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International migration, outsourcing, and Italian industrial districts

Abstract

The international outsourcing of production and the flows of migration are generally analyzed in the literature as independent phenomena. This paper draws attention to some possible interactions between the two. From the point of view of individual firms, both the employment of immigrants and the outsourcing of production can represent useful strategies to curb the costs of labor and satisfy the tight constraints imposed by the international markets. The evidence provided in the paper shows that, while most of the developed economies are increasingly involved in outsourcing activities, many small and medium sized exporting firms of the Italian industrial districts are using low-skilled immigrant labor instead of outsourcing production. For a country as a whole, however, the choice of one or the other strategy can have significantly different implications in terms of international specialization and economic growth. These implications are discussed in a model of growth and international trade. The model's main prediction is that the utilization of the unskilled immigrant labor in the manufacturing sector of the advanced countries tends to drive their specialization towards the low-skilled intensive sectors and to reduce their long-run growth rate.

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1. Introduction

In *A Day Without a Mexican*, a provocative film that has recently come out in the United States, the director Sergio Arau tells the story of what would happen if all the Latin American immigrants of California, about one-third of the state's population, suddenly disappeared. The film describes some of the likely consequences, among which: panic and confusion in families because children, the elderly, and households would remain without care; rubbish all over the streets, because no one would pick up the garbage; hospitals in paralysis, because many of the nursing, cleaning, and service jobs wouldn't be performed; closure of the schools, because a substantial part of the teachers would be missing; the impossibility to have fresh fruit and vegetables on the tables, because no workers willing to harvest the crops could be found. Of course, immigrants, above all those of Latin American origin, currently carry out most of these activities. The film is open to criticism from several viewpoints, including that of political correctness, but the lesson to be learned is undoubtedly interesting: without the low cost labor of immigrants, the local population would have to reduce greatly its consumption of some essential goods and services, or else be willing to pay much higher prices and wages in order to satisfy the same needs. Many of the problems described by Arau regard precisely labor intensive tertiary activities that are hardly tradable in the international markets, or the agricultural sector, which benefits from subsidies or trade protection from the national government.

The consequences of the event would be completely different and certainly less dramatic if it concerned the tradable sectors, whether those of industry or services. If, for example, immigrants suddenly disappeared from some manufacturing sectors, there would presumably be an increase in the imports of the same goods from abroad, at prices not very unlike those paid for the products of national origin.

The story told in the film is a good introduction to a problem that is common to the most advanced economies. The availability of the additional labor supplied by immigrants, and their lower reservation wages compared to those of the native population, give firms the possibility to reduce costs. This option is being used more and more often in the non-tradable services and in agriculture (OECD 2004, p. 56), which are sectors characterized by greater downward wage flexibility and by greater components of irregular work.

In manufacturing and in the tradable services things stand differently. In these cases firms have more options: keeping their production at home and "importing" low-cost immigrant labor or, else, importing goods (final or intermediate)

and transferring a part of their production in countries with low labor costs. The integration of markets, the new information and communication technologies and the emergence of economic systems with low labor costs and high manufacturing potential seem to make the second alternative preferable. This is testified by the increasing amount of foreign direct investments and by the growing role of different forms of international fragmentation of production (Gereffi and Korzeniewicz 1994, Feenstra 1998, Hummels, Ishii, and Yi 2001, Arndt and Kierzkowski 2001, Kleinert 2003). Following Feenstra (1998), in this paper (foreign) outsourcing refers to all internationalization activities that include not only multinationals' imports of goods from their own foreign branches, but also "all imported intermediate or final goods that are used in the production of [a firm in a developed country], or sold under its brand name" (Feenstra 1998, p.36).

The international outsourcing of production and the flows of migration are generally analyzed in the literature as independent phenomena. This paper draws attention to some possible interactions between the two. From the point of view of individual firms, both the employment of immigrant workers and outsourcing can represent useful strategies to reduce the costs of labor and, in this way, to satisfy the tight constraints imposed by the international markets. From the qualitative point of view, the effects of outsourcing can be similar to those of a skill-biased technological change, which translates into a reduced demand for low-skilled labor (Feenstra 1998, Burda 2000). Immigration, instead, acts on the supply side of labor, expanding the unskilled component. In both cases there is a wage reduction for the less-skilled workers, and thus a reduction in the firms' costs (see Borjas 1994, 1999). For a country as a whole, however, the choice of one or the other strategy can have significantly different consequences in terms of international specialization and economic growth. In the first case, there is a progressive improvement of the productive structure and of productivity, together with a deeper specialization in the skilled-labor intensive sectors. In the second case, the increased availability of unskilled immigrant workers can gradually shift the economy's specialization towards the goods produced with relatively more unskilled-labor intensive technologies. In these sectors, however, the less developed countries naturally enjoy a greater comparative advantage. The economy's output mix, therefore, tends to become closer to that of the latter economies without benefiting from their advantages in terms of costs and labor endowments. These changes can negatively affect the overall economy's productive structure and the growth of productivity.

In this general framework, Italy appears to be in a relatively anomalous position. Unlike most advanced countries, it has maintained a strong manufacturing

activity, and industrial production still characterizes the richest provinces of the country. Secondly, while manufactured goods remain a strong component of Italian exports, with respect to its main competitors the country seems to be relatively lagging in the outsourcing activities on an international scale (see Baldone, Sdogati and Tajoli 2002, Berger and Locke 2000). Thirdly, Italy continues to be specialized in mid and low tech sectors where competition is stronger at the global level, and where it is progressively losing ground in worldwide markets (Onida 2004). These features raise some questions about the future of Italian industry, and in particular about its most dynamic component, the so-called industrial districts of small and medium sized firms.

Starting with these considerations, this paper essentially seeks to address the following questions. Is Italy resorting more and more to immigrant labor as an alternative to the international fragmentation of production? If so, is it in order to preserve the traditional specialization of its manufacturing sector? Finally, what may be the implications for Italian industry and for the industrial districts in the mid and long term?

The paper is structured as follows. Making use of different data sources, the first part investigates if and in what measure the recourse to foreign immigration contributes to the survival of the industrial districts. In particular, a simple econometric analysis is used to assess if the industrial districts are attraction poles for the international migration flows. The results of the analysis clearly provide support in this direction, both at the provincial level and, especially, at the level of local labor systems. In general, the empirical data seem to indicate that immigration in Italy, more so than in other countries, is highly concentrated in manufacturing and in the main exporting sectors.

In the second part, a model of growth and international trade is presented that considers the implications of the two options, of either employing immigrant low-skilled workers or importing low-skill intensive intermediate goods from abroad. The model's main prediction is that the utilization of the unskilled immigrant labor in the manufacturing sector of the advanced countries tends to drive their specialization towards the low-skilled intensive sectors and to reduce their long-run growth rate.

The last section summarizes the main results of the paper and concludes.

2. Immigrants and manufacturing employment

Table 1 shows the employment distribution for different sectors of economic activity in the main OECD countries (data 2001). As one can see, Italy presents

a very high percentage of employment in manufacturing, equal to 23% of the total employment in all economic activities. This value considerably exceeds those of the United States, Great Britain, France and, in a less significant extent, Japan. Compared to these countries, the difference is 9, 6.5, 5.4 and 3 percentage points respectively. Only Germany shows a percentage of manufacturing employment slightly above that of Italy (23.4%).

Table 1

According to the empirical evidence reported in the international literature, there has been a growing use of different forms of outsourcing in recent decades. In part as a consequence of this, there has been a continuous reduction of manufacturing's share of employment in the main OECD countries in favor of the tertiary sector, in a manner that is analogous to what happened in the past between industry and agriculture (see ILO 2003). As a consequence, the so-called most industrialized countries are more and more taking shape as the least industrialized countries, with the tertiary sector of predominant importance. The industry that remains tends to be highly innovative and with a high content of research, while the intensive lower-skilled productions are progressively delocalized to emerging countries. The reduction in manufacturing does not seem to have damaged economic growth. On the contrary, it seems that the countries that have proceeded most intensely down the road of tertiarization of their economy have experienced better economic performance. This impression is confirmed by the existence of a strong negative correlation between the manufacturing's share of employment and economic growth, measured by the average GDP growth rate in the 1990-2001 period. Considering the 20 most important Western OECD countries, the simple correlation is -0.67, while the Spearman correlation is -0.72, both significant at the 1% level. Limiting the sample and taking into account only the seven most industrialized countries, the simple correlation is even stronger (-0,86). It is a matter of a correlation, and not a causal link, but the fact that the countries that had the greatest difficulties in the last decade in terms of economic performance (Japan, Italy, and Germany) are also those that present a significant share of their employment in manufacturing deserves attention and leaves numerous questions unanswered.

What the data just cited seem to suggest is that the worries about reducing a country's manufacturing base, as a consequence of the emergence of new competing countries, are in part unjustified. What seems important is not so much how much of the industry remains in a country, but the quality of the industry that remains.

This is an important issue that must be discussed both at the national and at the regional level.

In parallel to the reduction of manufacturing and the increase in outsourcing activities, the international migration flows have constantly increased in recent years. As the OECD data reported in Table 2 show, in a number of advanced countries foreigners represent a significant and growing share of the labor force. This is likely to affect the labor market, both in terms of wages and skill distribution.

What is the average skill-level of the immigrants? Unfortunately, there are no comparable international statistics in this regard. Here, we develop a rough and indirect index of the skill-level by utilizing two different datasets. The first, made available by Barro and Lee, reports the estimates of the population's average years of schooling for 126 countries in the world. The second dataset, supplied by OECD, contains information on immigrants' countries of origin for the main advanced countries (data refer to 2000). Combining this information, we can calculate an indirect index of the immigrants' human capital, assuming that the population that has emigrated from a certain country has the same average level of education as the resident population in that country¹. The index should be considered with some caution, because it is not possible to take into account positive or negative self-selection effects among those who emigrate and those who decide to remain in their own country. However, it is reasonable to assume the existence of a positive correlation between the average education level of a country's population and the portion of the population that emigrates. The results of these estimates are reported in Figure 1. In addition to the immigrants' human capital index, the figure also reports the estimate of the average years of schooling in the receiving country, expressed as a percentage of the United States value (12.5 years).

Table 2

As one can see, in all the countries the level of education estimated for the immigrant population is considerably lower compared to the native population. The

¹For each country of immigration, we computed the weighted average of the years of schooling estimated by Barro and Lee for each country of origin of the migration flows, weighted by the importance of each country in the foreign population (see Guerzoni 2004). This weighted average was then divided by 12.05 (the US value) and multiplied by 100. The resulting index can therefore be read as a percentage of the average level of education of the USA.

differences are particularly significant in Austria, Canada, and the United States, while they are less important in the Southern European countries, like Portugal, Italy, and Spain. Due to their geographic proximity, in these last three countries and in France, there are substantial immigration flows from African countries, generally characterized by relatively low education levels.

It is interesting to note how a negative and statistically significant correlation exists between the share of manufacturing and the estimated index of the immigrants' human capital (simple correlation -0.44). This could suggest that where industry is quantitatively important there is a relatively greater demand for unskilled labor. The firms' demand for labor is naturally only one of the determinants of the quantity and quality of the migration flows. An equally important role is played by the geographic proximity between the countries, their historical-linguistic ties, income differences, and migration policies. A specific analysis of the determinants of the quality of the migration flows, however, lies outside the aims of this paper.

Figure 1

In which activity sectors do immigrants work? In which of these sectors are foreigners over-represented as compared to native employment? What are the implications for the productive structure?

The distribution of immigrants among the different economic activities is conditioned by several factors: the sectoral composition of the economies, the immigrants' skills, the reservation wages of the foreign population compared to those of the native population, and the behavior of entrepreneurs. If the distribution of immigrants' skills were similar to that of the native population's and if there weren't differences in the reservation wages or discrimination by employers, immigrants would tend to distribute themselves among the different economic activities similarly to the local population. In the experience of advanced economies, this does not actually happen. Most of the migration flows into the advanced countries come from countries with low levels of income and education, and thus both the reservation wages and the skills of immigrants are generally lower than those of the native population. As a consequence, immigrants are in general more willing to accept the less skilled, poorly paid, or dangerous jobs (the so-called three-D jobs: dirty, degrading and dangerous, see Reynieri 2001). Thus a greater presence of foreigners can be expected in the sectors where these characteristics are present in a greater degree.

