Preliminary. Highly Incomplete

The value of flexible contracts

By

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Abstract

Fixed-term contracts have been used in many European countries to reduce firms' firing costs. In this paper we evaluate the size of these costs by measuring the willingness of firms to trade fixed-term for open-end contracts in exchange for a cut in the labour cost of permanent jobs. Our results are based on a panel of Italian firms in the engineering sector exposed to an exogenous reduction in their labour cost induced by a tax credit granted to all firms hiring workers with open-end rather than fixed-term contracts. We found that a 1 per cent reduction in the labour cost of open-end contracts reduces the share of workers hired with a fixed-term contract by about 0.28 percentage points. In Italy, the share of fixed-term among new contracts grew from 34 to 42 per cent between 1995 and 2003. Using our results we evaluated that the labour cost reduction associated with this expansion amounted to about 23 per cent.

JEL classification: D78, H25, J23, J38.

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1. Introduction

How large are the firing costs associated with employment protection legislation? This question appears to be crucial in the light of the renewed policy effort of the European Union aimed at combining better and more secure jobs with a highly flexible labour market. This orientation has been confirmed by the recent Kok Report (EU, 2003). The basic idea is to increase the number of permanent jobs by cutting labour costs associated to open-end contracts, thereby compensating firms for giving up the flexibility associated with fixed-term contracts.

Recent examples of such a policy can be found both in Spain and Italy. In 1997, Spain drastically reduced payroll taxes on new permanent contracts for a two year period, in an attempt to reduce the segmentation of the Spanish labour market induced by the previous 1984 liberalization of temporary contracts. Firing costs for unfair dismissal were also cut by around 25 per cent (Benito and Hernando, 2003). Kugler, Jimeno and Hernanz (2002) estimated that for young workers this reform reduced the labour cost of a permanent job by about 10 per cent (9.9 per cent for males and 9.5 per cent for females) in the first year and by about 7 per cent in the second year. In the year 2000, Italy adopted a similar provision by granting a large tax credit to firms hiring workers with an open-end contract. The implied cut in the labour cost has been evaluated to be between 15 and 30 per cent depending on the geographical area (Cipollone and Guelfi, 2003).

Knowledge of the value firms attach to flexible contracts is crucial for an optimal design of this type of compensation policies. Despite the simplicity of the underlying concept, this information is rather difficult to obtain because of the multidimensional nature of the costs associated with firing. Along with monetary expenditures (severance payment), there are indeed burdens associated with the length of the administrative and legal procedure and the cost of uncertainty. OECD (1999) provides a complete list of the costs generated by the employment protection legislation.

Three main strands of literature have tried to measure the magnitude of firing costs. A first line of research has attempted to evaluate these costs within the framework of dynamic labour demand[1], which was developed after the seminal work of Oi (1962). Along this line, Rota (2004), using an "Ss" approach, estimated that fixed costs account for as much as 15 per cent of monthly wages using a sample of Italian firms. In a similar setting, Aguirregabiria and Alonso-Barrego (1999) found that in Spain firing costs amounted to 51 per cent of the gross annual wages of a permanent worker over the period 1982-1993.

A second strand of literature has attempted to directly compute the cost of EPL by looking directly into the regulation or the actual costs declared by firms. Using direct evidence, Abowd and Kramarz (2003) evaluate that in France in 1992 separation costs amounted to anything between 56 and 126 per cent of average labour costs. Garibaldi and Violante (2002) suggest that in Italy firing costs are equivalent to about seven monthly wages.

A third group of empirical research has attempted to quantify the size of firing cost by estimating their impact on the level of employment. This large body of literature has not reached any conclusive consensus (OECD, 1999)

This short review of the main findings on the size of firing costs suggests a consensus is yet to be found and warrants another look at these issues.

In this paper we explore however another approach by evaluating the willingness of firms to exchange flexibility for a cut in the labour costs. In practice, we estimate the labour demand for fixed-term contracts relative to that for open-end contracts as a function of relative wages and firm specific controls. This route should lead to a direct evaluation of the money value that firms attach to fixed-term contracts, thereby providing an assessment of the value of flexibility in the labour market. This direct approach has the advantage that the pricing of certain types of regulation is left to the evaluation of firms rather than to ex-post computation. However, the reliability of this approach impinges on the assumption that the relative wage coefficient in this labour demand equation measures a causal effect. In most settings this is an heroic assumption because of firms' unobservable heterogeneity which acts as a confounding factor thereby introducing a bias in the coefficients. In this paper we claim that we have a research design and a set of good instruments that allow us to overcome the endogeneity problem and to measure the willingness of firms to exchange flexibility for labour cost cuts. We exploit the introduction of a tax credit which was granted to all Italian firms choosing to hire workers under open-end rather than fixed-term contracts. This regulation created a trade-off for the firm between wage cuts and the adoption of flexible contracts. Observing the variation in firms' response, we are able to uncover the rate at which firms are willing to trade flexibility for wage cuts.

This paper is organised as follows. In section 2 we discuss our empirical strategy, while section 3 is devoted to illustrate in some detail the characteristics of the tax credit; section 4 describes the results of our empirical investigation, while section 5 explains the implications of our findings for the aggregate wage dynamics. Section 6 finally concludes.

