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Wage Mobility and Dynamics in Italy in the 1990s

Bruno Contini, Roberto Leombruni,
Lia Pacelli, and Claudia Villosio

10.1 Macroeconomic Conditions and Long-Term Trends in Employment, Wages, and Mobility

10.1.1 Employment

From the end of the 1970s to the early 2000s, the employment cycle in Italy had two long periods of growth, from 1983 to 1990 and from 1994 to today, interrupted by a strong recession from 1991 to 1993. The first phase was marked by steady gross domestic product (GDP) growth accompanied by a very modest increase in employment, with 3 to 4 percentage points difference in 1984 to 1989 (it was described as “jobless growth”; see figure 10.1). In the early 1990s, Italy was hit by the most severe recession since the Second World War in terms of job losses. During the crisis of the early 1960s, which put an end to the so-called economic miracle, total employment declined by 640,000 full-time equivalent units; in the early 1990s, the cumulative fall reached 1,080,000 units (Brandolini et al. 2006). The high drop in employment was not mitigated by job creation in the public administration, nor in state-owned companies. Moreover, layoffs were easier—

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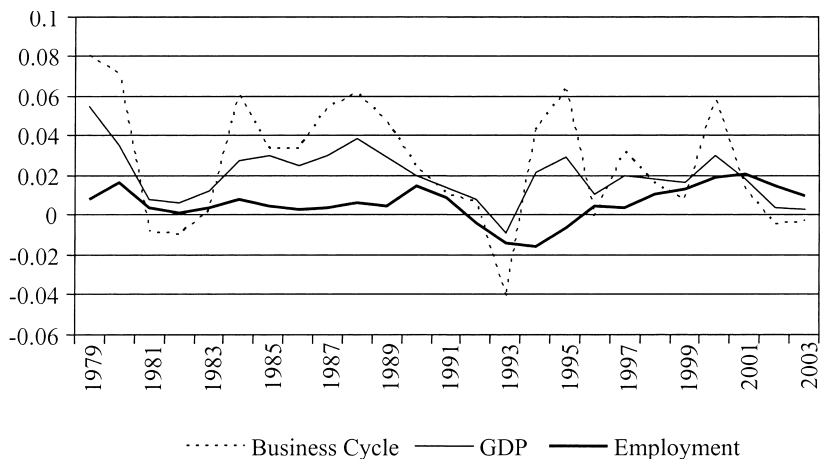


Fig. 10.1 Growth rates of GDP, employment, and Bank of Italy's coincident indicator of the business cycle

Source: Contini and Trivellato (2005).

thanks to the 1991 reform of collective dismissals (see section 10.2)—and a drastic restructuring process continued until 1995.

The subsequent recovery, in contrast with what was observed in the first growth phase, was marked by strong trends in employment—which took advantage of a period of salary moderation and labor market reforms—and a modest increase in GDP. Figure 10.1 shows that from 1996 on, employment started increasing again, with growth rates similar to the GDP. Beginning in 2000, this trend inverted, and the employment growth rate exceeded GDP growth—which, while positive, was clearly in decline. The elasticity of employment to GDP in the years post-1994 was about 0.7 percent, almost double with respect to the 0.38 percent that characterized the phase of jobless growth.

Employment growth since the 1980s is almost completely attributed to women (see figure 10.2). Female employment increased between 1979 and 2003 by 43 percent, while male employment was nearly stagnant.

The unemployment rate constantly increased until the end of the 1980s. After three years of modest decrease between 1989 and 1991, it increased again until 1996—when it reached, according to the old definition,¹ a peak

1. In table 10.1, two unemployment series are reported, before and after the revision of the Labour Force Survey methodology and definitions occurred in 1992. In the old definition, the criteria by which an individual was classified as a job seeker were looser. Job seekers included individuals who completed inactive search actions and whose last search action took place more than four weeks prior to the interview. In line with International Labor Organization (ILO) definitions, these individuals are currently classified as inactive, belonging to the so-



Fig. 10.2 Index numbers of employment by gender, 1979 to 2003 (1979 = 100)

Source: Contini and Trivellato (2005).

of nearly 16 percent. It then began to decrease during the years of intense employment growth, which brought it slightly above 10 percent in 2004 (see table 10.1).

Expansion of the service sector occurred mostly in the 1980s and 1990s, following, with some delay, the physiological pattern of industrialized countries. The service sector, 43 percent of total employment in 1970, swells to 66 percent in 2003, still below the EU average.

A profound transformation in the employment structure has been driven by population aging, which is currently proceeding at a pace more pronounced than in most other OECD countries (OECD 2006). After the “baby boom” of the 1960s and early 1970s, the fertility rate declined steeply: it fell below the replacement rate of 2.1 at the beginning of the 1980s, reaching 1.24 in 2000. At the same time, life expectancy is rising rapidly. Even though a slight recovery in fertility rates is expected in the coming years, the transition process to the new demographic regime is having, and will have, a profound impact on the economy. In the next two decades, the baby boom generations will reach retirement age and will be replaced by new cohorts roughly half in size. By 2050, more than one in three Italians will be over the age of sixty-five.²

Aging affects companies in different ways because the mature workforce

called potential labor force. There is evidence, however, that their characteristics and behaviors are more similar to the unemployed than to the inactive (see Brandolini, Cipollone, and Viviano 2006; Battistin, Rettore, and Trivellato 2007).

2. See the population projections produced by the Italian Statistical Office (ISTAT), “central” scenario (<http://demo.istat.it/index.html>).

Table 10.1 Macroeconomic conditions

Year	Unemployment rate		GDP (billion euros, 1995 prices)	Change in GDP		
	Before LFS revision 1992	After LFS revision 1992		1 year	2 year	5 year
1970	5.3		486			
1971	5.3		495	1.9		
1972	6.3		511	3.2	5.1	
1973	6.2		544	6.5	9.9	
1974	5.3		573	5.3	12.2	
1975	5.8		561	-2	3.1	15.5
1976	6.6		598	6.5	4.3	20.7
1977	7.0		612	2.4	9	19.8
1978	7.1		634	3.7	6.1	16.5
1979	7.5		669	5.5	9.4	16.8
1980	7.5		693	3.5	9.2	23.4
1981	8.3		698	0.8	4.3	16.8
1982	9.0		703	0.6	1.4	14.8
1983	10.0		711	1.2	1.9	12.1
1984	10.7		731	2.8	4	9.2
1985	11.0		753	3	5.8	8.6
1986	11.5		772	2.5	5.6	10.5
1987	12.3		795	3	5.6	13.1
1988	12.4		826	3.9	7.1	16.1
1989	12.4		850	2.9	6.9	16.3
1990	11.3		867	2	4.9	15.1
1991	10.9		879	1.4	3.4	13.9
1992	11.5		885	0.8	2.2	11.4
1993	13.7	10.3	877	-0.9	-0.1	6.2
1994	15.0	11.2	897	2.2	1.3	5.5
1995	15.7	11.8	923	2.9	5.2	6.5
1996	15.9	12.0	933	1.1	4	6.2
1997	15.9	12.1	952	2	3.1	7.5
1998	15.7	12.3	969	1.8	3.9	10.4
1999	15.2	11.8	985	1.7	3.5	9.9
2000	14.4	11.0	1015	3	4.7	10
2001	12.4	9.7	1033	1.8	4.8	10.7
2002	11.8	9.3	1037	0.4	2.2	8.9
2003	11.1	9.0	1040	0.3	0.6	7.3
2004	10.2	7.4	1052	1.2	1.5	6.8

concentrates in larger firms. The shift in the age distribution of employment, though, has been remarkable in all firm sizes: between 1988 and 1998, the mode of the distribution among smaller firms shifted markedly from the twenty to twenty-four age group to the twenty-five to twenty-nine group; among larger firms, the shift is toward a bimodal distribution, with one hump at age thirty to thirty-four and the other at age forty-five to forty-nine (see figure 10.3).