Table 3 illustrates the employment of foreign workers in the main advanced countries compared to the distribution of the overall population among the different sectors, based on a localization index. This index is equal to the ratio between the share of immigrants employed in the specific sector compared to total immigrant employment and the share of national employment in that sector compared to total employment.

Table 3

The index values above one indicate the sectors where the demand of immigrants is predominantly concentrated and where foreigners are over-represented compared to the national average. High sectoral index values, combined with high and increasing shares of immigration in the country, indicate a process of substituting local labor with foreign workers. This occurs in sectors that attract less native labor, either because the working conditions and wages seem unacceptable to native workers, or because there is an insufficient supply of specific skills in the national labor market.

As one can see, in the majority of the countries considered, the highest index numbers can be found in the hotel and restaurant sector, which represents a typical low-skilled employment opportunity for the immigrant workforce and a sector where there are numerous entrepreneurial initiatives conducted by foreigners. Furthermore, foreigners are over-represented in the business services sector. This sector includes a heterogeneous set of activities, like transport and cleaning services, but also more high skilled jobs in the banking and insurance sector and various professional activities where the percentage of foreigners is presumably lower. Moreover, in a number of countries values above one can be found in the building and construction sector, another typical low-skilled sector. Most of these sectors produce goods and services that are not tradable in the international markets. To a growing extent, the employment of immigrants tends to be concentrated in these sectors, and in particular in tertiary activities. According to a recent OECD report on international migrations, *"in the past, in most OECD countries many of the foreign workers were employed in the secondary sector [...]. In recent years, however, a gradual dispersion of foreign employment towards the tertiary sector can be observed [...]."* (OECD 2004, page 56).

In the case of industry, one can see that the countries with the highest index numbers are also those where manufacturing's share of the total national employment is greatest. This is the case of Germany, Italy, and Japan, where,

as seen, manufacturing employment's share of the total presents the highest values among the OECD countries. To some extent, this may suggest that in these countries immigrant workers allow the survival of several productive phases, productions, and sectors that otherwise would be delocalized in countries with lower labor costs. This is probably true for Germany, where the incidence of immigrants in the resident workforce has been high (9.1%) and above the European average, and for Italy, a country where immigration has grown at a particularly fast rate in recent years. In Japan, on the contrary, immigrants' share of the total workforce is equal to just 0.2%, and so the immigrants' impact on manufacturing employment is negligible.

The hypothesis that, in an era of globalization, the growing flows of immigration can contribute towards maintaining particular sectors or phases of manufacturing production within advanced countries seems particularly plausible for Italy. We have seen how in this country the importance of manufacturing is particularly significant, despite the fact that its international specialization is unbalanced in favor of productions with a high intensity of unskilled labor and low research and development. These are precisely the sectors where the competitive advantage of emerging countries is being felt most strongly. The traditional explanation for the competitiveness of the Italian manufacturing sector refers to the strong external economies that characterize the most dynamic part of Italian industry, the industrial districts (see Iapadre 2004). For a long time these economies have been able to counterbalance effectively the wage differentials with emerging countries. In addition, and above all, they have stimulated a widespread incremental innovation process that has allowed the Made in Italy firms to cover segments of the market that are not easily contestable by competing countries. The most recent data on Italian exports in its top specialized sectors, however, clearly demonstrate a progressive weakening of the country's position in the international markets (Onida 2004). In part as a consequence of this, between 1991 and 2001 manufacturing employment in Italy fell by at least 323,000 units, equal to 6% of the total (census data, Murat and Paba 2004). In the industrial districts, on the contrary, the reduction was on the whole negligible (less than 1%), though with substantial differences among the local systems. By and large these systems of production have to some extent maintained their competitive edge. This happened even after the Euro went into effect, which has prevented the recourse to competitive currency devaluations often used in the past to support firms, particularly the small to medium sized firms that operate in the traditional sectors.

As shown in recent literature, in order to take on international competition and curb the costs of production, a growing number of Italian firms are resorting

to forms of international outsourcing, particularly in Eastern European countries (Berger and Locke 2000, Crestanello and Dalla Libera, 2003). It is likely that the importance of these forms of internationalization will increase in the future, allowing the Italian economy to preserve and strengthen the highest quality and value-added productions, even at the price of reducing its industrial base.

This, however, is apparently less of an option for small firms, which constitute the most significant part of the Italian manufacturing sector. These firms have greater difficulties in implementing forms of internationalization aside from simple exports (Taran and Geronimi 2003, Basile and Giunta 2003). As an alternative to outsourcing, small firms seem to make increasing use of immigrant labor in order to contain production costs and maintain traditional specializations. This may have contributed to the good employment performance of the districts.

Two examples.

Arzignano, near Vicenza, represents one of the most important Italian districts for the tanning and working of leather. According to the data from the last census, more than 10,000 workers were employed in this sector in 2001. Compared to 1991, the growth in employment was very strong: 40% (9.4% if compared to 1996). In the same period, employment in the sectors of leather and footwear in Italy fell by 15% and 11%, respectively, presumably due to the strong competition exerted by emerging countries. Arzignano is also a local system where foreign immigrants' share of the total resident population is among the highest: more than 8%, compared to a national average of 2.3% in 2001. In the single municipality of Arzignano the percentage is nearly 10%. These data refer to the foreign population that is recognized by the authorities and possesses a "permit of stay", but to this population should be added a number of irregular and clandestine immigrants who evade controls. Most of these people find work in the small firms of tanning and working leather and they carry out the jobs normally refused by Italian workers because of the low wages and the poor working conditions. These data seem to suggest that the growth and survival of the district depends in a growing manner on the immigration of low-skilled workers from non-EU countries.

Prato, the largest Italian textiles-clothing district, is another case in point. In 2001, this local production system employed more than 41,000 workers. According to the census data, in the decade from 1991-2001 the decrease in employment was rather moderate: -1.9% , while on average the most important districts of the sector lost roughly 20% of their employees. Foreigners' share of the population in 2001 was more than double compared to the national average, for a total of almost 8,500 people, most of whom were Chinese. Prato's employment performance is in open

contrast to the overall drop in employment in Italy's textile and clothing industry, which lost more than 215,000 workers over ten years (-35%). Again in this case, the greater performance demonstrated by Prato is largely attributable to foreign immigration (employees and entrepreneurs), which has contributed to sparing the closure of numerous firms and has presumably favored curbing production costs.

To what extent can these cases be considered the rule? On the whole, is there evidence that foreign workers are over-represented in the industrial districts and, more generally, in the manufacturing sectors subject to international competition?

In order to answer these questions, in what follows a heterogeneous set of data and statistical sources has been utilized. The first set of data relates to the average number of foreign employees, derived from firms' monthly INPS declarations. The reference year is 2001. Data refer to "regular" or legal immigrants, who represent an important subset of the overall number of employed foreign workers. The total number is 280,000 workers, which excludes agricultural workers, household workers, and self-employed workers². With this information, a localization index of foreign employment for region and sector has been constructed, similar to the index used in the international comparison, but with a greater sectoral disaggregation that makes the analysis of the foreigners' distribution among the different industrial sectors possible (Table 4). The index is constructed as follows: the numerator reports foreign employees' share of total foreign employment for each sector in the region. The denominator instead relates overall employment's share of the regional total for each sector, as determined by the data of the last census of economic activities conducted by ISTAT (2001). A value greater than one therefore indicates that in that sector and in that region foreign employment is over-represented compared to the average.

Table 4

In the Table, values above one and above the relative value in the same sector for Italy as a whole are shown in boldface type. First of all, these data confirm what was seen in the international comparison: in Italy immigrants tend to be employed mostly in the industrial productions. The value of the index is above one in

²It is important to note that the share of foreign employment in industry could be underestimated because roughly one-fourth of the total number of foreign workers in the service sector are employed by temporary employment agencies, but in any case most of these workers find employment in industry (see ISTAT 2004).

the column corresponding to the industrial aggregate (1.48), and has a value even higher in the mining sector (1.74). Inside the manufacturing industry, the highest values correspond to the leather-footwear (a quite heterogeneous aggregate that also includes chemistry and plastic materials), metal-working and textiles-clothing sectors. For non-tradable goods, the value of the index is above one in the construction industry, while all other values in the right part of the table, except wholesale and retail trade, hotels and restaurants, are below one.

The North-Central regions in particular are represented: Lombardy's share of Italy's total immigrant employment is 28.6% , Veneto's 20.5%, Emilia's 15.3%, Piedmont's 8%, and Tuscany's 7%. Nearly 80% of regular foreign employees, therefore, are to be found in these regions. If one also considers Trentino and Friuli, the number reaches almost 90%.

In the case of mining and quarrying industries, the index has values above one in all the Central-Northeastern regions, with the exception of Tuscany. In some cases the value exceeds that of the national aggregate, for example in Veneto, Lombardy, and Piedmont. In manufacturing industry, values above one and above the aggregate index are found in the leather-footwear sector in Veneto (2.8), in the metal-working sector in Emilia (1.62), in the textiles and clothing sector in Tuscany (2.88), and in the wood and furniture sector in Marche (1.64) and in Friuli (1.95). Thus, in general, the highest index values inside the manufacturing industry are found in the Central-Northeastern regions of Italy and in the typical sectors of the Made in Italy firms.

For the tertiary sector as a whole, no region considered reached values higher than one.

As has already been mentioned, roughly 90 of foreign employees are found in the Central-Northeastern regions. It may be interesting to consider the regions' shares of foreign employment in industry. The regions which were first industrialized, Piedmont and Lombardy, have shares that are 8% and 25.5%, respectively, of the total foreign employment in industry, while the Veneto's share (27%) is the highest in Italy. Emilia employs 15.7% and Tuscany 7.6% of the foreign employees in manufacturing production. These data clearly demonstrate how Veneto and Emilia together employ a share of immigrants in manufacturing industry that is above the share of the sum of Lombardy and Piedmont (42.7% compared to 33.5%). If one adds Tuscany, Veneto, and Emilia the regions arrive at half of foreign employment in the manufacturing sector productions of our country.

Figure 2

Comparing these data with the information contained in the ICE Report on Foreign Trade (ICE 2004) for regional exports, it clearly emerges how the greatest concentration of immigrant employment in manufacturing in Italy coincides with the sectors of the Made in Italy exports. More specifically, the first export sector in Veneto is that of footwear, leather, and leather products. Emilia exports non-metal mineral products and machinery and mechanical equipment. Tuscany exports textiles-clothing and leather-footwear. Marche chiefly exports footwear, leather, leather products, and furniture. Friuli mainly exports furniture, wood, and wood products. In all these cases, the index values are indicated in boldface type; in these sectors immigrants work in greater proportion not only to the overall number of employees in the sector, but also above the index value for Italy as a whole³.

Another source of great interest for the analysis of foreign employment in Italy is the periodic investigation by INAIL on the flows of new employment for each activity sector according to citizenship (see Caritas 2003). In the first place, it must be noted how the foreign workers' share of the total new employment has been growing at a very intense rate in recent years. In 2000, the share was equal to 8.8% ; in 2003 it almost doubled (16.4%). Looking at the sectoral distribution, it is possible to understand in which activity sectors the employment of foreign workers is growing at a rate above the average (the data, presented in Figure 2, refer to 2002).

First, the hiring of foreigners is clearly over-represented in industry, and thus in internationally tradable goods. This is consistent with what has previously been said. Within manufacturing, the hiring of foreigners is particularly high in the typical Made in Italy exporting sectors: leather and footwear, textiles and clothing, rubber and plastics, wood products and furniture, non-metallic mineral products (ceramic tiles). In these industries, a clear process of substituting Italian labor with foreign, low-skilled workers seems to be in progress. One possible explanation is that, in these sectors, working conditions and wages are to some extent below the reservation wages of Italian workers.

