, the company contract might fix the amount of production that the employer could commission outside the factory. This amount would need to be determined with the help of precise data on the variations in the firm's turnover, informing the factory council of the variations. A procedure of this kind would allow the employer a certain amount of leeway in the use of the work force, while guaranteeing the workers against possible abuses on his part.

By thus intervening at factory level, the problem could be cut down to more manageable size. At which point, provision could be made for the following (not necessarily as alternatives):

- a) associations of small entrepreneurs who would contract with a certain number of workers to guarantee them a proportionate overall volume of employment; from season to season, the entrepreneurs would establish how many workers they would need;
- b) agreements between groups of small entrepreneurs who, in case of variations in the turnover of individual firms, would engage to produce as subcontractors for each other.

The list could go on and these suggestions are of course only given by way of example. But the problem should be clear: how to create the conditions which will enable entrepreneurs the maximum flexibility in the use of labour compatible with normal job stability for the workers.

Initiatives for a re-ordering of these sectors: unions, alteration in the law on home working and artisan work, reform of the system of financing of the welfare bodies

Any move in the direction desired must essentially come from mass initiative and pressure from the working class - both from that section of it employed in the factory and from that employed in home working.

An analysis of the present situation, made with the chosen objective in mind, helps to identify the instruments the working class will need to employ and the aims it must set itself. More precisely, the most appropriate initiatives can be subdivided into three groups as follows:

- a) initiatives relating to trade union activity properly so-called, regarding both home workers and all the workers in the sector;
- b) initiatives aimed at imposing a regulation of home work and artisan work in a different way from the current regulation and so as to offer more scope to initiative on the part of the workers;
- c) more general initiatives to eliminate or reduce the incentive to decenter production outside the factory.

These three points are examined in the paragraphs that follow.

Union initiatives outside and inside the factory: control of outside commissions

At which point in the union structure would the claims of the home workers against their employers have the best chance of making themselves felt? The answer would seem to be, on the one hand, in the area council; on the other, in the ordinary union structures at the level of town and province. For the fractioning of the production apparatus removes all possibility of bargaining at individual company level and suggests that the proper place for this is in the organisms having a territorial basis.

Three levels of mobilisation - area, town and province (and bargaining at national level will also need to be envisaged) - are all indispensable: the two highest, town and province, to prevent the employer from solving the difficulties arising out of the disputes by simply shifting his commissions

from one home worker to another; the lowest, the area council, as being much the most apt to stimulate workers to play a direct role in the bargaining. With the prospect of a progressive equalizing of home workers with factory workers, as regards both pay and regulations, the bargaining must on no account make provision for any attempt on the part of the employers to draw a distinction on principle between the one kind of workers and the other.

In particular, in order to highlight the points on which the employers' associations have hitherto based their attempts to bring about this division,

- a) the dependent character of home work must be clearly stated;
- b) the attempt to pay at least a part of the wage "under the counter" must be firmly opposed, even when such moves are concealed under the name of "conventional wage";
- c) there must be a re-emphasis of the principle according to which home workers are to be guaranteed job stability, even if by gradual stages and through special contracts.

Opportunity for bargaining can be found in the gradual stages by which wages are increased and in a possible commitment by the unions to request that, for the firms in this sector, the state fiscalize at least a portion of the social benefits (though in the framework of what will be said in the paragraphs below).

But it must be clearly understood that, in order to bring a great part of the home workers back into the factory and guarantee job stability for the remainder, a firm commitment in the struggle is indispensable from the workers in this sector already employed in the factories. At present, they are the only ones with sufficient bargaining power to halt the trend towards decentralization which since 1969 has been more and more manifest and is now by way of becoming a structural feature of Italian industry. Decentralization - or at any rate the increase of decentralized production - must be brought under control in the factory first of all, since the factory is the arena where the working class has the best chances of victory.

Already back in 1969 the textile workers' contract envisaged control of external commissions by the factory councils. However, this control was provided for only in cases where, at factory level, the levels of employment were threatened. Though holding out positive prospects, the regulation was in some sense self-contradictory, since it made provision for the workers to have access to certain documents among those most jealously guarded by the employers - namely, the registers of subcontracts - at the very moment when, with threats of dismissals in the air, the factory councils' leverage was at its weakest. On the contrary, information about the network of subcontracts must be made a primary target, whether or not restructuring is involved: it must be one of the goals to be aimed at in ordinary union activity, with the same daily conflicts as are necessary to achieve control over intensity of work and upgrading.

Only by possessing this information can a check be kept on outside commissions, in such a way that the union can limit them, in the same perspective as we have already mentioned, to those justified by the real organizational needs of the firm, while blocking those that merely represent an attempt on the part of the employer to utilize non-union (and thus more exploitable) labour.

Proposals for altering the law on home working presented by the regions of Tuscany, Emilia and Lombardy. Some suggestions for altering the law on artisan work

If the labour movement is to have stronger devices with which to forward its claims, further initiative suggests itself as indispensable: this involves modifying the current laws on home working and artisan work.

The line set out by the three regions of Emilia, Lombardy and Tuscany in the document recently drawn up by them jointly and due to be presented to the Minister of Labour, would appear to be valid.

Indeed, it is very much to the point to stress the dependent nature of

home work and to embody into the law the principle by which all those working at home in accordance with instructions from employers as to technique and organization of production "are legally presumed to be dependent"; also to the point is to entrust municipal commissions, on which the workers should be strongly represented, to decide who is and who is not a "home worker", irrespective of what the individual worker in question demands.

There is, however, one need - not immediately referable to home working - that the regulation envisaged by the three regional authorities leaves unsatisfied. By putting pressure on the home workers, it is possible to force them to enroll on the register of artisans, thus qualifying as such. Obviously anyone personally taking the necessary procedures to register as small entrepreneur cannot be "legally presumed to be dependent"; and if the new law were passed, this could be a way for employers to get round it.

The point we are trying to make, in other words, is that home work, artisan work and very small firms represent different aspects of the same fractioning of the production apparatus, and this makes it urgent to intervene with regulations covering the whole matter. Partial interventions - even if correctly oriented - can be got round and rendered useless; they must therefore be coordinated within a more complex, more general set of regulations.

As is known, article 2028 of the Civil Code currently in force defines as "small entrepreneur" "artisans, small firms, small traders and all those pursuing an economic activity employing predominantly their own labour and that of their family". The definition is an extremely comprehensive one and its generalness has been remarked on everywhere. F. Galgano* correctly notes how the regulation, introduced in the Fascist period, arose directly out of the intention to provoke divisions within the working class by extending the role of entrepreneur to the largest possible number of workers.

The regulation should therefore be altered in a new and different perspective, in order to encourage an inverse process as compared to the one actuated under the Fascist regime: i.e. to create conditions that shall favour the recomposition and reunification of the working class, which is the main objective of the movement.

Therefore, it is probably right for the law to restrict enrolment on the register of artisans to those "who produce final goods - whether consumer or investment - or who produce special or intermediate products having a market of their own."

Probably this definition will have to be more carefully worked out so that it can be used by the working class to their greatest possible advantage. It resumes, and in some sense "updates", the regulation in the old Italian Civil Code by which the qualification of "artisan" was confined to those performing "creative work".

Note that the line here indicated - whereby the civil code instituted under Fascism is rejected and revised - is gaining acceptance among the unions: the bargaining platform of the textile workers - who, not by chance, are the most aware of the problem, among workers in all sectors - proposes a return, pure and simple, to the pre-fascist civil code, and demands that the definition "artisan" be applied to anyone performing "creative work".

In order to discourage decentralization - but, above all, to increase levels of employment - payments by firms to the welfare bodies should be replaced by a tax on profits

Lastly, an initiative of more general nature: a reform of the system of financing the welfare bodies. This would appear indispensable if decentralization is to be discouraged; but it is also justified in itself, independently of the problems of home working.

As is known, the welfare bodies are financed by a system that requires firms to pay an amount of welfare contributions in proportion to the workers' earnings. The proportion is of the order of 45 - 55%: in other words, for every one hundred lire paid as wages to the worker in Italy, the employer is required to pay forty-five to fifty-five lire to the welfare bodies.

Control over these payments is carried out by the Ministry of Labour, through provincial labour inspectorates. This control is based on analysis of pay slips and is on the whole fairly rigorous. The law currently in force punishes evasion with not negligible fines. Yet in spite of this, enforcement of the law is anything but uniform. The larger the firm, and thus the more complex its administration, the more difficult and more risky does it become to avoid paying welfare contributions. Payment to the employee "under the counter" - i.e. the payment of wages, wholly or in part, without specification on the pay slip, thus enabling the firm to avoid contributions - is indeed almost unknown in medium and large firms. (Though these firms not infrequently practise bribery and personal incentive in the form of gratuities which, of course, do not figure on the pay slip.) On the contrary, in small firms and artisan workshops the employer is able to make under-the-counter payments personally to the workers without these appearing in the account books; and thus these firms can, and often do, avoid paying welfare contributions.

It is therefore possible to claim that the current legislation, in its practical application, takes the form of a tax on employment which, calculated worker by worker, is more burdensome to medium and large industry and less so for small firms.

This system has accompanied Italy's post-war economic development right from the start. Its consequences have been twofold.

- a) To one extent or another, all firms whose labour costs have been artificially swollen by this mechanism have been stimulated to a higher level of automation than would have been the case with a different system of taxation - even one requiring the same overall outlay in contributions. (For example, take a firm paying about 50,000 lire per month in contributions for each one of its thousand workers. The incentive to reduce the number of workers on its payroll - i.e. to restructure, will be much stronger than if it paid a tax of 50,000,000 lire per year on its turnover, irrespective of the number of workers employed.)
- b) Among medium and large firms there is an increasing tendency to decentralize production to smaller firms, one reason for this being that the tax on employment paid by the latter is lower. We have here, in effect, evasion "by proxy", with only two restrictions: decentralization is only feasible for those stages of production that do not allow economies of scale; and the trend towards decentralizing obtains only in cases where - the product being the same - there is an equal level of automation in the small and the large firm.

Restructuring and decentralization can thus be seen as two aspects of the same phenomenon. Of course, these two apparently contradictory tendencies do not originate solely from the system of financing the welfare bodies; however, it is symptomatic that, following the 1969 contracts - which increased the cost of factory labour and the burden borne by firms to the extent that welfare benefits are calculated in proportion to wages - the two tendencies have become more and more important throughout Italian industry as a whole.

In an economic system like Italy's - in which there are actually some millions of unemployed who do not figure in the unreliable statistics published by ISTAT - such strong incentives to save on manpower are certainly out of place. Moreover, any reform combatting decentralization, which is harmful by virtue of the divisions it creates within the working class, must be healthy. All of which justifies an initiative from the labour movement aimed at replacing the present system of financing of the welfare bodies - which effectively acts as a tax on employment - with a different one, whereby the welfare bodies are financed by ordinary taxation based on volume of turnover or, better, on volume of profits.

It may perhaps be helpful to spell out just how far this proposal differs from a simple fiscalization of social burdens. With fiscalization payments by firms to the welfare bodies would be reduced, but would not be replaced by payments adding up to the same overall amount though calculated on another basis. In other words, unlike a system of financing through a profit tax, fiscalization would simply represent a contribution made to firms by the state.

Note that the prospect of replacing the current system of welfare payments by a tax on profits is the necessary condition for the partial fiscalization of welfare payments by small firms making use of home work as proposed earlier. If there is no move towards a tax reform that effectively involves payments by firms to the welfare bodies, then fiscalizing - even only partly - the social benefits coming from small firms would simply mean that the current practice would acquire a perfectly legal status; and the process of decentering would be speeded up and made permanent fiscalization of social burdens for small firms therefore makes sense only as a temporary measure and can only be proposed as a step towards eliminating social burdens altogether.

To conclude, it should be remembered that replacement of the present system with a tax on profits is also justified by reasons that lie outside the topic discussed in this paper. For the present system of financing the welfare bodies originates in a privatised conception of social services: within this framework, assistance to the worker in case of illness and the old-age pension are seen as corresponding to the amounts paid by the worker during his/her working life, instead of figuring as the mechanisms that implement the right to health of each worker as recognized by the Italian Constitution. On the contrary, a welfare system financed through the normal fiscal channels would constitute a recognition of this right, both in principle and in the structures through which it would be exercised.

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As can easily be seen, this definition of work leaves wide margins of uncertainty (consider, for example, how vague is the distinction between between the figure of the home worker thus defined and that of the artisan).

It does, however, broadly coincide with the definition employed in the most recent studies on the subject. Among these studies - which only partly cover the area neglected by ISTAT, who have gathered no reliable data on home working - we may mention the following:

Borough of Modena, Il lavoro a domicilio nel quartiere Madonnina, litho, Modena, 1971 (obtainable from the Ufficio Statistico, Borough of Modena);

Borough of Nonantola (Modena), Conferenza comunale nell'occupazione femminile, Nonantola, 1967, and

Borough of Nonantola, Seconda conferenza comunale nell'occupazione femminile, Nonantola, 1971 (a printed leaflet can be obtained on request from the Borough of Nonantola, giving a synthesis of the results of the study);

Luigi Frey, I problemi del lavoro a domicilio in Lombardia, edited by the Assessorato al lavoro of the Region of Lombardy, Milan, 1972.

This study was presented as a report to a conference on home working organized by the Region of Lombardy. Useful information can also be obtained from the proceedings of the conference published by the same Assessorato.

Leonardo Tomasetta, Il lavoro a domicilio nell'Emilia Romagna, xerox copy, Bologna, 1973. This article written on the occasion of the First Conferenza sull'occupazione femminile organized by the Region of Emilia Romagna, can be obtained on request from the Assessorato all'Industria of the Region of Emilia Romagna.

L. Bergonzini, Problemi di accertamento della professionalità femminile e primi risultati di un'indagine sul lavoro a domicilio in alcuni comuni emiliani, in Società Italiana di Statistica, XXVII riunione scientifica Palermo, 29-31 maggio 1972, published in this number of Inchiesta.

Useful are also the two articles by S. Garavini published in Rinascita, 12/1/1973 and 4/5/1973.

These figures are obtained from the labour costs calculated in para. 7, based on the assumption that the home worker contributes a share varying from 66% to 50% to the total work force absorbed by the production process.

To propose the "conventional wage", as does S. Garavini (cf. S. Garavini in Rinascita, 12/1/73, p.10), means accepting that social benefits be paid on a portion of the wage. The remainder of the wage is therefore paid "under the counter".

Cfr. F. Galgano, L'imprenditore, Giuffrè, 1968.

2.

Before arriving in Emilia I had never set eyes on a real factory. Not in Sardinia, where I was born and took my degree in Agriculture at Sassari; there I was well acquainted with the sea and the countryside, where there were only the mines, a few foundries producing vive for concrete building, a few factories making pasta. And not in Cambridge, where I learnt (from scratch) English and Economics, models of growth and the arguments over the theory of capital.

The first factories I visited - where I talked to the workers and learnt to distinguish a lathe from a cutter - were in Bologna. This was in 1971, when Claudio Sabattini and Francesco Garibaldi, chief officials of the Bologna FIOM, invited me and others to cooperate in an enquiry into the metal-engineering sector in Bologna.

In this study Sabattini and Garibaldi proposed a method of working that was quite new for the Italian unions. The main target was to devise a strategy that would oppose the attempt of the entrepreneurs to cut costs by decentralization. To this end it was necessary first of all to discuss the problem with the union organizers. Sabattini and Garibaldi proposed doing this not merely on a simply ideological level and on the basis of information based solely on impressions and therefore questionable, but by offering a mass of data collected and discussed by hundreds of union cadres. Thus, for some months work focussed on determining to what extent the small firms were used by the large ones to keep wages low or to make the work force flexible. This was the first occasion when the term "outside departments" was used - to describe the small firms whose only market outlet was a large firm, with the result that they were compelled by the latter not only to earn low profits but also, through the reduced ability to pay, to offer low wages.

But these findings represented only a part of what our enquiry aimed at. For the target was also - perhaps more than anything else - a mobilisation and a commitment on the part of labour. The aim was to stimulate activity. The study sought to act as a school for cadres, to lead the shop stewards of the less combative factories to assess what gains had accrued from the struggles of other union comrades and to examine the work contracts that they had, at least in some cases, managed to obtain from the firms.

In addition, the union also sought information on the trend of employment, area by area and sector by sector: and given the critical dearth of any such data at local level, there was no other remedy but to go out and gather them.

The study covered all the firms in the province. A "blanket method", as we said. A different system, based on sampling, would somehow have seemed "bourgeois" to the union cadres. The fact was that any sample would have been unreliable: a research conducted on this basis would certainly not have generated mass mobilisation, and in any case the only available description of the terrain we were exploring was the list of those firms whose existence was known to union area officials. In Turin, in this period, Matteo Rollier had managed to get hold of the lists made up by INPS and by the Industrialists' Association, but, despite even the assistance of data experts at the University of Turin, his attempts to collate them were in vain.

Compiling the questionnaire taught me several things. On wages and work skills, first of all. Though belonging to a different period, Vittorio Foa's little book on the structure of wages derives from the same need to understand entrepreneurial strategies in controlling the cost of labour. But I also learnt something about technology. Certain machines were taken as indicators of a good technical level. Others testified to how the work was organized in the factory. All these facts - wages and working conditions, the organization of work and technology - were strongly characterized and differed from sector to sector. And this was when I became convinced - with a conviction still unshaken by the experience that ensued - that in many cases the specific approach in one sector, based on good knowledge of the technology involved, is preferable to methods which examine the manufacturing industry as a whole. (And in subsequent years it was this pattern of research which was to provide the basis for the studies on Gibraltar, as also the ongoing studies on the birth of firms).

The interviews were carried out by everybody: the researchers, the trade union officials, the shop stewards. Sabattini and Garibaldi were, I think the first to use the shop stewards of the large and medium firms, on union leave, to conduct the interviews. (The Italian national working agreement allows the workers to engage in union activity in

paid time for a stipulated number of hours). This enabled the cost of the enquiry to be drastically reduced, indeed almost to zero. But above all it sparked off discussion, and the interviews conducted in one or another union area often served as the premise for a precise knowledge of a group of firms and led many of the shop stewards to assume important roles in the union.

Time was all too much of the essence. Political tempi, as was said. Urgent political necessity saw to that. We had less than a year to interview 600 or 700 firms and write up the report. The date of the conference was the deadline. (Vittorio Capecchi achieved the maximum possible efficiency in 1975, when in less than six months from the draft of the questionnaire and in cooperation with the shop stewards of 50 factories in Bologna, he managed to issue a printed volume which is still an essential source for discussions of that period).

As a matter of fact, in the course of that first study in Bologna, I was unable to achieve a complete comprehension of the terms of the problem, and unable to formulate a judgment that appeared to me entirely defensible. The conference that concluded the study was of nationwide importance and ended with a speech by Bruno Trentin. I did not intervene - for two reasons: firstly, I needed more time for reflection than the political deadline set by the Bologna FIOM allowed; secondly, because I did not agree with the basic arguments put forward by Sabbatini. It seemed to me that several of the data on the number of small firms commissioning work showed that subordination was not so uniformly distributed as Sabbatini argued. In the conference Camillo Daneo had spoken of "helter-skelter" decentralization, but the examples did not convince me that there was a general tendency. And above all, many small firms were producing finished goods and reaching the market without passing through the larger firms. However, I was not convinced that a union strategy of defence against decentralization could be based on the "reaggregation of the productive cycle": i.e. on disputes in which the workers in large companies, and those in the smaller ones to which the production of the large companies was decentralized, should take strike action together.

My own position was basically the following. It had been established, in essentials, that in that period of the early 'seventies the small firms offered worse working conditions than the large ones. This situation must be opposed and, I was convinced, for the same reasons as stated by the Bologna FIOM. On the other

hand, this did not mean that all the small firms were in subordinate relation to the large ones, nor that all of them had worse working conditions, nor again that all, or even the majority, based their competitiveness on low wages rather than good technology; nor, lastly, that there existed a general tendency to subordination.

A strongly political element was present throughout the discussion. The idea of the Bologna FIOM - which I shared and which, at the conference, Trentin ended by rejecting - was that the PCI, in its concern to preserve its network of relationships and alliances with the middle class, was allowing too much latitude to the small firms, in terms of wages and working conditions. The large firms took full advantage of this, it was argued, using the small firms as a shield. The party's mistaken policy prevented the unions from breaking down this defence. It was this political line that the Bologna FIOM sought to oppose by documenting the facts for the first time and proposing to set up "consigli di ciclo" to coordinate the representatives of all firms involved in a production cycle.

Elsewhere, in Modena, in the other provinces of Emilia, in Lombardy and the Veneto, the offensive against the small firms was carried on, within the union, by the FIM above all. Indeed, the CISL metal-engineering workers often employed the polemic against the small firms to create problems for the FIOM communists who had been entrusted by their party to mediate between the union commitment to defend the worker and the need of the party to remain on good terms with the small entrepreneur.

In Verona, the CISL study centre, whose driving force was Federico Bozzini, brought out a small volume *Piccola impresa, grande sfruttamento*. This gave a detailed report on the reduced costs borne by artisan firms in the printing industry. The decentralization of certain production stages - for example, building - enabled Mondadori to make savings of the order of 57% as against the costs of performing the same stage in their own factory. In Milan, Luisa Morgantini, who headed the FIM's cadre training department, was always compelled to ask the speakers and participants in the courses to observe a minimum of caution when dealing with the problem of small firms: the risk being that otherwise Antonio Pizzinato, the then secretary of the Milan FIOM, might refuse to organize courses jointly with the CISL.

And it was indeed from a white area (with long-standing Catholic traditions), by the Bergamo unions, that in 1972 I was asked to replicate the Bologna study. The

Bergamo FLM was dominated by the FIM, and throughout Lombardy at that time, FIM was synonymous with Sandro Antoniazzi. Among other things, it was under pressure from him that the Bergamo FIOM was persuaded to organize a study, despite its initial reluctance.

Collecting the data was an inspiring experience. Once again shop stewards were employed for the interviewing. The group of shop stewards was coordinated by Gianni Chiesa, a worker priest with whom I was for several months in close relations.

Coding and processing of data were done in Modena and led me into hitherto unknown territory, e.g. the use of the computer; assistance came from Daniela Giacobazzi, who found herself compelled to use FORTRAN, which she had only just learnt in the university mathematics course. And since we did not even know of the existence of statistics packages - which the physicists at our computer centre did not use, and which we could not find on the market - Daniela and the rest of us assembled a very "home-made" package; we dubbed it by the pompous name "Inch" (as in "Inchiesta") and its logic, as we found years later, worked very much like that of

The inferior conditions of the workers in the small firms was documented beyond all reasonable doubt. And well documented, too, was the progressive vertical disintegration. In addition, by determining the production stages that had been decentralized, and the amount of workers employed per department, we were able to ascertain, for the first time, that in many instances the firm prefers to perform a production stage partly outside partly inside the factory; in this way it avoids a clear-cut choice between "make" and "buy". We also recorded the types of machines used in the large and the small firms, making a simple distinction into manual, semi-automatic and automatic. And from the tables in which these data were reported all of us engaged in the research were able to see that in several cases there was no difference in the machines used by the small firms and those of the larger ones. This was further confirmed by a practice that was fairly frequent. According to this, the entrepreneur of a large firm would encourage a worker - or group of workers - to set up on his/their own; he would declare himself willing to allow them in return for some payment, the use of the machines they employed inside the factory. Here was no case of artisans using machines similar to those of the large firms: they were literally the selfsame machines.

Thus the idea gradually took shape that economies of scale must be deter-

mined with reference to the productive capacity of a department, rather than to the capacity of the firm as a whole. It became clear that in large firms the departments often expanded by multiplying a given module, though without this involving any change in the productivity of the single module: e.g. there was no reason why a hundred lathes under one roof should each be more productive than the few lathes of an artisan firm.

What above all clearly emerged was the distinction between economies of scale - that could be achieved, technology permitting, by increasing the productive capacity of the single machine tool - and economies of vertical integration, which derive from the fact that one and the same factory employs machine tools with different tasks and whose size is frequently of scant importance. This distinction enabled me to argue that small firms could be efficient.

I discussed it with my fellow-economists. But even then it was already plain that the ideology of concentration was not confined to authors like Schneider and Bain. Among readers of Marx the idea that the large factory represented the most efficient form of production was deeply rooted - perhaps even more so than among economists with a different background. In this perspective I reread Marx and found my thesis confirmed. For it was clear that Marx made a distinction between financial concentration and productive concentration, and that he derived his predictions concerning the latter from the analysis of economies of scale in the production of motive power.

In a recent conference at Modena, Becattini has retraced the story of this discussion and declared that I arrived at this conclusion "in spite of Sraffa". Actually, though, as Becattini himself has said to me, the link between Sraffa and the unconditional devotion to the large firm should be sought in the personal idiosyncrasies of many of Sraffa's commentators and disciples - whom Becattini indeed knew, and who in my view had misread Marx, and who were keen supporters of both theses - rather than in the classical texts or in the work of Sraffa himself. No, I think I can affirm that it was the knowledge of Sraffa that enabled me to see a compatibility between low wages and good technology. Or perhaps it was the knowledge of Sraffa that persuaded us to document both wages and technology - in the awareness (not very widespread) that one could not deduce the one variable from the other.

The final report on the research therefore argued the theses that I had begun to have an idea of in Bologna, though at that time I had not been suffi-

ciently certain of their validity. It involved a strong defence of the initiatives aimed at getting uniform working conditions, and thus a direct attack on the Communist party's "latitudinarian" policy; but, also a passionate defence of the viability of the smaller firms. Yet I was still far from the idea of the industrial district.

The essay was very well received in the academic community, very badly in leftwing circles. For some months I held several seminars as the ever-courteous Luigi Frey recalls in an essay of his. And the fact of my having affirmed that it was at any rate possible - no more than that - that the small firms might be efficient brought derision upon me, what though tempered with some formal respect.

As when in Florence, in 1974, Bruno Trentin declared that it would be senseless to entrust the small firm with rescuing the Italian economy (fair enough) and that the real task was to construct a plan in which the industrial development of Italy should cohabit with the needs of the Third World. According to this conceptus, it was not so much a question of encouraging the growth of Prato or Carpi as of fostering the production of large firms making the goods necessary for the orderly development of backward countries. For example, the production by large firms of efficient trams and buses would contribute to raise the rate of employment in Italy while solving the transport problem in India.

ORGANIZATION OF WORK AND DECENTRALIZATION OF PRODUCTION IN THE ENGINEERING SECTOR*

Introduction

Over the past four or five years the traditional devices employed to keep the working class under control have been gradually losing their effectiveness. The brutal repression by the police that was typical of the 1950s is no longer workable. Control over working rhythms, at least in the large factories, has become more and more difficult. Control of employment by manipulating the aggregate demand - which in 1964 - 1965 had appreciably enfeebled the workers' power of protest - showed itself generally unsatisfactory in the years 1969 - 1971. Therefore, in exploiting areas which the labour movement had left unoccupied, the bourgeoisie has supplemented these old devices with some new ones. In this perspective one can interpret both the rise in prices - also partly due to international inflation - and the kind of reorganization of work which, owing to its application within the sector rather than merely within the factory, is known as "decentralization of production".

The study conducted in Bergamo aims to throw light on this novel manoeuvre by the employers; it also seeks to predict the course it will take in the next few years and to offer some suggestions towards a more conscious reaction on the part of labour.

In essentials, the study starts out from two data:

- a) an ever larger quantity of work is being commissioned outside the factory by engineering firms - and the phenomenon is present and widespread in other sectors, too;
- b) working conditions in medium and small firms are much worse than those in the large firms, in terms of wages, overtime, extra benefits, etc.

These are therefore the main lines along which the study was pursued.

Investigation was performed by a sampling method. It would be out of place here to describe the method, which is anyway reported in detail in Appendix I. Suffice it say that that a very wide range of firms was used, ample enough to guarantee reliable results and including firms of all sizes. Data were collected by interviews with the factory councils. This explains why the study focuses more exactly on the data regarding the conditions of the workers than on other matters. And it also explains why, for example, no evaluation was made of the amount of investments over the past year, or years. Factory councils, shop stewards, or - in the case of firms with less than 10 employees - the single worker, were in any case the only available source of information. It may be worth recalling that, at the outset of the study, the Bergamo industrialists' association sent a letter to the trade unions in which the workers were forbidden to give information about the firms in which they were employed. In any case, interviewing workers rather than employers was the necessary condition, to make of this study not a mere academic collection of data but a political act involving a large number of workers in collective reflection and gathering together a mass of necessary information at the same time.

Along these lines, before the final questionnaire was prepared, meetings were held with the factory shop stewards. The aim of this was to formulate the questions taking into account the expressions used by the workers in the area, to eliminate unnecessary questions (i.e. those that could not be answered even by the factory councils with most awareness) and to obtain all the useful information available.

Firms sampled numbered 389, with a total of 39,000 workers. Table 1 (the tables referred to in the text can be found at the end of the article) details how the firms are divided according to activity and dimensions. The interviews were conducted by union members. Without their participation this study would

not have been possible.

I. Working conditions in small, medium and large factories

Introduction

The analysis of working conditions as performed at Bergamo takes into account the application of the national contract, the practice of wage-bargaining with the firm, qualification, wages, overtime pay, the diffusion of piece work, the presence of under-the-counter payments.

As can be seen, there is no analysis of the object of the bargaining, nor is there any study of the working environment, nor, above all, of the relation between qualifications and tasks which, in lowering the labour costs in small firms, could play a highly important role.

On the other hand, a careful investigation of these points, given the forces available, might have meant reducing the number of firms interviewed and thus less reliability in the other data.

Bargaining at national level and company level

Regarding these points, factory councils were asked the following questions:

- Is the work contract bargained at national level regularly applied in your firm?
- In your firm is there, in addition, a contract negotiated at firm level?

The second of these questions requires no further clarification; whereas some details are necessary in order to understand the replies given to the first question. While interviewing factory councils or single workers the interviewers explained that, in each firm, the point of reference was the contract that was supposed to be applied in the firm in question (Confindustria, Intersind, Confapi or the confederations of artisans); and they added that among the infringements of the norms laid down by the contracts the study sought to highlight those regarding:

- a) minimum hourly rate of pay;
- b) classification of workers;
- c) union rights.

The question, therefore, takes no account of the fact that hours worked overtime exceed those permitted by the contract; it leaves out of consideration under-the-counter payments - which constitute an infringement of the laws regarding welfare benefits but not of the collective national work contract - and, lastly, the failure to observe the provisions of safety legislation.

The results are reported in Tables 2 and 3.

Analysing the data, we can arrive at some general considerations as well as some specifically regarding the trades union picture and the structural situation in Bergamo. To begin with, note that in all the factories employing more than 100 workers the national contract is in force and bargaining at company level is practised. This threshold of size, above which all the firms can be considered to be "unionized", is probably characteristic of the province of Bergamo. One has the impression that Milan, for example, has a higher threshold, around 200 employees. In the province of Bologna, on the other hand, the limit might be lower than in Bergamo. The difference is essentially one of degree of politicisation of the workers in the smaller factories, and cannot be explained as merely a difference in the effectiveness of union activity. The stability of the industrial texture may play a part here. A firm that has expanded only recently - for example, from thirty to seventy employees in the last two years - is very unlikely to be unionized. Another factor may perhaps be identified in the turnover of the work-force; unions have a harder time operating in firms that change their workers often.

Moreover, a look at the tables will show that - below the threshold of 100

employees - there is a clear increase in the number of firms where the national contract is not applied, and in the number of those where company bargaining is absent. Especially striking in this respect is the situation in firms with 9 or less employees: in over 40% of these the national contract is not applied, and in only 4.4% does bargaining with the company occur.

Significant, too, is the sharp drop in company contracts as the size of the company drops; and note that in companies with 10 to 49 employees these are stipulated in only one company out of three. To sum up, if we assume that in 1972 in Bergamo the distribution of firms classed according to size is still as given by the census of 1971, these data inform us that, among the engineering workers in the province of Bergamo, 10% are employed by companies who fail to observe the national contract and 32% by companies having no contract negotiated at company level.

Lastly, it is important to note that, as we shall see further on, the absence of company bargaining does not mean merely lower wages and qualifications. This lack is an indication of the impossibility or inability of the workers to figure as the opposite party in bargaining with the employers, and for this very reason it represents an index of higher work rates, excess of overtime and poor job stability.

Wages and qualifications

Regarding wages, in each factory and for each category, the study recorded the minimum and maximum levels (the difference, as is known, depends on the quota of wage contracted at individual level): between the two values the most widespread, and thus generally speaking the most representative, is the minimum level. The wage includes productivity bonus, cost of living allowance, and extra allowance agreed in September 1972 amounting to 20% for industry and 14% for artisan work.

The data, calculated as weighted average of the data recorded, are given in Table 4.

In Table 5 the same data are expressed as percentages of the values envisaged in the national contract for engineering workers stipulated in Confindustria and Intersind; at the time of the study they were as follows:

	lire per hour
1st category super	678
1st category	658
2nd category	596
3rd category	562
4th category	542
5th category	513

Several comments can be made from this table. To start with, 5th category workers are entirely absent from factories with more than 250 workers. Although the precise figure cannot be given, since workers in the 3rd, 4th and 5th categories were not recorded separately, it should be added that the number of 4th category workers, and above all those in the 5th category, is very low in all firms. (This also explains why the data show some irregular trends, first and foremost among these the one regarding the wages of 4th category workers in firms with 9 or less employees).

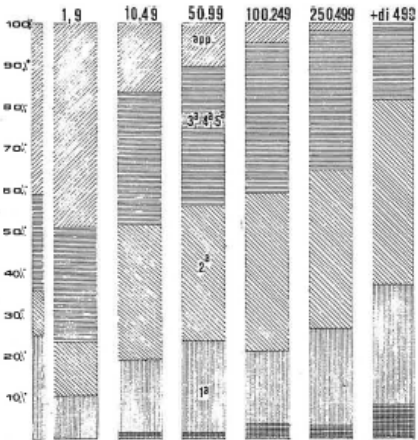
There is frequently a very appreciable difference between wages as laid down in the national contract and those actually paid. In all firms employing more than 100, this variation is connected with company bargaining, at least as

regards the minimum levels. In the other firms - where there is no company bargaining - the difference can be ascribed to phenomenon of wage drift; these are probably quite appreciable in an area like Bergamo where the activity rate is much higher than the national average. Worth noting once again is the massive influence of the size of the factory on wages. Wages in factories employing over 500 workers - as can perhaps be more clearly seen in Table 6 - are about 30% - 50% higher than those in smaller factories. The fact that this difference is so large even in Bergamo - where workers in small firms are certainly more politicised than elsewhere - is evidence of how difficult it is to extend the achievements of the more advanced workers to the working class as a whole.

Lastly, examination of the data shows that the wage differentials between the various categories may be considerably influenced by company bargaining. In particular, the differences in wages from one category to another in factories with over 500 workers remain proportional to those fixed in the national contract, whereas in the smaller firms they are very obviously wider. The national contract specifies a difference of about 30 points between minimum and maximum wages. But, as can also be seen in Table 7, while in firms with over 500 workers the difference remains around this order of magnitude, it rises as far as 50 points in firms with 10 to 49 workers and reaches a peak in those with 50 to 100 workers, where the wage of 1st category super is 80% higher than that of 5th category. To conclude: in the very large factories wages exceed by some two thirds those specified in the contract, and have the same differentials; wages in factories with 10 to 100 workers are about 35% higher and the differentials are much more spaced out; the wages in the very small factories are only a little above those specified in the contract and show a similarly wide differential spacing.

Our aim is to get an overall evaluation, even if only an approximate one, of the labour costs in firms of different dimensions. To this end, as well as analysing wages, it will be necessary to examine the distribution of workers over the six categories. Of course, different company dimensions often imply different production patterns, with differences in tasks and skills. It is a fact, nevertheless, that the classification of workers represents one of the most difficult aspects of company bargaining; and thus the frequency of workers in the various classifications affords an index of how much control they exert in the factory. Data on classifications are given in Graph 1, which refers to all the firms interviewed and corresponds to Table 8. Accurate collection and the particular way in which the interviews were conducted make these the most reliable of the data collected. It can be seen that, among the factories of different dimensions, the variations are so large and of such a character as not to be explained away by mere differences in the technologies employed.

GRAPH. 1 Categories by size class as a percentage of workers. All companies



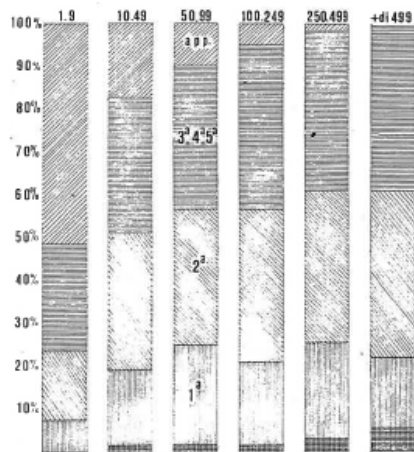
Note that in firms of 1 to 9 workers apprentices make up about 50% of the work force employed. In our opinion, this shows not that small workshops afford young workers better training in their jobs, but rather that they find it

easier to get round the regulations on apprenticeships. Likewise, at the other extreme, note that in the larger firms 80% of workers have a skill equal to or above the second category; this is certainly connected with the high level of specialisation required by the large engineering firms in Bergamo, but it is also linked, and not negligibly, with the high degree of unionization of the workers in the large factories.

Two attempts were made to isolate the "dimension" effect from the "technology" effect. The first appears in Graph 2, which transcribes the values of Table 8B.

GRAPH. 2 Qualifications by size class (as a percentage of workers). Companies in classes 3.10 and 3.11, excluding repairs and installations*.

For the identification of classes 3.10 and 3.11 see Tab 1



In order to make the groups of factories examined more homogeneous the table includes only firms in classes of activity 3.10 and 3.11 according to ISTAT: i.e. mechanical engineering industries and those involved in vehicle construction. To make the values even more easily comparable, the table excludes firms dealing with repairs and plant installation. The differences in the distribution of the workers among the various categories are now less appreciable than in the preceding graph. But it is still very obviously the case that as the dimension of the firm increases, so there is a sharp fall in the percentage of apprentices, together with a clear rise in percentage of workers with grade equal to, or higher than, the second category. Note that neither datum changes if the 81 entrepreneurs "working as employed workers" are added to the number of workers employed by the smallest firms - those with 1 to 9 employees.

An appreciable difference between the two graphs can be noted in the trend in the percentage of workers in the first category. This percentage, which rises almost constantly with the shift from one dimension to another when calculated over all the firms, shows a significant fall in firms with over 500 employees when calculated only for firms in classes 3.10 and 3.11. As was easily foreseeable, this is accounted for by the fact that in large firms in this class of activity, the assembly department organized as a line takes on special importance, equal, or almost equal - as Table 15A shows - to 40%. And, indeed, the second attempt to isolate the "dimensional" effect, referred to above, was motivated by the wish to measure the effect of the presence of assembly line in lowering the classification grade.

Table 9 gives data on the classification of workers in the assembly department, where this department is organized in an assembly line (as opposed to the department where the product is assembled in single pieces).

The values in the first column refer to a single firm and thus have no significance. From the other values, which are calculated on a set of workers as homogeneous as possible, we get a first approximation of the effect of work on the assembly line on the grading (the percentage of 1st category super + 1st moves from 22% to 18%), and a clear confirmation of the fact that - even when similar tasks are performed - the grades of workers in the large factories are

significantly higher.

Overtime, under-the-counter payments and piecework

The policy of the labour movement to reduce to a minimum the hours of overtime and piecework tends, on the one hand, to increase jobs and to diminish the workers' dependence on the changeable requirements of employers, and on the other hand, to exert control over working intensities. The employer, on his part, is assured of conditions that will better enable exploitation of the work force by payment of wages with a piecework system and the possibility of using overtime.

The implications of piecework are obvious and need no mention here. However, it is worth recalling that overtime - as Appendix II of this article demonstrates - costs about 8% less than work in ordinary time. Overtime, like shift work, enables better employment of plant and constitutes an element of flexibility very important for the firm. On this last point, suffice it to recall that cutting overtime from 4 to 2 hours per week per employee is roughly equivalent to dismissing 50 workers in a factory employing 1000. This is equivalent, of course, only from the point of view of volume of work force hired. The repercussions of either practice on the situation in the factory are very different.

The number of pieceworkers and the number of hours of overtime thus represent an index - even if only indirect - of the ability of the workers to enforce the union policy and, more generally, to control the organization of work in the factory. The following table gives data regarding piecework.

Firms using piecework and workers doing piecework according to class of dimension of the firms

	Companies		Workers	
	no.	%	no.	%
up to 9 workers	1	0,88	1	0,24
from 10 to 49 workers	6	3,97	108	3,11
from 50 to 99 workers	4	7,14	93	2,87
from 100 to 249 workers	15	32,61	1048	17,84
from 250 to 499 workers	8	53,33	1574	43,66
over 499 workers	1	12,50	448	2,99
total	35	9,00	3272	10,36

The percentages are calculated, respectively, on the total of firms and the total of workers in each class of dimension.

The table gives ample evidence of the concentration of piecework in firms with 100 to 500 workers. In the smaller firms systems other than piecework are used by employers to control the work force. In the medium-sized firms the organization of work allows for piecework and the unions are not strong enough to eliminate it. In the larger firms its application is hindered by the level of unionization of the workers.

With regard to overtime the situation is rather different, though here, once again, the workers in larger firms enjoy better conditions. As the data reported below demonstrate, overtime is widespread above all in firms with 10 to 99 workers; it dwindles rapidly as the size of the firm increases, till it becomes a mere 4.4% of the total work in ordinary time in firms with over 499 workers.

Hours of overtime worked on average in firms classed by dimension

Firms	hours per week per worker
from 1 to 9 workers	2h 48'
from 10 to 49 workers	4h 57'
from 50 to 99 workers	4h 48'
from 100 to 249 workers	3h 46'
from 250 to 499 workers	2h 51'
more than 499 workers	1h 46'
total	2h 55'

Table 10 provides more detailed data and gives a more precise picture of the phenomenon. Two points are particularly worth noting:

- a) almost all the firms with between 11 and 249 workers work at least one hour of overtime per week. That is to say, overtime is totally absent from a significant number of firms only in factories with over 250 workers;
- b) firms employing less than 10 workers represent a special case. On average, they have recourse to overtime to a lesser extent than the firms with more than 100 workers. However, if we exclude repair shops and firms dealing with plant installation, the situation alters substantially: Table 10B shows, in fact, that in the smallest "producer" firms overtime is much more frequent than in repair and installation firms. For further precision as to the situation of workers in these firms, it should be added that as Table 11 shows, in firms with 1 to 9 workers in about 28% of cases overtime is paid at a lower rate than that stipulated in the contract.

A final aspect of the workers' situation is the frequency of under-the-counter payments. As is known - and described in detail in Appendix II - the national engineering workers' contract provides for indirect wages (Christmas bonus, holidays, seniority benefit, accident allowance) amounting to about 36% of the direct wage. In addition, welfare legislation requires the employer to pay benefits totalling about 46% of the direct wage and equal to almost the entire indirect wage. The necessary condition for the employer to be compelled to pay an indirect wage in proportion to the direct one is that the latter be paid in a "pay packet", i.e. that the employer notify the welfare bodies of the amount of wages regularly paid. Receiving a part of the wage under the counter very often means, therefore, that the Christmas bonus, holiday pay, sickness and accident benefits, are less than they would be if the whole amount of direct wages were regularly declared on the pay slip.

But this is not the worst feature of the under-the-counter system. A wage paid, even only partly, under the counter must of necessity be determined by individual bargaining between the worker and the employer. This kind of personal relationship - which is enforced by the fact that the under-the-counter payment constitutes an infringement of the law - always represents a weakening in the collective bargaining power of workers in a firm. And thus this aspect of individual bargaining, which the worker often conceals, even from his colleagues, has made it impossible to determine the number of workers who receive their wages either wholly or partly under the counter. On the basis of the information openly available, together with the information that manages to reach the factory council or the union representatives in the firm, we can do no more than give a count of the factories where the under-the-counter system is used and an approximate evaluation of the extent of the phenomenon in each firm. The following table reports the number of firms where under-the-counter payments represent a not negligible proportion of wages paid.

Firms using under-the-counter payments classed according to dimensions

	Companies	
	no.	%
from 1 to 9 workers	40	35,4
from 10 to 49 workers	65	43,0
from 50 to 99 workers	25	44,6
from 100 to 249 workers	16	34,8
from 250 to 499	1	6,7
over 499 workers	2	25,0

Percentages are calculated over the total of firms present in each class of dimension.

In conclusion, by integrating the data in the table with the other evaluations, we can state that the under-the-counter system is practised above all in firms with less than 250 workers. The number of workers paid under the counter appreciably drops as a percentage, however, as the size of the firms increases, going from over 20% in the smallest firms to less than 5% in firms with over 100 workers. In firms with over 250 workers the under-the-counter system is, on the one hand, less widespread, on the other, with the exception of a single factory, involves only the foremen.

II. The role of the small firms according to certain authors and certain theses current on the left

Introduction

In the previous chapter it was seen how the situation of workers is in all respects worse in the small firms than in the large ones.

To understand why this should be so and to see how these differences arise and persist, it is necessary to examine the relationships obtaining between firms of different size and to ascertain the role played by small firms within the engineering sector.

To this end it may be worthwhile to look at three things: a well-known theoretical scheme in which the relation between small and large firms takes on a special importance; certain interpretations of Italy's economic development that pay particular attention to so-called dualism; and, lastly, certain analyses in which the problem of artisan or small firms is studied from a more immediately political angle.

The role of small firms in certain theoretical schemes and in some interpretations of Italy's economic development

To start with, let us consider the theoretical scheme put forward by Sylos Labini* for determining prices in oligopoly; this represents a typical example - though more interesting than others - of the way in which the relations between large and small firms have frequently been interpreted at theoretical level.

Basically two assumptions underly the entire analysis: that a certain good is produced by firms of different dimensions; and that among all the firms producing that good, the large firms have the advantage over the small ones owing to the fact that they enjoy economies of scale denied to the small ones by reason of their smaller size. On the basis of these data, indeed, Sylos Labini is able to state that the market price established itself at a level

that enables the smaller firms to survive and the larger ones to transform the sometimes very appreciable differences in the costs of production into profits.

In this scheme the small firms, even when they use a less "efficient" technology than the large ones, do not figure as a residue of backwardness in an otherwise advanced system. Theirs is rather the task of covering areas of the market that are too small for firms employing more demanding technologies. The two hypotheses above mentioned ("the same good may be produced by large and small firms" and "small firms are denied the economies of scale that enable production costs to be kept comparatively low") are the same as underly a great part of traditional economic theory, which finds one of its focal interests in the study of homogeneous markets.

It should also be remembered that in almost all statistical studies on economies of scale the starting assumption of a homogeneous market often becomes more and more rigid until it arrives at saying: "the firms operating within a sector, regarding of their size, all produce the same product". Of value, among all the possible examples that could be adduced, are the studies on economies of scale performed with the "survival technique", first proposed by Stigler in 1958,* and the research by Bain* into the differences in the industrial structure of various countries. On the other hand, there is a great scarcity - and this is the point we wish to underline - of statistical studies on economies of scale which take account of the different level of vertical integration of the firms operating in a given sector.

The researches done by Lutz* and Graziani* on the industrial structure and the process of development of the Italian economy following reconstruction represent, in a different area of study, another example of the way in which the relation between large and small firms has hitherto been interpreted.

Lutz's work appeared in 1962. According to her, along with a sector where large firms necessarily predominate, and a second sector where reasons of efficiency require minimum dimensions, there is third group of activities (...) in which the economies of scale are present but not so large as to prevent production in small units.

These activities, which could be called 'flexible' as regards scale, tend to give rise to a sector compounded of 'high wages' and 'low wages'. (In this sector) artisan workshop and factory may exist side by side in the same branch of industry; the large firm that hires labour at union rates near to the small firm that hires labour at a lower wage".

In this framework dualism, both at regional level and within a single sector, is explained as the result of the fact that the unions, which are stronger in the large factories than in the small ones, wrest higher wages from the larger firms and thus - by means of typically marginalist causal relations - compel them to adopt more sophisticated technologies. In sum, the different power of the unions in the different factory situations is held to cause distortions within the industrial set-up in Italy. The differing capacities for initiative on the part of the unions have hindered a homogeneous development - characterised, as Lutz would say, by a slow increase in the capital-labour ratio as the process of accumulation proceeds - and have instead created the conditions for, or actually compelled, unequal levels of technology and thus of productivity. According to this analysis (which displays all the limitations of the neoclassical tradition) artisan and small firms are widespread, even if in varying proportions, in all the sectors of the above-mentioned "third group of activities"; as Lutz says, they function substantially in competition with large industry ... "offsetting with lower wages the disadvantages of small-scale production". The role allotted to these firms by the Italian economic structure is to offer employment in factories at a very low technological level to workers who have failed to find any in large industry. And in fact, from these small firms - most widespread in South Italy but also present in the North - the workers move on to larger firms as the latter assume more importance in the Italian economy.

The analysis of Italian economic development proposed by Graziani in 1969 is radically different from Lutz's of 1962. Advanced and backward sectors are defined, first of all, with reference to the outlets for their products: the

former work for the export market, the latter for the domestic market. In the sector with advanced technology, moreover, the independent variable is not, as in Lutz, the wage fixed by the unions, but the "productivity of labour as determined by the requirements of international competition".

However, when we examine these two schemes of interpretation from the point of view that concerns us here, we find that they are very similar. As in Lutz, so in Graziani the backward sector plays the part of "a sponge soaking up available labour". Furthermore, although in the most recent model the distinction between backward and advanced firms is specified, first of all, according to commerce technology, it nevertheless retains a tendency to consider small firms, operating in whatever sector, as a residue of underdevelopment and a sign of low technological level. Although very cautiously and noting that the size of the firm "constitutes an indirect and obviously very rough way of evaluating the degree of automation and level of productivity" Graziani, too, uses the size of the firm as an index of its technological level.

The aim of this rapid survey has been to highlight the following point. The two hypotheses - that "large and small firms produce the same goods", and "small firms are poorly automated" - are very widespread in the whole range of economic studies. They always crop up in analyses performed at the highest level of abstraction, where they are imposed by the structure of traditional doctrine; and they frequently occur in much more detailed and careful interpretative analyses of real growth processes. Our opinion, however, as we shall try to show in what follows, is that these hypotheses may be highly misleading.

The role of small firms according to some more specifically political analyses

Alongside these analyses, more or less refined as they may be, it is important to bear in mind certain theses coming directly from the organization of the labour movement, in so far as these theses affect the political debate. In this area the debate is conducted in a much more complex way. The interpretation at structural level is offset by a purely political evaluation of the convergences and conflicts made possible or demanded by the relations of production. More especially, within the labour movement it would seem possible to identify certain positions that date back to the end of the 1950s, plus some other more recent ones, regarding policy lines taken by the movement in the period immediately following the "hot" autumn of 1968. Over the years these positions have been slowly changing. This fact, plus the dearth of structural analysis that bedevils the entire Italian left, means that all the said positions sometimes lack internal consistency and risk becoming contradictory. The various 'pieces' of the analysis must therefore be somehow organized so as to reflect two extreme positions that, while they may not occur within the movement exactly in this form, nevertheless represent the twin poles between which the debate is conducted.

According to the first thesis, the large majority of medium and small firms produce the same goods as are produced by the big ones. Thus all firms, irrespective of their size, operate in the same market. The dominant position ascribed to large firms mainly derives from the fact that:

- a) they know the market better, can afford to advertise, and - even more important - have their own distribution channels which enable efficient control of the product market;
- b) they enjoy better relations with the credit system and are more able to finance themselves; they also enjoy more authority vis-à-vis the state bodies, and sometimes resort to bribery; and, being of large size, can employ advanced technology and thus have lower production costs.

Yet despite its disadvantages, the small firm manages to survive; even though large and small firms are engaged in a continual struggle in the product market. Just by virtue of these tense situations and internal contradictions within the capitalist world, there may be reasons for convergence and alliance

between small entrepreneurs and workers. In a complex political framework both may find themselves engaged in a policy that, on the one hand, tries to reduce the control of the production set-up by 'monopolies' and, on the other, seeks to curtail the power exerted by the big industrial groups on government and all the other political and administrative structures of the state.

Within the perspective of this analysis, therefore, and in the attempt to bring about the above-mentioned alliance, the labour movement would appear to be justified in defending the small firms against the large ones. The paths taken towards this goal are many, and well known: the leftwing parties have produced mass organizations comprising small entrepreneurs, encouraging and assisting them to band together in cooperatives. Through these organizations, or by direct means, the leftwing parties support the requirement of these small firms for advantageous credit, contributions from the state for sinking funds, and so forth. The attempt to construct a stable alliance with the small entrepreneurs, in the struggle against the economic and political power of the large corporations, also underlies the fact that although the national contracts stipulated by the unions with the Confederation of Industry and Intersind, are similar in content, they nevertheless feature certain differences and, in each case, have different expiry dates.

The second of the two theses we mentioned above as being very widely accepted on the left is of much more recent origin, less articulated and above all less coordinated in a general political hypothesis. However, whereas the former analysis finds it hard to fit in the phenomenon of decentralization, this thesis rightly identifies it as a new reaction by entrepreneurs to the workers' struggle. As we said above, this thesis, in its extreme form, finds no actual support and is here expounded only to clarify the argument. It is simple to the point of banality: the overwhelming majority of small firms rather than competing with the larger ones remain subordinate to them. Under the pressure of increasing control, by the workers, of the working conditions in the large factories, the big firms commission an ever larger portion of the work required for their production to small firms. The relation between the big firm and small entrepreneur who takes the commission is the same as that obtaining between the big firm and one of its foremen: the latter controls the production process and ensures conditions of maximum exploitation for the benefit of the firm. In confirmation of these premises, a series of episodes is adduced as being of particular importance; these are not at all infrequent and bear witness to the subordinate role of small firms vis-à-vis large ones. Several cases are thus quoted of small firms - or even artisan firms - placing their entire production capacity at the disposal of a larger firm; in addition, many cases where a firm has encouraged its own best workers to set up on their own, with guarantees of loans and commissions, but obviously imposing tough conditions on the production prices. This interpretation of the relation between large and small firms offers no simple guide to what patterns of alliance the working class should pursue. From such a thesis, indeed, it can be deduced that any attempt at cooperation between the labour movement and small firms would be useless; and likewise idle would be an economic policy providing any facilitations for the small firms. If these were provided, supposing the role of the small firms to be that of exploiting labour on behalf of the large firms, they would only end up as an increase in the profits of the head workers of "detached departments" or, in some cases, as a reduction in costs for the large firm.

On the other hand, as happens, it is possible to use the category of "subordination" to shift onto the large entrepreneur - onto the so-called 'monopolies' - the responsibility for the inferior condition of the workers in the small factory. The small entrepreneur producing for a third party can be depicted not as someone acting in the name of the large firm and sharing in its profits, but rather as a primus inter pares among the workers who are heavily exploited by the large firm. The alliance between workers and small entrepreneurs thus becomes natural and desirable. As regards the 'subordinate' entrepreneurs producing on commission, the entire analysis and conclusions that saw small firms as competing in finished products with the large ones regains

validity.

III. The production of small firms and the problem of Subordination

Introduction

In the previous chapter we saw how there is some support for the thesis that the majority of small firms is in at least potential competition with the larger firms; this in spite of the disadvantages arising from more difficult access to loans, less control over the channels of distribution, and, lastly, the impossibility of benefiting from many of the economies of scale available to the larger firms. In support of this thesis it is often argued - though without the backing of adequate data - that a large part of the small firms produce "finished products", not "details" or "semi-finished products".

On the other side, as we have seen, it is held that the small firms are very often 'subordinate' to the larger firms; the supporters of this thesis point out that, at least in certain provinces, the small firms mostly work on commission from the larger ones. The authors of the enquiry performed for the conference* of small and medium engineering firms in Bologna found, for instance, that about 62% of firms employing between 20 and 100 persons work on commission. Whereby they deduce that "the majority of small firms does not enjoy independent decision-making".