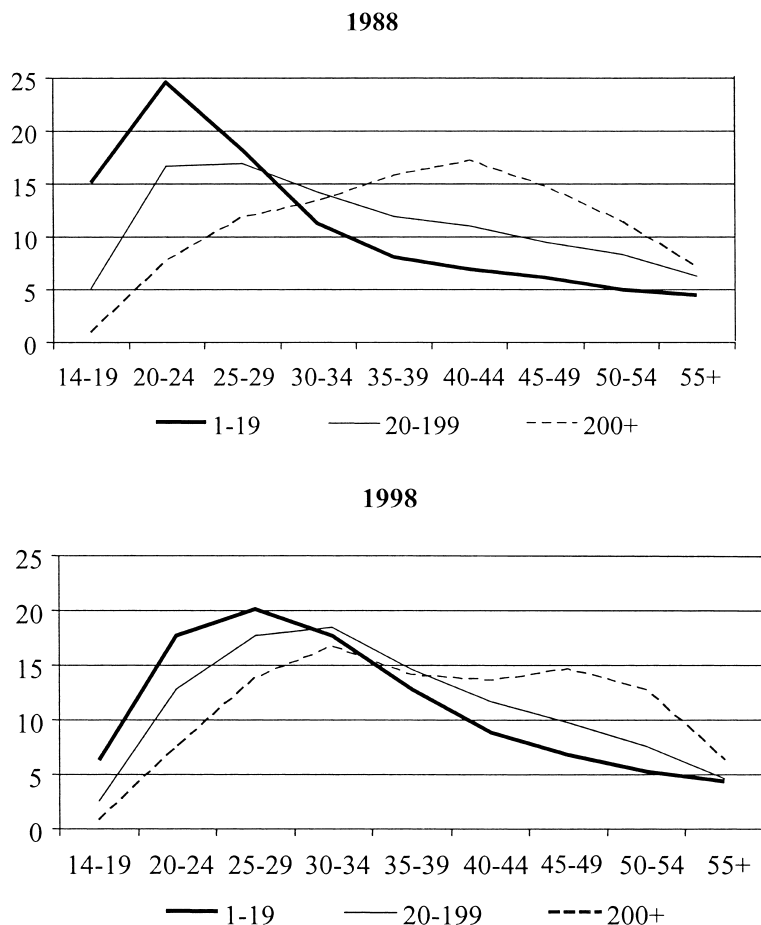


Fig. 10.3 Workforce age distribution by firm size, 1988 and 1998

Source: Our calculations based on WHIP data, 1988 and 1998.

The distribution of dependent employment by firm size did not change much over the last fifteen years: the share of firms with less than twenty employees held steady at around 40 percent of total employment, the share of large firms (> 1,000 workers) dropped by almost 4 percentage points, and that of small-medium firms (20 to 100 workers) increased in proportion. In manufacturing, the shift was huge (see figure 10.4), with the share of firms > 1000 declining from 23 percent in the early 1980s to 16 percent in 1998. Large manufacturers went through a profound restructuring process that caused the loss of about 380,000 jobs, only partially reabsorbed by small and medium firms: the overall employment loss in manufacturing was about 250,000 workers.

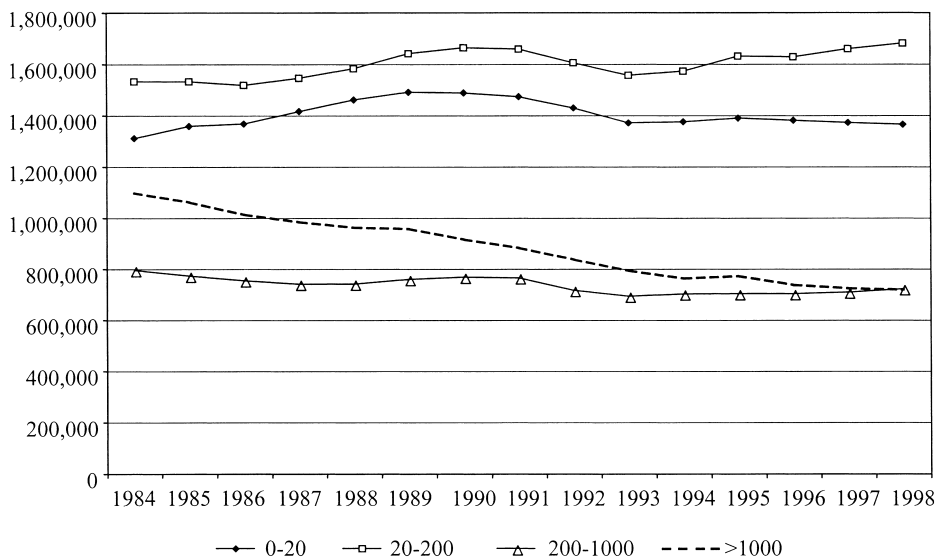


Fig. 10.4 Employment trends by firm size in the manufacturing sector

Source: Our calculations based on WHIP data.

10.1.2 Wages

In table 10.2, we report mean and median real wages 1985 to 1999 and a selection of distribution/inequality indicators. Real earnings constantly increased until the early 1990s. After the recession, and the 1993 collective agreements that reshaped the system of collective bargaining (see section 10.2), real wages stopped growing altogether, and only in 1999 did they attain the prerecession levels. In subsequent years, while most European countries experienced a long phase of real wage growth, in Italy they remained roughly stagnant.

Wages changed with remarkable differences between the tails and the center of the distribution. Over the 1985 to 1999 period, the median individual faced a modest 3.4 percent real increase, while at both ends of the distribution, growth was much faster. In 1985, the ratio between the ninth and the fifth decile (P90-P50) was 1.54; by 1999, it increased to 1.83. At the same time, the ratio between the fifth and the first decile (P50-P10) dropped from 1.52 to 1.44. Likewise, the ratio between the ninth and the first decile (P90-P10) ratio increased from 2.34 to 2.60. This points to a reduction of inequality in the low tail of the distribution and an increase in the high tail. Overall inequality measured by Gini, Theil, and Var-Logs indexes increased significantly in the period.

The relationship between wages and firm dimension is clear in figure 10.5: larger firms, on average, pay higher wages. The wage-firm size relation

Table 10.2 Real wage distribution

Year	Median	Mean	Percentiles ratios			Inequality measures		
			P90/P50	P50/P10	P90/P10	Gini	Theil	var-logs
1985	1424	1532	1.54	1.52	2.34	199 (0.6)	71 (0.5)	133 (0.8)
1986	1407	1529	1.55	1.52	2.36	203 (0.7)	74 (0.6)	136 (0.8)
1987	1427	1569	1.61	1.53	2.45	214 (0.7)	82 (0.6)	147 (0.9)
1988	1424	1572	1.63	1.52	2.47	216 (0.7)	83 (0.6)	149 (0.8)
1989	1435	1620	1.68	1.42	2.38	219 (0.7)	87 (0.6)	146 (0.8)
1990	1449	1671	1.73	1.42	2.46	233 (0.8)	102 (0.8)	160 (0.9)
1991	1503	1712	1.70	1.45	2.46	227 (0.7)	96 (0.6)	156 (0.8)
1992	1498	1719	1.72	1.43	2.47	229 (0.7)	97 (0.7)	156 (0.9)
1993	1499	1724	1.72	1.42	2.44	227 (0.8)	96 (0.7)	152 (0.9)
1994	1484	1711	1.73	1.42	2.46	228 (0.8)	98 (0.8)	153 (1.0)
1995	1444	1672	1.77	1.42	2.52	229 (0.7)	97 (0.7)	155 (0.9)
1996	1433	1673	1.79	1.41	2.52	233 (0.7)	101 (0.7)	159 (0.8)
1997	1461	1710	1.79	1.42	2.54	237 (0.7)	105 (0.7)	164 (0.9)
1998	1470	1723	1.80	1.45	2.60	244 (0.8)	112 (0.8)	170 (1.0)
1999	1473	1768	1.83	1.44	2.63	257 (0.9)	134 (1.2)	187 (1.1)
Percent change 1985–1999	3.4	15.4	19.4	-5.7	12.6	28.9	89.7	41.1

Source: Devicienti (2006).

