**Trends and dynamics in the Italian labour market.
An empirical evaluation using RFL data, 1993-2007**

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Abstract. The empirical analysis carried out in this paper represents the basis for the construction of the labour market module in the dynamic microsimulation model CAPP_DYN. Using LFS longitudinal data for the period 1993-2007, we describe the recent trends on the Italian labour market and provide an international comparison with other European countries. In order to investigate the determinants of labour market transitions, multinomial logistic regressions are implemented, and the estimated parameters are then used to model transition probabilities in the dynamic microsimulation model.

Keywords: Labour Mobility, Multinomial Logit

JEL classification: C25, C40, J60

Contents

1. Introduction

In this paper, we investigate the main trends that have featured in the Italian labour market over the last two decades. We provide a comparison with other European countries and a description of the recent trends in Italy in terms of occupation and transitions among different statuses (full time and part time workers, unemployed and outside labour force).

For this purpose, we use a pooled dataset of LFS (Labour Force Survey) longitudinal data, covering a time-span of 15 years, from 1993 to 2007. The inclusion of the last years has been possible thanks to the recent release of new longitudinal datasets by Istat. We analyse transition between different occupational states at a time distance of twelve months.

This piece of work is important as it contributes to shedding light on the factors that can influence labour market transitions in the dynamic microsimulation model CAPP_DYN. Finally, estimated parameters can be used in modelling transition probabilities into the dynamic microsimulation model.

Section 2 presents a comparison between the labour market figures in Italy and in the rest of Europe. Section 3 describes the data used in the analysis carried out in the subsequent sections. In Section 4, we draw a descriptive picture of the developments in the Italian labour market between 1993 and 2007, our main focus being the participation and employment rates. We define the participation (or activity) rate as the percentage of the working-age population (i.e. those aged 15-64) in the labour force, and the employment rate as the share of persons in employment relative to the population of working age. In Section 5, we adopt an econometric approach to investigate the evolution over time of the probability of being employed and of the conditional probabilities of transitions across four alternative employment states, namely full-time employment, part-time employment, unemployment and inactivity. The latter are used in CAPP_DYN for modelling conditional transition probabilities in the simulated years using the method presented in Section 6.

2. An international comparison

When compared to other European countries, Italy does not perform very well in terms of labour market outcomes. The rather low level of labour market participation among women and after 55 years of age is a well-known feature of the Italian economy. The consequences of this situation are also important for the sustainability of the social security system, particularly when faced with the expected ageing of the population.

On the whole, there have been remarkable improvements in activity and employment rates in the last 20 years in some segments of the Italian labour market, but not enough to approach the targets set by the Lisbon Strategy. As reported in European Commission (2008), in 2007 Italy remained more than 10 percentage points short of all the three Lisbon targets for employment[1].

As shown in *Figure 1* and *Figure 2*, Italy is one of the worst-faring countries within the EU, a clear consequence of past trends in the Italian labour market, with women choosing not to participate (or being forced not to), and the wave of early retirements in the'80s and'90s for men in their forties and fifties (see, inter alia, Malpede and Villosio, 2009). The overall employment rate as of 2007 for individuals aged 15-64 is 61%, well below the strategic goal of 70% set for 2010. The employment rate for older men and women (aged 55-64) rose from 29% in 1993 to 33% in 2007, the target set by the 2001 Stockholm European Council being 50% by 2010. Gender differences are remarkable here, as the rate for men is twice that for women; the overall improvement over time, however, is entirely explained by the higher employment rate for women (+9 percentage points).

Figure 1
Overall employment rates for Member States, 2000 and 2007
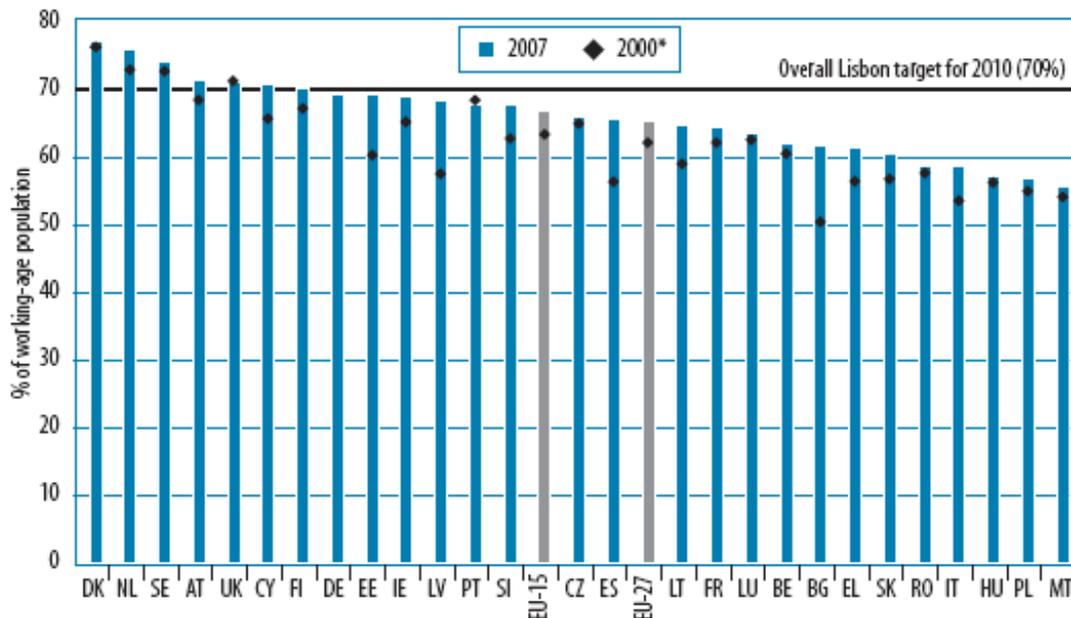
Source: Eurostat, EU Labour Force Survey, annual averages.
Note: * Data for RO, 2002.

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[1] The targets for 2010 were 70% for the overall employment rate, 60% for the female one, and 50% for older men and women (i.e. those aged 55-64).

Figure 2
Older worker employment rates for Member States, 2000 and 2007

Source: Eurostat, EU Labour Force Survey, annual averages.
Note: * Data for RO, 2002.

The female employment rate in 2007 is 45%, 10 percentage points higher than in 1993, but still very far from the 60% Lisbon target. A comparison with the other EU Member States shows that Italy is the second-last country (before Malta) as far as this indicator is concerned (*Figure 3*). This position in the ranking does not change if we consider only women aged 25-54, in order to exclude issues related to labour market entry and exit.

As with many of the structural problems of the Italian labour market, these gaps are mainly explained by the performance of the southern part of the country; the overall employment rate is above 60% in the rest of Italy, but only 46% in the "Mezzogiorno". The female employment rate is 56% and 50% in the North and in the Centre respectively, but only 30% in Southern Italy, which is also the area with the smaller improvement over the time span considered (+6 percentage points instead of 12 of the rest of the country, which corresponds to a lower percentage increase too). This shows that while in Northern Italy female employment reached the EU-27 average level, the South fares even worse than Malta (Reyneri, 2009).
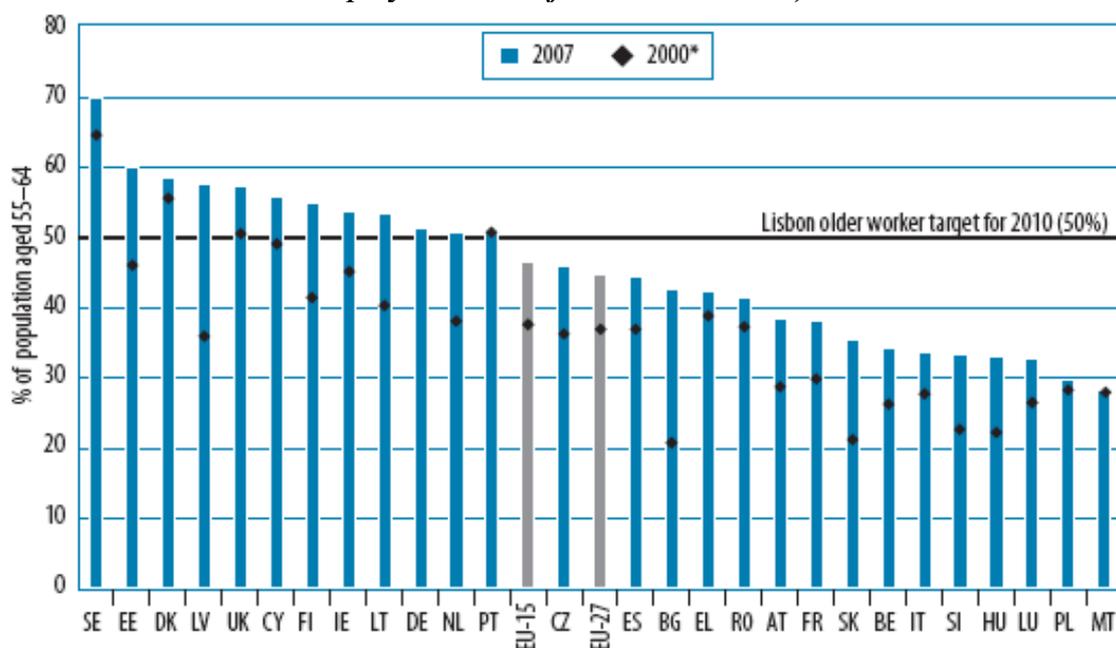
Figure 3
Female employment rates for Member States, 2000 and 2007
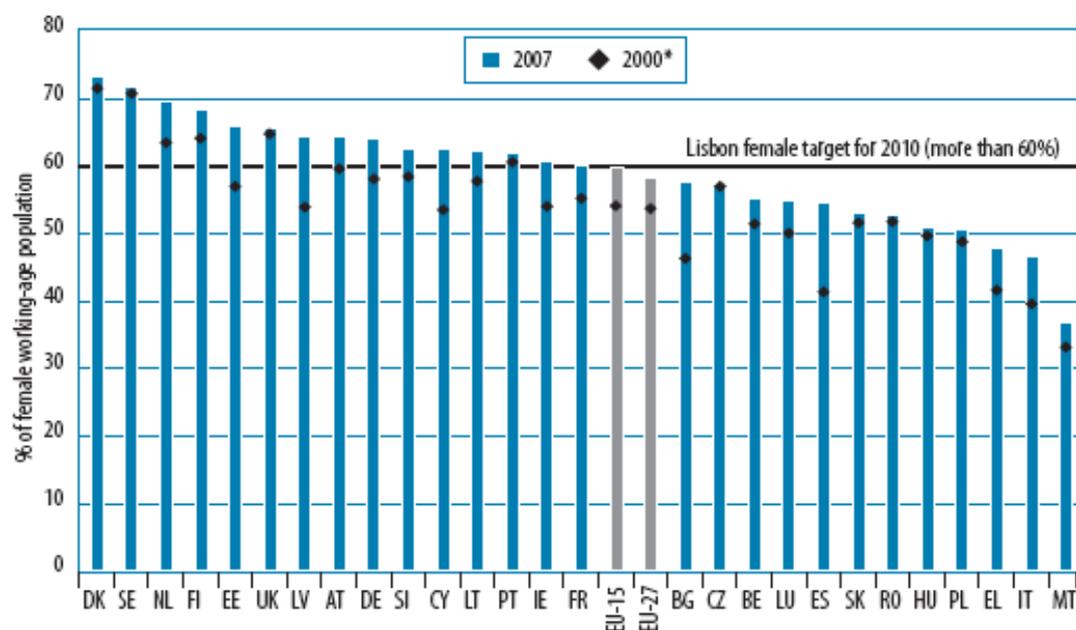
Source: Eurostat, EU Labour Force Survey, annual averages.
Note: * Data for RO, 2002.

Data presented in this subsection offer a twofold view. On the one hand it is clear that Italy performs rather badly with respect to the majority of other European countries in terms of labour market participation indicators. On the other hand the low starting point of both the participation and the employment rates offers Italian policy makers an important tool to favour policies aimed at increasing the growth rate of GDP. As already stressed, this will help to control the sustainability of the social security system, especially in the next decades when the ageing transition will bring into the labour market the less numerous cohorts of individuals born after the 'seventies.

To have a clearer picture of the Italian situation, to investigate its evolution over time, and to speculate about the likely evolution in the medium-long term, in the rest of this section we analyse the microdata from the Italian Labour Force Survey, from which the official statistics on Italy provided by Eurostat are drawn.

3. Data

The analysis carried out relies on microdata drawn from the Italian Labour Force Survey (LFS, or Rilevazione sulle Forze di Lavoro, RFL), a quarterly survey with a 2-2-2 rotating design,

which collects information about labour market participation on a sample of resident non-institutional individuals aged 15 and over, living in private households.

The choice to use LFS data is based on a number of reasons; first of all, it represents the benchmark as far as the analysis of the labour market is concerned, as it is the source of information from which official statistics in this field are derived in Italy. Also, it provides a bigger sample size than the other options available, such as ISFOL-PLUS (Participation Labour Unemployment Survey) and IT-SILC (the Italian version of the European Union Statistics on Income and Living Conditions, implemented by Istat). Moreover, our empirical investigation requires a panel dimension in the data, which in the LFS is available for a much higher number of years than in the other surveys.

The main LFS survey is designed to produce cross-sectional data; the sample it covers includes about 76,000 families per quarter, with 180,000 individuals responding. Starting from the quarterly cross-sectional datasets, Istat, the Italian Institute for National Statistics, provides additional data files where information on each individual is available at two points in time, one year apart, therefore creating a longitudinal dimension which can be exploited to investigate transitions between labour force categories. The longitudinal sample is smaller than that of the cross-sectional survey; given the rotational pattern in the interviews, it includes around half of the cross-sectional sample[2]. We use a pooled sample of longitudinal data covering the period 1993/1994-2007/2008. There is, however, a major issue to be taken into account when using LFS data on the time span we consider — namely a relevant discontinuity in the series occurring in 2003; this problem, and the measures taken to reduce its impact, are explained in more detail in the Appendix.

4. Recent developments in the Italian labour market using longitudinal LFS: some descriptive statistics

The Italian labour market witnessed an overall increase in participation and employment rates over the period 1993-2007[3]. After a few years of stagnation or modest decrease, from 1996 onwards both indicators started to rise, with an increase by 4 and 6 percentage points respectively

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[2] Also, the longitudinal sample cannot correctly represent the entire population, but only the longitudinal one, i.e. the one which resides in the same commune at both points in time (therefore net of deaths and those who changed address and/or moved abroad in between). Those who changed commune of residence over the year are probably significantly different in terms of behaviour on the labour market from the longitudinal population; however, given the low level of mobility in Italy, the number of individuals left out should not be too high.