On the other hand, a number of sectors present a lower incidence of foreign

³According to ISTAT's Annual Report, in 2001 "in some manufacturing activities, like the preparation and tanning of leather, and the smelting and coating of metals, foreign workers' share of the workforce is four to seven times their share of total employees. []. The proportions of foreign workers in the activities of cutting, planing, and the treatment of wood equal roughly three times their proportions of the total number of employees." (ISTAT 2003, p. 223).

workers, often much lower, compared to the average. This is true for activities that have a greater demand for skilled labor, like in the energy sector (electricity, gas and water supply), the chemical and oil industry, and the industry of machinery and electrical equipment. In the metal-working sector, it is interesting to note how the hiring of foreigners is above the average in the metal products industry (that also includes basic metal industry), the part that utilizes less-skilled labor, while for the rest of the mechanical sector (machinery and electrical equipment) the hiring level of foreigners is exactly within the average.

Second, and at the other extreme, foreigners are clearly under-represented in the services. This happens particularly in most of the advanced services (financial intermediation, education, healthcare), but also in the public administration, public utilities, and household and personal services. ITC services and professional activities are unfortunately included in the most general sector, which also includes cleaning services, in addition to those related to real estate. The sector appears in the figure as slightly below the average for foreigners' employment, but the realities are presumably divergent in these different divisions.

The hiring of foreigners and the activity sector are clearly correlated with the skill levels required by the firms. A confirmation of this comes from the information supplied periodically by Unioncamere, through the Excelsior system, that regards the professional traits and education level of the workers required by firms for their prospective hirings. Figure 3 presents the percentage of new hired workers in possession of secondary school or post-secondary school qualifications according to sector as anticipated by firms. The data refer to 2003. As can easily be seen, the figure is almost a mirror image of the previous figure (the sectional disaggregation, however, is slightly different). The greatest skill levels are required in the advanced services and in the industries that have the greatest intensity of skilled work, exactly the same sectors where the hiring of foreigners is below average. These are professional activities, ITC services (here considered separately from the less-skilled services to firms), financial intermediation services as well as other business services to firms, services related to education, wholesale and retail trade, the electrical machinery and equipment industries, and the transport industry. Instead, percentages that are lower than the average for workers required to have mid to high levels of schooling are found in all the manufacturing sectors of the Made in Italy firms, and even in construction, operational services for firms (cleaning), and in other household and personal services.

Figure 3

The overall picture appears quite clear: immigrants are generally hired in the sectors of export goods that require lower levels of education and professional training. This correlation, however, does not necessarily mean that the immigrants actually have low levels of education compared to the native population. Cases exist in which the opposite is clearly true. The most obvious example is that of the so-called "caretakers" who come from Eastern Europe, and often have good levels of education and have sometimes completed professional work experiences in the ex-planned economies.

3. Immigration and industrial districts

According to the data reported in Table 5, 58.3 of foreign employees are employed in very small and small firms (up to 50 employees), a share greater than that corresponding to the overall employment (column b). The indexes reported in the third column show the relationship between the hiring of foreigners and overall hirings. The values are appreciably higher than one for the small firms. Hence, small firms seem to hire foreigners in greater proportion than larger firms. This result is consistent with a number of studies (IRES 2002, Bertolini and Paba 2004).

Table 5

Further evidence on the importance of small firms as recipients of immigrant labor can be drawn by looking at the demographic data relative to the 784 local labor systems (LLSs). We find that the percentage of foreigners out of the resident population is on average higher in the LLSs defined by ISTAT as industrial districts (3.31%) compared to the national average (1.95%). Figure 4 shows the districts with a greater incidence of foreign population. In addition to Arzignano and Prato, one can note some of the most well-known Italian districts with different sectoral specializations like Pieve di Soligo, Castel Goffredo, Castiglion dello Stiviere, Montebelluna, Oderzo, Modena, Bassano del Grappa, Conegliano, Palazzolo sull'Oglio, and Lumezzane.

In order to test the industrial districts' importance in attracting flows of foreign immigration, two simple econometric models have been estimated. In the first model the geographical units of reference are the 103 Italian provinces, while in the second we use the more disaggregated data relative to the 784 local labor systems. In the first model, the dependent variable is the share of foreigners on the

resident population (2001 data) and, in another specification, the average yearly migration rates for the 1995-2002 period (see also Murat and Paba 2002). We regress these variables on the per capita GDP of the province, as a proxy for income and work opportunities, and on a district index constructed as the industrial districts' percentage share of employment out of the province's total manufacturing employment (see De Arcangelis and Ferri 2004). To these variables two territorial dummies were added: one that refers to the provinces located in the regions of Central and Northeastern Italy, which due to their quality of life and institutions are assumed to have a possible positive attractive effect on foreign immigration, and another regarding the large metropolitan areas of the country, which are thought to exert an equally attractive effect. More precisely, this is the estimated equation, using the least squares method, for the 103 Italian provinces:

$$FOR01 = \alpha + \beta_1 \log(PCVA96) + \beta_2 DISTRICT91 + \delta_1 dummyCNEAST + \delta_2 dummyMet + \xi \quad (1)$$

where FOR01 represents foreigners' share of the total resident population in 2001, PCVA96 represents the per capita value added of the province in the year 1996, and DISTRICT91 is the district index constructed utilizing the data from the 1991 census.

The results of the equation, reported in Table 6, in addition to demonstrating the great importance of the per capita value added, which alone explains 73% of the variance observed, confirm the role of the district provinces as territories of attraction for foreigners. This role is also confirmed when the dependent variable FOR01 is substituted with the average yearly external (international) migration rates for the 1995-2002 period (heading 4 in the Table). It is interesting to note how in the period 1995-2002, the district provinces, other factors being equal, represent a pole of attraction even for inter-provincial migration flows, as is shown in heading (5) reported in the Table. In this case one also notes how the large metropolitan areas lose a part of their populations to the less congested provinces.

Table 6

The second model (equation 2) is based on the data for the 784 local labor systems (LLSs) identified by ISTAT (with 1991 as reference year). The greater

level of geographical disaggregation allows one to obtain more precise estimates of the districts' importance, given that the districts are defined by ISTAT precisely as specialized local labor systems with a prevalence of small manufacturing firms.

$$\log(FOR01) = \alpha + \beta \log(OPVCVA9601) + \gamma_1 \log(EMPGTW9101) + \gamma_2 \log(DENSITY01) + \delta_1 dum(DISTRICT91) + \delta_2 dumNorthWest + \delta_3 dumNorthEast + \delta_4 dumCenter + \xi \quad (2)$$

As compared to the estimated equation for the provinces, that for the local systems includes two other explanatory variables. The first is the growth in total employment (manufacturing and services) in the 1990s, (EMPGTW9101), that represents an indicator of the economic dynamism of the local system and the job opportunities present in the territory. One expects this variable to exert a positive effect on the flows of foreign immigration. The second variable, the resident population per square kilometer in 2001 (DENSITY01), measures the housing density of the local system. This index of congestion should exert a negative effect on the flows, as it is presumably correlated with the cost of housing. Unlike the equation estimated for the provinces, the districts (DISTRICT91) are not a continuous variable but are indicated as a territorial dummy (199 districts out of 784 LLSs). Finally, three more geographical dummies are added to the equation, in order to capture the attraction effects of the Center-North regions of the country.

The results of the regressions are reported in Table 7. Per capita vale added and employment growth clearly represent attractive factors for foreign immigration, and they account for much of the variance observed. As expected, the district dummy is always positive and statistically significant, confirming the industrial districts' attractive power. The Central and Northern regions of Italy seem also to attract immigration flows, but notice that the positive role of districts remains even when these geographical dummies are added.

Table 7

Contrary to what was expected, finally, the variable regarding housing density presents a positive sign: foreign immigrants seem to go to the most densely populated areas that presumably present greater opportunities but that also have

greater housing costs. A non-linear relationship between housing density and the amount of foreign residents has been estimated. The idea is that the negative effect of the congestion begins to work only on local systems that are particularly densely populated. The estimates seem to confirm this hypothesis. In particular, foreigners tend to avoid the large metropolitan areas with more than 3,000 residents per Km².

Taken together, these results provide some support to the thesis that small firms have greater difficulty than larger ones in the process of outsourcing and internationalization of production activity (Taran and Geronimi 2003, Reynieri 2001). In order to control production costs, these firms probably find easier and cheaper to utilize the growing numbers of immigrants from poor countries. For this option to be effective, it is necessary that the employment of immigrants, who have reservation wages and average education levels below those of native workers, enables the firms to curb wage pressures. But does the employment of foreign workers really affect overall wages? There is some evidence of this in the international literature (see Borjas 1994, 1999), but the evidence regarding Italy is poor. Some signals, however, seem to point in this direction.

According to the Annual ISTAT Report (2003), immigrants employed in several macro-sectors receive wages that are on average below those of the overall population. In addition, from 1999 to 2001, this difference seems to have grown. In 2001, for example, the negative differential between the wages of foreign workers and the average wages of Italians was 24.2% in manufacturing activities, 17.8% in construction, and 16.5% in wholesale and retail trade. The gap is clearly higher in the manufacturing sector, which produces internationally tradable goods. The above differentials may be due to wage discrimination, but to some extent in regular jobs this is hindered by contractual provisions and union controls. A better explanation is the fact that foreign workers are generally employed in the lowest paid, least-skilled jobs, as has been shown by a number of case studies (see, for example, Bertolini and Paba 2004). As the importance of foreign labor within firms grows, it is plausible that there is an overall effect of restraining the wage dynamic at all levels. As the previously cited data from Caritas-Inail demonstrate, the incidence of non-EU workers' hiring on the total hiring by firms is actually fairly high and potentially such as to influence the wages in different sectors⁴. In 2002, for example, foreigners

⁴Their influence can also be such as to influence the composition of the mix of goods produced and exported from the country, that is to say Italy's specialization in international markets. The growth of the non-skilled and low-paid workforce

accounted for 23% of newly hired workers in the leather tanning industry, for 18% in the textile industry, for roughly 17% in the metal, rubber, and wood industries, for 14% in the agroindustrial sector, and for between 12% and 14% in the mechanical and transport industries, and in construction.

Furthermore, it is likely that the employment of irregular immigrant labor, at wages substantially lower than contractual wages, is greater in the small and very small firms that evade fiscal and union controls more easily.

4. The model

The model developed in this paragraph depicts a world economy that is composed of a very large number of small countries that share the same technology, resources and preferences. There is perfect competition at the world level and within each country. There are two final goods, X and Y , and two factors of production, skilled, S , and unskilled labor, L . There is also an intermediate good, Z which is produced only with labor and is employed in the production of the skilled-labor-intensive final good, which is X . Because of learning externalities, the productivity of the skilled workers in sector X increases as sectoral output expands. It is assumed that countries have started production at different moments of time, so their productivity, income and wage levels differ. Three different scenarios are analyzed: autarchy, free trade only in final goods and, finally, trade also in the intermediate good and unskilled-labor migration.

For the first two scenarios the model results are rather straightforward. In autarchy, countries produce both final goods and, for internal use, the intermediate good, and their growth rate depends positively on the share of good X in total output. With free trade in final goods, each country's real growth rate depends on its productive specialization and, specifically, on the weight of good X in production and exports. The opening of trade in intermediates and free labor migration rises some interesting possibilities. The poorest countries are characterized by lower wages and have a relative advantage in the production of the intermediate good. This tends to rise their unskilled-labor wages. At the same time, however, the unskilled workers of these countries now have the option of migrating to the richest economies, where wages are also higher. Symmetrically, the richest countries also face two possibilities: they can import the intermediate good from the developing countries, indirectly experiencing lower costs for the services of the unskilled workers,

tends to increase the country's specialization in goods that are not of high quality, exactly those that end up competing with the economies that have low labor costs.

or they can produce it internally, directly having relatively lower unskilled- labor wages. The latter result follows from the expansion of the unskilled labor force that is determined by immigration from abroad. Therefore, firms and workers in the different countries can rationally take different kinds of decisions. The model shows that the their effects on output and the economies' growth rates differ substantially.