Notes: Wages are monthly wages at 1999 prices, private sector only. Part-time monthly wages have been converted into full-time equivalents. Numbers in parentheses are standard errors.

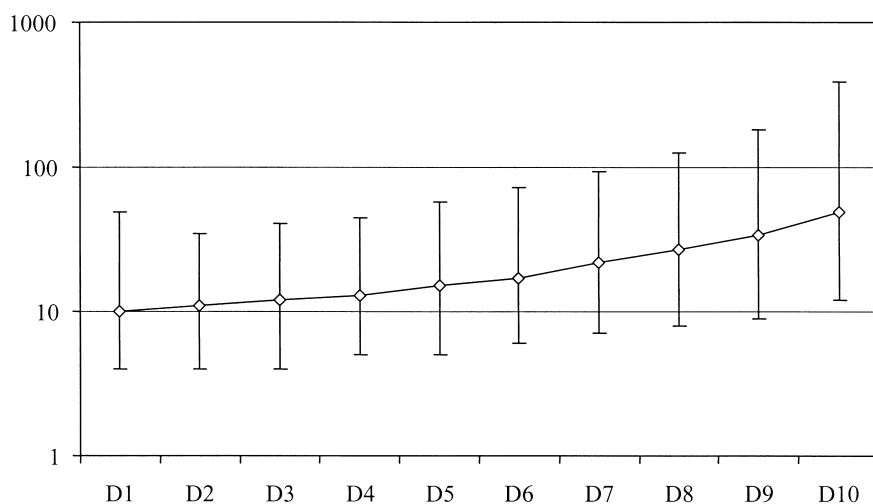


Fig. 10.5 Firm size distribution (P10, median, and P90) by wage deciles—1999

Note: Size in log scale.

Source: Our calculations on WHIP data.

Table 10.3 Monthly wages in 1986 and 1991 and wage growth rate 1986–1991 for movers and stayers

	Movers			Stayers		
	<i>N</i>	Mean	SD	<i>N</i>	Mean	SD
Wage 1986	9,641	1,731.2	548.2	20,526	1,906.7	604.2
Wage 1991	9,641	2,805.2	1,138.3	20,526	3,042.3	1,184.5
Wage growth rate	9,641	1.6	0.4	20,526	1.6	

Source: Contini and Villosio (2003).

also explains the wage dynamics of job changes: workers switching from small to large firms earn wage premiums, while job switches in the opposite direction often lead to wage losses (see Contini and Villosio [2003] and table 10.3).

Table 10.4 displays the results of a decomposition exercise: for all partitions, inequality is predominantly explained by its within-group component.

The between-group component is negligible except for age and occupation partitions. In the former, the between component accounts for about 12 to 14 percent of aggregate inequality, while in the latter, it explains about one-fourth. This is consistent with a collective wage-setting process that relies on seniority (here proxied by age) and occupation.

10.1.3 Mobility

Gross worker turnover (GWT) in Italy—the ratio of yearly flows of engagements and separations on average employment—hovered about 60 percent (see table 10.5), indicating that labor force mobility is higher than that of most European countries (Leombruni and Quaranta 2002, 2005). This may appear at odds with the view that Italian labor market legislation is among the most rigid: we will address this point in section 10.2.

As theory suggests (Blanchard and Diamond 1990), GWT appears to move procyclically, with peaks in the expansionary phases and a trough during the recession culminated in 1993.

The GWT, like most mobility indicators, reflects worker age and firm size (Davis and Haltiwanger 1999). Young workers are the most mobile: the search for a “good job” translates into many flows in and out of jobs. Worker flows are much higher in small firms, for a variety of reasons: higher entry and exit rates, limited internal mobility, and few firing constraints due to looser institutional constraints and to the limited presence of unions. Figure 10.6 displays GWT as a function of both variables. Mobility as a function of age is U-shaped in all size classes. In small firms, it is notably shifted upward compared to the large companies and has a flatter shape. Most notably, the “small firm” effect dominates the age factor in determining mobility: individuals aged fifty and over working in small firms

Table 10.4 Inequality decompositions by population subgroups, 1985 and 1996

	Theil index		Shares (%)		Average monthly wage (1999 prices)		Δ wage (%)		Relative average wages (all = 1)	
	1985	1999	1985	1999	1985	1999	1985	1999	1985	1999
<i>A. All</i>	71	134	100	100	1,532	1,768	15.4		1	1
<i>B. Males</i>	67	138	71	66	1,628	1,864	14.5		1.06	1.05
<i>Females</i>	61	115	29	34	1,298	1,579	21.6		0.85	0.89
Within-group inequality	66	131								
Between-group inequality	5	3								
<i>C. Apprentice</i>	49	90	5	6	899	1,003	11.6		0.59	0.57
<i>Blue collar</i>	43	86	65	60	1,431	1,540	7.6		0.93	0.87
<i>White collar</i>	71	115	29	33	1,828	2,212	21.0		1.19	1.25
<i>Managers</i>	36	34	0.6	0.8	4,044	6,393	58.1		2.64	3.62
Within-group inequality	53	97								
Between-group inequality	18	37								
<i>D. North</i>	68	133	60	61	1,535	1,797	17.0		1.00	1.02
<i>Center</i>	74	140	19	19	1,550	1,773	14.4		1.01	1.00
<i>South</i>	74	128	21	20	1,508	1,669	10.7		0.98	0.95
Within-group inequality	71	133								
Between-group inequality	0.0	0.4								
<i>E. Age 15–24</i>	51	79	23	16	1,179	1,244	5.5		0.77	0.70
<i>Age 25–34</i>	47	87	28	35	1,501	1,613	7.5		0.98	0.91
<i>Age 35–49</i>	68	133	35	36	1,716	1,984	15.6		1.11	1.12
<i>Age 50–64</i>	75	168	14	13	1,721	2,244	30.4		1.12	1.27
Within-group inequality	60	118								
Between-group inequality	10	16								

(continued)

Table 10.4 (continued)

	Theil index		Shares (%)		Average monthly wage (1999 prices)		Relative average wages (all = 1)	
	1985	1999	1985	1999	1985	1999	1985	1999
<i>F. Manufacturing</i>	64	149	56	48	1,511	1,795	0.99	1.02
<i>Building</i>	48	66	12	10	1,512	1,546	0.99	0.87
<i>Services</i>	89	129	32	42	1,578	1,790	1.03	1.01
Within-group inequality	70	133						
Between-group inequality	0.2	1						
<i>H. Full time</i>	70	133	99	90	1,531	1,781	1.00	1.01
<i>Part time</i>	104	137	1	10	1,639	1,651	1.07	0.93
Within-group inequality	71	134						
Between-group inequality	0.0	0.3						

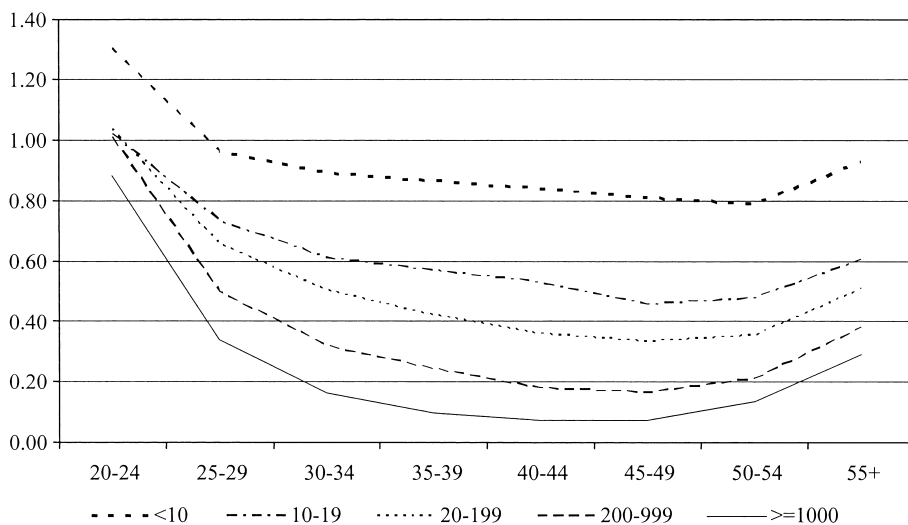
Source: Deicienti (2006).