[3] The data presented in this section, as in the rest of the paper, are based on weighted longitudinal data from the LFS; therefore, as mentioned above, they refer to the longitudinal population, not to the total one.

(*Table 1*). According to official Istat figures (Istat, 2006c; Istat, 2010), in absolute terms the number of employed individuals rose from 20.8 to 23.2 mln. between 1993 and 2007, while the total labour force grew from 23 to 24.7 mln.

This general trend is not uniformly distributed over the whole population and conceals different patterns for individuals in different stages of their working life; it has affected women much more than men (*Figure 4*), and the Centre-North much more than the South of the country.

The increase in female labour market participation and employment probability across generations is probably the most relevant phenomenon occurring in the last two decades: age being equal, subsequent cohorts of women show systematically higher activity and employment rates, at least for individuals above 25 years of age (*Figure 5*).

Figure 4.
Activity and employment rates.

Notes: sample aged 15-64. Figures are population weighted.
Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007.
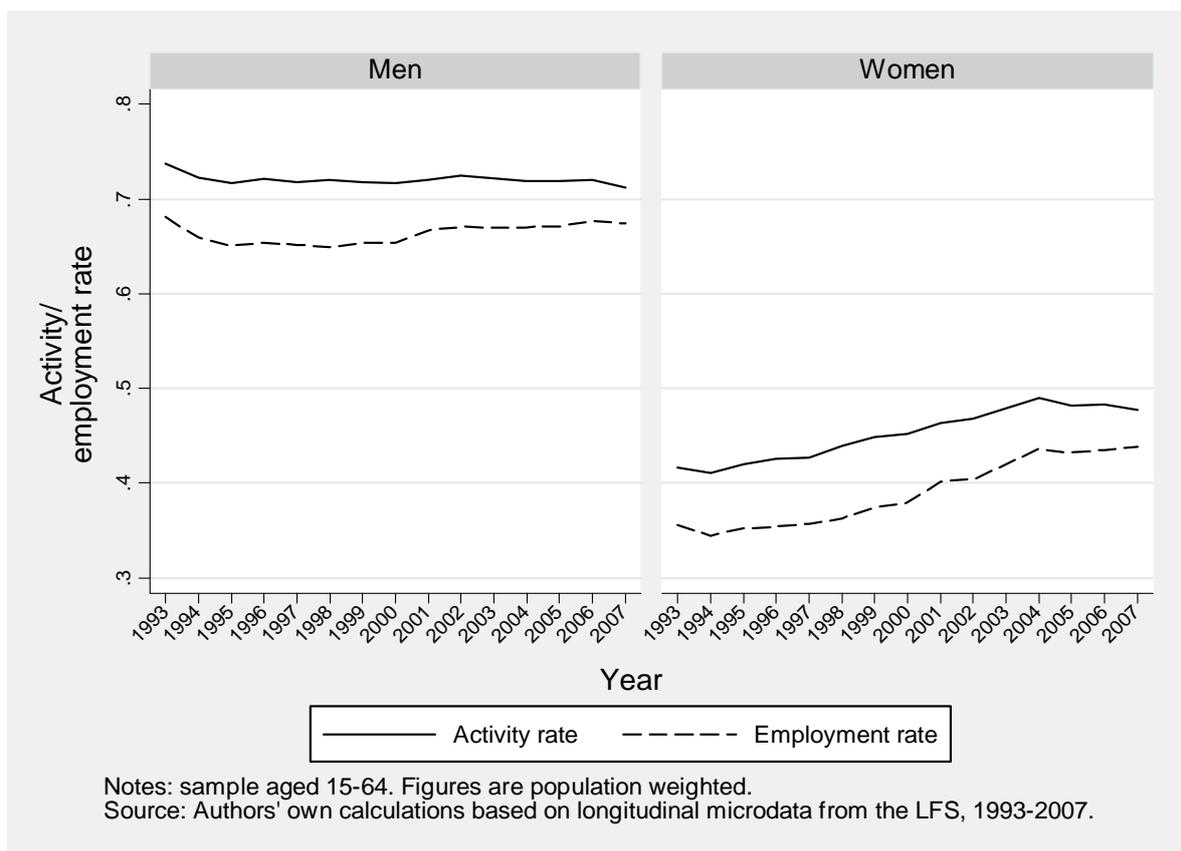
Figure 5.
Activity rates by gender and cohort

Notes: sample aged 15-64. Figures are population weighted.
Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007.
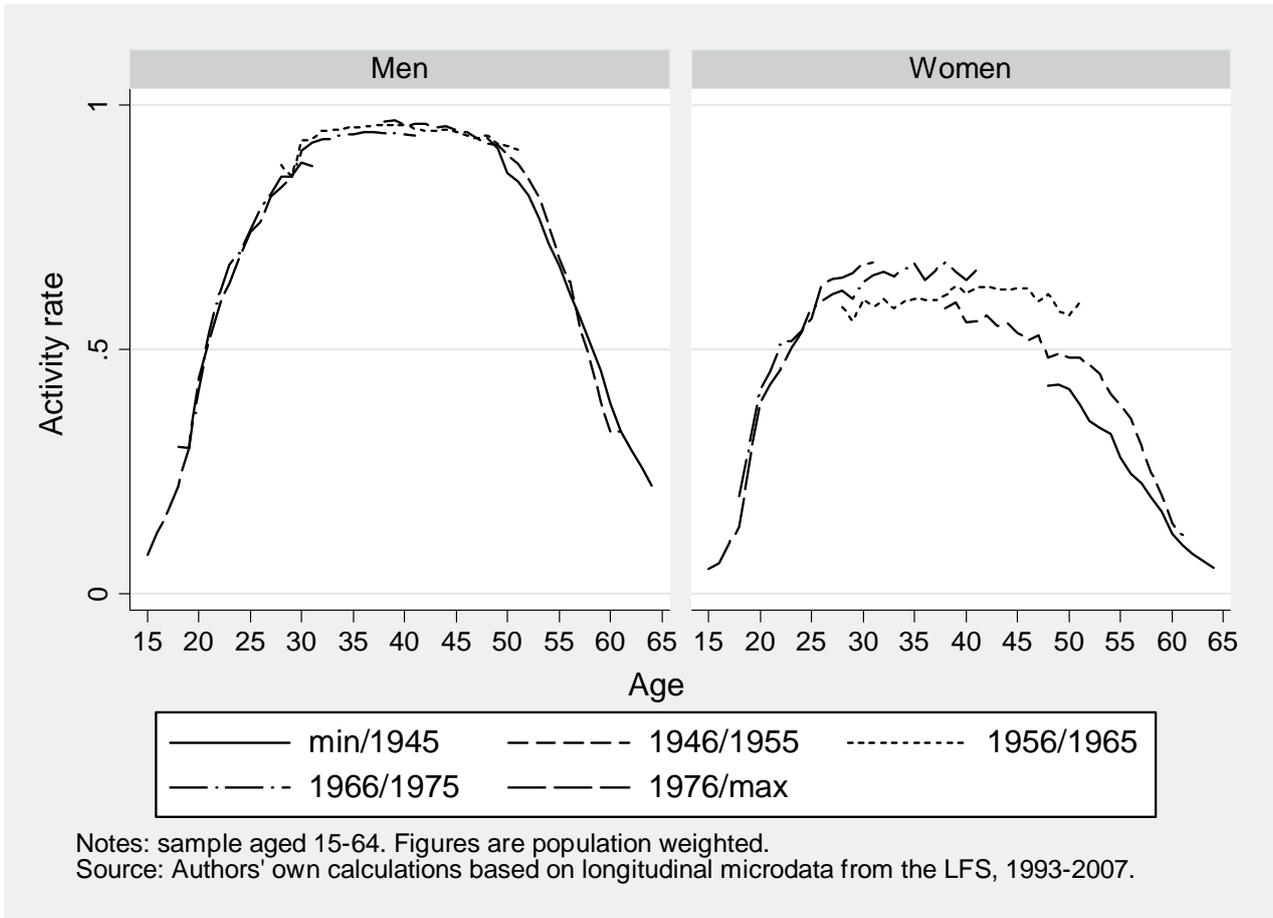
Table 1. Activity and employment rates by gender and age group

All	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2004	2005	2006	2007	2007-1993
Activity rate															
15-64	57.72	57.46	57.2	57.62	57.82	58.47	59.03	59.38	59.99	60.67	61.8	61.87	62.29	61.44	3.72
15-24	39.92	37.95	37.66	37.39	36.82	36.70	36.38	37.26	34.65	34.07	35.44	32.88	33.12	29.56	-10.36
25-34	74.40	74.46	74.52	74.59	74.77	74.94	75.28	75.28	76.23	76.35	77.38	77.48	77.73	75.12	0.72
35-44	76.38	76.50	76.56	77.30	77.24	78.80	78.65	78.68	79.36	79.73	81.16	81.23	80.52	80.06	3.68
45-54	64.21	64.53	63.84	63.82	64.72	65.48	66.85	67.35	69.39	70.26	71.63	73.03	74.18	74.37	10.16
55-64	30.19	29.90	28.61	29.48	28.80	28.41	28.68	27.70	27.92	29.94	30.42	30.83	31.90	33.50	3.31
Employment rate															
15-64	51.82	51.19	50.56	50.77	50.94	51.43	52.14	52.98	54.26	55.07	56.45	56.84	57.53	57.57	5.75
15-24	27.83	26.12	24.84	24.40	24.59	24.53	24.15	25.55	25.15	24.70	26.92	24.92	24.84	23.51	-4.32
25-34	65.80	64.91	64.32	63.93	63.61	63.62	64.36	65.24	66.59	66.80	68.55	69.24	69.70	68.51	2.71
35-44	72.52	72.09	71.79	72.18	72.04	73.06	72.69	73.32	74.43	75.10	76.27	76.26	76.22	76.18	3.66
45-54	61.86	61.75	61.15	61.06	61.50	62.07	63.67	64.17	66.61	67.29	68.29	70.22	71.56	72.18	10.33
55-64	29.32	28.76	27.43	28.18	27.52	27.01	27.41	26.48	26.57	28.80	29.25	29.64	30.90	32.69	3.37
Men	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2004	2005	2006	2007	2007-1993
Activity rate															
15-64	73.94	73.06	72.37	72.57	72.56	72.94	73.05	73.05	73.27	73.80	73.55	73.88	74.35	73.59	-0.35
15-24	43.77	41.94	41.27	40.99	40.40	41.61	39.80	40.16	38.41	37.94	39.44	37.72	38.64	34.91	-8.86
25-34	89.93	88.83	88.37	88.32	88.16	87.85	87.79	87.17	87.27	87.26	86.79	87.88	87.78	85.19	-4.75
35-44	96.70	96.50	96.18	96.38	96.27	96.56	96.40	95.80	95.71	96.13	95.20	95.13	94.76	94.45	-2.25
45-54	89.10	87.80	86.87	86.58	86.82	87.30	87.58	88.49	88.86	89.50	89.18	90.48	91.63	91.67	2.57
55-64	48.44	47.74	45.22	45.49	44.27	42.72	43.24	41.18	41.87	43.10	42.25	42.31	42.85	44.99	-3.45
Employment rate															
15-64	68.30	66.88	65.83	65.84	65.76	66.13	66.57	67.03	67.95	68.57	68.59	68.94	69.86	69.78	1.48
15-24	32.06	30.40	28.86	28.69	28.93	28.92	28.29	28.82	29.08	28.98	31.16	29.48	30.61	28.48	-3.58
25-34	82.22	80.16	78.72	78.19	77.05	77.85	77.82	78.02	78.80	78.56	78.74	80.02	80.28	78.78	-3.44
35-44	93.46	92.34	92.22	91.63	91.98	91.82	91.28	91.54	91.82	92.50	91.35	90.98	91.41	91.27	-2.19
45-54	86.96	84.72	83.73	83.58	83.34	83.92	84.55	85.46	86.30	86.55	86.16	87.68	89.02	89.35	2.39
55-64	47.03	46.05	43.47	43.67	42.16	40.57	41.51	39.41	39.84	41.47	40.55	40.49	41.51	44.02	-3.02
Women	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2004	2005	2006	2007	2007-1993
Activity rate															
15-64	41.72	42.04	42.2	42.82	43.20	44.10	45.11	45.81	46.79	47.6	50.17	49.94	50.31	49.35	7.63
15-24	35.91	33.78	33.90	33.64	33.09	31.59	32.83	34.24	30.75	30.04	31.26	27.82	27.32	23.94	-11.97
25-34	58.70	59.93	60.52	60.73	61.20	61.85	62.60	63.22	65.05	65.30	67.90	66.95	67.52	64.92	6.22
35-44	56.23	56.66	57.05	58.30	58.25	61.05	60.89	61.51	62.93	63.23	67.18	67.34	66.28	65.63	9.40
45-54	40.02	41.87	41.37	41.58	43.06	44.06	46.50	46.56	50.25	51.33	54.56	56.02	57.21	57.50	17.48
55-64	13.67	13.68	13.45	14.80	14.57	15.21	15.23	15.21	14.95	17.68	19.39	20.09	21.62	22.71	9.03
Employment rate															
15-64	35.55	35.68	35.45	35.84	36.24	36.85	37.80	39.02	40.64	41.64	44.44	44.83	45.27	45.42	9.87
15-24	23.42	21.65	20.66	19.92	20.06	19.96	19.85	22.14	21.07	20.25	22.49	20.13	18.78	18.29	-5.13
25-34	49.21	49.48	49.77	49.54	50.00	49.20	50.71	52.27	54.22	54.90	58.27	58.31	58.95	58.10	8.89
35-44	51.76	52.00	51.48	52.81	52.16	54.32	54.08	55.06	56.94	57.61	61.25	61.54	61.03	61.05	9.29
45-54	37.47	39.39	39.12	39.03	40.10	40.62	43.18	43.24	47.25	48.35	50.91	53.20	54.58	55.44	17.97
55-64	13.28	13.04	12.80	13.99	14.06	14.49	14.38	14.50	14.22	16.98	18.72	19.49	20.94	22.04	8.76

Notes: All figures are population weighted. Activity and employment rates are expressed as a % of population.
Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007

As shown in *Table 1*, the rise in both labour market indicators affected prime-age women (i.e. those aged 25-54) as well as old-age ones, but the most evident trend is found for the age group 45-54, with participation (employment) growing from 40 (37) to 58 (55)% from 1993 to 2007. Considering the starting level in 1993, for this age group the proportional increase was much higher for low-educated women (see *Table 2*), but this did not contribute to filling the gap with the highly educated: the activity rates of those with only primary education remain below 45%, against the 69 and 88% of those with secondary and tertiary education respectively. Regional patterns of growth are very diverse: the participation rates in the South increase by only 7 percentage points up to 43 (+21%), while for women in Northern Italy they soar from 41 to 67% (+26%). Employment rate patterns by both educational level and region are analogous.