4.1 *Autarchy*

Production. The economy produces two final goods, X and Y , with the following technologies:

$$X = (AS_X)^v + Z^v] \tag{1}$$

$$Y = [(1 - S_X)^v + (1 - L_Z)^v]^{\frac{1}{v}} \sigma \tag{2}$$

S is skilled labor, L is unskilled labor and Z is an intermediate good. The elasticity of substitution in both *CES* functions is assumed to be higher than unity: $\sigma = \frac{1}{1-v} > 1$. Good Z is produced by unskilled workers, with the technology $Z = \alpha L_Z$, $0 < \alpha < 1$, and is entirely utilized in the production of X . The total number of skilled workers, S , is normalized to 1. Unskilled workers, L , are employed in the production of Z and Y , and indirectly also in X ; hence $L = L_X + L_Z$ and $L_Z = L_X$. To simplify matters, it will be provisionally assumed also that $L = 1$; the assumption will be relaxed below, with the analysis of migration. International transport and information costs (not explicitly considered in the model) are supposed to be above a threshold that makes the international trade in Z and the migration of workers uneconomical. Hence, good Z is entirely produced within each country; its price, p_Z , is $p_Z = \frac{w_L}{\alpha}$, with w_L denoting the wage of the unskilled workers. Therefore, despite the model has two productive factors and three goods, with the constant proportion between p_Z and w_L , it is in fact reduced to a 2×2 model.

The productivity of skilled workers in sector X grows as an effect of learning externalities, which are a positive function of the sectoral output. More specifically, $A = X$

$$\frac{\dot{A}}{A} = \left[S_X^v + \left(\frac{Z}{A} \right)^v \right]^{\frac{1}{v}} \quad (3)$$

The economy's first order conditions, as determined by individuals' calculations are:

$$\left(\frac{1 - S_X}{1 - L_Z} \right)^{\frac{1}{\sigma}} = \left(\frac{S_X}{L_Z} \right)^{\frac{1}{\sigma}} \left(\frac{\alpha}{A} \right)^v \quad (4)$$

From (3), and as effect of externalities, the productivity of skilled labor employed in X increases with the level of sectoral output. The production of X is constant returns to scale for individual firms, but increasing returns at the sectoral level. When this is taken into account, the condition of efficiency in production becomes

$$\left(\frac{1 - S_X}{1 - L_Z} \right)^{\frac{1}{\sigma}} = \left(\frac{S_X}{L_Z} \right)^{\frac{1}{\sigma}} \frac{1}{2} \left(\frac{\alpha}{A} \right)^v \quad (4')$$

The price of good X is normalized to unity, so $p_X = 1$ and $p = \frac{p_Y}{p_X}$.

$$p = \left[\frac{X(1 - S_X)}{Y S_X} \right]^{\frac{1}{\sigma}} A^v \quad (5)$$

Figure 5 depicts the production possibilities frontier (PPF) of the economy. As shown in Herbert and Kemp (1969), Panagariya (1981) and Markusen and Melvin (1981, 1984) with increasing returns to scale in one sector and constant returns in the other, the PPF could have any sort of shapes. In the present model, given that the elasticity of substitution is constant in both sectors and that S has an increasing marginal productivity in sector X , the PPF is convex in the proximity of the Y axis, is concave in the proximity of the X axis and has a unique inflection point (Markusen, 1988).

The character of externality of A in the production of good X implies that the condition of optimality in production is not satisfied and that relative prices do not equal the marginal rate of transformation in equilibrium, or, in other words, that the slope of the price line differs from that of the PPF at the production point. The shape of the PPF is given by

$$\frac{dY}{dX} = \left(\frac{Y}{X} \frac{S_x}{1 - S_x} \right)^{\frac{1}{\sigma}} \frac{1}{2} A^{-v} \quad (6)$$

It follows from (5) that

$$p^{-1} = -2 \frac{dY}{dX} \quad (7)$$

i.e. the price line is steeper than the PPF . It may be noted in Figure 5 that, for a given price ratio, there exist either two or no internal production equilibria. Beginning from $X = 0$ and moving along the PPF towards $Y = 0$, the absolute value of the slope of the PPF first decreases, reaches a minimum at the point of inflection and then starts increasing, approaching infinity as output approaches $Y = 0$. Therefore, given condition (7), if a price ratio flatter than twice the slope of the PPF at the inflection point is chosen, no equilibrium will exist. On the other hand, if a price line steeper than 2 times the slope of the PPF at the inflection point is chosen, two internal production equilibria will exist: one in the convex to the origin range and the other in the concave range of the PPF .

Figure 5

The overall equilibrium within a closed economy can be depicted once the demand conditions are specified. Depending on the actual specification of these conditions, there may exist none, one or two of such equilibria. Typically, one may expect two of them, one in the convex and one in the concave range of the PPF . It has been shown (Eaton, Panagariya, 1979) that an equilibrium in the convex to

the origin range of the *PPF* is generally unstable. For this reason, in what follows attention will be focused mainly on the equilibria involving either production in the concave to the origin range of the *PPF* or complete specialization (when trade is considered) in one good.

Demand. Consumers' preferences are given by the *CES* utility function: $U = [\mu C_X^v + (1 - \mu)C_Y^v]^{\frac{1}{v}}$. By assumption, the elasticity of substitution $\sigma_v = \frac{1}{1 - v}$ is higher than unity, $\sigma > 1$.

Equilibrium prices, p , equal the marginal rate of substitution:

$$p = \left(\frac{1 - \mu C_X}{\mu C_Y} \right)^{\frac{1}{\sigma_v}} \quad (8)$$

Equilibrium. In equilibrium, prices equal the marginal rate of substitution and the marginal rate of transformation. From (5) and (8) $\frac{1 - \mu}{\mu} \left(\frac{C_X}{C_Y} \right)^{\frac{1}{\sigma_v}} = \left(\frac{X}{Y} \frac{1 - S_X}{S_X} \right)^{\frac{1}{\sigma}} A^v$.

Given the absence of saving and investment decisions in the economy, $C_X = X$ and $C_Y = Y$. The equilibrium allocation of skilled labor among sectors deriving from this equality is $S_x = \frac{1}{M \left(\frac{X}{Y} \right)^{1 - \frac{\sigma}{\sigma_v}} A^{1 - \sigma} + 1}$, with $M = \left(\frac{1 - \mu}{\mu} \right)$. The fraction of skilled labor employed in the sector is a function of A , of X , and of the other parameters of the economy. From (1) and (3), A and X are positively related. Hence S_X is a positive function of A and the fraction of skilled workers employed in the sector, S_X , tends to one as A goes to infinity.

Given that the long run allocation of workers across sectors is not affected by differences in the elasticities of substitution of the utility and production functions, in what follows it is assumed that $\sigma = \sigma_v$. With this, the equilibrium

equation simplifies to $\frac{1 - \mu}{\mu} = \left(\frac{1 - S_X}{S_X} \right)^{\frac{1}{\sigma}} A^v$ and the above expression becomes

$S_x = \frac{1}{MA^{1 - \sigma} + 1}$: the share of the skilled workers employed in sector X depends on A and the other parameters of the economy. By substituting this equality in (4), the fraction of unskilled workers employed in X turns out to be $L_x = \frac{1}{\left(\frac{1 - \mu}{\mu} \frac{1}{\alpha^v} \right)^{\sigma} + 1}$.

Differently from the share of the skilled workers, the latter is constant and depends only on the economy fixed parameters (L_x varies positively with μ , the 'weight' of good X in consumers' preferences, with α , the productivity of L in the production of Z , and inversely with σ). More generally, as productivity increases in sector X (and, as will be seen below, also wages) the skilled workers originally employed in sector Y move to the latter, while the unskilled workers maintain their initial, equilibrium, productive allocations. In other words, in the long run S_x tends to unity, while L_x remains fixed.

Equation (8) shows that both goods will be produced and that an equilibrium exists, while the latter equality evidences that it is uniquely determined at any given point of time. It depends on the value of A , and on σ and μ . Figure 5 depicts two equilibrium positions, E and E' . As can be clearly seen, the first position E is related to higher utility and welfare levels. The second one is of complete specialization and will not take place in a closed economy.

Dynamics. The positive externalities arising from the utilization of skilled labor in sector X influence the dynamics of the whole economy. From (3), the long run growth rate of productivity in the sector is a function of the proportion of skilled

labor employed in it: as A tends to infinity its growth rate, $\frac{\dot{A}}{A}$, tends to S_x . In turn, from (1), the long-run expansion of output X takes place at the same rate

of the productivity of skilled workers, $\frac{\dot{X}}{X} = \frac{\dot{A}}{A}$, while, the production of good Y does not generate any growth in real terms; its nominal output grows at the same

rate as prices, $\frac{\dot{Y}}{Y} = \frac{\dot{p}}{p}$. From (8), the latter increase at rate, $\frac{\dot{p}}{p} = \frac{1}{\sigma} \frac{\dot{A}}{A}$. Hence the output growth of sector Y is lower than that of sector X , both in real and nominal

terms: $\frac{\dot{Y}}{Y} = \frac{1}{\sigma} \frac{\dot{X}}{X} = \frac{1}{\sigma} \frac{\dot{A}}{A}$. From (5'), the price of the intermediate input follows the

same path: $\frac{\dot{p}_Z}{p_Z} = \frac{1}{\sigma} \frac{\dot{A}}{A}$. The whole economy's growth rate can be easily determined by taking into account that total output, G , is equal to the sum of sectoral outputs,

$G = X + pY$, so its rate of change is $\frac{\dot{G}}{G} = s_1 \frac{\dot{X}}{X} + s_2 \frac{\dot{p}}{p}$, with $s_1 = \frac{X}{G}$ and $s_2 = \frac{pY}{G}$.

The shares s_1 and s_2 , derived from the demand function, are $s_1 = \frac{1}{1 + p^{1-\sigma}}$ and

$s_2 = \frac{p^{1-\sigma}}{1 + p^{1-\sigma}}$. With p growing to infinity, s_1 goes to 1 while s_2 tends to zero; in other terms, the share of good X in total output goes to unity and that of good Y shrinks to zero. Hence, along the transition path, the output growth rate of the economy positively depends on the share of sector X in production, while at the steady state, where $\frac{\dot{G}}{G} = \gamma = \frac{\dot{A}}{A} = S$, it depends solely on the economy's endowment of skilled labor. More generally, at the steady state the economy is characterized by constant but uneven growth rates.

In Figure 6, the growing productivity of the skilled workers that produce good X determines a constant, unbalanced, rightward shift of the *PPF* and of its intersection with the X axis. This, as depicted in the Figure, implies that economies that have identical technologies and factor endowments but have started production at different times in the past will have different *PPFs*.

Figure 6

4.2. Trade

In what follows the opening to trade is analyzed firstly under the assumption of no trade in intermediates and no labor migration and secondly of free movements of unskilled labor and trade in intermediates. It is assumed that within each skill category, natives and immigrants are perfect substitutes.

Free trade in final goods

The world market has a very large number, $i = 1, \dots, N$, of small, competitive, countries that produce one or both goods. All countries have the same total endowments of S and L , which are both equal to unity.

The comparative advantage of each country in the production of any of the two goods depends on the internal relative prices compared to the world terms of trade, $p_i \leq p^*$, and is determined when countries open to trade. Countries that have internal relative prices that are above the world terms of trade, $p_i > p^*$ will specialize in good X , while the remaining countries will specialize in Y . In what follows $m < N$ will indicate the number of countries producing X while $N - m$ will denominate the number of countries completely specialized in the production of Y .