Note: For the definition of wage, see table 10.2 notes.

Table 10.5 Yearly worker flows, four subperiods, Italy

	Separation rate	Association rate	Gross worker turnover	Business cycle
1986–1990	29.86	32.53	62.39	Expansion
1991–1993	28.77	28.01	56.78	Recession
1994–1996	29.68	29.01	58.69	Recovery
1997–1999	33.00	35.00	68.00	Expansion

Note: Percentage values, authors' calculations based on WHIP data.

**Fig. 10.6** Gross worker turnover by worker age and firm size, 1987 to 1999

Source: Leombruni and Quaranta (2005).

(ten to nineteen employees) have a 50 percent overall turnover, while individuals aged twenty-five to twenty-nine employed in large firms (1000+) slightly exceed 30 percent.

Blue-collar workers are much more mobile than white-collar workers, who in turn are more mobile than managers (but the probability of a direct job-to-job change conditional to a move is much higher for managers than for any of the other categories). Moreover, the difference in mobility of blue-collar workers with respect to white-collars has widened noticeably over the years (Leombruni and Quaranta 2005). While GWT for white-collars has been stable at about 41 percent in the period, that for blue-collars increased from 69 percent in 1987–1989 to 78 percent in 1997–1999.

10.2 Institutional Aspects of the Italian Labor Market

For many years, and at least through the late 1990s, Italy has been renowned as the European country with the most rigid labor market legislation. The OECD has widely contributed to this view. It may, therefore, appear strange, to say the least, that the magnitude of job and worker turnover in Italy (as reported in the previous paragraph and, in more detail, in section 10.3.3) has been among the highest in Europe, second only to the United Kingdom.

There can be no question that Italy's labor legislation has been (and still is today) swamped by a huge number of laws and bylaws, sometimes patently contradictory. Labor jurists sometimes refer to a peculiar dichotomy between the "law in the books" and the "law in action." This dichotomy undoubtedly applies to Italy. Be it because of its internal contradictions, dubious interpretation, fragility of the system of controls, unapplied or inapplicable sanctions, illegal practices, and so on, the degree of labor turnover in Italy by far exceeds what might be reasonably expected under its current legislative apparatus. The magnitude of Italy's labor market flows is, to some extent, counterbalanced by the relative rigidity of the wage structure throughout the 1980s. One might say that the former is a consequence of the latter, because quantities adjust when prices cannot. Also on the wage front, however, there have been interesting innovations in the last decade, as witnessed by the trends toward rapidly increasing differentials of the 1990s (reported in section 10.3 of this report).

What follows is a summary of the most salient features of the institutional aspects of Italy's labor market and its major changes in the last twenty-five years. The data we are presenting in this chapter end with 1998: they are, nevertheless, representative of the abnormal features of the Italian labor market from the preceding perspective. In more recent years—since 2002—Italy's labor legislation has undergone a vast deregulatory process, as in many other European countries.

The early 1980s witnessed the most rigid "snapshot" of Italian labor market legislation that can be taken. It was characterized by centralized bargaining, by an egalitarian mechanism of wage increases, and by severe restrictions both on hirings and firings. Nominal wages were indexed to prices through an automatic mechanism known as *scala mobile* (escalator clause), whose rules were uniform across sectors. Indexation took place quarterly. Hirings involved almost exclusively open-end contracts. Manual workers were selected almost exclusively from the unemployment workers' lists held by the public employment service, and not via direct selection mechanisms. Individual firings in firms with fifteen or more employees were admissible only under a "just cause" rule: workers dismissed without justifiable reason had the right to reinstatement. This rule, given the diffusion of small firms in Italy, actually was not enforceable for about 35 percent of dependent em-

ployment; when applicable, it was commonly bypassed either legally by extrajudiciary settlements with severance pay, or by unlawful practices such as forced quits that would go unreported to the judiciary for fear of losing job options offered within the same industrial district.

Collective and temporary layoffs were instead widely utilized by way of ad hoc institutes—the earnings integration scheme (CIG; *cassa integrazione guadagni*) since the 1970s—easily available to large firms during times of industry crises or restructuring.

Starting from the mid-1980s, several reforms have radically reshaped the working of the labor market.

In 1984, restrictions on hirings were markedly reduced with a partial liberalization of direct selection mechanisms; part-time work and work-training contracts (CFL; *contratti di formazione-lavoro*) were introduced. The latter was a mixed contract, aimed at young people aged fifteen to twenty-nine, under which employers had to provide workers with appropriate occupational training. Hires via CFL enabled firms to benefit from a hefty 50 percent rebate on social security contributions. In addition, it was a fixed-term contract, with a predetermined duration of no less than eighteen months and no longer than twenty-four. At termination, the firm had the right, but no obligation, to upgrade the CFL contract into an open-ended one, taking advantage of favorable tax treatment for one additional year.³

In 1986, the automatic indexation of wages via *scala mobile* was reduced from quarterly to twice a year, and definitely abolished in 1992.

In 1991, a new institute (“mobility lists”) aimed at dealing with collective layoffs was introduced. Dismissed workers were granted long-term unemployment benefits, while fiscal incentives were made available to firms willing to hire from the “lists.” In addition, CIG was extended also to small and medium firms of the manufacturing sector (CIGS; *cassa integrazione guadagni straordinaria*). The latter, in principle, was still designed for temporary layoffs, but in practice it allowed mass layoffs at very low costs, as it could be extended several times.

In 1993, at the peak of recession, the unions, Confindustria (the Italian Manufacturers’ Association), and the government pledged to act in concert to improve the conditions of the labor market. A new two-level bargaining system was agreed upon, still in rule today. At the national level, wages are set according to the inflation rate targeted by the government for the following twenty-four months. The difference between actual and targeted inflation is not automatically recovered and is to be taken into account at the start of a new bargaining round. At the regional or firm level, additional wage components are introduced to be geared by profit-sharing

3. The CFL underwent several reforms during the years that progressively reduced their advantages in terms of social security rebates and flexibility. They were finally abolished in 2003.

considerations. In a few years, firm-level bargaining spread in the majority of large firms, while it was still negligible in the small-firm sector.

The new catchphrase of subsequent policies was “increasing flexibility on all fronts.” As a matter of fact, most of the action took place in the labor market, while little was achieved in terms of product market flexibility.

In 1996, the so-called *pacchetto Treu* extended the range of possible work contracts by introducing temporary work, by extending the applicability of part-time and fixed-term contracts, and by regulating the so-called *para-subordinato* contract, a form of disguised self-employment. The portfolio of available contracts was further extended into twenty-one different typologies in 2003, including job sharing, project work, and staff leasing.

As a consequence, from 1996 on, the standard open-end contracts lost importance in favor of atypical ones, which began to represent the most widespread channel for entry into the labor market. In 2002, the share of workers with a fixed-term contract already accounted for 10 percent of total employment—against an EU15 average of 13 percent (European Commission 2003).