Smaller but still relevant increases are observed for the other age groups above 25. Activity rates for women aged 25-34 and 35-44 grew by 6 and 9 percentage points, respectively, both reaching a participation rate of 65% in 2007. A similar increase is found in employment rates, which settled around 60%. Older women (aged 55-64) saw a 9 percentage point rise in both rates over the period, too. The rise was relatively higher in Northern Italy for the age groups 35-44 and 55-64, in the Centre for those aged 25-34. The South seems to keep lagging behind, with the gaps, already significant in 1993, getting even larger at the end of the period.

Disaggregating by educational level, a rather surprising result emerges: for these age groups, more educated women show consistently worse activity and employment rate patterns over time than the less educated. Adult women (aged 25-44) holding a university degree, who show significantly higher attachment to the labour market and employment probability than lower-skilled ones, witness a decrease in these indicators over the period considered, while women with only primary education exhibit a notable increase. As far as the older age group is concerned, women at all educational levels show growing rates, but the percentage increase for less educated women is three times as high as that of those with a university degree.

The only exception to the overall trend of increased participation is represented by the youngest age group. Activity rates for those aged 15-24 actually decline over the time span we investigate, and this pattern affects not only women, but also men (*Table 1*). This tendency is found in all regions of the country, and translates into a reduction in employment rates, too, although smaller than the reduction in activity rates.

The lower attachment to the labour market of the young can be easily explained by the longer time spent in the educational system; note, however, that this could be due not only to a deliberate choice to invest more in human capital, but also to the feeling that labour market

conditions are not favourable, which may discourage the most recent cohort and induce it to postpone labour market entry (Istat, 2006).

Turning to the male component of our sample, no significant change has affected the labour market indicators of prime-age individuals over the last couple of decades; something did happen, however, for men aged 55-64, i.e. those in pre-retirement age: the employment rate declined until 2000, and then started to rise again thereafter. Marano and Sestito (2004) suggest this trend might be explained by the fear of the increase in minimum age for old-age pensions and the tightening of the requirements for seniority pensions progressively introduced over the 1990s with the Amato (1992), Dini (1995) and Prodi (1997) reforms; these changes in the eligibility conditions for employed individuals have probably induced retirement among those who had accumulated enough seniority rights, and could therefore choose to retire earlier than the 'normal' age. This could also explain the rise in employment rates in the decade following, especially for those with a higher level of educational attainment (see *Figure 6*), who entered the labour market at a later stage of their lives, have less seniority and therefore have to face tighter retirement requirements[4]. Older workers in Italy appear to retire as soon as they have the chance to do so; OECD (2004) reports that the drop in activity rates for individuals over 55 is much more pronounced than in the other OECD countries, and that Italy has by far the highest share of individuals who are inactive because of retirement rather than other reasons like disability or family responsibilities (the main reason for inactivity of women, confirming the traditional separation of family tasks between men and women).

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[4] As reported by the authors: 'the sharpest rises in the participation to the schooling system happened from the mid '50s to the mid '70s and youth unemployment was particularly high during the '70s and '80s, both factors reducing the accumulated seniority rights of the cohorts progressively aging'.

Table 2.
Female activity and employment rates
by age group, level of educational attainment and geographical area

Activity rate (% of pop.)		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2004	2005	2006	2007	2007-1993
25-34																
Educational attainment	Compulsory	46.63	48.16	48.62	48.51	48.32	49.52	48.57	49.03	50.80	52.35	50.95	51.72	50.48	50.21	3.58
	Upper secondary	69.86	70.43	70.18	70.51	69.90	69.78	71.06	69.78	70.99	70.57	74.92	71.33	71.61	67.81	-2.04
	Tertiary	87.42	82.37	83.05	83.29	84.19	82.61	82.67	86.14	86.47	81.76	78.51	79.50	82.05	77.36	-10.06
Geographical area	North	72.12	72.86	74.53	75.80	75.90	76.49	75.49	75.91	78.29	78.51	79.08	80.68	80.58	78.91	6.79
	Centre	60.38	61.57	62.88	63.30	62.18	62.31	66.29	67.99	70.03	69.16	73.73	69.50	74.21	69.02	8.63
	South	41.66	43.49	42.45	41.25	42.91	43.87	45.08	45.40	46.48	47.36	51.80	49.51	48.93	46.55	4.88
35-44																
Educational attainment	Compulsory	44.10	45.29	44.27	45.23	44.46	46.93	44.72	45.76	48.49	47.79	51.76	52.62	50.36	48.69	4.59
	Upper secondary	73.05	70.43	71.58	71.56	71.12	73.40	75.16	75.51	73.49	75.30	76.35	75.52	74.84	75.86	2.81
	Tertiary	92.78	90.62	90.59	89.44	89.62	90.11	90.24	89.69	88.00	89.34	93.18	91.31	90.31	84.67	-8.11
Geographical area	North	63.52	64.66	65.63	67.45	68.42	69.88	71.77	72.66	72.71	75.38	79.21	79.21	77.51	77.60	14.08
	Centre	60.82	60.57	61.74	63.14	63.66	65.20	65.05	66.29	67.84	66.69	72.02	73.23	71.69	71.59	10.76
	South	44.24	44.27	43.65	44.20	42.62	47.80	45.02	44.85	47.82	45.74	48.92	48.48	48.27	46.05	1.81
45-54																
Educational attainment	Compulsory	34.51	35.52	33.95	33.91	35.15	35.82	35.67	34.68	38.62	39.33	41.14	40.65	41.40	43.96	9.45
	Upper secondary	59.87	59.78	61.63	59.46	61.23	58.03	66.66	64.89	67.54	67.29	67.76	70.76	72.67	68.72	8.84
	Tertiary	77.83	85.05	82.06	83.59	78.06	82.45	83.13	84.35	86.06	87.58	91.41	90.78	89.59	87.65	9.82
Geographical area	North	41.33	44.15	43.88	44.29	45.92	46.73	49.02	50.47	55.56	55.81	61.61	64.98	66.92	66.89	25.56
	Centre	44.57	47.08	46.73	47.75	47.64	49.73	51.50	53.56	56.32	56.55	61.26	64.46	63.98	62.39	17.83
	South	35.09	35.14	34.32	33.85	36.24	36.91	40.06	37.14	39.59	42.32	41.64	39.69	40.80	42.54	7.45
55-64																
Educational attainment	Compulsory	11.82	11.48	10.91	12.00	11.77	12.52	12.19	12.46	11.14	13.67	13.66	13.25	15.06	15.65	3.83
	Upper secondary	27.55	29.13	31.59	32.17	30.92	27.38	27.87	26.77	30.05	29.79	36.60	36.54	32.98	36.65	9.11
	Tertiary	47.66	46.82	44.73	44.72	42.13	43.54	43.71	36.81	44.01	49.65	47.70	54.74	56.24	52.38	4.71
Geographical area	North	11.59	12.17	11.62	12.82	14.20	14.11	14.31	14.34	13.97	16.27	18.82	19.10	20.87	23.04	11.45
	Centre	17.63	16.46	18.03	18.21	16.89	16.74	19.75	17.24	16.60	20.70	23.30	23.56	24.23	25.15	7.52
	South	14.22	14.14	13.24	15.58	13.65	15.90	13.69	15.21	15.35	17.86	17.78	19.39	21.11	20.71	6.49

Notes: All figures are population weighted.

Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007

Employment rate (% of pop.)		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2004	2005	2006	2007	2007-1993
25-34																
Educational attainment	Compulsory	37.90	38.97	39.23	38.64	37.64	37.36	37.19	38.71	40.36	41.51	41.63	42.22	40.48	42.56	4.66
	Upper secondary	60.53	59.71	59.45	59.04	59.45	57.71	59.38	59.03	60.37	61.32	65.95	64.24	64.40	62.24	1.70
	Tertiary	71.56	65.08	63.90	65.45	66.83	64.87	67.74	72.11	73.74	68.64	66.35	67.86	72.08	68.84	-2.72
Geographical area	North	66.54	66.83	67.48	68.77	68.90	69.11	68.74	69.97	72.40	73.56	73.06	74.55	75.45	74.42	7.88
	Centre	49.19	50.45	51.66	50.52	50.28	49.25	54.84	58.02	59.55	58.98	66.88	61.81	64.43	61.48	12.30
	South	28.34	28.07	27.50	25.84	27.02	25.05	26.76	27.90	29.51	30.29	36.52	37.46	36.97	37.41	9.06
35-44																
Educational attainment	Compulsory	39.25	40.06	38.02	39.08	37.69	38.78	37.03	38.38	41.26	40.84	44.43	45.96	43.43	43.75	4.50
	Upper secondary	68.65	66.53	66.87	66.72	65.29	68.13	68.75	69.44	68.17	70.64	71.08	69.81	70.72	71.15	2.50
	Tertiary	90.99	87.49	86.53	85.61	86.33	85.49	86.36	86.52	84.99	86.26	90.16	88.07	86.90	81.51	-9.48
Geographical area	North	59.95	60.72	61.59	63.66	64.22	65.01	66.90	68.82	69.60	71.77	76.42	75.50	73.92	74.31	14.36
	Centre	56.71	57.05	56.69	58.35	57.29	59.65	58.39	60.45	61.74	63.29	64.96	66.93	67.17	67.44	10.73
	South	38.42	38.07	35.86	36.20	34.31	38.09	35.70	34.78	38.23	36.31	39.54	40.21	40.41	39.49	1.07
45-54																
Educational attainment	Compulsory	31.73	32.90	31.55	31.16	31.88	31.98	31.87	30.84	34.95	35.87	36.99	37.18	38.33	41.35	9.62
	Upper secondary	57.78	57.46	59.52	57.04	58.94	55.01	64.28	62.20	65.27	64.78	64.27	68.29	70.27	67.21	9.43
	Tertiary	77.69	84.19	81.34	83.22	76.58	81.67	81.24	83.22	85.90	86.54	90.11	90.27	88.58	86.47	8.78
Geographical area	North	39.16	41.56	41.72	42.29	43.17	44.20	46.61	47.81	52.85	53.66	59.14	62.95	64.74	65.41	26.25
	Centre	42.09	45.40	44.96	45.45	45.16	46.84	48.11	50.95	54.73	54.39	57.08	62.07	61.68	59.91	17.81
	South	31.90	32.30	31.62	30.35	32.68	31.89	35.53	32.53	35.39	37.76	36.76	35.60	37.41	39.97	8.07
55-64																
Educational attainment	Compulsory	11.40	10.81	10.23	11.15	11.21	11.80	11.26	11.66	10.35	12.91	13.01	12.70	14.30	14.97	3.56
	Upper secondary	27.33	28.65	31.07	31.42	30.92	26.48	27.38	26.53	29.57	29.24	35.58	35.56	32.45	35.87	8.54
	Tertiary	47.66	46.82	44.73	44.72	41.12	43.54	43.44	36.81	43.68	49.65	47.62	54.74	55.90	52.19	4.53
Geographical area	North	11.21	11.64	10.97	12.13	13.50	13.48	13.78	13.58	13.37	15.79	18.37	18.28	20.09	22.41	11.19
	Centre	17.38	16.25	17.60	17.57	16.71	16.31	19.20	17.18	16.17	20.27	23.07	23.45	23.83	24.96	7.58
	South	13.71	13.07	12.44	14.47	13.22	14.85	12.18	14.16	14.25	16.66	16.48	18.80	20.41	19.70	5.99

Notes: All figures are population weighted.

Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007

Figure 6.
Employment rates for men aged 55-64
by level of educational attainment
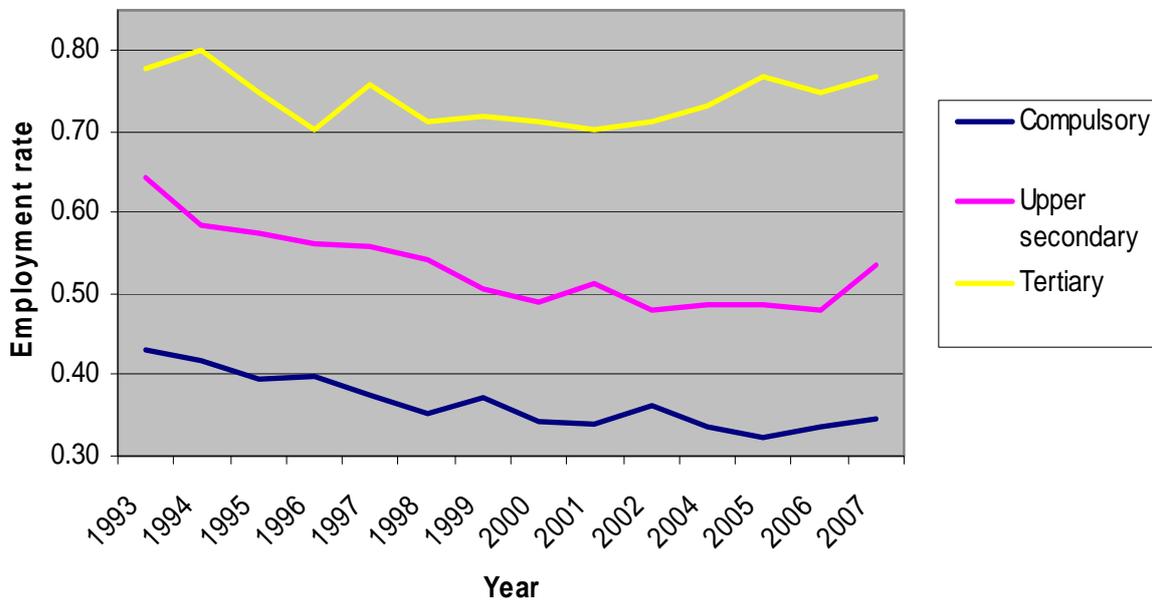
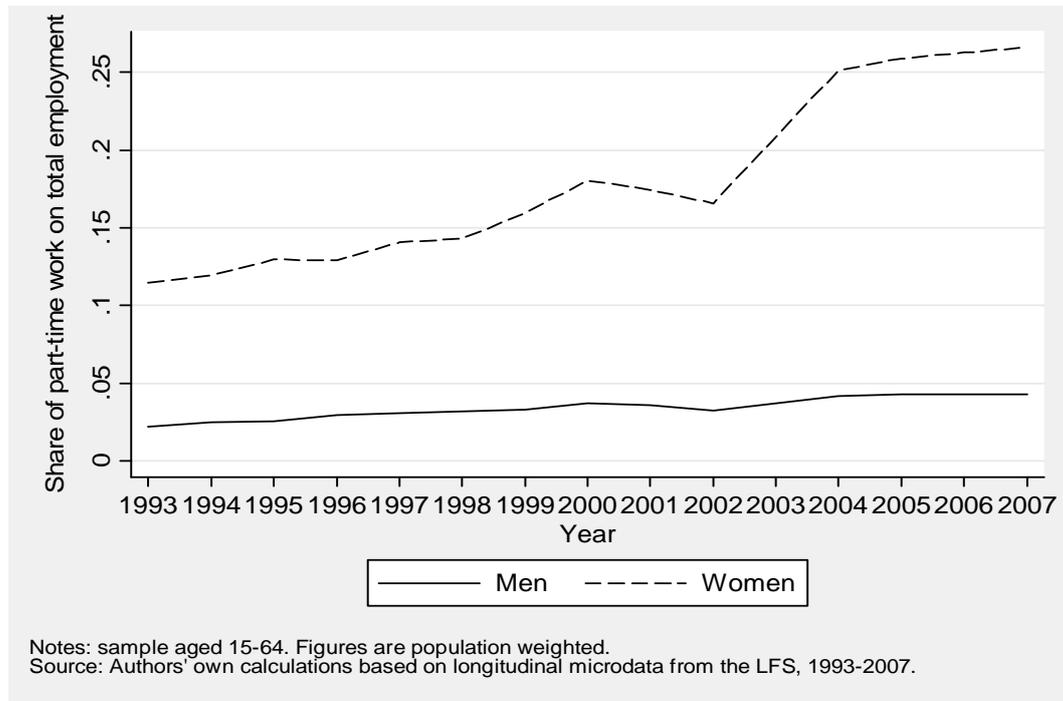Notes: Figures are population weighted.
Source: Authors' own calculations based on longitudinal LFS microdata.