Both the first and the second of these 'proofs' need to be verified; but the logic of the reasoning is the same and can easily be perceived. To start with, both positions implicitly assign different and opposite characteristics to the finished goods market and the intermediate goods market. In the first of these markets - it is argued - the large firms are able to control the small ones only by virtue of their superior ability to orient and condition the purchaser; which amounts to indirect control. Think, for instance, of small firms producing gas cookers or farm tractors. Given the great number of purchasers on these markets, the commanding position of the large firms is based merely on their control over distribution channels, their greater ability to influence customers through advertising, and so on. Whereas the intermediate goods market is quite different. Here, the producers of finished goods - "who have direct access to the market", as is sometimes said, and are implicitly identified with the large firms - are in an advantageous position compared to the others.

The best bargaining position, according to this thesis, would be in a monopoly situation: the small firm employing its entire capacity in the production of gear wheels or radiator tubes for a FIAT car - it is argued - cannot choose among alternative clients and must of necessity accept the price imposed by the commissioning firm. The basic idea is essentially that the final stage of production - the stage resulting in the final goods, through which the entire demand 'passes' - is privileged as compared to the previous stages. The "derived demand" - the thesis argues - is controlled by the industries producing final goods.

Thus, in order to verify both the statements and the assumptions implicit in these two arguments, it is necessary to ascertain:

- a) the proportion of small firms producing "finished products" and the proportion of those producing "half-finished products" or "details";
- b) whether all the firms producing "parts" or "components", and these alone, work as subcontractors;
- c) whether all subcontractors, and only those, stand in a subordinate relation vis-à-vis the commissioning firm.

Over 50% of small firms produce finished goods

In order to answer the first of the above questions, the firms interviewed in Bergamo were classified according to their production as follows:

- a) firms producing finished goods;
- b) firms producing parts;
- c) firms producing components;
- d) firms performing repairs;
- e) firms providing plant and installation.

Not even a basis can be derived from the classification of economic activities made by ISTAT. Indeed, this classification distinguishes industries on the basis of production stage in which they operate only a few cases: metal engineering industries, for example, are given separately from mechanical engineering industries. Very often the classification makes a distinction between the destinations of goods produced: for instance, producers of machine tools and producers of "parts for machine tools" figure in the same branch of activity. It was possible for us to define or delimit some of the five categories given above without too much difficulty. The "repair" or "plant installation" firms can be identified with very small margins of uncertainty. With regard to the first of these categories (d), the only problem had to do with the firms which exist within certain large firms - for example with Dalmine - and rather than performing repairs, are responsible for the ordinary maintenance of plant. These firms have been included among the "repair" firms. No special difficulties were encountered with the definition of "half-finished products". These comprised drawn and rolled products, tubes, sheets, wire from the preliminary working of iron or from scrap iron or other metals: in other words, the products of the industry traditionally known as "metallurgic". Note that the category of half-finished products therefore excludes second castings from the foundries.

Much harder to establish was the division between "parts" and "finished products". The basic idea is that the first term - in accordance with the technical jargon used in the sector - indicates the single "parts" that make up a complex good, while the second indicates the final goods made up of these parts. Obvious examples of these two categories are, on the one hand, the individual components of a car or a machine tool, on the other, the car or the machine tool themselves. Along these lines we may consider as "finished products" those goods that - after assemblage or installation - are in whatever way self-sufficient and require no further treatment in order to provide the services for which they were demanded by the consumer or the entrepreneur.

Some further remarks will, however, be necessary before we can proceed to classification. In particular, final products have been taken to include also:

- a) all those goods produced in the metal engineering sector that are fitted to, or installed on, goods produced in other sectors, when in the finished product thus obtained the value added of the other sectors is greater than that in the metal engineering industry. This is the case with lifts, gates, blinds, but also with buttons, buckles, zip fasteners, small metal parts, the spiral binding of exercise books. Even though in these cases the finished products are the house, clothes, shoes, furniture or exercise books, it seemed rather an exaggeration to class the above products among "parts";
- b) products which, by themselves, are unable to provide the service required but become able to do so when coupled, on installation, with other devices chosen by the user. In this group can be cited motors, pumps, fuel tanks, certain types of crane, etc.

Lastly, among firms producing "parts" have been classed those providing chemical or heat treatment of parts made by other firms: in other words, factories dealing with, for example, the chroming or tempering of parts coming from elsewhere.

Table 12A is based on these criteria. Here, the firms interviewed have been subdivided into the various groups. Two principal data emerge from the table:

- a) repair and plant installation firms are generally small ones, the largest employing generally not more than 100 workers;
- b) if we exclude - as in Table 12B - the repair and installation firms, the proportion of firms producing finished goods remains more or less constant

- around 60% to 70% - among those with over 10 workers, whereas with those employing 9 or less it drops, but only down to 40%.

The first result was fairly predictable. It should be remarked however, how SIP and ENEL tend to entrust the installation of their plant to small firms. If the telephone systems were installed by workers directly employed by ENEL, the data would show at least some local units of plant installation with over 100 workers.

The second result would, on the contrary, seem to be of great interest. More detailed examination of the production of the smallest firms shows that their finished products all have special characteristics. Frequently these involve production in sheet metal (blinds, tanks, boilers) or in drawn metal (railings) commissioned by the building industry. In other cases, on the contrary, the small firms produce small metal parts.

The interesting point, in other words, is that these firms perform particular tasks, often in order to fulfil a single order. The type of working is in some way imposed by the type of market existing.

Producing "parts" does not mean working "on commission"

The next step, as we said in Section 1, was to verify the soundness of the hypothesis that final goods are never produced on commission, and vice versa that parts always are. To this end we constructed Table 13, where all the firms (Table 13A), the firms producing finished goods (Table 13B) and those producing parts or components (Table 13C) are subdivided according to whether they produce "for the market", "on commission" or "partly for the market and partly on commission". The hypotheses underlying the analyses we are in the process of discussing are flatly contradicted by the data in these tables. What emerges is that a large part of the finished products are produced on commission, and there is also a fair number of factories producing details or semi-finished products who do not work on commission from other firms.

Careful examination of the firms and their products should not leave us surprised by these results. To the many finished products produced on a large scale - often in different models in order to give the consumer or the entrepreneur a range of choice - can be added many final goods custom-produced for those for whom they are destined. An obvious example is the one already quoted of blinds and railings and, more generally, of many products commissioned by the building industry from the metal-working sector.

Another very widespread case of final goods produced on commission is that of machinery that must be constructed according to the specifications of the purchaser: examples are the large dynamos for electrical energy, each one matching the particular features of the dam, or, as regards goods of smaller value, certain machine tools having special characteristics. Lastly, another category or products showing these features is that of final goods for consumption or investment produced by one firm but carrying the trademark of another: in Bergamo there are firms producing "bronze knick-knacks" on commission. More important is the example of the Zanussi refrigerators which were sold with the AEG trademark, or the refrigerators produced by Philco and sold under the name of Bendis.

Conversely, there are frequent cases of "parts" not produced on commission. The most important involve the components of final goods produced in various models by several firms. Examples are many of the components and accessories of cars: accumulators, windscreen wipers, light alloy wheel hubs. To conclude, as we said, the analysis shows that the type of good produced by a firm does not correspond to the type of market in which this firm operates.

Working on commission does not mean subordination

The above result merely bears witness to the high level of division of labour attained by the production set-up of capitalism. But there is a final,

and more important observation to make, one that constitutes the answer to the last of the problems listed at the end of Section 1. If by subordination we mean "the ability of a firm to limit the profits of another firm - and, indirectly, given certain conditions, also its wages" - the study of firms working on commission and of their relations with the commissioning firms shows that subordination is a very infrequent phenomenon. Generally speaking, the firms working on commission do not operate in a market of monopsonistic type where the bargaining power of the commissioning purchaser is very appreciable, but rather in a market which, although highly imperfect, is fundamentally a competitive one.

It has long been known and needs no repeating that production on commission is compatible with a product price determined through competitive-type mechanisms. By way of example, take the competitions for tender, at national and international level, for public works or large-scale industrial manufactures: motorways, ships, large dynamos for hydroelectric dams in underdeveloped countries, nuclear power stations. Competitive pricing and production on commission can also coexist in markets for goods of lesser value. Everyone would agree that this class embraces a large part of the market for sheet metal products, and, of course, the entire market for repairs and installations. One typical example, though it has nothing to do with the metal engineering industry, can help to clarify the point: tailors producing custom-made clothes.

All these cases, however, are characterised by orders which account only for a very small part of the working capacity of the firm with which the order is placed. It remains to be seen whether competition and production on commission are compatible when the orders reach a volume where, in order to fulfil them, the firm is compelled to concentrate a large proportion of its production capacity on the task over a fairly long period. This is the case with the firms called "detached departments" by the Bologna FIM in the enquiry carried out in 1971: small foundries, workshops doing jobs employing lathes, cutters, drills, where "over 80%" of production capacity is employed in working for a single firm. Even this situation, in our opinion, is not sufficient alone to determine a condition of monopsony, i.e. where the commissioning firm clearly prevails over the supplier. In a complex industrial texture like that of Bergamo, or Bologna or Modena, a firm producing for a single customer can defend itself by producing for another without suffering serious repercussions. For example, the artisan making gear wheels for tractors can, if he chooses, easily switch customers and produce gears for machine tools; the metal carpentry shop cutting stampings for transformers can without difficulty produce laminations for electric motors.

We have available two indications of how in actual practice the small firms can switch their commissions without incurring serious harm. The first comes from an enquiry carried out in Modena in 1974 by the Faculty of Economics of the University. Out of 60 artisan firms whose production capacity was entirely absorbed by commissions from FIAT tractors a year and a half previously, 15 moved to producing for other customers without any problems. Here again each of the small firms was completely committed to fulfilling a single order. Another similar case, this time involving a factory employing more than 100 workers, is quoted in the enquiry carried out in Bologna for the conference on small and medium engineering firms: "Till six months ago, REM worked for GD (now it produces only for Zamboni), doing precision tasks on a very small scale in which the professional skill of the worker played an important role".

The enquiry performed here in Bergamo mentions no such examples. However, this is not accounted for by the fact that Bergamo shows no cases where an artisan or a small firm switches from one commissioner to another without any problems. As a matter of fact, no attempt was made to find cases of this sort. Indeed, when the enquiry began, none of us had any inkling of the existence of this market for working on commission which, however, imperfect, nevertheless preserved several of the features of the competitive market. It was known that a very large number of firms were involved in fulfilling commissions on this

market, but none of us suspected that the number of commissioning firms was also very high. But the enquiry has shown that, among the firms that decentralize their production, we must include not only the medium and the large ones - which in Bergamo number over 60 - but also a high percentage of those with less than 100 workers. Table 14 clearly shows that at least 40% of these last-named decentralize a part of their production. Yet the figures in the table still underestimate the phenomenon, since they refer to firms that decentralize part of the production for which they are themselves equipped. Thus for example, the said figures do not include a machine tools factory that does not itself carry out any metal carpentry but prefers to commission tasks of this kind outside. Table 12, already cited, may provide a significant point of reference for a better evaluation of the quantity of small firms decentralizing their production. According to this about 60% of the small firms produce finished products. Indeed, we can be certain that, in practice, all the firms in this group commission work from others.

Lastly, we should not forget that artisans and small firms in one area often work for firms in another area. In Modena, for example, certain artisan firms actually work on commission for large German companies; in Bologna a significant amount of work is commissioned by Necchi of Pavia.

To conclude: we mentioned the possibility for small firms working for third parties to switch their commissions fairly painlessly. This feature, combined with the high number of commissioning firms - small, medium and large, within the one area or outside of it - lend the market for commission working the characteristics of a basically competitive market. The only datum that can be adduced to contradict this conclusion is the fact that the firms producing for third parties sometimes grant the larger firms quite appreciable discounts. This fact is sometimes quoted as proof that the larger firms enjoy a presumed power of monopsony.

In reality, there are two explanations for the fact that the larger firms are often charged lower prices, and these would seem quite sufficient to account for the phenomenon without dragging in forms of market that imply conditions of subordination. The first reason is that the large factories are "good customers" by virtue of the larger volume of their orders. This may persuade the producer of parts on commission to grant a discount; but this discount is always a very small one in practice. There is a more important datum to account for this phenomenon. Since the large firms generally order a great number of the same item, the work necessary to set up the machine tools corresponds to a larger number of pieces and this the average cost per piece is lower. So the lower price is determined by the scale of production, not by the size of the firm.

The conclusion drawn - namely that "in general the small firms do not stand in subordinate relation to the large ones" - has important political implications. It shows that the responsibility for the worse conditions of the workers in the small firms cannot be laid at the door of the large firms, nor of the small entrepreneurs. For their would be no sense in arguing that the wages paid in the small firms working for third parties are lower because the prices paid for the parts they produce are lower. The causal relation leans in quite the other direction: as in all competitive markets, it is the level of wages - or, more precisely, the cost of labour - that determines the level of prices, and not the other way round.

There exist, however, real cases of subordination, and in each case there is dependence by the small firms on the large ones

All that has been said so far does not mean, of course, that there are no cases where conditions of subordination do not obtain; that is to say, where, owing to a particular situation, the commissioning firm succeeds in restricting the profits of the supplier firm to its own advantage. When this occurs, however, the different bargaining power of the two contracting parties derives neither from the difference of size between commissioner and supplier, nor from

the volume of commissions in relation to the production capacity of the supplier. Instead, a particular situation lies at the origin of the commissioning firm's ability to limit the profits of its supplier (this being the only sense in which "subordination" can be understood): it may sometimes happen, for example, that the larger firm has granted a loan to the former, or that the smaller firm uses machinery so specialised as to deter it from switching customers without incurring serious problems. Cases like these are, however, relatively uncommon. Among artisans, less than 10% are likely to find themselves in situations like these.

We have just emphasized that it is very uncommon for a firm, however large, to be able to exert a direct influence on the price of a job put out on commission. By contrast, it is worth pointing out that, through decentralization the large firms can very appreciably influence the levels of employment in an area where they operate. When commissions are abundant, the ups and downs of a large firm will make themselves felt, and at very short notice, throughout the surrounding industrial texture.

Some special situations may occur, especially in the South, where the structure of industry is so poorly articulated that the crisis of a single firm may affect an entire sector. Leaving these aside, however, it should be noted that this role of leadership assumed by certain firms over others does not detract from the correctness of the conclusions drawn above regarding the characteristics of the market for production of parts. If it is true that the fall in turnover of a firm may have significant effects in the surrounding area, it is equally true that the results of these variations in the levels of employment will be felt not only by the particular firm in difficulty but by all the firms in that sector. Therefore, the ability of a firm to affect levels of employment outside itself - sometimes involving a number of other workers between one and four times the number it employs - should not be confused in any way with the ability to determine the price of work put out on commission.

On the basis of these last remarks, it may be useful, by way of conclusion, to introduce a distinction between those firms who are more directly responsible for employment levels and the rest, with reference to an area and a given sector. The former firms, which produce final consumer or investment goods, or produce for markets in other countries or, simply, other areas, can be called "direct demand firms". Between these firms and the others, the "indirect demand" firms there is a leader-dependent relationship. When this is clarified, it may be useful in working out union strategy and in planning the economic development of an area.

IV. Economies of scale and technological level in small firms

Introduction

At this point it is worth briefly recalling that the various interpretations of the role played by small firms within the production apparatus show nothing like agreement among themselves. Some maintain that these firms use a backward technology, their important task being above all to take up the workers whom large industry has not managed to absorb. Others credit small industry with advanced technology, emphasizing the fact that the decentralized production stages of big industry devolve on them. To ascertain the technological level of the small firms will therefore be a significant contribution towards clearing up one of the most controversial points of the debate. And this empirical verification takes on all the more importance as it becomes essential to identify the relation between the increase in decentralization and the overall productivity of the sector.

Thus, in the enquiry conducted here in Bergamo, the attempt to assess the technological level of small firms has occupied an important place. Before setting out the results, however, it will be essential to say something about the so-called "economies of scale" that, of necessity, play a significant part in any evaluation of the efficiency of the small firm. This will be done in the

next section. In the two sections following that, the results of the enquiry will be dealt with. The final section offers some hypotheses on the factors involved in determining the size of the firms.

Small firms also have access to "economies of scale"

There is a very strong and widespread conviction that high levels of technology - i.e. high levels of labour productivity, to refer the sole possible measure of technology - are necessarily associated with large scale production, feasible only in factories employing a large number of workers. The ratio of production scale and number of workers is, of course, not a rigid one. Still, in this context and at this level of generality the rule that high volumes of production require many workers is more or less valid. This opinion also enjoys plenty of support within the labour movement and finds confirmation in a series of statements by Marx: according to him, only by "presupposing large-scale cooperation" "can the division and combination of labour be organized", and only by "mass concentration" can "the means of production be economised".*

Suppose, then, that this conviction were justified by the characteristics of contemporary technology, i.e. that a good level of technology can only be attained in large or, at most, medium-sized firms; in that case, the presence of a large number of small firms could only be evidence of low productivity. But, on the basis of the data collected in Bergamo, it seems clear that there has often been an overestimate of the size a factory needs to be in order to adopt the "best technology" in use in the sector at a given moment. In our opinion, this wrong view essentially stems from the fact that the minimum but optimal size of a firm is usually evaluated with reference to a factory where the greater part - or at least a very large part - of the stages necessary for the production of a certain good are performed.

Thus, for instance, we have the idea of a refrigerator factory as a place where there is a long assembly line, requiring hundreds of workers if the "best technology" available is to be adopted; alongside this, all the other departments at either end of the assembly process also employ hundreds, maybe thousands of other workers, producing parts to send to the assembly line and putting the finishing touches to the refrigerators as they come off the line.

A view of this kind, moreover, finds confirmation in the traditional theoretical treatments of economies of scale. In order to calculate the minimum optimal size of a factory, works dealing with industrial economies explicitly advise that the production department requiring the highest scale be taken as point of reference and that from that datum the dimensions of all production units prior and subsequent to that department be deduced. And not only that. It may happen that two production stages - requiring a high production scale - appreciably diverge in size; in which case, the optimum scale for the factory, in terms of production units, will be the lowest common multiple of the dimensions of the two departments.

For instance, let us suppose that in a car factory the transfer machine for producing the engine block demands a minimum production of 500 pieces per day, and that the assembly of the bodies involves a dimension of 750 vehicles per day. The optimal dimension of that factory will correspond to an output of 1500 cars per day, or to a multiple of that quantity. This dimension enables full utilization of the two most 'demanding' machines: the factory will employ three transfer machines and two lines making the bodies. The dimensions of all the other departments will be made up on the basis of this volume of production: i.e. all those departments needed for the production of mechanical parts (using lathes, cutters, drills, reamers), those producing details of metal carpentry (presses, benders, cutters, small stamping machines) and lastly, the departments where the engine is mounted on the body, the departments dealing with painting, upholstering, finishing etc. To conclude, the size of the factory in terms of workers employed will be given by the sum of all the workers needed to perform the above tasks and the clerical and

technical staff. What remains to be explained - and here lies the most important source of the misunderstanding - is why all this machinery should be collected together in the same factory. Of course, it is easy enough to see that dispersing the individual assembly parts over various factories would mean a drop in labour productivity. But an assembly line essentially represents a complex working unit and dividing it up into components would be like dispersing over different factories the individual parts that, once assembled, make up a machine tool.

The case of a factory and the production units of which a factory is made up is different, however. Unlike the assembly line, a department employing 200 lathes does not constitute a complex mechanism but is simply the result of a juxtaposition of so many, essentially autonomous, working units. Each of the 200 lathes could without difficulty be used by itself in a small workshop. The situation remains much the same even if the production units located together in a large factory are different from one another. For in this case, too, there are no clear technological reasons for supposing that the production units of a factory will become more productive if they are sited next to each other. In other words, there are no obvious grounds for thinking that the amalgamation of all this machinery under the same roof is a necessary condition for achieving economies of scale. When Marx explained why it was useful to gather together in one and the same factory not only a chain of heterogeneous machine tools along which the object of the labour passes through a continuous series of gradual different processes, but also an agglomeration of homogeneous* operating machines he was adducing, first and foremost, a technical reason.

For in the factory "the several operating machines are driven simultaneously and uniformly by the energy common to all deriving from the first engine"*.

It is this unit of the central engine, typical of mid-nineteenth century technology, that transforms the factory into a "mechanical monster, whose body fills entire buildings, whose demoniacal force - 'formerly concealed in almost solemnly measured movement of its gigantic limbs - explodes into the mad, feverish, whirling dance of its innumerable working organs"* . Even though he maintains that the "combined operation machine (...) is the more perfect, the more continuous its overall process, that is to say, the less interruptions occur in passing from the raw material to the final stage", there can be no doubt that, according to Marx, "the main economies in the employment of constant capital"* , are linked to the scale of production through the performance of the machines producing motive power. "In a large factory with one or two central engines, the expenditure on these does not grow in proportion to the relative power and thus the relative sphere of action: the expenditure on transmission devices does not increase in the same proportion as the mass of working machinery powered by these devices"*.

That the economics of scale in the production of motive power, when Marx wrote, were very sensitive is demonstrated by the way, described by him, in which artisans attempted to react to competition from the large factory: i.e. by banding together to produce motive power at lower cost. "At the centre of some rows of cottages built in a square a so-called engine house was built for the steam engine, which was connected with the cottage looms by means of shafts. In all cases the steam was rented, for example at two shillings per loom"* . With the invention of the electric motor - whose power supplies are almost constant with the variation in size - the technical datum that in Marx played a central role in accounting for the trend towards concentration at factory level lost all significance. "A tailoring factory (established) by the juxtaposition of several sewing machines in the same workshops"* nowadays no longer achieves any saving in the production of motive power, as compared to a large number of sewing machines each operated by a home worker.

On the contrary, contemporary bourgeois economists attempt to explain the reason why different working units are gathered together in one factory by referring mainly to:

- a) the greater costs that would be involved, in a situation of "vertical isintegration", in order to coordinate the work of the projects department

with the buying department, instead of directly with the production departments;

- b) the easier adaptability to change, which is held to be characteristic of the large factory;
- c) the need to avoid monopoly situations in purchasing raw materials or in selling one's own product. (The example usually quoted is that of copper refineries: any firm not acquiescing in the monopoly of the big multinationals that control copper, must expand its activities in the field of research and copper mining.)

At first glance, point (a) would appear to be quite well founded. As for the greater adaptability to changes of product on the part of large firms, this would seem highly questionable, at least in the majority of cases. It is certainly true that the need to escape the influence of monopolistic forms may in certain cases exert decisive pressure towards vertical integration; though this factor obviously affects only large firms.

Aside from these above-mentioned factors, there may be other elements which firms must bear in mind in establishing the level of vertical integration at which they operate. For with the variation of this level there may also be changes in the costs of transport and warehousing - which make up the principal elements of that 'continuity' of which Marx speaks - and also in the costs connected with quality control.

Whether the differences in transport costs are positive or negative mainly depends on two factors:

- a) the localisation of the producer of the raw material needed to make the product with respect to the factory producing parts and with respect to the factory where assemblage is carried out
- b) the cost of transport of the raw material as against that of transport of parts produced.

The differences in the warehousing costs may be quite appreciable and advantageous to a vertically integrated factory. Note, however, that in large plants stockpiles divide each machine tool from the one following, thus ensuring a smooth production flow. The more widespread this type of work organization, the lesser will be the differences in this cost item. Nor is it possible to give a hard and fast answer as regards the costs of product control. It can, however, be noted that the costs of control of details produced outside the factory will be all the lower, the more sophisticated and articulated is the overall industrial texture.

To conclude, among all the factors considered, it is impossible to pinpoint one that is at the same time important and generalised. The need to deal with monopoly situations - which seems to be the sole element capable of exerting a decisive influence on company strategy - makes itself felt only in particular instances, and in any case only affects very large firms. The differences in the costs of coordination and warehousing - which are certainly conducive to vertical integration - do not seem noteworthy. As for the costs of control and transport, and the adaptability of a firm to changes of product, nothing can be said. It is not even clear whether these elements are conducive to, or dissuasive from, a high vertical integration.

If these conclusions were completely verified in actual practice, it would, paradoxically, be possible to argue that, using the same machinery, there would be no difference in the productivity of labour in a 'normal' situation and the productivity of labour in a situation of total vertical disintegration, where each factory has only one "production unit" and where the size of each factory, measured by number of workers, is determined by the labour force needed to operate the "production unit". If the mechanical details were produced with the same lathes; if the metal carpentry details were stamped with the same presses; if the chroming were done with the same "baths"; if the assemblage were performed with the same lines; if, in short, the machinery employed were the same, the same economies of scale would be obtained. The fact that lathes, presses, baths and assembly lines are housed in separate premises instead of under a single roof would have no effect on production costs. The sole difference between the two situations is that in the second - where a

total vertical disintegration is achieved - there would be a highly developed market for details, where the firms that assemble the final goods purchase, or commission, everything they need. Less paradoxically, it seems possible to conclude that, as a rule, even very small factories can achieve economies of scale if the work they perform has the corresponding minimum optimum dimension.

In addition, the foregoing gives indications for a research method which proved very useful in the enquiry conducted in Bergamo. In particular, there emerges the conviction that - in order to evaluate the technological level of small firms, and to understand the logic of decentralization and its implications for the productivity of labour - it is necessary to make a careful analysis of the work carried out in the small firms and decentred towards these firms.

Thus the two following sections are devoted, respectively, to this analysis and the evaluation of the machinery employed.

Operations performed in small, medium and large firms

On the basis of the foregoing, data were collected on the operations that each firm performs within its own premises and those that firms put out on commission.

Before collecting the data, a classification was prepared of the operations performed in the metal-engineering industry. Using information obtained from factory councils and technicians in the sector, and with the help of specialist publications, these operations were listed - and they ran to more than 80 - and grouped in seventeen classes. It was then seen, factory by factory, how the workers were subdivided between the various departments. Note that this notion of "department" is not the same as that commonly used when referring to the organization of work in the factory, though in the case of certain factories the two notions overlap. The "turning" department, for instance, in our tables involves all workers using lathes, regardless of the fact that all of them work in one of the units as set up in the hierarchic organization of the factory. Viceversa, the workers in a single unit of a factory, when their number was not too small, were divided into different "departments" if they performed different operations within that unit.

Table 15A refers to all the firms interviewed and reports the data so collected.

It is important to note that the operations in which the working units generally employ a smaller number of workers - i.e. metal carpentry and mechanical operations - are more widespread in the small than in the large factories. As can be easily calculated, if we leave aside repair and plant installation departments, the carpentry and mechanical operations together involve 80% of workers in the smallest factories, more than half in those with 10 to 49 workers, only about 40% in those with 50 to 500 workers, and even less in the largest factories. On the contrary, if we exclude the metallurgic firms in order to get a more homogeneous comparison, we see that the percentage of workers employed in the assembly department rises constantly as the size of the firm increases. (This datum, however, means something different from the preceding one since in this case - as will be seen in the next table - the techniques used in the small factories often differ from those employed in larger firms.)

Tables 15B and 15C separate firms producing finished products from those producing details and semi-finished products and give us a whole series of information on the type of work performed in the various factories.

Highly significant, to start with, is the fact that among the workshops producing finished products about 70% of the workers perform metal carpentry operations; both the production on commission of railings and gates, and that of metal sheet manufactures too various to make by stamping substantially rule out economies of scale. In this type of production the small firm can be as efficient as the large one. Still on Table 15B, referring to factories making finished products, it is important to note that in the firms with more than 500

workers, those employed on the assembly represent about 40% of the total. This datum shows, with singular clarity, that the level of decentralization reached by these factories is by now very high. Less clear, or even misleading, is the datum regarding the assembly departments in factories with 10 to 39 workers and 50 to 99 workers. In order to interpret it correctly one must bear in mind that in a fair number of small firms producing metal sheet or stamped products - especially when these products are of large size - the work of assembly ends by merging with that of the metal carpentry: rivetting and welding operations must be included among the carpentry operations but they also belong with the assembly operations. To obviate this confusion we could remove from the calculation those firms producing large metal sheet products; then the proportion of workers involved in assembly in these firms would increase considerably. These classes of dimension include several firms that decentre all operations except the construction of prototypes and the assembly. Such is the case, for instance, of factories employing less than 30 workers to produce scales, dishwashers, machines for the paper industry and machines for the textile industry.

By decentralizing, these firms recover - or can recover - a great part of their economies of scale: each piece and each operation (from the pedestal of a machine tool to the chroming of a door knob) can be achieved using machinery with an optimal scale. Note that, in the tangled relationships arising out of this situation, the firms working for third parties no longer figure as those operating the worst forms of exploitation on behalf of the big monopolistic firms, but rather as the indispensable support for the more sophisticated small enterprises.

Table 15C, too, shows how the division of labour achieved by the industrial structure is compatible with the reasons of efficiency. Mechanical operations - in which, as we said, the working unit employs a very small number - involve two thirds of the workers in the smallest firms. This area, too, - as compared with factories of large size - concentrates workers in the firms with 10 to 49 workers. Lastly, Table 16 reports the number of "departments" that decentre a part of their activities; it gives both the absolute number and the percentage out of the total of departments of that type in firms of a certain class of dimension. For example: in the factories with 10 to 49 workers there are two "metallurgy" departments - equivalent to 25% of the "metallurgy" departments present among all the firms that employ from 10 to 449 workers - that decentralize part of their work. As can easily be seen, the data are very rough and approximate. They do, however, provide a picture which, when completed with the rest of the information collected by the enquiry, confirms the hypotheses put forward hitherto.

Actually, the metallurgy operations that have been decentralized largely consist of wire working, for which there are no important economies of scale. Also decentralized is the operation of scrap metal selection which Dalmine has handed over to a substantially fictitious firm. Among the decentralized foundry jobs the complementary operations of sandblasting and cleaning figure importantly. Even in the large foundries these operations are usually performed by manually controlled equipment, especially with large-size casts. In metal carpentry there is more differentiation. Many firms - small, medium and large - where carpentry represents a marginal aspect of the production process as a whole, decentralize almost all operations. Others - where carpentry operations occupy a more important place, especially in the large firms - produce the largest details in factory, sometimes using machines designed specially for the purpose; the smaller details are commissioned from outside firms, where they are produced by more versatile stamping machines. Almost all the mechanical operations - using lathes, cutters, drills, hobbors - are decentralized. Note the high percentage of "departments" decentralizing their production in firms with more than 100 workers. The relatively low percentage of smaller firms doing likewise can be explained by the fact that in several firms making finished products and employing less than 100 workers all mechanical working is decentralized. (The Table, as we mentioned, records only those operations that are partly decentralized.) Note, also, that the high proportion of finishing

operations that are decentralized is linked with the fact that in these operations the economies of scale are very often small ones. Lastly, to account for the rather high amount of decentralization in assembly operations, it should be remarked that almost all cases involve the assembly not of the final product but of the so-called "sub-groups", that can often be assembled without the use of special equipment.

Obviously the foregoing analysis could not be a long and detailed one; but it confirms, in conclusion, that along the complex path of operations necessary to produce a certain good, there is a whole series of points at which economies of scale play an entirely secondary role. The analysis also shows that among the smaller firms some operate at these very points, whereas others - i.e. those making finished products - are only apparently small since, in effect, they coordinate the work of a far greater number of workers than those on their payroll.

Machines in use in small, medium and large firms

As we saw in the previous section, the operations commissioned from the small firms are those that can be performed at a good technological level also by a reduced number of workers. It now remains to enquire into what machines the small firms actually have available. Let us take an example. We noted that lathe operations are decentralized. It is now necessary to ascertain whether the lathe used is technologically up-to-date or antiquated. In assessing the technological level of the small firms it would have been unhelpful and maybe misleading to take into account all the technologies made possible by the present state of knowledge. For this reason we have left out of consideration both the 'book of blueprints' with which the individual small entrepreneur could, in the abstract, make a choice of his machines, and the level of technology prevailing in other countries. Instead, the point of reference chosen was the technological level obtaining in medium and large Italian firms, for the same operation.

However much easier this renders the enquiry, some difficult problems nevertheless arise. A precise assessment of technological levels would, on the one hand, have required the construction of complex indices capable of taking into account both the type of machinery employed for a given operation and its state of preservation; and, on the other hand, it would have necessitated a profound knowledge of the technological situation in the sector on the part of the interviewers. And it would be all the harder to fulfil these conditions in view of the fact that the range of products and technologies in the engineering sector is one of the widest and most varied on the area of manufacturing.

It was therefore decided to simplify the problem drastically, by performing a first approximation analysis, based on a very simple classification of the equipment and on the assessment abilities of the factory councils.

Equipment was classified as follows:

- a) machines with numerical control;
- b) automatic machines;
- c) semi-automatic machines;
- d) machines with manual control.

Firm by firm, we asked factory councils, or shop stewards, or individual workers, what types of machines were "present" in the factory and what types were "predominant". Note that several of the arguments that follow are based not merely on data collected but also on impressions, judgements, evaluations and discussions after the data had been collected. In our opinion, these assessments constitute a not ineffective substitute for the complex index that we mentioned above and that, under other conditions and with more finance available, it would have been possible to construct and apply.

Tables 17 and 18 report the data referring to machines "present" and machines "Predominating" in the mechanical industries and those producing vehicles, excluding firms performing repairs and plant assembly. The tables

therefore exclude the metallurgic industries. To the questions "What machines are present in the firm where you work?" and "What machines predominate in the firm where you work?" several replies were possible. This explains why in both tables the total number of replies differs from that of the interviews. The figures reported in the tables give a picture of the engineering industry in Bergamo that coincides with the most widespread assessment of the technological situation in the Italian engineering industry as a whole.

Machines with numerical control are present, at a general level, only in factories with over 500 workers. But note that although this type of machine is present in 75% of the larger factories it does not predominate in any single one. In other words, the introduction of these machines is still in its first stages - one could almost say, in the stage of experiment. The most widespread types are the automatic and semi-automatic, and these characterize the stage of development so far achieved by the engineering industry in Bergamo. The former are present almost everywhere in factories with more than 100 workers, though with a drop in those with 100 to 250 workers; they represent the predominant machine in about one quarter of the firms. Automatic machines, too, can always be found in factories with over 100 workers and predominate in the remaining 75%.

In firms with under 100 workers the situation alters significantly. In each of the three classes of dimension into which the firms with less than 100 workers are divided automatic machines are present about 30-35% of cases, and predominant in 10-15%. Semi-automatic machines predominate in one third of the cases. Combining the two figures, therefore, we can say that in all the classes of dimension - including that from 1 to 9 workers - half of the firms employ a technology that has reached at least the level of semi-automatic machines. The other half have a technology based mainly on manually controlled machines. Nonetheless, in this backward half it is possible to distinguish between the firms with over 10 workers - where semi-automatic machines are, at least, frequently present - and the smallest firms where only manually controlled machines are employed.

The smaller firms, as we said, therefore present a different picture from that sketched for the larger ones. Yet it is also very different from the picture of backwardness and underdevelopment usually painted. And, in an overall assessment, it must be borne in mind that the figures relating to the smaller firms are affected by the fact that when, as often occurs, these firms are engaged in metal carpentry and assembly, they cannot use automatic or semi-automatic machines. The construction of tanks of various sizes, or of cranes, or the assembly of toys or electrical circuit boards, cannot be done with automatic or semi-automatic machinery but require manually controlled machine tools.

The dimensions of the factory are determined by Economies of scale generally play a negligible role

As we have seen, in the previous sections - leaving aside exceptional cases technological requirements play a far less important role in determining the size of a firm than that generally assigned to them. To sum up, it was said above that technology imposes a dimension on the "working unit" (lathe, press for stamping metal sheet, assembly line) but that - at least in the majority of cases - it does not encourage the concentration of several working units within a single factory. Thus there arises the problem of identifying exactly which forces encourage or discourage the aggregation of the various working units; or, more generally speaking, the problem of identifying the factors that determine the size of a firm. As a first approximation, it could probably be argued that, whereas the factors conducing to the aggregation of working units are basically of an organizational nature, those that press in the opposite direction are, above all, political.

In a situation where the owners exercise overall political control over the working class, entrepreneurs tend to concentrate their activities on one

factory, or a small number of factories. The main reason for this, in our opinion, is that less effort of organization is needed to overcome all the problems connected with setting up and starting off production when all the plant is concentrated in the same premises instead of being dispersed over several different factories. Relations with local administration, setting up the hierarchy necessary for the plant to operate, relations with suppliers and, in general, all the problems of coordination, are certainly more difficult if they have to do with five factories with 2,000 workers than if they relate only to a single factory with 10,000 workers. Note that the presence of all these problems does not contradict what we have said about economies of scale. The difficulties of coordination and organization that encourage concentration are important only in the initial period, when the plant is being constructed or set in operation. When this stage has been overcome, however, all the justifications for the single factory lose validity. Relationships develop between the various factories and the social environment that surrounds them and procedures are gradually found that enable their activities to be coordinated without undue friction or delays.

It is essential to note that even in periods when the entrepreneurs have no difficulty in exerting control over the workers, there may be appreciable differences between wages paid in large firms and those of small ones. When this happens, however, the highest wage paid in the large firms does not represent the outcome of a conflict - as is now the case in 1974 - but, rather, the price the entrepreneur chooses to pay in order to achieve two equally important results. For, in this way, he guarantees himself the possibility of selecting the most highly skilled and the most docile workers in the labour market and, on the other hand, manages to impose working rhythms that would otherwise be out of the question.

Aside from these organizational factors we have mentioned, there is another which may tell in favour of the large firms: namely, the need to operate highly sophisticated quality control on items produced. This element may be important above all when the work process requires very advanced technologies; and it assumes all the more importance when the technical capabilities in the network of small factories surrounding the large factory are not very high.

These stimuli towards aggregation of the working units lose all significance when control over the labour force becomes more difficult, as a result of greater combativeness and better organization among the workers and, above all, owing to the overall political climate. As conflict grows tougher and the workers manage - at least in certain moments - to exert real control over the organization of work, the picture changes completely. In this situation, the large factory becomes the place where wage-earners and capital enter into most direct confrontation and harshest conflict. Above all, the large factory, where the proletariat gathers "in great masses" is the place where the strength of the proletariat grows, "and with its strength also its consciousness of that strength".

From the entrepreneur's point of view, the evil of the large factory is not only the high wages the workers manage to obtain. To this must be added the fact it is also the place where union organization breeds and the political organization of the proletariat put down roots; imagination is richer and insubordination is more radical. In this sense, therefore, to talk of the "need for workers' control" is a very different matter from talking simply of "labour cost" or - as would nevertheless be more correct - of "rate of increase of labour cost".

Entrepreneurs can respond to this situation in various ways: some articulate their enterprise over several factories; others artificially subdivide the enterprise into different units juridically independent of each other; yet others commission a series of operations outside the firm, retaining control only of the most important operations. The ultimate aim, however, is somehow to split up large concentrations of workers. Pursuit of this aim, by whatever means chosen, forces the large firms to make appreciable improvements in management and organizational devices. This can be done fairly quickly and

without too many problems. And it is only in this case - when it becomes a matter of priority to split up concentrations of workers - that technological factors take on a significant role in determining the dimensions of firms. For, as we have seen, as long as the work force can easily be controlled, the optimal technology will determine only the scale of the working unit and it will be the entrepreneur who decides how many working units to aggregate in a single factory (and thus the size of that factory). On the contrary, when the entrepreneur wishes to disperse the working units, the limits imposed by the optimal dimensions of the working unit become operative.

Recent Italian history offers plenty of examples of how entrepreneurs respond to different political situations. The largest factory in Italy, at Mirafiori, was built in the Fascist period, when control over the workers was exerted by typically political means external to the firm. The setting up of the FIAT plants in the south of Italy certainly has to do with the desire to escape from the concentration of workers in Turin. The undertaking by SIR to split its company at Porto Torres among 60 firms makes coordination among the workers very difficult and cannot be accounted for merely by the need to obtain a larger amount of contributions from the State. Lastly, the tendency to decentralize production, which significantly intensified in the late 1960s, can only be explained as an attempt on the part of entrepreneurs to stem a workers' offensive that was becoming too strong.

And, to conclude this discussion, it is important to note that the factors that determine the dimensions of a firm, as we have identified them here, coincide with those that determine the organization of work within the factory. In both cases "all the means for increasing production are transformed into means of domination and exploitation on the part of the entrepreneur"*. Means of domination, which is to say control over the "worker-individual" and the working class in general; means of exploitation, i.e. such as to exalt the productivity of labour.

Yesterday, the so-called scientific organization of work served both to increase productivity and to utilise the labour of ex-farm labourers against the skilled workers belonging to the "leghe operaie". Today, the practice of decentralizing production is a device by which small firms are entrusted with control over the largest possible share of the work force. Working rhythms are no longer measured with the obsessive precision of the "time and motion" department; rather, they are imposed by the continual presence of the small entrepreneur. Thus the organization of work based on fragmentation of tasks and piecework gives way - whenever possible - to an organization based on direct control, exercised with the help of a minute knowledge of the production process and achieved in a climate of consensus or even real cooperation, when the small entrepreneur succeeds in getting the workers to identify themselves with the firm.

Appendix One

Choice of sample and its representativeness

In order to choose a sample company representative of the engineering firms operating in the province of Bergamo at the start of research, it would have been necessary to have an up-to-date list of all the firms, specifying the numbers of workers employed by each firm and its class of activity.

It is impossible to obtain a list of this sort from public bodies: census data are not available to private persons and, in any case, would not have been updated to the time of the enquiry; the data of the Inspectorate of Labour are also secret and inadequate as regards firms with less than 10 workers or, in some sectors, less than 5; the register of companies kept by the Chamber of Commerce includes several firms who have ceased activity, does not specify with precision which sector the firm operates in, and gives no idea of the number of workers employed; the register of artisans is more precise as to firms that have ceased activity but has otherwise the same limitations as the register

above mentioned; the lists of firms paying INAM and INPS contributions - not easy to have access to - give the numbers of employees of firms operating, but the subdivision of the firms into classes is extremely approximate. On the other hand, it would have been very expensive to make up a complete list of the firms operating in the sector. The list of firms from which the sample was selected was therefore patiently prepared by collating a very incomplete list given us by one of the welfare authorities with the registers in which the Bergamo FLM records its own members. Much information was also collected from trade union officials in the area. Thereafter the firms on the list were subdivided according to size.

From the firms included in the list a sample stratified according to dimension was extracted: the sample is composed of:

- all firms with 100 or more workers;
- 75% of firms with 50 to 99 workers;
- 50% of firms with 10 to 49 workers;
- 7.5% of firms with up to 9 workers.

In some firms it was not possible to perform interviews. There were various reasons for this. Sometimes the firm could not be found because it had closed down or changed premises. In some cases the workers could not be persuaded to reply to the questionnaire. Hence, as can be seen in the table below, in each of the classes of dimension the number of firms given is less than that in the sample.

Local units and workers operating in the engineering sector in the province of Bergamo, according to class of dimension

	1		2		3		4	
	firms	wkrs	firms	wkrs	firms	wkrs	firms	wkrs
-> 9	3643	9706	1646	6238	123	482	113	439
10-49	541	11063	308	7946	154	4091	151	4051
50-99	96	6521	80	5441	60	4149	56	3863
over 99	72	29253	70	30249	70	30246	69	30479

1. according to the industrial census of October 21, 1977.
2. according to the line followed in this enquiry.
3. firms, and their workers, included in the sample to be interviewed.
4. firms in which interviewing was successfully carried out.

Examination of the table will give some overall idea of the representativeness of the sample of firms on which the research was carried out. With reference to the data reported and the whole procedure followed in choosing the firms to be interviewed, it can be observed that:

- a) in all classes of dimension the differences between the data in column 1 and those in column 2 can be ascribed - at least partly - to variations in the numbers of those employed by the firms between October 1971 and October 1972;
- b) owing to the part played by union officials in preparing the list, the less unionized forms are probably absent;
- c) those firms which, although included in the sample, could not be interviewed, are certainly among the least unionized in the area;
- d) the standard of organization and commitment of the Bergamo FLM makes it practically certain that, in the "class of dimension" with 100 or more workers, the differences between census data and the data in the list stem from variations in the numbers of workers employed;
- e) in the class of from 10 to 49 workers the average dimension is given by the census as 20.4 workers, but according to our list is 26.8; this indicates

that the list is clearly biased in favour of the larger firms, probably as a result of the role played by union officials in its preparation;

f) as regards the firms with up to 9 workers, the considerable discrepancy between the data in the first and second columns largely derives from the fact that the list prepared for the research included only those firms employing dependent workers. It is perhaps worth recalling that in the province of Bergamo, according to the industrial census, in October 1971 there were 2064 firms in the class of "up to 2 employees".

In conclusion, we can say that the sample of firms interviewed is affected by distortions of various origin. The effects of these are almost negligible in the upper classes of dimension but become more and more appreciable the further one descends. As a result of these distortions of the sample, the picture of working conditions as presented by our research is probably better than what really obtains.

Lastly, it may be worth recalling that, with no precise list of firms available, it would have been quite impossible to construct a sample enabling the characteristics of the sector as a whole to be determined. Thus although the results of the enquiry, allowing for certain distortions, well represent the situation for each class of dimension of the firms, they cannot be used for other purposes. Any overall evaluation could only be achieved by relating the results obtained to the census data, would require heroic assumptions to be made, and could only have the status of a very rough approximation.

Appendix Two

The cost of labour in overtime

- In the course of one year the worker
- has the right to four weeks paid holiday, equal to 160 hours;
 - has the right to 17 days of paid public holidays (weekdays), equal to 136 hours;
 - is presumed to be absent on sick leave on 10 working days, equal to 80 hours.

The hours worked by a worker in one year can be calculated as follows:

365 days
 ----- x 40 hours - 276 hours = 1,720 hours.
 7 days

Assume that a worker has a total hourly wage, inclusive of all items, equal to L. 1,000 in normal working time.

In order to calculate the cost to the employer of one hour of work, the L. 1,000 must be increased by

- 9.30%, equal to 160/1720, for holidays;
- 7.90%, equal to 136/1720, for public weekday holidays;
- 10.05%, equal to 173/1720, for Christmas bonus;
- 2.33%, equal to 40/1720, for sickness and accident integration, on the assumption that half of the wage paid to the worker during sick leave comes from the employer;
- 5.81%, equal to 100/1720, for seniority bonus, assuming the worker has less than 11 years seniority.

These costs represent an indirect wage for the worker and amount to 35.39% of his hourly wage.

In order to get the total cost of labour the above sum must be increased by the welfare benefits. These are calculated on the basis of the total hourly wage increased by all the items of indirect wage except the seniority bonus. In our example, therefore, the calculation is as follows:

$$[1,000 + (9.30\% + 7.90\% + 10.05\% + 2.33\%) \times 1,000] = L. 1,295.8$$

- The employer's share of the welfare payments is divided up as follows:
- 5.10% to INAIL, assuming that in the firm in question over recent years the worker has undergone a "normal" amount of accidents;
 - 13.96% to INAM;
 - 0.70% to GESCAL;
 - 26.19% to INPS.

Social payments therefore amount to 45.95%.

The cost of one hour's work in ordinary time thus amounts to:

- L. 1,000 of direct hourly wage;
 - L. 353.9 of indirect hourly wage;
 - L. 595.4 (equal to 45.95% of L. 1,295.8) of social benefits,
- producing a final total of L. 1,949.3.

The cost of labour in overtime is as follows. During the first two daytime hours of overtime, and for the first two hours of Saturday - if on the Saturday not more than two hours are worked - the hourly wage is increased by 25%, as laid down by the national contract. Since the items of indirect wage do not vary, neither absolutely nor in percentage as the overtime worked in the course of the year increases, the cost of overtime is equal to the hourly wage increased by the social benefits, and this amounts to:

$$L. (1,250 + 45.95\% \times 1,250) = L.1,824.$$

The third and fourth hours of overtime carry a higher increase on the hourly wage, amounting to 30%.

The cost of labour for these hours is thus:

$$L. (1,300 + 45.95\% \times 1,300) = L. 1,897.$$

Note, in conclusion, that on the first 12 hours of overtime per week (assuming that these are worked at two hours per day, including Saturday) the employer makes a saving of 8.2% as compared to the hourly wage in ordinary time. On the hours from the 13th to the 22nd the saving is smaller, amounting to 4.4%.

TABLES

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* Only in the hours of following the 22nd, or the second of Saturday does the cost of labour in overtime exceed that of labour in ordinary time. In this case the normal hourly wage in ordinary time. In this case the normal hourly wage is increased by 50% and the cost of labour is

L. $(1,500 + 45,95\% \times 1,500) = L. 2,189.*$

3.

For me, as for many others, certain of Sylos Labini's proposals for analysis have provided important food for thought.

But Sylos is also the author of two remarks that played a leading part in my own decision-making.

The first belongs to 1956. Fresh from my studies of Agriculture I was seeking admission to Cambridge in order to study there the economics that I had not managed to learn at Sassari. I sent in my application, along with testimonials from the dean of my faculty and the professor whose unpaid assistant I was, Enzo Pampaloni, teacher of Agrarian Economics in the faculty. The application was rejected. The following year I asked Antonio Pigliaru, who taught Philosophy of Law at Sassari and whom Sylos held in high esteem, if he could procure me a letter of introduction. "One cannot write letters of introduction for people one doesn't know personally," was Sylos's reply. "With his Quaker uprightness, I was almost certain he would give that answer," was Pigliaru's comment. Thus it was that I did not enter Cambridge until the year after that, with an introduction from Ross M. Walker, teacher at Manchester of Adult Education, who was working on an OECE project at Montiferru and whom I met almost by chance.

The second of Sylos's remarks, expressed in a much homelier more commonsensical way, was not made directly to me. "In order to win a professorial chair, you must serve up a nice juicy steak and fried potatoes round it," Sylos was accustomed to tell his pupils. By the "steak" he meant the book or monograph, by the "potatoes" a few articles and, perhaps, a review of the subject.

And in line with this second rule, since I had as yet not written the "book", I did not apply for the chair that fell vacant in 1976.

Then in the late 'seventies I wrote *Agricoltura ricca e classi sociali*, which Carlo Boffito accepted for publication in the Feltrinelli series of which he was codirector. The book was a complicated mixture of ancient enthusiasms - the agrarian economics that I had been concerned with in my university thesis and in the two years following - combined with what I had learnt about small firms. It turned out to be a little book about the small enterprise, but with one special feature: namely, that the small enterprises dealt with were agricultural ones. Thus there was some reason behind

the fact that in agriculture, too, I should have come across the phenomenon described by Stigler in "The division of labour", i.e. the expulsion from the firm of the stages having a disproportionately large minimum efficient size: as were the firms called in by the farmer to do the ploughing, the threshing, or even the transformation of the products of the farm. Once again I had amused myself in contradicting the commonplace - often typical of the left - which envisages no alternative between the furious exploitation of the big firms on the one hand, and a state of economic weakness, misery and continual crisis on the other. And did not the very title of the book refer to rich agriculture? The explanation I gave for the "persistence of the peasant farm" (to which I also devoted a long historical appendix) was even more closely linked to the experience I had gained in my studies of industrial sectors. And it so happened that Paola Villa, in an essay on the construction sector published in 1985, employed the same arguments to account for the mushrooming of small firms in that area.

And thus with the publication of this volume I had now satisfied the conditions laid down by Sylos. But I had still six or seven months to kill until the competition for the professorial chair was concluded in 1979.

Gibrat's law had never been tested over a network of small firms. Gathering the data presented obvious difficulties and other important problems arose out of my profound ignorance of econometric techniques.

(To this ignorance I can, of course, only plead guilty. With some extenuating circumstances: the fact that mathematics and statistics did not figure in either of the degree courses I had taken, at Sassari and at Cambridge, plus the strong irritation I feel at having to juggle with data that have often been badly sampled. I often wonder how Paolo Bosi felt when in 1987 ISTAT drastically altered their estimates of income and blandly announced that their historical series of data which had been in use for so many years were false. But all this counts for little. At bottom, I am finally convinced that, provided due care is taken with the quality of the data, here are highly useful instruments. I try to keep my sense of guilt under control by remembering that much can also be achieved without recourse to these techniques).

In the event, however, both problems were soluble. Following the work at Bergamo, we conducted a long series of researches, together with the joint union federations of metalworkers, textile workers and ceramic workers in Modena and Reggio Emilia. The questionnaire followed the same pattern as that of Bergamo: the greatest attention was focused on working conditions and on ongoing processes of innovation and decentralisation. Once again data were collected by shop stewards with union permission (and in several cases the information was re-collected at a later point in time). But this time assistance was provided by a group of students from my faculty. Over a number of years these students undertook the burdensome task of interviewing factory councils even as they simultaneously studied for their degrees. Which activities generated some degree theses, several reports to union conferences and, in certain cases, a good deal of curiosity and a style of doing research.

And together with this, a detailed knowledge of the industrial texture in the areas of Modena and Reggio. Partners with me were Werter Malagoli, who compiled and codified many of the questionnaires and interviews, and Enrico Giovanetti, who had originally come to Modena for the six-day "course for militants" in 1973 and had ended by moving to Modena on a permanent basis in order to work with the Faculty and the trade unions. In this way it was possible to reconstruct the historical series needed for verifying Gibrat's law, making use of data from the files of INPS, which was the only archive that could be drawn upon and then only by one who was already familiar with the history of the individual firms. (For, otherwise, each time the series had been suspended, this would have been interpreted as meaning that the firm had closed down; whereas, in actual fact, it sometimes meant that the documents had to be rummaged for in some store-room of INPS). Moreover, Giovanetti's keen interest in the study of statistics enabled him to act as econometrician of the

group, and eventually enabled us to utilise the knowledge of Vittorio Capecchi, as also of Bruno Chiandotto, who had just left Modena for Florence but was always ready to lend a hand.

The essay was to have been thirty or forty pages but, as can be seen, it at once got out of hand. The econometrics is, I think, correct, but it receded into second place. The results of the tests - even the less important ones - provided us with the opportunity (or maybe only the excuse) to report on what we had learnt about the three sectors under investigation, over the preceding years. The essay is essentially a final report, set out in the language demanded by academic usage, of all the researches conducted by the unions in the course of the 1970s.

At this time, in 1981, none of us three authors really understood the nature of the work we had done: which was, namely, to turn an academic occasion into an opportunity to write a history of industry in Emilia in the 1970s. This was, however, clearly perceived by Nando Vianello and Andrea Ginzburg, who invited us to rewrite the whole thing but without bothering about Gibrat's law.

And I continue to think that a good econometric analysis is all the more significant the more it is accompanied by a direct knowledge of the facts. For example, anyone who discovers with a regression model that the school or university diploma does not affect the length of time spent looking for the first job, can usefully refer to the host of small enquiries into the subject made by municipal and provincial authorities studying the transition from school to job. And from these small-scale home-made studies the same person can learn that the educational diploma has a supreme importance but one that differs according to the particular secondary school attended. So that in the ISTAT data, where the diploma is given as simply "higher secondary education", there is no further link between education and unemployment.

THE RELATION BETWEEN SIZE AND THE RATE OF GROWTH IN INDUSTRIAL FIRMS: AN EMPIRICAL RESEARCH*

1. Introduction*

In 1931, commenting on the census data relating to the size of the industrial firms in France, Gibrat observed that distribution of firms according to size may adequately be shown by a lognormal curve*; seeing that, on the basis of a uniform size population of individuals, a lognormal distribution may be generated from a process in which all units have the same probability of growth at a given rate of growth, he deduced from this that the rate of growth is independent of the size of the firm. This hypothesis later came to be known in literature as Gibrat's law or "the law of proportionate growth".

Since then, various versions of Gibrat's law have been worked out: a weak version, which simply entails that the probabilities that a firm develops according to a certain rate of growth are independent of the size of the firm itself; and a strong version, in which two more requisites are added to the preceding ones, i.e. that the standard deviation of the rate of growth be the same between small and big firms and that the

rate of growth of a firm be independent of the rate of growth that said firm experienced during the period preceding the one taken into consideration.

In subsequent years Gibrat's law was used for two main ends.

Firstly, with the principle of proportionate growth it was possible to explain ongoing concentration processes in industry.

The concentration of the product over few firms and the market powers deriving herefrom, could thus simply be attributed to the effect of accidental mechanisms.

When used to this end, Gibrat's hypothesis is efficient - i.e. it produces a concentrated industrial structure, starting from a situation where concentration is zero - even if the standard deviation of the rate of growth of a firm varies according to the variation of the size class; or even if the rate of growth of a firm during a given period depends on the rate of growth of said firm during the preceding periods*; or even if it may be assumed that firms of a smaller size class are continually coming into existence, as long as the amount of these is not too high in relation to the amount of firms present; or even if it may be

assumed that during each period examined, a certain amount of firms "die", i.e. go bankrupt or are forced to wind up.