10.3 Results

The tables presented in this section have been computed using the Work Histories Italian Panel (WHIP), based on administrative data from the Italian Social Security (INPS) archives.

Wages are average daily earnings paid to the worker, at 1990 prices, expressed in Italian lire (,000), gross of income taxes and payroll taxes paid by workers, and net of payroll taxes paid by employers.⁴ Social security payroll records a relatively accurate measure of total earnings, at least when compared to survey-based information. The same does not apply to the measurement of labor input: there is some evidence of underreporting in the number of paid working days, as some firms adjust the reported daily wage to minimum wage requirements. Such underreporting seems to be important mostly in the South of Italy, leading to a potential bias in within-country comparisons (Contini, Filippi, and Malpede 2000). There are no obvious ways of recovering the correct value of the variable. An option could be to approximate the number of days using another available variable in WHIP—the number of paid weeks—which are not affected by such bias. Unfortunately, this would introduce another bias, as they do not accurately measure temporary leaves and the duration of short spells. Because we do not need to drill the data down to the regional level, we used the original value of the variable.

4. This is the so-called base wage, on which social security and pension contributions are calculated. It includes basic wage, cost-of-living allowance, residual fees, overtime plus back pay, bonuses, supplements, holiday pay, and sick pay.

For worker-based statistics, we select all blue- and white-collar workers with a job spell active during the month of May of the year of interest, working full-time, in firms employing at least twenty employees.

For firm-based statistics, WHIP is a 1:90 random sample of workers. Hence, we do not have a representative sample of the workforce in small- and medium-sized firms. This is not an issue for tables in section 10.3.3 on mobility indicators: the monthly employment stock and the average wage of each firm are reported in WHIP, yielding good approximations of entry and exit rates. For the tables in sections 10.3.1 and 10.3.2, in contrast, we pooled together firms into cells—called “synthetic firms”—in order to have enough individual observations to compute firm wage and wage change distributions. The 800-cells grid is based on the following partition:

- Geography: twenty Italian regions
- Firm size: five classes (20 to 49, 50 to 99, 100 to 199, 200 to 499, 500+ workers)
- Sector of activity: forty-four classes (Nace-70 two-digit sectors)

More details on the data and a discussion on the synthetic firm approach can be found in the methodological appendix.

10.3.1 Structure of Wages between and within Firms

Table 10.6 includes two sets of statistics: worker-based (referred to as “observation = one person”) and firm-based (referred to as “observation = one firm”).

Worker-based statistics confirm several stylized facts well known in the literature. Average individual wage and standard deviation increase with worker age, reflecting the wider range of career paths experienced as workers grow older. The dispersion of individual wages in Italy is in line with the other countries included in this book. It is not far from that of Norway and Sweden, but it is high with respect to Denmark and Finland: in Italy, the P90-P50 ratio is 1.7, and P10-P50 is 0.7 (in Denmark and Finland, these statistics are much closer to 1).

Firm-based statistics introduce new hints. Average firm wage is lower than average individual wage, reflecting the fact that small firms pay (on average) lower wages than large ones. The ratio of between-firms wage variability relative to the country’s average wage is 13 percent, similar to other countries included in this book, except the Netherlands and the United States (see figure I.5 in the introduction of this volume). Within-firm wage variability represents about two-thirds of total variability (25.87 against 33.36 in 1998), and is larger than between-firm variability (12.52 in 1998).⁵

5. The true difference between the two, however, may be upward biased, as statistics based on synthetic firms tend to underestimate between-firm variability and overestimate within-firm variability, as a consequence of attributing to “within cell” the variability “between firms belonging to the same cell” (see the methodological appendix).

Table 10.6 **Structure of wages between and within firms**

	1990	1993	1998
Average wage ^a	94.67	97.76	95.15
SD	33.42	34.77	33.36
CV			0.35
90th percentile	139.99	144.50	140.31
75th percentile	109.57	112.70	111.26
Median	86.75	89.36	87.44
25th percentile	71.63	74.01	72.23
10th percentile	61.48	63.68	61.75
No. of workers	54,794	51,777	47,173
Average of firm average wage ^b	83.61	86.44	85.53
SD	12.74	12.61	12.52
CV	0.15	0.15	0.15
90th percentile	96.97	99.71	99.77
75th percentile	90.07	92.32	90.97
Median	84.12	86.01	85.26
25th percentile	76.85	80.25	78.10
10th percentile	66.65	69.28	70.90
No. of firms (cells)	822	781	775
Average no. of workers per cell (unweighted)	60.88	60.77	57.32
Average SD of no. of workers per cell	69.24	65.71	56.85
Average of SD of wage ^b	25.36	26.21	25.87
SD	6.92	7.56	7.12
90th percentile	33.86	35.50	34.76
75th percentile	29.43	30.73	31.10
Median	25.32	25.88	25.76
25th percentile	20.38	21.53	21.53
10th percentile	16.48	17.30	16.77
No. of firms	763	732	731
Average CV of wages ^b	0.30	0.30	0.30
SD	0.0007	0.0007	0.0007
90th percentile	0.38	0.38	0.40
75th percentile	0.34	0.34	0.33
Median	0.30	0.30	0.30
25th percentile	0.34	0.34	0.25
10th percentile	0.22	0.21	0.22
No. of firms	763	732	731
Correlation (average wage, SD of wage) ^b	0.63	0.69	0.59
<i>p</i> -value	0.0001	0.0001	0.0001
Average wage for workers between 25 and 30 ^a	85.03	86.66	83.74
SD	25.02	24.73	23.97
90th percentile	117.17	116.70	115.08
75th percentile	97.34	98.46	95.03
Median	80.14	81.81	79.32
25th percentile	68.21	70.53	68.58
10th percentile	59.77	62.33	59.76
No. of workers	10,365	10,487	9,318
Average wage for workers between 45 and 50 ^a	102.57	106.76	105.80
SD	35.70	37.60	35.54
90th percentile	153.15	160.74	154.64

Table 10.6 (continued)

	1990	1993	1998
75th percentile	119.68	124.88	124.51
Median	94.53	97.86	99.00
25th percentile	77.76	80.79	81.16
10th percentile	66.25	68.40	67.38
No. of workers	7,844	8,343	7,489

Notes: CV = coefficient of variation; SD = standard deviation.

^aObservation = a person.

^bObservation = a firm.

The ratio of the between-firm wage variability relative to total wage variability is sizeable in all countries, and Italy is no exception (see figure I.4 in the introduction of this volume). In Italy, it is sizeable also with respect to other decompositions (see section 10.1.2). Characteristics like gender, geographical area, and industry account for a negligible part of the total variance of wages. The results presented in section 10.1.2 are not directly comparable with table 10.6, as the one displayed in the latter is not an exact decomposition.⁶ However, this is an indication of the importance of firm wage policies in shaping the wage distribution, a point that seems to overrule the importance of individual observable characteristics.

Figure 10.7 adds to the point. Panel A shows P10, P50, and P90 of the within-firm wage distribution at the end of the period (based on firms—here not synthetic firms—of which we observe at least ten workers), ranked by firm-average wage. Indeed “the tide lifts all boats,” as all percentiles increase with average firm wage. In addition, the spread becomes larger with increasing average wage, especially in the P90 band. Workers receiving “low” wages (P10) from a high-wage firm are paid more than many workers receiving “high” wages (P90) from a low-wage firm. This is true not only in large firms, like those included in panel A, but also among small firms, as shown in panel B, which refers to firms employing ten or more workers of two Veneto provinces for which we have population data (see appendix for details). This finding strongly suggests that firms do not follow a pay compression model in their wage policy.

Also, the widening of within-firm wage differentials as average wages increase is at odds with the hypothesis that firms are homogeneous with respect to human capital (all workers alike in terms of skills, productivity, effort). It rather points to a substantial amount of worker heterogeneity rewarded according to human capital, at least among the medium-large

6. Total variability do not decompose into the within and between components reported in table 10.6, although it is positively correlated with both. An exact decomposition, for instance, is that reported in equation (1) in the introduction to the volume.