Altogether, these diverse male and female trends implied a significant catching up in labour market indicators for women; except for the youngest age group, where the gender gap has even slightly increased over time, women have been reducing the penalties in both activity and employment rates, by between 10 and 15 percentage points depending on the age group. Given the size of the initial gaps, however, the differentials are still between 20 and 35 percentage points. They tend to be wider in Southern Italy and among less educated individuals, although women with only primary education seem to have narrowed the gap with men relatively more. This suggests that a number of factors are still discouraging female labour market participation; among these, several studies have identified the lack of childcare services, but also the strongly asymmetric distribution of domestic work within the family (see among others, Del Boca and Pasqua, 2002; Istat, 2006)

Moving now to the analysis of the evolution of the share of contract types, the most intense change in the observed period is the remarkable increase of part time work, in particular among women. *Figure 7* shows that the share of part-time work on total female employment is substantial: around ¼ of employed women have this work arrangement in 2007, 5 times the share of male part-time workers. It appears to be more frequent among less educated women (32% of those with

primary education had this type of arrangement in 2007, against 18% for women with a university degree), and it is slightly more usual in the Centre-North than in the South.

Figure 7.
Share of part-time work
on total employment

Notes: sample aged 15-64. Figures are population weighted.
Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007.

Despite the increase in recent years[5], the diffusion of part-time work is still relatively low in Italy when compared to other European countries; the proportion of women with this work arrangement in Italy is about 5% lower than the average for EU-27, even 10% lower than EU-15. Part-time work is often considered as a tool to facilitate integration of women in the labour market, as it makes work-family reconciliation easier. Jaumotte (2003) reports that Italy is one of the countries where preferences for part-time are well above its current level, therefore suggesting that an increase in part-time work opportunities might raise female attachment to the labour market. This mechanism, however, would be beneficial only if it did not entail a marginalization of women, which might happen where it is characterised by wage penalties, lower social security coverage, job insecurity and little training. Reyneri (2009) explains that female part-time work in Italy is often more unstable than full-time positions, although it is difficult to say whether this is due to the nature of the contract, or to a lower level of attachment to the labour market of part-time workers. Also, he

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[5] After the redesign of the survey in 2003, Istat reconstructed the time series for the period 1992-2003, so that they are comparable with the more recent estimates. The reconstructed series show a pattern which is very different from the one displayed in Figure 7, insofar as the share of female part-time work is consistently above 20%, and we do not see the same sharp rise registered when using the original microdata.

reports that training and career chances are more limited, therefore implying some level of segregation in lower quality jobs for women with this work arrangement. In our sample, one woman out of three states she is working part-time because she could not find a full-time job; in this case, this work arrangement is clearly not a tool chosen to reconcile work with family commitments, but rather an involuntary situation; this seems to suggest that part-time work is indeed considered less satisfactory than standard full-time work on some occasions, and may represent a case of underemployment.

The evidence provided in *Figure 8* appears to partially corroborate this line of reasoning; the graph presents the evolution over time of the share of women in each labour status (FT employment, PT employment, unemployment and inactivity[6]). We can see that the increase in PT work in the last few years has been counterbalanced by a decline in the share of unemployed and inactive females, but also by a decrease in the women employed FT; this might suggest that this work arrangement may be a double-edged weapon.

Figure 8.
Share of women in each work status
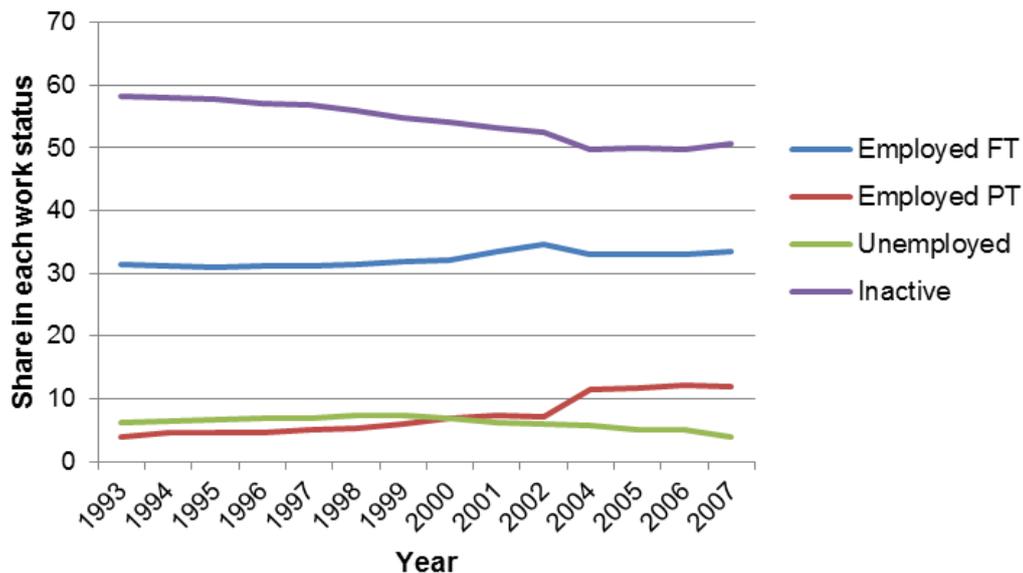
Note: Figures are population weighted.
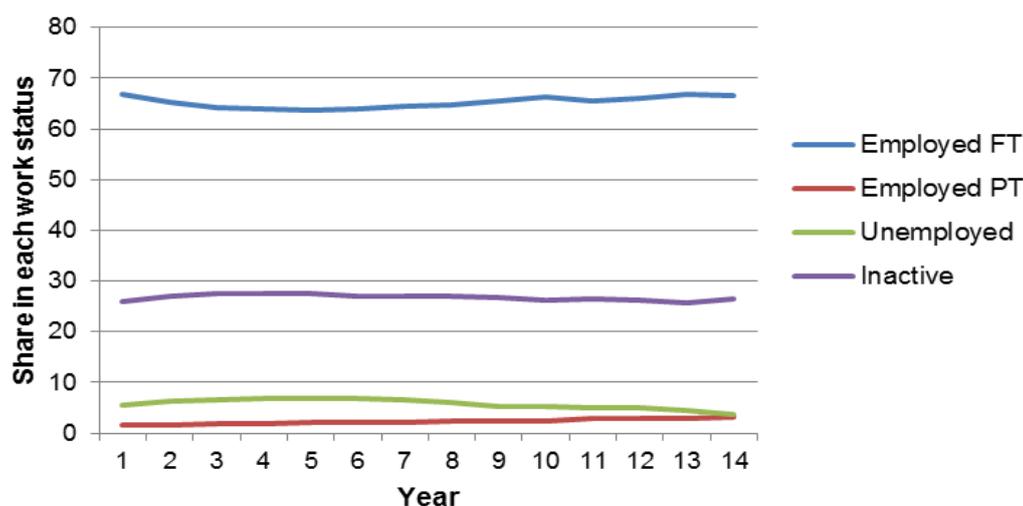Source: Authors' own calculations based on longitudinal LFS microdata.

Much more stable, as reported in *Figure 9*, is the evolution of the share in each work status for men.

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[6] The definitions of employment, unemployment and inactivity are provided in the Appendix. The distinction between individuals working full- and part-time is based on the response of the interviewee.

Figure 9.
Share of men in each work status

Note: Figures are population weighted.
Source: Authors' own calculations based on longitudinal LFS microdata.

The rise of atypical work

In this subsection we consider atypical work, whose rise is one of the most discussed features characterising the Italian labour market in the last decades. Atypical work can be defined as that wide range of employment relationships that do not conform to the standard ('typical') model of full-time work with an unlimited duration contract and a single employer. Part-time work falls therefore within this category[7]; however, the major form of non-standard work is temporary employment, i.e. work under a fixed-term contract. Besides fixed-term contracts strictly speaking, this category includes temporary agency contracts, training contracts and apprenticeships, but it can be extended to comprise parasubordinate work as well.[8] According to MLPS (2008), in 2007 nearly 2.8 mln. individuals were employed in a temporary job, half a million of them as parasubordinate workers.

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[7] When involving self-employed or employees with a long-term contract, part-time is sometimes called a 'partially standard' form of work.
[8] Whether or not to include quasi-subordinate (or parasubordinate) workers (*collaborazioni coordinate e continuative* and *prestazioni d'opera occasionali*) among temporary workers is controversial. Formally, they are not employees but self-employed, and tests run by Paggiaro *et al.* (2009) show they are rather 'different from the bulk of temporary employees in terms of past and future outcomes'. However, they share many features with temporary employees, and Mandrone (2008) shows that their contracts often present a number of subordination bonds that make them 'false self-employed workers', but quite formally similar to employees. For the purpose of this descriptive analysis, we will include them in temporary employment, as do Berton *et al.* (2008), Elia (2010) and MLPS (2008).

Since the late 1990s, several reforms have been introduced in the Italian labour market in order to increase flexibility, primarily by deregulating fixed-term contracts and temporary work agencies while leaving the legislation for standard employment unchanged, thereby facilitating the resort to temporary employment. As appears in *Table 3*, our dataset shows that the share of temporary work in total employment has risen considerably over the time span we consider, from around 4% in 1993 to over 11% in 2007. In the same period, the OECD Employment Protection Subindex for temporary employment for Italy dropped from 5.38 to 1.88, the sharpest decrease experienced by an OECD country.

There is an ongoing debate on the advantages and disadvantages of temporary jobs. Such contracts can represent a useful device to screen the ability of candidates for permanent jobs, leading the 'best' workers to an open-ended position within the same firm; also, they could increase the chances to get a permanent job elsewhere by increasing the worker's human capital relative to the unemployed worker and providing more contacts. In this sense, they may therefore represent a stepping stone to permanent employment. On the other hand, these jobs are often considered poor-quality jobs, as they are characterized by a substantial wage gap when compared to open-ended positions, and of course by a lower level of protection and working (as well as social security) rights; this makes them a useful tool for firms to handle fluctuations in demand without investing in a worker and without the burden of restrictive firing regulations; as a consequence, they may generate some sort of labour market segmentation with temporary workers 'trapped' in low-productivity sectors and/or endless precariousness.

The literature provides contrasting evidence on whether temporary jobs are a springboard toward permanent employment or dead-end jobs. Berton *et al*. (2008) find that an unemployed person who goes through a spell of temporary work has better chances of having a permanent job one year later than one who does not; Picchio (2008) finds that a person in a temporary position today has better chances of being in a permanent job in two years than one who is currently unemployed; Ichino *et al*. (2008) find that Temporary Work Agency employment has a positive impact on the probability of finding a permanent job after 18 months, although the effect is more robust in Tuscany than in Sicily; Gagliarducci (2005) investigates the effect of repeated temporary jobs on the probability of finding a stable job, and concludes that 'it is not temporary employment *per se* but the intermittence associated with it that is detrimental to employment prospects'. Barbieri and Scherer (2009), on the other hand, find that '*atypical employment does not serve as a springboard towards stable employment but rather postpones this transition considerably. […] not necessarily whatever kind of job is definitely better than remaining unemployed, especially if this time – sheltered by the family – is spent searching or waiting for a secure, insider position*'.

Besides the analysis of employment prospects, another way to investigate the situation of temporary workers, and more specifically the intrinsic quality of their job, is by drawing a distinction between satisfactory and unsatisfactory employment. Barbieri and Sestito (2008) and Paggiaro *et al.* (2009) define satisfactory employment as '*holding a job position in which an individual is neither involuntarily placed because of lack of alternatives nor actively looking for another job*'. As a consequence, the worker stating that he accepted the current temporary position because he could not find a permanent one, and/or that he is looking for a new job because the one he has is only temporary, are both a sign of some level of dissatisfaction with the current job.[9]

In our sample, 64% of temporary workers show at least one sign of dissatisfaction; 11% of the group is both involuntary temporary employed and looking for another job, 48% is involuntary in a fixed-term position, but not looking for an alternative one. Altogether, this shows that temporary work is often not a choice but something imposed by the employer.[10]

The next question then is: which subgroups of the population are most affected by the upsurge of temporary work? First of all, the proportion of individuals in temporary positions is systematically higher for women than for men: *Table 3* shows that the share for the former is on average 76% higher than for the latter. This trend seems to be driven by women in parasubordinate positions, whose share is more than twice as high as that of men.

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[9] The distinction between temporary and permanent jobs, and the reason for being in a temporary position, are based on the answers provided by LFS respondents. However, it is worth noting that, up to 2003, there might be some distortions in the information. First of all, the relevant filter for determining whether the worker is in a temporary or permanent position is the interviewee's perception, which might not coincide with the formal status. Secondly, the lack of alternatives is captured by a question which is not specific, but contains information on several aspects of the part-time nature of the job; again, the answer could be imprecise. Given the purely descriptive nature of this part of the work, these indicators can nevertheless provide some useful insight into the nature of employment.