The world price, p^* , can be read directly from world demand function, (5); it is $p^* = \left(\frac{1 - \mu \bar{X}}{\mu \bar{Y}} \right)^{\frac{1}{\sigma}}$; the superscript '-' indicates average world levels in the production of each good. Taking into account that the first group of countries will also produce some Y , the average world output of each good is $\bar{X} = \frac{\sum_{j=1}^m X_j}{m}$, $\bar{A} = \frac{\sum_{j=1}^m A_j}{m}$ and $\bar{Y} = \frac{\sum_{i=1}^N Y_i}{N}$ ($j = 1 \dots m, i = 1 \dots, m, \dots, N$,). From (5) and (7)

it follows that $p_i \leq p^*$ if $\frac{\left(\frac{A_j S_{jX}}{\alpha L_{jX}} \right)^v}{\left(\frac{1 - S_{jX}}{1 - L_{jX}} \right)^{+1}} \leq \frac{\left(\frac{\bar{A} \bar{S}_X}{\alpha \bar{L}_X} \right)^v}{\left(\frac{1 - \bar{S}_X}{1 - \bar{L}_X} \right)^{+1}}$. Considering that, as seen

above L_{jX} is fixed in each country, $L_X = \bar{L}_X$, hence the above inequality shows that the comparative advantage of countries directly and indirectly (through S_X) depends on the internal level of A as compared to the international average level. Hence, the countries having a higher level of productivity in the production of good X relatively to the world average will specialize in its production.

Figure 7 depicts the case of two countries that differ in the shapes of their *PPFs*. The less developed economy (the one that started production later in time) specializes in the production of good Y at point E' and consumes at C' , while the more developed produces both goods at E , exports X and consumes at C . The income and welfare level of the more developed economy is clearly higher.

Figure 7

This relative advantage of countries specialized in good X grows in time with production. Hence, the growth rate of country i producing both goods X and Y (relatively specialized in X) will be $\gamma_{iXY} = s_{i1} \frac{\dot{X}_j}{X_j} + s_{i2} \frac{\dot{p}^*}{p^*}$. In the long run, as

$A_j \rightarrow \infty$ the growth rate will be equal to $\frac{\dot{A}_j}{A_j} = S_{jX} = 1$. On the other hand, the growth rate of countries specialized in the production of good Y will be zero in real terms and equal to the growth rate of the terms of trade in nominal terms: $\frac{\dot{Y}_i}{Y_i} = \frac{\dot{p}^*}{p^*}$. In turn, the latter can be read from the world demand function, and in the long

run are equal to $\frac{1}{\sigma} \frac{\dot{X}}{X}$. Therefore countries specialized in the production of good Y grow at permanently lower rates than the other countries, both in real and nominal terms. The producers of good X will not have incentives to switch to the production of Y , even with their countries' terms of trade worsening with time. A switching would take place if the terms of trade deteriorated faster than the output growth rate, but this is excluded by the assumption of $\sigma > 1$.

In sum, with trade in final goods but not in intermediates and no factors' mobility, each small country specializes in one of the two final goods, factors' prices are not equalized and incomes grow at constant but different rates. As in Lucas (1988), countries that specialize in good Y can experience dynamic losses deriving from trade.

Trade in intermediate goods and migration

It is assumed that migration can take place only from one country to the nearest one in terms of income. This assumption ensures that countries remain small and price takers. A representative country can thus be analyzed without needing to take into account the effects of its production on the world terms of trade.

The developing countries now relatively specialize in the intermediate good because its internal price will be lower than the international price, $p_Z < p_Z^* = \frac{p^*}{\alpha} \frac{\partial \bar{Y}}{\partial \bar{L}}$. Their internal wage level w_L was lower than αp_Z^* , but once good Z is produced and exported internal wages increase to the level given by the external intermediate good price $w_L = \alpha p_Z^*$ and good Y is produced to the point where $\frac{\partial Y}{\partial L} = \alpha \frac{p_Z^*}{p^*}$.

On the other hand, in the absence of migration, the rich countries would specialize in the production of X and import both Z and Y . The share of sector X in the economy, and hence the specialization in good X would be higher than in the previous scenario, of trade only in final goods.

The consideration of migration introduces a slight modification in the notation. In what follows, the number of unskilled workers present in the country will be denoted by L , which corresponds both natives and immigrants.

The workers' mobility introduces a degree of freedom. The developed country can either import Z or produce it internally; in the latter case the lower level of unskilled labor wages required to meet the new terms of trade can be fulfilled by employing the extra labor force provided by immigrant workers.

As Z is produced with constant returns to scale, free trade in Z leads to the standard gains from trade: it is welfare improving for both the countries that export and that import it. Equality between price and marginal cost in sector Z gives $p_{iZ} = \frac{w_i}{\alpha}$ and $p_{jZ} = \frac{w_j}{\alpha}$. If, under no-trade conditions $p_{jZ} > p_{iZ}$ because country j has a lower level of development and income, then $w_j < w_i$. With free trade the terms take a value such that $p_{jZ} > p_Z^* > p_{iZ}$, so the usual gains from trade follow.

The world terms of trade, as determined above, grow in time. More specifically, from the demand function, the rate of change of p^* depends on the growth rate of X^* , $\frac{\dot{p}^*}{p^*} = \frac{1}{\sigma} \frac{\dot{X}^*}{X^*}$, and $\frac{\dot{p}_Z^*}{p_Z^*} = \frac{1}{\sigma} \frac{\dot{X}^*}{X^*}$, while X^* in the long run depends on the average quantity of skilled workers employed in the production of good X in the world: $\frac{\sum_{j=1}^m S_j}{m}$, ($j = 1, \dots, m$). Each small country will experience a different evolution of its internal relative costs as its internal allocation of skilled labor among the two sectors is above or below the world average. Countries relatively specialized in the production of good X , will have productivity levels above average world levels and, as a consequence, also higher wages and income.

In sum, a competitive developed country can maintain the production of Z within its boundaries by employing the extra labor force provided by immigration. The increased number of unskilled workers exerts the downward pressure on wages that is needed to satisfy the external constraint. However, the variation of the proportions of the economy's labor endowments, with a smaller share of skilled workers, determines a shift of specialization towards the unskilled labor-intensive goods, Z and Y . This, in turn, is accompanied by a diminution of the economy's real growth rate. Depending on the magnitude of the shift, this decline in growth can be temporary or permanent. As shown in Figure 8, an increased production of good Y can determine a complete specialization in this sector, and hence a permanent diminution of the economy's steady state growth rate. In the Figure, the production equilibrium prior to the immigration of unskilled workers is E_0 ; after the expansion of their share of the labor force it shifts to E_1 . Static consumption (C) and welfare do not vary (they can even increase, because of the static gains from trade), but the long run real growth rate decreases to zero.

Figure 8

Differently, if the country imports Z from abroad, its specialization in good X increases together with its short-run growth rate. The steady state growth rate remains unchanged.

5. Summary and conclusions

This paper has considered immigration and outsourcing as two alternative strategies pursued by the firms of advanced countries as a reaction to the tough competitive conditions of the global markets and the increased productive capacities of the emerging countries.

Both these strategies allow firms to curb production costs. The integration of markets and the new information and communication technologies have made increasingly attractive the delocalization of the most labor-intensive and standardized phases of production from the rich countries to economies with low labor costs and good productive performances. This goes in parallel with the developed countries' reduction of the share of manufacturing and their increased specialization in productions that are relatively more intensive in skilled labor and in research and development, resources with which these countries are relatively better endowed. For some developed countries, however, this process of adaptation to global competition has been slower and more difficult. One way of facing the new international scenario, without undergoing the deep internal restructuring that it entails, is the recourse to immigrant workers. Immigrants generally have lower reservation wages than the native population and are more willing to accept low-skilled jobs.

The empirical data available regarding these phenomena on the international level are still scarce and incomplete. It has been seen in this paper, however, that for the main industrialized countries the incidence of foreign labor in the manufacturing sectors, and generally in the tradable sectors, is falling, while it is increasing in various non-tradable sectors. As a rule, in the latter sectors the foreigners are over-represented as compared to the native population. According to the available data and statistics, the countries where the share of manufacturing is declining more rapidly in terms of employment are also those that resort most extensively to outsourcing. In addition, as shown in this paper, the share of the manufacturing sector and the economic growth rate are negatively correlated. From this perspective, the fears about the negative consequences of deindustrialization in the advanced economies seem to be less serious. What seems most important is the quality of the industry that remains in the developed countries, not the quantity of manufacturing employment per se. This issue should be analyzed in greater depth, and this is a subject for our future research.

Using the model of growth, international trade and migrations presented in this paper, some interrelations between the fragmentation of production and the immigration of low-skilled workers have been analyzed. It has been seen that firms can rationally choose between two options - importing intermediate, low-skilled intensive goods or employing the extra labor force provided by immigration. In both cases the constraint represented by the international terms of trade is satisfied. At the same time, the workers of the less developed countries can choose between two possibilities - migrating to the richer economies or producing the intermediate goods at home. In both cases their relative wages increase. The overall effects of the two alternatives, however, are significantly different. In particular, the outsourcing of production deepens the comparative advantage of the developed countries in the skill-intensive productions and enhances their growth rates, while the use of the unskilled immigrant labor force drives the specialization pattern towards that of the developing countries, slowing growth in the long run.

In the real world, every country adopts a mix of the two strategies, but its relative position in the global markets is ultimately affected by the prevalence of one or the other. In this general framework, Italy seems to be following the option of reducing costs by resorting to the immigrant labor force. The delocalization of production, though increasing, seems to proceed at a slower pace than in other advanced countries. A possible explanation for this, and for the weakness of the Italian firms in the global markets, is the composition of the country's industrial structure, its strong component of small and medium sized firms, and the specialization in the production of traditional goods. For these firms, that were not "born global", the strain of adapting to new markets can prove to be very challenging.

In this paper it has been seen that the incidence of the hiring of immigrant workers in the Italian manufacturing sectors is higher than the average of the advanced countries, and that it is lower in the tertiary sector. Most of this new employment is concentrated in the small and medium sized firms that are located in the regions and provinces of the industrial districts, where the goods of the Made in Italy, which constitute the most substantial part of Italian exports, are produced. Therefore, the prices of the Italian exports are to some extent prevented from increasing and many productions, that otherwise would be abandoned or decentralized abroad, are kept alive thanks to the labor services of the immigrant labor force. The steady fall in the Italian share of the worldwide exports that began in the second half of the 90s, however, casts some doubts on the effectiveness of this strategy.

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Tab. 1 - Share of employment by selected OECD country and 1-digit activity sector