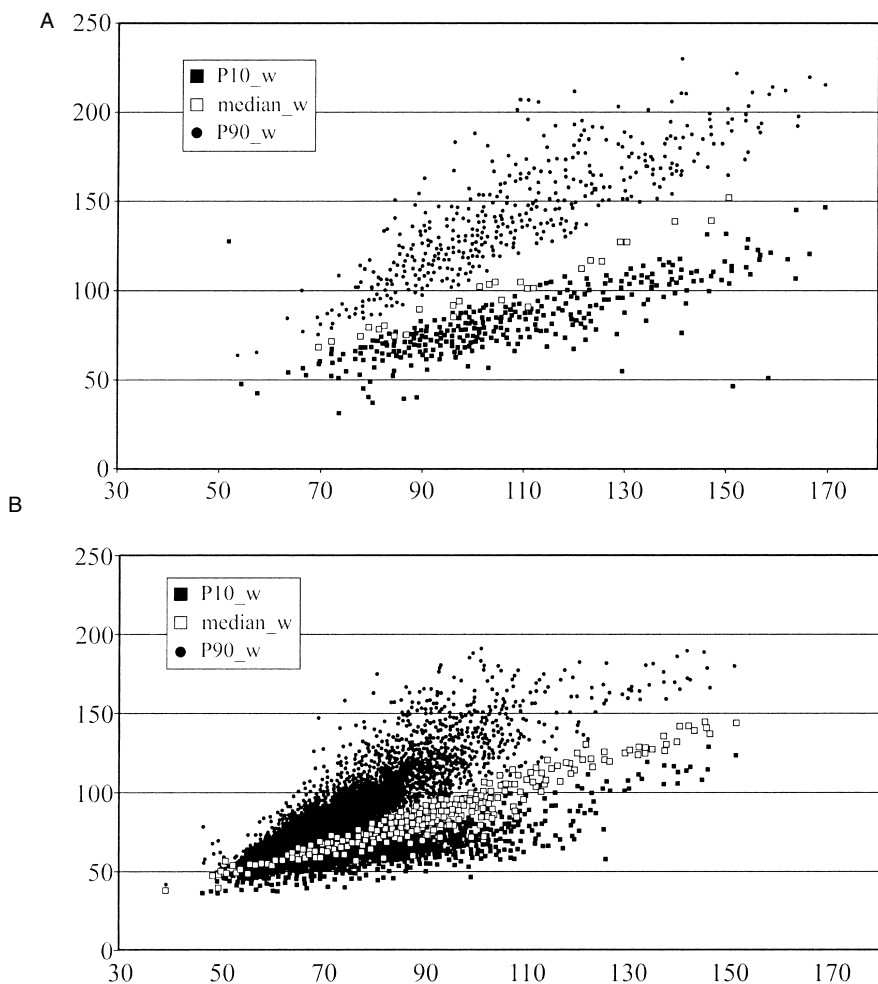


Fig. 10.7 Tide raises all boats: *A*, Mean versus P10-P50-P90; Italy, firms employing more than 1,000 workers, 1998; *B*, Mean versus P10-P50-90; Treviso and Vicenza, firms employing more than ten workers, 1998

firms. It is also consistent with the impact of a bargaining system that has been decentralized during the period under examination (see section 10.2). Today, almost all large firms in Italy bargain over wages with unions at the firm level, holding the nationwide industry contract as a benchmark. This is less frequent among small firms, which at times refer to local agreements at the district level. In addition, both the correlation between firm-average wages and within-firm SD (0.59 in 1998), and the average coefficient of variation increasing from P10 to P90 (table 10.6) confirm that job hetero-

geneity increases with firm size. In general, the task of ascertaining the source of the firm-specific wage policy (the firm itself or the bargaining process with unions) is hard, but the conclusion still holds: firm wage policy shows its relevance in all of these statistics.

10.3.2 Wage Dynamics

Table 10.7 displays year-to-year absolute and relative wage changes computed for individuals working both in May t and in May $t - 1$.⁷

Average changes in individual wages roughly follow the business cycle: 3 percent in 1990, 0.3 percent in 1993, and 2 percent in 1998. The whole distribution of individual wage changes follows the same pattern, although different parts of the distribution react differently, the upper tail showing a higher responsiveness to the business cycle. In the low tail, the large negative wage changes observed among movers and short tenure workers stay within 20 to 22 percent and 12 to 14 percent, respectively, all over the period.

Average relative changes are higher for movers than stayers and for low-tenure workers than high-tenure workers. This is consistent with an increasing and convex wage profile over seniority and can be observed in all countries included in this book.⁸ Also, the standard deviation of wage changes is larger among movers, decreases among low-tenure workers, and is smaller among long-tenure workers. Different past career paths generate heterogeneity of wage changes at the beginning of one's career; once on the payroll, workers follow a much more predetermined wage path, described mostly by seniority and task.

Firm-based statistics in table 10.7 show that average change in firm wages is very close to the average change in individual wages. This means that individuals employed in small firms and in large firms enjoy the same average wage growth (recall that this does not hold for wage levels, discussed in section 10.3.2). The distribution of firm wage changes is more compressed than that of individual wage changes, as expected, and it is also somewhat more compressed in Italy than in other countries: P90 of the 1998 wage change distribution is 5 percent; P10 is -1 percent. In Denmark, the percentiles are 10 percent and -3 percent, in Finland 8 percent and -2 percent, in Germany 5 percent and 3 percent.

The between-firm variability of wage changes (0.03 in 1998) is lower than the variability of individual wage changes (0.13 in 1998). The within-firm standard deviation of wage change (0.11 in 1998) is almost as high as that of individual wage change. The two statistics are of the same order of magnitude in most countries (compare figures I.10 and I.11 in the introduction in this volume). Most of the discussion on wage levels applies here as well.

7. Relative changes are $\ln W_t - \ln W_{t-1}$.

8. It must be recalled that movers are also included in the short-tenure group.

Table 10.7

Wage dynamics

	Logs			Levels		
	1989–1990	1992–1993	1997–1998	1989–1990	1992–1993	1997–1998
Average change in wage ^a	0.03	0.003	0.02	3.58	0.21	2.20
SD	0.14	0.12	0.13	11.88	10.26	10.25
90th percentile	0.16	0.11	0.14	16.36	10.78	13.09
75th percentile	0.08	0.04	0.06	8.01	4.06	5.84
Median	0.03	-0.00	0.02	2.29	-0.01	1.47
25th percentile	-0.02	-0.04	-0.02	-1.58	-3.93	-1.93
10th percentile	-0.08	-0.10	-0.08	-7.34	-10.26	-7.65
No. of workers	50,244	48,871	43,377	50,244	48,871	43,377
Average of firm average change in wage ^b	0.03	0.005	0.02	2.86	0.47	2.07
SD	0.03	0.02	0.03	2.32	1.84	2.20
90th percentile	0.06	0.03	0.05	5.48	2.43	4.78
75th percentile	0.04	0.02	0.04	3.89	1.56	3.28
Median	0.03	0.01	0.02	2.64	0.57	2.14
25th percentile	0.02	-0.01	0.01	1.51	-0.38	0.54
10th percentile	0.00	-0.03	-0.01	0.48	-2.08	-0.62
No. of firms (cells)	791	761	734	791	761	734
Average no. of workers per cell (unweighted)	52.81	55.45	49.91	52.81	55.45	49.91
Average SD of no. of workers per cell	63.23	63.35	51.66	63.23	63.35	51.66
Average of SD of change in wage ^b	0.13	0.11	0.11	9.75	8.76	8.50
SD	0.05	0.03	0.04	2.54	2.10	2.09
90th percentile	0.19	0.15	0.16	13.17	11.40	10.99
75th percentile	0.14	0.12	0.12	10.93	10.06	9.57
Median	0.12	0.10	0.10	9.58	8.57	8.32
25th percentile	0.10	0.09	0.09	8.17	7.41	7.30
10th percentile	0.08	0.07	0.07	6.81	6.41	5.99
No. of firms (cells)	739	713	687	739	713	687
Average CV of change in wages ^b	9.03	6.33	0.004	5.50	3.13	4.64
SD	0.76	0.58	0.53	0.18	0.64	0.43
90th percentile	14.42	23.07	14.82	11.91	21.17	14.82
75th percentile	5.76	8.63	5.16	4.88	8.80	4.83
25th percentile	2.38	-6.37	1.61	2.37	-4.90	1.72
10th percentile	1.28	-17.35	-9.42	1.57	-22.82	-6.00
No. of firms (cells)	739	713	687	739	713	687
Average change in wage for people who change firm ^{a,c}	0.06	0.02	0.06	4.91	1.53	3.75
SD	0.25	0.22	0.24	18.17	16.23	16.52
90th percentile	0.35	0.27	0.33	28.40	22.39	25.43
75th percentile	0.17	0.13	0.17	14.25	10.43	13.54
Median	0.05	0.01	0.04	3.69	1.08	3.11
25th percentile	-0.06	-0.09	-0.07	-4.90	-7.60	-6.02
10th percentile	-0.20	-0.22	-0.21	-16.50	-19.23	-17.40
No. of workers	4,775	3,344	3,496	4,775	3,344	3,496