Secondly, however, the principle of proportionate growth has furnished an opportunity - and a means - to verify certain theories about firms.

Indeed, it can easily be seen that the empirical verification of Gibrat's law contradicts the assumption that the curves of long period costs are U-formed, whereas it is compatible with the hypothesis proposed by Bain* that the curve of costs is J-formed.

(As regards more recent theories about firms, where the limit is set not according to the size of the firm but according to its rate of growth*, Gibrat's law is, on the contrary, substantially indifferent).

The present essay should be included within this range of problems.

The universe examined includes approximately 1250 firms and takes into account all the ceramic, metal-mechanical and textile firms operating in the Province of Modena from the beginning of 1966 to the end of 1977. It should be added that the size of the firms has been measured according to their number of employees and that the people employed in each firm have been counted at quarterly periods.

Thus there are two facts distinguishing this work from almost all past research on these topics.

First, there is the quarterly collection of data. In comparison with the usual procedure in which data collection of the conditions of the firms is carried out at the beginning and at the end of the period under examination, this method enables a close analysis which throws light on some problems which would otherwise remain unsolved. This means that by this method it is possible to study the relationship between the rate of growth and the size of the firm, not only as regards the rapidity but also as regards the way of growth.

The second difference derives from the fact that the universe of the firms examined has very special characteristics.

First of all - especially when compared to the firms studied by other authors - generally these are of a small size: the biggest has no more than 4000 employees, and their average size, in 1977, was 64 employees. Actually, seeing that their industrial nature does not depend on a minimum size, many of these firms have fewer than 10 employees: sometimes only 1 or 2.

(The study of these very small firms is of extreme importance because in the metal-mechanical and textile industries, where very small firms abound, more than 40% of the people employed work in artisan firms, and

it may be assumed that there are no important differences of behaviour between very small industrial firms and artisan firms).

Moreover, in spite of their small size, the firms examined generally have a good level of productivity. Almost all firms producing a finished product work not for the local market but for the national or international markets; thus it may be maintained that all the small firms which are subcontractors to these parent-firms, work, although indirectly, for national and foreign markets.

Finally - during the period and in the area examined, in two of the three sectors under examination - a very rapid vertical disintegration process has taken place; without exception, this process has involved all major firms and has caused the birth and growth of a wide range of minor firms. And it is easy to see that this texture substantially coincides with the type of industrial structure comprising the submerged economy or, rather, the structure of which the submerged economy is an essential component. The study of firms with fewer than 20 employees* - widely representing the submerged firms, as already mentioned - therefore marks a decisive moment in the survey of this particular industrial structure, which from the smaller

firms derives its increased ability to control the cost of labour and, more generally speaking, greater ability to manage the workforce.

Of course the data have been influenced by all the particular features mentioned above, but so, also, has the method by which this analysis has been projected and performed.

Indeed, the study does not set out to draw conclusions on the trend of the curve of scale*, nor on the features of concentration processes. (Obviously the statistical material available would have been grossly insufficient if it had been employed to this end).

The aims, instead, were basically the following.

Firstly, to compare the data relating to the universe of small firms to the data obtained by other writers, who, as already mentioned, always refer to bigger firms. The comparison is of general interest, because it enables the verification of the field of application of Gibrat's law.

Secondly, the research has experimented the possibility of using the investigation trends which the range of problems connected with Gibrat's law has simply proposed in order to point out the characteristic features of the process of growth having influenced the industries examined and which, therefore, very

probably has involved all the structures and industrial districts, too, in

which the submerged economy finds not only shelter but incentives and stimulation.

Finally, and this is certainly the most ambitious aim, the research tries to build up a strategy of analysis capable of, at least generally, illuminating the processes influencing a productive structure in rapid evolution.

The exposition scheme adopted - which is strictly connected with the above aims - provides, for each year under examination, a rapid survey of the research techniques and results obtained by other authors. The survey is followed by the illustration of the elaboration method we have followed and the conclusions reached.

On the basis of the available knowledge an interpretation of these conclusions will then be attempted.

Following this introductory section, the second paragraph will examine the relation between the size of a firm and the rate of growth from this point of view. The subsequent section studies the dispersion and the regularity of the rates of growth and the implications that both the one and the other have from the worker's point of view. In the fourth section, birth and death of firms are examined as special cases of growth: according to the birth rate and mortality rate, the trends in time are studied, as well as their

relationships with the rate of growth of the industry. Finally, in the conclusions, we try to give a comprehensive judgment on the validity of Gibrat's law and some considerations on the role and importance of the degree of vertical integration.

Sources and adopted conventions are indicated in the appendix.

2. The size of a firm and the rate of growth

The first attempts to verify Gibrat's law on the basis of data relating to small firms - rather than to the distribution of firms according to size - date from the middle of the 1950s.

The best known studies are those of Bain (1956), Hart and Prais (1956), Simon and Bonini (1958), Hymer and Pashigian (1959), Ferguson (1960), Mansfield (1964) and Singh and Whittington (1975).

Sometimes, the rate of growth of the size of the firm is identified with the size of its stock capital, measured in absolute value, in relation to the minimum efficient size, or in relation to the size of the biggest firm in the sector; in other cases, the size of a firm is measured according to the number of its employees.

Sometimes, the rate of growth of the size of a firm is studied in relation to a short or very short period, or more often as the average of a period of approximately 10 years.

In some cases the group of firms on which the verification of the law is attempted coincides with the total of firms quoted on the Stock Exchange. This procedure, however, may actually create considerable distortions if the industries have different rates of growth. What happens is, in fact, that in each industry, firms group into one particular size class and therefore, during the verification, the "industry" effect is superimposed by and mixed up with the "size" effect.

To avoid this danger, the verification of the law is sometimes attempted on a sample of firms of the same sector, or the same subsector. Eventually, some researchers prefer examining all firms operating in extremely concentrated industries (tyres, cars).

Various methods have been employed to verify Gibrat's law.

Some have studied the b coefficient of the regression line

$$\log D_{i,t+n} = a + b \log D_{i,t}$$

in which D indicates the size of the firm and the suffixes t+n and t indicate

the end points, initial and

final, of the period in question. (It can easily be seen that if the rate of growth was not independent of the size of the firm, b would not be significantly different from 1*).

Others have calculated the correlation coefficient between ranks between size and development.

In addition, the [EQN "x super 2"] test has been applied to the distribution of firms by size class and by the level of growth rate, and the F test to the growth rates by size classes.

Lastly, parametric and non-parametric tests have been performed and the variables examined have been considered sometimes of a quantitative type, sometimes of a qualitative type.

The results of this research are not clearcut. Some - in particular Hart and Prais, Simon and Bonini, and Hymer and Pashigian - confirm the independence of the rate of growth from the size of the firm. In other studies the results differ from one industry to another or without the same industry, changing according to the period examined. It also happens that different tests, applied to the same data, give contradictory results. On the basis of the results as a whole, Ferguson concludes that "the results of the test are widely indeterminate"*; Mansfield concludes that "Gibrat's law is verified in no more than half of the cases" and that "smaller firms tend to have higher rates of growth [...] than larger ones"*; Singh and Whittington, in

direct contrast to Mansfield, state that there is a significant, though not strong, positive relationship between size and growth"*.

The results emerging from our data - like those of the last three authors above - are widely contradictory and show, if anything, like those of Mansfield but to a higher degree, the tendency that small firms grow faster than big ones.

More in detail, the results achieved and the study procedure adopted are the following.

The annual rate of growth of each firm i, relating to the period from the quarter t to quarter t+n, has been calculated as

$$g_i(t,t+n) = \text{antilog} \frac{\log D_{i,t+n} - \log D_{i,t}}{n} \quad .4$$

where D_i is the size of the firm i, measured according to the amount of employees, t and t+n delimit the period examined, and n is the number of quarters making up the period.

The growth of the firms has been studied in relation to different periods:

- from the 1st quarter of 1966 to the first quarter of 1971
- from the 1st quarter of 1971 to the 3rd quarter of 1974

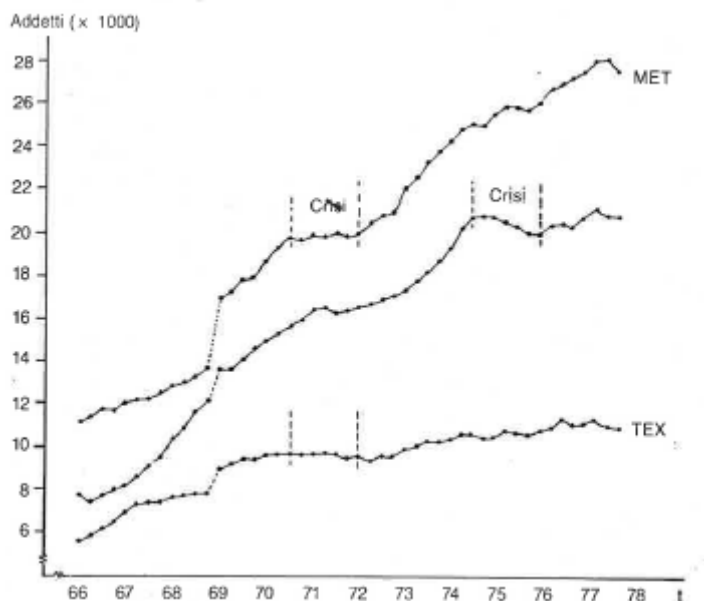
- from the 1st quarter of 1974 to the 4th quarter of 1977

- from the 1st quarter of 1969 to the 4th quarter of 1977*.

Moreover, as appears from Fig. 2.1, for each industry a fifth period has been chosen, generally a little over two years, delimited so as to coincide with a moment of crisis. As may be easily observed, during a "period of crisis" in the engineering industry, only a very slight reduction in employees is shown; still, as will be seen, this condition is sufficient to bring about a different behaviour from that typical in firms during the periods of normal growth of the industry.

Further, the firms tested have always been analyzed in separate groups according to industry, and for reasons already hinted at, it was never found appropriate to consider them as belonging to one single group.

Fig. 2.1



Hence the relation between g and D is studied in 15 "cases", i.e. in 5 periods for each of the 3 sectors.

Finally, for each case, the independence of the size of the firm from the rate of growth has been assayed by means of two methods.

The first method, based on F test, considers the size of a firm as a variable of a nominal type: the emphasis here is that, generally speaking, it is possible to single out different types of firms. The size of a firm, although defined by size thresholds expressed in numerical values, here becomes completely equivalent to a qualitative variable, and the character "from x to $x+n$ employees" becomes similar to, for example, other characters relating to the product ("chemical" firm or "textile" firm) or to the area of activity ("Lombard" or "Pugliese" firm).

Thus the thresholds singling out the size classes should derive directly from the knowledge of the industries and are on the one hand closely connected with the industrial texture studied and, on the other hand, with the aim of the research. Hence, they are in a certain sense vague and arbitrary.

In the industrial structure examined, in 1977 the firms with more than 500 employees totalled only 11, and during the period in question the industrial structure of some of the industries investigated had undergone great changes due to ongoing vertical disintegration processes: hence it seems appropriate to distinguish the firms in great detail within the range of larger sizes. The scale adopted derives from the latter need - and from having fixed the thresholds so as to make them vary, except for the former and latter classes, in geometric progression.

For each of the classes thus delimited, therefore, the simple arithmetic mean of the rates of growth of every single firm has been worked out, and F test has been calculated on these data.

Tables 2.1 and 2.2 give the results relating to each of the fifteen cases examined; in the first table, calculations include the firms that ceased activity during the period in question; in the second, on the contrary these firms have been excluded.

As hinted at the beginning, the data have also been analyzed by a second method, besides the one above, in which the size of the firm is considered as a quantitative variable.

Hence, following the indications of other authors, the parameters of the equation

$$\log D_{i,t+n} = a + b \log D_{i,t}$$

have been calculated for all periods and for the three industries considered, where D indicates, as already mentioned, the size of the firm calculated according to the number of employees.

Tab. 2.1 The average growth rate by size class, computed including firms that died, over the periods and sectors examined

	<i>dal</i> 1° tr. '66 <i>al</i> 1° tr. '71	<i>dal</i> 1° tr. '71 <i>al</i> 3° tr. '74	<i>dal</i> 3° tr. '74 <i>al</i> 4° tr. '77	<i>periodo</i> <i>di crisi</i>	<i>dal</i> 1° tr. '69 <i>al</i> 4° tr. '77
<i>Settore Ceramico</i>					
da 11 a 20 addetti	1.3	11.0	0.4	3.2	6.5
da 21 a 40 addetti	9.4	9.8	4.1	7.0	4.9
da 41 a 80 addetti	7.2	8.5	-1.0	-3.6	3.4
da 81 a 160 addetti	9.6	3.0	-1.5	-3.6	1.8
oltre 160 addetti	8.9	2.9	-0.3	-1.7	1.6
F	1.46	1.99	2.35*	3.46*	1.86
<i>Settore Metallmecc.</i>					
da 11 a 20 addetti	25.1	15.3	8.2	29.4	7.2
da 21 a 40 addetti	2.2	5.4	2.5	-2.3	1.0
da 41 a 80 addetti	2.8	2.5	-1.5	-4.8	1.0
da 81 a 160 addetti	5.4	4.6	-0.5	-0.9	1.2
oltre 160 addetti	1.9	2.7	1.7	-2.2	1.2
F	13.35**	3.76**	4.49**	8.28**	1.90
<i>Settore Tessile</i>					
da 11 a 20 addetti	15.1	8.3	7.4	31.8	5.5
da 21 a 40 addetti	7.3	3.4	-0.9	2.6	1.1
da 41 a 80 addetti	2.7	-1.2	-1.4	1.0	-1.5
oltre 80 addetti	1.0	-0.8	-3.1	-1.4	-0.5
F	5.62**	4.99**	4.69**	13.07**	4.97**

NOTE (To table 2.1) In order to verify the validity of Gibrat's law, the F test was applied to each case. The hypothesis subjected to verification is that the mean growth rate be equal in all classes of size. (It may be worth noting that it is possible to verify the hypothesis that the mean growth rates be different.) Two asterisks beside the F value indicate that the hypothesis of equality of growth rates is rejected at a level of significance of 1%; a single asterisk indicates rejection by 5%; no asterisk indicates that the hypothesis is accepted (or, more precisely, that it is not rejected). Unlike what usually happens, in this case refutation of the hypothesis implies refutation of the law subjected to verification. We can say, therefore, that two asterisks indicate that Gibrat's law is refuted; one asterisk that the law is "weakly" rejected - or, if one will, "weakly" confirmed; no asterisk that the law is "strongly" confirmed.

Tab. 2.2 The average growth rate by size class, computed excluding firms that died, over the periods and sectors examined

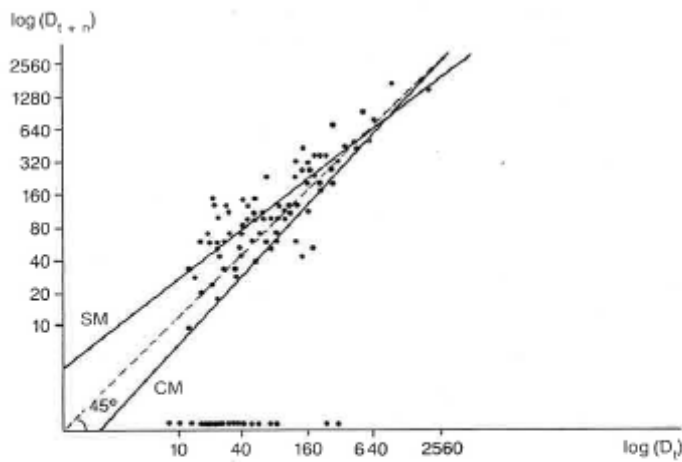
	<i>dal</i> 1° tr. '66 <i>al</i> 1° tr. '71	<i>dal</i> 1° tr. '71 <i>al</i> 3° tr. '74	<i>dal</i> 3° tr. '74 <i>al</i> 4° tr. '77	<i>periodo</i> <i>di crisi</i>	<i>dal</i> 1° tr. '69 <i>al</i> 4° tr. '77
<i>Settore Ceramico</i>					
da 11 a 20 addetti	3.3	16.0	0.7	4.1	9.7
da 21 a 40 addetti	10.1	11.2	4.8	7.8	7.3
da 41 a 80 addetti	7.6	9.0	-1.1	-3.8	4.3
da 81 a 160 addetti	10.3	3.2	-1.5	-3.6	1.9
oltre 160 addetti	8.9	2.9	-0.3	-1.8	1.7
F	0.61	3.13*	2.64*	3.54**	3.75**
<i>Settore Metallmecc.</i>					
da 11 a 20 addetti	25.1	19.1	11.8	29.4	8.7
da 21 a 40 addetti	2.2	6.6	2.9	-2.3	1.3
da 41 a 80 addetti	2.8	2.6	-1.7	-4.8	1.2
da 81 a 160 addetti	5.4	4.8	-0.5	-0.9	1.3
oltre 160 addetti	1.9	2.9	1.6	-2.2	1.3
F	13.25**	4.66**	5.91**	8.28**	1.90
<i>Settore Tessile</i>					
da 11 a 20 addetti	17.3	12.2	12.1	35.0	11.6
da 21 a 40 addetti	9.1	4.7	-1.2	3.2	1.8
da 41 a 80 addetti	3.9	-1.5	-1.6	1.0	-3.1
oltre 80 addetti	1.1	-1.0	-3.6	-1.5	-0.7
F	5.59**	6.0**	6.24**	13.00**	6.61**

NOTE (To table 2.2) For the meaning of the asterisks, see note to table 2.1

In this case, too, the total of firms "with death" and the total of firms "without death" have been taken into consideration.

Figure 2.2 indicates the calculated values, and the two regression lines correspond to an industry and a period respectively. Its value is mainly by way of example and in what follows it will make certain explanations simpler.

Fig.2.2



Un esempio di diagramma di dispersione — riferito ad un periodo, e ad un settore — e le relative rette di regressione del logaritmo della dimensione d'impresa al tempo $t+n$ (D_{t+n}) con il logaritmo della dimensione d'impresa al tempo t (D_t). La retta di regressione CM include le imprese morte; la retta di regressione SM le esclude.

Tables 2.3 and 2.4 indicate the regression line parameters for each period and for each industry.

Tab.2.3

I parametri della retta di regressione di $\log D_{t+n}$ su $\log D_t$, calcolati includendo le imprese morte, nei periodi e per i settori presi in esame.

	<i>dal</i> 1° tr '66 <i>al</i> 1° tr '71	<i>dal</i> 2° tr '71 <i>al</i> 3° tr '74	<i>dal</i> 3° tr '74 <i>al</i> 4° tr '77	<i>periodo</i> <i>di crisi</i>	<i>dal</i> 1° tr '69 <i>al</i> 4° tr '77
<i>Settore Ceramico</i>					
numero dei casi	62	120	138	138	101
<i>a</i>	-0.89	-0.49	-0.78	-0.45	-0.89
<i>b</i>	1.23	1.09	1.10	1.04	1.11
<i>r</i>	0.74	0.72	0.70	0.74	0.58
<i>Settore Metalmecc.</i>					
numero dei casi	173	289	372	275	235
<i>a</i>	0.85	-0.42	-0.030	-0.30	-0.91
<i>b</i>	0.81**	1.06	1.05	1.04	1.14
<i>r</i>	0.78	0.71	0.83	0.86	0.64
<i>Settore Tessile</i>					
numero dei casi	130	203	257	201	175
<i>a</i>	0.43	-0.43	-0.72	0.40	-0.65
<i>b</i>	0.77	0.95	1.04	0.70	0.81
<i>r</i>	0.47	0.51	0.61	0.52	0.41

NOTE (To table 2.3) In order to ascertain the validity of Gibrat's law we verified, for each straight line of regression, the hypothesis that parameter b is equal to 1. Two asterisks beside the b value indicate that the hypothesis was rejected by a 1% level of significance; one asterisk that it was rejected by 5%; no asterisk that it was confirmed. In this case, too - as happened with the data of table 2.1 and unlike what usually happens - rejection of the hypothesis implies refutation of the law subjected to verification. Here, too, we can therefore say that two asterisks indicate refutation of Gibrat's law; one asterisk "weak" refutation - or "weak" confirmation; and no asterisk "strong" confirmation.

Tab. 2.4

I parametri della retta di regressione di $\log D_{t+n}$ su $\log D_t$, calcolati escludendo le imprese morte, per i periodi ed i settori presi in esame.

	<i>dal</i> 1° tr '66 <i>al</i> 1° tr '71	<i>dal</i> 1° tr '71 <i>al</i> 3° tr '74	<i>dal</i> 3° tr '74 <i>al</i> 4° tr '77	<i>periodo</i> <i>di crisi</i>	<i>dal</i> 1° tr '69 <i>al</i> 4° tr '77
<i>Settore Ceramico</i>					
numero dei casi	56	109	125	129	81
a	0.57	0.81	0.18	0.14	1.19
b	0.96	0.87**	0.96*	0.96*	0.81**
r	0.94	0.91	0.96	0.97	0.84
<i>Settore Metalmecc.</i>					
numero dei casi	172	254	345	263	196
a	0.72	0.44	0.27	0.08	0.28
b	0.85**	0.92**	0.93**	0.97	0.96
r	0.85	0.92	0.92	0.94	0.85
<i>Settore Tessile</i>					
numero dei casi	107	163	206	185	105
a	1.16	0.39	0.27	0.75	0.76
b	0.73**	0.89**	0.91**	0.79**	0.79**
r	0.80	0.88	0.89	0.88	0.83

Table 2.5 sums up and compares the results of F test and the significant values of parameter b.

Tab. 2.5

I risultati dell'analisi della relazione tra saggio di sviluppo e dimensione d'impresa - per tutti i periodi ed i settori presi in esame - ottenuti attraverso il test F e attraverso la regressione di $\log D_{t+n}$ su $\log D_t$

	<i>dal</i> 1° tr '66 <i>al</i> 1° tr '71	<i>dal</i> 1° tr '71 <i>al</i> 3° tr '74	<i>dal</i> 3° tr '74 <i>al</i> 4° tr '77	<i>periodo</i> <i>di crisi</i>	<i>dal</i> 1° tr '69 <i>al</i> 4° tr '77
<i>A) con le morte</i>					
<i>Settore Ceramico</i>					
F	si ₅	si ₅	si ₁	si ₁	si ₅
b	si ₅	si ₅	si ₅	si ₅	si ₅
<i>Settore Metalmecc.</i>					
F	no	no	no	no	si ₅
b	no	si ₅	si ₅	si ₅	si ₅
<i>Settore Tessile</i>					
F	no	no	no	no	no
b	si ₅	si ₅	* si ₅	si ₅	si ₅
<i>B) senza le morte</i>					
<i>Settore Ceramico</i>					
F	si ₅	si ₁	si ₁	no	no
b	si ₅	no	si ₁	si ₁	no
<i>Settore Metalmecc.</i>					
F	no	no	no	no	si ₅
b	no	no	no	si ₅	si ₅
<i>Settore Tessile</i>					
F	no	no	no	no	no
b	no	no	no	no	no

NOTE (To table 2.5) The si5 corresponds to "no asterisk" in Tables 2.1 to 2.4, and indicates "strong" confirmation of Gibrat's law; the si1 corresponds to a single asterisk in said tables; "no" corresponds to two asterisks and rejects the law.

Examining table 2.5, it is easily seen that the inclusion - or exclusion - of dead firms in the group of firms taken into consideration, barely influences either the value or, hence, the significance of F, whereas it does affect considerably the value and significance of b.

More particularly, if the two series of results are compared, test F, on 15 possible cases, gives widely differing results - i.e. the answer goes from a yes5 to a no - only in one case. When, instead, the "dead firms" are taken into consideration, the b values are always higher, and significantly so: in 9 cases out of 15 the b value becomes significantly not different from 1 just because of the inclusion of the firms which in the period in question ceased their

activities.

Two facts, which will be examined in further detail below, lie behind this different behaviour of F and b - namely, that the "dead" firms in proportion to the present ones are few, and that, generally, the "dead" firms are of small size.

The low proportion of firms ceasing their activities explains the indifference of the F test. In analyses like these - as for example in Mansfield (1962)* - the inclusion or exclusion of "dead" firms was often decisive for the result of the test; but, in fact, said study concerned industries with a high degree of concentration, with few firms operating, and where the rate of firms having ceased their activities was a far from irrelevant proportion of the existing firms. The concentration of the "dead" firms in the smaller size classes, instead, explains the change in the value of b. What happens - and this can be seen, although it is valid only with an example, in figure 2.4 - is that the inclination of the regression line is very sensitive to the presence of a cluster of firms which, although not very numerous, is far from the others, and situated near the origin of the axes.

Under these conditions it is reasonable to keep the analysis of the factors determining the mortality of the firms distinct from the analysis of factors influencing their growth. (And, in fact, one of the

following sections is specifically dedicated to the study of the mortality - and natality - of the firms). The description of the total growth of the industry - and the possible processes of concentration in progress - may, however, be recomposed at a different time, considering first the growth factors and then the relation to the natimortality of the firms. If this approach to the problem is correct, the results here to be taken into consideration are only those relating to the groups of "live" firms from the beginning to the end of each period.

After having thus delimited the field of examination - i.e. taking into consideration only the groups of firms which in table 2.5 are indicated by the words "without dead firms" - it is now possible to formulate the results of the verification of Gibrat's law:

- in the ceramic industry the law is securely confirmed by both tests in 1 period; in another period it is weakly confirmed, but by both tests; the tests employed give contradictory results in 2 more cases; and, finally, in one case the law is rejected;
- in the textile industry the law is always rejected by both tests employed.

The observation of the average values of the rate of growth and the examination of the values assumed by parameter b, is indicated in the above tables, enable a better definition of these data and highlight some behaviour constants.

In particular, the most important conclusions are as follows.

First of all, there is a general tendency of the small firms to grow faster than the big ones; this is roughly true for all three sectors. In periods of growth of the industry the fastest rate of growth among the ceramic firms is generally that of firms with from 11 to 40 employees; it is around 5-10% in comparison to the 0.5-3% of the bigger firms. Among the engineering and textile firms, the fastest growers are the firms with fewer than 10 employees whose rates of growth are about 10-20% per year; during the same periods, the big textile firms shrink and the engineering ones grow 2-4% per year.

Moreover, a significant difference of behaviour is noted between the firms of the ceramic industry and those of the two other industries examined. In the first case, Gibrat's law is clearly disproved only in 1 case out of 5 employing both tests; in the other two industries - as we have seen - this happens much more frequently.

Finally it should be noted that in the engineering and textile industries the

difference between the rate of growth of the small firms and that of the big ones becomes much larger than usual during periods of crisis; in these periods while the big firms have a negative rate of growth, the small ones grow by an average of 30-35% per year.

The line of research sketched at the beginning requires that a reason for these facts be sought. To do this we must refer to the knowledge of the structure of the industries examined, obtained during this research or in different studies. It is worth noting that whereas the results reached so far can in some way or other be proved by the data, further data would need to be collected for the interpretation of these results in order to give a statistical proof of them.

A first explanation, which refers above all to the general trend towards a higher rate of growth by the small firms, depends on two main points of reference: the dimension of the firms at birth and the minimum efficient size (indicated, as in the custom, as the smallest size at which it is still possible to produce at competitive costs*. Thus, when firms are born in sizes smaller than the minimum efficient one, they are stimulated to grow very rapidly; and indeed they do grow in this way, soon reaching conditions necessary to efficiency.

In order to understand this process better - and above all to identify with precision the firms that undergo this process - it is indispensable to clarify certain elements that more accurately define "minimum efficient size"

Several authors* have observed that the minimum efficient size cannot simply be deduced from analysis of the techniques available; rather, it must also be made to depend on all the factors that determine the vertical integration of the firms - which, however, traditional analysis leaves out of account. This would occur, it is argued, even when a specific study - as the saying goes - was made of a section, i.e. a group of firms producing the same product, and thus a fortiori when, as in our case, the object of study is represented by a sector, as it is traditionally defined.

If this argument is correct, as it seems to be, to a productive technique there corresponds not one only minimum efficient size but a whole constellation of minimum efficient sizes: one for each of the working stages in which the production process can be subdivided.

Under these conditions, therefore, in order to verify whether firms really do come into being below the minimum efficient size, we should know which is the production stage performed by each of the new-born firms, and compare the size at birth with the minimum efficient size of that production stage.

Hence, in these conditions, if one wishes to verify whether firms usually come into existence at a level below the minimum efficient size, it would be necessary to know the stage of production carried out by each new-born firm and compare the size at birth with the minimum efficient* size of that particular stage of production.

Obviously, all this is not possible. However, there is another method which - even though less precise - may still furnish useful indications. Among all possible stages of production of an industry, the one with the smallest minimum efficient size should be chosen. This size may be compared to the size at which firms most frequently start their activities. Although not precise, this comparison may still yield well-founded conclusions; for if at the moment of birth firms are generally smaller than all the minimum efficient sizes of the industry in question, they are also sure to be smaller than the minimum efficient size corresponding to the stage of production they dedicate themselves to.

On the basis of the above specifications it thus becomes necessary to discuss the technologies of the industries examined in order to verify which is the smallest of the minimum efficient sizes in each of said firms.

In the ceramic industry the minimum efficient size is about 30 employees: these are nearly always small glazing factories, decorating the biscuit bought from other firms. In the engineering industry this size is much smaller: these are the workshops with 3 or 4 workers who perform lathing, milling; or, in

other cases, the 6 or 7 employees doing metal carpentry. Lastly, in the textile industry, the minimum efficient size relating to the least exacting stage of production in terms of number of employees is the weaving requiring 3 or 4 employees. But parent-firms, too, may be very small, like those with 7 or 8 employees, both blue collars and white collars, preparing samples, subcontracting out the mass-production, and then controlling, packing and forwarding the product*.

Industry by industry the sizes indicated, therefore, represent the point of reference to which the size of a firm should be compared at the moment of birth; and the available data show that very often firms are so small when they come into existence that the conditions of efficiency cannot be guaranteed. Indeed, the ceramic firms very often start their activities with fewer than 20 employees, and the engineering and textile firms with 1 or 2 employees only.

These are the firms, therefore, which grow very quickly*; and how these firms, thus strongly stimulated to grow, face the financial problems connected with growth, will be mentioned in the following paragraph, if only parenthetically.

Aside from the minimum efficient size, there is another phenomenon which may contribute to explaining the above-mentioned facts. Indeed, in our opinion, both the differences between the industries examined and their behaviour during periods of crisis, should be traced to the fact that during the period in question the degree of vertical integration - defined as the ratio between value added and sales* - remained substantially constant as regards the ceramic industry, whereas it changed considerably i.e. diminished - in the metal-mechanical and textile industries.

The phenomenon may be examined in further detail by using the knowledge of the three industries in question obtained in the course of this research.

First, and in order to build up the background, it should be noted that the level of vertical integration of the ceramic firms is much more homogeneous than that of the engineering and textile firms.

In the ceramic industry, in fact, there are only three types of firms: the firms that produce tiles from clay and thus carry out the "complete cycle" of the production process; the firms producing non-glazed tiles from clay, the so-called "biscuit"; and the firms buying the biscuit, glazing it and selling the finished tiles. Hence, there are only three ways of running the production cycle, only three levels of vertical integration.

In the engineering and textile industries, on the other hand, the situation is completely different. The levels of vertical integration of the bigger firms are highly differentiated; beside the firms which arrive at the finished product from the raw materials and from intermediate goods bought from other industries, there are the stages of production necessary for the production process. The differences are even greater among the smaller firms. Some have a level of vertical integration which is nearly equal to 1; suffice it to think of those receiving raw materials from the consigner and carrying out the first stage of production-weaving, lathing, or plate-cutting. Other firms, instead, have a completely insignificant value added compared to their sales. The obvious reference here is to the textile firms, already mentioned above, which project the product and subcontract everything out to other firms; but the engineering firms also belong to this type of firm. The best example is given by firms producing small agricultural machines, with the factory itself involved only in assembling parts coming from outside.

What interests us more nearly is how the different dynamics of the levels of vertical integration correspond to the differences between the conditions of the ceramic industry and that of the engineering and textile industries. During the period examined this level has remained substantially constant in the ceramic industry; but in the engineering and textile

industries the division of the work among the firms has become still more pronounced. Very often the big and medium-sized firms have subcontracted out stages of production which they previously performed directly; and the amount

of small firms carrying out one single task - sometimes representing one of the initial stages of production, or other stages, or even, as already mentioned, the coordination of the whole production cycle - is continually increasing.

It is easy to perceive the relationship between the verification - or missed verification - of Gibrat's law and the time variations in the industrial structure. One might say that the stability of the degree of vertical integration represents a necessary condition, although not a sufficient one, for verifying the independence of the rate of growth from the size of a firm in a sector. The same forces modifying the level of vertical integration favour firms of a certain size, and hinder the growth of others. If there is a pressure towards diminishing the average level of vertical integration of the industry, this turns to the advantage of the growth of smaller firms, and vice versa.

The relation between the variations in the level of vertical integration and the extraordinarily high rate of growth level of smaller firms during periods of crisis, is, on the other hand, less immediate.

It seems legitimate to suppose, however, that during periods of crisis the process of vertical disintegration in the engineering and textile industries is accelerated; the same reasons which in favourable economic situations induce entrepreneurs to this strategy - they have been examined several times and can be reduced, in short, to a saving of costs of production* - become more pressing and urgent in these cases. The result is, indeed, that the smaller firms grow very fast because the demand for their products, or their services, increases faster than normally.

It is easy to note how radically these conclusions differ from the common opinions. For, it is very often held that recession specially affects the smaller firms and that, generally, situations of crisis - not only when involving one industry only - bring about fast concentration processes of the production structure.

In actual fact, these theories, and the arguments maintained above, are not contradictory. When it is said that the crisis particularly affects small firms, the reference is to small firms competing with bigger ones, producing the same products as the latter and operating on their market; think only of the small firms producing dry "pasta" or peeled tinned tomatoes, operating in Campania during the middle of the 1960s and which crumpled, one after another, under the blows from the big firms in the industry operating on the national market. With the small firms referred to above, however, the situation is different. They work in collaboration with the large companies and, on behalf of the latter, manage difficult relations with the workers*.

An interpretation like the one just sketched suggests certain main lines for research and requires that at least one specification be made.

As to the first point: the reference to the variations in the level of vertical integration to explain the connection between the size of a firm and growth evokes, by analogy, a series of other factors which may indeed affect the quality of that connection; generally speaking, these are all the factors privileging certain sizes of firms instead of other sizes. Think, for instance, of a control legislation regarding monopoly power or, more simply, of a credit legislation which is not impartial towards all firms.

Moreover - and this, too, is both a declaration of incompleteness and an indication for research - if one wishes to trace further reasons for the phenomenon, it is necessary to verify which factors modify the level of vertical integration of an industry. It may be worth mentioning the technological changes in the industry

or in transport technologies, the changes in market areas, the variations in the regulations of industrial relations. This topic, too, runs off at a tangent from the questions under examination here and discussion of it must be postponed for another occasion*.

Lastly, to rule out any ambiguity the following observation will be of

use.

It should be specified in further detail which are the "obstacles" that a tendency towards vertical disintegration puts in the way of the big firms, and how the firms react to said obstacles. What actually happens is not that the biggest firms impede their development. Faced with the difficulties deriving from an increase in the number of employees or from an increase in fixed capital, the capacity of growth of these firms finds the way out in an increase in sales. Almost all parent-firms - concentrated among the biggest firms and also present to a considerable degree among the other size classes - adopt a strategy of growth which is very evident in the following points:

- subcontracting outside the factory of certain stages of production;
- increase of orders in all stages of production already being performed outside the factory;
- shifting of workers who have been "freed" from the stages of production moved outside the factory to other stages that the firm continues to perform directly.

Such behaviour results in a halt in the growth of the firm in question - as regards both employees and fixed capital - while still enabling an increase in sales.

To conclude, faced with the pressure towards vertical disintegration, the biggest firms do not interrupt their growth (perhaps they do not even decelerate their rhythm, but the datum should be verified); instead, they convert to a "style" which has special connotations. Particularly, whereas the subcontractors' aim is, as always, the increase of the value added - to be carried into effect by means of an increase both in employees and in employed capital - the aim of the parent-firms is represented by the increase in sales volume.

Generally speaking - and considering the need to define in further detail the variables examined and the relations that connect them - this attitude presupposes that in the firms in question the volume of profits is proportionate to the volume of sales. This assumption, however bold it may seem, is actually quite credible.

For since the parent-firms perform only a small part of the operations necessary to reach the finished product, they are furnished with a fixed capital and a volume of working capital assigned for the payment of wages; the working capital is wholly insignificant compared to the volume of working capital necessary for the purchase of raw materials and the payment of subcontractors. Generally speaking, it is this second amount of working capital which produces the profits of firms organizing the production process by using the equipment of other firms and themselves seeing to the sale of the finished product. The smaller the parent-firm's direct involvement in the production process, the more precisely this amount of working capital becomes proportionate to the sales. Thus, the statement that profits are proportionate to sales should be understood as a first approximation valid only in the extreme case of a parent-firm with no fixed capital and no employees, equipped only with the amount of working capital mentioned above: i.e, the working capital necessary for the purchase of raw materials and the payment of subcontractors. But this effort may be useful in order to perceive the trends along which the parent-firms have moved, as they progressively shed employees and capital.

It must be emphasized that this line of argument in no way implies an oligopolistic power on the part of parent-firms over subcontractors. This assumption is actually opposed by two main facts which are well-known to the scholars studying the industries in question. Firstly, that new entries are easy and frequent not only among subcontractors but also among parent-firms which coordinate, not the work of their own employees, but the work of other firms. Secondly, the parent-firms are - as already mentioned several times - especially concentrated among the biggest firms, but they also represent a very considerable portion of smaller firms. This is then what the arguments up till

now allowed us to assume: firms similar to the ideal firms without fixed capital and employees, referred to above, are in fact very small and not at all infrequent in the area examined.

The fact that entry is easy both among subcontractors and parent-firms - and that the passage from one category to the other is both easy and frequent - indicates that in the two groups of firms - except for those having a special income position in the finished products market - average rates of profit of the same kind and size are realized. It should be stressed that the reference is to average values because, as may easily be imagined, parent-firms - the only ones to deal with consumers' judgments on the finished product - run much higher risks; hence they probably have much less uniform rates of profits in time.

To conclude, it should be pointed out that, what with the important changes in the division of work among firms, the failure to verify Gibrat's law is not connected with the fact that the size of the firms has been calculated by the number of employees. The facts quoted show that the rate of growth would not have been independent of the size of a firm even if the unit of measure had been fixed capital. But Gibrat's law would probably have been proved false even if the size of a firm had been measured according to the sales. A necessary condition for the increase of sales to be proportionate in the firms of different sizes - and hence for Gibrat's law to be verified - is, in fact, that parent-firms' new commissions, deriving from the decentralizing of some stages of production, should be distributed among all the already existing subcontracting firms in amounts proportionate to the sales of each of them.

On the other hand, it is very improbable that this would happen, because parent-firms do not subcontract a constant amount of all stages of production out of the factory - for example, 10% of the assembly stage. Instead, they often decentralize almost the whole of a stage of production, for instance 90% of the pressing stage. Further, all parent-firms tend to behave in a similar way, i.e. the stages of production subcontracted always tend to be the same. The result of this process is that the orders deriving from decentralization are not distributed among all the firms, but among the firms carrying out a certain stage of production; and as these firms are centered around a particular size, the sales increase of the subcontracting firms is not uniform.

To conclude, a new division of work among firms stimulates the growth of the firms of certain size classes, not of all classes; and this is exactly the point which disproves Gibrat's law.

3. Size of firm and regularity in development

As already mentioned in paragraph 1, regarding the rate of development of firms - subdivided in size classes - it is important to observe not only average values, but also dispersion.

In this case, too, the results of observations carried out up to now are not unambiguous, and at times different interpretations have been given to similar results.

According to Hart and Prais, and Simon and Bonini, the size of the firm influences neither the level nor the dispersion of development rates. The second result, therefore, sounds like confirmation of the first: homoschedasticity of the variable "development" compared with the variable "size" confirms that there is no relationship between the two variables.

Mansfield and Singh and Whittington had different results; according to these the dispersion of development rates decreases as the size of the firm increases. Dividing the firms into "large" and "small", the former measures the dispersion of development rate in the two groups of firms, determines with an F test the significance of the difference in the two dispersions and concludes that the heteroschedasticity of g is one of the causes explaining the non-verification of Gibrat's law. The latter use the datum simply to reject Gibrat's law, in its "strong" version.

Lastly, Hymer and Pashigian note that the standard deviation of development rates is lower in the larger size classes, but not so low as it would be if the larger firms were simply a group of small firms selected randomly *.

From this observation - with a series of deductions that Simon, in our opinion correctly, calls "exceedingly tenuous"* - they argue that the curve of long-term costs of the firm has a continually decreasing trend.

The standard deviation of development rates is as shown in figures 3.1 ("with dead firms") and 3.2 ("without dead firms"). It was calculated on the data regarding the firms studied by us, the firms being grouped according to the same size classes used in the previous section. To ascertain the significance of the differences between the different classes of size, the Barlett-Cochran test was applied to the standard deviation. The results of the test also appear in the figures.

Two facts seem to be particularly significant:

- on the whole, the standard deviation of development rates is lower in the greater size classes;
- the standard deviation of development rates becomes considerably higher at times of crisis.

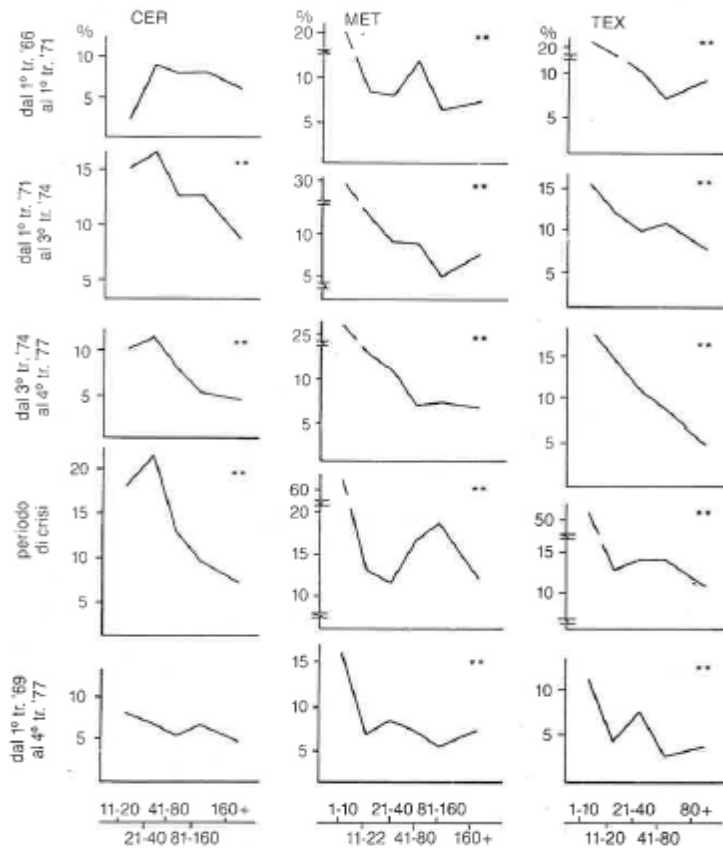
To some extent, the first point reinforces the doubts expounded in the preceding paragraph on the validity of Gibrat's law. The fact that the variable D_{t+n} is heteroschedastic as compared to the variable $D-1$ makes the results deriving from the observation of the values of the parameter b of the straight line regression less reliable.

Note, furthermore, that as can easily be verified from figure 3.1 and confirmed from the test - the hetero-schedasticity of g is quite a lot lower in the ceramic sector than in the other two sectors: the conclusions of the preceding paragraphs are thus confirmed also as regards the fact that, in the ceramic sector, the independence of the development rate of the firms seems to be rather more sensitive than in the engineering and textile sectors.

Over and above any reference to Gibrat's law, the greater dispersion of development rates in small firms is in any case important because it defines one of the basic patterns of small firms: although, considered as a group, their average growth is more rapid than that of others, their behaviour patterns are much less homogeneous or uniform.

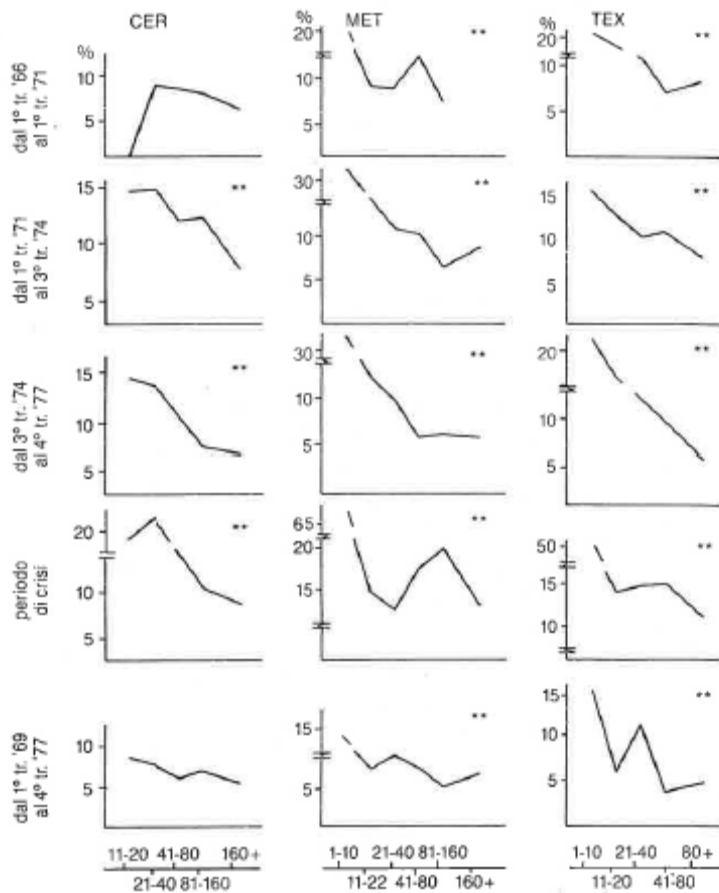
It is not easy to explain the reason for this greater dissimilarity, which none of the authors quoted has tried to take into account*.

Fig. 3.1 The standard deviation of firm development rates by size class, calculated including firms that are dead, in the sectors and periods examined



NOTE to Fig. 3.1 Bartlett's test has been applied to the values of standard deviation. Two asterisks indicate that the values differ by 1% significance; one asterisk that they differ by 5%; no asterisk that they are not significantly different.

Fig.3.2 The standard deviation of firm development rates by size class, calculated excluding firms that are dead, in the sectors and periods examined



NOTE to Fig. 3.2 For the meaning of the asterisks, see note to Fig. 3.1

Hymer and Pashigian are the only ones to suggest an explanation. They maintain that "the small firm is more likely to enter a crisis (because of high average costs) than the large firm and at the same time a greater probability of growth (because of the incentive to save costs through an increase in size)"¹

Any explanation for the two facts quoted, instead, must take into account the fact that - even when they belong to the same sector - large and small firms normally produce different goods and have different levels of vertical integration. What should be noted and borne in mind, in other words, is that size is a rather imprecise index of the technology used, that may be valid only in a limited number of cases, and when accompanied by an additional series of details.

In this perspective, the greater dissimilarity of development rates of small firms may be explained as follows.

First of all, small firms are more dishomogeneous than large ones as regards investment per employee; the reason for this is the difference in the product to which reference was made earlier.

Often, in fact, among the smaller firms the only capital necessary is for a few simple tools: think of the equipment in use at small firms that carry out plant repair work for the larger firms. In these conditions an increase in the

¹ The underlying hypotheses in the argument are: that large and small firms move along the same curve of average costs over a long period - i.e. they have the same product, the same market, the same level of vertical integration; and that this curve has a continually decreasing trend. Although the universe of the firms examined by the two authors is wholly composed of very large firms - the smallest firms in Hymer and Pashigian's sample have a turnover of four million dollars - these two assumptions, especially the former, have no empirical basis

size of the firm requires hardly any investment at all. The only necessary investment is for the payment of wages, and this, too, may have a very short rotation period. On the other hand, small firms will sometimes reach levels of investment per employee that are among the highest in their sector. This is the case, for example, of weavers and certain metal-mechanical firms that produce components using machines with numerical control.

This variability of investment per employee does not occur among the larger firms. This is not surprising as it is strictly linked with the fact that the small firms can undertake to do a single operation while large ones tend to carry out several operations internally. Thus, among small firms, investment per employee has as its outside limits the value of the most exacting operations and the value of the least demanding; among the other firms investment per employee tends towards the average of the sector.

It seems most likely that this difference in the dispersion of investment values is translated into a difference in the dispersion of development rates. This is because, when the work carried out requires very expensive machinery, growth in terms of employees will certainly be slower and growth in terms of turnover and added value more irregular with time.

Mention has been made of the relationship between the size of the firm and investment per employee, and in connection with the size of the firm, it is useful to examine also the possibility of having available finance for those investments. The subject would require much more careful study than is possible here. Of necessity, one can rely only on impressions and estimations not based on organic findings of the necessary data.

Whether medium and short term credit is more easily obtained by small firms or by large ones is difficult to ascertain and it would be going too far to even try to list the few hard facts that are available. The only certain fact is that the situation varies widely from region to region. Undoubtedly there are considerable differences of attitude by the banks of Northern and Southern Italy towards small firms; the different spread

of guarantee consortia among the smaller firms creates institutional diversity of no small account; and the facilities - in capital account - or as a contribution towards payment of interest on mortgage loans granted to small firms by state or local authorities are widely different.

More certain conclusions can be drawn on the capacity for self-financing. Even though the data on the relationship between average profit rate and size of the firm may be contradictory and uncertain, the existence of a negative relationship between variability of profit rate and size of firm sufficiently proved. And it is natural to think that a greater variability in the profit rate may give rise to a greater variability in development rate.

If we now look at self-financing we can see that the smaller firms enjoy an advantage. The profit rate achieved being equal, the small firm is much freer than the large one to decide how much profit to re-invest. And small firms reinvest their entire profit in the firm more frequently than do large ones.

Lastly, it should not be forgotten that - even though the phenomenon concerns only very small firms - self-financing is often achieved at the expense of the wages* of self-employed workers and their relatives: in the rush to reach a competitive level of technology cases of unbridled self-exploitation very frequently occur.

Besides the greater variability of investment per employee and of the profit rate, plus the wider variety of behaviour patterns in the destination of profits, there is yet another element that distinguishes the small firm and that - better than the other factors listed so far - explains the very high dispersion of development rates of small firms in moments of crisis. This is the greater freedom of action in decreasing the work force occupied in the production process. In very large firms - say, those with over 2,000 or perhaps 5,000 workers - the decision to stop taking on more personnel - that is, not to replace the work force leaving the firm through retirement or voluntary resignation - is the occasion for a labour dispute. In smaller firms - much

smaller, let us say, below 50 or 100 workers - the replacement of personnel turnover is no longer under the control of workers organizations, but the decision to sack is still a subject for heated discussion. In small firms - for example, below 20 workers - dismissals are not unusual and the firm has no difficulty in carrying them out.

Why this happens is easily explained. Legal reasons, plus trade union and political ones, lie behind the greater flexibility with which the small firms make use of their work forces. Among the legal reasons note especially the limited application of the workers' statute and of the law of "just cause" of 1966. These regulations do not apply to firms with, respectively, fewer than 15 and fewer than 35 employees. As to the second group of reasons - i.e. those relating to union and political matters and underpinning the freedom to dismiss that small firms enjoy - much has been written in recent years. Reference must be made to the weakness of union organizations which impede a general intervention by the unions even in the small firms. Then there is the policy of alliance with the "productive middle classes" pursued by the left-wing parties; as it relates to small firms, this policy invites union organizations to assume a prudent and moderate attitude.

This is why, faced with a drop in demand over a sector in general, or a reduction in orders for a single firm, only the smaller firms can react by dismissing employees. Or, to be more precise, in order for the union to go through the procedures for dismissal, these procedures must be justified by increasingly serious and more and more fully demonstrated crises accompanying the growth of the firm. Thus, ultimately, the crises are immediately translated into dismissals only in the smaller firms. In the others, employment tends - at least for a time - to be stable or to diminish according to the work intensities determined by the rate of employee turnover.

This difference in the ability to reduce the volume of work allocated in the factory is certainly one of the elements that count most in explaining the impressive phenomenon of vertical disintegration referred to in the preceding paragraph; and it automatically exerts a considerable effect on the employment policy of the firm. (So that we now have a complete picture of the variability in development of small firms).

During periods of expansion - or even only of increase in orders for the firms' products - small firms have no hesitation in increasing the number of their workers. Large firms, instead - knowing that workers taken on are no longer dismissable and that their presence will make it more difficult to face possible future crises - prefer to postpone taking on new personnel as long as possible and do so only when strictly necessary. There will be appeals for higher production, attempts at speeding up work intensities, longer overtime hours and some increase in resort to external work, as far as is possible in the short term.

In large firms, that is, the hiring of personnel in relation to the economic trend tends as a rule to be very limited: the variations in the product in connection with variations in the number of workers in a grown plant are, in our opinion, almost nil. There is only one occasion in which workers are hired - i.e. when plant size is increased.

It is important - for greater clarity - to highlight the differences between what has just been said and the widespread hypothesis according to which small firms carry out the role of "lung" with respect to larger firms*. It was originally thought that the small firms simply increase their workers in periods of expansion and decrease then in those of crisis, leaving aside the variations in the fixed capital they have available; and that the larger firms, instead, take on workers only when they are compelled to by important modifications in the plant.

On the contrary, the hypothesis of the "lung" holds that the leading firms meet variations in demand through variations in the volume of external orders. In other words, a role that responds to economic trends is attributed to decentralization, as if the operations into which the productive process is

divided could, in turn, be shifted outside the factory and then reintroduced without difficulty. But this is possible only in very particular cases and is in no way a general phenomenon. The error probably derives from a mistaken interpretation of the fact that - as was said in the preceding paragraph - during periods of crisis, the vertical disintegration processes occurring in industrial sectors become more rapid. Up to this point we have argued that the greater dispersion of development rates in small firms must be traced back to a greater dishomogeneity and, above all, to a wider freedom of action in dismissing and hiring personnel.

According to the argument, the greater dispersion of growth rates of small firms must be retraced not only to a greater dishomogeneity but also, and above all, to a greater freedom of action in hiring and firing. This perhaps requires more proof than has been offered hitherto.

A greater dispersion of development rates of the smaller firms could also be explained with the hypothesis that these firms are divided into two groups: the first composed of firms that find it hard to keep going, that rarely hire and frequently dismiss personnel; and the second whose firms, in continuous growth, frequently hire and very rarely dismiss personnel. If this were the case, one could not speak of a "flexible" use of the work force by any firm: but there would still be a considerable dispersion of development rates.

(Obviously, since the average development rate of small firms is higher than that of large ones, the second group of firms must be more numerous than the first: but this fact is of scant importance if, instead of a

clear division between two extreme groups, as is supposed for ease of interpretation the smaller firms were distributed continuously from very low to very high values of development rate).

We have, then, two alternative hypotheses: according to the first, small firms take on and dismiss personnel with much greater "nonchalance" than larger ones; according to the second, small firms are less uniform among themselves than large ones, though each shows a constant behaviour. And these hypotheses can be submitted to verification.

The likelihood of misunderstanding really arises from the fact that, in the measure of dispersion used, the behaviour patterns regarding groups of firms are confused with those regarding a single firm over the time period under consideration.

However, we can get round these uncertainties by fixing an index r that separates the two phenomena and studies only the employment trend in single firms, measuring the regularity of growth and thus by contrast, the flexibility in the use of work force.

This index - though with completely different aims from those predominating here - was proposed by Ferguson (1962) with the name "stability of employment".

Given the quarterly employment levels in a firm, Ferguson - who was working in 1962 and would therefore have found other methods too complicated and expensive - defines a linear trend of the firm's employment, joining with a straight line the values at the beginning and end of the period. The sum of deviations from this trend, normalized by the average employment level of the firm in the period, represents the stability of employment. The lower the index, the higher the stability. The relationship of the index of stability is then studied - with a correlation between classes - in relation to the size of the firm. Out of 15 sectors examined, the coefficient of correlation in 13 showed a significative relationship - of negative sign - between stability of employment and size of firm.