ISIC-Rev.3, 1990		Year	Agriculture, hunting and forestry	Fishing	Mining and quarrying	Manufacturing	Electricity, gas and water supply	Construction	Wholesale and retail trade, repair	Hotels and restaurants	Transport, storage and communications	Financial intermediation	Real estate, renting and business activities	Advanced services	Public administration and defence	Education	Health and social work	Other community, social and personal services activities	Other services	TOTAL
			A	B	C	D	E	F	G	H	I	J	K	J + K	L	M	N	O		
Australia	2001		4,7	0,2	0,8	12,0	0,8	7,4	19,7	5,0	6,5	3,9	11,8	15,7	5,3	7,2	9,7	5,0	0,0	100
Austria	2001		5,7		0,3	19,8	0,8	9,0	16,0	5,5	6,8	3,5	7,8	11,3	5,9	5,9	8,3	4,1	0,6	100
Belgium	1999		2,2		0,1	17,3	0,7	6,6	14,2	3,1	6,6	3,3	8,6	11,9	6,9	8,0	10,7	4,3	7,4	100
Canada	2001		2,7	0,2	1,2	15,1	0,8	5,6	17,6	6,5	7,7	4,2	11,8	16,0	5,1	6,4	10,2	4,5	0,4	100
Denmark	2001		3,2	0,1	0,1	18,1	0,5	6,7	14,0	2,3	6,8	3,1	9,5	12,6	5,0	7,5	17,9	4,7	0,5	100
Finland	2001		5,6		0,1	20,0	0,9	6,2	11,8	3,4	7,4	2,1	10,7	12,8	4,4	7,0	14,5	5,4	0,5	100
France	2001		1,5	0,1	0,2	17,6	0,9	5,6	13,1	3,3	7,0	3,1	12,8	15,9	10,6	7,7	9,9	4,6	2,0	100
Germany	2001		2,6		0,4	23,4	0,8	7,9	14,2	3,3	5,5	4,1	8,9	13,0	7,4	5,3	10,2	5,4	0,6	100
Ireland	2001		6,8	0,2	0,4	17,4	0,7	10,5	14,5	6,1	6,5	4,0	8,8	12,8	4,3	6,0	8,3	4,5	1,0	100
Israel	2002		2,0	16,5	0,8	5,2	13,6	4,1	6,4	3,3	12,1	5,9	12,6	18,5	10,2	4,8	1,5	0,1	0,9	100
Italy	2001		5,1	0,2	0,3	23,0	0,8	8,0	16,0	4,1	5,5	3,1	7,3	10,4	7,8	7,1	6,2	4,4	1,1	100
Japan	2001		4,9	0,1		20,0	0,5	9,9	23,0		6,3	9,8	9,8		24,8				0,7	100
Korea, Republic of	2001		9,9	0,4	0,1	19,7	0,3	7,4	18,1	9,1	6,2	3,4	7,1	10,5	3,2	5,6	2,1	6,3	1,1	100
Netherlands	2001		2,9		0,1	14,2	0,4	6,5	16,1	3,7	6,2	3,9	12,1	16,0	6,4	6,1	14,4	4,5	2,5	100
New Zealand	2001		8,9	0,2	0,2	15,8	0,6	6,2	16,4	5,2	6,2	2,9	9,9	12,8	5,1	7,5	8,7	5,7	0,5	100
Norway	2001		3,3	0,8	1,6	13,0	0,8	6,9	12,6	3,0	7,7	2,2	10,2	12,4	6,0	8,6	18,9	4,3	0,1	100
Portugal	2001		12,3	0,4	0,3	21,8	0,7	11,7	15,2	5,1	3,9	1,7	4,5	6,2	5,6	5,7	5,1	2,9	3,1	100
Spain	2001		6,0	0,4	0,4	19,0	0,6	11,7	16,1	6,1	6,1	2,5	7,8	10,3	5,8	5,6	5,4	3,9	2,6	100
United Kingdom	2001		1,3	0,1	0,4	16,5	0,7	7,3	15,1	4,2	7,1	4,4	11,4	15,8	6,3	8,0	11,1	5,3	0,8	100
United States	2001		2,4		0,4	14,0	0,8	7,1	21,6		5,8	12,3	12,3		35,4				0,2	100

Source: ILO

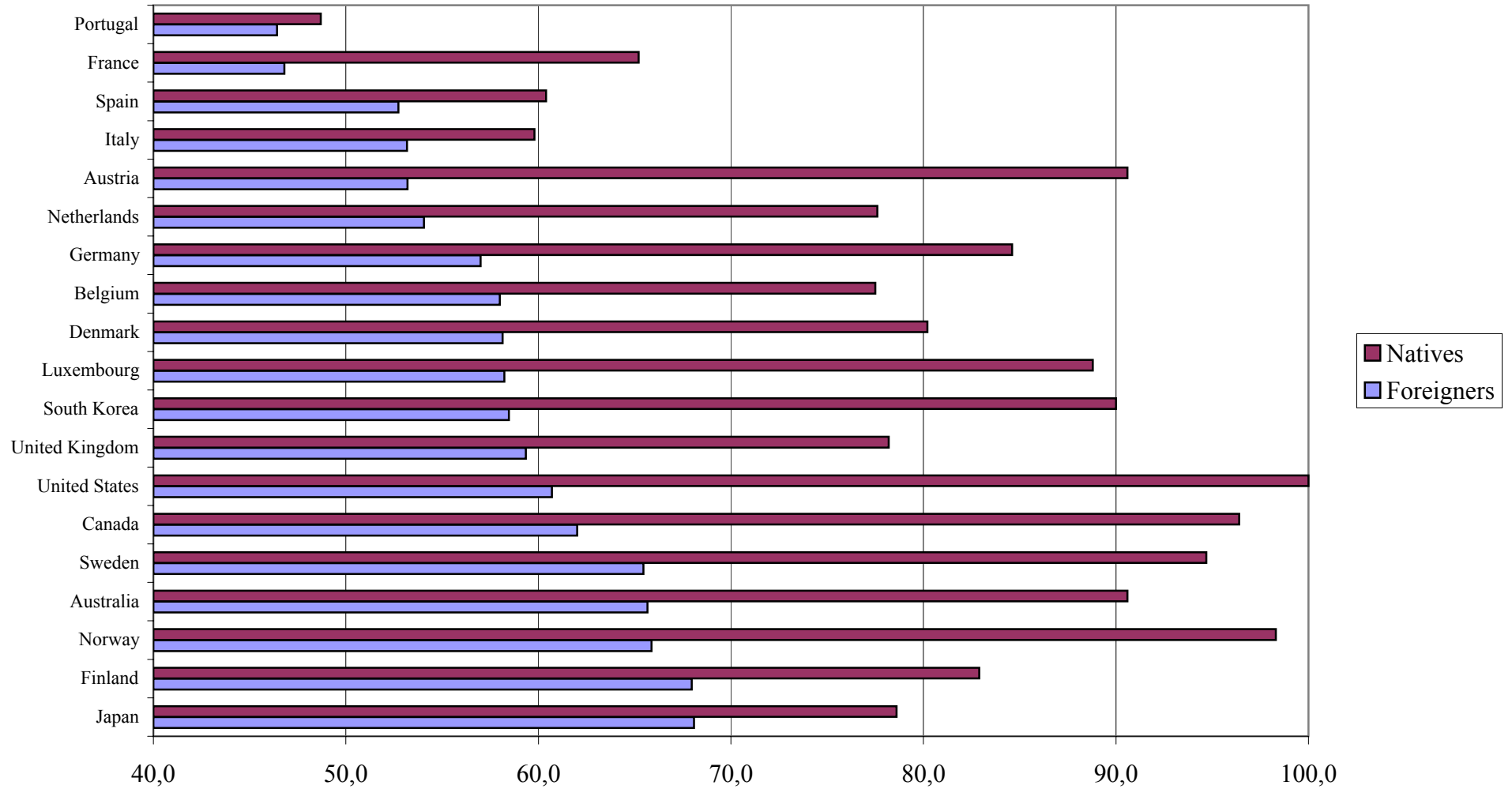
**Tab. 2 - Stocks of foreign and foreign-born labor force
in selected OECD countries (% of total labor force)**

	1992	1996	2001
Australia	n.a.	24,6	24,2
Austria	9,1	10,0	11,0
Belgium	7,8	8,6	8,9 (a)
Canada	n.a.	19,2	19,9
Finland	n.a.	n.a.	1,7
France	6,0	6,3	6,2
Germany	n.a.	8,9 (b)	9,1
Ireland	3,0	3,5	4,6
Italy	1,4	2,6	3,8
Japan	0,1	0,1	0,2
Netherlands	3,5	3,1	3,2 (c)
Norway	2,3	2,6	4,9 (d)
Spain	0,9	1,0	3,4
United Kingdom	3,6	3,3	4,4
United States	n.a.	10,7	13,9

(a): 1999, (b): 1997, (c): 1998, (d): 2000.

Source: OECD (2004)

Fig. 1 - Human capital index for the natives and the stock of foreign population in selected OECD countries (USA=100). Year 2000.



**Tab. 3 - Share of employment of foreigners over share of national employment by sector and country
(years 2001-2002)**

ATECO Classification	Agriculture and fishing	Mining, manufacturing and energy	Construction	Wholesale and retail trade	Hotels and restaurants	Public administration and defence	Education	Health and other community services	Business services
	A + B	C+D+E	F	G	H	L	M	N+O	I+J+K
Australia	0,41	1,29	0,99	0,86	1,10	0,66	0,86	0,70	1,23
Austria	0,19	1,17	1,50	0,95	2,05	0,20	0,36	0,51	1,34
Belgium	0,41	1,18	1,36	1,13	2,55	1,20	0,54	0,53	1,26
Canada	0,62	1,12	0,84	0,81	1,14	0,76	0,89	0,64	1,40
Finland	0,00	0,73	1,26	1,23	3,24	0,00	1,54	0,58	1,35
France	2,00	0,92	3,13	0,86	2,21	0,25	0,42	0,35	1,13
Germany	0,46	1,33	1,03	0,91	3,42	0,31	0,51	0,45	1,16
Ireland	0,46	0,93	0,66	0,70	2,26	0,00	0,90	0,80	1,56
Italy*	n.a.	1,79	2,21	1,70**		n.a.	n.a.	n.a.	n.a.
Japan	0,08	2,99	0,20	0,40					1,66
Netherlands	1,28	1,46	0,72	0,96	2,16	0,55	0,67	0,62	1,24
Norway	0,00	1,05	0,88	0,99	2,43	0,00	1,10	0,92	1,15
Spain	1,34	0,56	1,35	0,68	2,70	0,09	0,57	0,20	1,02
United Kingdom	0,00	0,68	0,60	0,79	2,62	0,65	0,96	0,85	1,45
United States	1,33	1,13	1,15	1,41		0,52			1,15

Two highest values in bold.

* : estimates based on INPS and ISTAT data for 2001. Only employees.

** : data include transport and communication services.

Source: calculations from OECD (2004) and ILO (2003) data.

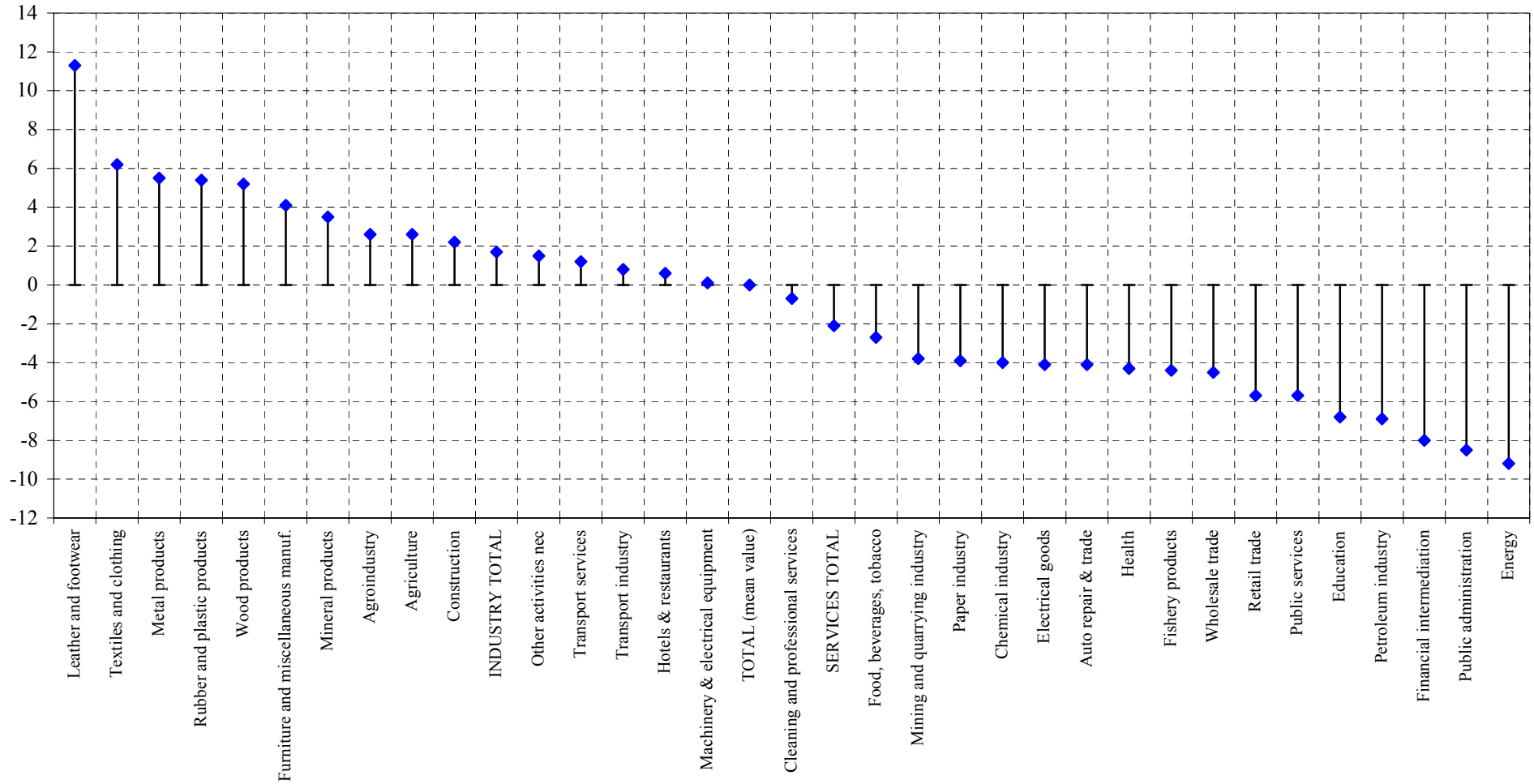
Tab. 4 - Share of employment of foreigners over share of national employment by sector and region (year 2001)