Table 10.7 (continued)

	Logs			Levels		
	1989– 1990	1992– 1993	1997– 1998	1989– 1990	1992– 1993	1997– 1998
Average change in wage for						
people with tenure <3 years ^a	0.05	0.02	0.04	4.50	1.48	3.22
SD	0.19	0.16	0.17	14.06	12.30	12.33
90th percentile	0.23	0.17	0.21	20.57	15.48	17.68
75th percentile	0.12	0.08	0.10	10.02	6.60	8.48
Median	0.04	0.01	0.03	3.22	0.90	2.39
25th percentile	-0.02	-0.04	-0.03	-1.64	-3.63	-2.01
10th percentile	-0.12	-0.14	-0.12	-9.70	-12.05	-9.98
No. of workers	13,305	11,133	10,782	13,305	11,133	10,782
Average change in wage for						
people with tenure ≥3 years ^a	0.03	0.00	0.02	3.25	-0.16	1.87
SD	0.12	0.10	0.11	10.97	9.54	9.44
90th percentile	0.14	0.09	0.11	14.87	9.37	11.50
75th percentile	0.07	0.04	0.05	7.29	3.40	5.08
Median	0.02	0.00	0.01	2.03	-0.24	1.27
25th percentile	-0.02	-0.04	-0.02	-1.56	-3.99	-1.91
10th percentile	-0.07	-0.09	-0.07	-6.66	-9.77	-7.09
No. of workers	36,939	37,738	32,595	36,939	37,738	32,595

Notes: SD = standard deviation; CV = coefficient of variation.

^aObservation = a person.

^bObservation = a firm.

^cThese are true firm changes as we don't need to pool together observations into synthetic firms.

Firm wage policy matters in shaping not only the wage level distribution but also the wage change distribution.

10.3.3 Mobility

Focus: Firm Data, Turnover, and Legal Transformations

- The WHIP reports the monthly employment stock and average wage of each firm. The employment stock counts all workers, including part time, apprentices, and managers, excluded from the previous tables.
- We use the monthly employment series to approximate worker flows: positive monthly changes in employment are association, and negative changes are separations. The sum of monthly associations (separations) relative to the average yearly employment is the firm association (separations) rate.
- There are two sources of measurement error. The first is that we miss across-month churning: if a worker exits during a given month and his

or her position is filled in the following month, we do not observe any monthly change in the employment stock, as the latter is measured as the number of heads present in the payroll in a given month. The second one is that it is—not surprisingly—difficult to control for legal transformations. We handle this problem by computing monthly changes from January to November only and reweighting to twelve months, as most legal transformations take place between December and January (end of the Italian fiscal year). Furthermore, we exclude entry and exit rates above 200 percent. The exclusion of spurious movements remains, however, far from perfect.

- The firm-average wage refers to white- and blue-collar workers only. Firms are selected if they employ at least twenty employees.

The sum of entry (associations) and exit (separations) rates measured on worker data yields a gross turnover of about 47 percent in 1998. This is the turnover rate relative to people working in firms with more than twenty employees.⁹ When computing the same statistics with firm data, we tend to overestimate all rates. The overestimate in entry and exit rates is larger during the 1993 downturn, while they are more precisely estimated in 1998 and 1990. The imperfect control of legal transformations may explain the upward bias when large reorganizations take place (see preceding bulleted list).

Low-wage firms almost always show the highest positive net flows, which is consistent with what is observed in other countries. This is explained by the correlation between average firm size and firm wages, as in Italy most job creation occurs in the small-firm sector. Top-decile firms have higher net flows than top-quartile ones, due to the better growth performance of firms with highly skilled workforce. The positive correlation between average firm size and firm wages also explains the ranking in turnover levels, with low-wage firms showing the highest turnover.

Finally, the correlation between firm size and within-firm individual seniority is positive, and exit rates decline as wages increase. All this is consistent with the working of internal labor markets that provide opportunities for advancement without leaving the firm and with declining external wage offers that dominate current wages as the latter increase (see table 10.8).

10.4 Conclusions

In spite of the centralized nature of wage bargaining in Italy, we find some evidence suggesting the existence of firm-wage policies. First, the ratio of the between-firm wage variability relative to total wage variability is sizeable and not very dissimilar from that reported for other countries. In

9. The same figure is about 60 percent considering all firms; see section 10.1.3.

Table 10.8 **Mobility**

	Entry			Exit			Net		
	1990	1993	1998	1990	1993	1998	1990	1993	1998
Rate (person)	0.22	0.16	0.24	0.21	0.19	0.23	0.01	-0.03	0.01
Rate	0.26	0.25	0.25	0.20	0.25	0.20	0.05	0.01	0.04
SD	0.29	0.30	0.27	0.23	0.30	0.23	0.27	0.28	0.25
Rate, top decile of firm wages	0.28	0.24	0.21	0.16	0.23	0.15	0.12	0.01	0.06
SD	0.36	0.33	0.28	0.24	0.32	0.22			
Rate, top quartile of firm wages	0.25	0.22	0.20	0.17	0.23	0.16	0.08	-0.01	0.04
SD	0.32	0.29	0.25	0.23	0.31	0.22			
Rate, bottom quartile of firm wages	0.30	0.31	0.33	0.23	0.29	0.25	0.07	0.02	0.08
SD	0.31	0.34	0.32	0.23	0.31	0.25			
Rate, bottom decile of firm wages	0.34	0.37	0.38	0.25	0.33	0.29	0.09	0.04	0.09
SD	0.34	0.39	0.37	0.24	0.35	0.28			
				1990		1993			1998
Employees				90.62		87.85			88.25
SD				745.67		670.58			603.96
Correlation (exit rate, average wage)				-0.06		-0.03			0.00
<i>p</i> -value				0.00		0.00			0.56
Corr-size-tenure, ^a obs: person				n.a.		n.a.			0.199
<i>p</i> -value									0.00
Exit-90% wage, obs: person				0.170		0.174			0.192
Exit-median-wage, obs: person				0.172		0.189			0.183
Exit 10%-wage, obs: person				0.430		0.378			0.511

Notes: SD = standard deviation; n.a. = not applicable.

^aElapsed tenure May 1998, truncated at 161 months.