The procedure we follow is very similar to Ferguson's.

Given the employment level of the firm i at quarter t , $D_{i,t}$; the development trend of the firm, over n quarter is estimated as

$$D_{i,t+n} = D_{i,t} + n$$

$$r_i = \frac{\sum_{j=t}^{t+n} (D_{i,j} - \bar{D}_i)^2}{n \cdot \bar{D}_i}$$

for when \bar{D}_i is equal to

$$\bar{D}_i = \frac{\sum_{j=t}^{t+n} D_{i,j}}{n}$$

And it is, thus, the average number of workers that the firm i has had from t to $t+n$.

Substantially, therefore, r represents the standard deviation from the trend that estimates the employment of the firm, normalized with the average size of the

firm during the period. The only considerable difference compared with the Ferguson's index, is that an exponential trend is used here instead of an approximate linear trend*. So in this case, too, the lower r is, the more regular is the development of the firm.

By examining how r varies with the variation in the size of the firm, we can now distinguish between the two hypotheses referred to above. Index r will, on the whole, be constant as the size of the firm varies if dispersion is due - as for the sake of simplicity, we said above - to the division of firms into two groups: those growing rapidly and those growing very slowly or declining: in this case each firm will have a regular growth: those that grow will have a regularly positive development rate; whereas the others will grow not at all or regularly shrink. The rate of regularity will decrease as the size varies if the small firms are enabled to make more flexible use of their work force.

The arithmetical average of r was then computed, corresponding to firms divided into classes of size*.

Test F was applied to each of the cases examined.

Figure 3.3 shows the trend of the values thus calculated together with the values of test F.

Table 3.1 shows the parameters of the

$$\log r_i = a + b \log \bar{D}_i + e_i$$

(In the calculation of the parameters of the (?) only firms "alive" from beginning to end of the period were taken into account).

The results of the two tests broadly agree. Test F affirms that stability is always significantly influenced by the size of the firm. The sign of parameter b , always significantly negative, and the average values show that the regularity of development increases considerably as the size of the firm increases.

Before drawing conclusions, however, another fact must be borne in mind. To simplify matters, we can refer to figure 3.4 where, in relation to certain cases examined, both the values of the index of regularity and those of standard deviation are shown by class of size. Note that the cases selected, relative to the periods and sectors shown in the figure, are broadly representative of the type of processes that, to a greater or lesser degree,

have affected the whole industrial tissue under examination.

Tab. 3.1

I parametri della retta di regressione dell'indice di regolarità sulla dimensione media di impresa, calcolati escludendo le imprese morte, nei periodi e nei settori presi in esame.

	<i>dal</i> 1° tr '66 <i>al</i> 1° tr '71	<i>dal</i> 1° tr '71 <i>al</i> 3° tr '74	<i>dal</i> 3° tr '74 <i>al</i> 4° tr '77	<i>periodo</i> <i>di crisi</i>	<i>dal</i> 1° tr '69 <i>al</i> 4° tr '77
<i>Settore Ceramico</i>					
numero dei casi	56	109	125	129	81
<i>a</i>	5.96	5.33	5.23	5.22	6.07
<i>b</i>	-0.30**	-0.28**	-0.33**	-0.44**	-0.31**
<i>r</i>	-0.51	-0.50	-0.42	-0.45	-0.54
<i>Settore Metalmecc.</i>					
numero dei casi	172	254	345	264	196
<i>a</i>	5.51	5.61	5.10	5.84	5.36
<i>b</i>	-0.29**	-0.37**	-0.28**	-0.55**	-0.21**
<i>r</i>	-0.47	-0.53	-0.39	-0.63	-0.37
<i>Settore Tessile</i>					
numero dei casi	107	163	206	177	105
<i>a</i>	5.66	6.15	6.08	5.84	6.33
<i>b</i>	-0.26**	-0.55**	-0.53**	-0.58**	-0.47**
<i>r</i>	-0.46	-0.70	-0.58	-0.61	-0.61

Note to Tab. 3.1. The hypothesis that *b* is equal to zero has been verified. Two asterisks indicate that *b* differs from zero by 1% significance.

The figure aims to make clear the following: that the values of *r*, as has been said, diminish with the class of size and remain, class by class, roughly equal in normal periods and in those of crisis; and that, on the other hand, the dispersion of development rates, which also always diminish with the class of dimension, assumes higher values in periods of crisis, especially in very small firms. Thus, while in normal periods the values of the two variables are very close, in periods of crisis these two values considerably diverge from each other.

On the whole, this phenomenon suggests that in interpreting data it is useful to distinguish between normal periods and those of crisis.

As far as the former are concerned, the results achieved seem to confirm the hypothesis that was submitted to verification - namely, that the criteria available to small firms for management of their work force are different from those of larger ones. That is to say, it would appear certain that the volume of a firm's orders has a greater influence on the number of workers employed, the smaller the size of the firm.

In periods of crisis, on the other hand, the fact that, while dispersion values increase so considerably, the average value of indices of regularity remains stable, suggests that there is a very wide difference in the destinies of various firms. It seems that in this case small firms subdivide, as was supposed at the beginning, into flourishing firms and declining ones: each going its own way with the same irregularity as in normal times. The hypothesis presented at the beginning as an alternative to greater flexibility in

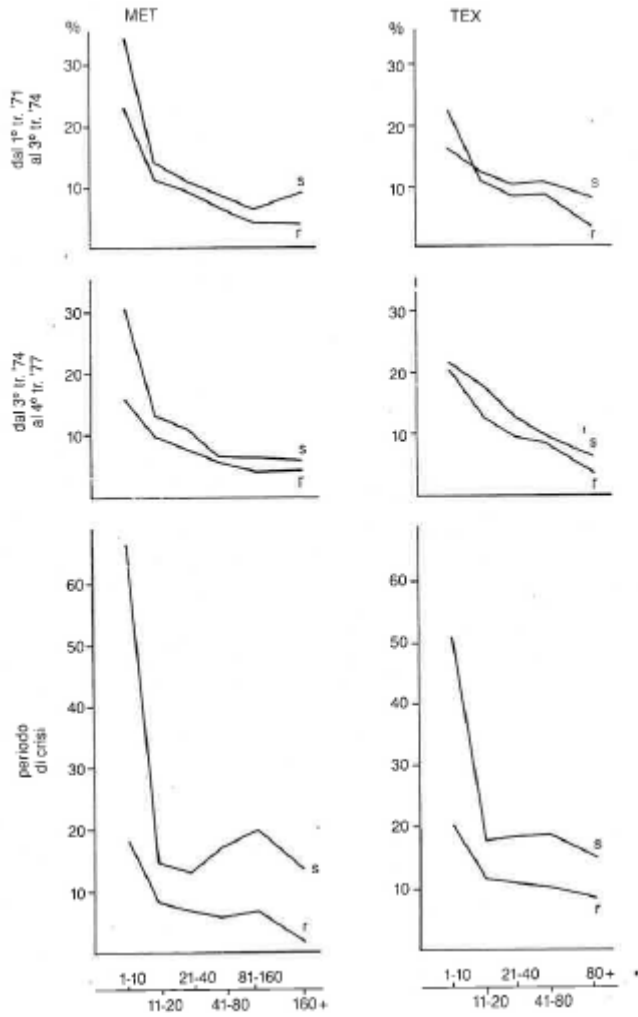
the use of work force by small firms may, therefore, have an explanatory role, but only a partial one, reserved for moments of crisis.

The differences in dispersion and regularity of growth among large and small companies - which, as we said above, must be traced back mainly to differences in the regime of industrial relations - can also be studied from other point of view.

That is to say, we can analyze the implications for the workers of "flexibility" in the use of the work force, measuring probabilities of dismissal and the probabilities of hiring in the large and small firms.

Fig. 3.3

L'indice di regolarità (r) e la deviazione standard (s) dei saggi di sviluppo per classe di dimensione in periodi normali e in periodi di crisi.



Note to Fig. 3.3 The F test has been applied to the indices of regularity. Two asterisks indicate that the indices differ by 1%; no asterisk that they do not differ significantly.

To this end parameters l_i and a_i have been defined. With regard to firm i , in the period from t to $t+n$,

$$l_i = \frac{\sum_{j=t}^{t+n-1} b (D_{i,j+1} - D_{i,j})}{\sum_{j=t}^{t+n-1} D_{i,j}} \quad . \quad 4$$

where D_i is the dimension measured with the number of the employees, i.e. the rate of employment of the firm, and

$$b = 1, \text{ se } D_{i,t+1} - D_{i,t} < 0$$

$$b = 0, \text{ se } Di,t+1 - Di,t > 0$$

As against that

$$ai = \frac{\sum_{j=t}^{t+n-1} c (D_{i,j+1} - D_{i,j})}{\sum_{j=t}^{t+n-1} D_{i,j}} \cdot 4$$

where

$$c = 1, \text{ se } Di,t+1 - Di,t > 0$$

$$c = 0, \text{ se } Di,t+1 - Di,t < 0$$

The meaning of the indices is very simple: in order to obtain li the sum calculated of all the negative variations in the rate of employment of the form i in the period from t to $t+n$; this sum is then measured as a percentage of the mean employment in the period; then multiply by 4 to get the result as an annual amount.

In turn, ai is calculated in the same way on the sum of all the positive variations.

Thus the two indices give the measure of dismissals and hirings made by the firm; however imprecise this measure may be.

For it should be borne in mind that when the datum for the quarterly period is recorded, it may actually conceal a positive number of dismissals, if the firm has balanced these with an equal amount of hirings.

Moreover, not all falls in employment in a company are connected with dismissals: at times, even voluntary resignations may give rise to important negative variations in the work force employed.

Lastly, the measurement is strongly influenced by the time period in which the is recorded. On the hypothesis of relative stability of employment, both

indices would probably turn out to be higher if the were taken over a period shorter than three months, and lower if they were taken.

As with the other growth parameters examined, we studied the relation of l and a with the size of the firm.

To this end, we calculated the arithmetical average of the values of li and ai , subdividing the firms on the basis of size of firm at the beginning of the period. (The calculation of the average obviously includes also those firms in which the value of the index is equal to zero). The mean values by class of size were then subjected to the F test. The parameters of the regression lines were also calculated:

$$\log li = a + b \log Di + ei$$

$$\log ai = a + b \log Di + ei$$

The trend of the mean values is reported in Figs. 3.5 and 3.6, where the asterisks indicate the significance of the F test; the parameters of the regression lines are reported in Tables 3.2 and 3.3.

As can easily be seen, hirings are more frequent, in almost all cases, in the smaller than in the larger firms: the F test shows significant differences in all cases, and b has a significantly negative sign in 12 out of 15 cases.

Tab. 3.2

I parametri della retta di regressione dell'indice di licenziamento sulla dimensione media d'impresa, calcolati includendo le imprese morte, nei periodi e nei settori presi in esame.

	<i>dal</i> 1° tr '66 <i>al</i> 1° tr '71	<i>dal</i> 1° tr '71 <i>al</i> 3° tr '74	<i>dal</i> 3° tr '74 <i>al</i> 4° tr '77	<i>periodo</i> <i>di crisi</i>	<i>dal</i> 1° tr '69 <i>al</i> 4° tr '77
<i>Settore Ceramico</i>					
numero dei casi	62	120	138	138	101
<i>a</i>	7.05	5.26	4.94	3.41	6.10
<i>b</i>	-0.66**	-0.33**	-0.19**	0.08	-0.41**
<i>r</i>	-0.77	-0.29	-0.19	-0.04	-0.58
<i>Settore Metallmecc.</i>					
numero dei casi	173	289	32	275	235
<i>a</i>	5.64	5.97	3.73	5.91	5.88
<i>b</i>	-0.36**	-0.45**	-0.03	-0.44**	-0.39**
<i>r</i>	-0.42	-0.50	-0.02	-0.30	-0.58
<i>Settore Tessile</i>					
numero dei casi	130	203	257	201	175
<i>a</i>	5.36	5.35	4.63	5.04	5.82
<i>b</i>	-0.23**	-0.29**	-0.09	-0.24**	-0.36**
<i>r</i>	-0.31	-0.27	-0.06	-0.16	-0.53

Nota - È stata verificata l'ipotesi che *b* sia uguale a zero. Due asterischi indicano che *b* è diverso da zero ad un livello di significatività dell'1%; un solo asterisco che è diverso al 5%; nessun asterisco che *b* non è significativamente diverso da zero.

Tab. 3.3

I parametri della retta di regressione dell'indice di assunzione sulla dimensione media d'impresa, calcolati includendo le imprese morte, nei periodi e nei settori presi in esame.

	<i>dal</i> 1° tr '66 <i>al</i> 1° tr '71	<i>dal</i> 1° tr '71 <i>al</i> 3° tr '74	<i>dal</i> 3° tr '74 <i>al</i> 4° tr '77	<i>periodo</i> <i>di crisi</i>	<i>dal</i> 1° tr '69 <i>al</i> 4° tr '77
<i>Settore Ceramico</i>					
numero dei casi	62	120	138	138	101
<i>a</i>	5.83	5.68	5.21	4.01	5.78
<i>b</i>	-0.19**	-0.24**	-0.27**	0.20	-0.25**
<i>r</i>	-0.40	-0.23	-0.24	-0.10	-0.42
<i>Settore Metallmecc.</i>					
numero dei casi	173	289	32	275	235
<i>a</i>	5.61	5.54	4.30	5.03	4.86
<i>b</i>	-0.24**	-0.23**	-0.03	-0.33**	-0.08
<i>r</i>	-0.33	-0.24	-0.03	-0.18	-0.13
<i>Settore Tessile</i>					
numero dei casi	130	203	257	201	175
<i>a</i>	5.86	5.69	5.03	6.06	6.01
<i>b</i>	-0.29**	-0.37**	-0.27**	-0.55**	-0.44**
<i>r</i>	-0.37	-0.34	-0.18	-0.31	-0.54

Nota - È stata verificata l'ipotesi che *b* sia uguale a zero. Due asterischi indicano che *b* è diverso da zero ad un livello di significatività dell'1%; un solo asterisco che è diverso al 5%; nessun asterisco che *b* non è significativamente diverso da zero.

The results regarding dismissals are more contradictory. However, it seems fairly certain that there is a negative relation between *li* and *Di* in the ceramic and engineering sectors. The relation is less certain in the textile sector where - although *b* has a significantly negative sign in 4 or 5 cases - the *F* test almost always indicates that the behaviour of the large and the small firms is significantly equal. The results regarding hirings, and those regarding dismissals in the ceramic and engineering sectors, were largely foreseeable. The data relative to level of growth rate and its dispersion and regularity led one to suppose that that was the trend of *l* and *a*.

It remains to account for the behaviour of the textile sector: but the uncertainty in the negative relation between rate of dismissal and size can be explained if we remember that, of the three sectors, the textile is the only one where the large firms have a consistently negative growth rate in all the periods examined, as tables 2.1 and 2.2 of the previous section showed. The dismissals resulting from the ongoing restructuring in the large firms are thus confused with the conjunctural dismissals in the small firms; hence arises that uniformity of behaviour indicated, if not by the sign of *b*, by the significance of the *F* test.

But, as was noted when speaking of the need to calculate l and a , this was not the main objective of the observation made and the calculation performed.

What was important, rather, was the attempt to measure - from the point of view of the working class - the implications of the differences between large and small firms in level, dispersion and regularity of rate of growth.

And reference must thus be made to the data of the figures: the large firms, on average, hire 5-7% of workers each year and dismiss 4-6%; the small firms hire amounts of work force between 19 and 31%, and dismiss 13-16%.

In periods of crisis the behaviour of the large firms does not substantially alter. If we except the larger firms in the textile sector, which dismiss 11% of workers, the values of l and a do not change order of magnitude: the two indices oscillate around 4-6%, and are thus only slightly below the norm (even though, in this case, dismissals obviously exceed hirings).

On the contrary, among the small firms - where crisis leads to the diversification between firms in expansion and firms in decline of which we spoke above - the values of l and a alter by more significant amounts, above all in the metal-engineering and textile sectors. Although in these sectors the average rate of growth of these firms is around 30-35% per year, as we noted in paragraph 2, the number of dismissals as percentage of those employed reaches 14-19%: which implies that in declining firms dismissals may reach levels higher than 50% of total employees. By contrast, as was predictable, the proportion of hirings reaches extraordinary levels; in the textile firms it runs to 37%, in metal-engineering firms 42%. This means that in periods of crisis there is a large group of small firms that grow at very high rates.

4. The life and death of firms

As we have seen, in the amount of literature devoted to analysing the relation between rate of growth and size of firms has by now grown to impressive proportions; however, the birth and death of firms have received much less attention. The only empirical works available are those of Mansfield, who seeks to identify the factors influencing the birth and death of firms, and that of Singh and Whittington, who study the distribution by size of born and death firms.

Mansfield proposes that the birth rate, defined as a relation between firms born and firms present, is an inverse function of the investment required to bring to life a firm of size equal to the minimum efficient size, and a direct function of the mean rate of profit obtained by the firms of the sector in the period in question. The equation of regression proposed by Mansfield - who thus considers firms of different sectors simultaneously - has a correlation coefficient, corrected for degrees of freedom, equal to 0.70.

Mansfield also uses the two variables mentioned to explain the death rate: with the correction that in this case the reference is not to the optimal minimum size but to the amount of firms below that size or, more precisely, to the distribution of firms around that size. In this case, of course, the mortality would be an inverse function of the rate of profit of the sector, and a direct function of the number of firms below the minimum efficient size. Here again the equation of regression considers data of different sectors, and in this case, too, the correlation coefficient is equal to 0.70.

The work of Singh and Whittington is less ambitious than Mansfield's.

In studying, as we mentioned, the firms quoted on the U.K. Stock Exchange, the authors note that a large amount of births takes place in the smaller classes of

size, but their number is "considerable in all classes of size". They show, too, that also the number of deaths falls with the size of firms.

The type of firms studied certainly influences the results; as the authors themselves point out, "the wide range of size of births is partly due to the fact that quoted companies are after in existence as unquoted companies for a number of years before achieving a quotation and so being born into our

population"*

The strategy of analysis according to which the data available to us were processed is appreciably different from Mansfield's. No direct comparison has been made between birth and death rates in the three sectors studied: i.e. the comparison by which Mansfield attempts to ascertain which factors may explain why those rates differ from sector to sector.

The reason for forgoing this comparison can easily be understood, if the arguments developed in the previous paragraphs are borne in mind. For Mansfield's proposal is open to a fundamental objection, to which we have already made frequent reference: it implicitly assumes that each sector has only one corresponding minimum efficient size.

An assumption of this kind may be founded on a variety of hypotheses. The simplest - if not the most thorough-going - is that economies of vertical integration have a U trend, always equal for all levels of production, so that, in order to minimize costs, it is necessary to keep the level of vertical integration constant whatever the volume of production. This hypothesis, and others equivalent to it, has not been in any way verified: experience rather shows that in many sectors the levels of vertical integration may vary by large amounts; and this both for firms of equal size (however size is measured - whether by numbers of employees, amount of capital, production, turnover) and for firms producing finished products, with equal volume of finished pieces produced. Nor does the fact that Mansfield considers not sectors but sections - in particular those of steel, automobiles, tyres and petroleum - enable the problem to be avoided. Consider an example that refers to one of the sections adduced by Mansfield: the difference in the level of vertical integration of the automobile divisions of FIAT and FORD. In this way, the explicative variable central to Mansfield's model fails: this is that minimum efficient size which, in our opinion, requires redefinition not only of its properties but of its very notion.

Our investigation is much closer to that of Singh and Whittington, if for no other reason than the attention it focuses, as will be seen, on the distribution of born and dead firms by class of size.

More in detail, the analysis seeks to highlight, for each of the three sectors studied, both the trends which the birth and death rates have taken in the period in question, and the influence exerted on those rates by the

To this end, the firms were divided into "small", "medium" and "large"*. The number of firms born, of firms dead and of all firms present, quarter by quarter, was seasonally adjusted* - and chance fluctuations were attenuated - with a simple mobile average over 8 quarterly periods. On the data thus modified we then proceeded to calculate - in the way described in the appendix - the birth and death rates. Lastly, on these rates, over the 48 quarterly periods considered, we calculated the parameters of the equations

$$N_{d,t} = a_1 + b_1 t + c_1 \text{ gsop},t + e_{d,t}$$

$$M_{d,t} = a_2 + b_2 t + c_2 \text{ gsop},t + e_{d,t}$$

where

N and M respectively indicate the birth and death rates;
d specifies the class of size considered and signifies, according to the occasion, "small", "medium" and "large";
t, both as suffix and as variable, indicates the quarterly period referred to; and
gsop represents the rate of growth, measured in terms of employees, of the surviving firms.

Autocorrelation of the first order between the errors, where it exists, has been measured using Durbin and Watson's test. In all cases positive autocorrelation was found. Therefore the parameters of all the functions were

re-estimated, following the generalized differences method. With this new estimate of the parameters - in order the better to evaluate the relative effect of the two independent variables - the values of the variables were standardized. Tables 4.1 and 4.2 give the values of the parameters thus obtained.

With regard to the equations proposed two points should be noted.

First of all, it should be explained that the decision to indicate the hiring and firing situation with the rate of growth of the surviving firms - instead of with the total rate of growth of the sector - is connected with our intention to eliminate a systematic autocorrelation factor: both births and deaths exert an influence, at times appreciable, on the variations in the total employment in a sector.

Then, the fact that the values of N and M have been placed in relation to the values of g_{sop} of the same period requires justification. Since the birth of a firm and its closure are certainly investment operations - of positive and negative sign respectively - and g_{sop} in some sense a proxy variable for the rate of profit, it would have been fitting to separate the two variables by a lag.

In reality, in the course of the research, two equations of regression with variable lags from 2 to 8 quarters were calculated. However, these always gave worse results than the ones presented in tables 4.1 and 4.2. Probably the point is that since the values of N, M and g_{sop} are calculated on a mobile average over 8 quarters, they already incorporate in themselves those elements of knowledge of the past and prediction of the future that underlie decisions to invest or remove investment.

The data in the tables - which, following these notes, it will be as well to examine - suggest some observations, the most significant of which can be summarised as follows:

- in the metal-engineering and textile sectors the birth rate of the small firms tends to grow and that of the large firms to shrink;
- in the ceramic sector the birth rate of small, medium and large firms rises;
- in the ceramic sector the death of the larger firms increases, that of the medium firms falls;
- in all sectors studied the birth rate of the smallest firms is influenced by the cycle; strong influence of the cycle is also observable in the death rate among the small textile firms.

One should try to account for all these variations in the birth and death rates; among other reasons because, even if indirectly, the study of the factors that determined those variations assists in identifying the forces that, in a stable situation, govern the distribution by class of size of firms born and firms dead.

Tab. 4.1

I parametri della regressione $N_{d,t} = b_1 t + c_1 \delta_{199,t} + \varepsilon_{d,t}$

	settore ceramico	settore metalmecanico	settore tessile
<i>Imprese Piccole</i>			
b_1	-0,45 ⁰²	0,85 ⁰⁰	0,72 ⁰⁶
c_1	0,33 ⁰²	0,40 ⁰⁰	0,17 ⁰²
r	0,64	0,77	0,74
D	0,65	1,71	1,69
<i>Imprese Medie</i>			
b_1	-0,31	-0,31	-0,22
c_1	-0,30	0,12	0,19
r	0,32	0,36	0,29
D	1,48	1,32 [*]	1,73
<i>Imprese Grandi</i>			
b_1	-0,44 ⁰²	-0,45 ⁰⁰	-0,92 ⁰⁶
c_1	0,07	0,37 ⁰²	-0,14
r	0,49	0,67	0,88
D	1,51	1,54	2,04

Note - È stata verificata l'ipotesi che ciascuno dei parametri sia pari a zero. Due asterischi indicano che un parametro è diverso da zero ad un livello di significatività dell'1%; un solo asterisco che è diverso al 5%; nessun asterisco che un parametro non è significativamente diverso da zero.

D è il test di Durbin e Watson, e l'asterisco indica che il valore segnato è compreso nella zona di indeterminazione corrispondente ad un livello di significatività del 5%.

Tab. 4.2

I parametri della regressione $M_{d,t} = b_2 t + c_2 \delta_{200,t} + \varepsilon_{d,t}$

	settore ceramico	settore metalmecanico	settore tessile
<i>Imprese Piccole</i>			
b_2	0,09	0,27	-0,02
c_2	-0,28	-0,01	-0,44 ⁰⁶
r	0,33	0,27	0,44
D	1,73	1,55	1,95
<i>Imprese Medie</i>			
b_2	-1,21 ⁰⁶	0,11	-0,05
c_2	-1,11 ⁰⁶	0,02	-0,06
r	0,83	0,10	0,08
D	2,38	0,99	2,17
<i>Imprese Grandi</i>			
b_2	0,45 ⁰²	0,22	0,27
b_2	-0,14	0,13	-0,03
c_2	0,56	0,23	0,27
D	2,02	1,68	1,77

Note - Circa il significato da attribuire agli asterischi, vedi tabella 4.1.

Fig. 4.1

Il saggio di natalità delle imprese piccole (p) e grandi (g), nei settori metalmeccanico e tessile, dal 1° trimestre 1966 al 4° trimestre 1977.

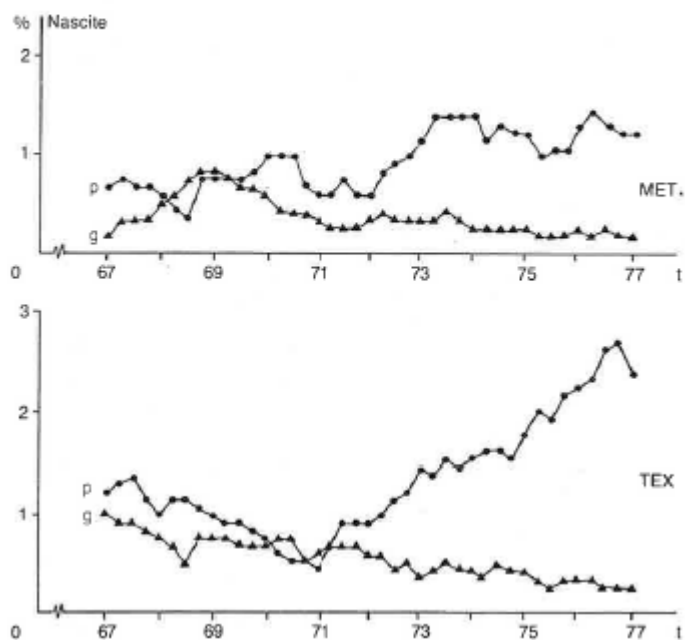
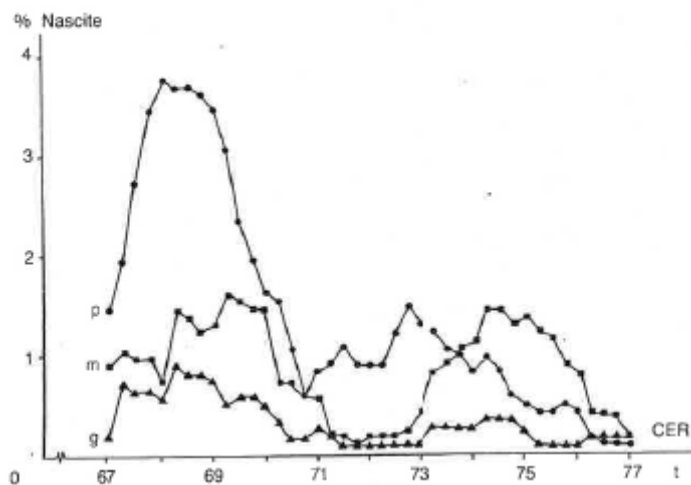


Fig. 4.2

Il saggio di natalità delle imprese ceramiche piccole (p), medie (m) e grandi (g), dal 1° trimestre 1966 al 4° trimestre 1977.



The first point of those listed above can be further elaborated by examining Fig. 4.1, which reports the quarterly birth rates in the metal-engineering and textile sectors. It can easily be seen how the increase in the birth rate is slower and more regular in the metal-engineering sector, sharper and less uniform in the textile sector. The birth rate of the small textile firms actually shows an alternating trend: up to 1970 it falls and only after that date does it start rising - more rapidly in these last years than may appear from the value of parameter b_1 . (It seems that one could

identify 1970 as the moment which, in the area considered, witnessed the beginning of that tendency towards decentralisation that characterizes the entire Italian textile industry at the present time).

Figure 4.1 also shows how regular is the fall in the birth rates of the largest firms in both sectors considered.

Note, too, that the values of the correlation coefficients are in general

rather high; sometimes very high, as in the case of the larger textile firms: thus all the lines of trend which we are dealing with can generally be deemed broadly variable.

In order to explain these variations it seems reasonable to refer to phenomena that have been amply treated in the foregoing paragraphs.

The increase in the birth rate of the small firms and the decrease among the large firms are undoubtedly linked to the ongoing process of vertical disintegration. The same forces that encourage the growth of the small firms, and "hinder" the growth of the large ones, also induce an increase in the birth rate of the small firms and a fall in that of the larger ones. Thus variations in the birth rate represent another of the ways through which the industrial structure of a sector is modified.

A different explanation must be given for the process referred to in the second part, i.e. the variations in the birth rate in the ceramic sector.

The negative variations in the birth rate - reported in Figure 4.2 quarter by quarter, for the three groups of firms of different sizes - would seem to be due, before all else, to the slowdown in the rate of growth of employment of the sector, provoked by substantial increases in productivity and by the simultaneous slowing up in the activity of the construction sector in Italy. In this situation, the sharp rises in production connected with ongoing restructuring in the existing firms are sufficient to meet the increased demands of the foreign market, and in some sense discourage the birth of new firms.

Even with the uniformity of this general picture it will be useful to carry the analysis to more disaggregated levels. In this way it can be observed how the birth rate of the small firms has decreased more than all the others; how the birth rate of the medium firms - as the nonsignificance of the parameter b_1 shows: has undergone no important variations; and how, on the contrary, the birth rate of the large firms has slightly fallen.

The first phenomenon can be attributed to the progressive reduction in volume of demand for hand-decorated tiles, which were the typical product of the small ceramic firms. On the other hand, the trends in the birth rates among the medium and large firms (which trends are closely linked to one another) seem to require explanation by the evolution of production techniques: this has appreciably lowered - in terms of employees if not of production - the minimum efficient size of factories producing "biscuit", of glazing plants, and of factories performing a "complete cycle" producing ordinary machine-glazed tiles.

Explanation must also be given for what is summarised in the third point: i.e. the variations in the death rate of the medium and large ceramic firms.

The reduced mortality among the medium firms can probably be attributed to the technological evolution already mentioned: currently among the medium firms one should include certain important factories employing the new single-firing process, which was unknown at the beginning of the period we are studying.

The rise in the death rate of the large ceramic firms also poses problems for interpretation - more, indeed, than the other phenomena mentioned, if we bear in mind what was said in paragraph 3 when describing the regime of industrial relations in the zone studied.

For there can be no doubt that if the large firms rarely show high rates of dismissal, it is even rarer to find them closing down. of the threat of bankruptcy unleash a whole series of reactions on the part of the workers, the unions, the local authorities, the press and, sometimes, in the most important cases, the population of the district. In a region like the one studied, where there is a high employment rate, these reactions almost always manage to create the conditions necessary for rescue. And it should be noted that, just by virtue of the particular conditions of the labour market, this occurs not only for firms employing thousands of personnel but even for quite small firms with less than 100 employees.

However, the rise in the death rate of the large ceramic firms does not

contradict these conclusions - for it seems to be linked, above all, with the ongoing processes of concentration in the sector and reflects not so much an increase in the number of firms that have ceased activity as an increase in the takeovers of small firms by large ones, or in the mergers between firms of similar size. And it can be easily seen that, since the takeover of one firm by another does not involve dismissals, this does not lead to any reaction on the part of the workers and their organizations, provided certain minimum conditions are guaranteed.

To conclude, the last point, referring to the ratio of birth and death rates and the requires comment.

In all three sectors, as has been mentioned, there is a positive relation between the trend of the cycle of the birth rate of the small firms. It would appear, therefore, that this offers another way of verifying the fact that at moments of crisis processes of decentralisation are speeded up. In paragraph 2 documentation was given as to how - when the demand for the products of the sector stagnates or decreases - the growth of the small firms becomes more rapid, both as compared to the large firms and in the absolute sense. The results now obtained show that this increase also takes the form of an increase in the birth rate.

Nor does the relation between cycle and mortality of the small textile firms bring any surprise, if considered in the light of the results set out hitherto. Indeed, it seems to confirm that, as was said in paragraph 3, the small firms, in times of crisis, polarize into two groups: one consisting of very rapidly growing firms, the other of firms acutely affected by the crisis. The latter obviously include those firms that discontinue activity during the crisis.

5. Summary and conclusions

The following main facts emerge from our analysis:

1. The law of proportional effect is verified - if not with absolute certainty - in the ceramic industry. In the metal-mechanical and textile industries, on the contrary, small firms grow at a considerably higher rate than large ones.

The difference between the two development rates increases in periods of "crisis". The differences between the two cases seems to be due to the fact that in the metal-mechanical and textile industries, firms - even those carrying out processes of the smallest minimum efficient size - are often born below that size. But, above all, the greatest growth of small firms must be attributed to the rapid processes of vertical disintegration going on in the two industries, which stimulate the growth of small firms and "hamper" that of large ones.

2. The standard deviation of development rates decreases on going from small firms to large ones: more slowly in the ceramic industry, more quickly in the metal-mechanical and textile industries. In the last two industries, the dispersion of development rates - and the difference between the dispersion of small firms and that of large ones - increases sharply during periods of crisis. Also the regularity of the development rate decreases with the size of the firms and, especially in the metal-mechanical and textile industries, it decreases in periods of crisis.

Examined in the light of each other, these two facts show that small firms, as against large ones, enjoy a much greater freedom to dismiss personnel.

However, the difficulties connected with implementing dismissal procedures induce large firms to considerably reduce the taking on of personnel for reasons of economic trends, i.e. personnel not strictly required by major modifications in the firm's plant.

3. In the twelve years taken into consideration - from the beginning of 1966

to the end of 1977 - the "birth rate" of large and small firms declined substantially in the ceramic industry, whereas it remained almost stationary in medium-sized firms. In the metal-mechanical and textile industries, the birth rate of small firms increased, whereas the others remained constant. In several cases death rates also altered.

Lastly, it is shown that birth rates in small firms are - in all those industries - closely linked in a positive relationship with the course of events in the economic cycle.

In order to explain these variations and to account for the above-mentioned relationship between birth rate and trend, reference was made to various phenomena: the modification of production techniques; the variations in the quality of products required by an industry; on going processes of vertical disintegration; the urgent need to recover margins of flexibility in the use of work-force; and, finally, the phenomena of progressive concentration.

The points listed require some comment which will confer generality on the conclusions reached. It was said at the beginning, with quotations from the relevant literature, that empirical research on Gibrat's law is addressed to two categories: students of the theory of the firm and students of the processes of concentration.

Of course, on the basis of the analysis performed, our data do not enable deductions to be made on the curve of costs. To start with, the results are contradictory: as has been seen, Gibrat's law is coherent as regards what happened in the ceramic industry, but it is rejected by what happens in the other industries studied. But, above all, the universe studied exhibits such special features as to rule out any indications for theory. Indeed, it is all too obvious that the results - obtained on a group of firms of which the largest has no more than 4000 employees - cannot be generalized.

In the same way, and for the same reasons, the results do not seem to enable greater understanding of the ongoing processes of concentration.

However, our data and analysis would seem, in our opinion, to indicate a way of tackling the study of the state of and variations in an industry and its structure. More especially, the main methodological lesson of our work is that it is almost always possible - with reference to known facts of the industries studied - to account for deviations from the law of proportional effects. In order to explain these deviations, we have referred to the influence of several factors of various types. These have but one fact in common, i.e. that knowledge of them derives from other studies parallel to those whose aim was to verify Gibrat's law.

In more general terms, the essence of the conclusions appears to be as follows.

Gibrat's law derives from the observation - which is, of course, completely acceptable - that the growth of the firms depends on a large number of factors. And it consists of a single hypothesis: that the effect of all these factors which act cumulatively, in a positive and in a negative sense, and each of which, taken singly, may be connected with the size of firms is such as to produce the same distribution of development rates in any class of size. From this premise alone the lognormal distribution of firms by class of size can be derived.

The empirical evidence collected since the publication of Gibrat's work up till now has shown, however, that the law of proportional effect has no general application. As has already been said, different results have, from time to time, been obtained not only by different authors but often by the same author from different periods examined. (And this is essentially what the present study has shown, in examining a universe with special distinguishing feature).

In these circumstances, it seems reasonable to recognize that Gibrat's law has no universal application and that - to this extent - it must be rejected as false; but, at the same time, all the suggestions deriving from that hypothesis must be extracted.

First of all, the placing at the centre of attention, not so much the size of the firm as the manner of its development and thus the shifting of emphasis

from the study of the trend of the curve of costs to the study of factors that govern the development of the firm.

Secondly, attention must be paid to the birth and death of firms, as one of the ways in which important changes in the industrial structure come about. Thus studies on takeovers and mergers may, more organically than in the past, be integrated with studies on the distribution by size of firms "born" or "dead".

Finally, Gibrat's idea of a possible connection between the large number of factors affecting the growth of the firm and a stochastic process must be utilized so as to take into account the fact that chance may play an important role in determining the structure of an industrial sector.

From this point of view, the independence of the development rate from the size of the firm is no longer such a reliable estimate as it would have been had Gibrat's law been more generally verified; it becomes, instead, a test by which to ascertain, industry by industry, period by period, whether there are factors or tensions that affect the industrial structure under examination. Summing up, though the law itself may fail, it still remains an extraordinary tool for investigation.

In other words: when there is independence between size and development of the firm, the factors that favour the growth of smaller firms offset those that favour large ones, and the factors that hamper small firms offset those that hamper large ones; the lack of independence between size of firm and development, on the contrary, indicates the presence of forces that, at that time, in that area and in those industries, act systematically so as to give a certain orientation to the industrial structure under examination.

As we said, it "indicates the presence of forces": thus it resembles a clue that may stimulate further investigation but gives no indications about the nature of the factors that have favoured this or that size of firm. What these forces are and how they operate must be ascertained using other tools of investigation than those employed in analysing development rates; and the point of reference must, of course, be the study of the industry and of its history, carefully examined in the light of all the knowledge that traditionally constitutes the "corpus" of doctrines of industrial economics.

Perhaps it is in this sense that we should understand Sherer's suggestion to the effect that "a sophisticated explanation of how industrial structures become what they are must, at the same time, take into account conventional factors, which are more or less static, and the type of dynamic considerations introduced by models of stochastic development"*. For that matter.

Although in the works cited one can already detect a sort of commitment to avoiding reference to what is known about events peculiar to the sectors studied, traces of this manner of using Gibrat's law can be found. Ferguson, for instance, notes that 3 out of the 15 sectors examined show a significant relationship between size and development of the firm; and states that "each of these cases has a special explanation"* (36). He then rapidly sketches an analysis of the motives which, in each of the three sectors, have stimulated the growth of firms of a particular size.

Appendix

1. Sources. The sources of the data for employment in firms, quarter by quarter, are principally two: the findings of the "Ispettorato del Lavoro" (Employment Inspectorate), and the records of the "Istituto Nazionale della Previdenza Sociale - INPS" (National Institute of Social Security). The former have always been considered less reliable than the latter; and, on the whole, they have only been used as a marker, to include in our lists those firms belonging to industries examined which INPS wrongly placed in other industries. With the aim of checking and correcting the INPS lists, those of firms prepared

by trade union federations of the industries in question have also been used.

A consequence of the fact that the main point of reference of the findings are the INPS records is that our data never take into account "irregular work": however, in industrial firms, this omission does not seem to be very important.

Often, in order to complete the historical series; to place a firm precisely in its sector; to clarify dates of merger or takeover processes; to reconstruct the history of a firm bearing in mind, in the expected way,

changes in ownership and name, entrepreneurs were directly interviewed, or the archives of the Chamber of Commerce were consulted.

2. "Birth" and "death" of firms. According to the conventions used, a firm is "born" in the same quarter period in which employees are taken on for the first time, and it "dies" in the quarter following the one in which it employed personnel for the last time.

What is very helpful in calculations is that the two conventions enable firms present in each quarter to be counted, as follows:

$$(\text{firms present})_{t+1} = (\text{firms present})_t + (\text{firms born})_{t+1} - (\text{firms dead})_{t+1}$$

There is just one exception to this rule. When a firm at quarter t takes on for the first time n employees, and at quarter $t+1$ it has more than $4n$ employees, it is considered as "born" at quarter $t+1$. It often happens, in fact, that a firm takes on only a few employees at the beginning or a few foremen, and then, immediately afterwards, all the workers that it needs. This behaviour cannot be considered as a witness to rapid growth; it must, instead, be put down to the need for somehow co-ordinating the initial taking on of the personnel, or, more simply, to the impossibility of employing all

new personnel on the same day. This procedure enables us to discriminate between these firms and small ones that grow rapidly.

Finally, it is important to remember that neither changes in trade name nor in juridical form, nor "simple" changes in ownership - excluding takeovers and mergers, which will be mentioned later - have had any importance in sorting out "births" and "deaths".

On the other hand, changes in ownership preceded by official liquidation proceedings - whether this liquidation is voluntary due to bankruptcy - are recorded as "death" of the firm that has been liquidated, and "birth" of the firm which, under the control of the new owner, has started its activity.

3. Takeovers and mergers. When two firms join into one, it is said that a merger has taken place if the size of the larger firm is equal to or lower than 1.3 times that of the smaller. If this is not so, it is said that there has been a takeover of the smaller firm by the larger one.

In the former, the two firms are considered "dead", and the firm that derives from the merger is "born"; in the latter case, the smaller firm "dies", and the larger one simply increases in size.

4. "Birth" rate and "death" rate. The "birth" rate of a given class of size - for example of "small firms" - has been defined as the relationship between the number of firms "born" in that size class and the number of all firms present in the same period. This convention could be contrasted with the tradition in demographic studies, by analogy with which the "birth rate" should be defined as the relationship between the number of, let us say, small firms newly instituted and the number of small firms present.

Unlike the case of populations dealt with in demographic studies, newly constituted small firms can in no way be considered as deriving from other small firms already present, we therefore preferred to follow the criterion mentioned above, as being less subject to chance variations; and use has been made, however imprecisely, of the expression "birth rate", which should be

rights have been defined as a relationship between firms of the same size class - i.e. between those "dead" and those present.

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Lognormal distribution in its simplest form can be defined as the distribution of a variable whose logarithm obeys a normal probability function" (cf. Aitchinson and Brown (1966), p. 1).

(2) Cf. Ijiri and Simon (1964) and Ijiri and Simon (1967).

Cf. Bain, 1956.

(4) Cf., for example, Penrose (1959) and Marris and Wood (1971).

For a definition of the "submerged" economy, two references can essentially be made. First, to the estimates of gross national product made by ISTAT: according to this "submerged" - i.e. "badly estimated" - applies to that portion of the national economy made up of firms with less than 20 employees (cf. Guglielmo and Martina (1979), pp. 28-29). Second, to the field of application of social welfare legislation: according to which the submerged economy consists of all workers not covered by welfare payments.

The data on which the research is based - as will appear more clearly in the appendix - come from INPS: so the perspective in which we work is obviously that of the first of the two references above.

Cf. Pratten (1971), pp. 4 et seq.

If all firms grew at the same rate the difference

$$\log D_{i,t+n} - \log D_{i,t}$$

would be equal for all the firms. The function

$$\log D_{i,t+n} = a + b \log D_{i,t}$$

would therefore be represented by a straight line inclined at 45°, with an intercept equal to that difference.

(8) Ferguson (1962), p.54.

Mansfield (1964), pp. 95-96.

Singh and Whittington (1975), p.18.

The subperiods were chosen bearing in mind the rate of variation of the work-force employed overall in the individual sectors. The first subperiod includes the long boom running from 1966 to the start of the slight crisis of 1971; the second ends with the crisis - again slight, except for the ceramic sector - of halfway through 1974; the third goes up to the time of data collection.

In 1971 the fall in growth rate that divides the first and second periods does not coincide in the three sectors. For the sake of uniformity in the periods investigated this datum was disregarded. It is, in any case, not very important, since the crises in the different sectors are staggered only by a few quarters.

The fourth subperiod was to have examined the whole 12 years under investigation. However, in the three years up to the beginning of 1969 no figures were available for the total number of employees firm by firm, but only the number of workers. From the early 1970s on, there was an appreciable increase in the hiring of white collars over blue collars. For this reason it seemed better to process data over a shorter period, but on all employees, rather than over a longer period and only on blue collars. For the same reason - i.e. in view of the lack of data on white collars in the first three years - the data of the period 1966-1971 refer to blue collars in each firm. In all the other periods the reference is to the total number of employees.

Since the logarithm of zero is not definite, it is impossible to include firms with zero employees in the regression. Dead firms have therefore been conventionally allotted 1/10 of one employee.

In Mansfield (1962) the X² test contradicts Gibrat's law in 7 out of 10 cases when dead firms are included, but only in 4 out of 10 cases when only firms alive throughout the period are considered (of Mansfield (1962), Table 2 on page 93).

The notion of "minimum efficient size" was introduced by Bain (1954) and Bain (1956), and can now be found in textbooks - e.g. Scherer (1970), p.74.*

See, for example, Mariti (1977), Müller (1976) and Brusco (1975).

The notion of "minimum efficient size" was introduced by Bain (1954) and Bain (1956), and can now be found in textbooks - e.g. Scherer (1970), p. 74.

This analysis obviously leaves out of account production stages generally entrusted to home workers. Otherwise, the smallest minimum efficient size would be 1 employee, in all three sectors. In the ceramic sector, the obvious example is that of the female workers who, at home, perform the hand decorating of tiles; in the metal-engineering sector one of many possible examples is the assembly of hair-grips; in the textile sector a very common example is the "fare il puntino" - i.e. when the neck is attached to the already knitted body (see page 22).

Note that in order that the argument conducted hitherto shall be well founded it is necessary not to have a large number of firms starting up activity below the minimum efficient size. If this were the case, the newly constituted large firms - they, too, stimulated by rapid growth - would raise the mean growth rate of the larger firms, thus returning the mean growth rates by class of size to uniformity. Which is to say that our argument up to this point would break down if there were a significant number of large firms that, at the outset of activity had several departments available, each of them below its minimum ef-

efficient size. But there are no clues indicating that this does happen, or that it happens frequently. And anyway it is highly unlikely. It should be recalled, among other things, that large firms often come into being as a new entrepreneur takes over a failed company that had already worked in the past and in which, presumably, each of the departments had already reached its own minimum efficient size.

For the purposes of this work the level of vertical integration of a firm V_i , and of a sector V_s , can be defined as follows. Let Y_i , F_i , and O_i be respectively the value added, the turnover and the employees in the firm i , operating in sector s , and let n be the number of firms operating in sector s . The vertical integration will then be

$$V_i = \frac{Y_i}{F_i}$$

$$V_s = \frac{\sum_{i=1}^n V_i * O_i}{\sum_{i=1}^n O_i}$$

thus defined, decreases each time a firm, of whatever size, commissions outside the factory some production stage that was formerly carried out inside. (Note that on the basis of this definition it is meaningless to compare the level of vertical integration of two different sectors).

Cf. Brusco (1975), pp. 11-22 and Frey (1975) above all pp. 22-25. For a different opinion as to the "dominant reasons" for decentralisation, cf. Mariti (1979), pp. 78-82. On the basis of the replies of two groups of entrepreneur - one from Tuscany, the other from Lombardy - Mariti concludes that "roughly speaking [there is] no "hierachy" of reasons".

Cf. Brusco (1975), pp. 55-59.

For an analysis of the degree of vertical integration and the factors governing it, cf. Adelman (1955) and the more recent Cockerill (1979).

Assume a universe of n small firms. Imagine extracting (with repetition) from this universe all possible random samples of n firms each. If σ is the standard deviation of rate of growth in the N firms, the standard deviation between the means of all samples σ^* will be equal to σ/\sqrt{n}

If the large firms were simply the sum of n small firms chosen at random, the standard deviation of the rates of growth among the large firms would not significantly differ from σ^*

(23) Cf. Simon (1964), p.82.

It may be useful to recall that Mansfield offers an explanation - alternative to that of Hymer and Pashigian - of the fact that the standard deviation of the large firms decreases at a slower rate than $1/\sqrt{n}$ (cf. note 22). But of course this is another problem.

Cf. Hymer and Pashigian (1962), p. 566.

For that matter, the same authors (cf. note 9, p.561) acknowledge that "there are few theoretical references on how to define a sector"; that is to say, they acknowledge that the lack of a theoretical definition of the notion of sector hinders us from having any indications on the fact that all the firms in a sector have - or do not have - the same curve of scale.

Obviously attributed wage is meant.

Cf. Paci (1975), above all p.4, and for a different view Bagnasco and Messori (1976), p. 71.

As mentioned above, Ferguson estimated the employment trend of a firm in a rough way, linking the extreme values (initial and final) of the period by a straight line.

For reference the class of size to which the firm belongs at the start of the period has been chosen.

Cf. Singh and Whittington (1975), p.22.

Ibid., p.23.

In the metal-engineering and textile sectors we have defined as "small" the firms with from 1 to 10 employees; "medium" those with 11 to 20; and "large" the rest. In the ceramic sector the "small" firms have up to 20 employees; "medium" from 21 to 40; "large" those with more than 40. These thresholds take account of the characteristics of the industrial texture investigated, as well as of the need not to go below a certain number of cases in all the classes of size.

The "seasonable" element must be removed from the data, since firms, especially small ones, tend to be born more frequently at the beginning of the year than at the end.

Cf. Scherer (1970), p.130.

Cf. Ferguson (1960), p.54.

4.

One of the important findings of the Bergamo research was that, in order for the conditions for efficiency to be fulfilled, it was necessary that the department and not the firm itself, be not inferior to the minimum efficient size of the various stages of production, and to ascertain whether the small firms involved in those stages actually matched those requirements. Of course, this would not by itself have constituted a test of efficiency: the above condition was a necessary but not a sufficient one.

I made the first attempt in this direction in the ceramics sector, with the assistance of two students enrolled in the evening courses, both chemistry technicians and both directors of the Marazzi group. We found that the basic production module was given by the producers of firing kilns. The smallest factory - in the majority of cases - produced 4,000 square metres of tiles per day; when the factories were larger, they were so by multiples of 4,000 square metres. All the other production stages - milling, pressing, glazing - fell into line with the basic module. Gabriele Canotti, Mario Cervi and I studied, in finicking detail, the trend of costs with the variation in size of the firm. The result confirmed Georgescu-Roegen's idea: that in a vertically integrated factory, increase in size goes hand in hand with an increase in the degree of utilisation of plant and a reduction (if only a small one) in costs.

These two theses involved me, essentially, in a long course of technology and work organization in the ceramics industry. What I have learnt since - over and above what I learnt at that time from Cervi and Canotti - was taught me in the subsequent years by Margherita Russo, who has continued her studies on the ceramics sector and is about to publish a book on the subject.

Ceramics, however, raised problems of no great importance as regards the division of work among firms. Thus I followed the same pattern of investigation in the textile sector, with the help of Werter Malagoli Paola Mengoli, Paolo Bertossi, Manuela Samek Ludovici and Daniela Giacobazzi, who prepared all the programmes for the plotter to trace the curves of the costs. The little essay that follows is the outcome of this work.

The results achieved were not of great analytical importance: and perhaps they could not have been, since the problem was, basically, only one of making

certain measurements. But some things we did learn, even though the most important are not reported in the essay that follows. The data were concerned with the different average dimensions of knitwear factories, the making up of garments, the manufacture of underwear. The knitwear factory very seldom requires a production line: once the material has been woven and cut out, the garment can often be made up by a single worker. Other garments are produced by stages: lines of eight, ten or twelve workers in the artisan firms; lines of up to forty in the big firms like Max Mara. The lines are composed of the various working points, each having a sewing machine, a machine for making buttonholes, another for attaching the buttons; every few days, when a new garment enters production, the line is recomposed accordingly. Underwear is produced in large runs and the work is divided up into several stages.

The same research scheme was employed once again for the building sector. Daniela Giacobazzi helped with the computing, and, as before, the work went unpublished. Collaborators were Massimo D'Alessandro and Gabriella Zangrandi, both teachers of construction technology at 'La Sapienza' University of Rome. Together we measured the minimum efficient size of all stages in construction, with traditional technology and "tunnel" technology. Once again we discovered that one of the reasons behind decentralisation was the huge difference in minimum efficient size between the various stages.

This result to some extent supported by the hypothesis put forward at the end of the nineteen-seventies by Gianfranco Dioguardi on the basis of his experience as entrepreneur and teacher of Industrial Economics. According to him, the general contractor in building performs tasks that demand a complex and specific professionalism - the professionalism, i.e., of the person who must efficiently coordinate a large number of stage firms: these firms have very different working schedules and intervene at very different moments in the production process, and each of them attempts to construct its own continuous work flow in passing without interruption from one building site to the next.

The Rome research also enabled us to compare the curves of long term costs of three techniques for construction of the supporting structures of a residential building: the "advanced traditional", the

"tunnel" and the prefabricated. Of the three, the prefabricated was by far the least convenient, on all points of the curve. On the contrary the cost curves of tunnel and traditional technology crossed at a certain point, indicating that tunnel technology is more expensive than the other at low production levels, but thereafter becomes more convenient. The calculations also show that, if the ribs of the tunnel were not required by law to be reinforced with large quantities of iron rods - which is quite unjustified from the constructional point of view - the tunnel technology would always be more efficient than the traditional one. All these findings are of some interest, if it is remembered that up to then the comparisons between the costs of the various technologies had been made only for a single quantity of product, instead of continuously, for the entire long term curve.

This research also had an epilogue, which taught me much but, once again, led to no publication. In 1985 the FNAM, the federation of engineering artisans belonging to the CNA, decided to conduct a survey of its members. I asked Mauro Ronchetti, who was organizing the survey, to collect information on all the machines belonging to the various firms. Each machine was recorded according to model, maker, year of purchase and so on. My hypothesis was that if we could thus obtain a complete list of all the machines used in the single firms, we would finally be in a position to gauge the technical level of the firms. When the information had been collected, Margherita Russo and I, armed with the list, asked a technician - one of the best metal-engineering technicians in Modena - to give an assessment in points to each of the firms. Thus we could get some sort of measurement, however approximate, as Ezio Avigdor had done in Prato several years previously. But the engineering sector is very different from the textile sector. In order to give his assessment, the technician needed certain extra infor-

mation: not only whether the firm was producing mainly prototypes, in short runs, repeated short runs, or long runs (which information we were able to provide); but also what proportion of total sales was represented by each group of products, and how short were the short runs, how long the long ones, and so on. As a matter of fact, after four or five evenings spent discussing the data, it became clear that there was only one way to give an assessment of technical level of the firms: the technician would have to visit a firm two or three times and watch the production as it went on, see what kind of workers was employed on it, and what machines were used and when. What we did not fully understand at the time - though it seems obvious enough - was the very close link between the type of machinery used and the product. Old machines with manual control may be the best for constructing prototypes with minimum tolerance. An automatic machine, perhaps not specially productive and not regularly used, may provide the most efficient way of tackling production peaks. An underemployed machine with numerical control may be evidence of a situation where the desire for efficiency outstrips the efficiency actually achieved.

Of course, the foregoing does not hold for all firms. Where a firm is characterized by a strong technical nucleus - as with the kilns for single firing in ceramics, or electric ovens in small steel mills - collecting information on machines may show that, at least as a general rule, they are of some value in forming a judgment. But where the texture of production is fragmented, the relations between firms very close and complex, and production highly diversified, an assessment of technical level becomes far more difficult.

And in any case, the problem posited by Leibenstein in his studies on x-inefficiency** still awaits solution: if machinery is equal, can one hypothesize equal productivity?

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**Leibenstein, General X-efficiency theory and economic development, Oxford, Oxford University Press, 1978.

DECENTRALIZATION, PRODUCTION COSTS AND WORKING CONDITIONS IN THE KNITWEAR INDUSTRY*.