	Mining and quarrying industry	Food, beverages & tobacco	Wood products and furniture	Basic metals, metal products, machinery and electrical equipment, transport industries	Textile and clothing	Leather, footwear, chemical products, rubber and plastic products	Paper products, printing and publishing	Building and construction	Transport and communication services	Financial intermediation	Wholesale and retail trade, hotels and restaurants	Other services	TOTAL	INDUSTRY TOTAL	SERVICES TOTAL	Share on total foreigners employed	Share on total foreigners employed in manufacturing
PIEMONTE	1,99	1,09	1,19	1,32	1,29	1,18	0,52	1,95	0,86	0,00	1,17	0,06	1,00	1,26	0,64	7,9	8,0
VALLE D'AOSTA	1,94	1,76	0,30	0,76	0,91	0,58	0,34	1,84	0,37	0,07	1,27	0,10	1,00	0,90	0,74	0,2	0,0
LOMBARDIA	1,79	0,93	0,75	1,28	1,05	1,12	0,42	1,16	1,00	0,03	1,71	0,08	1,00	1,13	0,88	28,6	25,5
LIGURIA	2,05	0,71	1,23	0,78	1,07	0,59	0,22	2,94	0,20	0,01	1,44	0,16	1,00	0,84	0,75	1,1	0,4
TRENTINO A. A.	2,00	1,07	0,70	0,96	1,29	1,22	0,39	0,95	0,97	0,00	1,54	0,06	1,00	1,01	1,01	4,2	2,0
FRIULI V. G.	1,63	0,57	1,95	1,42	2,06	1,24	0,44	1,55	0,75	0,01	0,98	0,07	1,00	1,47	0,59	4,3	4,8
VENETO	1,91	0,66	1,12	1,53	1,23	2,80	0,61	1,25	0,93	0,00	0,71	0,10	1,00	1,51	0,50	20,5	27,0
EMILIA R.	1,45	0,87	1,09	1,62	1,23	1,44	0,64	1,20	0,93	0,00	1,16	0,09	1,00	1,38	0,70	15,3	15,7
TOSCANA	1,00	0,92	0,68	1,25	2,88	1,58	0,43	1,78	0,52	0,01	0,92	0,08	1,00	1,51	0,55	6,9	7,6
MARCHE	2,22	0,63	1,64	1,53	0,86	1,93	0,65	1,52	0,52	0,00	0,60	0,08	1,00	1,51	0,40	3,9	5,5
UMBRIA	1,69	0,63	0,98	1,37	0,85	0,86	0,30	3,05	1,05	0,01	0,66	0,06	1,00	1,09	0,48	1,5	1,0
LAZIO	1,37	1,53	1,04	0,75	1,21	0,38	0,31	1,72	0,30	0,02	2,24	0,06	1,00	0,83	0,94	3,5	0,9
ABRUZZO	1,21	0,93	0,93	0,86	2,06	0,93	0,45	1,65	1,17	0,00	0,97	0,42	1,00	1,09	0,78	0,8	0,6
MOLISE	2,05	1,22	0,00	1,21	1,68	0,00	0,00	1,39	0,40	0,00	1,06	0,58	1,00	1,16	0,78	0,0	0,0
CAMPANIA	0,55	0,89	0,38	0,61	12,72	0,56	0,34	0,76	0,36	0,00	1,21	0,03	1,00	1,92	0,66	0,5	0,6
PUGLIA	2,12	1,53	1,70	1,19	1,19	1,72	0,84	1,07	0,47	0,04	1,35	0,06	1,00	1,41	0,78	0,3	0,2
BASILICATA	0,56	0,73	0,35	2,25	0,96	0,28	0,00	1,62	0,75	2,54	0,73	0,00	1,00	1,30	0,61	0,0	0,0
CALABRIA	1,53	1,99	1,54	1,72	1,60	0,90	0,43	1,30	1,01	0,10	1,14	0,04	1,00	1,61	0,78	0,1	0,1
SICILIA	1,07	1,18	1,04	1,59	0,89	0,98	0,83	0,66	0,38	0,08	1,65	0,17	1,00	1,25	1,00	0,4	0,2
SARDEGNA	1,61	0,49	1,73	0,84	1,10	0,51	1,52	0,77	0,54	0,00	1,80	0,04	1,00	0,99	1,05	0,1	0,0
ITALY	1,74	0,84	1,33	1,59	1,57	1,83	0,55	1,29	0,75	0,01	1,15	0,08	1,00	1,48	0,67	100,0	100,0

Note: values higher than national average in bold

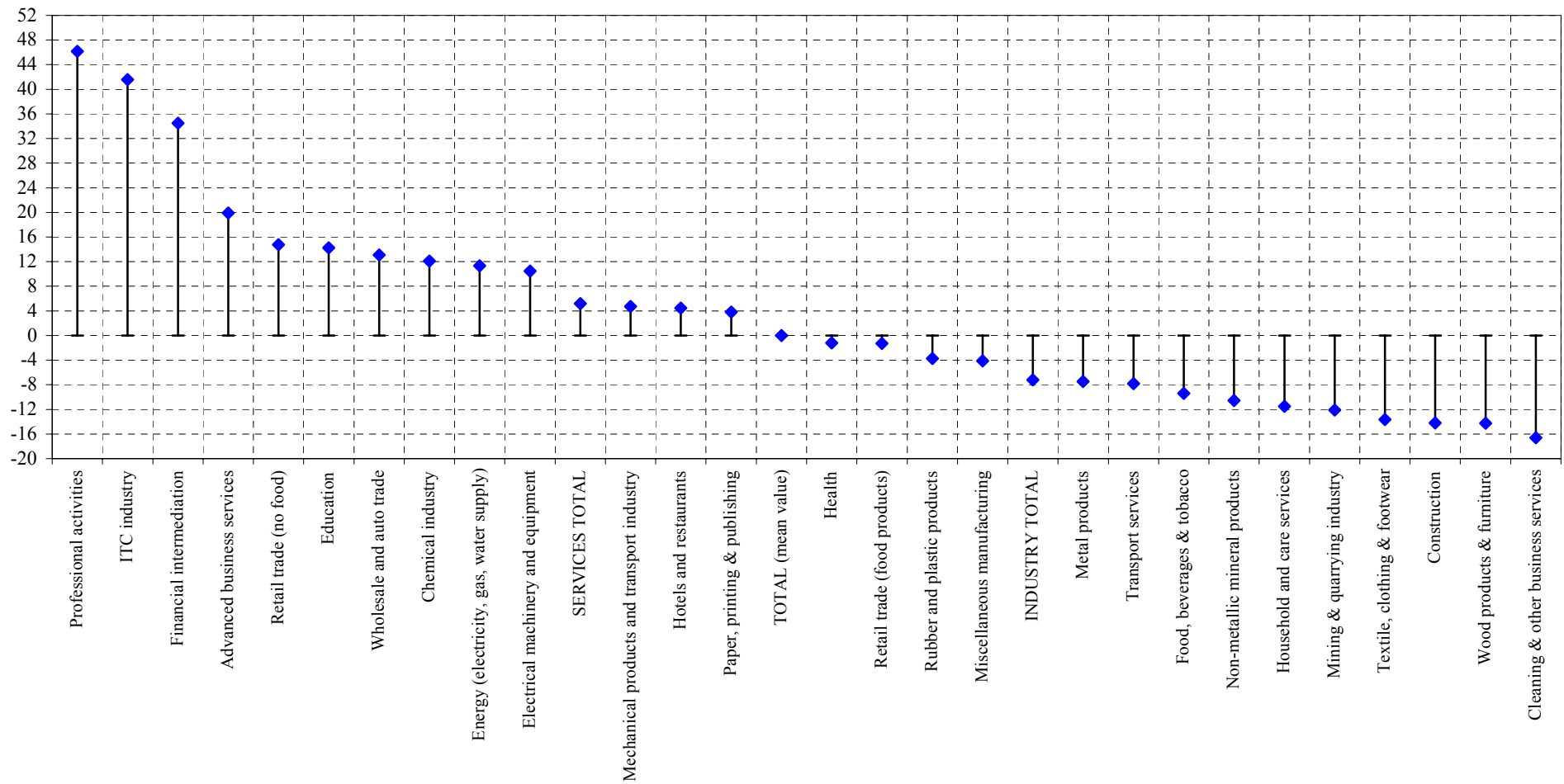
Source: calculations from INPS data and ISTAT Census 2001 data

**Fig. 2 - Hirings: share of foreigners by sector of activity. Difference from the mean value (= 11,5%).
Year 2002.**



Source: calculations from Caritas-Inail data

**Fig. 3 - Prospective hirings: share of employees with secondary or tertiary education by sector of activity.
Difference from the mean value (= 26,6%). Year 2003.**



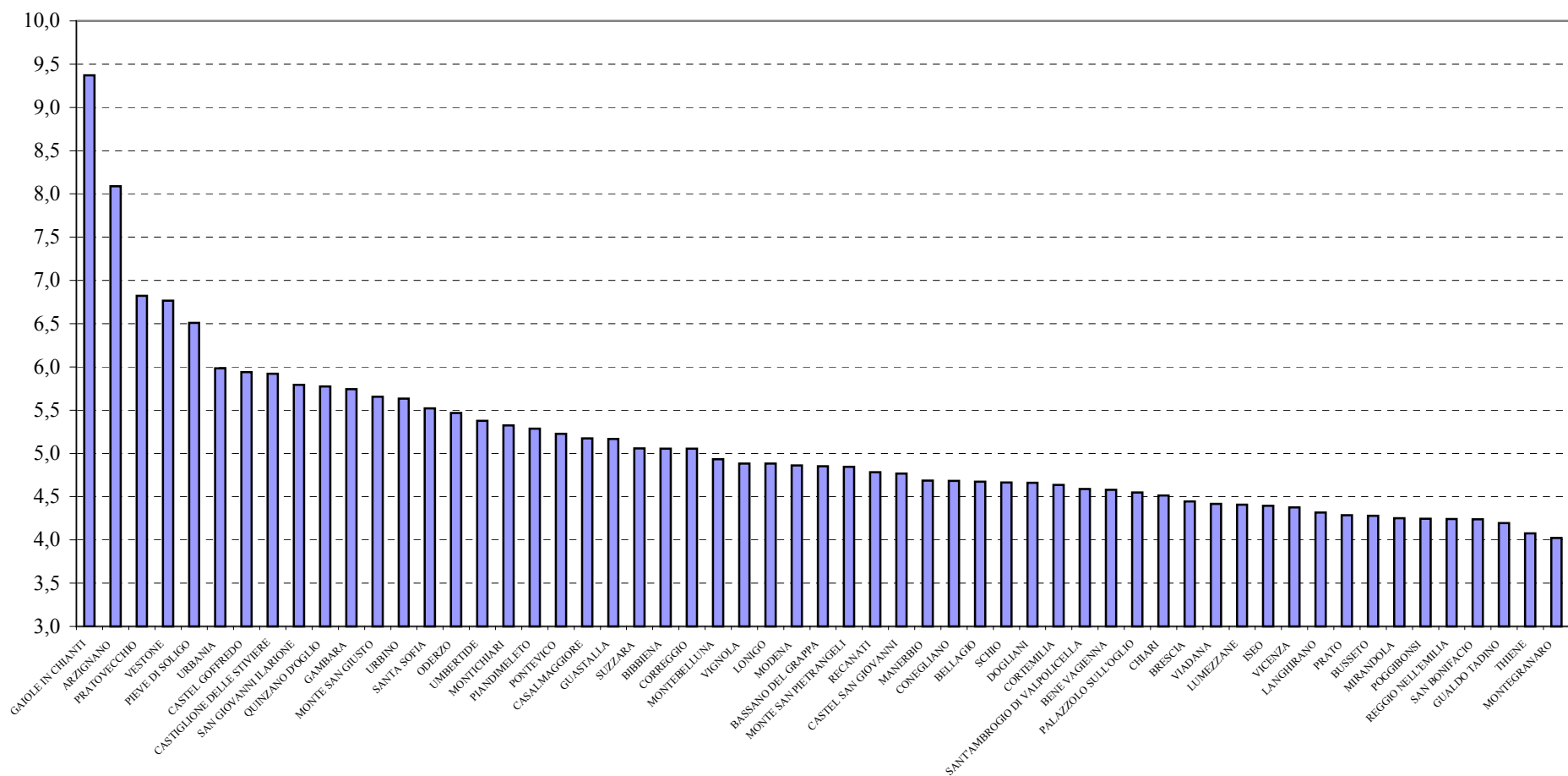
Source: calculations from Unioncamere - Excelsior data

Tab. 5 - New hirings of foreign workers per employment size class of firms

Size class (employees)	(a)	(b)	INDEX: a / b
	% workers total	% foreign workers	
< 10	25,4	28,2	1,11
11 - 50	26,2	30,1	1,15
> 50	48,4	41,7	0,86
Total	100,0	100,0	1,00

Source: calculations from Caritas (2003) and INAIL/DNA data.