Italy, it is sizeable also with respect to other decompositions: characteristics like gender, geographical area, and industry account for a negligible part of the total variance of wages. Second, the tide raising all boats is also quite suggestive: not only do individual wages throughout the whole distribution increase as average firm wages increase, but the spread increases too as we move from P10 to P90, indicating that the rewards of high-pay individuals are highly differentiated even within the same employer. This is coherent with the detected positive correlation between firm size and firm wages. In Italy, almost all large firms directly bargain over wages with unions, holding the nationwide industry contract as a benchmark. This is less frequent among small firms, which at times refer to local agreements at the district level.

Firm wage policy matters in shaping not only the wage level distribution

but also the wage change distribution. The within-firm standard deviation of wage change is almost as high as that of individual wage change, and much higher than between-firm variability of average change in wages. Worker-based statistics, on the other side, show that relative changes in individual wages follow the business cycle, although different parts of the distribution react differently, the upper tail showing a higher responsiveness. Both facts are at odds with the often-reported rigidity of Italian wages. Indeed, the detected flexibility is mainly driven by movers and short-tenure workers, who show higher and more dispersed relative wage changes. Different past career paths generate heterogeneity of wage changes at the beginning of one's career within each firm. Once workers become insiders, they follow a predetermined wage path according to seniority and task.

The preceding results, and the simple comparisons between stayers' and movers' wages (see table 10.3), are in line with well-established facts: wage growth (on impact) is often higher among movers, while wage levels are lower compared to stayers, before and, often, also after the job switch. Along similar lines suggested by Lazear and Shaw, we find that negative wage growth is more common among movers and short-tenure workers. In addition, worker entry and exit rates are higher at low-pay firms and lower at high-pay firms. This stylized fact is, however, of more difficult interpretation, as composition effects due to the high correlation between firm size and wages may hide the conclusion. Nor do we have any direct evidence that voluntary mobility is higher where wage compression is high. The cross-country comparison suggests that the relatively high degree of wage compression in Italy could be associated with higher entry and exit rates, but, as Lazear and Shaw emphasize in the introduction to this volume, one must be cautious with this comparison, as the different data sets used in this book measure exit over different time intervals and types of jobs.

Methodological Appendix

Data Used

In order to produce the tables presented, we used the Work Histories Italian Panel (WHIP), a database developed at the LABORatorio R. Revelli based on administrative data from the Italian Social Security (INPS).

For the purpose of this chapter, we used the WHIP section on dependent employment, which is a Linked Employer-Employee Database made up of a 1:90 sample of employees over the period from 1985 up to 2001. Details on the database and a public use file can be found at <http://www.laboratoriorevelli.it/whip>.

Treatment of Legal Transformations, Mergers, and Acquisitions

The use of administrative data on firms poses the problem of the treatment of legal transformations. Administrative archives treat events such as ownership transfers, bequests, donations, and legal transformations as if they were firms' start-ups and closures, even if these events do not produce a real interruption in the life of a firm. These events generate spurious flows of firms, jobs, and workers.

The WHIP database detects and corrects legal transformations first through a longitudinal firm identification algorithm that builds directly on the firm data provided by INPS. This algorithm is particularly suited to correct for mergers and acquisitions involving establishment or plants.

Moreover, the linkage between employees and the firms for which they are working enables to detect other legal transformations tracking simultaneous flows of workers between two or more firms. The key is to discriminate between normal movements, deriving from workers' decisions to change jobs, and spurious movements. It is intuitively unlikely that many workers of a company independently and simultaneously decide to move together to another firm, whereas this event will take place if all, or part of, the activities of the first firm are transferred to the second firm, or if the second firm is just a legal transformation of the first. In order to identify spurious components, a threshold for the intensity of such movements has been established. Given the WHIP sampling ratio, the observation of two workers moving within one month from the same firm (call it A) to a same firm (call it B) would statistically mean that, on average, firm A has handed over about 180 workers to firm B. Thus, if we observe in the same month at least two workers moving from firm A to firm B, we treat it as a spurious movement. Once spurious movements are detected, we reconnect the job spells of every worker involved in the simultaneous job change.

The Synthetic Firm Approach

Because WHIP is a 1:90 random sample of workers, we do not have a representative sample of employees working in small- and medium-sized firms. In addition, we observe the average wage paid to blue and white collars, but not the standard deviation. Only if the firm is sufficiently large is the number of observed workers sufficient to estimate the standard deviation of wages. For 99 percent of firms recorded in WHIP, we have less than ten workers belonging to the same firm; for 83 percent of them, we have just one worker.

In order to compute firm-based statistics in section 10.3, then, we pooled together firms into cells, called "synthetic firms." The synthetic firm approach leads to an underestimation of between-firm variability and to a parallel overestimation of within-firm variability as we attribute to "within

cell” the variability between firms belonging to the same cell. To limit this bias, we chose the finest grid granting a sufficient number of observations per cell. After several explorations, we ended up with an 800-cell grid along the following partitions:

- Geography: twenty Italian regions
- Firm size: five classes (20 to 49, 50 to 99, 100 to 199, 200 to 499, 500+ workers)¹⁰
- Sector of activity: forty-four classes (Nace-70 two-digit sectors)

Each cell has been weighted with the actual number of firms with the same characteristics in the population, as published by “*Osservatorio INPS*,” the official aggregate statistics on the population produced by INPS.

The validity of the synthetic firm approach is tested using a data set that covers the whole population of workers and firms located in two provinces of Veneto, in the Italian Northeast (Treviso and Vicenza). On this data set, we mimicked the sampling procedure that generates WHIP and then pooled the resulting firm sample using three different synthetic firm definitions. We are, therefore, in a position to evaluate how within- and between-variance estimates vary at increasing levels of cell disaggregation and how far we are from statistics measured in the firm population.

Results are as follows:

1. Worker-based statistics computed in the sample are quite close to true values (and, obviously, do not change at different synthetic firm definitions).

2. As expected, between-firm variability is always underestimated in synthetic firms with respect to population values, while within-firm variability is overestimated. Comparing the three definitions we have that as cells become smaller, the bias decreases. This is particularly true for the between-firm variability, which increases from 7.32 to 10.11 (the true value being 13.89).

3. The correlation between average wage and standard deviation of wage, at the highest level of disaggregation, is almost equal to the correlation computed at the firm level.

10. Firms under twenty employees have been excluded for cross-country comparability.

Table 10A.1 Structure of wages between and within firms, year 1990, Vicenza and Treviso

	Synthetic firms on sample data			Firm population
	Definition (I)	Definition (II)	Definition (III)	
Average wage ^a	78.87	78.87	78.87	79.11
SD	23.64	23.64	23.64	24.11
90th percentile	109.37	109.37	109.37	108.66
10th percentile	57.34	57.34	57.34	57.43
No. of workers	2075	2075	2075	194095
Average of firm average wage ^b	76.21	76.10	76.11	73.45
SD	7.32	8.46	10.11	13.89
90th percentile	84.47	88.48	88.48	90.74
10th percentile	68.34	67.28	62.40	58.44
No. of firms (cells)	28	52	95	4502
Average no. of workers per cell (unweighted)	74	40	22	43
Average SD of no. of workers per cell	91	49	26	106
Average of SD of wage ^b	21.62	21.03	19.81	14.70
SD	6.68	8.69	10.03	8.72
90th percentile	30.61	28.74	29.49	26.80
10th percentile	16.82	15.27	9.40	4.72
No. of firms	28	50	91	4481
Correlation (average wage, SD of wage) ^b	0.38	0.61	0.66	0.68

Notes: Definition (I) = cells are by eight one-digit Nace-70 sectors and five firm size classes. Definition (II) = cells are by eight one-digit Nace-70 sectors, five firm size classes and two provinces. Definition (III) = cells are by forty-four two-digit Nace-70 sectors, five firm size classes and two provinces.

^aObservation = a person.

^bObservation = a firm.

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