[10] The LFS does not provide information on whether the worker feels the temporariness of his position as justified, which is another factor that might say something about the individual perception of the job. Using Isfol Plus 2006, Mandrone (2008) finds that more than half of the individuals interviewed believe that the temporary nature of their contract is not motivated by a need for flexible production, but rather by the lower cost and less stringent firing regulation. This, again, does not speak in favour of a decent perceived quality of the job.

Table 3.
Share of temporary workers on total employment

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2004	2005	2006	2007
Total	4.32	5.11	5.06	5.25	5.76	6.09	6.94	7.23	6.88	7.27	9.87	10.71	11.38	11.14
of which: parasubordinate											*2.08*	*2.03*	*2.12*	*1.87*
By gender:														
Men	3.33	4.08	4.05	4.44	4.83	5.00	5.72	5.94	5.65	5.91	7.67	8.42	8.59	8.48
of which: parasubordinate											*1.35*	*1.34*	*1.40*	*1.23*
Women	6.20	7.03	6.92	6.72	7.42	8.04	9.08	9.43	8.91	9.51	13.23	14.20	15.66	15.22
of which: parasubordinate											*3.21*	*3.08*	*3.21*	*2.85*
By educational level:														
Compulsory education	4.32	5.08	4.93	5.18	5.83	6.05	6.85	6.76	7.02	7.27	8.07	9.12	9.88	9.14
of which: parasubordinate											*1.12*	*0.91*	*1.00*	*0.72*
Upper secondary education	4.30	5.15	4.94	5.35	5.55	6.24	7.09	7.48	6.44	7.12	10.61	11.01	11.51	11.37
of which: parasubordinate											*2.34*	*2.25*	*2.35*	*2.12*
Tertiary education	4.37	5.12	6.34	5.29	6.12	5.76	6.84	8.27	7.77	7.80	12.98	14.15	14.93	15.59
of which: parasubordinate											*4.21*	*4.45*	*4.37*	*4.04*
By region:														
North	3.11	3.79	3.94	3.99	4.48	4.55	5.7	5.57	5.13	5.96	8.36	9.21	9.54	9.41
of which: parasubordinate											*2.18*	*2.06*	*2.00*	*1.74*
Centre	3.55	4.03	4.03	4.18	4.48	5.25	5.59	6.39	6.00	6.26	10.51	11.09	12.74	11.96
of which: parasubordinate											*2.67*	*2.81*	*3.10*	*2.63*
South	6.91	8.18	7.83	8.32	8.96	9.43	10.14	10.85	10.61	10.35	12.08	13.11	13.69	13.67
of which: parasubordinate											*1.50*	*1.45*	*1.63*	*1.54*
By age group:														
Men														
15-24	11.75	12.68	13.66	14.60	14.78	17.81	20.88	19.81	18.46	22.20	30.21	31.02	36.11	35.40
of which: parasubordinate											*2.22*	*3.14*	*3.12*	*2.75*
25-34	3.76	5.09	5.19	5.98	6.49	6.29	7.28	7.29	7.30	7.59	9.46	11.49	11.91	12.14
of which: parasubordinate											*2.06*	*1.78*	*2.66*	*2.36*
35-44	1.58	2.42	2.20	2.50	2.66	3.02	3.70	4.12	4.03	3.79	5.51	5.99	4.95	5.56
of which: parasubordinate											*0.93*	*1.04*	*0.73*	*0.68*
45-54	1.66	2.25	2.20	2.15	2.68	2.15	2.68	3.43	2.87	2.85	3.05	3.58	4.13	3.80
of which: parasubordinate											*0.48*	*0.51*	*0.59*	*0.37*
55-64	2.19	1.96	1.86	2.29	3.09	3.36	2.96	3.29	3.60	4.03	4.75	5.08	4.38	4.53
of which: parasubordinate											*2.32*	*2.04*	*1.36*	*1.54*
Women														
15-24	13.04	15.80	17.18	16.63	18.06	23.16	25.15	23.57	22.29	24.74	30.79	40.76	41.67	46.21
of which: parasubordinate											*6.07*	*6.98*	*6.75*	*9.89*
25-34	7.53	9.41	8.25	8.01	10.61	9.34	11.42	12.09	12.14	12.35	18.71	17.84	22.29	21.44
of which: parasubordinate											*4.58*	*3.85*	*6.14*	*4.53*
35-44	4.40	4.57	4.54	5.31	4.46	5.77	6.78	7.21	6.60	7.74	10.80	12.37	13.69	12.25
of which: parasubordinate											*2.49*	*2.60*	*1.87*	*1.78*
45-54	3.06	3.15	3.84	2.98	3.18	4.28	4.22	4.59	3.95	4.91	6.74	7.62	7.54	8.65
of which: parasubordinate											*1.63*	*2.14*	*1.16*	*1.31*
55-64	3.00	2.28	2.52	2.73	2.50	2.37	2.78	2.79	4.90	3.70	4.96	6.02	6.71	5.87
of which: parasubordinate											*3.02*	*1.91*	*2.43*	*1.52*

Notes: All figures are population weighted.
Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007

Temporary work is relatively more common among skilled workers (i.e. individuals holding a tertiary qualification) than the unskilled, in particular in recent years: once again, the source of this difference can be found in the diffusion of collaboration contracts, four times higher for individuals with a university degree than for workers with primary education.
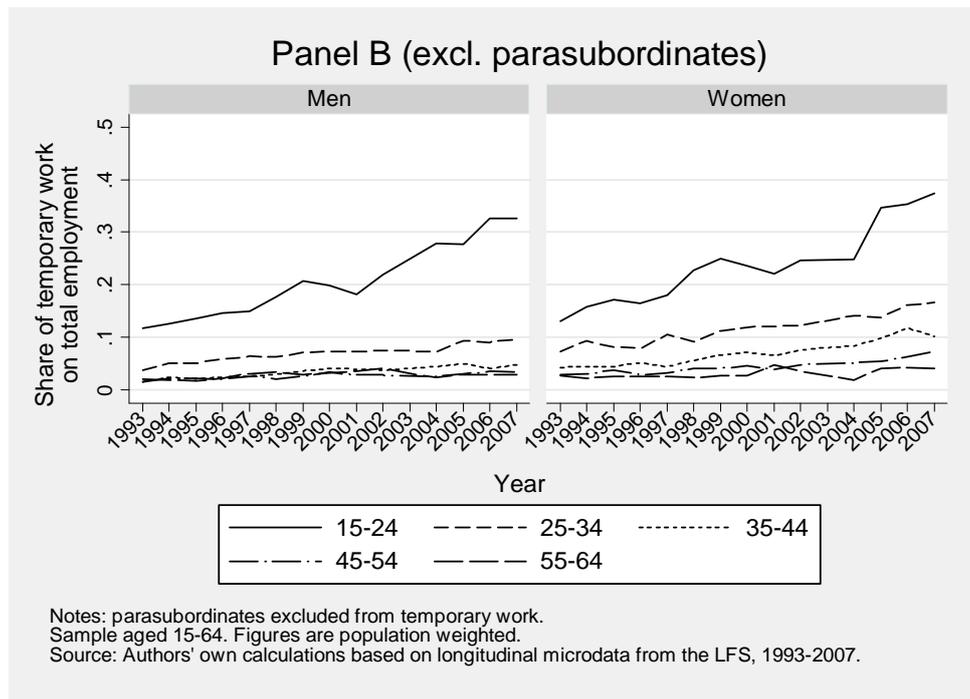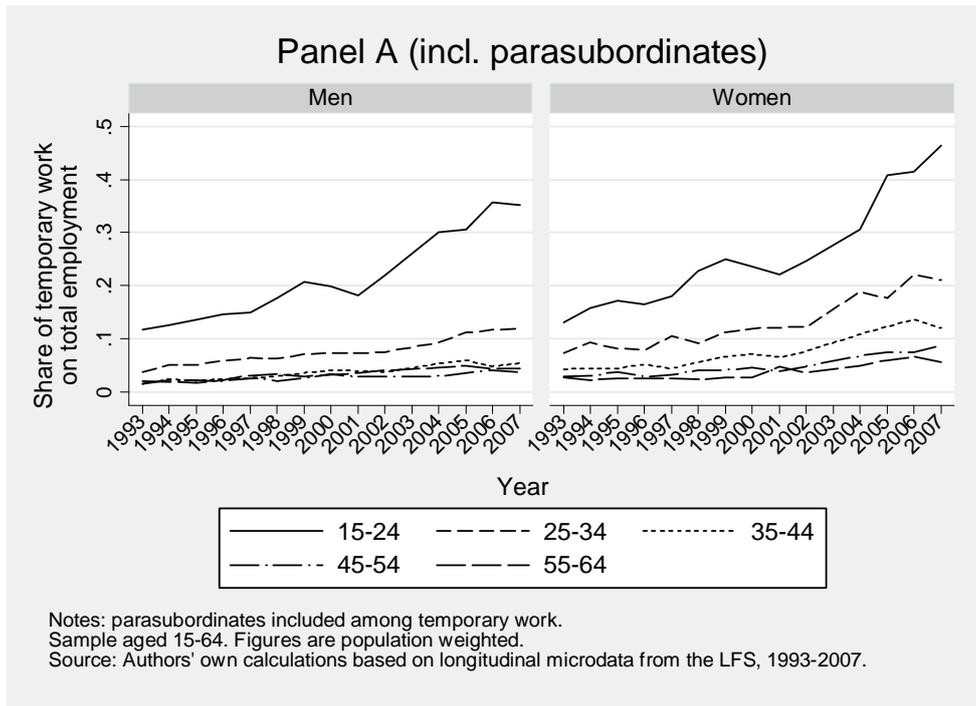
Workers in Southern Italy are relatively more affected by temporary work than in the rest of the country; the difference was sizeable until 2002, but in recent years the gap has been narrowed, as parasubordinate work seems to be relatively more common in Northern and Central Italy.

Figure 10 shows the share of temporary work in employment for different age groups, both including (Panel A) and excluding (Panel B) parasubordinate contracts. It is evident that the incidence of fixed-term work is higher for younger cohorts, consistently, according to Barbieri and Scherer (2009), with the way the recent labour market deregulation has been targeted.

For female workers aged 15 to 24, in particular, the share of temporary workers in 2007 is around twice as high as it was in 2002; this upsurge is partly due to the inclusion in our figures of parasubordinates from 2004 (who cannot be identified before this year), who make up 6 to 10% of individuals in this group in the last four years; however, from 2005 onwards we also see an evident increase in temporary workers in the strict sense.[11]

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[11] As for part-time work, the series reconstructed by Istat after redesigning the survey show consistently higher shares of temporary work from the beginning of the period, although the difference is much smaller here than was previously the case.

Figure 10.
Evolution of temporary work as a share of total employment

Panel A (incl. parasubordinates)

| Men | Women |

Notes: parasubordinates included among temporary work.
Sample aged 15-64. Figures are population weighted.
Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007.

Panel B (excl. parasubordinates)

| Men | Women |

Notes: parasubordinates excluded from temporary work.
Sample aged 15-64. Figures are population weighted.
Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007.

As mentioned above, parasubordinate workers are formally self-employed. Over the time span we consider, there has been an overall decrease in self-employment rates, which is consistent with the fall experienced by most OECD countries (OECD, 2009). Men exhibit fairly stable shares of self-employment until the early 2000s, followed by a clear decrease from 2002, concentrated among the youngest and oldest cohorts. On the other hand, *Figure 11* shows a fall in female self-

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employment rates for those aged 45 and above, which is quite constant over the entire time span. For old-age workers, the rate at the end of the period is half that at the beginning. On the contrary, the youngest female cohort appears to have experienced a 5 percentage point rise in recent years; note, however, that this increase is entirely due to parasubordinate work: this component has somewhat offset an otherwise overall decline in self-employment. [12]

Figure 11.
Evolution of self-employment rates

Notes: parasubordinates are included among the self-employed.
Sample aged 15-64. Figures are population weighted.
Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007.
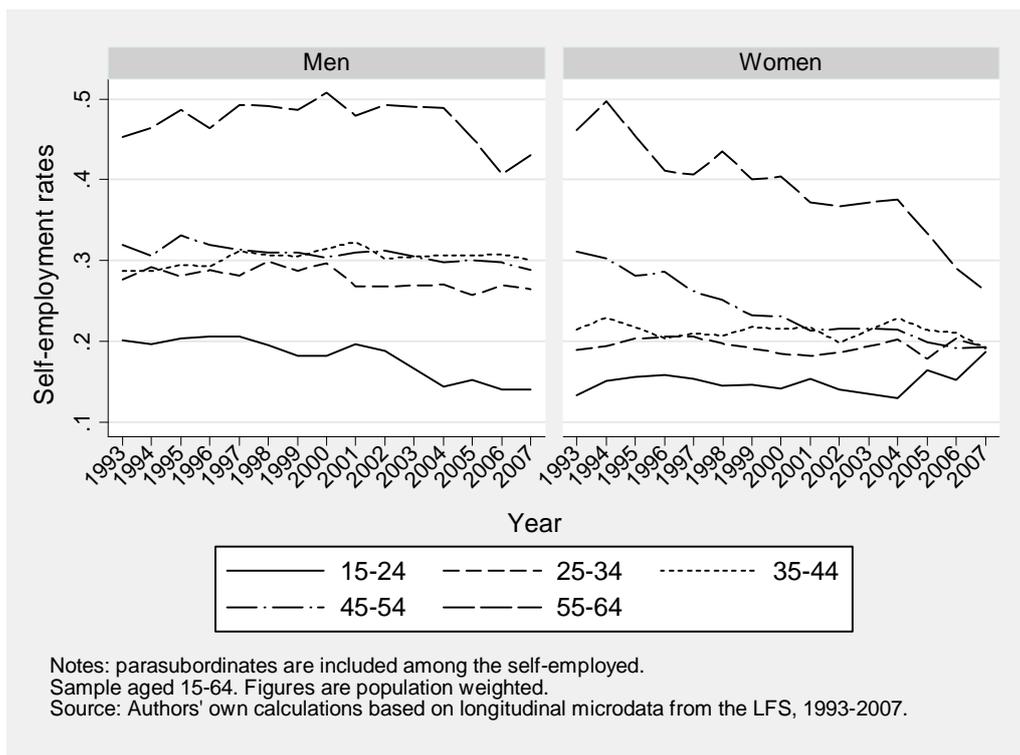
Summing up, the picture drawn above shows a situation where, despite a remarkable increase in activity and employment rates over the last decades, a number of crucial problems persist. First of all, the rise in these rates has not been high enough to allow Italy to reach the strategic goals set by the Lisbon Strategy, which puts the country among the worst-faring ones in the EU in this respect; female labour market indicators, as well as those referring to older workers, are still far from being satisfactory. Second, regional differences are still significant, and often even on the rise. Third, the young display a decreasing level of attachment to the labour market; while this could very well be due to the choice to invest more in education, we cannot rule out the possibility that this decision results from a perceived lack of alternatives, which drives these individuals to stay for longer in the

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[12] As mentioned above, before 2004 it is not possible to separately identify parasubordinates in our sample, so we cannot distinguish the relative diffusion patterns of these contracts and self-employment strictly speaking up to that year, but only from 2004 onwards.

educational system '*waiting for better times*'. Finally, one of the main phenomena observed is the upsurge of atypical work, which has affected especially women and the young, with the risk of making them second-class workers in a labour market which appears to be more and more dualistic.