I should like to describe some research I am currently engaged upon in the Economics Institute in the Faculty of Economics at Modena University, in cooperation with Werter Malagoli and Paola Mengoli. The research has three main aims. The first is to ascertain what relation exists between decentralization and efficiency in the sector: i.e., whether decentralization weakens the sector overall, or whether it enables high levels of international competitiveness and efficiency to be achieved. The second task is to study the relation between decentralization and workers' conditions, in order to verify how far decentralization entails lower incomes for workers than they would earn in a factory. The third objective is to construct a tool for formulating accurate forecasts on the trend of the sector; for understanding which production stages are destined to be moved outside the factory or stay inside; and to enable one to predict what kind of restructuring the firms will have to tackle in the near future.

Two principal stages have so far emerged in our research. The first consisted of a long series of interviews (more than 1500 all told) with artisans, home workers, factory workers and entrepreneurs, in the areas of Carpi-Correggio and other provinces - especially Ancona, Verona, Rovigo, Ferrara and Mantua. These provinces were selected from those where the Carpi-Correggio district puts out work on commission. They represent the main areas to which production in the province of Modena is decentralised.

The second stage required a very careful sampling of all the techniques presently employed in the production of certain articles of knitwear. We studied three products that, in one way or another, were representative of the whole sector: underwear, classic knitwear (i.e. fully fashioned pullovers) and "cut and sewn" knitwear. For each of these three products we studied all the stages in which the production process is split up; and, for each stage, all the technical alternatives currently available on the market. On the basis of these alternatives the curves of total mean cost were constructed.

The figures report in the data on men's underwear. The volume of product is shown in the abscissa (items produced per day); on the ordinate are given the total mean costs (i.e., the sum of fixed mean costs and variable mean costs), in lire of 1979, for each production stage and for the whole production process. The costs appearing in the graph for each level of production are the minimum obtainable, taking into account all the techniques considered. (In elaborating the curves we collected the data relating to fifteen looms chosen from among the types most widely used; as well as data relating to two systems of cutting, two three methods of calendaring, and to the various possible ways of organizing work in the making up stage).

Curves and calculations were made at the Computing Centre of Modena University; the program was prepared by Dr. Daniela Giacobazzi of the Istituto Economico.

Fig. 1
Magazzino filato

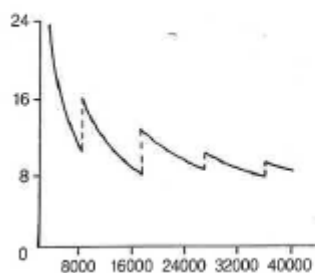
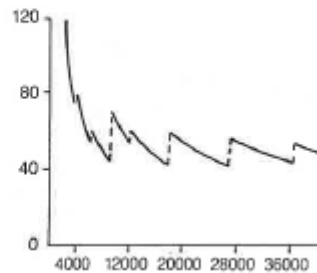


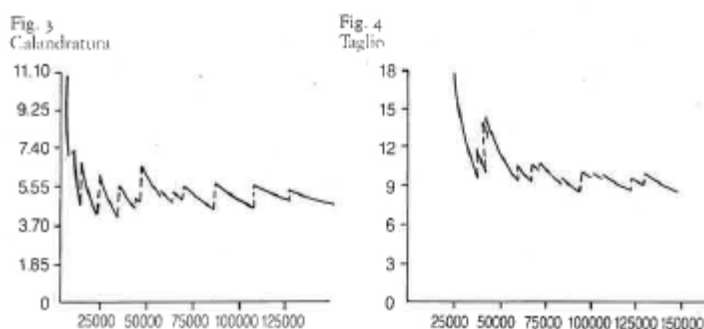
Fig. 2
Tessitura



It would be out of place here to give detailed explanation of the assumptions on which the curves are based. It will perhaps suffice to sketch the reason why they are broken rather than "continuous" like those usually

employed for long-term mean tests. This is because the model worked out by us estimates the costs with reference to a number of subsequent factories that differ from one another by a very small quantity of product. The individual strokes of a curve remain downwards inclined until the increase in quantity of product enable a progressively greater utilisation of the machines and the workers already available to the firm. The curves are broken when the machines or the work force already present reach their first utilisation. In this case a further increase of product - however small - in line with the hypotheses underlying the model requires purchase of other machines or hiring of more workers; so that, of course, the total resources available to the firm undergo a sudden sharp fall in utilisation. Note also that, as we mentioned, the model chooses, for each level of production, the technology that will minimize costs: thus a stroke of the curve is broken both (as we said) when the current resources reach full utilisation, and when the introduction of different machines enables production at lower costs.

On these curves, so constructed, the minimum efficient size can be calculated, stage by stage of production.



The following table reports, for three departments of the Textile sector in Carpi, the minimum efficient size of the sections of weaving, cutting and assembly, measured in number of items per day and in number of workers per section.

	Dimensione minima efficiente					
	Capi al giorno			Numero addetti		
	tess.	taglio	conf.	tess.	taglio	conf.
Maglieria intima	7.500	25.000	2.500	5	3	15
Maglieria tagliata	200	727	234	3 ^{1,2}	4	7
Maglieria calata	1.028	594	226	14 ¹	13	9

¹ Su tre turni
² Si assume su lavori filato di una sola finezza
 L'operazione di taglio riguarda soltanto alcuni particolari.

These data may vary with modification of the garments for which they were estimated - e.g. addition of a pocket or a tuck. But knowing, for instance, that the minimum efficient size in cut-and-sewn knitwear is achieved at around 230-250 items per day, with 7 workers, and at around 2,500 items in underwear, offers an important point of reference for evaluating the efficiency of the artisan firms making up garments for other firms.

On the basis of the interviews performed, it was possible to compare the characteristics of existing firms and the conditions necessary for efficiency, deduced from analysis of the production process carried out at engineering level.

Not only as regards the assembly, but also the other stages, and not only for underwear (where decentralisation is very rare) but also for fully-fashioned and cut-and-sewn knitwear, one has the impression that over the entire Carpi-Correggio district firms generally meet the requirements of minimum efficient size: that is, the units working for third parties almost always achieve the efficient size.

Of course, an additional element was necessary to make a full assessment of the productivity of firms working for third parties in the area: the machines employed in the factories had to be evaluated on the basis of the data collected in the engineering model.

Fig. 5
Confezione

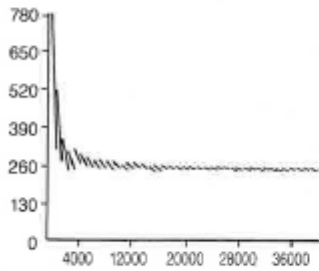


Fig. 6
Imbustaggio-spedizione

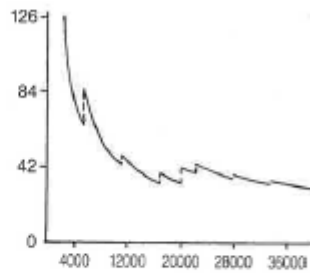
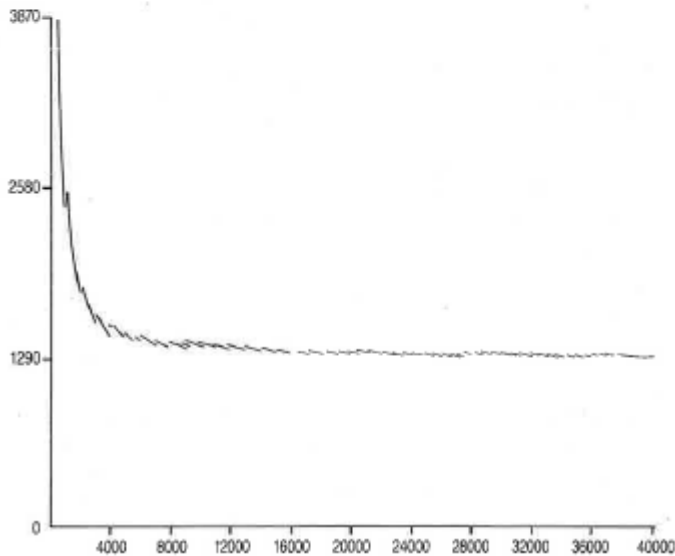


Fig. 7
Costi unitari di produzione relativi a tutte le operazioni



Note that, in order to have an assessment of the technological level of the firms, both elements (minimum efficient size and study of the machines used) are indispensable. For, as can easily be imagined, a firm can reach minimum efficient size even without very productive machinery; whereas, as is often forgotten, it may have highly sophisticated machinery but in smaller quantity than that required by the minimum efficient size. Think, for example, of an artisan weaver working on a good quality loom and producing at costs above the minimum because the optimal situation envisages two looms per worker.

Here again, from this point of view, the firms working for third parties in the Carpi-Correggio district meet the criteria of efficiency: the number of latest generation looms is very high, around 70%.

In the other provinces, however, where the Carpi-Correggio firms decentralize their production, the situation is different. Minimum efficient size is almost always achieved, but as a rule the machines used are much inferior to those employed by the artisans in the area round Modena.

In conclusion, therefore, the first question proposed in the study may be answered as follows: if, instead of using as term of comparison a hypothetical vertically integrated factory, we consider the minimum efficient size per production stage, it can easily be seen that both in Carpi-Correggio and in the other provinces receiving commissions from Carpi-Correggio, the firms working for third parties achieve efficient size; on the other hand, while the type of machinery used is at high level in the province of Modena, it is much less so elsewhere. Thus the example of Modena shows that decentralization - provided there be no strong economies of scale (as there are not in the sector under consideration) - does not necessarily represent an obstacle to the

competitiveness of the sector.

The second point our study aims to clarify bears on the relation between decentralization and the condition of the workers.

Essentially, this analysis has provided elements for understanding why the struggle rightly waged by the unions against decentralization is so terribly difficult and so often doomed to failure.

The point is that the workers who work for third parties are anything but homogeneous: indeed, their income range is an extremely wide one.

First and foremost, the income of workers for third parties depends on professional skill. It is easily ascertained that female home workers in Carpi, doing sophisticated production stages, earn an income far higher than female home workers in the Marche performing simpler production stages, or than those in Carpi who, coming from the South, are only capable of low-skilled production stages and are thus compelled to sell their labour at much lower prices.

Income also depends on the investment necessary to carry out a certain production stage. Weavers who work for third parties have invested an important sum in their looms, earn much more than those doing sewing or working with the flat-bed loom. In addition, income is linked to the efficiency of the machinery employed: the home workers and artisans in the Marche use much less efficient machines than those of Carpi and earn much lower incomes.

All the foregoing is fairly obvious, even if often denied. There exists, however, another variable of extraordinary importance in determining the incomes of those working for third parties: the area where the work is done. There can be no doubt - and the data collected from the interviews mentioned above confirm this in all cases, with no exceptions - that with equality in machinery and size of firm, and while performing the same production stages, the artisans of the provinces to which Modena decentralizes earn about 30% less than the artisans of Carpi-Correggio. The most convincing example is that of artisans who make up garments with a firm employing about fifteen workers, performing production stages that are not specially sophisticated but at normal level of skill: in Ferrara these artisans earn very much less than in Carpi. And note that the comparison is between artisans doing the same work, using the same machines, and with the same size of firm.

The struggle waged against decentralization by the unions is difficult precisely for this reason: those working for third parties include the well-off artisans of Modena, the skilled home-workers of Modena, who often earn higher wages than female factory workers (though, of course, they work longer hours - with the typically Emilian phenomenon of an overall high wage and a relatively low hourly wage), but there are also the artisans of Ferrara, the home workers of Ferrara and Ancona, or the home workers from the South working in Carpi, who often earn wages of less than 200,000 lire per month.

In other words (concluding this second point and linking it with the first), I feel I must to some extent dissent from two opinions that generally find much support. The first says that decentralization weakens the sector. This I do not believe. On the contrary, decentralization strengthens the sector, since it does not affect efficiency, enables good technology and encourages levels of competitiveness such as to make productivity very high. According to the second opinion, with which I disagree, decentralization condemns all those who work on commission to low incomes. If this were true, it would be easy to lump all those who work for third parties together in the same bargaining program. In reality, however, since among them some are high earners, some medium and some overall poor, the creation of a platform that should unite all these disparate and dishomogeneous elements is extremely difficult. What happens instead is that decentralization on the one hand compels the unskilled workers, plus those operating in provinces where the labour market offers no alternatives, to earn very low wages. Thus the Southern homeworkers in Carpi or the home workers in the Marche or Rovigo, or the workers who produce for the artisans of Ferrara, foot the bill for this decentralized structure. A single datum may serve as example: among those working in artisan shops the apprentices are about 80% in Modena, over 45% in Ferrara.

To conclude: decentralization lends strength to the sector and is paid for by the weaker section of the work force. Any bargaining platform that aims to affect the conditions of the knitwear and garment assembly sections must take account of these two facts in planning its strategy in the large firms, in working out the first part of the contract, and in putting forward a platform that will enable the defence of a work force that, more than any other, is currently subject to exploitation.

There is one last point which I wish to highlight and that relates to the use that may be made of the analytical tool we have devised.

We said that all the data referring to the machines used in the sector, stage by stage, were collected and put on computer. Apart from a few exceptions, the machines considered were those in use for 10 years already. It was also mentioned, in the first point, that from these data it was possible to calculate the curves of total mean cost, and this was accordingly performed.

But the data have other possible uses.

For each production stage the increase of productivity enabled by the machines, as they are introduced, can be followed.

For instance, the data reveal that over the last 7-8 years in weaving physical productivity has increased by 40% and the cost has fallen by about 25%. In cutting (the reference is to underwear but it could be to "fully fashioned" or to "cut-and-sewn" knitwear) productivity has risen in physical terms by 30% and costs have decreased by 30%. As for garment assembly, it could be argued that there has been no appreciable change in machinery, but that improvements in the organisation of work have brought down costs by about 10%.

With periodical data collection - for example, every two years - such as to enable assessments to be made on the trend and orientation of technological innovations before these spread, it would be possible to forecast the restructuring firms would have to undergo, the credit requirements of the sector in order for it to keep abreast of technical progress, and the increase in volume of production needed in order not to lay off work force.

Continuing this hypothesis of a constantly updated collecting of data - which would enable the sector to take account of the new machines presented yearly at industrial fairs and offered to operators in knitwear and garment assembly, these data, regulated by an appropriate program, could be the basis of broad outline projects produced by computer for new firms. Given the quantity of product desired, the computer can choose the techniques that will minimise the cost; it can list the machines necessary, the number of workers required and their skill, and can calculate the investment cost, the mean production cost (in its fixed and variable components) and the physical productivity per worker.

This result can be of importance as a service rendered to the individual entrepreneurs requiring a broad assessment on an investment to be made, or to those selling entire factories abroad, who could thus be enabled to make a rapid evaluation of alternative projects.

But the most important use is another: namely to offer the unions, entrepreneurs and local authorities a device that would assist in a detailed and reasonable discussion of proposals for restructuring presented by individual firms. That is to say, I believe that, both from the point of view of the unions and that of the entrepreneurs, it is far preferable to discuss possible restructuring with a broad outline project in front of one that guarantees the correctness of the forecasts, the precision in the estimate of the costs, and a reasonable estimate of the labour units to be hired and those to be laid off; this rather than engaging in trials of strength which may at times prove fruitless.

5.

In Sardinia, in the years prior to my admission to Cambridge (1962), I had often worked in collaboration with Salvatore Sechi. Both of us were friends of Pigliaru, and to some extent his pupils. Both also had worked with Ichnusa, which in those years played an important part in the political and cultural life of Sardinia. And then Salvatore went off to study Political Sciences in Turin. He had discovered Gramsci and the working class and had joined the Communist Party. Years later we met again, in Emilia; I was living and teaching in Modena; Salvatore lived in Bologna and taught Contemporary History at Cà Foscari.

And it was he, no less, who in 1981 invited me to collaborate with the RAI on the Emilian episode of the programme called "L'Italia che tiene" (The Italy that keeps going) - the episodes dealing with the regions of Marche and Tuscany had already been produced. The aim was to show how, faced with widespread crisis of the late 1970s, certain local economies had managed to prosper. Emilia was one such area.

First of all, we had to make up a grid - a script as they called it at the RAI - in order for the producer of the programme to sketch out a scenario. The design must be simple, with few technical terms (so that the producer should have no trouble in understanding), plenty of facts and names, something fairly close to a scenario.

So I went to work and what emerged after a couple of days turned out to be the first draft of "The Emilian model". Actually, this was the first time I had put together all my thoughts on industrial districts. As it was also the first time I went beyond the strict limits of what is customarily termed economic analysis and took account (though without going into particular detail) of the social and political context; which was what Becattini had already been doing for some time, as well as Bagnasco and Trigilia in their books. Hitherto I had scrupulously refrained from trespassing on this territory; in the conviction - that I now see as increasingly mistaken - that economic analysis was something quite different from analysis of institutions and control mechanisms and political give-and-take.

As had happened with the article on Gibrat's law, the writing took in several of the findings obtained in researches done with the unions that had not hitherto reached the stage of publication. The

information on workers' careers comes from the work of Giovanni Solinas, which was published the year after. Werter Malagoli and Paola Mengoli had analysed the different levels of development of the Modena, Ferrara and Ancona districts; the first findings had been cited at a couple of conferences, but the work was destined to remain in draft form* The interview at the Moto Morini company - which was often quoted as an exemplary case of decentralisation in Emilia - had been done by me in cooperation with Charles Sabel and some Bologna trade unionists a few months previously.

The piece also features the first explicit attempt to combine analysis of industrial structure with analysis of segmentation of the labour market. The pattern of segmentation put forward therein has not found particular favour and rightly so, I fancy. The point is that - unlike what is implied in the essay - the primary division is not between the workers in small firms and those in large ones. Rather within the district the distinction must be made between "weak" and "strong" workers. The power to decide - at least to some extent - one's own destiny does not depend on discriminations made by the entrepreneurs, on the basis of sex, age or other characteristics; on the contrary, it derives from levels of professionalism, from the ability to interact with other people, and from a degree of authority that enables one to direct the work of others and achieve not only efficiency but also consensus. On this basis, in the labour pool that coincides with the district, one must distinguish between those who are so weak as to be able to work only at the margins of the productive system (i.e., certain home workers, many elderly people, and so on); and the others, who move from large firms to small firms to self-employment, and vice versa, according to the shifting trend of demand for the individual firms and following as far as possible their personal inclinations. If this be so, the labour market in the districts must be studied as a Piore-type model. This means considering the district - in its totality of production units, great and small - as a single enterprise; and studying, à la Piore, the ports of entry and the mechanisms regulating internal mobility. So that, looking at the matter in this perspective, it comes as no surprise to find that there is a mountain of work still to be done.

Some years later I gave a university course on theories of vertical integration. In preparation for the course, I read Richardson's "The organisation of industry" in Economic Journal, 1972. And in that article I came upon an argument very similar to the one I had used in accounting for decentralisation. The argument holds that a structure having a low level of vertical integration is able to show a high degree of efficiency in tackling variations in demand solving the problem, as the essay that follows maintains, "not so much through a shift in manpower as through a shift in orders". Of course, this holds good if the demand for the products of the district, or sector, is more stable than that for the products of the individual form. And, according to Richardson, this is precisely the reason why entrepreneurs in the building sector hardly ever seek upstream vertical integration and do not turn to producing bricks or cement.

The television programme was never realised. I made one or two alterations to the piece and published it in Problemi

della Transizione, a periodical from Bologna dealing with "culture and politics" which struck me as a suitable vehicle for an article which, I felt, would be out of place in a strictly academic journal. That the article originated as a television programme can still be felt. Almost every paragraph begins with a question: here was the explanation, intended for the producer, of what I meant to deal with as I went along.

Some time later the piece was read, in Italian, by a referee of the Cambridge Journal of Economics and published there, in revised form. The English version, which appeared in 1983, won the prize of the Cassa di Risparmio di Biella for the year's best article on industrial economics. Giorgio Fuà, who chaired the committee of judges for the prize, published part of the article in his Industrializzazione senza fatture.

And I think it must have been there and in the Cambridge Journal that it was read, since very few can have read it in Problemi della transizione.

For instance, at the conference at which the essay "Decentralization, production costs and workers'condition in the knitwear sector" was presented.

Editor's note

This paper was not translated, being available an English version. Originally published in Italian, the paper was translated and abridged by Jonathan Zeitlin e Diego Gambetta, and published in English by the Cambridge Journal of Economics, in 1982, under the title "The Emilian Model: Productive Decentralization and Social Integration".

THE EMILIAN MODEL: PRODUCTIVE DECENTRALIZATION AND SOCIAL INTEGRATION

Sebastiano Brusco*

Introduction

The following essay presents a dynamic analysis of the interaction between the productive structure, the labour market, and the principal political institutions in Emilia Romagna.

There are at least three reasons why, in recent times, many economists have focused their attention on the economy of the region (Bagnasco and Messori, 1975; Bagnasco, 1977; Filippucci, 1978; Capecchi et al., 1979).

The first is that over the last fifteen years Emilia-Romagna has had an economic performance distinctly better than many others regions in Italy, and has shown itself more resilient to crisis.

Secondly, the industrial structure which developed in Emilia-Romagna, and which is the basis for its economic performance, may also be found in other parts of Italy, so that the study of Emilia is of general interest and its results may help to understand the working of industrial districts elsewhere in Italy.

Finally, in Emilia-Romagna almost all local authorities, including the regional government, are controlled by the communist party, often in alliance with the socialist party. The region, therefore, represents a kind of test for a coalition of left wing parties in Italy which is of broader European interest.

The superior economic performance of Emilia-Romagna

Table 1 compares both the participation rate and the unemployment rate in Emilia-Romagna and in Italy as a whole over the last twelve years.

According to ISTAT (the Central Statistical Office), which generally underestimates these figures, the rate of participation in the labour force reached almost 46% in 1980, 6% higher than national average. The contrast is even more striking if Emilia is compared with Southern Italy where less than one third of the population participates in the labour force.

On the other hand, the rate of unemployment is in general lower in Emilia-Romagna than in Italy. More detailed figures would also show that recession reach Emilia later than other regions, and their effects are more temporary.

Two other indicators also show the superiority of economic performance of Emilia-Romagna when compared with the rest of Italy.

From 1970 to 1979, the rate of growth of money income per head in Italy was 17.15% per year in Emilia-Romagna over the same period income grew at an annual rate of about 18.5% (Unioncamere, 1981). Consequently, Emilian income rose from an already favourable position in 1970 to 5.6 million lire per head in 1979 compared with the average Italian income of 4.4 million per head. Moreover, the provinces of Modena and Reggio had in 1979 an income per head of 6.2 and 6.0 million lire respectively, and where the second and the fourth richest provinces in Italy (whereas in 1970, in the classification of the richest provinces, they occupied the 17th and the 12th position respectively).

Another interesting indicator is the amount of exports which originate in the region. Table 2 shows that the share of Emilian exports in total Italian exports continued to increase, almost without interruption, from 1963 to 1980.

The characteristics of Emilia

There are no great differences between Emilia-Romagna and Italy in the distribution of the labour force among sectors and among industries (see Tables 3 and 4). More significant are the differences in other aspects of the region's industrial structure, in particular the size distribution of firms. Table 5 shows that the proportion of the labour force employed in small productive units is always greater in Emilia than in Italy as a whole.

But the most significant point is that these small firms, often with less than 10 employees (see Table 5), are frequently grouped in relatively small zones according to their product, and give rise to monocultural areas in which all firms have a very low degree of vertical integration and the production process is carried on through the collaboration of a number of firms. In these areas only a proportion of the small enterprises market finished goods; the others work as subcontractors, executing operations commissioned by the first group of firms. Production has become widely decentralized as more and more firms which previously manufactured their own components increasingly resorted to outside suppliers. Despite union opposition, 'putting out' is now a common phenomenon.

There are many possible examples of these industrial districts: knitwear in Modena; clothes and ceramic tiles in Modena and Reggio; cycles, motorcycles and shoes in Bologna; buttons in Piacenza; tomato canning and ham in Parma; pig breeding in Reggio Emilia. But it would be a mistake to think that this phenomenon is confined to the production of consumer goods.

Industrial districts are also common in engineering: the production of automatic machinery and packaging machinery in Bologna; of agricultural machinery and oleodynamic apparatus in Modena and Reggio; of woodworking machine tools in Carpi; of food processing machinery in Parma. In these cases, the industrial districts are less clearly defined, since they form specialized parts of the engineering sector where component producer supply the manufacturers of a wide range of finished products. This concentration of small firms also extends to the service sector and is found widely on the Adriatic Riviera to which four million foreign tourists come every year.

It is also notable that there is a clear connection between the proliferation of small enterprises and the use of 'black' labour. This concept has been given many definitions (Frey, 1975). It has been applied to situations where social welfare contributions are evaded and again to cases where labour is paid lower wages than the minimum set by national agreement, works in substandard conditions, or does not receive agreed levels of supplementary bonuses and holiday pay. However defined, black labour is extremely common in Emilia-Romagna, and underpayment, tax evasion and the extraordinary flexibility of labour are all important features of the productive system.

The economy of the region is also characterized by a high income per head of the labour force engaged in agriculture (in 1971 Emilian agriculture gave work to 8.6% of all Italian agricultural workers, and produced 11.5% of the total Italian agricultural product); by active and increasingly strong cooperatives, which although concentrated in food and construction exert a powerful influence on the social and productive structure as a whole; and by a limited presence of wholly or partially state-owned enterprises.

The following sections of this paper consider various aspects of the region's industrial system - the industrial structure and industrial relations. Particular attention is paid to dynamic interactions between these, the market and the government in order to study their impact on the region's economy.

Inter-firm relations

Recent research in the Faculty of Economics at the University of Modena sheds significant light on the relations between different types of firms in this

industrial structure (Brusco and Malagoli, 1981). This study focuses on the garment industry in Modena, Reggio Emilia and the adjacent provinces, as a sector marked by an extremely low level of vertical integration. It shows that in Modena and Reggio the artisanate considered as a legal category can be divided economically into three groups: half are homeworkers inscribed under the category of artisans purely for the purpose of evading taxes and social welfare payments; one-quarter produce on their own account, having direct relations with the market of finished goods; and a final quarter are subcontractors. It is important to note that many of the independent artisans put out a good deal of the components of the finished product both to the other artisans and to the numerous female homeworkers of the region. In order to understand this structure, one must also consider the larger industrial firms of the region. Half of these enterprises undertake internally only the preparation of samples and the packing and distribution of the garments, while the bulk of the work is decentralised. The other half perform directly at least some of the work, though even these also decentralise an often substantial part.

In the neighbouring provinces, the picture is totally different. There the artisans producing on their own account constitute only 8% of the total, while the larger firms are in most cases owned by entrepreneurs from Modena and Reggio. To interpret these findings, it is necessary to consider together Modena and Reggio on the one hand and the neighbouring provinces on the other. Those artisans with direct access to the market need the dependent artisans of the neighbouring or secondary provinces as a bulwark for their own productive structure. The relationship between Modena and Reggio on the one hand and the neighbouring provinces on the other thus appear to be that of metropolis to colony, and the two together constitute a single system.

It would be tempting to interpret the relationship between the purchasers of components and their subcontractors in monopsonistic terms, as if, in other words, the enterprises producing on their own account were price makers able to compel the subcontractors to accept extremely low profits. But this is untrue, as we will see more fully below. Here it suffices to stress that the market between the two parties is almost invariably competitive. The great majority of subcontractors in fact have the ability to switch customers, if the prices offered are too low, and there is no collusion among the latter strong enough to enforce artificially low prices.

The sources of decentralisation

The principal sources of the movement towards decentralisation of the productive structure in Emilia, and in Italy more generally, are twofold. The first cause can be found in the rise of the trade union power since the 1960s. Since the victories of the late 1960s, the union has acquired enough strength in the large firm to make redundancies almost impossible; to protect their shop-floor representatives and to force the employers into plant-level bargaining; to exercise a certain degree of control over working conditions; and sometimes even to impose changes in the organisation of work. Since these developments did not take place to the same extent in the smaller firms, it is only natural that the large employers sought to offset the effect of unionism by shifting production towards the small firm sector. Thus it is no coincidence that the process of vertical disintegration gathered force in Italian industry towards the end of the 1960s.

The second cause can be found in the emergence since the mid-1960s of a significant demand for more varied and customised goods, produced in short series, alongside that for standardised goods. Among the examples of this trend one can point to much greater number of versions of each model of car than existed fifteen years ago; a multiplying of styles in clothing and shoes; a growth in the publication of new books and magazines; and an increase in the varieties of furniture, refrigerators and sewing machines. Before the market experienced this evolution, these goods were most often produced according to

the techniques originally developed by Taylor and Ford. Many of the components used in those products were made with specialised machinery, the so-called transfer machines, which were designed for the production of a single part, and which were therefore both very productive and very costly. These products were put together on elaborate assembly lines, designed in such a way that each operation was often to be completed in less than thirty seconds. Assembly lines, too, were highly costly, since they were both expensive to build, and required large amount of planning, work study and running-in time. Both types of technology were restricted to large industry: transfer machinery because of its cost and rigidity, and assembly lines because of their dimensions alone.

The advantages of mass-production technology were reduced by the diversification of the product market and the competition in terms of quality and variety which this implies. The new demand requires more flexible, even if less productive, machinery than the transfer machines, as well as methods of assembly in which tasks are less fragmented so that slightly more diverse products can be assembled. This flexible technology is much less expensive than its predecessor and, more importantly, it is quite compatible with the needs of small firms.

This trend in turn affects investment goods. Without going into much detail, one should note that the construction of sophisticated machine tools was synonymous with that of transfer machines, which were custom-built in small series or single examples. For this reason they were particularly suitable for production with a fragmented structure, insofar as the small firms possessed the relevant know-how. During the past few years, however, the shift in consumer demand has cut down the demand for these machines. What will happen in the future will depend both on the extension of the current standardisation of components and on the diffusion of numerically-controlled machine tools which may be produced in long series. It seems probable in either case, however, that even the investment goods sector there will remain space for short runs and therefore for small firms.

Alongside the increase in unionisation and changes in demand which have provoked the fragmentation of the industrial structure, there is another element which without acting directly constitutes a necessary condition allowing the process to occur without reduction in productivity. The sectors in which decentralisation is particularly marked are those in which it is possible to fragment the productive process without having recourse to an inferior technology. For example, the Morini motorcycle plant in Bologna has 100 employees and produce an average of 20 motorcycles per day. Most of the workers in the plant are engaged in assembly, on lines on which the tasks are not very subdivided. Except for the camshaft and the engine mounting, all the components are put out: the frame, the tank, the shock absorbers, the handlebars, the brakes, the gears and the wheels; almost the whole machine is produced by subcontractors. And the key point is that they are produced with precisely the same techniques which would have been used had the firm decided to make them directly.

In other words one should bear in mind that, despite the increase in the scale of production in the 1950s and 1960s, with certain technologies there is no advantage in producing all the components of a product under a single roof: whether they produce similar or different pieces, twenty lathes have substantially the same productivity if they are gathered together or dispersed in separate buildings. This is what economists mean when they assert that economies of scale should be calculated in the first instance for phases of production, and that the economies which result from the juxtaposition of similar operations are often negligible (Brusco, 1975; Müller, 1976). It should be noted, therefore, that generally the sectors in which this type of industrial structure prevails are those characterised by limited economies of vertical integration. Where these conditions do not hold, as in the ceramic tiles sector, decentralisation is nearly non-existent or assumes purely legal forms.

Even if it is accepted that for many industries the importance of technical economies of scale has often been overstated in the past, it might

still be objected that there exist nonetheless both indivisibilities in the administrative work of firms and significant pecuniary economies of scale. Thus small firms might experience difficulties in book keeping, in obtaining raw materials, and in obtaining credit at the same price paid by larger firms with greater bargaining power. But in this context it is extraordinary to observe how the artisans and small entrepreneurs of Emilia-Romagna have overcome these difficulties by creating association to provide these administrative services and to coordinate purchasing and credit negotiations, thus establishing on a co-operative basis the conditions of achieving minimum economic scale of operation. These associations, which cover the whole region, prepare the pay slip, keep the books, and pay taxes of small firms, giving to the latter the expertise of a large office in administration and accountancy at a minimal price. Furthermore, these associations also establish technical consultancy offices, consortia for marketing and the purchase of raw and semi-fabricated materials, and, most importantly, co-operatives which provide guarantees for bank loans which can thus be obtained at the lowest possible rate of interest.

Industrial relations

Turning to the field of industrial relations, the first premise of the analysis is that the industrial structure, as we have already suggested, is divided into two segments by the size of the firms. In the 'primary' sector, the trade union has two main characteristics. First of all, it is extremely strong: there labour legislation is almost always respected; trade unions representatives are recognized on the shop floor; plan bargaining yields wages above those negotiated at national level, and seeks - with intermittent success - to influence the organisation of work and to establish job ladders within the firm; finally, there is a tradition of popular mobilisation which in practice enables the unions to block any factory closure. The strength of the unions both depend on and is illustrated by the fact that in Emilia, by contrast to Piedmont and Lombardy, the 'primary' sector extends downwards to include all enterprises with more than 30 employees, so that roughly half of the labour force is unionised. Secondly the, union is generally 'reasonable'; it does not bid up wages too strongly in plant bargaining and is prepared to be flexible, even if within fairly strict limits, in enforcing contractual provisions concerning layoffs, overtime, and health and safety regulation; finally, it does not put forward over-bold projects of work reorganisation within the factory.

These characteristics of trade unionism in Emilia ensure a prompt, and generally non-violent, resolution of industrial disputes. The point at which agreement will be reached is usually recognized by both parties in advance, since it can be easily derived from the going rate for plant settlement in the country. It is precisely the strength of the union and its flexibility which guarantee at the same time that the negotiations will produce a satisfactory result without concessions and that the terms of the agreement will be enforced without subsequent flare-ups of localised conflict or idleness among the workers. Thus even though the union exercises a real control over working conditions in the plant, the employer enjoys a secure climate which makes possible a greater degree of planning of the volume of production and investment.

In the 'secondary' sector, in contrast, everything works differently. But before going on to examine the 'rules of the game' in this segment of the labour market, it is necessary to draw attention to the heterogeneity of those to be found within it. Besides the artisans working on their own account and the subcontractors we have already discussed, there can be found four main groups. First, highly skilled workers, often specialised in maintenance work, who have registered as artisans in order to free their wages from the limits established in the national agreements, but who continue to perform exactly the same job during the same hours as before. Second, the various types of homeworkers: those already mentioned who are forced by their bosses to register

as artisans in order to evade social security payments; those whose position has been regularised according to recent labour legislation; and those whose position remains 'irregular', some highly qualified and others without any particular skill, whether elderly or from the South. Third, moonlighters and pensioners who have returned to work, who often agree with the employer to evade all social security payments and divide the proceeds. And finally, women and students who, in evasion of all controls, accept seasonal, temporary, and precarious work of every kind.

In this world the dispersion of wages is extremely high, extending from maintenance workers registered as artisans who can earn twice as much as their factory fellows, to the elderly or immigrant homeworkers who get less than one-third of what they would receive in the factory. Here there is little evidence of the struggle for egalitarianism which has formed so noteworthy a part of the history of the Italian unions. The Emilian unions attempt to regulate wages, unlike their counterparts elsewhere, by making collective agreements with the artisanal associations, which in turn press their members to regularise the working conditions of their employees and to respect the contracts; certain recent legislation has a similar intention (Malagoli and Mengoli, 1979). But the level of wages is fundamentally determined by three factors: the level of demand for the product; the intensity of labour; and finally the level of skill.

In this sector, moreover, redundancies are possible. Here firms are able to hire and fire as the volume of orders changes, both because legislation against unfair dismissals does not apply to firms with less than 15 employees and because of their scanty unionisation. In this sector all variations in the level of output are translated into variations in employment. By contrast, as a recent study shows, the large firms fear that a subsequent recession will leave them unable to dispose of surplus manpower and they therefore refrain from hiring unless they install new machinery (Brusco, Giovannetti and Malagoli, 1979).

The segmentation of the labour market

The two labour markets which correspond to these two types of firms are, in general, linked and movement from one to the other is possible. There are, to be sure, significant numbers of workers who are unable to gain access to the 'primary' sector: elderly or immigrant women; middle aged peasants; and at least for a time recent agricultural immigrants working in small firms with particularly unhealthy working conditions. But when demand is expanding, anyone accustomed to factory life and able to work intensively, even if not very skilled, can find work where he or she pleases. And each worker is ultimately able to choose in which segment to work. Under such conditions of increasing demand, wage differentials between the sectors narrow markedly and choices between them are not determined by earnings. For women, their family situation is the most important consideration, while the central influences for men are such factors as preferences concerning the atmosphere in large and small factories, possibilities of acquiring skills, and networks of personal or family contacts.

Many young people, in these conditions, are able consciously to choose a temporary or part-time job, or to decide to work at whatever job, however disagreeable. This choice is possible in some cases because of the level of family income which ultimately guarantees subsistence; in other cases, it is based on a light-hearted trade-off of lower earnings against shorter hours of week. Often, this latter attitude springs from a sharp critique of the capitalist use of labour power; always, it depends on the expectation that it will be possible to find a job when necessary.

For highly skilled workers, it is possible not only to choose the plant, but also to decide to go into business for themselves. The latter choice, while it brings a higher income, also requires longer and more intensive hours of work. Thus the question for the worker is whether or not to opt for more work

and higher earnings. What is striking is not how many become artisans, but how many of those who are able do not. This is ultimately a further sign of the health of this regional economy.

If instead the labour market should become depressed, the situation would change significantly. The less skilled workers would experience much more difficulty in changing segments; then the absence of collective bargaining and of union guarantees would make themselves sharply felt. The very flexibility which currently constitutes an advantage for this sector would become an insurmountable obstacle to the organised defence of employment. The effects of a crisis would be much less for the highly skilled workers whose bargaining power gives them greater means of self-defence.

No major recession has struck Emilia-Romagna since the 1960s, and the system easily absorbed the effects of the central bank's credit restrictions. However, some indication of what might happen in recession can be seen from what happened during the downturn in the garment industry in 1974, when many homeworkers were left without work, while those who were employed suffered cuts in real and even money wages. The black economy of the South indirectly suggests what might happen in recessionary conditions. There the overall level of unemployment is so high that even when the product market is booming individual bargaining gives rise to wages well below those agreed nationally, to frequent evasion of social security payments, and to very poor working conditions (David and Pattarin, 1975; Botta et al., 1976).

In conclusion, the possibility of mobility from one segment of the labour market to the other depends on the same factors which determine wages: skill, the intensity of work, and the state of the product and labour market.

Mechanisms of labour market adjustment

Certain channels exist whereby the power to shed labour is transmitted between the small and the large firm sectors so that the system as a whole retains its flexibility. There are two main mechanisms, which are complementary rather than alternatives. The garment sector provides the most clearcut example of the first of these. There the impact of a fall in demand for the products of a particular firm depends on its level of vertical integration: where this is high, such a fall in demand will produce unemployment; where it is low, the workers employed in subcontracting firms will simply receive their orders from more successful competitors. To follow the process in more detail: when the level of integration is highest, each firm circulates its collection of samples through its own agents; collects and executes the orders; finishes, packs and sends the final product. When the level of integration is lowest, the firm which had prepared the samples and received the order will execute it through subcontractors from whom it will collect the final product for despatch.

Now suppose that (1) in both cases firms are sufficiently numerous to guarantee competition; (2) that the total demand for garments is constant, so that orders lost by one firm are taken up by another; (3) that all commissioning firms belong to the primary segment, and all subcontractors to the secondary; (4) finally, that subcontractors are able to shift easily from the production of one model to that of another.

We can now see what would happen in both cases when the styles offered by a firm are rejected by the market. In the first case (high vertical integration) the crisis in the firm will hit all the workers involved in the various phases of production. If orders fall to zero, they will have to be made redundant, even if they will be hired soon afterwards by the more successful firms. In this case the system has reached a new equilibrium by redistributing workers among firms, requiring a certain number of redundancies, which by hypothesis are tense and difficult for the firm concerned.

Under similar assumptions, we can now consider what would happen in the second type of structure, i.e. one which is characterised by a minimal degree of vertical integration. This time the firm struck by the crisis does not employ weavers, cutters, stitchers, pressers and finishers; it employs only

people working on prototypes, and workers in packing and despatching goods. Only these workers directly employed by the firm will be made redundant. The vast majority of the workers directly employed by the firm will be made redundant. The vast majority of the workers actually producing the garment would continue to work as before for the subcontracting firm which employs them directly. The work which is no longer coming to the subcontractor from the firm whose styles have been rejected by the market will simply be replaced by that commissioned by its more successful competitors. In this case, too, the system imposes some redundancies in order to find its equilibrium, but these are fewer than in the preceding one, and are made by firms which have fewer employees for the same gross turnover. The equilibrium has been restored not so much through a shift in manpower as through a shift in orders. The response to a downturn has been rendered that much easier.

In presenting the second mechanism to which we initially referred, our simplifying assumptions will be to some extent opposed to those employed in describing the first. Here the global movement of demand and the type of price-formation mechanism operating in this sector will be unimportant; it is rather assumed that the subcontractors are unable to shift their production. The only assumption which remains as before is that the commissioning firms belong to the secondary one.

We can now illustrate the second mechanism with an example. Imagine a firm with 1000 employees in which a decrease in production of 10% would provoke 100 redundancies. This level of redundancies would be highly problematic in the primary segment. Imagine instead a firm which decentralises 80% of the same volume of production, which would therefore be left with 200 workers. This firm would still belong to the primary sector, while the other 800 workers would be scattered among the small enterprises of the secondary sector. This time a fall in production of 10% would require 20 redundancies in the primary sector and 80 in the secondary. The first poses no great problems, both because 20 workers are few in absolute terms and because the union is weaker in a firm with 200 employees than in one with 1000. The other 80 redundancies would pose no problems at all since they belong to the secondary sector. In this case, too, it is ultimately the secondary sector which absorbs the tensions coming from the large firms. The difference is that in this case the small firms perform this role by assuming responsibility for the major portion of the redundancies, while in the first case they coordinate the flow of subcontracted labour from the less to the more successful firms.

We can add four observations in order to clarify what has been said so far. First, the link between the two segments of the labour market has an important implication: all attempts to impose rigidities on the secondary sector would immediately reverberate on the system as a whole. Any successful initiative, whether by the unions or public policy, which aimed to limit the small firms' power to hire and fire would automatically rigidify the manpower management of the large enterprises. It seems as if there is, therefore, a clear alternative between two objectives, both desirable: that of maintaining the system's flexibility, and that of limiting the small enterprises' power to make workers redundant when they want.

There is only one way to avoid the dilemma of ensuring primary conditions of employment in all Emilian firms and yet preserving the flexibility of the system as a whole in a situation where demand is uncertain. To achieve such a result it would be necessary to construct a new secondary sector of firms and workers outside the region. Beyond the need to find manpower which has become even more scarce in Emilia, this is to some extent the significance of the extension of decentralisation to the Veneto, the Marche, and even Puglia. The internal contradictions of Emilia gradually become in this way external ones, which other regions have to face and resolve.

Secondly, it often happens in some productive activities that the great majority of firms cluster in the secondary sector, irrespective of the role played by the enterprise. This is, for example, the case of knitwear in which 50% of the 'parent' firms (i.e. those with direct access to the market for finished goods) have less than 30 employees. This state of affairs reaches its

limits in Prato, a Tuscan town with an analogous industrial structure, where the commissioning firm very often has no employees other than the proprietor, the so-called *impannatore* who designs the fabric and commissions the spinning, weaving, and finishing from other enterprises.

Thirdly, it will be useful to dwell for a moment on the differences between the mechanisms discussed above and another interpretation of decentralisation as a sort of 'productive lung' for the commissioning enterprises (Paci, 1975). There it is assumed that short period variations in the demand for the product of the commissioning firm may lead from time to time to the expulsion of certain operations from the factory and their subsequent recall. In this case, variations in the level of vertical integration of the firm are understood as conjunctural manoeuvres. In our view, this practice is difficult to realise, and it has no place in the mechanisms of the 'Emilian model'.

Finally, it is necessary to ask how frequently each of our hypothetical mechanisms of labour market adjustment might actually occur. As will be apparent from the assumptions on which they are based, the answer depends on two main considerations. The first is the demand for the product: the longer and more frequent the recessions, the more often the second mechanism will operate. The other consideration points instead towards the technology used by the subcontracting firms and the ease with which they are able to shift their production.

How plausible is this hypothesis that Emilian firms are easily able to shift from one product to another? In this context we should note there are variations between the production of components and assembly and in the experience of individual sectors. In the knitwear industry, for example, there are virtually no difficulties in switching models, neither in the production of components nor in assembly; in that of women's clothes, the production of components is highly flexible, whereas the adaptation of assembly lines poses some problems, though these are easily resolved; in the food industry, the flexibility is also very high. More careful attention should be paid to the engineering sector. Generally, components are more flexible than assembly and this is the reason why decentralisation is more prominent in the former. It should be noted that in this case a subcontracting firm can easily shift not only models but also subsectors: a firm producing stamped metal has no problem in switching from the production of, say, gas stoves to that of chair frames. Single-purpose machine tools, as remarked earlier, have next to no flexibility, whereas that of numerically controlled machine tools is extremely high. Finally, the flexibility of assembly lines is itself very variable: it is least where tasks are very fragmented and greatest where each position is assigned longer operations. Given the diversification of demand, this capacity to adapt easily to different products becomes synonymous in practice with the capacity to produce in short series at competitive costs. In conclusion, the hypothesis that it is possible to shift quickly and easily from one product to another is certainly true for many firms and in many industries. And this fact is closely related to the capacity of Emilian firms to produce in short series.

The solidity of the industrial structure

The capacity of the 'Emilian model' to resist foreign competition, in particular that of Third World countries, is rooted in three main factors. First of all, flexibility in the use of manpower. We can add to what has been observed earlier that this feature of the industrial structure becomes all the more important when compared to the rigidity of industrial structures, such as, say, that of Milan, which are dominated by large firms. Second, there is the rather high technical level of machinery employed. The flexible use of labour facilitates the introduction of innovations, even when they are labour-saving. As we observed earlier, when demand is expanding wages in the primary and secondary segments of the labour market are more or less the same; there is

therefore, no possibility for firms to recoup with low wages the low productivity of their machinery. It will be remembered that most markets, including those for semi-finished products, are highly competitive and this too speeds up the adoption of more sophisticated machinery. There is evidence, moreover, that in the most industrialised regions small firms experience no disadvantage relative to large ones in raising credit (Guglielmi, 1978; Filippi, 1979).

Finally, the solidity of the 'Emilian model' derives from the fact that this type of industrial structure more than any other fosters the skills and initiatives of its entrepreneurs in a variety of ways. In the first place, it spurs their emergence. The number of artisans of artisans or even major entrepreneurs previously employed as workers is very high, particularly as foremen, maintenance workers, and coordinators of putting-out networks. For each of these groups, their knowledge of some part of the productive process facilitates their passage to independent work. Even easier in some sectors, particularly that of garments, in the transition from subcontracting to direct contact with the market. Many subcontractors through their relations with their customers learn how to prepare samples, come into contact with the network of distribution, and eventually reach the point where they can circulate samples on their own. If these are well received they will produce a few copies within the firm and will put out the rest. At the same time, they will continue to work as subcontractors, thus avoiding undue risks. The system therefore operates as a 'forcing' ground for entrepreneurship.

Second, by using the foresight and imagination of so many artisans and entrepreneurs, this productive structure is able to offer an extraordinary variety of products, many of them novel, which cleverly interpret the needs of consumers and the shifts in their tastes. The garment sector is an obvious example. It is sufficient to realise that it would be impossible for a few large firms to produce the enormous range of styles which are created by hundreds of small firms. An idea, seen at Parisian or Florentine fashion show, can be reworked in a multitude of workshops. And in this way thousands of options are offered to domestic and foreign buyers. But more important examples can be cited from the investment goods sector, such as machines which dispense railway tickets, pack cigarettes and medicine capsules, or clean the streets; the extraordinary variety of agricultural machinery, from light tractors to fruit-harvesting platforms; or the many sophisticated hydraulic devices used in servo-mechanisms. There are all cases in which new needs are satisfied by a multitude of competing small firms which emulate and imitate each other and which as a result can give shape to new ideas with a speed that would be unthinkable in larger enterprises.

Finally, the small firms' capacity to develop new products and to devise new machines is enhanced both by the proximity of so many entrepreneurs engaged in similar activities and by the extensive collaboration between skilled workers and technicians within each firm (Brusco and Sabel, 1981). This phenomenon, which is particularly characteristic of monocultural areas, should be emphasised since it undercuts the conventional idea that research is only what scientists and technicians do in the laboratories of the big firms and not on-the-job creativity of ordinary people who know their own needs. For instance, in the ceramic tile industry, the machines which move the tiles uninterruptedly along the glazing lines, or which detect breakage through the use of sonic waves, were not the product of formal research, but were rather developed through the collaboration of the tile firms with a number of small engineering firms.

Emilia: an 'interstitial case'?

The idea of 'interstices' is connected with a view of the world in which goods can be divided into two groups. The first group consists of goods produced in long series by large firms with highly subdivided labour; strong economies of scale mark such production processes. The second group reverses these

characteristics, and is accordingly neglected by the large firms. As a result, their production, concentrated in small firms, is considered 'interstitial'. In such a classificatory system, the first type of goods are usually but often implicitly considered technologically advanced and the second backward. To this view is often added the assumption that goods produced in long series in large factories can only be reproduced with great difficulty in the Third World, in contrast to those of the second type, and are therefore less exposed to competition from developing countries. This has led some observers to conclude that the second type of production is ultimately destined to disappear from the advanced countries.

As we have seen, however, many goods produced in short series are nonetheless the fruit of enterprises which employ advanced technology and have some real market power. The simplest example is that of investment goods, which are often produced in short series or even on a one-off basis. The limit case, among these goods, is that of transfer machines, the robots used at Fiat, or the special pieces used in chemical plants; but, among Emilian products, this is true also of many automatic machines, machine tools, agricultural machines, and those used in ceramic tile production and food processing.

It is also true, to be sure, that some goods produced in short series are vulnerable to competition from Third World countries: for instance, the garment and knitwear industries, which on occasion suffer from the influx of Rumanian jackets and Indian T-shirts, or the producers of toys and stoves who face competition from Hong Kong and Poland. But on the whole it can be noted in most cases that the products of the underdeveloped countries are aimed at the bottom of the market. In other words, it seems possible to counteract the competition from these countries by shifting production up-market. These types of goods can only be produced with difficulty in predicting shifts in tastes, and the low skill-level of their workforces.

The history of the Italian monocultural area is precisely the history of this specialisation and movement up-market. This is the case of ceramics in Sassuolo, or to choose a case from outside Emilia, of textiles in Prato. This process can, of course, lead to a progressive narrowing of the market, and an attendant contraction of the industry and its labour force. So far, though, the process seems to go slower than is commonly expected, either because, as in Prato, sidelines have been found to make up the lost ground or because, as we have already seen, consumer demand for quality and variety is becoming increasingly pronounced. This slow expansion in the market for sophisticated products goes alongside the need to produce in shorter series and therefore to find means of controlling the labour force different from that developed by Fordism. All this naturally increases the space in which the small firm can operate efficiently. In conclusion, therefore, the notion of interstices seem to be weak and of limited value.

Agriculture

We can now turn our attention to the relation between industry and agriculture. There is a basic distinction to be made in this regard. Agriculture has not been able to survive in the Appenine mountains which mark the southern boundary of the region. To varying degrees, therefore, the mountains have lost their population and, to schematise a bit, only those areas which can attract tourists have managed to maintain their per capita income relative to that of the region as a whole. By contrast, the Po valley, which includes the most fertile soil in Italy, has been able to dispute with industry the labour force it requires. As a consequence, the incomes of many agricultural workers, including the day labourers, are often comparable to those of their industrial counterparts. This prosperity constitutes the principal feature of Emilian agriculture even though there remains a stratum of poor peasants which some estimate at one-third of the total agricultural labour force (Brusco, 1979).

The general prosperity of agriculture in the region can be ascribed to three main causes. First, there is extraordinary fertility of the soil. Yet

this is not a sufficient cause, since there are areas in Campania and Puglia which are even more fertile but less prosperous. The second reason is the presence of co-operatives which heavily influence the market for a wide variety of agricultural products. The diffusion and strength of co-operatives which sell Emilian agricultural products directly to consumers throughout Italy has eliminated the parasitic middlemen who still flourish in other regions. The co-operatives even manage to obtain for their members a share in the profits of the food processing industry. It is for this reason that the regional government has quite correctly chosen them as its main channel for influencing the agricultural sector, to such an extent that since its creation at the beginning of the 1970s the region has directed more than 20% of its total agricultural expenditure towards co-operatives.

It should be noted in passing that this practice of co-operative work has had its impact on industry as well. While there are no co-operative firms such outside construction, it is plausible to suppose that these traditions of co-operation have influenced those associations of artisans and small entrepreneurs of which we have already spoken.

Finally, and most importantly, the superiority of Emilian agriculture can be explained by the transformation of agrarian property relations since the war. Of all Italian regions, Emilia-Romagna was one of those in which sharecropping was most widely practiced in 1947. In the province of Modena, this type of contract covered 70% of the soil. Its decay, due more to the growth of industry than to legislation, has had deep repercussions. Many of the old landlords, whose estates often included ten to twenty sharecroppers' plots, once freed from this system have unified them into a single capitalist farm. Some of the minor landlords, almost always belonging to the urban bourgeoisie, have preferred to keep their farms as a second activity run by a salaried manager. All the remaining proprietors, large and small, have sold their land to the peasants. These sales, which were in some cases preceded by a period of rental, have selected out a wide stratum of highly skilled peasants.

The situation, therefore, has evolved along radically different lines to those of the southern regions. There, apart from the effects of the agrarian reform, the importance of large and medium landed property as remained unchanged; the only modification of agricultural techniques have been those linked to irrigation; the small properties freed by migration have in practice remained blocked and often uncultivated. In Emilia, where as we have seen, the land market has been extremely active, a major part of the capital accumulated through the sale of large estates was invested in the growing industrial sector. The initial capital of many engineering, ceramic, textile, and food processing firms was drawn from this source. A final example of the integration of agriculture and industry in Emilian development can be seen in the growing tendency for workers and artisans who are employed in the towns to go to live in the countryside, where they engage in a certain amount of part-time farming.

The state and local government

The central stated administration appears to play a lesser role in this region than in others. First of all, tax collection is less effective here than elsewhere, both as regards firms and private households. One might expect that in such a fragmented productive structure the longstanding deficiencies of Italian public administration might be even more striking than elsewhere. One might expect, in other words, that something similar to what happens to the trade unions (or by that token to the central statistical agencies) might happen to the state: the smaller the unit in question, the less such institutions will be able to control it. If this were true it would follow that Emilia-Romagna contributes less to the state than the other rich regions of the country. In this sense, then, it would be as if there were a transfer of income from these regions to Emilia. On the other hand, it is necessary to recall that the state also contributes less to Emilia since there are fewer public and semi-public enterprises there than in other regions.

In the case of public works, too, the absence of sound data makes any conclusions speculative. It seems certain, however, that the 'red belt' is discriminated against in terms of the distribution of public funds and credit concessions. Today perhaps this bias has eased off and is less pressing than in the past: there is no doubt, however, that such discrimination has never troubled the public conscience of the Christian Democratic Party. Another phenomenon, however, acts in the opposite direction: the extraordinary efficiency of Emilian municipal government in organising public interventions, no matter how complex; in providing financial resources; and in mobilising local forces, including Christian Democrats, in support of demands directed to the state.

A specific case may serve to exemplify this political efficiency, peculiar in Italian terms. The river Panaro, which separates the province of Modena from that of Bologna, had flooded thousands of acres of Modenese land several times between 1966 and 1973. These disasters were due to the absence of adequate flood-gates. The intervention which should have been planned by the Ministry of Public Works was instead prepared by the provincial administration of Modena and Reggio Emilia, and was ready by 1972. The Ministry had accepted it but by 1976 nothing had happened. When the river flooded in this year for the fifth time, the municipal government of Modena convoked an assembly in the city square of its citizens and those of the other affected towns; with the collaboration of all the MPs of the province so much pressure was brought to bear on the Ministry of Public Works that the funds for the long-planned flood-gates were released within fifteen days.