Fig. 4 - Industrial districts: share of foreign population
 (Percentage of total population. Only districts above the districts' mean value = 3.3%)



Source: calculations from the ISTAT Population Census 2001 data

TAB. 6 - Migration and provinces: regression results

Dependent variable	(1) Stock of foreigners (% of tot 2001 population)	(2) Stock of foreigners (% of tot 2001 population)	(3) Stock of foreigners (% of tot 2001 population)	(4) Average external migration rate (1995-2002)	(5) Average internal migration rate (1995-2002)
Constant	-7.821	-6.598	-5.719	-7.025	-22.540
log (Per capita value added 1996)	3.759*** (16.48)	3.213*** (12.77)	2.828*** (10.10)	3.211*** (8.65)	8.660*** (9.85)
Industrial district index		0.780*** (4.05)	0.726*** (3.74)	0.771*** (2.99)	1.441** (2.36)
Dummy Center and Northeast			0.425** (2.98)	0.506** (2.68)	0.319 (0.71)
Dummy Big cities			0.465 (1.27)	0.513 (1.05)	-4.610*** (4.00)
Number of observations	103	103	103	103	103
Adjusted R-squared	0.726	0.762	0.778	0.717	0.700

t-values in parentheses

*: 10% significance level; **: 5% significance level; ***: 1% significance level.

Tab. 7 - Migration and local labor systems: regression results

Dependent variable (logs)	(1) Stock of foreigners (% of tot 2001 population)	(2) Stock of foreigners (% of tot 2001 population)	(3) Stock of foreigners (% of tot 2001 population)	(4) Stock of foreigners (% of tot 2001 population)	(5) Stock of foreigners (% of tot 2001 population)
constant	-13.319	-11.881	-5.602	-5.460	-5.290
Log (average per capita value added 1996-2001)	1.443*** (24.89)	1.277*** (22.01)	0.563*** (7.93)	0.512*** (7.07)	0.523*** (7.19)
Log (total employment growth 1991-2001)	0.591*** (3.44)	0.459** (2.80)	0.624*** (4.35)	0.521*** (3.56)	0.574*** (3.98)
Industrial district dummy		0.507*** (9.18)	0.281*** (5.60)	0.254*** (5.01)	0.265*** (5.27)
Dummy Northwest			0.924*** (12.66)	0.959*** (13.07)	0.947*** (12.90)
Dummy Northeast			0.896*** (11.73)	0.961*** (12.21)	0.934*** (11.98)
Dummy Center			1.012*** (14.91)	1.061*** (15.33)	1.040*** (15.12)
Log (population density 2001)				0.069** (3.18)	
Population density 2001 / 1000					0.404*** (2.63)
((Population density 2001) ^ 2) / 1000000					-0.166** (2.29)
Number of observations	784	784	784	784	784
Adjusted R-squared	0.533	0.577	0.679	0.683	0.681

t-values in parentheses

*: 10% significance level; **: 5% significance level; ***: 1% significance level.

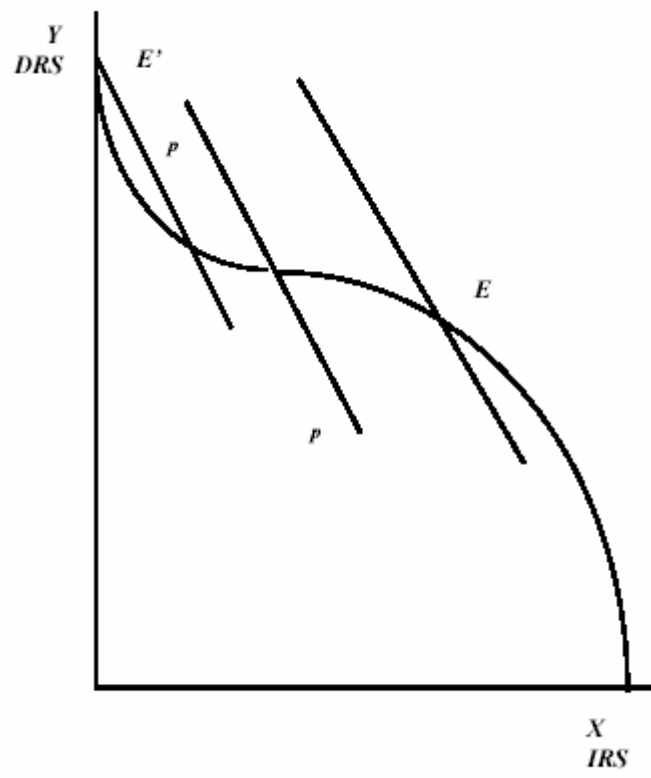


Figure 5

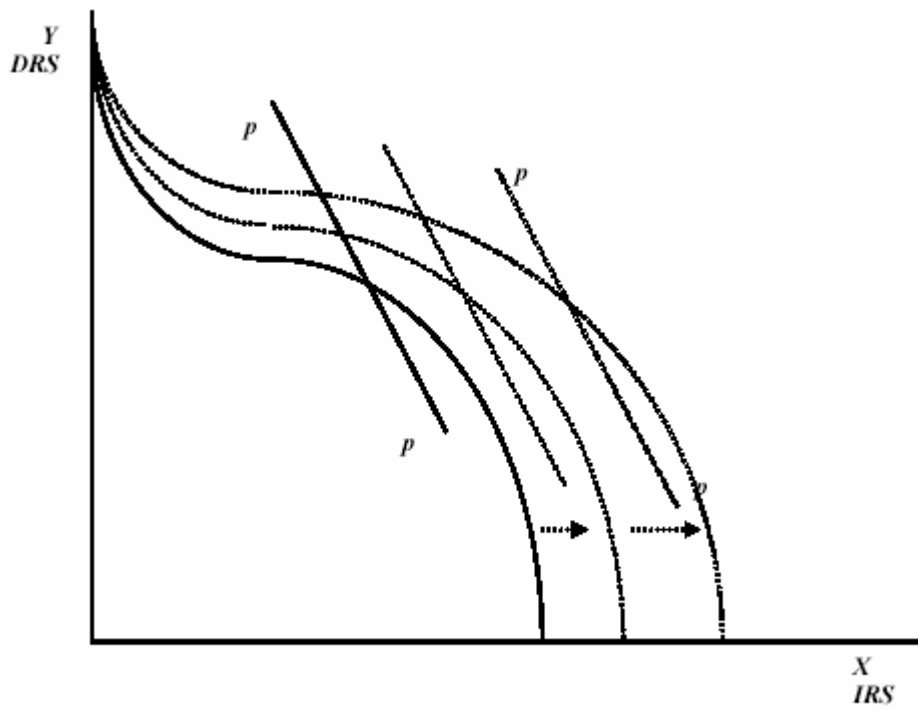


Figure 6

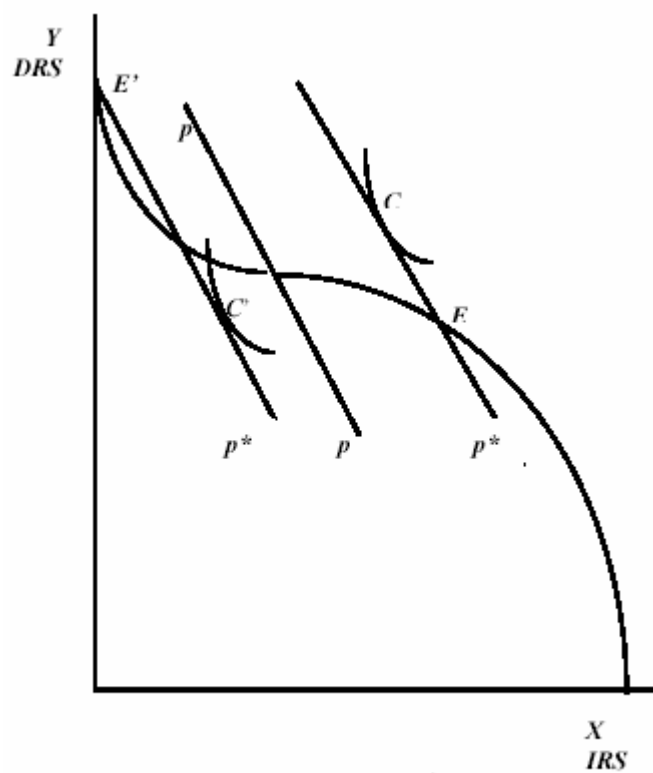


Figure 7

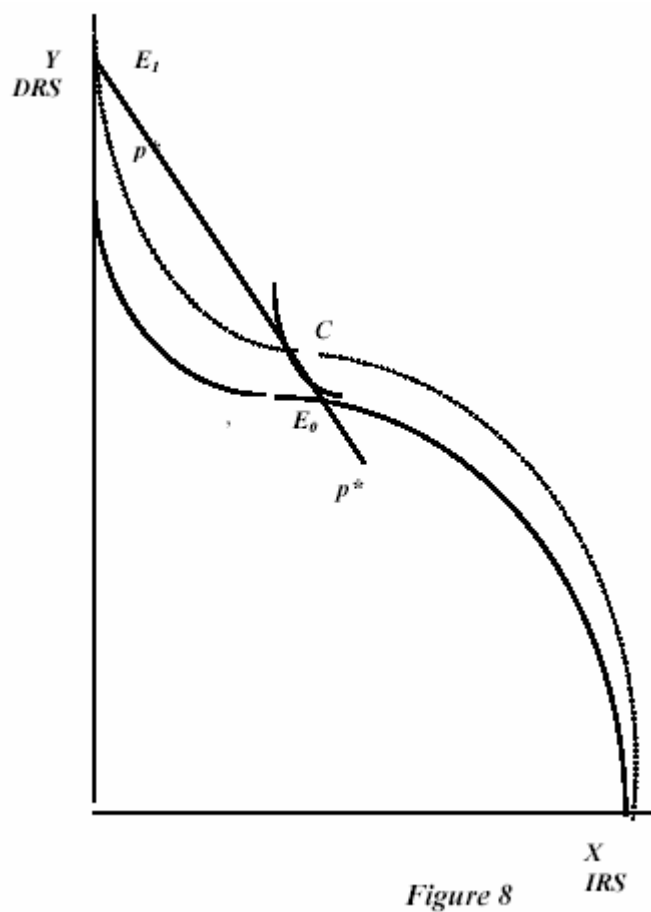


Figure 8