5. An econometric approach

The analysis presented in the former subsection describes the evolution over time of some labour market indicators. In order to further explore factors which determine transitions between different conditions in the labour market, *ceteris paribus*, we need to adopt an econometric approach.

There are two main issues we want to investigate, namely the evolution over time of the probability of being employed in the Italian labour market, and the evolution of the conditional probabilities of transitions across employment states.

For the current analysis we focus on women between 16 and 60 years of age, and men between 16 and 65. Our sample is composed of 720,504 observations, 48.44% of which are women.

For the first task, we ignore the longitudinal feature of the data and we use a static logistic model, where the probability of being employed at time *t* is regressed over a set of observable characteristics, including time dummies aiming at capturing the evolution of the employment probability over time. The econometric framework is the following. Assuming a dichotomous nature of the employment variable, such that $y_i = 1$ if the *i-th* individual is employed and 0 otherwise, the conditional probability of being employed in *t* (y^*) is modelled as:

$$P(y^* = y \mid X_{it}) = \frac{\exp(X_i B)}{1 + \exp(X_i B)}$$

where X_i is the vector containing individual characteristics as well as time dummies. A detailed presentation of the set of characteristics we are controlling for and of the parameter estimates is provided in section 5.1.

As far as the second task is concerned, conditional transitional probabilities among states are modelled as follows. Individuals within the age bands stated above, excluding those who reported being, at any considered point in time, students (therefore ruling out working students), retirees, disabled or in military service, can be classified as:

- full time workers (those who reported working full-time);

-    part-time workers (those who reported working part-time);

-    unemployed;

-    outside the labour market (inactive).

Again, this categorization is based on the definition provided in the Appendix.

Transition probabilities are estimated on the pseudo-panel RFL 1993-2007 composed of 554,151 non-missing observations, 51.08% of which refers to women. Gender-specific multinomial models are used, assuming that, controlling for a set of observable characteristics, the individual status at time *t+1* depends on the state observed in *t*. Given the initial status of individual *i* at time *t*, the conditional probabilities of transition or immobility in the following year (*J=j*) are modelled as[13]:

$$P(J_{t+1} = j_{t+1} \mid j_t, X_{it}) = \frac{\exp(X_{it} B_j)}{1 + \sum_{j=1}^{4} \exp(X_{it} B_j)} \qquad j = 1,...,4.$$

where *j* is one of the four feasible statuses, X_i is the covariates vector (education, second order polynomial in age, geographical area, marital status, sector and type of employment and time dummies) and β_j is the vector of coefficients varying according to each state. Paragraph 5.2 reports a detailed explanation of the features of this econometric framework together with estimates.

5.1 Describing probabilities of being employed

To analyse the employment propensity of individuals over time, we ignore the longitudinal dimension of the microdata and focus on the individuals' occupational state at the beginning of the period (*t*). We use two gender-specific logistic models, where the dependent variable is a dummy variable indicating whether the interviewee is employed at time *t*. We use time dummies (when the year corresponds to year *t*) to capture the evolution of the employment probability over time. We include among the covariates the following socio-demographic variables: a quadratic term in age; three levels of educational attainment (compulsory education – which is lower secondary education or below, upper secondary education, and tertiary/higher education). We furthermore control for

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[13] The multinomial logit model is valid under some conditions. The most important, known as Independence of Irrelevant Alternatives (IIA), imposes errors ε_{ij} which are independents of j, i.e. the odds-ratios are assumed to be constant between two alternatives, even if the number of alternatives increases.

marital status, through a dummy variable capturing whether the individual is married/cohabiting[14], for regional differences in labour market trends, differentiating between three macro-areas (North, Centre and South of Italy). The presence of time dummy variables allows us to identify changes in employment probability over time, holding fix individual characteristics.

Table 4 shows the estimated parameters from the logistic regressions, together with the marginal effects evaluated at the sample means of the covariates. We find the expected signs for the socio-demographic control variables: the propensity to be employed increases with level of education, while age (which tends to be highly correlated with working experience) yields positive but decreasing returns. The probability of being employed is higher for individuals living in Northern Italy, and lower for those living in the South, for both men and women. Being married is associated with a higher employment propensity for men, while married women tend to be more frequently out of employment than non-married ones.

Time dummies (with 1993 as the reference year) suggest an unexpected U-shaped development for both female and male employment propensities; the former decreases from 1995, then remains fairly stable for a few years (with coefficients for the year dummies in the central part of the time span that are not statistically different from one another), and witnesses a notable rise from 2001, with an employment probability higher than in 1993, other things being equal. A similar pattern can be found for men, with an immediate decrease at the beginning of the period, a few years of stability, after which the propensity settles at a slightly higher level, from 2001 onwards; the difference here is that the chances of being employed at the end of the period are lower than at the beginning. For women in particular, these findings are rather different from the trend observed in *Figure 4*, where the rise in female employment was more pronounced; a possible explanation is that part of the upward trend shown by the aggregate employment rate was due to the changing composition of the female labour force, especially in terms of educational attainment; the share of women with higher secondary and tertiary education has risen constantly over the period, and as a higher level of education is generally associated with a higher attachment to the labour market, this could explain why the trend observed in the regression is somewhat less pronounced, given the fact that we are controlling for educational attainment in the regressions.[15]

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[14] For privacy reasons, no data are available on the marital status of individuals in the RCFL. For the period 2004-2007, we therefore constructed a proxy for this variable, with a procedure explained in the Appendix.
[15] A difference between Figure 4 and the trend captured here is present for men, too, but it is not as big as the one obtained for women. Running a regression without controlling for level of education allows us to have results consistent with the descriptive ones.

Table 4.
Logistic regressions for employment probabilities (year)

	Women						Men					
	Coefficient (1)			Marginal effect (2)			Coefficient (3)			Marginal effect (4)		
Upper secondary	0.8814	***	(0.010)	0.2132	***	(0.002)	0.1759	***	(0.011)	0.0337	***	(0.002)
Tertiary	1.6785	***	(0.019)	0.3890	***	(0.004)	0.8215	***	(0.025)	0.1327	***	(0.003)
Age	0.4138	***	(0.003)	0.0995	***	(0.001)	0.5587	***	(0.003)	0.1085	***	(0.001)
Age^2	-0.0052	***	(0.000)	-0.0013	***	(0.000)	-0.0071	***	(0.000)	-0.0014	***	(0.000)
Centre	-0.3553	***	(0.012)	-0.0832	***	(0.003)	-0.2326	***	(0.014)	-0.0467	***	(0.003)
South	-1.1683	***	(0.010)	-0.2646	***	(0.002)	-0.7339	***	(0.011)	-0.1488	***	(0.002)
Married/cohabiting	-0.4327	***	(0.011)	-0.1047	***	(0.003)	0.9713	***	(0.014)	0.1947	***	(0.003)
1994	-0.0249		(0.022)	-0.0060		(0.005)	-0.1293	***	(0.025)	-0.0258	***	(0.005)
1995	-0.0657	***	(0.021)	-0.0157	***	(0.005)	-0.2175	***	(0.024)	-0.0440	***	(0.005)
1996	-0.0784	***	(0.021)	-0.0187	***	(0.005)	-0.2377	***	(0.024)	-0.0483	***	(0.005)
1997	-0.0897	***	(0.022)	-0.0214	***	(0.005)	-0.2695	***	(0.024)	-0.0551	***	(0.005)
1998	-0.0849	***	(0.022)	-0.0203	***	(0.005)	-0.2754	***	(0.024)	-0.0563	***	(0.005)
1999	-0.0577	***	(0.022)	-0.0138	***	(0.005)	-0.2549	***	(0.024)	-0.0519	***	(0.005)
2000	-0.0148		(0.022)	-0.0036		(0.005)	-0.2456	***	(0.024)	-0.0500	***	(0.005)
2001	0.0373	*	(0.022)	0.0090	*	(0.005)	-0.1937	***	(0.024)	-0.0390	***	(0.005)
2002	0.0771	***	(0.022)	0.0187	***	(0.005)	-0.1652	***	(0.024)	-0.0331	***	(0.005)
2004	0.1700	***	(0.024)	0.0414	***	(0.006)	-0.1821	***	(0.027)	-0.0366	***	(0.006)
2005	0.1644	***	(0.024)	0.0400	***	(0.006)	-0.1679	***	(0.027)	-0.0337	***	(0.006)
2006	0.1668	***	(0.025)	0.0406	***	(0.006)	-0.1261	***	(0.029)	-0.0251	***	(0.006)
2007	0.1425	***	(0.025)	0.0346	***	(0.006)	-0.1204	***	(0.028)	-0.0239	***	(0.006)
Constant	-7.4997	***	(0.054)				-8.7790	***	(0.048)			
Observations	349038						371466					
Pseudo R^2	0.171						0.291					

Notes: the reference individual is a person with compulsory education, living in Northern Italy, not married. Robust standard errors are in parentheses. Estimates are weighted using longitudinal weights from LFS. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007

Table 5.
Logistic regressions for employment probabilities (cohort)

	Women						Men					
	Coefficient (1)			Marginal effect (2)			Coefficient (3)			Marginal effect (4)		
Upper secondary	0.8756	***	(0.010)	0.2118	***	(0.002)	0.1635	***	(0.011)	0.0311	***	(0.002)
Tertiary	1.6740	***	(0.019)	0.3882	***	(0.004)	0.8077	***	(0.025)	0.1299	***	(0.003)
Age	0.4061	***	(0.004)	0.0976	***	(0.001)	0.5436	***	(0.004)	0.1049	***	(0.001)
Age^2	-0.0049	***	(0.000)	-0.0012	***	(0.000)	-0.0068	***	(0.000)	-0.0013	***	(0.000)
Centre	-0.3541	***	(0.012)	-0.0829	***	(0.003)	-0.2326	***	(0.014)	-0.0464	***	(0.003)
South	-1.1666	***	(0.010)	-0.2642	***	(0.002)	-0.7373	***	(0.011)	-0.1488	***	(0.002)
Married/cohabiting	-0.4352	***	(0.011)	-0.1053	***	(0.003)	0.9747	***	(0.014)	0.1944	***	(0.003)
Cohort 1948-1952	0.2818	***	(0.019)	0.0689	***	(0.005)	0.2231	***	(0.022)	0.0412	***	(0.004)
Cohort 1953-1957	0.3770	***	(0.023)	0.0925	***	(0.006)	0.5521	***	(0.028)	0.0949	***	(0.004)
Cohort 1958-1962	0.4042	***	(0.026)	0.0993	***	(0.007)	0.4044	***	(0.032)	0.0720	***	(0.005)
Cohort 1963-1967	0.5819	***	(0.029)	0.1433	***	(0.007)	0.4008	***	(0.035)	0.0716	***	(0.006)
Cohort 1968-1972	0.7485	***	(0.032)	0.1844	***	(0.008)	0.4594	***	(0.039)	0.0810	***	(0.006)
Cohort 1973-1977	0.7526	***	(0.037)	0.1854	***	(0.009)	0.4616	***	(0.043)	0.0812	***	(0.007)
Cohort 1978-max	0.6344	***	(0.042)	0.1563	***	(0.010)	0.4763	***	(0.048)	0.0836	***	(0.008)
Constant	-8.1959	***	(0.092)				-9.2563	***	(0.096)			
Observations	349038						371466					
Pseudo R^2	0.172						0.292					

Notes: the reference individual is a person with compulsory education, living in Northern Italy, not married, born before 1948. Robust standard errors are in parentheses. Estimates are weighted using longitudinal weights from LFS. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007

An alternative reading is provided by the regressions in *Table 5*, which consider the employment pattern of subsequent birth cohorts rather than a pure time trend. We consider here five-year cohorts. Among women, we find an evident increase in the employment rates of succeeding cohorts, even if controls for educational attainments are still employed. Results may be read as consequence of the higher female attachment to the labour market or an increase in the chance of women to find a profitable job in the labour market, *ceteris paribus*; the only exception concerns the more recent cohort, i.e. women born from 1978 on: arguably, this category includes individuals who are likely to be still in full-time education at the time of the interview, and therefore recorded as inactive, which brings down the employment probability for the whole cohort. A different picture can be drawn for men; the likelihood of being employed appears to rise for subsequent cohorts until the group of those born around the mid-'50s. For those born around or after 1960, the employment probability settles to a slightly lower level – although still higher than the one obtained for the first cohorts – and remains stable for the subsequent ones.

5.2 Investigating labour market transitions

We turn now to the analysis of labour market dynamics, where we distinguish four separate employment states, i.e. full-time employment, part-time employment, unemployment and inactivity/outside the labour force. We consider the transitions from the occupational state at the beginning of the period, i.e. year *t*, and the end of the period, year *t+1*.

Table 6.
Labour market transition matrix by gender
percentage of the longitudinal population by labour state at time t

		Year t+1			
		Employed FT	Employed PT	Unemployed	Inactive
		Men			
Year t	Employed FT	96.42	1.12	1.42	1.05
	Employed PT	40.08	48.67	6.22	5.02
	Unemployed	26.03	3.89	52.60	17.48
	Inactive	23.56	3.55	26.38	46.51
		Women			
Year t	Employed FT	91.00	4.13	1.60	3.27
	Employed PT	19.08	69.48	3.32	8.12
	Unemployed	13.33	6.62	47.55	32.50
	Inactive	3.31	1.96	5.38	89.35

Notes: The sample includes 554,151 individuals. All figures are population weighted.
Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007

Table 6 shows the transition matrices for the whole period, disaggregated by gender. The proportions displayed on the main diagonals point in the direction of a significant level of persistence in the original state, especially for those employed full-time: 96% and 91% of respectively men and women in this category find themselves in the same state one year later. Women display substantial persistence in inactivity (89%) and part-time employment (69%), too, while 40% of male part-timers have a full-time job one year later, and 27% of inactive males take on new employment. The unemployed show a relatively higher mobility as well: among men, 30% have a job at time *t+1*, compared with 20% among women.