There is no doubt in fact that the efficiency of local government has markedly raised the real wages of Emilian workers, and improved the quality of life. Using the minimal, even non-existent, spaces provided by a hazy legislative framework, the local government have managed to implement policies unheard of in the rest of Italy. Two areas of intervention stand out in this respect. The first is that of social services: for example, in Reggio Emilia and Modena, nursery schools can absorb the entire demand for their services, in sharp contrast to the situation elsewhere, particularly in the South. Thus it is striking that in Bologna there are enough places in creches and nursery schools for 25% and 65% of the respective age groups; in Naples, by contrast, the corresponding figures are only 14.5% and 4% (Capecchi and Pugliese, 1978).

The second is that of urban planning and control of speculative building development. After some initial mistakes, the local governments have opted for a policy of controlled development. All possible legal instruments for expropriation and agreements to threats and inducements have been used to control the price of commercial property. As a consequence the Emilian cities have a higher proportion of publicly and co-operatively funded accommodation and lower house prices than elsewhere in Italy. The new neighbourhoods are often architecturally undistinguished but the proportion of green space per inhabitant is certainly quite high. The low price of property not only benefits private households but also promotes the prosperity of local firms. By planning for artisanal districts this policy allows small firms to buy lofts at relatively reasonable prices and thus promotes their growth.

In other areas, too, the municipal administration are active. Despite a certain delay they are attempting to control pollution as much as possible. They are creating a network of psychiatric consultation centres and family counselling centres. A wide range of cultural initiatives have been launched, ranging from opera to the theatre to rock concerts. Finally, particularly in the past few years, attempts have been made to revive the old urban centres from which traffic has long been excluded.

Summary and conclusions

In conclusion, let us re-examine the principal component parts of the 'Emilian model' and their relation to the operation of the system as a whole. First, agriculture in this region has emerged strengthened from the reorganisation of

the past two decades. Some poor peasants remain who have not been able to establish an independent farm from the collapse of sharecropping. But these groups are destined to disappear. The regional labour market is too tight to permit a rigid compartmentalisation, and the next generation is more prone to acquire industrial skills. In any case, the presence of agricultural co-operatives makes this sector rather cohesive, and certainly more resistant to recessions than elsewhere.

Second, there is a 'primary' industrial sector with advanced technology, innovative ability, high wages, and considerable union presence. Its only limitation comes from restraints on redundancies. The industrial relations system, however great its powers of mediation, imposes serious rigidities on the employers, and it is in this context that the third component of the 'Emilian model' finds its place. The 'secondary' industrial sector, consisting of small firms, shares with the 'primary' sector its advanced technology, its innovative capacity and its ability to compete on the world market, and at least when business is good pays similar wages to the most of its workforce. The true role of this sector, therefore, at least in periods of expansion, is to return flexibility in the use of labour to the entire productive structure, rather than to exploit cheap labour and so make possible the use of backward machinery. There is, however, another mechanism by which the system as a whole escapes the rigidity imposed by the unions in the larger firms: the putting-out of work to other regions, in which the classic secondary labour market characteristics of low pay and backward machinery can to some extent be found.

Finally, all this takes place under the watchful eye of a local government which helps to raise real wages and to improve the quality of life. The state on the other hand, for better and for worse, plays a lesser role than in other regions.

This complex productive apparatus gives the worker a wide range of choices and opportunities: to the more skilled the opportunity to go into business for themselves; to others the ability to choose in which firm to work; and to young people the possibility of alternating periods of work with periods of 'life'. The work force can be set along a continuum with two opposite poles: artisans working to the limit of their capacity to earn a high income, and youth prepared to trade off low wages for short hours of work. More generally, therefore, it can be stated that each worker is able to decide how to divide life between work and leisure in a context which measures precisely the amount of labour expended and converts it into income.

From this above all comes the widespread certitude that this system is rich in opportunities for all, and that everyone is ultimately the master of his own fate. Such certitude is amongst the basic elements of the political consensus enjoyed by those who have attempted to guide and control this development process. For the same reason, however, there is little sympathy for those who do not share the basic values of the system and hostility and even contempt for those who criticise it from outside.

Cohesion and closure have been reinforced by the virtuous circle fuelled by the continuous prosperity of the past two decades. Flexibility and entrepreneurship produce high rates of growth, which push up family incomes; high incomes permit increased education and the accumulation of skills; and local government keeps the environmental consequences of development within tolerable limits. The circle depends on the basic condition: 'when you work you work, without cheating yourself or anyone else'.

Thus cultural as well as economic factors lead us to emphasise the freer role played by market forces in Emilia and the more authentically capitalist character of its development as compared to other Italian regions. This can be seen in the extensive role played by individual initiative; in the system's capacity to regain the flexibility lost to the unions in the large factory by segmenting the productive structure and exporting its contradictions; and in the relative absence of the national state, both in terms of public spending and tax collection. To a certain extent, however, this absence of the state has been compensated for by the initiatives of those few efficient public institutions more closely linked to the civil society of the region. Thus there

has been realised in Emilia a harmonious mixture of discordant elements, but one whose complexity makes it difficult to take it as model: efficient institutions despite the absence of the state, and active trade unions which control only the half of the labour force.

So long as demand continues to expand, this social and productive structure will face only the problem of integrating into itself those who declare themselves to be outside it. But some doubt remains that this system might react badly to a deep and prolonged recession. Consider for example what happened to Turin in response to the Fiat redundancies in October 1980, and what would happen in Emilia if the success of a new Mary Quant were to create as many redundancies among knitwear workers. In Turin the clash between employer and resistant workers was clear cut and was moderated by special state unemployment funds and so the situation was controlled.

In Emilia, unless the local entrepreneurs could quickly copy and improve on the new styles (which could well happen), the dynamic interaction of the parts of the industrial district which guarantee a flexible response to the product market could quickly deteriorate in a competitive scramble for orders. This, in the condition where trade unions only partially control the labour market, could put downward pressure on wages, and cause a reduction of prosperity and a dismantling of the productive structure upon which that prosperity is based.

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The success of the industrial districts meant that, by the beginning of the 1980s, it could no longer be argued that small firms were inefficient and unable to stand up to international competition. But two theses were still in favour: one, that small firms and districts were, basically, able only to produce frivolities (dresses, fashions, buttons, sequins, ostrich feathers); two, that their competitiveness depended on low wages and tax evasion. More than in Italy, it is in leftwing and trade union circles in Britain and the United States that opinion holds that small firms can only survive by paying subsistence wages. In 1985, for example, the Greater London Economic Board denied any facilities to firms with less than 50 employees on the ground that the growth of such firms would pose an obstacle to union power. In other words, it was taken for granted that the small firms had all the features of sweat shops, where an unregulated market condemned the weaker to adverse working conditions and left the workers defenceless in a situation bordering on illegality.

On the other hand, it cannot be denied that the unions are primarily equipped to represent the workers in large firms. The discussion at the conference on decentralisation in Bologna, 1971, constituted an attempt at formulating a strategy whereby the unions could also defend the workers in the smaller forms. And it should further be noted that one of the most singular features of the industrial districts is that very ability to bring about good working conditions throughout a network of small firms. (This may be linked with social mobility and the kind of workers' careers that prevail in industrial districts; a relation between these two aspects has as yet to be ascertained with precision and remains no more than a working hypothesis and a pointer for research).

In writing "The Emilian Model" I was very attentive to these aspects. I showed that, generally speaking, the conditions of the workers was no worse - and often - better than the condition of those in the large firms. But I did not hesitate to point out the not infrequent instances where the firm evaded paying taxes and social benefits and imposed heavy overtime. I also argued that tax avoidance, pure and simple, was more common in small firms than in large; but adding that this did not imply that, on the whole, the

small firms enjoyed better treatment from the state than the large ones: for the latter certainly take advantage of every kind of contributions, of regulations that encourage fiscal erosion, and so on.

My attitude aimed to be a balanced, fair-minded one, giving each his due. It provoked various reactions. In its bulletin the Emilia CNA devoted two whole pages to me, in two consecutive numbers, where it was argued with great vehemence that I had misread the facts and had overestimated what were actually backward features of the system. In essentials, I fancy, Irene Rubbini and Mario Baccarini, who already occupied authoritative positions in the CNA, felt themselves to be still under fire and, at the beginning of the 1980s, saw the union strategy that had commenced in 1971 as still a winning one. The CNA felt a need to affirm its legitimacy as the representative of a modern, competitive sector, and it was a nuisance to have to admit that there were pockets of illegality and exploitation in the industrial districts. Since then the situation has changed greatly, the CNA has acquired prestige and is now the first to denounce, when necessary, improper use of the register of artisans by the large firms. I should also mention that my relation with the CNA has become one of cooperation and mutual esteem.

A similar reaction came from Charles Sabel, who had been in Emilia for some months by then and who kindly read the manuscript. Chuck did not quibble with the facts: he maintained, however, that in a picture so complicated by nuances and contradictions the reader would find it hard to perceive the novelty of the model. My paper described the small creative firm of the district but did not neglect the small number of outside departments subordinate to large firms. And it was this that blurred the clarity of my argument. Which, as it happened, was very similar to the one he himself was just then expounding in his *Work and Politics*. Chuck therefore proposed that we should collaborate on an essay which would highlight the features of the two models we had worked out: that of the subordinate artisan and that of the artisan of the district: that of places like present-day Sardinia, where the culture of the metal craftsman still reigns while the culture of the machine tool is slow to affirm itself.

Following discussions in which we soon found agreement on all points, Chuck

wrote the piece in a couple of days. On one point alone did I fail to convince him and his position, not mine, is the one adopted in the essay: namely, that the interpretation of decentralisation put forward by Piore - which assigns to the small firm the task of fulfilling peak demands at, moments when the large firm has no interest in doing so - was of scant importance in the context of Italy,

even though Massimo Paci had credited Piore's hypothesis. And of course it is Chuck's idea that the moment of innovation must be sought above all in the relation between the commissioning firm and the stage firm.

The essay was published only in English, again in a volume, edited by Frank Wilkinson, which did not find many readers.

Editor's note

This paper was not translated, being available an English version It was published under the title "Artisan Production And Economic Growth", in F. Wilkinson (ed.), *The dynamics of labour market segmentation*, London, Academic Press, 1981, pp. 99-113

ARTISAN PRODUCTION AND ECONOMIC GROWTH

Sebastiano Brusco and Charles Sabel

Introduction

As usual, economic facts are running ahead of models of the economy. Recent developments in the sector of small, even microscopic industry in Italy have created economic structures that appear improbable against the backdrop of the available models of small firms facing uncertain demand, firms, that is, operating in the secondary sector. For, instead of being the creature of big industry or its victim, as the models suggest, many of the small Italian firms seem in some respects to be their heirs.

In this brief note we present three models of the internal organisation of small firms and their connection with the market. The first two models represent situation which are fairly well known; the third aims to describe the new developments that have occurred in the workings of the industrial structure.

For the sake of convenience we present the three models in the order in which they appeared in the literature. Not surprisingly, there is a rough correspondence between this order and the successive transformation of small industry in various countries. But all three forms of artisanal production continue to co-exist, and there is no reason to believe that subsequent development will lead to the extinction of any one of them. The three models, in other words, are not to be understood as three necessary evolutionary steps.

The Traditional Artisan

Take first the traditional artisan, as described by Lutz (1952) - the worker who provides services and products to the local markets. His heyday is before the introduction of standardised, mass-produced goods; but even after mass production has created national markets, there are still occupations in which he can find a place.

The survival of local markets can be explained by supply and demand factors and by State intervention. Some sectors remain backward and fail to develop national markets, for example the production of doors and window frames for the building industry. On the demand side strong social consensus may defend traditional products against industrially produced substitutes: locally baked bread is a good example. The traditional sectors also benefit from institutional support, as when the State legislates against the spread of supermarkets and retail chains that diffuse mass-produced goods, or when it lowers the price of traditional goods by exempting them from certain taxes.

The artisan of this type can provide a complete set of services or produce a particular product. He is familiar with and capable of personally executing all the tasks necessary to his work. Examples include the tailor, the ice-cream maker, the locksmith, the auto-mechanic, the smith; or in countries like France, Italy or Germany, the neighbourhood baker. In each case the artisan's tools are simple but multipurpose, and for that very reason unsuited to precision work. The mechanic, for example, is likely to have a lathe able to turn out a very wide variety of pieces, none of them fashioned to close tolerances. The artisan's skill consists precisely in the capacity to produce or repair the whole range of locally demanded goods with simple tools. The classic case is the auto-mechanic who repairs one car by modifying parts from another. This inventiveness, however, does not lead to the creation of new products. Innovation would require a set of skills - familiarity with industrial designs, new material and processes - that the artisan does not

have, and a market for new products that a traditional community does not provide.

The practical inventiveness of the artisan as well as his limited capacity to innovate have their origin in his education. Skill is acquired through apprenticeship to an established artisan and rarely completed by formal schooling in the theoretical fundamentals of the craft.

Relation between artisan firms of this type resemble relations between traditional small retail stores: there is free competition. Each artisan tries to establish a network of loyal customers, often attracted by the worker's willingness to undertake unusual projects at a moment's notice. Unions play no role either in the origin or day-to-day operation of the business.

Excluding for a moment the possibility that artisan firms can develop into the types of firms to be described subsequently, then there is essentially one way in which they can grow - by being offered a lucrative alliance by the producers of mass-consumption goods. A manufacturer of standardised hardware products, for example, might offer a dealership to the leading locksmith of a town, to diffuse the new products and allow the locksmith to dominate the market at the expense of his traditional competitors. This possibly depends on the structure of the market and the nature of the product. An automobile maker is likely to make a deal with a traditional mechanic to ensure that his products are kept in good repair. An industrial producer of ice cream or suits is much less dependent on the established firms, and may decide to create a distribution network from scratch.

But the assumption made above - that traditional artisan firms cannot transform themselves into more advanced firms - is not necessarily true. Some traditional firms do survive by transforming themselves into small businesses that exploit the limitations of large firms. It is this type of firm we describe next.

Dependent Decentralization: the Small Firm in the Shadow of the Large

One of the central differentiating features of the second type of small firm is that demand for their products and services is ultimately determined by the investment and marketing decisions of the large firms. The small firms meet demand not covered by the large firms. In this respect, small firms are vulnerable to the market and production strategy of the large firms, although not necessary to the extent that the derivative character of their markets at first suggests. Firstly, however, it is necessary to understand why large producers tolerate the existence or actively encourage the creation of small firms.

To answer this question it is necessary to consider together the results of research into the structure of industries and the structure of labour markets. This work still has to be done, and can only be hinted at in this paper. However, the basic reasons why vertical disintegration takes place seem to be the following.

Firstly, unions are usually stronger in big firms than in small ones. The most obvious effects of this are differences in the level and structure of wages and fringe benefits (such as holiday pay) and social welfare payments. This is of particular importance when unions are particularly strong and pursue strong egalitarian policies. In this case, by the careful use of subcontracting, employers can homogenise their labour force and prevent unions raising the standard of all workers to that of the better off.

Another major effect of lower levels of unionisation can be seen in differences in the intensity and conditions of work, particularly in respect of health and safety rules. Moreover, small firms have a greater ability to adjust the amount of labour power purchased through overtime and short-time working, or even through hiring and dismissals. By subcontracting the large firms thus acquire a degree of the flexibility the small firms enjoy.

The second basic reason for decentralising is because the stages of the

production process may have different levels of minimum efficient scale. As E.A.G. Robinson put it:

Where some given process requires a scale of production considerably greater than the smaller firms in an industry can achieve, this process tends to be separated off the main industry, and the smaller firms to get this particular process performed for them by an outside specialist firm...The specialist firm, working for a number of the smaller firms, is on a larger scale than any of the individual firms could have achieved for that particular process or product (E.A.G. Robinson, 1958, p. 20).

Robinson had in mind a large, and perhaps capital-intensive, firm, which provides intermediary goods and services for a host of small firms. His analysis also applies to small firms and even to a single self-employed person when the division of labour and the level of specialisation are very high. For example, a single, even medium-sized, firm in the garment industry would not find sufficient work to employ a skilled embroiderer full-time; similarly, a building firm would need to be extremely large and well-organised to maintain the flow in demand for plastering to keep a three-man team fully occupied; and Mr Bristow would need many telephones to keep their cleaners in a full-time job.

The third reason for subcontracting is that emphasised by Piore: cutting the risk of long-term investment. A clear example would be that of a firm which introduces a new product by buying only the capital equipment specific to that product, and by subcontracting all the production of more standard parts.

Finally, vertical disintegration may be introduced by a shortage of labour, and by the consequent need to mobilise sources of labour that are not normally available for direct-wage employment. This incentive to fragment production is not to be confused with that emanating from the difference in strength of the unions in large and small firms. In that case outwork was called forth by desire to pay lower wages: in this case the demand for outwork derives from the shortage of labour power.

All these factors strongly interact with each other in a way that may be peculiar to particular countries. But in doing so they give form to the structure of the labour market and the structure of production. This interaction can be illustrated by the relationship between the minimum efficient scale of production and the trade union strength. The minimum efficient sizes are not strictly determined by technology. A line capable of assembling 10,000 pieces may often be replaced by 20 smaller lines, each capable of assembling 500 pieces, and a line where final product is assembled. The incentive to apply the research and development necessary to put into operation smaller assembly lines is reinforced by strong trade union control of the large assembly line.

A further example is the interrelation between union strength and the inducement to reduce the risk of long-term investment. The fixing of costs depends on the structure of market for the capital goods* and labour. When the strength of the union is high it becomes impossible to hire and fire workers, or even to vary the number of hours they work: labour becomes therefore a fixed cost, and the incentive to vertical disintegration becomes greater.

We now want to shift attention away from the employer's calculus of advantage to the question of the organisation of small firms. Our aim is to show that although these firms taken as a whole are subordinate to the strategy of the large firms, their use of technology and skill are frequently as sophisticated as that of their clients, if not more so. As we shall see in the third model, these capabilities, together with the innovative capacities required by some kinds of small series production, can become the foundation of a development that breaks the dependence of the small firms on the large.

To grasp the inner logic of small firms of this type it will be helpful to refer to the case of Italy in the late 1960s and 1970s, where a series of factors converged to produce an explosive decentralisation of production. We have already referred to the role of the trade unions. In addition, the markets

were expanding and becoming more and more specialised, as consumer tastes changed; as competition grew in standardised product markets from industrialising nations like South Korea; and as State regulations tightened on products such as automobiles in different countries. Risk associated with long-term investment also rose as wage costs became increasingly fixed by growing trade union power.

For analytical purposes we will distinguish an early, middle and late phase in the decentralisation of each industry. As trade unions grew in strength in the 1960s employers began to decentralise, subcontracting work to traditional artisans, to former skilled workers, or to foremen or directors of departments who set up in business at the request of the firm to supply their needs. Ironically enough, many of the artisans who profited from the wave of decentralisation were skilled workers fired during the late 1950s as part of the employers' attempts to crush the unions, and who went into business for themselves and supplied their scarce skills on a different basis.

In the early period the small firms give the impression of being especially subordinate to the large ones: they were usually dependent on one or two clients, and equipped with old machinery, which was all they could afford. Moreover, the isolation of workers in the small factories increased the violation of minimum health and safety rules and the avoidance of social welfare payments, thereby reinforcing an image of backwardness. But even in this first period the organisation of production was comparable to that of the large plants (Brusco, 1975). The small firms usually applied the same techniques of production as the large firms producing for world markets: where they used apparently backward machines - for instance in the cashmere knitting industry - these in fact embodied the most advanced technology available for that particular work. This use of similar technology in the large and small plants underlines an important precondition for the success of extensive subcontracting: economies of scale are realised at the level of single machines, not whole factories*. The operational value of this principle was underlined by the second phase when a market developed for almost every phase of production in industries like metal-working, shoes, textiles, clothing and furniture. As long as the boom lasted, subcontractors were as free to switch clients as clients were free to switch subcontractors. The result was a series of markets that approached the neoclassical ideal of perfect competition.

The organisation of work in this type of small firm is a curious amalgam of the traditional forms of artisanal production and the techniques of production in the large firms. In a firm of anywhere from 5 to 100 employees it is usually possible to distinguish two groups of workers. Many of the officially less skilled perform routine tasks - assembling, packing - that are essentially indistinguishable from analogous jobs in large plants. Others, as Rubery and Wilkinson (1979) have shown, are unskilled in name only. They perform specialised and demanding tasks - sewing is an example - that require skills the workers acquire on their own (typically at home), and which they cannot sell to anyone else but a local monopsonist.

The more skilled workers, on the other hand, are frequently called on to perform more demanding and more varied tasks than the equivalent workers in large plants. Since the subcontractor constantly shifts production from one client's product to another, production runs tend to be shorter and require the frequent re-setting of machines, and hence frequent changes and small innovations in tools and machinery. A skilled worker thus gains a range of experience that he is not likely to acquire in a large factory doing rather routine work.

Notice, however, that there is no likely to be much mobility from the pool of the unskilled to the pool of the skilled. There is a market for skilled workers of every type, just as there is a market for machines and phases of production. This means that a subcontractor who is well aware of the derivative and potentially short-term character of demand is likely to hire a new skilled worker if he needs one, rather than invest in the training of an unskilled one.

Thus, small firms present both better and worse prospects for workers than the large factories. For skilled workers, who may have been apprenticed to a

traditional artisan or trained in a large plant, a small firm offers significant possibilities for experimentation and self-education. For the unskilled worker, who in a large plant might be able to take advantage of a job ladder (created by the union, the employer, or both) to acquire at least some skill, the chances of moving up the skill hierarchy are slim. At least in an expansionary period, however, unskilled workers can still change jobs and take advantage of the greater opportunities for mobility found in large firms.

Sophisticated as they are, however, these small firms remain vulnerable to a drop in demand for the products of the large firms and the resulting cancellation of orders. It is only when they begin to develop their own products, exploiting the skill and the experience acquired in this second phase, that they can guarantee their own survival. This is the third phase of the development of some small Italian firms; and it is this development that we describe in our third model. But before we discuss the special conditions that favoured the emergences of this third, independent, type of small firm, it will be useful to say exactly how such a firm functions.

Independent Decentralisation

The central feature of the independent small firm, according to the model developed by Sabel, is its capacity to innovate. Where the traditional artisan accepts the definition of demand given by the local market and the dependent small firm the demand mediated by the large firm, the independent small firm defines its own demand: it tells the customer what it really wants. The independent small firm, in other words, invents new needs and satisfies them at the same time. The secret of this trick lies in the particulars of the firm's internal organisation, its close relations with its clients and its collaboration with other firms in the sector.

Take first the firm's relations with its clients, which can be large or small manufacturers, wholesalers or even retailers. In contrast to the clients of dependent small firm who place precise orders, often supplying tools, raw materials, special machines and detailed blueprints themselves, the customer of an independent, small firm typically arrives with a problem to solve. He needs, for example, a gear shift for a new kind of small tractor, a pump for spreading a new kind of insecticide, which must be vaporised into extremely fine particles, or an elaborate container for mounting the cables of a nuclear power station. Even if the customer has a blueprint, he is much more likely to pose the problem than answer it.

The job of the small firm is to find some technically and economically feasible solution to the problem, thus creating a new product and defining the customer's needs at the same time. Typically the solution involves piecemeal modifications to existing technology: a conventional automatic packing machine will be redesigned to fit the available space; a standard metal press will be modified to accept certain new parts; a particular type of pump used in automobiles will be modified for agricultural purposes; a standard loom or cloth-cutting machine adjusted to work efficiently with certain threads or cloth.

Often these modifications are of interest only to the client whose problem inspired them. But a percentage of the marginal innovations prove to be applicable to a variety of problems. For example, an efficient, low-horsepower diesel engine can be used in a wide variety of agricultural machines, and certain innovations in packing machinery can be applied to a variety of specialised automatic devices. The result is that a small firm can occasionally succeed in creating a new, international market, first for itself and then for a series of imitators, greatly enlarging the circle of its customers and freeing itself from dependence on local conditions.

The innovative capacity of the third type of firm depends in turn on its internal organisation, particularly its use of various kinds of skill and technology, as well as on its relations with similarly innovative small firms. More precisely, the firm's capacity to solve its client's problems and to

generalise some of these solutions, depends on the close collaboration of workers with different kinds of expertise and between variously specialised firms.

The need for this collaboration stems directly from the nature of the firm's relations with its clients. It does a small firm no good to propose a solution to a problem if it cannot supply the product at the right price. Hence, the design of the new product is inextricably connected to the discussion of how it can be produced; and the final blueprint will be the product of a period of consultation between technicians of various kinds and production workers at various levels.

In consequence, the internal division of labour of these firms is quite flexible. Contact between owners, engineers, technicians, the various heads of production and skilled workers is likely to be extremely close, with little distinction between hierarchical grades. (The unskilled workers, especially in the larger firms, tend to be excluded from this collaboration - a point to which we will return in a moment).

The result is a blurring of the boundaries between intellectual and manual work. There is a conviction that no one can design a usable, economically viable product if he cannot build it, or build it if he cannot design it. In fact, the founder of the innovative small firm is proof of the efficacy of this fusion of conception and execution. Typically he is a skilled worker - a builder of prototypes, a tool and die maker - with a bright idea for a new product or component closely related to his experience in a large plant. As his market expands he faces design problems involving specialised kinds of knowledge, which go beyond his original stock of practical experience. Frequently he begins to attend night-school classes, acquiring perhaps a degree as a technical designer or engineer, and continuing to apply his new knowledge practically as he acquires it. In this way the career of many innovative small entrepreneurs resembles the career of the night-school engineers (Graduierte Ingenieure) described by Lutz (1969), with the important difference that the small innovator often has greater freedom to experiment with and apply his new formal training than does the night-school engineer who, for example, becomes chief of production inside a large factory.

This use of skill in turn defines the firm's use of technology. The production of even new parts and machines requires constant experimentation with possibilities and limits of the firm's own productive apparatus. To make a new machine at a reasonable price, or to produce a new kind of cloth with an existing loom, it is frequently necessary to modify an existing machine tool or to jimmy-rig the loom. The need to tinker in this way does not depend on the sophistication of the equipment: an innovative artisan with a numerically controlled lathe or grinding machine is just as likely to tinker with it - inventing new tools, finding new ways to cut odd-shaped pieces - as an artisan with traditional equipment. The ability of the innovative artisan to make virtually any tool in his shop do new tricks is merely another sign of continuity between design and production, conception and execution, mental and manual labour, that characterises this kind of small firm.

The last important influence on the firm's innovative capacity is its contact with related firms. Where the relation between small firms in the same sector in the first two models approximates to free competition, in the third model the relation between firms resembles the collegial relation between good doctors, good lawyers, or good university teachers: each firm is jealous of its autonomy, over-proud of its capacity, but fully conscious that its success and very survival is linked to the collective efforts of the community to which it belongs and whose prosperity it must defend.

One kind of dependence on related firms is implicit in the firm's innovative activity. At first the firm's comparative advantage derives from intense specialisation: the capacity to tailor a particular part or component to special conditions. The disadvantage of this concentration of attention is that it distracts attention from other possibilities.

The moment the firm begins to expand and move beyond its original speciality it finds itself dependent on the help of neighbours with

complementary kinds of specialities; and since the neighbours can never exactly anticipate when the shoe will be on the other foot, the help is forthcoming.

The more the system of related, innovative small firms expand and prosper, the more explicit the collective character of the activity becomes. The artisans realise that the only way to expand business is to increase the sophistication and range of their products; and that the only means to that end is to increase the range of sophistication of their capital equipment. But such investment is risky, and no one is likely to undertake it unless he is confident that his friends will help him utilise it by passing along others even when there is no immediate profit to them from doing so. Mistrust freezes the technological progress of a whole sector. Trust fosters it. The same logic applies to every phase of the business, and this is natural where industry invents demand and invention is collective.

The sense of mutual dependence between firms is further reinforced by an appreciation of economies of scale that result from certain explicit forms of collaboration. Small firms, for example, are not likely to be able to maintain white-collar staffs to handle marketing, accounting or even certain technical services. An obvious solution, frequently adopted in Italy, is to pool resources through an association of small employers and to provide the services collectively. Similarly, consortia of small employers can purchase raw materials or even secure bank loans at better prices than single firms. Thus, narrow economic considerations combine with less precisely calculable ideas of collective advantage to create a sense of professional solidarity which is the backdrop and limit for the competition between the firms.

Now that the basic elements of the third type of small firm have been set out, we can return to the question of the origin of this system of firms in Italy. An answer to this question will make it possible to discuss the general preconditions for the emergence of an independent small sector and an analysis of its long-term prospects.

We interrupted the schematic history of Italian small firms during the high noon of the second phase. At that point there was a market for virtually every phase of the production of textiles, machines, automobiles, farm equipment etc. The technological level of the subcontractors was high, the skills of the workforce in constant expansion, and their dependence on their clients mitigated by the freedom to choose between them.

Knowing this much of the beginning of the story, and how it would end, it is easy to imagine what happened in the middle. Take, for example, a small factory producing gear shifts for a large manufacturer of tractors. Ambition, the joy of invention, or the fear of an economic downturn that will devastate his clients - and thus his business - lead the artisan to modify the design of the gear box he is making and offer the new product to a small market of high-quality seeders. To make the gear box, however, he needs some precision parts not easily available on the market. So he turns to a friend with a precision lathe, like himself afraid of the danger of being too closely tied to a few large customers. The two begin to co-operate and the system of small firms as a whole begins to approximate to our third model.

As the story unfolds, it may seem, despite our earlier intentions, that we are constructing an evolutionary model in which each stage calls forth the next. But we are not. The passage from the second to the third phase in the development of small, decentralised industry in Italy depended on a number of features exogenous to the second model. Were it not for these background conditions the elaborate and interconnected set of innovative firms that today constitute an important novelty of Italian industrial development would not exist.

The preceding discussion has touched on the most important of these background conditions, and it will be sufficient to review them briefly.

First, there was an expansion and a diversification of the market. This allowed the small firms to learn their lessons in an expanding market - a market that began to demand diversification and innovation. Second, all this was occurring in an industrial system in which the large firms, embattled by the unions, were seldom in a position to respond to the demand for the new

products. Perhaps the small firms would have discovered the strategy of diversification without the insistent promptings of the market or the temptation to occupy the spaces left free by the paralysis of the large firms. Whatever the case, there can be little doubt that the combination of economic conditions characteristic of the 1970s - expanding, diversifying, but also uncertain markets - provided a powerful stimulus to the development of small firms.

This leaves the problem of the future of the small innovating firms. We have stressed that, unlike the first and the second type of firms, they invent their own demand: they are vulnerable neither to the standardisation of products (as is in the traditional artisan) nor to a fall in demand for the products of the large producers (as are the dependent small firms). But, for all that, the firms of the third type are not invincible. They face two related dangers, which threaten their reproduction and expansion.

The first danger concerns the transmission of skill from one generation to another. As a rule the medium-sized firms of the third type - those with say 15 or more workers - tend to be divided, like the firms of the second type, into two strata of skilled and less-skilled workers. The skilled workers have usually acquired their knowledge through a combination of experiences in large firms and dependent small ones. The process of collaboration between technical and production workers described earlier tends to develop and extend their skills. But with rare exceptions this does not apply to the stratum of unskilled workers, who find it difficult to take the first steps towards learning a trade. Moreover, the firm is reluctant to invest in the general training these workers need because such craftsmen are likely to move to another firm or go into business for themselves. In other words, the system as a whole needs skills that no single employer is likely to produce.

The second danger lies in the possibility of a slackening of the innovative drive. Whenever an innovation is generalisable, a new market is created. To exploit it the firm begins to change production methods and moves in the direction of mass production techniques. The distance between technical personnel and production workers increases: the possibilities for developing the skills of the skilled diminish, and the possibilities for the unskilled to acquire some technical versatility are likely to vanish completely. The longer the firm can live from a single successful innovation, and the greater the shortage of skilled workers, the greater this danger. And, of course, once this mechanism is established, a vicious circle begins: success reduces the entrepreneur's appetite for innovation, and the rationalisation of production and stagnation of training reduces his innovative capacity. Hence, the third model, no less than the first two, is dependent for survival, at least in part, on conditions outside the individual firm, though those conditions are significantly different for each model.

Conclusions

Firms corresponding to our three types are likely to co-exist, and single firms will frequently find themselves in transition between two types, or will deliberately combine operations typical of the different models as part of a strategy of diversification. To give some sense of how the typology might be put to use, as well as to review some of its main features, we here apply it briefly to an analysis of the small business sector in Italy.

The small firms in Apulia or Sardinia, for example, usually correspond to our first model. They continue to exist because of the failure to standardise the production of certain goods. The survival of traditional methods of home construction, for example, has left space for the metal-workers who fashion railings for each building. The creation of giant petrolchemical refineries and aluminium smelters in various parts of the south has fostered the growth of small firms of the second dependent type - sometimes born of one of the existing artisanal firms, sometimes the descendant of firms from the north that have moved south to set up or to maintain the new plants.

In Lombardy and Piedmont the small firms tend to be much closer to our second type, though there are examples which approximate the third. The influence of Fiat and Alfa Romeo in these provinces is unmistakable. It is not uncommon to find medium-sized factories producing only for one or both of these firms, and so dependent on them for orders, plans, technical advice and even managerial personnel that they in effect stand as detached departments of the central plants. When the Italian automobile firms have no orders neither do these plants.

Around Bologna, Prato, Venice and Ancona the situation is the reverse: firms of the third type tend to predominate, though it is easy to find instances of the second. The independent Bolognese engineering shops, the textile firms of Prato, the climbing-shoe makers of Venice, and the street-shoe makers of the Marche both subcontract work from neighbours in the same sector and make goods to sell to the final consumer. Regardless of their proximity to the final market they all depend for survival on their skill in innovation, and hence on the peculiar forms of collaboration between firms and between skilled groups within the single firm described earlier.

These distinctions between firms are not merely of academic interest. They help to explain the shifting pattern of alliance between small and large industry. Thus, the engineering firms of Bologna and Modena, with independent markets and a strategy based on the quality and diversity of their products rather than low prices, do not have to follow the lead of the large Italian firms who periodically demand devaluations and wage cuts to keep their standardised products competitive on world markets. The engineering firms of Lombardy and Piedmont, living under the shadow of the giants, do.

Similarly, policy proposals that confuse on sort of small firm with another are likely to go awry. The Italian Communist Party, for example, tends to assume that small firms in the south are like the small firms with which it so comfortably cohabits in a booming area like Emilia. Since the Communist are mistrustful of State aid when it is controlled by the Christian Democrats, they tend to pin their hopes on the probably illusory idea that aid to small firms in general will turn the artisan shops of the south into the pillars of a new industrial structure. But without the necessary markets and experience, aid will only help the traditional artisans become richer versions of what they are, not to be something else entirely.

If our analysis is correct, and markets remain volatile and become more diversified, small firms are likely to become more important - though to differing degrees - in the various industrial economies. The more important they become, the greater the risks, intellectual and political, of failing to perceive the differences between them.

Notes

1. If it were always possible to buy a machine or a factory shed in the morning and sell it at the same price minus a day's depreciation at night, investment in capital equipment would be variable cost.

2. Ten lathes in ten different rooms can be operated as efficiently as ten lathes in one room.

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In the provinces of Modena and Reggio Emilia the agricultural machinery sector is a very strong one. First among the firms is FIAT Tractors of Modena, where for some months now the central management of the firm has also been based. But there are also some other companies producing tillers, walking tractors, transporters, rotoscythes, motorhoes, etc., in an amount between 40% and 50% of the total national production. And, lastly, there are numerous factories producing all kinds of machinery for mechanical agriculture: ploughs, irrigation pumps, hay balers.

In the early 1980s the sector underwent a period of crisis. This led to a widespread request for intervention by the Region, the provincial administrations, and the municipalities of the provincial capitals. A possible strategy had been suggested by the efficient intervention of CITER, founded in 1979. Discussion began on the setting up of CESMA (Centro Servizi per le macchine agricole). In this case the initiative was no longer the rather improvised, rather low-key thing that the institution of CITER had been. The constitution of CESMA involved ERVET, the regional finance body, in a leading role. The political condition for the establishment of the service centre was that all the entrepreneurial associations should take part in the initiative: which meant, for instance, the Confindustria (Confederation of Italian Industry), the API, the three artisan associations. Agreement had to be reached as to who should be president. A programme for the first two or three years had to be worked out. Fortunately there was no question about where the centre should be located. Since Modena had already got CITER, CESMA would have to go to Reggio.

The negotiations were lengthy and Francesco Cavazzuti, president of ERVET, had to use all his skill for the initiative to become a reality. During this period, while ERVET's planning department bent its efforts to defining the programmes for the projected centre, the entrepreneurs' associations played their full part in the scheme with analyses, projects, proposals; and those not only contributed towards a more precise formulation of the programme of activity but also helped to confer authoritative-ness and prestige on the negotiations.

It was on this occasion that the API branch in Reggio Emilia - which was,

and is, one of the strongest in Italy - decided to entrust me with an investigation of the sector. From the beginning the research also involved Adriano Baldassare, a graduate of Modena on the political economy side. Adriano had spent a couple of years at Databank, in charge of three or four sectors. (At that time this was a common destiny for many of those graduating on the political economy side in Modena; and some of them even made a career at Databank).

API set us no limiting conditions. They only required us to determine the needs of the firms, under the heading of technological and market ability, and to indicate the most suitable ways of satisfying these needs. Baldassare and I decided that these evaluations must be fitted into a map of the relations between the firms.

Thus for the first time I found myself involved in an industrial policy intervention at local level. After interviewing a few firms in difficulty, I became convinced that the work did not consist in recording the requests of the entrepreneurs. The replies to our questions expressed needs that were always of a very general nature: easier markets, technologies enabling costs to be cut, structures in support of the firm's activity. But invariably the replies provided few elements for understanding which particular markets investment should aim to conquer, in the form of promotion or planning ad hoc products; which technologies were the most promising and thus most worth developing, and what supporting structures would be the most useful. These decisions would have to arrive at gradually, with a lot of patience and many interviews, not only with the entrepreneurs but also with the technicians employed outside the area under study, with the distributors of the products, and so on. So this was a good opportunity to learn that working out a line of intervention and attempting to articulate it in detail involve much toil and require imagination: anything but a mere collecting of information, even when that is done by hard-working interviewers.

The study yielded several analytical results, and at the time I did not clearly perceive them.

Perhaps the most important is the definition of the totality of firms to be included in the study. Right from the start, we decided that the sector should include companies producing motors. The

ISTAT survey had kept them separate from the producers of agricultural machines, but in Modena and Reggio they sold a very large share of their production to the firms making power cultivators, pumps, hay cutters, etc. We had also to include the producers of engine parts or hydraulic systems - again on the basis of the very close relation between these firms and the producers of agricultural machines. In sum, already in the early 1980s we were moving towards a definition of industrial district in terms that echoed the notion of vertically integrated sector. It was the experience of studying these relationships between firms that induced me along this path. Today, the problem of fixing the production boundaries of a district is the object of much attention: and I am convinced that it would be much more profitable to determine the points of contact and divergence between the vertically integrated sector of Leontief, which represents a precise reference point, and the notions of district as a large scattered enterprise, of industrial complex à la Izard, of filiŠre according to the version current in France above all for the activities of the food industry. All of which seem to me similar notions, responding to the same needs, but which, as far as I know, nobody has investigated with the aim of arriving at formally lucid definitions.

It was of course owing to the fact that we had not clearly faced the problem of "completeness" of the district that service companies were excluded from the firms we investigated. Thus we took no account of transport companies or of the information services which were already operating, or even of the exporters of agricultural machines. We confined ourselves to studying the sales network of individual firms.

I fancy Becattini would not have approved of this analytical operation; it substantially isolated the producers of agricultural machines and their main suppliers from the rest of the engineering sector. And it was certainly a mediation: between the idea of sector, with its technology and market, and the idea of district, with its culture, its customs, its style of cooperation between firms. Perhaps Becattini would have argued that the engineering district of Bologna, Modena and Reggio is so homogeneous, its relations between firms so intimate and so intertwined, that one cannot extract a single sector and consider it separately outside its context.

To some extent, Becattini's argument is confirmed in our article, however, in another finding to which we did not give due importance. One of the sum-

mary tables at the end of the work shows that the entire body of agricultural mechanics is sustained by a section of artisans who do not work for a single finished product but carry out work for producers in many sectors. The map represents the typical industrial structure of districts. The section of artisans working for third parties is the one at the bottom: as one goes higher, the more specialist firms appear, until the firms nearest the finished product market are reached. The idea was already present in the study on engineering firms in Bergamo, but this is the first time that importance is given to this stratum of artisans serving the entire sector. And it may be not without significance that this undifferentiated metal-engineering - that of artisans working for third parties and not specially linked with any finished product - did not appear in the industrial census of 1971 but did figure (though not to its full extent) in the census of 1981.

Many industrial structures feature a single leader firm, that vis-à-vis the others plays a decisive guiding and directing role and conditions their growth and type of development. As against that, the district is defined as system having within it a large number of firms that differs according to their role in the productive process but all enjoy more or less similar abilities to produce, to sell and to innovate.

And it was to the first model, rather than the second, that we had ultimately to refer, in order to describe how the agricultural machinery section functions. Little by little it emerged that the producers of motors, and especially Lombardini and Ruggerini, played a leadership role; and their success, their ability to innovate, and above all their service network, were of crucial importance to the success of all the other firms. And, ultimately, the reason was plain to see: namely, that nobody will buy a motorhoe unless the engine is absolutely reliable and the spare parts are easily obtainable.

In this situation where such a firm is in a position of greater responsibility, if not of actual domination over the other firms, there are several elements of the model which nowadays Federico Butera would call "network firm". And what the essay demonstrates may be of importance: namely, that a structure of network firms may be concealed within an industrial district to the point where it becomes almost invisible.

The political proposals we arrived at represented no great novelty in the discussion under weigh at that time. Previous studies had already demonstrat-

ed the need for the service centre to provide information on regulations in force in foreign countries to assist the firms in the procedures for homologation; also the need for distributing information on technology and markets. On the other hand, our study omitted discussion of how to tackle one of the sector's weak points that was the focus of attention in many quarters.

Giuseppe Pellizzi, a student of agricultural mechanics, had called attention some time back to the fact that a structure made of up small firms - like those of Modena and Reggio - was in no position to compete on the international markets because no single firm could offer a complete range of products. Here was a stumbling block when it came to exporting to developed countries, and an insuperable problem when it was a question of making tenders to underdeveloped nations. Even the unions, in the conference at which the study was presented, laid great stress on the problem.

Looking at the problem from the standpoint of now, one can see various solutions. One might encourage a process of concentration, such that a single firm would be able to offer all the products requested. Of course, this strategy would involve a radical transformation in the industrial structure and the decline - if not the total disappearance - of the small firms. Alternatively, it might be possible to establish a trading company which would purchase the various machines from the various firms and in this way make up a complete range of products. In order for an export company of this kind to be efficient and competitive, it would inevitably end by subordinating the producer firms to itself. A third solution would be to set up a consortium of producer firms which would have the task of coordinating them. But this solution is beset with more problems than one might suppose. For a consortium is very expensive to run, especially in the first stages of activity. And then, it would inevitably end up by favouring one firm or another in the sales, thus creating ill feeling. And then again, the consortium might find itself compelled to buy products outside the group of companies associated in it. And so on.

To sum up, my present view - the fruit of mature reflection - is that one cannot conceive a situation where small firms produce, while preserving full autonomy, and a large consortium deals with sales. The kind of separation between production function and sales function would seem to me to give rise to a highly unstable system which must of necessity lead to a consortium that

is very strong and authoritative vis-à-vis the firms; or, alternatively, to a consortium unable to fulfil its tasks. In the first case, as in the other alternatives mentioned, we have in effect a single large firm or trading company; in the second, the firms must individually manage their relations with the market, as they did before the consortium was set up. Of course, this does not rule out possible measures to assist the smaller firms to reach their customers more easily. It means only that other initiatives than the consortium must be considered - unless we wish to bring about extensive changes in the industrial structure in order to help small firms to relate to the market effectively.

At that time, neither Baldassare nor I were in a position to offer a reasoned reputation of the proposal for consortium. But we were convinced that it would not work, and we did not care to argue for a process of concentration encouraged and governed by the institutions. Both Pellizzi and the unions, on their part refrained from taking any clear stand on the decisions to be made in order for the firms to offer the market a complete range of products. The upshot was that we proposed a consortium between non-competing firms, hoping in this way to avoid at least the more glaring contradictions.

In 1985, two years after the study had been presented, CESMA was set up. Under the chairmanship of Cavaliere del Lavoro Raniero Lombardini and the management of expert technicians Nicola Schicchi and Claudio Candini, the Centre has registered some important achievements. But from a reading of the minutes of the board, it emerges that the requests now submitted by firms to CESMA have gradually diverged from what was envisaged by the entrepreneurs' associations and in our research. For instance, since the founding of CESMA the firms have slowly discovered that the expert technicians that the Centre made available to them could help them in making up tenders for third world countries, and in translating them; or that these technicians could offer valuable technical advice in stipulating contracts with foreign customers. And these services are more and more frequently requested and used; and they are paid for.

The story has an important moral: namely, that real service centres make sense if they make available to firms high level technicians, rather than young graduates who, however brilliant and well intentioned they may be, tend to be used as general factotums.

**STRUCTURE AND GROWTH OF AN INDUSTRIAL DISTRICT: AGRICULTURAL IMPLEMENT INDUSTRY
AT REGGIO EMILIA***

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Editor's note

The English text is not available digitally or in the printed English copy.

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In 1976 the municipality of Carpi sought and obtained from the European Social Fund a contribution for a four-year training course for artisans in the knitwear sector. Direction of the course devolved upon Loredana Ligabue, a young graduate of Political Sciences and militant in the Carpi branch of the Young Communist Federation. A group of young people, mainly women were employed as course leaders; their tasks were to programme the courses as they proceeded, to organize the running of the course, selecting and summoning the teachers, and to assist those following the courses in putting together in a coherent whole what was taught by the various experts, from different towns.

Over the four years of the course contacts were made with at least 200 possible teacher-technicians, experts in the sector, sociologists, economists. From among these the course leaders eventually managed to select about 40: which meant those who could make themselves understood to the artisans, who had something to impart, and who were really willing to lend a hand in the courses. The topics included textile technology, how a fashion trend is started, how one can attempt to predict a trend that will dominate in the following year, costs, productivity, efficiency.

Paradoxically, those who learnt most during the four years were the course leaders. At the end of the course, in 1980, with the bond of an important experience in common, with a recognised leader who knew the corridors of power and the customs of politics in Emilia, the course leaders found a willing and intelligent interlocutor in one of the town commissioners of Carpi, and with his help they coordinated the project to set up CITER (Centro informazioni tessile per l'Emilia Romagna). It was essentially a question of consolidating the work experience of the years up to then. But the plan was to move from an activity that concentrated mainly on training through courses to one aimed at the collection and diffusion of information. Agreement was easily reached with the artisans' associations, the trade unions and the small firms, and the necessary funds were ultimately made available by the regional finance company and the municipality of Carpi. The Carpi garment manufacturers' association (AIA) declined to take part in the ini-

tiative, but this did not prevent the centre from being set up and commencing activity.

A detailed account of CITER's programmes and modus operandi will be given in one of the later essays ("local bodies, industrial policies and social consensus"). What I wish to point out here is that the first real service centre in Emilia-Romagna owed its establishment much more to fortuitous circumstances and to the intelligence of a group of young people than to any reflection on theory.

Reflections came afterwards and even today have still not gone deep enough. But little by little a pattern of intervention emerged and this was applied to other sectors. And this was the point of the essay that follows: to affirm how much originality and innovation there was in this strategy of industrial policy; and this not only by reason of the level at which it is run - for clearly at local level, before the establishment of the service centres, almost nothing else had been done beyond making available to firms ready equipped areas at relatively low prices - but also because of its specific content. To this end, the service centre policy, reduced to its essential terms, was compared with the policy that finds its model in the French boutiques d'innovation, much discussed in those days and even now still a talking point.

In my view, the contrast between the two types of intervention goes deeper than is usually perceived. The boutique d'innovation is a universal agency, open to all, supposed to be capable of tackling any problem the firms may be faced with. On the contrary, the centre, is by its very nature, specialistic, it is aware of the difficulty of obtaining the necessary information, and of "digesting" that information so that it can be easily understood. The boutique works on request, dealing with the problems put before it; the centre analyses the productive texture, determines what can usefully be done, and actively tries to persuade the entrepreneurs to use the new information. The boutique has its theoretical basis in the need for the "culture of innovation" to be diffused; the centre strives to diffuse specific technical and market skills. Both models recognize the necessity for training and, basically, offer themselves as schools: but the first is based on a hy-

pothesis of general culture that recalls the so-called arguments in favour of the formative function of Latin and the universal need for it; whereas the second is more closely linked to the technical high schools, that recall the educational policy of Germany based on difficult specialist studies.

The law on services to firms - presently being debated in Parliament - seems to choose in favour of the French type of "horizontal model". One might, moreover, maliciously think that one of the reasons behind this strategy is that the selection of "general experts in the culture of innovation" will enable the handing-out of lucrative jobs; whereas the choice of proven "technicians of one sector" severely restricts the scope for political bargaining.

But this is not the main criticism to be made of the projects currently under discussion. Today more than ever in the past it seems to me that agencies "for innovation" can play a part: if nothing else, they can operate, like ISELQUI in the Marche, to make available data banks that would otherwise be inaccessible and expensive. One further point remains, however: the discussion in parliament has not paid due attention to the specific requirements of the districts which have a desperate and urgent need of the service centres. This need applies above all to the backward districts of the South; to a greater extent than appears from the ongoing debate, these may constitute a focal and decisive point for growth and development.

Editor's note

The text of chapter 8 "Quale politica industriale per i distretti industriali?" (Which industrial policy for industrial districts?) was translated by Julia Bamford and published under the title "A policy for industrial districts" in E. Goodman and J. Bamford (eds.), *Small firms and industrial districts in Italy*, London and New York, Routledge, 1989, pp. 259-69.

A POLICY FOR INDUSTRIAL DISTRICTS

Sebastiano Brusco

(translated by Julia Bamford)

In Emilia-Romagna and elsewhere there has been a long debate on the nature and characteristic of industrial districts. This has taken into account the advanced technological level which the most forward-looking districts have reached. However, their capacity to survive in a world in which a continuous high level of innovation is a fundamental feature is less clear.

One of the first points to be clarified concerns the conditions under which an industrial district is capable of producing at competitive prices using the most efficient and technologically advanced machinery currently available. To be able to answer this we must go back to the factors which are behind the growth and development of industrial districts. In the past the role played by the decentralization policies of large firms in developing the productive flexibility of industrial districts has often been reiterated. It is certainly correct to emphasize that from the end of the 1960s onwards many small firms were born as a result of decentralizing by large firms trying to get round restrictions imposed by trades unions. However, another phenomenon underlying the development of industrial districts may be a better explanation: the progressive specialization of all the firms working in the same sector in the same area. The model to which this refers no longer has industrial relations as a main variable, but the growth of the size of the market. The references in economic literature are to Stigler's 1952 model or, to go back to the original, Adam Smith's principle according to which 'the division of labour is limited by the size of the market'.

Progressive specialization is easily verifiable in many industrial districts. One of the most interesting examples is to be found in the agricultural machinery sector of Modena and Reggio Emilia. Here the story begins in the years between the two wars when there were very few large firms (such as Fiat, Ruggerini and Lombardi) which produced tractors, most of the components being made internally. In the years that followed, as the market for smaller agricultural machinery grew, some firms specialized in the production of motors, others in carpentry and trucks, others in differentials and yet others in the assembly of motors and the various components of motor cultivators and diggers. Specialization has taken the place of vertical integration, thus enabling the industrial district to have at its disposal high-level skills such as those needed to produce oil-filled circuit mechanisms or gears.

One of the characteristics peculiar to industrial district, once they reach a certain level of development, is the numerous markets for different components and different processes. These are highly competitive, with a large number of both buyers and sellers. From this competition derives the stimulus and the capacity to innovate: the stimulus because the subcontractor who does not innovate finds himself rapidly excluded from the market and because the variegated flexibility of the productive system encourages the buying of specialized machinery; the capacity because competition does not allow buyers to impose prices on sellers and reduce their profits, thus enabling them to make necessary investments.

The surest index of the intensity of competition - not only between buyers but also between sellers - is that of the number of clients the small subcontractors each have. In Modena in 1982, 65 per cent of the mechanical engineering artisans working on a subcontracting basis had more than twenty regular clients. This state of affairs does not apply in all industrial districts. Even in the Veneto, recent research shows that the proportion of artigiani with twenty clients does not exceed 35 per cent, and in Naples subcontracting means using antiquated machinery and accepting long wages.

We have seen how the industrial structure described above is capable of using relatively sophisticated machinery. But to what extent are they capable

of evolving new techniques of production or new products? Our point of reference here is Sabel's well-known model in which he shows that the relationship between clients and subcontractors is original and different from that of the research and development office and the production department of a large firm. In large firms research and development departments have high levels of technical competence and knowledge of the market. Projects are worked out down to the last detail. However, those who work on the production side do not collaborate with R & D even at the highest levels. The production manager's job is to organize the production of a series of parts laid out in the R & D department in the most efficient way. In small firms, on the other hand, technical competence and the capacity to plan are less refined. A single idea goes through all the phases of its development in a continuous confrontation between clients and subcontractors, that is designer-draughtsmen and producers. The relationship between clients who want to make a certain product and subcontractors is extraordinarily rich and complex, full of reciprocal stimulation. The producer is not asked to design the part but very often to help in the solution of a problem. This collaboration between small producers of finished goods and subcontractors is a collaboration between someone who has an idea to be transformed into a product and someone who has to produce parts for this product. It reduces production costs to a minimum and enables a series of modifications or later adjustments to be made to the product which differentiate it from the others on the market and thus make it able to compete both at national and international level.

Examples abound of how creative the process of collaboration between producers of finished products and their subcontractors, or even between producers and users of machinery, can be. We have only to look at what has happened in Bologna in some of the more advanced mechanical-engineering sectors such as the packaging machinery sectors; or in the field of machinery for manufacturing ceramic tiles, where small firms have been able to make drastic reductions in costs.

Furthermore, recent research shows that the phenomenon is not limited to Emilia. The development of a sector which specializes in the making of machinery for the shoe manufacturing industry has developed in the shoe-making area of Vigevano. This very particular type of collaboration which ties small entrepreneurs who sell finished goods on the market to both subcontractors and skilled workers, kindles capacity to produce innovation and to use innovation.

However, two observations are pertinent at this point. The first is that the vision of technical progress implicit in Sabel's model is not the more widespread traditional one. Technical progress is not seen in Schumpeterian terms as a flow of important innovations brought about by a particularly daring and far-seeing entrepreneur which radically change the production process or open new markets or introduce new products. The hypothesis from which we set out is that of technical progress as put forward by Rosenberg: advance by means of tiny successive steps, with strong links between sectors, which in the manages to achieve success in terms of production process and product. The second observation, while more banal, has several implications. Progress made by small steps takes place less visibly within one sector or branch of manufacturing. In this case, innovation is not characterized by the identification of whole new sectors of activity such as has happened in the past for chemical dyes and the petrochemical industry and more recently in electronics. Innovation of this kind occurs within the traditional sectors, unnoticed by official statistics. However, this innovation brings about further changes, differentiating segments of the market with different degrees of prestige, capacity of growth and profit. Thus those sectors which have been considered homogeneous, and 'mature' or 'backward', are in reality composed of non-communicating heterogeneous compartments. They are so heterogeneous as to consider themselves producers of different products altogether. As Salvatore Biasco has said, 'are we sure when we compare the aggregate Italian textile sector to that of Hong Kong that we are referring to something comparable as far as technology, organization, type of product and market are concerned?. The history of Emilia in recent years has been the history of how in different

sectors Emilian industry has gradually passed to higher segments of the market acquiring international competitiveness and escaping from the competition of newly industrialized and Third World countries.

It is on this basis that we must elaborate the measures of an industrial policy to create the conditions for future developments. Before we proceed to analyse possible measures, two preliminary questions must be examined. Should these policies aim to change substantially the characteristics of the Emilian industry or should they respect its present fragmentary structure? Can this system of disintegrated and complementary firms survive the introduction of new electronic technologies?