These figures are clearly just mean trend indicators referred to the entire sample. However, labour market transitions (or persistence) are obviously influenced by a number of personal characteristics, and our purpose is to investigate what are the determinants of the individual propensity to move from one work state to another. Unlike some of the previous work on the topic (see for example Fabrizi and Mussida, 2009; Lucarelli and Mussida, 2010), we carry out separate estimations for men and women, as we believe that their behaviour and their response to different characteristics display significant differences.

To model the conditional probabilities of transition between different employment states, we use multinomial logistic regressions (MNL), as in Bellman *et al.* (1995) and Chies *et al.* (1998). In these models, the dependent variable is the work state at time *t+1*, and the base outcome for the MNL is full-time employment. In addition to the list of covariates described above, we include a lag of the dependent variable which takes the form of dummy variables for the possible working states

at time *t*, in order to facilitate the presentation and discussion of results (taking full-time employment as the reference condition); we take into account heterogeneity in labour market transitions between employees and self-employed workers, by including a dummy equal to 1 if the individual was an employee, and 0 otherwise; we also distinguish between those who work in the public and private sector, using a *public* dummy.[16] It is worth noting that, as pointed out by Chies *et al.* (1998), the choice of the control variables is not meant to describe the behaviour of individuals (as of course it is hard to believe that all transitions are due to the individual's decision), but rather to investigate the determinants of mobility between different labour market states. In other words, we assume that individual labour market transitions are fully determined by features of the supply side of the labour market.

A well-known feature of multinomial logistic regressions is that they estimate *k-1* models, where *k* is the number of possible outcomes of the dependent variable (given that the alternatives are mutually exclusive and exhaustive, probabilities sum to one, and only *k-1* parameter vectors are required to compute the *k* probabilities). This implies that the estimated parameter for an explanatory variable is relative to the chosen reference category; it therefore gives a measure of how the propensity to be in each category changes relative to the propensity to be in the benchmark one, due to a one-unit change in the corresponding variable, and while holding all the other predictor variables constant.

Table 7 and *Table 8* present the estimates from MNL regressions for women and men respectively, together with the relative marginal effects evaluated at the sample means of the explanatory variables. As mentioned above, we choose full-time employment as our benchmark state, so that the parameters in columns 1-3 in the Tables have to be read in relation to that base outcome.

Table 8 presents the estimates concerning male transition probabilities. The high level of persistence in the original state is confirmed by the dummies relative to the three alternative work states at time *t*. These dummies show significantly higher estimated parameters when the state at time *t+1* is the same as in the previous year. On the other hand, the table also shows a relevant flow from unemployment to inactivity and vice versa – much higher than between employment and non-employment.

In general, the higher the level of educational attainment, the lower the probability that men move to an occupational state other than full-time employment. If we consider this as the 'best'

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[16] When compared to the cited papers, the set of covariates we can use is limited, because of constraints in the availability of variables in the LFS. See the Appendix for more details. In this section, the inclusion of time dummies is not meant to describe a trend over time (as in Fabrizi and Mussida, 2009), but rather to control for the effect of the business cycle, or other changes in the economic or institutional situation that can affect the estimates of the transition parameters. This also allows us to partially control for the break in the LFS series occurring in 2003.

outcome, or the most preferable one, we can say that being more educated lowers the probability for a man in full-time employment at time t (the reference category in the regressions[17]) to be in a 'worse' work state one year later. We also observe a positive effect of age, meaning that the older the individual (and for men, who have a fairly continuous employment history, this reasonably entails more working experience), the lower the likelihood to be found in a different occupational state, and especially to leave employment. On the other hand, young people are more prone to change labour market state than their older counterparts, *ceteris paribus*. Because we are modelling transitions based on the characteristics observed on the supply side we can speculate that our findings are justified by younger age groups being more mobile. However, as Fabrizi and Mussida (2009) point out, this could also signal a lack of opportunities for the young. The propensity to leave full-time employment for another state varies significantly across regions: when compared to someone living in Northern Italy, the transition is more likely in Central Italy, and even more so in the South. Being married appears to increase the propensity to be still in full-time employment at time $t+1$; it also significantly reduces the probability to be outside the labour market. Working in the public sector rather than in the private is associated with a higher chance of transition to part-time employment, and to a lower chance of being out of work; the opposite holds for being an employee rather than self-employed.

In *Table 7* we find a few patterns for women that follow those observed for men. Once again, we find evidence of a high level of persistence in the origin state, as shown by the dummies relative to the three alternative work state at time t.

A higher educational level seems to increase the female attachment to the labour market, drastically reducing the propensity to drop out of the labour force, but also the chance to be out of work. As for men, there are relevant regional differences, with a higher probability to be unemployed or inactive at time $t+1$ for women in full-time employment living in Central Italy and especially in the South rather than in the North. It should be noted, however, that residence in these regions also appears to imply a lower propensity to work part-time; this may be due to the wider diffusion of this work arrangement in the North than in the rest of Italy.

Age does not necessarily appear to keep 'worse' labour market outcomes at bay, as happens for men; on the one hand, an older woman seems to be less likely to exit the labour force, and more likely to be still in full-time employment one year later; however, females have a higher propensity to be in part-time employment or unemployed. This different behaviour when compared to men can

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[17] It is reasonable to evaluate the parameters with full-time employment as reference state, as it is the most common work condition in our sample: 86% of the men are employed full-time at time t. We do not find a comparable prevalence of FT work among women: only 42% of female individuals find themselves in this occupational state, yet this is still the most frequent outcome.

be explained by the fact that for women age may not be so closely related to work experience, as female employment histories tend to be much more fragmented.

As may be expected, marital status has a very different impact for women than for men. Being married seems to diminish a woman's chances of still being in full-time employment one year later, but also those of being unemployed; on the other hand, the positive marginal effect in column 7 shows that married females are more likely to exit the labour force; therefore, other things being equal, being married appears to substantially reduce female attachment to the labour market.

Having a job in the public sector increases the chances for the woman to be still employed full-time at time $t+1$, while reducing the possibility to be in a different occupational state. When compared to a situation of self-employment, being an employee carries a lower chance to drop out of the labour market, but not of being unemployed or in part-time work instead of full-time.

Table 7.
Multinomial logit analysis of labour market transitions - Women

Work state at time $t+1$	Coefficients						Marginal effects							
	Part-time employment (1)		Unemployment (2)		Inactivity (3)		Full-time employment (4)		Part-time employment (5)		Unemployment (6)		Inactivity (7)	
Whether in PT employment at time t	4.287 ***	(0.026)	2.2792 ***	(0.052)	2.4406 ***	(0.039)	-0.4556 ***	(0.003)	0.4380 ***	(0.007)	-0.0065 **	(0.003)	0.0241 ***	(0.009)
Whether unemployed at time t	2.5326 ***	(0.052)	4.9882 ***	(0.061)	4.0041 ***	(0.043)	-0.4954 ***	(0.003)	-0.0534 ***	(0.002)	0.2515 ***	(0.012)	0.2974 ***	(0.013)
Whether inactive at time t	2.5817 ***	(0.045)	4.4120 ***	(0.060)	5.8996 ***	(0.035)	-0.8148 ***	(0.002)	-0.0338 ***	(0.002)	0.0484 ***	(0.003)	0.8002 ***	(0.003)
Upper secondary	-0.2221 ***	(0.024)	-0.4215 ***	(0.027)	-0.7105 ***	(0.023)	0.1428 ***	(0.005)	0.0088 ***	(0.002)	-0.0083 ***	(0.002)	-0.1433 ***	(0.005)
Tertiary	-0.3223 ***	(0.040)	-0.8404 ***	(0.048)	-1.2640 ***	(0.047)	0.2388 ***	(0.008)	0.0134 ***	(0.004)	-0.0253 ***	(0.002)	-0.2269 ***	(0.007)
Age	0.0624 ***	(0.009)	0.0415 ***	(0.009)	-0.0495 ***	(0.007)	0.0042 ***	(0.002)	0.0071 ***	(0.001)	0.0039 ***	(0.001)	-0.0153 ***	(0.002)
Age^2	-0.0009 ***	(0.000)	-0.0011 ***	(0.000)	0.0009 ***	(0.000)	-0.0001 ***	(0.000)	-0.0001 ***	(0.000)	-0.0001 ***	(0.000)	0.0003 ***	(0.000)
Centre	-0.0460	(0.029)	0.3162 ***	(0.036)	0.2277 ***	(0.028)	-0.0477 ***	(0.006)	-0.0149 ***	(0.002)	0.0167 ***	(0.003)	0.0459 ***	(0.006)
South	-0.2502 ***	(0.027)	0.8846 ***	(0.028)	0.7151 ***	(0.023)	-0.1411 ***	(0.005)	-0.0534 ***	(0.002)	0.0449 ***	(0.002)	0.1496 ***	(0.005)
Married/cohabiting	0.3490 ***	(0.027)	-0.1677 ***	(0.029)	0.8628 ***	(0.026)	-0.1477 ***	(0.005)	0.0030	(0.002)	-0.0411 ***	(0.002)	0.1858 ***	(0.005)
Public sector	-0.2096 ***	(0.027)	-0.4458 ***	(0.052)	-0.4851 ***	(0.040)	0.1062 ***	(0.007)	0.0016	(0.003)	-0.0158 ***	(0.003)	-0.0920 ***	(0.009)
Employee	0.1110 ***	(0.033)	0.2834 ***	(0.062)	-0.2909 ***	(0.038)	0.0334 ***	(0.007)	0.0187 ***	(0.003)	0.0287 ***	(0.005)	-0.0808 ***	(0.009)
1994	-0.1029 *	(0.062)	-0.0392	(0.059)	-0.0608	(0.049)	0.0161	(0.011)	-0.0064	(0.005)	-0.0003	(0.004)	-0.0094	(0.010)
1995	-0.0775	(0.060)	-0.0194	(0.058)	-0.0461	(0.048)	0.0118	(0.011)	-0.0049	(0.005)	0.0006	(0.003)	-0.0074	(0.010)
1996	-0.0487	(0.059)	0.0370	(0.056)	-0.0677	(0.047)	0.0122	(0.010)	-0.0021	(0.005)	0.0051	(0.004)	-0.0152	(0.009)
1997	0.0059	(0.059)	0.0364	(0.057)	-0.0956 **	(0.047)	0.0144	(0.011)	0.0038	(0.005)	0.0055	(0.004)	-0.0237 **	(0.010)
1998	0.1272 **	(0.058)	0.0619	(0.057)	-0.0963 **	(0.048)	0.0078	(0.011)	0.0152 ***	(0.005)	0.0063 *	(0.004)	-0.0293 ***	(0.009)
1999	0.1416 **	(0.058)	0.0402	(0.057)	-0.0840 *	(0.048)	0.0059	(0.011)	0.0163 ***	(0.005)	0.0042	(0.004)	-0.0264 ***	(0.010)
2000	0.1636 ***	(0.059)	-0.0953	(0.059)	-0.1072 **	(0.049)	0.0131	(0.011)	0.0207 ***	(0.006)	-0.0049	(0.003)	-0.0289 ***	(0.010)
2001	0.1327 **	(0.059)	0.0061	(0.058)	-0.0740	(0.049)	0.0059	(0.011)	0.0153 ***	(0.005)	0.0015	(0.004)	-0.0227 **	(0.010)
2002	0.2234 ***	(0.057)	-0.0175	(0.058)	-0.1023 **	(0.048)	0.0065	(0.010)	0.0260 ***	(0.006)	-0.0002	(0.004)	-0.0324 ***	(0.010)
2004	0.6166 ***	(0.061)	-0.0010	(0.072)	0.2426 ***	(0.056)	-0.0698 ***	(0.012)	0.0536 ***	(0.007)	-0.0123 ***	(0.004)	0.0285 **	(0.012)
2005	0.6657 ***	(0.060)	0.0708	(0.073)	0.1712 ***	(0.059)	-0.0636 ***	(0.012)	0.0634 ***	(0.007)	-0.0062	(0.004)	0.0065	(0.012)
2006	0.6821 ***	(0.062)	-0.2456 ***	(0.080)	0.2285 ***	(0.063)	-0.0658 ***	(0.013)	0.0652 ***	(0.008)	-0.0264 ***	(0.004)	0.0269 **	(0.014)
2007	0.7901 ***	(0.060)	0.0515	(0.075)	0.0770	(0.061)	-0.0572 ***	(0.012)	0.0865 ***	(0.008)	-0.0064	(0.004)	-0.0228 *	(0.012)
Constant	-4.3367 ***	(0.169)	-4.0870 ***	(0.171)	-2.9159 ***	(0.148)								
Observations			283,062											
Pseudo R^2			0.568											
Predicted probability (at sample means)							0.4403		0.0985		0.0771		0.3840	

Notes: the reference individual is a single, self-employed woman working full-time in the private sector, with compulsory education, living in Northern Italy. Robust standard errors are in parentheses. Estimates are weighted using longitudinal weights from LFS. Marginal effects are calculated at the sample means of the explanatory variables. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007