The end of the overflow of Emilian industry towards nearby regions has caused many observers to think that this type of structure of production had its magic moment at the end of the 1970s but that now, with different market conditions, it runs the risk of being overcome. It has also been alleged that industrial districts are finished, meaning that they would not be capable of dealing with different competitive conditions. If by this we mean that the system of firms must make a qualitative change and that they have to organize to get to know the market better, learn to use new technologies creatively, then this is certainly true. It is also true that market forces alone are not enough to provide the firms of a district with the essential services they need. If, however, we mean that these services can only be utilized by larger, more integrated firms, then the statement above is probably untrue.

What has happened in the years of crisis in fact seems to demonstrate that a system of small firms survives better than large firms, and to confirm this we can look at the rates of employment and unemployment in small-firm Emilia and the predominantly large firm Piedmont or Liguria regions. In the last years of the 1970s Emilia remained unscathed, the intensity of the depression having been felt much less here than elsewhere; and above all in the last few years the movement up-market has continued to guarantee competitiveness in international markets.

Elsewhere in the industrialized world, West Germany, Great Britain, France and the United States, there is a tendency towards a reduction in the average size of the firm. The principle cause of this is to be found both in the realm of industrial relation and in the personalization of demand. Everything leads us to think that systems of small firms are particularly suited to operate in this context. As far as the introduction of electronic technology into these systems is concerned, the answer is not easy or obvious. However, it can be seen that this sort of technology can make the production of non-standard goods in the large firms possible, but this does not mean they cannot be produced in small firms also. Thus the evidence of their good performance in the most recent economic crises and the characteristics of the market lead us to think that systems of small firms can compete successfully. It is, however, essential that they are given capacities that the market does not provide spontaneously.

The second question stems directly from an analysis of the discussions which have recently involved both industrial economists and the government. We must bear in mind that after the miserable failure of sectoral plans - which were the backbone of industrial policy in Italy during the 1970s - a consensus seem to have emerged in favour of measures of other kinds, mainly horizontal policies directed towards factors of production and not only to sectors or branches. The importance of introducing new technologies into the apparatus of production has changed the attitude of the experts and those responsible for industrial policy. Unlike the situation in the relatively recent past, the new technologies are now universally considered as being one of the factors of production.

In this change of attitude there are both acceptable and unacceptable elements. In general there is a feeling of disillusionment with plans, especially sectoral plans which had no operating powers and which left all the important choices to the market. There is also a realization that all national information structures must be urgently updated because of their vital importance for firms. The need for an adequate market policy co-ordinated between the various ministries is recognized. However, the problems raised by

the introduction of new technologies, the use of means to get to know markets, and the availability of sophisticated technical services are undervalued. They raise problems of translation from the general to the specific for sectors of production, problems which are often difficult to solve. If we take, for example, skilled training, this certainly involves the need for a general policy, but at the same time we need to define the type of training necessary for specific production processes.

Monitoring of markets differs considerably between sectors connected with fashion goods and those producing investment goods, as does promotion and marketing.

It seems that the passage from one policy to another has been too brusque, not taking into account even in its most recent form some of the important requirements of firms. A much more effective policy would be one involving a complex set of measures which create horizontal policies and other organs which facilitate the application of general measures to the specific needs of a sector or branch of production.

We have seen above the characteristics of industrial districts or systems of small firms; we have also discussed some of the general principles which should guide industrial policy. I can now proceed to outline the main aspects of a specific policy. In particular, I will examine the horizontal and the other specific to the sector. I do not take into consideration either the many measures for professional training in skills or management of the labour market or the fiscal and financial measures in favour of investment, or the initiatives which are urgently needed at a national level to encourage the development of frontier technologies. This is not because I underestimate their importance, but because a division of labour is necessary here.

The technical change underway in the Italian industrial structure requires a more detailed examination of the question: how will the systems of firms be capable of reacting to the introduction of electronic technology? How will these technologies, which involve all sectors of production, be accommodated within this structure of small firms? The reply to this question is strictly tied to what we have said so far; that is, that the capacity to innovate of a system of firms depends absolutely on the collaboration between hundreds of firms and thousands of people in different roles and with different skills. It also depends, therefore, decisively on the level of competence and knowledge of the production process of these thousands of protagonists.

Against this background we must remember that in Emilia skills and knowledge of basic mechanical technology are deep-rooted and widespread among both entrepreneurs and workers. The opportunity of working in both large and small firms has contributed to this diffusion. Furthermore, right from the beginning of this century the existence of many technical institutes has played an important role in the spreading of skills and technical knowledge in the region. The knowledge of mechanics, deeply ingrained in the abilities of the local population, is given high status in the social structure. On the other hand, the new technologies, which are based on electronics, and therefore in a different technological field, are not widely known and the apparatus of production suffers consequently from this lack of skill.

In planning a policy which caters for these needs, we must not forget that a solution based on the import of highly qualified workers is not feasible. The fact that the innovation process is based on the interaction of such large numbers of actors would immediately render it unworkable. This expedient would work well for a large firm, which could, in a relatively short time, equip its research and development department by taking on a limited number of specialists. What is needed is a policy which operates by spreading skills in this field to a large proportion of workers and hence to the tiny cells of the apparatus of production which up till now have worked together to produce innovation and are hindered by the lack of necessary basic skills. This hold-up caused by a lack of skills, which is already beginning to make itself felt, is a problem of utmost urgency. In other countries, the inability to pass from mechanical skills to electronic skills has made tens thousands of workers unemployed. The most glaring example of this is the machine-tool industry in

the London area.

One way of working towards a solution to this problem of the introduction of new skills into the structure of production could be through the local technical institutes. These could once more be urged to fulfil the role of leader in the diffusion of new skills. This role has been understated in the past but deserves more emphasis. From the beginning of the century to the present these schools have been a central element in the Emilian structure of production. They have been as important in their own way as the technical schools which have had such an influence on the development of German industry. However, notwithstanding their many merits, vocational courses are not sufficient to furnish the basic knowledge necessary to be able to use the new technology creatively. Serious reflection is needed before a strategy can be worked out. To begin with, legislation regarding secondary education in Italy leaves much to be desired. For years there has been talk of reforming both curriculum and structures without even the general outlines and principles having been agreed on. In the meantime, while waiting for the reform to materialize, the curriculum remains the one brought out at the beginning of the 1960s, and it is easy to see that in fields such as computers and electronics which have developed in ways unforeseen twenty-five years ago, it is now totally inadequate. Suffice it to say that official electronics courses include the study of valves as the latest advance in technology, the existence not only of microprocessors but of transistors being completely ignored.

Naturally in most cases the common sense of the teachers has made up for what is lacking. Experimental courses with Ministry of Education approval have been started, changing the content of courses in fact if not in name and adapting them to the needs of modern technology. These initiatives, which are often pursued with a great enthusiasm, as in the Aldini Valeriani technical school in Bologna or the Fermi school in Modena, are not sufficient. Not only have the courses to be brought up to date but the number of courses in electronics available to the students for the Emilia Romagna region should be increased. This cannot wait for prospective reforms of the whole of the system of secondary education, nor be seen only as part of that reform. The pace of change in the industrial system is rapid, and much more urgent than the foreseeable timetable for reforms. The hypothesis to be worked with is that of immediate action which can be co-ordinated with the reform when it is ready.

Even if there is a general consensus that the success of business firms is incompatible with the long wait which a reform implies and there is agreement on the need for immediate action, numerous problems remain to be solved. To increase the number of courses in electronics, the simplest solution would be to convert some of the courses of the last three years of secondary school into electronics courses. Some of the existing courses have lost relevance and can easily be substituted for those which the system of production needs. In practice this solution is largely impracticable because of the internal rigidities in the school themselves. In short, teachers would have to be persuaded to teach new subjects or be made redundant to make way for better qualified ones, the latter being almost impossible given the laws on employment in the Italian education system. Other solutions to the problem must be found, therefore, such as the starting of new courses alongside existing ones both in state schools and in local authority ones, or the creation of new schools outright.

There are, however, long delays in this field such as to warrant an emergency measure over and above the reform of the school system as a whole and not relying on a rearrangement of courses based on persuading and convincing teachers. The question must be tackled immediately, since it is one of the crucial areas of Emilian economic development and of much greater importance than that of the managerial capacities of entrepreneurs, or of the training of people in marketing or exporting. The market itself is dealing with the latter to some extent. The system of production by itself, however, is not capable of coping with the need to provide people with skills in electronics. The debate on the updating of technical education in the region must assume the same public importance as that on new universities or the role of electronic

infrastructures.

The second policy measure is much more vertical in character working on sectors or areas of production. Service centres for industrial districts have been the subject of debate and discussion for some time now, and furthermore are already in operation in several areas in Emilia region. It seems appropriate here to clarify the analytical background on which they are founded and point out the ideas behind a policy towards them and indicate where their future lies.

The problem put in a nutshell seems to be this: small firms in collaboration with other small firms manage to use and even to produce innovations but are not able, on account of their size, to carry out some of the functions of an entrepreneur which are essential for success. Because of high costs, many aspects of traditional entrepreneurial activity are not possible for small firms. These include gathering funds for complex applied research, getting information about the outcome of the latest research, evaluating with precision and continuity the state of markets, taking advantage of the opportunities which potential markets offer, judging the relative merits of highly sophisticated machinery, controlling access mechanisms and management of trade fairs, organizing the correct reaction to frequent attempts at indirect limitation of competition and overcoming the difficulties tied to the changing standards for products destined for the export market.

These arguments are not sufficient to justify the need for centres built with public funds at general request. It can be argued that these services can, as in other cases, be left to market forces. After all, in the last ten years the structure of private sector services has changed radically. The number of bank branches and the provision of quasi banking services like leasing and factoring has increased; studios for graphic design and advertising have improved in quality and number; the agencies for learning new skills and management consultancies have become widespread; many specialists in software consultancy have set up, though often under the control of important hardware manufacturers; many laboratories producing models for the fashion industry or designing industrial plants have emerged; the network of transport has expanded. Neither must we forget the role of manufacturers' associations, which goes from the simplest assistance in organizing a payroll and keeping the books to more sophisticated activities like help in obtaining a mortgage, the organization of guarantee associations or buying associations, or the planning of production. However, neither the market nor the producers associations have been able to provide the sorts of services listed in the previous paragraph. The probable reasons for this are twofold: that initial investment is rather high, due to the cost of putting together and co-ordinating the necessary skills for this type of activity, and that the market is restricted because these activities are often linked specifically to an area which has a limited number of firms. Thus, because the market is obviously and understandably insufficient, public policy is not necessary. This is not an invasion of the private business by the public authority, but making good the inability of the market to deal with a situation.

This line of analysis has been the inspiration behind those centres which have been formed so far. They include both public and private participants such as ERVET (Regional Economic Planning Board), the Confindustria (the Confederation of Italian Industries), API (Association of Small Firms) and the artisan associations. The centres which already exist rely, quite correctly, on public funds for a limited period of around five years. Entrepreneurs also have to pay for the services they receive, the idea being that the local authority helps to finance the initial investment, including the starting-up expenses, but then the centre becomes progressively self-sufficient.

Not all the centres which have started up so far have had the same objective. Some, such as those in the knitwear, shoe-making, agricultural machinery, and earth-moving equipment industries are centres with general objectives but different tasks depending on the industry they deal with. These, however, aim to operate in respect of all functions of the firm, from planning and production to marketing. The ceramics centre, on the other hand, which has

forged links with the universities of Bologna and Modena, provides only technical services, such as the analysis of the characteristics of kaolin.

Along what lines should a policy for centres of services be developed? First, the decision to involve both producers associations and individual entrepreneurs which has been followed so far should be continued. Centres founded with public funds and without representatives of firms on the governing body would probably be destined to failure. Only entrepreneurs or their associations are able to set up an organization and programme of work which is useful for the firms, and participation in decisions is essential if the firms are to use the services that the centres provide. The failure of the French experience with state-run centres has shown how difficult it is to impose on firms the use of services that they have neither asked for nor helped to set up.

This choice, it must be recognized, makes the formation of centres very laborious and difficult. There are several reasons for this: the entrepreneurs do not always recognize the usefulness of the centres; producers' associations fear that centres could become rivals; there are often problems of precedence between groups; and questions of prestige in the distribution of places on the governing bodies. However, there is no alternative to this system.

A serious limitation of these schemes is that the industries covered by the centres already in operation represent only a small part of the regional economy. Important areas remain without the assistance of service centres. These include the food-processing industry, the tanneries of Parma and Bologna, the wood industry of Parma and Modena, some parts of the mechanical engineering industry such as oil-filled circuits, machine tools for metal and wood, machinery for food packaging and processing, the small chemicals industry, and the tourist industry on the coast. This initial phase has of necessity been one of successive experiments and it would seem reasonable at this stage to substitute a carefully planned policy. This would avoid the danger of reducing the service centres to mere crisis solvers and restricting their future development.

A useful measure would be a census of the local industrial capacities, thus pinpointing the areas in which service centres could be of real use. A map could be drawn for proposed service centres, distinguishing the centres with more general purposes from those with more technical aims. This map, which should be the reference point for future action, could also include more than one centre for the same branch of manufacturing in different areas of the region. It could also show centres linked to each other.

I should also stress the need for legislative measures to provide subsidies to those entrepreneurs who decide independently to form a consortium operating as a service centre. In other words, the work of ERVET on behalf of the service centres, the success of the centres already in operation, and the consequent discussion have stimulated an interest and a demand which must be satisfied. It should also be noted that funds can be made available not only from the region, where money is limited, but also from local authorities and other organizations.

Acknowledgement

An earlier version of this chapter appeared as 'Quale politica industriale per i distretti industriali?' in *Politica ed Economica*, 1984.

9.

Ezio Righi is an architect and for many years has been in charge of Modena's Town Planning Department. In this guise he has played an important part in preparing Modena's urban development plans, certain of which have been an obligatory reference point in the debate that revolved around these topics following the passing of Law 863 in 1972.

For this reason he is often invited to international meetings and congresses to recount the experience of Modena. And in 1984 he invited me to accompany him to a meeting organized by the OECD in Vienna, to comment together on Modena's town planning experience.

There has been much discussion of the role played by local bodies in the development of industrial districts; decisive have been the studies of Bagnasco and Trigilia, where comparison is made between the history of the Valdelsa district, where all the municipalities are actually communist-governed and that of the Bassano del Grappa area, where the Christian Democrats are in power. Obviously the matter has important political implications since it raises a question in connexion with the development of the industrial districts: to what extent is this development due to good administration by the Left?

Bagnasco's and Trigilia's answer to the question does not differ greatly from the one I gave in a passage in "The Emilian model". The idea we have in common is that, on the political exchange market, the red and white areas are much more similar than might be supposed at first glance; though the quality of government in the red areas is certainly higher.

Collaborating with Righi provided a good opportunity to measure - by means of sometimes quite precise indicators - how much the Borough of Modena had done to benefit the smaller firms, in the course

of town planning. And in the first part of the essay we made this measurement.

As well as town planning, we also described two agencies that might be of interest to those taking part in the meeting: the loan consortia, and CITER, which could be taken as an example of real service centres. And as we examined the various cases we soon discovered that they had a feature in common: namely, that they had all been made possible by the authority of the local administration, and by the social consensus on the initiatives undertaken. Hence the title of the essay. Of course the analysis was not performed with the specific competence of Bagnasco and Trigilia. But our case studies may yet be of some interest, especially for international readership. Moreover, we took into consideration certain elements that over the previous years I should certainly have played down: i.e. consensus as an essential condition for any economic initiative.

The essay had a limited diffusion in a cyclostyled English version. The only part to be actually published - in a review of the Corporation for Enterprise Development (Washington, D.C.) - was the central section on the loan consortium. It was no accident that this was considered the part most worthy of note for a U.S. public: for in the United States - as the debate on Small Business Administration clearly shows - all the problems of small firms stem from their lack of access to credit. I have never ascertained whether that really is the situation in the U.S., or whether this hypothesis conceals the profound conviction that the fate of the entrepreneur always depends on the benevolence of the banker. But I certainly am convinced that this is not so in Italy.

LOCAL GOVERNMENT, INDUSTRIAL POLICY AND SOCIAL CONSENSUS*

di Sebastiano Brusco ed Ezio Righi

Introduction

1. Through the studies of Brusco (1962), Sabel, Sabel and Piore, Sabel and Zeitlin, and Bagnasco, the Emilian development model has become well known to an international public as one of the cases in which growth has been strongly characterised by the presence of numerous small enterprises, concentrated in restructured areas, resulting in the formation of systems of production (Wilkinson, 1984) which recall the industrial districts of Marshall.

The aim of this essay is to give a detailed account of three industrial policy initiatives adopted at local level in Modena, which is one of the central provinces of Emilia-Romagna and the one where the features of the model appear clearest. Apart from describing the interventions, the essay also seeks to demonstrate that a climate of social consensus and strong credibility on the part of the local government are necessary prerequisites for pursuing local industrial policy interventions. This condition - necessary, though not by itself sufficient - is imposed by the fact that, in Italy as in many other countries local competences in the area of industrial policy are few and confusingly defined, so that the effectiveness of the intervention depends, first and foremost, on the authoritative standing of the body taking the initiative.

Three kinds of intervention will be examined: the first was intended to make available to firms - small firms above all, but also large ones - the land needed for their orderly development; the second aimed to guarantee special financing to the small firms; the third was directed towards supplying information on technology and markets to an industrial district producing textiles and knitwear.

Industrial estates and artisan parks

2. The intervention by local government on the market of the areas - - is strongly conditioned by the laws regulating the matter, as well as by the finances available.

In 1971 management of local government was radically altered by a new law. For this reason the analysis that follows will distinguish two periods: the first going from the postwar period to 1971, the second from 1971 to 1985.

3. In the period immediately following the war town-planning law no.1150 of 1942 was still in force.

This allowed municipalities to make compulsory purchase of any area destined for urbanization, at the price of agricultural land. The power of the municipalities was, however, subject to one condition: namely, that the development plan put forward by the municipality be approved - and thereafter passed into a law, by a decree from the President of the Republic. Conversely, in the absence of a development plan, control over the areas by the municipalities was severely limited, indeed reduced almost to zero, by the possibility that the private owner of the areas might oppose the compulsory purchase, thus involving the municipality in endless litigation. The picture was completed by the fact that the procedure for getting borough development plans approved was so long and complicated that, by 1960, in the whole of Italy only a few dozen such plans had been passed.

However, municipalities lacking a development plan still had one means of bringing pressure to bear on the private owners of areas: this resided in the fact that only the municipalities themselves could declare an area to be

building land and thus enable its private owners to achieve huge profits of a speculative kind.

For that matter, between 1947 and 1971 the municipalities received only paltry amounts from the state by way of finances for the purchase of areas.

In a number of Italian towns this situation led to several episodes of corruption: in many cases pressure from owners of areas caused towns to expand like oil slicks.

Like certain other towns, the borough of Modena reacted to this state of affairs with a strategy that essentially displayed definite features of private ownership features.

When owners agreed to the purchase of their areas by the municipality at agricultural prices, the municipality guaranteed - by a commitment that owing to its very nature could not be formalised into a contract explicitly agreed between the contracting parties - that the owners could retain ownership of a portion of the area in question, build it up and sell it at very high prices.

The municipality was able to finance the entire operation from the proceeds of sale of the areas. Although the municipality was burdened with the costs of urbanisation, the areas could still be sold at prices much lower than the market prices.

In 1949 the borough of Modena experimented with this strategy for the first time. Agreement with some landowners was reached, the necessary advances were obtained by loans from the bank acting as treasurer to the borough, and the building plots thus acquired were sold to families and residential cooperatives.

Thereafter, however, the formula was also applied to industrial estates. A first "artisan park" of 15 hectares went up in 1953. 74 plots were carved out of this and over the next three or four years a similar number of artisan firms established themselves, many of them run by workers dismissed in that period from Fiat Tractors and the larger metal-engineering firms in Modena. A second park of 38 hectares was established between 1962 and 1967, for 178 firms. All told, in the period 1954 - 1971, the borough of Modena purchased and built up a surface area of 98 hectares and granted building plots to 398 firms.

In this first period, the aim of the municipality was merely to offer the firms the possibility to grow in suitable places, equipped with the requisite services (including canteens), at costs lower than market ones. The requests from firms were fulfilled on the principle of first come first served, with no selection of any kind. Once a firm had acquired a plot, it went ahead with the building of premises on its own account.

In this period the borough operated under two main restrictions. The areas on which the artisan parks were to be built were not designated in accordance with a pre-established plan but were located in those districts where the borough had managed to agree purchase of land from private owners. Moreover, this procedure did not enable the needs of very small firms to be met: the construction of premises of less than 800 - 1000 sq. mt. area is an expensive business.

4. In 1971 law no. 865 was passed, empowering municipalities to make compulsory purchase of land for purposes of urbanisation. The power of compulsory purchase was still to be subject to the existence of a plan; but the definitive approval of such a plan put forward by the municipality now followed much more rapid procedures and devolved on the Regional authority rather than the ministry. The purchase price was equal to that of agricultural land. Leaving aside the special facilities for farmer-owners and share-croppers, the price paid by the municipality could be increased by 20% - and from 1975 by 50% - if the owner did not oppose purchase and accepted the price offered by the municipality. The law involved one further restriction: in at least half of the areas purchased the private grantees of the land were to have only surface rights for 60 years.

In this way the powers of the municipality were considerably enlarged as

compared with previously. However, private owners still retained the right to oppose compulsory purchase, to appeal to law and to prolong the compulsory purchase process for periods of years. This is one of the reasons why in several Italian towns the possibilities of the law have not been fully exploited.

Once again the borough of Modena opted for a pragmatic approach. The consensus of private owners to the proposal of compulsory purchase - now originating from decisions on town planning - was sought: this by overestimating to some extent the price of the areas, and by leaving the private owner a portion of land to sell on the free market. The result was that, between 1971 and 1985, only 5% of owners involved made objection to the borough's proposals for compulsory purchase.

On this more solid legislative basis the borough of Modena worked out a line of intervention that involved different strategies for the industrial estates reserved for the large firms and those for the artisan parks.

5. In order to implement the policy for settling the large firms - defined as those requiring plots of more than 3000 sq. mt. - the borough of Modena teamed up with 10 neighbouring boroughs in a consortium.

The eleven members of the consortium agreed to set up five industrial districts over a total of 252 hectares. The areas were almost all located outside Modena in boroughs where there was a higher rate of unemployment. In order to discourage excessive immigration, firms outside the member-boroughs were not allowed to settle within the areas. In order to favour the utilisation of the areas furthest from the provincial capital, or of those less advantaged, a discriminatory policy was followed in the matter of prices, with discounts or mark-ups on the costs of building plots.

This whole operation, like the one described in the preceding section, was conducted but also without burdening the borough finances.

6. In offering areas to the small firms, on the other hand, each of the eleven member-boroughs of the consortium, and thus also those of the Province of Modena, pursued an autonomous policy, though co-ordinated with the others. Between 1971 and 1985 the borough of Modena established five areas, 73 hectares overall, in which 275 firms set up premises.

This was perhaps the most innovative period in the activity of the borough. The need to keep urbanisation and building costs down - even though the artisan firms often requested very small premises - led the borough to project sheds with covered surface areas of 4000 - 6000 sq. mt., divisible into modules of 150 sq. mt. (and in fact more than 40% of the building plots sold had surface areas of between 150 and 300 sq. mt.).

Construction of the sheds was not done directly and at the expense of the borough. It was entrusted, instead, to construction firms working by tender and giving the following guarantees:

- to build according to standards agreed with the borough;
- to sell at agreed prices and conditions;
- to sell only to purchasers as agreed with the borough.

On this basis, despite a number of problems with organization, the borough was enabled to make only small financial advances over short terms.

In this stage one of the most complicated problems the borough had to tackle was that of selecting the purchaser firms.

The first principle followed was that of granting very high priority to those artisans who already operated in the town and whose existing premises involved some special disadvantage or gave annoyance in the immediate neighbourhood by causing noise disturbance, producing excessive traffic or some particular form of pollution that could be controlled on a new site. Note that in these cases the objective of encouraging the growth of firms was accompanied by another aim - namely, to improve the already existing urban tissue. Along these lines new premises were granted to carpenters, motor mechanics, metal workers and so on.

High priority was also given to consortia formed among small firms. This decision was part of a more general policy aimed at encouraging associations

among producers. Moreover, when this gave rise to market synergies, the device of priority was used to concentrate in a restricted area firms that had formerly been scattered over various districts. In this was, 50 hectares were reserved for wholesalers (of industrial raw materials, parts and components, but also of foodstuffs), and 20 hectares for the artisan associations in order that they could construct the premises for their purchasing consortia and for the service companies working for their members.

Lastly, preference was given to firms who accepted to buy not the ownership of the shed but only the surface rights.

This measure, as we have seen, was to some extent imposed by law no. 865. But it was also dictated by another reason: it prevented any firm from buying from the municipality at a low price and reselling on the market at a much higher one.

In the contract granting surface rights municipality and purchasing firm agreed that in the case where these rights were sold to a third party the following terms should apply:

- the municipality should have an option to purchase in every case;
- the selling price should be equal to the purchasing price, increased by the amount of inflation in building prices.

In this way, by granting only surface rights the municipality was enabled to control the trend of the real estate market in the years to come. But it was saddled with another burden. The local banks, who granted loans to the artisan firms for the construction of new premises, declined to accept mortgages on surface rights by way of security for the loans. The borough of Modena therefore agreed to give direct guarantee for the mortgage obligations contracted by firms who purchased the sheds.

7. In the course of all the activity described above, a special commitment was necessary in order to maintain the relationship of consensus with the purchasing firms. And this was anything but easy. For the artisans had to be persuaded to abandon the idea of acquiring an individual plot, with a shed for each of them, and a yard in which to keep the dog or the car, as in the past.

They had also to be persuaded to give up the idea of ownership each of his individual shed: this in return for a surface right, towards which, even in the best of hypotheses, they harboured all sorts of suspicions. To be sure, these new conditions could be translated into a price for the shed up to 50% less than what they would traditionally have paid. But custom, the sense of ownership and of being "master in one's own house", die hard.

To these difficulties were added the problems of managing the waiting list and assigning the building plots. Did a firm really need to move out of the town centre? Should a firm be given a plot on the main road or on a side road? What form should a particular plot take? Which artisans should receive special treatment? Here was enough material to create tensions of every sort in the town council. The solution was to work in close contact with the artisan associations. The waiting lists were made up by a council commission on which these associations were strongly represented, and the same commission dealt with assigning the plots. Relations between council functionaries and the associations were, in more than one case, anything but easy. But in the end it was possible to find agreement on the basic lines of the project and to map out procedures that enabled the project to be implemented in a transparent way and without too much conflict.

8. What is the overall result of all this activity? What effect has it had on the economic development of the province of Modena?

To the main question - whether the development has been encouraged by these initiatives above described, or whether the policy of the districts has not rather been stimulated by a helter-skelter vitality on the part of the smaller firms - no pat reply can be given. One can only suggest, rather pedestrianly, that the policy of industrial areas has encouraged, governed and managed a growth that would have happened anyway, if in a less lively fashion.

But a few data may assist in evaluating what has been done.

In the period 1955-1984 the municipality made available to industrial and artisan firms a total of 301 hectares, equal to 71% of all the municipal areas; in these areas 584 firms with more than 3 employees established premises, which is 30% of all firms existing in the borough, occupying a covered surface equal to 40% of all the covered surface occupied by manufacturing firms that set up since the war.

The financial advantages for the firms accruing from these initiatives were relatively small - perhaps equal to 20% of the value of the area - up till the end of the 1960s. In this period the advantage of building in the municipal districts was represented above all by the fact that, to a greater extent than the privately owned areas, the municipal area was provided with services: roads, lighting, main water supply.

In the period following that, however, the advantages became much more noticeable. Municipal areas cost only 25% of public ones. Establishing premises in large-sized sheds enabled even small artisans to enjoy considerable economies of scale. As a result, the covered area cost on average 35% - sometimes 50% - less than a similar area built by individual firms on privately owned areas. According to a reasonable estimate, up to 1985 inclusive, firms settled in the municipal districts had purchased their sheds at 350 billion lire instead of 500 billion, thus representing a saving of about 150 billion.

The entity of this saving can be gauged with greater precision if one compares it with the amount of finance on easy terms that the firms received from the banking system. The comparison cannot be made for the whole of our period, nor for all the firms. On the basis of available data it can be estimated that in the period 1979-1984 the easy-term credit granted to Modena artisans cost the state and the region about 8 billion lire. In the same period the saving on the cost of sheds constructed by artisan firms in municipal districts amounted to 25 billion lire. It can thus be argued that the total amount of resources made available by the borough to the firms has been extraordinarily important.

Certain indicators, though only very approximate, show that - at least in part - these savings were used to have available a larger working area and to purchase new machinery. Examination of available data shows, indeed, that out of all the firms who moved into the artisan parks between 1973 and 1985, 60% had new premises with a covered area three times that of their former premises. Moreover, data collected by us from 73 artisan firms who settled in the municipal districts in 1980 showed that between 1980 and December 1985 the employees of these firms increased from 230 to 330, an increase of 40%. In the same period the number of machine tools used in these firms grew from 145 to 301 units, an increase of 106%.

Who paid for these advantages? In part, as was said above, the intervention by the municipality served merely to put in the way of the small firms the economies of scale obtainable in the construction of the sheds. The remaining part represents a transfer of resources from owners of real estate to the industrial firms. The cost of these initiatives, regarded from the point of view of the municipality, was thus almost negligible.

The loan guarantee consortium

9. Another type of local instrument designed to assist the growth of small firms is the Loan Guarantee Consortium. In the following pages we shall discuss not the nationwide experience of these consortia, but rather that proper to the province of Modena which, in turn, can be taken as representative of the Emilian experience in general. Unfortunately, there are no studies available which enable us to evaluate the role this kind of cooperatives have had at national level. As a result, no more overall discussion is possible at present.

From a legal point of view, the Loan Guarantee Consortium, founded in Modena in 1974, is an artisan cooperative where the minimum membership fee is

7,500 lire. (Approximately 3500 artisans working in the Modena area are members of the Modena Loan Guarantee Consortium, they represent 15% of the artisans in the area).

Like all other similar consortia the credit cooperative carries out two main functions. First and foremost it guarantees the loans its members take out with ordinary credit institutions. If the artisan is unable to repay the loan, the cooperative will pay the bank and then endeavour to recover the amount of the loan from the artisan. If necessary, legal action is taken.

A second task of the credit cooperative is to negotiate the interest rate with the banks. As a normal rule the rate agreed upon is 1.5% lower than the going rate for similar type operations.

It should be noted that, in accordance with the regional law in Emilia-Romagna:

- the maximum sum that can be guaranteed is 20 million lire;
- for sums up to 10 million lire the Regional Government contributes 3% of negotiated interest rate;
- the maximum term of the guarantee is 24 months: thus the cooperative only guarantees loans for working capital;
- the cooperative charges 1% annually on the amount of the loan as an underwriting fee.

The total amount of loans guaranteed by the cooperatives is not very high - somewhere in the range of 1.5 billion lire. This amount is balanced by the capital of the cooperative which is in the form of equity shares, a small *unatum* contribution from the Region, and the underwriting fee.

10. Up to now, we have briefly discussed the technical data. But it is more important to understand how the cooperative actually works.

To understand this, it should be kept in mind all the artisan members are also members of another association which has the same legal nature as the associations of entrepreneurs and the unions. 60% of the artisans in the Modenese territory belong to this association, which is the local branch of the National Confederation of Artisans (CNA), and receive a number of services from the association.

It should also be noted that there is a high degree of political solidarity among the members. In fact, the vast majority of the members belong either to the Italian Communist Party or Italian Socialist Party. The Loan Guarantee Cooperative discussed here, therefore, in very close relationship with the association to which the politically left-wing artisans belong. In a certain sense, perhaps, it could be described simply as an agency of the association itself.

In practical terms, the artisan who applies for a loan goes to his local branch of the CNA (there are 27 such branches in the district of Modena) and discusses his needs with the branch secretary. The secretary asks for detailed information on the overall situation of the firm, its long and short term credit exposure, its main customers and suppliers, receipt and payment periods. He then sends a report to the Board of Directors of the Loan Cooperative, adding his own opinion on the personal characteristics of the applicant, his trustworthiness and his professional standing.

The Board of Directors is made up of seven artisans plus an official from the CNA. The seven artisans are successful and well-known small entrepreneurs who work in different industries and know the market situation. They will also be likely to know the loan applicant personally. They do not receive any fee for the work they do for the association.

The Board of Directors, therefore, examines the application. The decision is then made, sometimes after more information has been obtained, on the basis more of the personal characteristics of the applicant than any real guarantees he may be able to offer.

This is the central point of the whole procedure, which sharply distinguishes credit cooperatives from banks. The credit cooperative bases its decisions first and foremost on the trustworthiness of the applicant, his

professional skill and his ability to fulfil his obligations. In a word, the reputation he has within his work and social environment. A bank, on the contrary, bases its loan decisions solely on the financial situation of the applicant.

Naturally, this essential difference between the credit worthiness criteria applied by banks and credit cooperatives is not simply the result of a political choice or company strategy. The important fact is that the credit cooperative has available, at an extremely low cost, the means of evaluating the personal qualities of the loan applicant. The local CNA secretary has known the firm for years since he has kept all its account books. He is aware of the esteem which the applicant enjoys with his colleagues because he has seen and heard him at the various association assemblies. He may even know the personal and family matters of the applicant.

Furthermore, as previously mentioned, at least one of the Board of Directors will be competent to give an informed opinion on the applicant's firm, its customers and suppliers, its equipment and machinery.

But there is another important point which must not be forgotten. The fact that the guarantee is granted by his colleagues and is based on personal esteem, has a very important effect on the receiver of the loan. Someone once remarked that "the person who receives a loan from the cooperative will stay up at night thinking up ways of repaying his loan. Whereas, the person who receives a bank loan will stay awake at night thinking up ways of NOT paying back his loan". There is undoubtedly a very strong social pressure on the loan recipient to fulfil his obligations to the cooperative. This is the reason why the credit cooperative of Modena, founded in 1976 and which has guaranteed Lit. 7 billion in loans, today has only Lit. 50 million unrecovered loans.

The loan cooperative thus has certain features in common with the mediaeval guild system.

The directors of the cooperative are chosen from among the most authoritative and influential artisans, who can thus grant or deny loan requests without losing the respect of their colleagues and with no danger of being accused of favouritism or unfair practices. The considerable amount of work contributed without pay by these directors, the ability of the cooperative to act as a pressure group on the banks and the collaboration of these cooperatives with local government are all elements which call to mind the mediaeval guilds. It is amazing to see how this occurs on the basis of a kind of solidarity which is not only personal but has also some political overtones. For, as we mentioned above, the large majority of members of the cooperative have a common bond in the fact that they attend the same branches of the Italian Communist Party.

A final observation. Our reference has been to the affairs of a small cooperative based on the CNA and operating in the district of Modena. To be able to evaluate this phenomenon fully, we should note that there are also other artisan associations active in the Modena area, those closer to the Christian Democratic Party. These too have organized loan guarantee cooperatives which work along the same lines as those already discussed. In some cases, there are also some "unitarian" cooperatives, which cross party lines and have members from both kinds of artisan associations.

The real service centres

11. An additional industrial policy intervention at the local level can be found in the "real service centres".

Before describing how this works, it may be worthwhile to point out two fundamental decisions which have had a decisive influence on the establishment and running of these centres.

The first problem which had to be faced in planning industrial political measures at a regional level, was whether any intervention policy relating to

small industries should aim at changing the Emilian industrial apparatus or whether it should respect the existing characteristics. In other words, should an effort be made to stimulate the concentration of these companies or should the fragmentary nature of the industrial structure be respected?

At the end of the 1970s the discussion of the role of economies of scale at production level could be considered as finished. The analyses conducted during the decade had proved that a productive structure made up of industrial districts was, under certain conditions, capable of producing goods for the international markets at competitive prices.

The important point from these analyses - which has been discussed elsewhere (Brusco, 1982) - was that the production process can be managed efficiently even when a single firm splits up into a number of firms, corresponding to the number of its departments or even to the number of machines employed in production. To quote a phrase that effectively sums up these conclusions: "Ten lathes in ten different rooms can be operated as efficiently as ten lathes in one room" (Brusco and Sabel, 1982). Naturally, only under certain conditions:

- the manufacturing process must lend itself to being divided into stages which can be efficient even in small size (lathes for example, but not steel furnaces);
- the disintegrated firms must possess machinery at a good technological level.

However, it is certain that these conditions were fulfilled in many Emilian industrial parks. Even the introduction of electronic technology, which presented serious training problems and the need for new competence within the social fabric, does not appear to have required an increase in the average size of the companies.

The situation was somewhat different for economies of scale in marketing, financial management and information management which enabled instant liaison between the market and the manufacturing stage. The minimum efficient size, measured in correlation with these functions, cannot be determined so easily. However, everything points to its being quite large.

Along these lines, a whole series of measures were taken by the Region, the Province and the Boroughs which granted incentives to create purchasing consortia, sales consortia and loan guarantee consortia (these latter, discussed in the preceding section).

A number of these consortia were established and have worked well. But they did not have any very great influence on the competitive character of the companies in the industrial districts. Purchasing consortia, in fact, had rather high operating costs and only with much difficulty enabled input costs to be reduced by a few points. Sales consortia worked only rarely, and then only when the members produced different items. Only the loan guarantee consortia, as we have seen, have had a degree of success.

The next step, therefore, was the decision to take advantage of the strong points of the industrial districts, while respecting their productive structure, and to intervene, by means of the centres, in order to equip the industrial districts themselves with the kinds of competence that were most clearly missing.

The hundreds of parent firms in the industrial district were able to adapt quickly to market demands - in fact, their number and high professional level guaranteed that they would be attentive and responsive to the market.

The hundreds of subcontractors, also highly professional, could guarantee good quality products and the possibility of changing over to technologically advanced equipment.

The centres were intended to supply the abilities which the district lacked.

12. The second problem was somewhat different. Should the field of action of the centres be defined by sector or by company function? Would it be necessary to have one centre for knitwear factories, one for agricultural

machinery and so on? Or would it be preferable to create one centre for marketing, another to assist export programmes, yet another to improve the financial management of the companies? Or should the centres offer the companies a complete industrial consultancy service?

Centres specialized in company management or general type consulting certainly have many advantages. They stress the fact that new technologies filter down throughout all the different manufacturing processes, and thus override the classical distinction between one sector and another. They also justify their existence by the fact that all sectors share common problems of flexibility in their response to market demands. Finally, they underline the very generalized need to create very rapid liaisons between sales markets and the production process. In a word, there is a very strong argument in favour of these centres - namely that the restructuring processes which are needed within industrial firms have many characteristics in common, quite independently of the sectors in which the firms are operating.

But there are also some very good reasons to support the creation of sectorial centres. The introduction of new technology, the use of new methods for acquiring information on the markets, the availability of advanced technical services, face the various sectors and subsectors with very tough problems of transfer from the general to the specific. Suffice it here to consider professional training, which certainly requires general type interventions but also demands that typical professional profiles be defined. Here, too, we must consider market monitoring systems which are so different, for example, in the fashion industry and in the market for industrial goods. And what about marketing and publicity? This too is a field which is fundamentally different from sector to sector according to the nature of the subject - consumer or investment goods.

In Emilia, the solution has been to set up a mediation between all these different needs. In the area of management training, much freedom has been left to the private sector and the entrepreneurs' associations. Recently the Region has set up an agency which will make a number of data banks available to all businessmen in the Region.

But the most important commitment to date has been the creation of seven or eight sector centres or, as we may call them, "Industrial District Centres". It is worthwhile spending some attention on these centres, for they represent the most creative experiment carried out by the Region.

What are their responsibilities?

The problem, reduced to its essential terms, would seem to be as follows: the small companies which manage, through mutual cooperation, to use innovation, and even sometimes to produce innovative techniques are unable, and precisely because of their small size, to carry out certain entrepreneurial functions which are essential to success. Bearing the costs of a serious research programme; gathering information on the new solutions

which such research can offer the production process; carefully and continually evaluating market trends; recognizing the opportunities offered by potential markets; judging the comparative advantages and disadvantages of highly advanced machinery and equipment; controlling the access mechanisms to trade fairs and being involved in their management; organizing the necessary reaction to the frequent efforts made by competing nations to establish non-tariff protection; overcoming the difficulties connected with the complicated and ever-changing procedures for obtaining product approval on foreign markets - all these activities which have, as is easily seen, different levels of importance from district to district, are not accessible to the small company because of their high cost.

On the other hand, the market itself cannot be expected to supply these services. There are two motives for this. First of all, the initial investment required to put together the kind of knowledge necessary to carry out this type of activity is quite high. The market itself is also fairly small for, as we have already mentioned, these kinds of activities are specific to a certain sub-sector which includes only a limited number of firms. It is from this

easily explained market insufficiency that the need for public intervention derives. And therefore the centres are not an invasion of the field occupied by private industry, but rather an initiative to combat the insufficiency and incapacity of the market itself.

The structure of the centres set up to date is based on these analytical lines and on these proposals. Participation has come from the Regions and the municipalities together with the producer associations: the Confederation of Italian Industry and the artisan associations.

In addition, these centres envisage public financing limited in time, over a period of about five years; and the entrepreneurs are expected to pay for the services they receive. The idea is that local administration should shoulder an important part of the initial investment burden, including starting costs, whereafter there should be a progressive transition to self-financing.

It should be noted that the centres hitherto established do not all follow the same goal. Some supply specific technical services only to a certain group of firms.

Among these the Ceramic Centre is worthy of note, It studies the characteristics of various types of clay for ceramic tile production. Other centres have a much wider field of interest and their activities go from product design and production to marketing. As a general rule, however, the second group of centres also concentrates on a limited number of problems. In other words, even these centres specialize in a specific activity which coincides, or at least should coincide, with the more urgent needs of the firms in that sector.

13. To give a clearer idea of how a centre targets its activity, it may be useful to describe CITER, a centre which works in the knitwear field and is situated just a few kilometres from Modena.

Basically, this centre performs four activities.

First of all, it produces a periodic report on market trends. By trial and error, the Centre has found some university professors who are capable of following the market for the products and are willing to do so. What we are dealing with here is the gathering of all the available information on import and export flows, on production activity, on the various restructurings which are taking place within the industry in various countries, on the attempts by Third World Countries to break into the market, and so on. Such experts were not generally available to the industry, apart from some very large firms which had their own. But these experts have also been created by working with CITER and now give half-yearly reports to crowded meetings on the condition of the Italian and the International market.

A not unimportant off-shoot of this initiative is the increase in academic publications on the sector.

Secondly, CITER informs the artisans on the various kinds of yarn available and the current prices. It was no easy task to obtain samples of yarn from all the producers since many of them, especially those who had more efficient sales networks, were not willing to be placed on the same level as the rest in a market which had become very transparent. Nowadays, samples of the vast majority of available yarns in coloured skeins, are on display in a large room with all the relevant information on composition and prices.

In addition, CITER collects all available literature on equipment in the field and prepares notes which compare the technical characteristics of the machines used in the sector. Frequently, independent consultants or Production Managers of large firms report on the more important technical innovations.

Finally, and this is the more important activity, the Centre publishes information on fashion trends. As is well-known, the models for each season are presented and pre-sold six months before the models actually become available for general sale. Work on the 1986 winter models must therefore be started in the summer of 1985. The main task which CITER has undertaken is that of supplying information to the entrepreneurs and their stylists to enable them to prepare their collections before the major fashion designers hold their fashion parades and in competition with them.

But let us now see in detail what activities CITER actually performs in furtherance of these aims.

To start with, CITER reflects on the trends of the year in progress. CITER has been able to establish relationships with the large department stores (Standa, Coin, Rinascente) and obtains information from these on the success of various fashion lines offered on the market and on their purchasing trends.

At the same time, information is collected from the textile firms on the yarns which have been most successful and on the yarns that are going into production.

A further important source of information is the opinion research companies. There are firms which study evolution in taste, values and motivation in the consumer and single out particular population sub-groups. Companies such as Fiat or Rai or political parties can afford to make use of these kinds of services. Ordinary companies cannot. CITER studies the periodic reports of these groups, which are active in Italy and France, so that the products of its members can be designed in accordance with the characteristics of the consumer. Thus it follows the same methodology used by Fiat in designing its cars and by Rai in deciding on its programming.

In addition, it purchases the very expensive catalogues of the Institutes for fashion forecasting which are active in Great Britain, France, the United States and Germany. The reports of these organizations which try, as does CITER to forecast the main fashion trends, together with the main specialized fashion magazines, are assiduously studied to give indications on trends and comparative data.

Lastly, much attention is paid to the world of entertainment and important changes in habit. In 1983 the fact that four films based on Carmen were at the production stage warned that 1984 would see a fashion trend inspired by the Spain of the last century. The current boom in romantic novels in Italy suggests that it might be well to design clothes with lace, openwork knitwear, pastel colours.

CITER's officials classify all this information to identify inspirational trends that will predominate. To give an example, for the summer of 1986 five main lines have been identified: one based on Paris in the years immediately following the last war, completely overriding the androgynous trends of recent years and the feminine character of the clothes is once again accented; a second trend which mixes elements of African and Asian folklore and is linked to the reaction against Le Pen's chauvinism, and so on.

CITER then supplies the artisans with the largest available amount of iconographic material on these trends. The result is that, season after season the Centre is enriched with the volumes of Leni Riefenstahl on the Watussi when fashion used African inspirational themes; or volumes of war photography in Vietnam when the uniform of the Marines became a reference point for fashion; for the books on Keith Haring and the Graffiti movement in the United States.

To conclude this brief profile of CITER's activities, it should be noted that the Centre never intervenes at individual firm level. It does not design models and does not sell them to the entrepreneurs. It does not offer technical consulting, advising for example on a certain type of loom. It does not suggest company strategy or plan restructuring. Its task is limited, and this by choice, to collecting information and making it widely available. The task of translating this information into company decisions is left strictly to the entrepreneurs in the field.

What effect has CITER had on the production structure of the district? Obviously, the result cannot be easily measured. But everything seems to indicate that its role has been a determining element in orienting the sector towards the more sophisticated segments of the market, where quality is as important as price, or even more important, and where the danger of NIC competition is less worrisome.

Still, some data to illustrate the success achieved can be cited. The number of members went from 95 in 1981 to 480 in 1985. Firms belonging to the Confederation of Italian Industry which at first ignored the existence of this

initiative, now all belong to the Centre. The Centre's budget (approx. 650 million lire) now requires an annual contribution from local authorities of only 70 million lire).

Finally, and this is a significant test since it comes from the market, at least three producer associations, two in Tuscany and one in Romagna, have asked CITER to repeat for their members the reports on market and fashion trends. Prato, Empoli and S. Mauro Pascoli pay CITER a total of 180 million lire a year for these same reports.

Conclusions

14. The initiatives described in these pages have a number of common features which should be underlined to stress the philosophy behind the interventions by local authorities in this region.

First of all, they show that much attention is given to small firms - often with less than 10 employees. But we are not dealing, as we have already mentioned, with small firms which are active only in the local market. The production structure involved in these interventions is characterized by industrial sectors where many vertically disintegrated firms operate in an atmosphere which is at once one of competition and cooperation. They produce similar products which are destined for national and international markets. The industrial policy carried out at the local level is not directed to the single firms but to the system of firms and tends to equip the sector with those capacities which it cannot supply through its own means.

Furthermore, these interventions have always been carried out at a comparatively low cost. They have been based on creative ideas and good management rather than on any large funding capacity. Nor could it have been otherwise since the local authorities, given their modest financial means, can only succeed by involving private resources. In other words, in these interventions the public authority is responsible for the initiative, the planning and the initial investment. Thereafter the authority retains the function of directing and controlling, but all management devolves on the entrepreneurs' associations and private operators. This cooperation between public and private sectors can be very problematic and can give rise to showdowns or snags in the decisional process. But it also represents a guarantee of solid social consensus for the initiatives of local government and prevents flights of fancy and proposals based on abstract or unrealistic reasoning. And in some cases it ensures that difficult decisions will be made on the basis of common sense rather than complicated bureaucratic procedures.

The final point that should be made clear is essentially the following: namely that these industrial policy initiatives managed at local level need a very firm consensus from the communities involved. It is as though there were, in some sense, a very strong trade-off between the extent of the competences acknowledged by the law and the need for consensus. The state, with its ample power of intervention, can create a consensus for itself in the course of the initiative, or it can even impose one decision or another.

Local governments on the contrary, have to make up for their narrower range of competence by hegemony and authoritativeness.

This necessity can clearly be perceived in the three initiatives we have examined here. The municipality would never have managed to agree compulsory purchase with the land owners, if the latter had not been convinced that in no case would bribery or political pressure help them to more favourable conditions, and if they had not seen the justice of the municipality's demands. The assigning of the building plots among the firms would have produced tension or political disputes, if the entrepreneurial associations had not been persuaded in favour of the strategy as a whole and if they had not been given the chance to control each step of the procedure. And only a municipality with great authority and ability to persuade could induce small entrepreneurs to

construct their sheds on land to which they held only the surface rights. By the same token, the loan consortium has been enabled to function, as we said, by the very fact that the artisans who sit on the board of directors can refuse to grant a loan just because that seems the right course of action, without the refusal's being seen as unfair. And the activities of the service centre can be oriented in one direction or another without leading to arguments and ruptures among the members just because the management of the centre, however difficult, is sufficiently transparent to assure everyone that no single member is being favoured at the expense of others.

An important factor in all this may also be the political homogeneity. It is no accident that the Italian Communist Party enjoys an absolute majority on both the municipal and provincial councils of Modena. Though without stronger unity on the left, future initiatives like the ones we have described might no longer be possible, for want of said political homogeneity.

15. What has been the role of these initiatives in the development of the territory? To what degree have they been important? There is no doubt that these interventions have had a decisive qualitative influence on growth. Control of industrial locations and housing has guaranteed orderly growth along carefully selected axes - growth which is completely different from the "oil-spill" growth which has afflicted many Italian cities.

Today, the inhabitants of Modena have 27.6 m² of park area per capita at their disposal and 75% of the citizens live within 15 minutes of where they work or study. There is no doubt that the policy of controlling the areas has made its contribution to this state of things and has helped to remove the noisy and polluting industries from the city's historical centre. Initiatives such as CITER have certainly assisted by directing the sector to more sophisticated and sure market areas.

More problematic is to ascertain to what degree the activity of the local authorities has had a quantitative effect on growth, or rather on the rapidity of this growth. Certainly, the more rational distribution of production activity throughout the territory cannot but have some positive effects on the system's overall industrial productivity.

But there are also many proofs, even if we refer to Italy alone, which show that the support of local authorities for production activity is neither necessary nor sufficient. It is not necessary, as we mentioned: in the Veneto and the Marche, where intervention from the public sector is far less intense, there are areas which have had growth similar to that of Emilia-Romagna. Nor is it sufficient, as the south of Italy has proved, where so many industrial parks and so many industrial sheds, available at even lower prices than in Modena, have remained unused. Here, moreover, far greater incentives than those offered in Modena have produced no noteworthy effect.

Therefore, while bearing in mind the successes that have been obtained, it seems needful to recall something that is known to all - that the growth of an area is the result of a series of factors far more complicated than the low cost of industrial sheds and real services supplied to the firms. Local authority initiatives can have a decisive role only rarely, and then only if they are carried out in an area which has intrinsic growth potential.

These comments, which may seem fairly obvious, are extremely important to temper the enthusiasms with which many economists and politicians in these last years have exaggerated the value of local authority interventions. It should also be said, even if in passing, that this enthusiasm from the sources mentioned above is always somewhat suspect, because it always seems to suggest that it is not the government which is responsible for local crises but rather the local authorities which were unable to show sufficient initiative or to carry out the necessary interventions.

On the other hand, regional industrial policy, however carefully managed, cannot in any way counteract the weaknesses of an industrial policy carried on at a national level. One initiative level cannot replace another, nor can it be an alternative for another.

The large networks for transport of commodities or information, public company strategies, the choice of those sectors whose growth is to be fostered; the direction to be taken in research programmes; the institutions which regulate the labour market; the choice of the international markets to be followed with particular attention; the policy of joint ventures between the large national firms and foreign companies; decisions on mergers between large firms - all these are elements of a national industrial policy which are absolutely essential to create a reference field within which the regional policies will find their own role. Within this overall picture, at a local level, intervention may take the form of efforts towards improving the quality of life, controlling the distribution of production activity in the territory, assisting and accelerating the growth process.

If the industrial policy carried out in Emilia is read in this key, the conclusion reached is rather distressing: within a national context which is quite inadequate, the local authorities have used their very few powers and their small funds as well as they could. But certainly their activity has not been able to match the effectiveness of the large Japanese trading companies.

16. Finally, there is a last observation that is worth developing here to avoid misunderstanding. In this paper, we have discussed the small firm, and in particular the small firm in the context of industrial districts. But it should be understood that this attention, while almost exclusive, in no way implies a negative judgement on the larger companies or hints as to their possible decline.

What we have simply maintained, in this paper, is that an industrial district, if it is equipped with certain necessary support structures, is capable of being competitive on international markets both in its prices, the quality of its products and its attention to market trends.

In other words, we have argued that in many sectors, contrary to the common current of thought on the advantages of large size, small firms united in a production system can compete with the large company and do so effectively. It is also worth adding that some of these sectors are fairly sophisticated - machine tools, manufacture of robots, and so on, as the Italian experience has proved.

But this is quite different from asserting that there are sectors in which the large firms cannot succeed. It can easily be seen how much room there is for the large firm even in the fashion sector, where the industrial districts would seem to have a relative advantage. Benetton, which has a thousand employees, sub-contracts work to 7000-8000 other workers and owns 2400 retail outlets, is a case in point and shows how a large company, too, can be flexible and capable in its understanding of even these markets. In other countries, this same ability to follow market trends is characteristic of vertically integrated large firms whose planning and production cycle is based on CAD/CAM.

What essentially emerges from all this is that the same kind of production or market problem can be solved with quite different production structures. The future will show whether any one of these structures in particular is destined to dominate. What this paper has aimed to show is simply that the industrial districts should also be counted among these structures.

A further problem remains to be discussed - to what extent can the industrial districts take on the tasks traditionally assigned to the large firms? This is not the place to reply to this kind of question, which involves age-old problems of industrial economics and which raises the need for a theory containing a model of the division of tasks between large and small firms. But probably this is not the correct way in which to pose the problem. There may be many cases in which planning and production activities can be carried out both by large and by small firms and the productive structure will depend on the history of the country, social mobility, traditions and institutions. In other cases it seems certain that the large companies are indispensable - consider large scale applied research; the investment needed to

acquire new markets; the sectors in which large economies of scale and vertical integration still figure; the task of spreading industrial production methods and technologies to backward areas.

[PB]

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Giacomo Becattini and I have both done a lot of work on small firms. But his research has followed a very different path from mine.

His first writing on this topic appeared in 1969 and was published in a volume of IRPET, Istituto Regionale per la Programmazione Economica della Toscana which excels among similar bodies as one of the most efficient and creative. In postwar Italian economic literature that essay was the first to argue that systems made up of small firms could be vital and competitive and that it was a mistake to interpret them merely as the residues of a production system doomed to failure. At national level this thesis did not receive the consideration it deserved. Indeed, in right and left-wing circles in Tuscany Becattini was fiercely criticised, as though he had argued in favour of the vitality of fossils left behind by a long vanished ocean, or had sung the praises of production systems of mediaeval or, at best, pre-Raphaelite character.

In that study - and in the more complete one published in 1975 and again devoted to the economic growth of Tuscany - there was an examination of the relation between the decline of agriculture and the growth of industry; between the events of the postwar period and the helter-skelter proliferation of small firms; between the special links that connected Tuscany to Europe and the ability of those firms to hook up with foreign markets. The argument revolved around two crucial points: that these systems of small firms shared a rich culture, formed over centuries, from which, as from a common matrix and substratum, entrepreneurs and workers derived a style of relationships, skills and knowledge; and that from their closeness and their having certain values in common the firms derived external economies sufficient to enable them to work creatively and compete effectively in international markets.

The proposed scheme of analysis made use of a new method, that inextricably linked economics and history, and offered a new interpretation that emphasized, among the success factors, the culture shared by the community, and the external economies.

All these elements reappear, in 1979, in what is perhaps Becattini's best known essay: where the systems of firms in Tuscany or, as it was then called, the Third Italy - are recognized as examples of

Marshallian industrial districts, thus rediscovering the historical and theoretical roots of our contemporary studies.

Becattini's contribution does not end here. One may wonder to what extent he has influenced the studies of Bagnasco, who was for some years a colleague of his at the University of Florence. There can be no doubt, however, about the strong link between Becattini and Piero Tani who - taking a hint from Georgescu-Roegen - contributed to clearing up the definition of "development", or "operations"; which, in my opinion, was the unit that could reasonably be adduced when referring to minimum efficient size. For following Tani's study it became clear that the "department" had been identified by the "fund factor" of Georgescu-Roegen. So that an operation was defined as the activity connected with a particular type of machinery. And this had implications of no small moment, since different technologies, or even different organizations of work, could mean that a production process was subdivided into - or gave rise to - different operations. To the point where assembly lines made up in different ways - where the subgroups arrived at the main line in more or less advanced stages - gave rise to different fund factors and thus to "departments" with different features.

Alongside the work of Piero Tani we must, of course, set that of Marco Bellandi who, in 1982, very carefully retraced the lines along which Marshall, in both his early and mature work, had described the industrial district.

My own studies have followed a different path.

To begin with, they have never aroused strong reactions, in Emilia, either from the parties or from the trade unions. One possible reason for this may be that in Emilia the attitude of the left - and especially of the PCI - towards the small firms has moved through three stages. The first, going up to about 1976/77, was marked by the fact that, as compared with Tuscany, Emilia showed itself a more convinced supporter of what Togliatti had taught in the matter of alliance between proleteriati and middle-class producers. In that period, in my view, political leaders in Emilia were not very confident that these textures of small firms could withstand competition from the "monopoly". But the initiatives taken in favour of the small firms were many, and often effective. The mass organizations - from

the National Artisans' Confederation (CNA) to the entrepreneur's confederations - were able to exert much pressure on institutions and showed great intelligence in "orienting" the votes of their members. Many of the latter, for that matter, were of working-class extraction, often ex-trade unionists, or active militants in the PCI. At that time, and especially in the early 1970s, in Bologna and Modena I was regarded with suspicion, not because I had argued that small firms could be efficient - as was the case with Becattini in Tuscany - but because I had shown that the workers in small firms were often subject to awful working conditions. I was taken to task for not having understood the reasons for the policy of alliances, for denouncing too roundly the licence allowed by the unions to the small firms, for being, essentially, an enlightened intellectual who had not learnt the lessons of Togliatti.

Then - for once in a while - it happened that hard facts prevailed over the ideology of the large industry and of size as a condition for efficiency. The industrial districts of Emilia experienced a visible increase in employment, income, prosperity, exports to many parts of the worked. One began to hear of the "Emilian model" and the "positive difference" of Emilia-Romagna. Not that the left was ever entirely convinced that the model could survive: but the conviction was more solidly held in Bologna than in Rome. My article, published in the Cambridge Journal, was often quoted in those years.

Since the beginning of the 1980s the attitude of the Emilian managerial class has changed again. The large firms have carried out important restructuring, often with the introduction of complex technologies with which the small Emilian entrepreneurs are hardly familiar. The accounts of the large firms show conspicuous profits, though these may often be connected with financial activities. In Italy and elsewhere in Europe large-scale processes of concentration are under way. All this arouses fears and misgivings and nurtures a growing mistrust of the ability of small firms to survive. Though often, in reality, it is only a matter of breaking with old ways of thinking that have never for a moment been questioned. This was certainly the case of those (and their number was not small) who up to December 31, 1981, argued that the industrial districts were too weak to survive; and since January 1, 1982, have been arguing that, yes, they were formerly efficient but are now unable to hold out.

For my part, faced with this change of opinion, I think that these fears have some foundation and that stimulus and in-

tervention are urgently needed - and these must be more incisive and more sophisticated than in the past. But, granting this, I feel that there is still a role for the industrial districts. Like the large firms, the districts have their easy periods and their difficult ones, but I see them as a system of production that is destined to endure. And I am also convinced that one should reflect more deeply on how much ideological content resides in the certainty that large size alone can enable efficiency, and on how ineffective has become the double-dealing of those who regard small firms merely as possible allies. And, by virtue of these opinions, I sometimes pass for a laudator temporis acti, blindly enamoured of a thesis that has outlived its time.

As to the role of external economies, I regret to have to record my dissent from Giacomo Becattini. In a model of perfect competition I have found no other example of external economy apart from the classical one of the bee-keeper who operates in the vicinity of an orchard. The fact is that when all information is freely available to everybody, it does not matter whether the firm that possesses a highly specialised machine is situated near me, or far distant, or even in another country. In perfect competition, the fact of my being near to or far from the buyers is of no importance: they know all about me and will bear me in mind in their purchasing. And in this situation of completely available information, I know everything that everyone else is doing, even at a long distance. To sum up, in perfect competition the only important role may be played by transport costs: but if that were the case, external economies would have a very paltry function. From which it follows that external economies exist in so far as imperfect markets exist. The economies "outside the firm and outside the district", as Becattini defines them, are the analytical tool by which one accounts for the fact that a market - normally imperfect - becomes more efficient within the district. If, however, this be the case, it may be better to start out from the imperfections of the market, to make them explicit, and then to see how a system of firms attenuates the adverse effects of a lack of information or of anything else. In this sense perhaps, the costs of transaction are a more efficient or a more direct instrument than external economies, even though they enable one to take account only of the imperfections of the market and ignore the positive effects of interactions between firms - and, indeed, make up an analytical scheme that actually prevents one from taking the latter into account.

All things considered, I am convinced that external economies represent an analytical tool that fully reflects the ambiguities and the richness of Marshall's thought. For Marshall was always concerned with tracing out a tidy model, and always prepared to complicate the model in order to take account - it might be said - of history and geography: but on the condition that the complications should not become too evident.

That all this is quite clear to Giacomo Becattini, I have no doubt. But it is scarcely so to others, who regard external economies and the Marshallian atmosphere as a bin into which one dumps everything one cannot manage to explain, and who use these categories to give an academic cachet to studies worthy, at the very most, of a mediocre Chamber of Commerce.

It is on other points that Becattini, on more than one occasion, has been a help and a comfort to me: his proposed method with its close links between economic studies and historical studies; and his noting that the system of values and the culture referred to are always essential parts making up any economic system. So convinced am I of this now that I feel there would be no point in comparing Japanese wage rates with European ones without taking into account a whole lengthy series of other phenomena that arise from the cultures of those places.

At the start of the 1970s, however, I thought differently. At that time, Cambridge was contrasted with Oxford as the "leftwing" faculty, where Keynes was defended against neoclassical infections and where a model of income distribution was put forward based on social classes. At Cambridge in those days Sraffa was already being read, Kahn was talking of Keynes, and Kaldor took a term or two of leave to be economic adviser to the Labour government. Joan Robinson lectured not only on "The function of production and the theory of capital", but also on the economic development of China, and Meade was not yet professor. But in my own case, whereas I had learnt something of the theory of capital and of Keynes, I had absorbed little in the way of realism and common sense, nor had my critical view of the world been encouraged a great deal. On the other hand, I had learnt perfectly the rules that had been dictated to me as a novice in my profession: namely, that values should be kept separate from facts and Paretian efficiency from political judgements. A correct enough lesson, had it not been for the fact that I was incapable of transforming the critique of marginalism into an attention to institutions and the differing rules of cohabitation which regulate

countries, classes, social groups; and thus I was not persuaded that the professionalism of the economist should make him give priority over all else to purely economic motivation and disregard any elements that might interfere with the frigid mechanisms of economic analysis.

Thus, in all my writings up till then, those on home working and the metal-engineering sector in Bergamo and, above all, all the studies done with the unions that were ultimately brought together in the piece on Gibrat's law and the Emilian model, I was always very wary of dealing with "culture". I was convinced that everything must be explained only in terms of mutual economic convenience between the parties involved in the exchange.

Had I been a little bolder in giving credit to facts other than purely economic ones, I should, among other things, perhaps have managed to write something sensible on the factors that determine the level - and the measure, and the form of vertical integration of the firm. Paolo Mariti went to work on this problem but did not go much beyond an intelligent review of the theoretical instruments to be referred to. I myself did a lot of work on it, and once even gave a lecture on the subject to the Society of Economists, but not a single line did I publish. Nowadays I suspect that what is within a firm and what is outside depend, first and foremost, on the history of that firm, on the characteristics of the entrepreneur, and on chance: and in this I seem to be in agreement with Richardson.

Then at the beginning of the 1980s the problem of planning intervention to encourage the growth of districts became more and more urgent. With the spread of technologies that no longer derived exclusively from metal-engineering, it was clear that the difficulty no longer lay in affirming that the small firms, grouped together in a district, could be efficient. The task was to compare large firms and districts, to identify the advantages and limits of each system of production, and to deal with the limitations of the districts by public intervention, without affecting their characteristic potentialities. Travelling by this road, I rediscovered what Becattini called the "culture" of the district: a knowledge that has spread and settled in the social texture, and that in a close network of relations among entrepreneurs manages to create, to react and to operate effectively. But for these reasons Marshall's and Becattini's "atmosphere" needed to be replaced with an analysis of what skills were present and what were required, of how to go about introducing these necessary skills into the produc-

tion texture, of the specific difficulties that held up these processes. Problems of this kind could not be disregarded, in any case. For the writings on districts, by Italian economists and by Sabel, Zeitlin and Piore, had aroused - more outside Italy, it must be said - a strong interest in the Emilian model (or the NEC model, the system areas, the Third Italy, however one likes to call it). Foreigners - theoreticians or politicians entrusted with investigating the topic - asked themselves and us whether the model could be reproduced. The question was whether the model could be used to increase the competitiveness of the textile firms in Nottingham or the very small knitwear firms at Ridgewood and Queens, or the small engineering firms in Detroit. To say nothing of whether the model could be used to encourage the growth of the south of Italy - though this has never been a problem for those in charge of public affairs in Italy. Here, then, is the framework of the essay that follows. What exactly is the culture

of the district and what are its sources? Though no answer is given to the most important question: namely, whether this mixture of consensus and know-how can be reproduced. The path followed is different from Becattini's but ends by converging closely with his theses. Even though my own interest in problems of industrial policy is stronger than his and, perhaps improperly, I call by the name of "backward districts" what Becattini regards as simply aggregate of firms concentrated in the same area and operating in the same sector.

The essay contains one idea, perhaps an important one, that I should have liked to do more work on. I refer to the passage where it is said that in the districts labour is often transformed into capital without passing through saving. This shows, once again, how strong is my aversion towards thinking that the problems of growth can be identified, first and foremost, with problems of credit availability.

SMALL FIRMS AND INDUSTRIAL DISTRICTS: THE EXPERIENCE OF ITALY

Sebastiano Brusco

A typology of Small Firms

The significance of small firms in Italy's industrial structure increased steadily and consistently during both the two recent intercensal decades, from 1961 to 1971 and from 1971 to 1981. I do not feel it is important here to examine the rate of this growth, which obviously could be done by region or by industry. What, instead, may be more useful is an examination of the changes in quality that have come about in small firms. I feel that the best way to do this is to refer to certain models proposed by Brusco and Sabel in 1981 that, in my opinion, still hold today their capacity of interpretation.

Brusco and Sabel single out three models of small firms:

- the traditional artisan;
- the dependent sub-contractor;
- the small firm in the industrial district.

These models will be described by reference to just a few variables: market, tools, skill, acquisition of skill and relations between firms.

The following three paragraphs set forth these models, summarizing the results of Brusco and Sabel with a few modifications of slight importance.

The Traditional Artisan

The traditional artisan is well known in those areas and sectors where a national market is not yet formed. Consider, in the years immediately following the Second World War in Italy, the tailors who were making made-to-measure suits before the big garment firms had started to evolve; consider the many ice-cream makers before the large, national ice-cream manufacturers had started up. Or, even today, consider the blacksmiths who make fences and gates designed for single buildings.

The market of the traditional artisan is, therefore, fundamentally a local market which is there not because it is highly specialized - like, for example, certain tailors or ice-cream manufacturers in Italy in 1985 - but because there is backwardness in the country and in the sector.

The tools used by traditional artisan are, in general, simple and multipurpose. These tools can be used to produce many different things but not for those pieces that require close tolerances. The skill of the artisan lies here: in being able to cope with complex situations, working with few tools, often with unsuitable material. The artisan acquires his skill little by little through years of apprenticeship to an established artisan with very little formal schooling.

The relations between these firms are described by a model well known in literature, that of imperfect competition. The relationship between customers and artisans is based, above all, on trust and on reciprocal knowledge, and only secondarily on price.

The Dependent Sub-contractor

The dependent sub-contractor is the figure around which, in the early 1970s, all the controversies about decentralization centred in Italy.

At that time, for many reasons, but primarily because in the large firms trade unions were a lot stronger than in small ones, the large and medium firms decentralized some stages of production to other, smaller firms. The stages of

production which were decentralized were not always the same: in some cases, the simplest, in others the most harmful, in still others the most sophisticated.

The dependent sub-contractor consequently produced - and in many sectors and regions still produces - parts and components for larger firms that sell on the national and international markets. The dependent sub-contractor, therefore, although indirectly, works for the national and international market. His own direct market, however, is the large firms which place orders for his product.

The tools and machinery available to the dependent sub-contractor are not all of the same kind, as are those of the traditional artisan. In some cases, low wages and long working hours enable the dependent sub-contractor to stay on the market with backward machinery. More often, however - and this was certainly the case of Emilia in the early 1970s - the machinery used is identical to that in large firms which perform the same operations. Indeed, in many cases the machinery was the same as that used previously in the larger firm in that some medium-sized firms lent or sold their own machinery to their own workmen who continued as self-employed doing the same job as they had done as employees.

There is often a high level of skill in these firms. This depends on the facts that mostly short series are produced and, therefore, the machines must often be re-equipped for the new product. But this professional quality is strongly polarized: alongside a minority that carries out difficult and varied tasks there is a majority of lower-grade workers who perform routine tasks after the machinery has been equipped to do a given job by the more expert workers.

Very often the more skilled workers have acquired their expertise in the larger firms from which they come. There they were foremen, skilled workmen with particular responsibilities. They are frequently skilled workers who had good technical training at secondary school.

The relations between firms are very characteristic, at least in the purest form of the model: there is fierce competition among sub-contractors specialized in the same stage of production. It is truly cut-throat competition. Between sub-contractors and sub-contracting firms, on the other hand, there is a typical monopsonistic situation: the larger firms are in a position to squeeze the profits of smaller firms, forcing them to pay lower wages, to evade social security payments, to work longer hours.

The Small Firm In The Industrial District

The third model is that of the small firm in the industrial district. It coincides with what Sabel, in his recent book (1982), calls the flexible specialization model. It is the model that today predominates in many parts of Emilia, Veneto, Tuscany, the Marche. In these regions, this third model is often claimed to be an evolution of the second model.

Reference to Marshall's industrial district (Marshall 1919, 1920) is important both because it connects this structure to certain important data and because it places the accent on the fact that, in this case, what is relevant is no longer the characteristics of one single small firm, but the characteristic of the industrial structure of which the small firm is a part.

The market of these firms is always national or international. Often it is a direct market in the sense that many firms, although they are small - as a point of reference, with fewer than 20 employees - have direct relations with the markets of the finished product. It can be seen that these are small only in name; in practice, they subcontract many stages of production to other firms so that the labour-force they mobilize is ten times as great as the labour-force they have on their wages-book. In other cases these firms reach the national market indirectly through the work they carry out for parent-firms, whether large or small.

The relations between these firms are completely different from those in

the previous model. A market is developed for every stage of production; there is a market of weaving, of turning, of carpentry, of dress-making. These markets are strongly competitive; sub-contractors are free to switch clients, and clients are free to switch sub-contractors. The sub-contracting firms, therefore, can no longer squeeze the profits - and the wages - of the sub-contractor. Among firms that carry out different jobs, instead, there is a great readiness to collaborate. We shall see the implications of this shortly.

This climate of competition has important effects on the type of machinery used. There is a strong incentive to invest in order to be able to offer, with more productive machinery, lower prices; and there is the scope for investment because profits are no longer squeezed by parent-firms, that is, by the firms that have direct relations with the market of the finished product and that produce on their own account. Moreover, in the industrial district there is a gradual diffusion of machines that could be called 'off standard', those able to level a steel surface of 4 x 2 metres perfectly, or those able to carve wood according to a very complex pattern, or those able to work at extremely close tolerances. The district, that is, entrusts to a few firms the task of meeting demand on all sides for unusual, specialized and exacting jobs.

Skill in these firms, too, is strongly polarized. Some carry out simple tasks and in the course of their work they do not learn much. Others are highly specialized and their skills continually increase in their relations to other firms.

There is in these firms in the most skilled workers a particular ability that is linked with the way in which the industrial district works. It is the ability to meet and solve specific problems often in a very original way that signifies in more than one case a real capacity to innovate. To clarify this point, one must reflect on how, in different contexts, planning of new products is carried out. In large firms, planning is done in very competent technical offices; the project is defined in detail; executive plans produced by various offices are, lastly, passed on to production. In these industrial district, the parent-firm normally has a rather vague idea of what it wants. Its technical offices, which often coincide with the manager, define the new product along general lines - more in terms of requirements than in specific technical solutions. The definitive plan is perfected in talks between management and the most skilled workers, and especially between management and sub-contractors, in a common task that has no other hierarchy than that of professional quality and competence. This collaboration nearly always manages to minimize production costs, for example, through the adaptation of standard components already existing on the market. Sometimes, however, this collaboration gives place to small innovations or even important innovations that open new market prospects.

Perhaps it is worth quoting two examples. The first is of an artisan from Modena who produces pumps for weed-killer spraying. A liquid crystal capacity gauge, which was designed by an electrical sub-supplier, found an autonomous market and is now regularly exported to Germany. The second is the story of a maintenance worker from Reggio Emilia who had inserted a small innovation into the perforated card mechanism that controls the movement of knitting frames and who realized, after some time, that this device of his could be used to ring church bells automatically. Today that device works regularly in many parishes in Northern Italy.

Some Indicators To Discriminate Between The Three Models

The three models described above, as is clear, are stylized models not infected by all the contradictions to be found in real situations. There are situations, however, that may be much more complex and in which the second and third models may co-exist, or even all three models together.

It must be said that, even though no specific reference has been made to these models, much has been said in Italy about the fact that the enormous spread of decentralization gave place to the second or to the third models. Today, on the whole, this discussion is a lot less heated because the idea has

been accepted that small firms may be qualitatively different from one another, and that there is no endogenous force within the economic system that derives the second model towards the third, or, even less so, the first towards the second. Furthermore, students of this topic have elaborated some parameters that are easy to collect - even if they are not collected by the Central Statistical Office - which enable us to distinguish these types of artisan firms. Perhaps it is useful here to give an account of this experience. The first type of artisan firm is easily identifiable from the market for which it works. Working for a local market is nearly always characteristic of the traditional artisan. On the other hand, working directly or indirectly for the national or international market characterizes the second and third types. An analysis of the clients of small firms takes on, therefore, a decisive importance. Very few exceptions escape this indicator: one could be the ice-cream maker who makes a very refined product that is not comparable with that of the big national producers, and who finds a niche not within a backward market but one dominated by large firms; or like the local baker who also defends himself from the competition of the large firms with the high quality of his product. It is also to be noted that, on close examination, these exceptions always involve goods which are not transportable. Although the tailors of Savile Row work as artisans, it can hardly be said that theirs is a local market.

The indicators which are easily collected and which enable us to distinguish the second from the third model are of a very different nature.

The first is represented by the percentage of small firms that have a direct relation with the market of the finished product. The higher this percentage, that is, the greater the ratio between parent-firms and sub-contractors, the closer will the industrial texture under examination be to the third model. Earlier research on the clothing industry during the second half of the 1970s (Brusco 1982) discovered, for example, that in Modena, small firms producing on their own account represented about 50% of the true artisans, whereas in Ferrara the figure was not more than 8 per cent. This, obviously, synthesizes two situations which, according to all the experts, were completely different.

The second indicator is that of the percentage of sub-contractors who have a large number of clients. When, during one year, a sub-contractor works for a large number of clients, this means that the market for spare parts and components is a competitive one; that it is not possible for subcontracting firms to squeeze the sub-contractor's profits; and that, lastly, the subcontractor produces in short series and, therefore, tends to have a high technical standard and a good professional quality. Recent research carried out by various people shows the effectiveness of this indicator. For example, Bagnasco and Trigilia (1985) found that among the metal-mechanic sub-contractors of Bassano, only 30 per cent had more than 20 clients a year. The figure found for Modena and Reggio Emilia by Favaretto (1984) is 60 per cent. All other available indicators confirm the diagnosis that derives from this figure.

To conclude, there is a last symptom which is highly diagnostic and which enables us to distinguish the second from the third model. It is the presence, in an area that produces a certain commodity, of firms that produce the machinery necessary for the production of that commodity. A very clear example of this enriching of the industrial texture is to be found in Sassuolo where, following the growth of a large number of firms that produced ceramic tiles for floors and walls, a significant number of metal-mechanic firms producing machinery for the working of clay developed. These are almost always firms with fewer than 50 workers, which have revolutionized conveying and firing methods of materials inside the tiles factories, drastically reducing costs. These firm, by exploiting the professional quality of maintenance workers, have gradually developed a capacity for autonomous planning and they are now beginning to gain markets for themselves at home and abroad (Russo 1983). Similar things have happened elsewhere - for example, in Sardinia where the industrial district of cork, in the province of Sassari, is beginning, although

slowly, to innovate machinery for the production of bottle corks and the recovering of working waste.

Obviously, the indicators possible, apart from the four I have quoted, are innumerable. A whole family indicators is concerned with identifying labour market parameters: working conditions, autonomous workers' profits and so on. Still others can be found from the quality of machinery used.

But parameters concerning the labour market are, for an independent researcher, very difficult to collect; if it is easy to observe working conditions, it is not so to obtain information on wages, especially when these wages are high; paid in such a way as to avoid social security payments. Lastly, it is almost impossible to obtain any data on the level of profits of autonomous workers.

The same goes for finding out about machinery used. A recent research experience (Brusco 1985) shows that when machinery is not radically backward, its assessment must be made only after a very careful, competent analysis of the product. In short, the point is that multipurpose machinery, as long as it has close tolerances, is the best for working short series, even if such machines are not suitable for long ones. In other words, it would be nonsense to judge the machinery that produces a Ferrari or a Maserati as having a low productivity simply because it is different from that used by Fiat.

Summing up, therefore, in order adequately to assess the machinery used by a small firm, the mixture of products that the machinery produces must be known. So too must be the different combinations of short and long series worked during a year; whether a short series, as often happens, is put into production periodically, with time intervals; and whether, lastly, the firm has the use of special equipment, to be mounted on multipurpose machines to produce longer series. This analysis, of course, is not simple to conduct.

To conclude, the importance given to the three indicators defined at the beginning is justified by the fact that they are easily collected and effective. Any other data on technology, on the labour market or on the product market will always be useful, but it is very likely that, in general, these will be qualitative data.

Small Firms and Economy of Scale

In the previous discussion it was maintained that industrial structures composed of small firms can be very efficient and capable not only of using but indeed of producing innovations. It was also specified, although not incidentally, that by the term "small firms" we refer to firms with fewer than 50 employees, and more often fewer than 20.

Up to what point do these conclusions contrast with the usually widespread opinion that large firm size is a necessary condition for the enjoyment of economies of scale and, therefore, for economical and efficient production? Up to what point can the estimates carried out by leading industrial economists like Bain (1956) and Pratten (1971) be accepted in contrast with what has been maintained? The problem may also be presented in other terms. One might ask, that is, how much of what we have maintained is in opposition to many current texts, according to which the small size of a firm is a powerful indicator of bad technology.

The fact is that, both in large scale-economy estimates à la Bain or à la Pratten, and in the use of the small-scale as a symptom of low technical level, two fundamental assumption are implicit.

The first assumption is that a product of a long or very long series is being considered. The cars that Bain refers to are probably produced in at least a million units.

Instead, the small firms considered here typically produce in short series. Maserati does not produce more than 8,000 cars a year or more than 2,000 of the same model; women's garments manufactured by small firms are produced in not more than 5,000 copies per model; the machine tools of Emilian firms are often produced in just a single model for a given client, like the

automatic packaging machines in Bologna; the cloth of Prato is very often produced in limited quantities and its exclusive use is granted to a single, leading tailor. In this type of production, the advantages of large-scale production quickly disappear. On the other hand, the advantages of flexibility, of being able to make special plans or designs on demand, of being able to move about within the market, are much greater.

It could be objected, here, that we are talking about small segments of the market: the interstices that Penrose (1959) talks about. But, on careful investigation, it would seem that whole sectors have converted to short series. At least within the markets of capitalist countries, high quality accompanied by the price that derives from good technology suitable for small series often comes off best against low quality, even though accompanied by prices that derive from a production technique of the Taylorite type.

But in those estimates of the minimum efficient size and in those identifications of the 'small' with the 'backward', there is another important assumption. It is assumed that firms around which discussion centres have a level of vertical integration similar to that, we might say, of representative firms existing in the 1950s and 1960s.

Both the dependent contractor and the small firm in industrial districts, on the contrary, have a much lower level of vertical integration. In practice, one type of firm corresponds to every stage of production. There are firms that only supply, or weave, or plan the product, or cook mortadellas, or assemble a machine tool, or carve the legs of a flake Louis XV chair, or cut the uppers of women's shoes. So it is with reference to the single phase of production that the minimum size for efficiency must be estimated. And, in fact, if this is the reference, these firms nearly always reach the minimum size for efficiency. If a worker can operate three looms, we can be sure that a textile artisan firm will have these three looms. In this case, the minimum size for efficiency, measured in terms of labour force, is that of one worker. And a software house, giving a service to third parties, may be completely efficient with fewer than ten workers. In other words, the situation is that described by Marx when he refers to the production of clocks in the nineteenth century. Those who remember the long list of trades and firms that Marx mentions in the fourth section of *Das Kapital* first book will have a clear idea of what is meant.

Of course, one may wonder what the costs of this radical fragmentation of the productive apparatus are. A reply to this question is given elsewhere (Brusco 1975). Here, it is sufficient to say that fragmentation is possible only because many small firms that complement one another are grouped together in a relatively restricted area. It is the already quoted notion of an industrial district proposed by Marshall, where interrelations between firms, competition and collaboration, availability of services, the differentiated presence of suppliers, and the appeal to final purchasers, are elements essential to efficiency.

It is the same consideration, the fact of being a 'system' rather than a 'single firm', that defines the degree of sophistication of these industrial structures and that makes it difficult, as will be seen, to reproduce these experiences on the basis of incentives measures of industrial policy.

Regional Variations in the Characteristics of Small Firms in Italy

What is the regional distribution in Italy of the three models? The data placed at the disposal of students by the Central Institute of Statistics do not, in fact, give any indications. The only phenomenon that emerges from the 1981 Industrial Census data is that the number of employees in firms with fewer than 20 workers increased compared with 1971 in almost all regions and almost all provinces in Italy.

In contrast, however, there are now available a large number of studies based on non-official findings which do identify the areas in which there are systems of firms with the features previously outlined. Some of these studies, like those of the Unioncamere (1982, 1983) and those of Garofoli (1981, 1983)

try to construct a map of these areas, localizing them over the whole country. Although the procedure cannot be exact, it may be that where no industrial district has been found the small firms still possess the features described in the first model, that of the traditional artisan who operates within the local market.

On this basis - although with a high degree of uncertainty common to residual determinations of this type - it is possible to maintain that the subdivision of the country proposed by Bagnasco in 1977 is still quite valid. In the South, in fact, small firms that serve the local market predominate, even if it is to be noted that, especially in Puglia and Campania, it is possible to identify some areas that are similar to the second and third models explained previously. In older industrialized areas of the North, many studies show that big factories are often surrounded by a large number of dependent sub-contractors. But even here, industrial districts of recent formation are quite frequent. Among these, one of the most interesting cases is represented by a group of small electronic and data processing firms operating in the area between Turin and Ivrea (Bianco and Luciano 1982). But of course it is in the 'Third Italy' that industrial districts are most diffused: in Veneto, Emilia, Tuscany, Umbria, and the Marche. Some are old, others are of more recent formation. Some are more developed and capable of innovations, others more backward, with low wages, without steady relations with foreign markets, and exposed to the competition of the newly industrialized countries.

A Tentative Explanation of the Industrial District Formation

How can the irregular distribution of industrial districts within the national territory be explained? Why is it that in Southern Italy industrial districts are so infrequent compared to other parts of the country, although considerable incentives of various kinds in favour of small firms have been available?

An important contribution to the analysis of this problem has been made by Bagnasco and Pini (1981). Among other things they stress two main points. First of all it may be noted that the 'Third Italy' areas correspond to the diffusion of *m,tayage* (share-cropping) agricultural areas. The coincidence is not surprising. In spite of the fact that some recent studies (Forni 1985) show that the *m,tayer* often played a role which was little different from that of a wage-worker, it is clear that, mostly, it was the family living on the farm who took all fundamental business decisions regarding its management. Therefore, in some way the spreading of *m,tayage* favoured the growth of managerial capacities, the capacity of relations with supplier and purchaser markets, the capacity of calculating the convenience of investment, the capacity of book-keeping, and, in some cases, of keeping the pay-rolls. Obviously, these are the same capacities which, a few years later, would be needed for the management of a small industrial firm.

It should be noted that, contrary to what has been maintained by Paci (1982), the relationship between the *m,tayage* condition and the artisan-entrepreneur condition is not based on personal experience. In fact, as shown by Forni (1985) the proportion of entrepreneurs having had previous *m,tayage* experience is not particularly high. Indeed, the relationship between *m,tayage* and entrepreneurial capacities is more complex and passes through a slow sedimentation of managerial competence within the whole social texture.

Secondly, Bagnasco illustrates the basic role of towns in the development of industrial districts. The town is important as a place of trade, of commercial and financial organization, as a place of markets. It is to mere coincidence, perhaps, that a considerable proportion of first-generation entrepreneurs - those setting up their own business in the post-war period, when the active population rate engaged in agriculture was still 45 per cent - came out of the ranks of stall-keepers. It is not possible here to go deeper into this question, as it would need a detailed analysis of the social texture and of the competences spread in the 'Italy of the Towns'. But it is certain that, for example, in Modena, the building which until 1861 housed the Austrian

Embassy bears witness to the great richness of relations , interactions and acquaintance which may have played a part, later on, in determining the direction and path of development.

Bagnasco's observations, however, do not seem entirely sufficient to explain the territorial differences hinted at the preceding paragraph. It is necessary in addition to refer to at least two other elements which are very important, not only because they explain what happened in the past, but also because they indicate some prospects for future operation.

First of all it should be observed that the historical origins of industrial districts often stem from the previous existence of one or more large firms which, sometimes a long time ago - were working in the field where small and artisan firms are now operating. There are many examples of this, which are often clear and unambiguous. At Castelfelfredo, in the province of Mantova, the stocking industry was begun by one factory, NOEMI, which was established there in the 1920s; already at the end of the last century, Vigevano, in the province of Pavia, housed the large footwear factory of the Bocca brothers; in Reggio Emilia and Modena the 'Officine Reggiane' and 'Fiat Trattori' have played a decisive part in stimulating the growth of the agricultural machine sector and so on. Many districts of newer formation, too, directly derive from the establishment of a branch plant by a large firm having its head office in another region. Indeed, as happened in the Serra de'Conti territory of the Marche (Bronzini and Grassini 1981), often the firm of extraprovincial origin closes down a few years after its establishment and is replaced by a local firm uniting the dismissed workers in a co-operative firm. From this first company, then, all the other firms of the actual district derive.

The logic of this pattern of evolution is very clear. It is the large of average firm which, with its daily work, manages to introduce the necessary technical and professional competence into a peasant social texture with few market connections. The workers learn to manage the productive process, the employees learn the connections to suppliers and to the market of the product. Then, under certain conditions, workers and employers little by little tend to change into independent workers doing on their own the work they have learnt in factories. What these conditions are has already been hinted at several points: that the market asks for customized goods, that the large firms tend to decentralize, and that the productive process can easily be divided into phases (Brusco 1982).

Finally the importance of the school system should be remembered. From the very beginning of this century technical schools - spread all over the areas with many small autonomous firms - have been furnishing the workers with the fundamental theoretical elements of their trades. Until less than ten years ago (Capecchi 1983), people with a diploma of the Aldini-Valeriani school of Bologna represented the backbone of the Bolognese metal-mechanical industry.

As may easily be verified, there is a single red thread uniting the four factors that have been mentioned: the m,tayage, the role of the town, the large firms, and schools. Essentially it is a question of courses along which - in different ways - the local communities have accumulated managerial, technical and commercial competence and capacity. And it is a distinctive feature of the industrial district that this knowledge is not characteristic of one particular group within the community, but that is spread to all social strata. Considering the fact that in Emilia-Romagna, where active population is now approximately 1.5 million workers, there are 150,000 artisans, one cannot but notice that, essentially, everybody in Emilia has a direct experience of what a firm means, of what it means to apply to a business consultant, to resolve a technical problem, to meet with certain market difficulties, to deal with banks, to accept association with a friend to start a new activity. Certainly, this is a knowledge of a not very sophisticated level, but it is a knowledge settled deep within the social texture, which little by little, feeds and incites the growth of new firms. And, notice, it is the same diffused competence which lies beneath the innovation model that Sabel (1982) elaborated very precisely and which has been shown here with reference to the industrial

districts: because it is only a collaboration between thousands of workers and technicians which can explain how a not very clear need may be transformed into a minimizing of costs or into a new product by means of workmeetings and friendly discussions.

If all this is true, if actually the fundamental factor of growth is diffused competence, a further observation is necessary. One cannot but notice, in fact, the very limited relevance of the availability of capital - or, even more directly - of savings in the evolution of these areas. This is not the place to go further into the question, which would take us too far, but it should be observed that, fundamentally, the capital invested in these areas does not represent the alternative to a commodity which one has renounced in order to improve one's future conditions. It is rather an alternative to rest; it is the transformation of the income earned by working a number of hours per year above the average. A model describing this economy should not base its data on the level of employment and consumption and hence deduce the saving. As crucial variables, instead, it should take the number of persons that every family is capable of employing in the family-firm, and the number of working-hours of each person during the day; as data it should take consumption and hence deduce the level of investment: The crucial starting-point, the condition which permits the mobilization of the work of the old and the young, and which is an incentive to longer working-hours, is know-how. The know-how which - alone - is capable of transforming rest into work, and work into capital.

Local Government and Industrial Districts

What role has been played by municipal government in the development of industrial districts in Italy? The answer to this question has important implications, especially with reference to industrial policy. The basic data to take into consideration are probably two. The first datum is that industrial districts are just as frequent in Emilia and Tuscany - where the local authorities are mainly left-wing, controlled by the Italian Communist Party - as in Veneto, where almost all local authorities are controlled by the Christian Democrats. Secondly, it is necessary to point out that, as may be observed from many data, the industrial districts of Emilia are probably the most developed of all, where the rate of development has been highest. However, this primacy should be taken into consideration while remembering that, in many cases, the development in Veneto has also been enormous and striking.

It might be maintained, as Bagnasco and Trigilia have done (1985), that, in practice, no matter what their political ideology may be, the local authorities involved have, above all, sought to create the conditions of consensus around the industrial structure which has been asserting itself from the post-war period until today.

Actually, apart from the usefulness of a mainly sociological and politicological literature as the one quoted, perhaps the vicissitudes of these years may be read in a more articulated way. Even a superficial observation, in fact, will show that generally the red local authorities have been the most efficient ones. The pollution deriving from new industries has been held at a tolerable level in spite of the lack of effective national legislation. And the comparison between Sassuolo, where the ceramic tile factories could have degraded the whole environment substantially, and Vicenza, where only very recently has pollution from the leather industries been brought under control, is certainly in favour of the Emilian Authorities.

Abundant quantity of high-quality public services have been available for the family. Today the availability of places in day-nurseries and kindergartens is at a European level. Obviously, this has favoured the rate of participation.

Urban development has been programmed. Wide and orderly streets - which do not expand as oil spots around the towns - characterize the artisan villages, where the work-sheds of the small firms can be found together with the homes of their owners. Land speculation is under control, preventing the owners of land

from putting obstacles in the way of investments by the firms.

However, one cannot believe that these have been the decisive incentives for a development of this type of productive structure. The development of the industrial districts in Veneto or in the Marche - where the Christian-Democratic authorities have certainly been less efficient - is a significant proof, by now, of the fact that this way of organizing the production process on a territorial basis is strictly connected with basic forces, engrafted into the whole social texture, as those described in the preceding paragraph. These are the forces which, in certain particular conditions - as referred to above - have given raise to the growth of the districts. Probably the more alert local authorities in Emilia have accelerated development. But the main references for an understanding and explanation of what has happened are not the experts of industrial policy, programming incentives for underdeveloped areas, but Hirschman and Braudel.

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POSTFACE

The introductory notes to each of these essays - and the essays themselves - retrace a path of research that covers twenty years. In them the tendency of much of my applied studies can be seen, together with the place they occupy in the academic and political debate that stimulated them. But against the background to this story certain problems stand out, in which personal events go hand in hand with discussions of greater moment.

Like many economists of my generation, my first efforts were addressed to the theory of capital: in particular, I had studied, with assiduity and with pleasure, the early work of Wickcell. I was also fond of Wickcell: by virtue of his intelligence, his intellectual honesty, his pertinacity, and also certain of his obsessions, which bore witness to a lively, jovial character. As a teacher, for many years I gave a course on the classical theory of value and distribution, from Smith to Ricardo, Marx and Sraffa. The early 1970s in Modena, as I said above, saw a goodly number of young economists, in their thirties, who were convinced opponents of the neoclassical paradigm and careful interpreters of Sraffa, whose book could be referred to simply by quoting the appropriate paragraph number (as is the practice among scholars of the Torah). My course went by the name of Political Economy 2. It was supposed to teach the true theory of value and distribution, as opposed to the false one that was taught only on Wickcell's Lessons. So that our students grew up on three main courses: a Keynes strictly of 1936, purged of every IS-LM of Hicksian derivation; Wickcell's Lessons; and my course from Smith to Sraffa. Following which, the special economies: money, development, industrial, and so on. There was also a course on Marx, given by Vianello or Lippi, which offered a more precise idea of Marx than the rather schematic one that derived from the proposal for the analysis of value as given in my course. Armed with these instruments, the students who were to pursue economics (as opposed to business) studies would be in a position - or so we said - to understand rapidly the trick played by the marginalists and the error they had fallen into, in the work of Arrow and Debreu, and in that of Frank Hahn.

There was, in all this, a certain obsession with integrity and a great deal of passion. And, when all is said and done, not too much harm was done to the students, since they also received large doses of information on the Italian econ-

omy, on the trends of other economies and so on. And so it may be that we teachers, rather than our students, were the ones most marked by that period - which was followed by syllabuses of a more reasonable kind.

In this atmosphere where theory clashed with theory, I began to take an interest in applied economics and the small firm. The decision to abandon my studies in the theory of value for other matters was not dictated by any particular plan of research aimed at criticising neoclassical theory in the most effective way. I was simply curious to know what was going on around me, and I wanted to work with the trade unions. Of course, the idea that wages were connected with the then ongoing conflict between unions and employers, rather than with productivity and technological level made for greater understanding. Somehow, I felt more inclined to let the facts speak for themselves. But my suggestions did not derive from Sraffa. Rather from Marx, the Marx who went beyond the theory of value; from my reading and experiences in Sardinia and Cambridge; from my astonishment at the Emilian world around me, so different from the one where I had grown up and spent my first thirty years; and, above all, from political discussion and talking with trade unionists. Home working and decentralisation led to animated discussion involving people, political behaviour, personal success. And if one sought to understand anything, one found there were no data available, no meaningful information to analyze. Or, at least, I was unable to imagine how the available official data could be used to get any sort of evaluation. Information was lacking on any and every subject - unless it were impressions and anecdotes reported as having general value. Nobody knew what were the technical levels, the working conditions, the characters of the firms that exported, nor whether decentralisation was increasing, what stages of production were decentralised, and so forth. On matters as delicate as these the entrepreneurs were scarcely forthcoming. But the workers and technicians were now at last ready to speak freely and often prepared to get hold of documents reserved exclusively for management, and talking to them was the only way to get some light on the problems. The point was, then, to understand what data needed to be acquired in order to discriminate between one interpretation and another; and materially to get hold of those data.

Many others up and down Italy were grappling with the same problem. From all of them the unions requested research and

studies; and in several regions economists and sociologists of left wing sympathy were working on similar problems: Massimo Paci in Ancona, Enrico Pugliese and Augusto Graziani in Naples, Lorenzo Caselli in Genoa, Luigi Frey in Milan and then in Parma, Vittorio Capecchi in Bologna, Giacomo Becattini in Florence. Each brought to the debate his own experience, his personal style of research and choice of theory.

Little by little certain points for argument arose. What had been the role played by events in agriculture, and especially share-cropping, in the growth of the districts? Was it possible to distinguish between various types of decentralisation - one "physiological", and the other "pathological"? Could decentralisation be used in a cyclical way by the large firms in response to demand peaks? Did it represent a structural or a conjunctural element? And many other questions.

As the work went ahead, certain of these points became less interesting. Since they were found to have arisen out of questions that had been wrongly put or were not very meaningful in the first place. Others required investigation that should carry out the necessary measurements and evaluations and indicate the correct solution.

Over the years the debate as a whole dug up useful references and proposals for analysis in literature. For instance, by using Chenery's engineering functions of production, it was possible to study the optimal size of departments. Georgescu-Roegen provided a precise definition of "development". The incremental innovations and technological convergences of Rosenberg suggested a possible way of accounting for innovations in the districts. Marshall indicated "atmosphere" as one of the features of systems of firms, and Hirschman - though working in very different contexts - suggested ways to specify in detail the ways in which the so frequent opportunities of profit were created; the analysis of Penrose was available to explain why firms preferred to grow by increase of turnover rather by hiring more personnel. Williamson proposed transaction costs as a mechanism to account for the different levels of vertical integration. Vera Lutz's theses on small firms required to be refuted. Richardson confirmed the possibility that there might be other ways of allocation, intermediate between the market and the hierarchy. Young and Stigler called attention to the history of the sector and proposed it as a variable capable of explaining the levels of vertical integration. E. A. G. Robinson indicated, among the ways in which an industrial structure

is formed, certain mechanisms that enabled one to explain why districts contained some highly specialised stage firms. The vertically integrated sector of Leontief and the French "filière" invited one to seek for the reasons for the productivity of the district even outside the main sector. One's interest in workers' careers was supported by the work of Osterman. The segmentationists - from Kerr to Piore - suggested that analysis of the labour market might be a key to understanding industrial structure. Wilkinson proposed the notion of "productive system" and argued that different productive systems could compete in the same market. Simon's limited rationality enabled one not to rule out common sense as a rule of behaviour. A. Weber, Loesch and Hoover offered important points to reflect on.

To sum up, the corpus of economic studies provided useful elements of theory, sketches of models to discuss, to adapt, to re-utilize. And, aside from the collecting of new data, a goodly part of the work done in those years consisted in absorbing several of these suggestions and stimuli and ordering them into a composite picture.

In retracing these matters of ordinary day-to-day research, in concluding these notes and comments, and reconsidering how matters stood with my friends and myself in the early 1970s, I cannot help wondering what was the point of my choosing a field other than the neo-classical. Did it influence my studies in applied economics? Did my thinking shrink to an eclecticism without principles? Did I perhaps, as Colletti was writing at the time, "make a bonfire" of the work of the giants upon whose shoulders I had climbed?

In answering these questions I find it very useful to refer to a recent discussion held at the 1984 annual meeting of the American Economic Association, in which Arrow, Solow and some historians debated with others and among themselves what might, hopefully, be the relationship between economics and history. I find these contributions enlightening: the protagonists in the debate speak with authority and, on a closer look, it is possible to argue not dissimilar theses and working hypotheses regarding the relation between economic theory and applied economics.

In the discussion Arrow argues that economic analysis is "a subject like physics, valid at all times". Of course, it can never be applied ready made and just as it is to a concrete situation. But this does not detract from its usefulness, for it yields working hypotheses and probable trends and tendencies. To

applied economics - but Arrow would say: to history - belongs the task of introducing specific, concrete elements that have interfered with, or obscured, the functioning of the general model. On the other hand, Arrow continues, historical analysis may cast doubts - even important ones - on the general, abstract model, and may thus encourage us to modify it.

Solow's position is diametrically opposed to this. He says: I am not prepared to give up the exhaustive study of the implications of particular systems of axioms, even though I must admit that I do not expect impossibility of concluding experiments controlled in all their smallest aspects", and the fact that "all economic activities are enmeshed in a network of institutions, habits, convictions, social behaviours", imply that the "final result of economic analysis will probably be a collection of models conditioned by social events - one could say, by the historical context - and not by a single monolithic model for all seasons".

Rarely, I think, have the neoclassical research scheme and that of the theoreticians of surplus value been so tersely and lucidly described. And it is paradoxical that such clear opposition to Arrow should come from Solow who on more than one occasion has taken his stance in the neoclassical tradition.

What Arrow argues, at bottom, is that neoclassical analysis has at its core a particular ensemble of hypothesis relating to human behaviour and technology. Historically speaking, this analysis came into being, with Menger, Jevons and Walras, around the theory of value and distribution, and the hypotheses at once led to a model of general equilibrium. Thereafter, researchers worked slowly - by the lengthy chains of deduction which Marshall opposed - to construct all the special economics around those hypotheses; from the theory of international trade to the theory of money and growth. Every bit of it rigidly coheres; as the new territory is conquered, no new axioms are added and none of the old ones are redefined. Numerous difficulties are encountered along the way and all are gradually overcome. Two episodes in this process are of special significance: that of the problem of absorbing into the model Keynes's contribution - which carries with it the equilibria of under employment and a determination of interest rate not based on scarcity - and that of Sraffa's work, which shows the logical difficulty of making a single measurement of capital and that, in so doing, prevents sophisticated economists from making use of a whole family of models.

In all cases the model remains closed, prohibited from seeking stimuli

and suggestions outside its axioms and starting hypotheses. Consensus is unanimous on the fact that, by the very way in which the model is constructed - which derives solely from hypothesis about human nature and is thus independent of any historically determined condition - there is no place in it for institutions, traditions, values. And Arrow describes the relations between abstract laws - those "valid for all times" - and applied economics with an instructive analogy, arguing that history - and, I would add, applied economics - stands in relation to economic analysis as geology to physics: since physics and economic analysis are governed by unchangeable laws, whereas geology and applied economics study how those laws actually work, in specifically characterised processes, within unrepeatable historical events.

I do not know if there is any point in trying to give a picture of so compact a model. Looking at it in one way, I see the model as having a pyramid structure, rigidly hierarchic: at the apex stands the theory of value, then come the deductions that lead to applied economics. From another angle, neoclassical analysis looks so compact as to resemble a clean, smooth sphere, such that, penetrating by any radius, one can deduce the rules that govern the construction and logic of the entire edifice. And there can be no doubt, to take an example, that while from the theory of value one can deduce Samuelson's theorem on international trade, one can also proceed on the opposite direction. Or again, neoclassical analysis can be seen as a gigantic crystal, rather like the crystals that form in saturated solution around an initial seed, all equal with one another in all directions.

On the contrary, the economic analysis that refers to theories of surplus value or to classical theories has quite different structures. The Sraffian theme of the theory of value is at once open to the influence of institutions, customs, power relationships, and everything that can be included under these headings. The long chains that run from the theory of value and distribution to applied economics are no longer possible. Keynes must not be reabsorbed by the theory: he simply represents another partial model, explaining other phenomena. The various partial models that account for the working of firms, the formation of an industrial structure, the process of development of a region or of a country, will presumably be, themselves, open models, "limited in their possibilities of application and incomplete in their field of action".

The structure of the discipline, in this case, no longer appears as a compact system but, to reiterate the quotation from Solow, as a "collection of models". Not all these models have the same level of abstractness, nor the same level of generality: for it is certain that Sraffa's model is of a different kind and describes more general relationships than say, a model of the Japanese credit market. All these models are compatible among themselves, but they cannot be deduced one from another. It may be that if one seeks better understanding of the real meaning of this compatibility, one will discover that the idea of scarcity is lacking in all the models proposed: that is, the idea that scarcity determines the rewards of labour and capital. The principle of scarcity can be used solely with reference to non-reproducible goods, like land, or goods that require a long time to be reproduced, as sometimes happens with skilled workers. When all is said and done, I feel that theories of surplus value produce a discipline with an unequal structure: a net with so many meshes, the node of each representing a partial model "conditioned by the events of society".

All this does not greatly differ from what my friends and I were saying to each other in the early 1970s, in our search for a path of research outside neoclassical theory. And at that time it was our custom to resume many of these considerations under the watchword that Garegnani, paraphrasing Marshall, had made his manifesto: proceed along short chains.

And yet, although the main references have not changed, the work of those years contributed towards eliminating some uncertainties and clearing up certain points.

At that time I was perhaps not alone in thinking that applied study - if successfully carried out - might assist towards reinforcing the Sraffian paradigm. It was said: "Now we have a correct scheme of theory, it is only a question of putting flesh and muscle on it, in order to contribute to the growth of an economics that has once again become political economy." To be sure, no reader of Popper can imagine verifying a paradigm. But perhaps it was possible at least to put some spokes in the neoclassical wheel.

Today, unlike then - and resuming Arrow's analogy - I think that only very rarely can the findings of geology create problems for the laws of physics. There are at least two reasons why. The first is that in many cases theoretical proposals alien to neoclassical theory can easily be transferred into the new para-

digm: in this process - which all depends on small betrayals, concealing misunderstandings, the restoration of hypotheses and crucial passages - the new theoretical tool is perfectly adapted to the old machine. One glaring instance of this translation/betrayal has been well studied by Renzo Bianchi, who has shown up the "slight modifications" made by Modigliani to the model of Sylos Labini. More often, it is simply very hard to ascertain whether the difference between the results obtained and those expected is due to errors in the general laws - those "valid at all times" - or to particular constellations of parameters or very loud background noise. Now more than previously, it seems to me that the theory of value can be criticised only if tackled head on. And I think it is worth noting that Sraffa and Garegnani have met with consensus when adducing the incapability of theory to take account of several actors differing among themselves; i.e. when they have remarked how the model works only when the organic composition of capital is constant. Which is, perhaps, the same kind of criticism made by Lippi, when he argues that it is possible to deduce individual behaviours from aggregate data only if all the actors behave in the same way and according to the same time scheme. The one finding and the other show that for the neoclassicists the most serious difficulty is in taking account of the fact that several agents are active in the world: however sedulously they may conform to the rules of equal behaviour, they will be out of step with one another in the timing of their decisions.

At bottom, the idleness of contrasting theory with data is nothing new. My self and others have merely discovered an old rule: that one theory can only be contrasted with another theory, not with facts. Anyone reading Robinson's old introduction to the second volume of her *Collected Papers* can hardly help the sense of traversing familiar ground.

Yet our work of these years also suggests more comforting conclusions, and offers a wealth of opportunities for the growth of non-neoclassical economics which is worth reflecting on. The long series of intellectual debts mentioned above may refer to a marginal area of research, but it shows that in the corpus of economic theory - say, in the textbooks and in the ten leading academic reviews - there are not a few models capable of taking effective account of this or that bit of the world. And I fancy the situation is no different on moving to other sectors of our discipline.

These contributions come from different quarters. Sometimes from authors

who clearly do not fit into the neoclassical paradigm or in whom one hears overtones from other disciplines or whose work is replete with rich and complex cultural influences. I have in mind Young, Schumpeter, Kerr, Bain, Georgescu-Roegen, Simon, Penrose. In other cases the neoclassical background is immediately noticeable, but the eagerness to explain facts, the detailed knowledge of institutional mechanisms, or any other source of inspiration, override the rigidity of theory. Think, for instance, of the Williamson of the costs of transaction or the Stigler of The Division of labor. The phenomenon is not confined to limited or special cases, or to particularly acute or enlightened minds. One might say, maliciously, that several of these results are obtained in spite of the neoclassical grounding: but, as I remarked, I think it is not rare to find useful and effective working hypotheses and schemes of interpretation also in schools and authors who play an important role in the neoclassical area of our discipline. The problem is, of course, to retrieve these partial models for some sensible aim, scraping off the barnacles that they have accumulated and that make them unusable in a different theoretical framework.

I feel that for too long the theories of surplus value have treated these findings and proposals for analysis with condescension. Today, some years after the publication of "Production of Commodities by means of Commodities" it seems to me that the right strategy would be that suitable for a war of position, and I think it must be said outright that these contributions should be put to profitable use, wherever possible and whenever worthwhile, even to the point of including them among the "collection of models" that make up the theory of surplus value. One can, and one must, condemn as futile a great part of the work mentioned by Solow that studies the implications of particular sets of axioms, if its sole value resides in the elegance of its mathematics. But it would be sectarian and foolish to forego work on ideas that may generate effective partial models, and may throw light on one fact or another, merely because these ideas have been thought out in a different area of theory or, indeed, because they have been put forward in a spirit of homage to the reigning academic faction. To do this would be cutting off one's nose to spite one's face; it would be tantamount to deciding (which unfortunately no one thinks of doing) that the short term is one of the neoclassical devices best avoided.

This is the attitude taken by many of those working in Modena over these

last years, whether studying export credits, or the tractor industry, or certain episodes of international trade. And I myself have trodden the same path: at first with much trepidation, then with greater confidence. The results achieved - by me and others engaged in this area of research - have not always been exciting, but they have enabled a step or two forward to be taken. Out of this there emerges, more clearly than hitherto, the need for a theory that will account for vertical integration: Attention has been drawn to the role of know-how, as against the exclusive role all too often assigned to credit availability. It has been emphasized that there is no necessary relation between wage rate and technical level. The geographical closeness to one another of firms has been shown to be important, at times decisive. But above all, I feel, it has been confirmed that production systems can be different, that it is not possible to identify one as more efficient than all the rest, and that the industrial district takes its place, as of right, among production systems that are able to be efficient.

There remains for me to add something - whether in the nature of a caveat or a provocation, I do not know.

I have mentioned above how the events in one particular - and minuscule area of research interwove themselves with events of a more general nature, where the debate revolved around the very structure of the discipline. And also how some of us, including myself, took a decision that was, to say the least, unusual: to share in a research programme that did not tend towards compactness, that went in quest of only a few hypotheses - indeed, as few as possible - to explain each phenomenon. The programme is a very singular one: rather like that of an art historian who eschews a tidy exposition of his subject matter following a coherent thread of interpretation - though obviously strongly characterised by personal choices - and prefers the Renaissance *theatrum mundi* where, following the suggestions of Samuel Quicquelberg, he sets forth the examples of the world in all its variety and diversity: which is to say, a collection of partial models.

Faced with this choice, the least one can do is to ask oneself: is this programme merely a temporary one, awaiting the accumulation of a sufficient number of partial models that will offer the material for a new and different synthesis? Or is this, rather, a stable condition of the discipline of economics? Or should it be argued that the aim of this science is such as to impose a structure that does not deal in compact chains of deduction deriving from a handful of

laws, but rather in collections of juxtaposed models whose sole condition for co-existence resides in their mutual compatibility?

This, too, at the start of the 1970s was the subject of long discussions: when my friends and I found more pleasure in reading Marx, Sraffa and Keynes than Wicksell, Knight and Hicks. And, as far as I can remember how we thought then, I have the impression that we felt this situation to be a temporary one. The thing was to accumulate facts in order to make possible a new and different synthesis. In particular, a synthesis where the Sraffa who determined relative prices was to be associated with the Keynes who determined the quantity produced; where - as I have already mentioned - scarcities played no part, but where the solid block of theory, capable of generating questions and working hypotheses, was once again available.

Today I no longer believe this to be possible. I think that the object of economic theory - which is to say, the behaviour of people - imposes a structure of theory in short chains, where the several facets of tradition, culture, customs, life-styles of contemporary civilisation gradually take their place and play a role. I even think that one cannot talk of "wage rate" without specifying in detail, and one cannot suppose that wages in the United States, in Japan, in Europe, in Egypt, are comparable without taking into account of the different possibilities of dismissal, pensions implied in wages or not, the commitments of entrepreneurs to workers, and so on. Essentially, I believe that over and above the rationality of individuals - which constitutes the foundation of the neoclassical system - there exist numerous and different group rationalities: and that the latter prevail over the former.