Table 8.
Multinomial logit analysis of labour market transitions - Men

Work state at time $t+1$	Coefficients						Marginal effects							
	Part-time employment		Unemployment		Inactivity		Full-time employment		Part-time employment		Unemployment		Inactivity	
	(1)		(2)		(3)		(4)		(5)		(6)		(7)	
Whether in PT employment at time t	4.5332 ***	(0.038)	2.2133 ***	(0.065)	2.2892 ***	(0.071)	-0.5864 ***	(0.007)	0.4994 ***	(0.008)	0.0478 ***	(0.004)	0.0391 ***	(0.003)
Whether unemployed at time t	2.4102 ***	(0.061)	4.5954 ***	(0.046)	3.8171 ***	(0.051)	-0.6498 ***	(0.007)	0.0358 ***	(0.003)	0.4567 ***	(0.009)	0.1573 ***	(0.006)
Whether inactive at time t	2.369 ***	(0.072)	4.0436 ***	(0.051)	4.8026 ***	(0.051)	-0.6871 ***	(0.007)	0.0294 ***	(0.003)	0.255 ***	(0.009)	0.4027 ***	(0.011)
Upper secondary	-0.081 **	(0.035)	-0.2979 ***	(0.027)	-0.3726 ***	(0.031)	0.0117 ***	(0.001)	-0.0011 **	(0.001)	-0.0055 ***	(0.001)	-0.0051 ***	(0.000)
Tertiary	-0.1247 **	(0.059)	-0.6985 ***	(0.058)	-0.8087 ***	(0.066)	0.0208 ***	(0.001)	-0.0016 *	(0.001)	-0.0105 ***	(0.001)	-0.0087 ***	(0.001)
Age	-0.0515 ***	(0.010)	-0.0544 ***	(0.007)	-0.0956 ***	(0.008)	0.0032 ***	(0.000)	-0.0008 ***	(0.000)	-0.0010 ***	(0.000)	-0.0014 ***	(0.000)
Age^2	0.0007 ***	(0.000)	0.0005 ***	(0.000)	0.0014 ***	(0.000)	0.0000 ***	(0.000)	0.0000 ***	(0.000)	0.0000 ***	(0.000)	0.0000 ***	(0.000)
Centre	0.1738 ***	(0.048)	0.4298 ***	(0.041)	0.3754 ***	(0.047)	-0.0180 ***	(0.002)	0.0026 ***	(0.001)	0.0094 ***	(0.001)	0.0059 ***	(0.001)
South	0.4345 ***	(0.036)	1.1447 ***	(0.031)	1.0443 ***	(0.034)	-0.0508 ***	(0.001)	0.0065 ***	(0.001)	0.0268 ***	(0.001)	0.0175 ***	(0.001)
Married/cohabiting	-0.3265 ***	(0.041)	-0.5916 ***	(0.031)	-0.7652 ***	(0.035)	0.0295 ***	(0.001)	-0.0050 ***	(0.001)	-0.0123 ***	(0.001)	-0.0123 ***	(0.001)
Public sector	0.2846 ***	(0.043)	-0.7980 ***	(0.063)	-0.6269 ***	(0.072)	0.0147 ***	(0.001)	0.0053 ***	(0.001)	-0.0125 ***	(0.001)	-0.0075 ***	(0.001)
Employee	-0.0752 *	(0.042)	0.4130 ***	(0.047)	0.1964 ***	(0.052)	-0.0091 ***	(0.001)	-0.0014 **	(0.001)	0.0078 ***	(0.001)	0.0027 ***	(0.001)
1994	-0.0906	(0.088)	-0.1395 **	(0.058)	-0.1944 ***	(0.070)	0.0064 ***	(0.002)	-0.0013	(0.001)	-0.0025 **	(0.001)	-0.0026 ***	(0.001)
1995	-0.1495 *	(0.086)	-0.1266 **	(0.057)	-0.0738	(0.065)	0.0055 ***	(0.002)	-0.0022 *	(0.001)	-0.0023 **	(0.001)	-0.0010	(0.001)
1996	-0.0672	(0.083)	-0.0800	(0.056)	-0.1330 **	(0.065)	0.0043 **	(0.002)	-0.0010	(0.001)	-0.0015	(0.001)	-0.0018 **	(0.001)
1997	0.0451	(0.082)	-0.0923 *	(0.056)	-0.2199 ***	(0.066)	0.0038 *	(0.002)	0.0008	(0.001)	-0.0017 *	(0.001)	-0.0029 ***	(0.001)
1998	-0.0763	(0.083)	-0.1259 **	(0.055)	-0.1710 ***	(0.066)	0.0057 ***	(0.002)	-0.0011	(0.001)	-0.0023 **	(0.001)	-0.0023 ***	(0.001)
1999	0.1342 *	(0.080)	-0.1510 ***	(0.055)	-0.1047	(0.065)	0.0019	(0.002)	0.0023	(0.001)	-0.0028 ***	(0.001)	-0.0015 *	(0.001)
2000	0.0257	(0.082)	-0.2121 ***	(0.056)	-0.0865	(0.066)	0.0045 **	(0.002)	0.0005	(0.001)	-0.0038 ***	(0.001)	-0.0012	(0.001)
2001	0.0458	(0.082)	-0.1560 ***	(0.057)	-0.1147 *	(0.067)	0.0036 *	(0.002)	0.0008	(0.001)	-0.0029 ***	(0.001)	-0.0016 *	(0.001)
2002	-0.0022	(0.082)	-0.2495 ***	(0.057)	-0.1945 ***	(0.067)	0.0069 ***	(0.002)	0.0001	(0.001)	-0.0044 ***	(0.001)	-0.0026 ***	(0.001)
2004	0.2459 ***	(0.091)	-0.2505 ***	(0.069)	0.3199 ***	(0.074)	-0.0051 *	(0.003)	0.0043 **	(0.002)	-0.0046 ***	(0.001)	0.0054 ***	(0.001)
2005	0.2915 ***	(0.087)	-0.3779 ***	(0.071)	0.2632 ***	(0.073)	-0.0031	(0.003)	0.0053 ***	(0.002)	-0.0065 ***	(0.001)	0.0043 ***	(0.001)
2006	0.2711 ***	(0.086)	-0.4430 ***	(0.080)	0.4043 ***	(0.074)	-0.0045	(0.003)	0.0048 ***	(0.002)	-0.0075 ***	(0.001)	0.0071 ***	(0.002)
2007	0.3389 ***	(0.088)	-0.3834 ***	(0.074)	0.4031 ***	(0.076)	-0.0066 **	(0.003)	0.0062 ***	(0.002)	-0.0067 ***	(0.001)	0.0070 ***	(0.002)
Constant	-3.6564 ***	(0.198)	-2.9990 ***	(0.143)	-2.9948 ***	(0.152)								
Observations	271,089													
Pseudo R^2	0.412													
Predicted probability (at sample means)							0.9489		0.0161		0.0201		0.0148	

Notes: the reference individual is a single, self-employed man working full-time in the private sector, with compulsory education, living in Northern Italy. Robust standard errors are in parentheses. Estimates are weighted using longitudinal weights from LFS. Marginal effects are calculated at the sample means of the explanatory variables. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Source: Authors' own calculations based on longitudinal microdata from the LFS, 1993-2007

6. Simulation of transition among states in the dynamic model

In this section we describe how the individual position within the labour force is simulated within CAPP_DYN. The gender-specific estimates displayed in *Table 7* and *Table 8* are used to predict the individual probabilities of being in one of the *J* states in every year of the simulation. As stated before, in line with the SAGE model we consider 4 possible states[18]:

- J=1: full time workers (those who reported working full-time);
- J=2: part-time workers (those who reported working part-time);
- J=3: unemployed;
- J=4: outside the labour market (inactive).

CAPP_DYN allows for four employment statuses and, in keeping with other dynamic microsimulation models, it assumes that employment decisions depend solely on individual characteristics and are thus independent of demand-side factors and that the individual status at time *t+1* depends on the state observed in *t*. Consistently with previous works (Creedy *et al.*, 1993; Disney and Emmerson, 2005), mobility between industries, occupations and sectors are not currently modelled.

It is interesting to note that, in the population, we can identify the expected *J=j* status in period *s+1* (with s>t) conditional on the occupational status at a different period *t+1,* and on the set of covariates at both time periods x_{it} and x_{is} and the lagged values of the *j*s (J_s and J_t). Assuming normality of both components of the error, and independence between them, the conditional probability of *J=j* in time *s+1* will be:

$$P(J_{s+1} = j_{s+1} \mid j_s, j_{t+1}, j_{s+1}, X_{it}, X_{is}) = \frac{\exp(X_{is}B_j)}{1 + \sum_{j=1}^{4} \exp(X_{is}B_j)} \qquad j = 1,..., 4.$$

where *j* is one of the four feasible statuses, X_i is the covariates vector evaluated in time t and s and β_j is the vector of coefficients varying according to each state shown in *Table 7* and *Table 8.*

The application of this method allows us to predict, in each of the simulated years *(s+1),* the individual probability of being in each of the *J* states considered, conditional on the set of observable characteristics in time *s* (X_s and J_s). This can be represented by a strictly positive matrix, called transition or stochastic matrix:

---

[18] See appendix for details on the definition in use.

$$
P_{J_s * J_{s+1}} =
\begin{vmatrix}
p_{11} & p_{12} & p_{13} & p_{1J_{s+1}} \\
p_{21} & p_{22} & p_{23} & p_{2J_{s+1}} \\
p_{31} & p_{32} & p_{33} & p_{3J_{s+1}} \\
p_{J_s 1} & p_{J_s 2} & p_{J_s 3} & p_{J_s J_{s+1}}
\end{vmatrix}
$$

where the rows (columns) identify the space of events in year s ($s+1$), $J_s = J_{s+1} = 4$. The *i-th* row of the transition matrix (i.e. any of J status observed in time s), $P : | p_{i1}\ p_{i2}\ p_{i3}\ p_{44}|$, is called *probability vector* and represents the probability of all possible transitions of state J (observed in s) into any other state in the space of the states, in period $s+1$.

Matrix P has the following properties:

- it is a square matrix, the number of states being the same in year s and s+1;

- $0 \leq p_{ij} \leq 1\ \ \forall i, j$;

- $\sum_{j=1}^{n} p_{ij} = 1\ \ i=1,2...,m$;

- main diagonal elements represent the probabilities of inertia.

Transitions among states are simulated yearly through a Monte Carlo experiment: every year the simulator generates a random number (u_k) for the *k-th* observation drawn from a uniform distribution with support [0,1]. If u_k is lower than p_{i1}, the *k-th* individual will have *J=1*; if u_k falls between p_{i1} and $p_{i1} + p_{i2}$ then J is set equal to 2; if u_k is greater than $p_{i1} + p_{i2}$ and lower that $p_{i1} + p_{i2} + p_{i3}$ then *J=3* is assigned. Finally if u_k is greater than $p_{i1} + p_{i2} + p_{i3}$ (and lower than 1, by definition) *J=4* is assigned.

A problem in applying a dynamic model for simulating the transition probabilities in CAPP_DYN is that J_s is unavailable for those who were not in the labour market in time s. The *initial condition* problem is then solved in a standard way, imputing J_s for the new entrants (i.e. ex full-time students and new immigrants) using MNL static models.

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Appendix - Data issues

Discontinuity in the series

The sample used in the analysis includes longitudinal datasets for the periods April 1993/April 1994 – April 2002/April 2003 and Quarter I 2004/Quarter I 2005 – Quarter I 2007/Quarter I 2008. The gap between 2003 and 2004 is due to the fact that the LFS was significantly redesigned in 2004, when the old 'quarterly' survey (*Rilevazione Trimestrale sulle Forze di Lavoro*, RTFL) was replaced by a revised 'continuous' version (*Rilevazione Continua sulle Forze di Lavoro*, RCFL). Both surveys are quarterly as results are disseminated on a quarterly basis, but in the former interviews were conducted in only one week per quarter, while in the latter they are spread uniformly throughout the whole quarter.

The other major difference between the surveys lies in the criteria used to identify the respondent's labour force status. The categorization made in the RTFL was based on the individual perception, with the respondent being asked to define her current labour status. In the RCFL, a new official definition for labour market status was applied, following the guidelines provided by the International Labour Organisation (ILO) and adopted by Commission Regulation (EC) No. 1897/2000; here, working-age individuals (15 years and above) are assigned to one of the three mutually exclusive and exhaustive groups – employed, unemployed and inactive persons – on the basis of the most objective information possible obtained through the survey questionnaire, which principally relates to their actual activity within a particular reference week. Employed persons are therefore defined as all individuals aged 15 and over who worked at least one hour for pay or profit during the reference week, or were not working but had jobs from which they were temporarily absent, or were unpaid family workers. Unemployed persons are all persons 15 to 74 years of age who were not employed during the reference week, had actively sought work during the past four weeks and were ready to begin working immediately or within two weeks. Inactive persons are those who are classified neither as employed nor as unemployed.[19]

Considering these changes, a comparability issue between data from the RTFL and the RCFL arises[20]. However, we decide to still rely on a pooled sample from RTFL and RCFL data: we

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[19] The redesign of the survey concerned other issues too, for example the method of data collection (from Paper & Pencil Interview – PAPI – to CAI – Computer-assisted Interview), data quality control (with inconsistencies checked also during the interview, and not only ex-post), population weighting (different procedure and reweighting of RCFL data to the latest Census of Population), and the formulation of the questionnaire.

[20] As can be noticed in Section 4, activity and employment rates do not show any evident break. However, significant disruptions can be found when considering absolute values instead of percentages: in particular, what we find in our series is an upsurge in the number of individuals working part-time from 2002 to 2004, with an increase by almost a million units.

believe this solution is preferable to the alternative, i.e. relying on either RTFL or RCFL. RCFL is a higher quality, more recent source of information, which makes it particularly interesting for our analysis (and for its subsequent use in CAPP_DYN); on the other hand, only four waves of the continuous survey are available at the moment, and we think our estimates are more reliable if they can draw information from a longer time period, as in this way the risk of being biased by the particular economic situation characterising those years is reduced. Pooling the two surveys is therefore the only way to exploit both the benefits of a wider time span, including more recent data, and the higher informational content of the continuous survey. We are fully aware that this implies the need for special caution when dealing with the pooled database; we therefore take a few measures to reduce the impact of the break.

The major comparability problem when pooling data is found, of course, in the definition of the labour market status. However, alongside the main variable based on the individual perception, the RTFL also reports a derived variable that reconstructs the occupational status of the interviewee on the basis of more objective information about the number of hours worked and the job-search activity. This variable is meant to capture also non-self-reported employed individuals[21], and to discriminate more objectively between unemployment and inactivity. We therefore choose to use this variable as labour status indicator, which should reduce the discontinuity in the series when compared to the RCFL official definition.

For the other variables considered in the analysis, continuity issues were less stringent, but we controlled for changes in the formulation of the questions over time when building our covariates.

Availability of variables

The list of covariates we can use in the econometric analysis is limited by data availability issues; missing information may be due to the lack of questions about particular topics, but sometimes responses to existing questions are kept confidential so that data are non-disclosive.

Among other things, longitudinal LFS data do not provide detailed information on the work history of the individual, which prevents us from controlling for factors such as work experience, duration in the current job (in RCFL), past unemployment spells. In RTFL, it is not possible to identify immigrants. There are constraints concerning some family variables, too; no information

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[21] Admittedly, this correction could be rather small; Istat (2006b) reports that, on average, over the period 1993-2003 the share of non-self-reported employed is around 1% of the total employed individuals.

about the presence and age of children is available, and, at least in the RCFL, no data on the marital status of individuals either.

We tried to overcome this last problem by constructing a proxy for the period 2004-2007, using the following procedure. In the first step, starting from the number of family components and their age and gender, we established a range of possible family structures (with the presence of children, parents, grandparents)[22]; within each family, we ordered individuals by increasing age, and, building on the age gap between the components, tried to identify subsequent 'generations' (we assume that a reasonable age difference between generations is 18 years); whenever we found two adult individuals in the same generation, we assumed they might be a couple, and we controlled for gender; if one individual within the supposed couple is a woman and the other is a man, we concluded there is a high chance they are married/cohabiting, and therefore attributed them a proxy equal to 1. We tested this procedure on the cross-sectional version of the RCFL (where the information on marital status is available), finding that we assign individuals to the correct marital status in 96.5% of cases, a percentage of successful matches that we think makes our proxy quite reliable.

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[22] In this phase, we used the entire sample, which in the RCFL includes individuals below 15 years of age.