[1] Hamermesh and Pfann (1996) have recently reviewed the literature on the nature and determinants of the

2. Our approach to estimate the value of fixed-term contracts.

Our approach to measure the value to a firm of flexible contracts is straightforward: we use a simple model relating the ratio between the share of hires under fixed-term contracts and the corresponding inflow of new permanent workers, to their relative wage:

$$(1)\ \frac{H_{ft}}{H_{oe}} = a_0 + a_1 \frac{w_{oe}}{w_{ft}}$$

where *H* stands for the number of hires, *w* for the wage, *ft* for fixed-term and *op* for open-end. In this simple framework, the coefficient a_1 should be an estimate of the number of fixed-term contracts firms are willing to trade for permanent jobs in exchange for a reduction in their relative costs. It measures the money value firms require in order to give up the flexibility associated with fixed-term contracts.

Despite its simplicity, equation (1) cannot be taken to the data without further discussion. The first problem to be addressed concerns the interpretation of equation (1). Indeed, as it is equation (1) might look a completely *ad hoc* model without any theoretical foundation. A simple way to tackle this point is to recognise that fixed-term contracts are mainly used to hire low-skilled workers; therefore equation (1) represents a modified version of a relative demand schedule[2] widely used in the Skill Biased Technical Change literature. There exists both theoretical and empirical evidence that fixed-term contracts are associated with low-skilled workers. Cipollone and Guelfi (2003) have shown that this association is an implication of a simple model in which firms choose whether to hire people with a fixed-term contract and face an increasing risk of quitting or rather employ them with an open-end contract and face the risk of incurring in firing costs. Bentolila and Saint-Paul (1992) justify a similar assumption on the ground that firms have an incentive to invest in firm's specific training only for permanent workers. Turning to the empirical evidence, data collected on a sample of Italian manufacturing firms (the data-set used in this paper that will be described in section 5) show for instance that (table 1) in the years 1999-2001 about 74 out of 100 blue-collar workers were hired with a fixed-term contract, while among white-collars the correspondent share was only 28 per cent. About 87 per cent of all newly hired fixed-term workers were blue-collar, whose share on total

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adjustment costs.

[2] Let $Y = ft^{\alpha} op^{\beta} K^{1-\alpha-\beta}$ be a standard production function with *ft* representing low-skilled , *op* highly skilled qualified and *K* the stock of capital; the implied relative demand for fixed to open-end contracts is $\frac{ft}{op} = \frac{\alpha}{\beta}\frac{w_{op}}{w_{ft}}$

hiring (both open-end and fixed-term) was about 73 per cent. These numbers suggest that our approximation, while not perfect, is acceptable.

A second issue concerns the nature of the data required to properly estimate equation (1). We feel that a firms' panel data are needed in order to take into account both observed and unobserved heterogeneity. In this respect we have a large set of information on a panel of firms for the period 1997-2001 (a complete description of the data-set is provided in the next section).

Given these characteristics, equation (1) is the workhorse used in this paper to estimate the value of flexibility. However this equation might still suffer from endogeneity problems that might hinder our ability to consider that coefficient a_1 measures the causal effect of relative wages on relative labour demand. Panel data allow us to remove the effect of firm's heterogeneity that is invariant over time; we also relay on instrumental variables to further control for other sources of endogeneity. However we cannot be fully sure that the estimated coefficient is unbiased. An alternative route would be to look at the result of a controlled experiment in which firms are asked to choose between hiring people with open-end contracts and enjoy a wage cut or hiring them with fixed-term contracts and enjoy the associated flexibility. In this setting we would be sure that the wage variation is truly exogenous. Exploiting the variation of the firm choice we could trace the relative demand curve and therefore the trade-off between wages and contract flexibility.

We think that a recent policy intervention on the Italian labour market provides a good approximation of this ideal experimental setting. In particular, we exploit the fact that starting from October 2000 the Italian government rewarded firms choosing to hire workers under open-end contracts through a tax credit of about € 413 (€ 620 for workers in the South) per month and per worker from the hiring moment until the end of December 2003 (a more thorough description of the regulatory aspects of this recent provision is discussed in the following section). Since this tax credit could be claimed against any type of taxes, such as income tax, social security contributions, value-added tax, it is not reflected into workers'gross earnings, which is our measure of wage. Therefore equation (1) can be rewritten as

$$(2)\quad \left(\frac{H_{ft}}{H_{oe}}\right)_{it} = a_0 + a_1\left[\left(\frac{w_{oe}}{w_{ft}}\right)_{it} - \left(\frac{TC}{w_{ft}}\right)_{it}\right] + X_{it}\gamma + \alpha_i + \varepsilon_{it} \quad \text{where i=1…..N, t=1997-2001,}$$

where N is the number of firms, TC_{it} is the value of the tax credit which equals zero if t< 2001 and either 413 or 620 in the year 2001 for all firms hiring with open-end contracts either in the central and northern regions or in the south of the country, X_{it} is a set of controls, α_i the unobserved firm's fixed effect, and ε_{it} a random component which we assume to have zero mean and to be uncorrelated both serially and with the observables variables. Notice that if we

separate the two terms in the square bracket we have two different estimators for the causal effect of relative wages on relative labour demand

$$\text{(2 bis)} \left(\frac{H_{ft}}{H}\right)_{it} = a_0 + a_1\left(\frac{w_{oe}}{w_{ft}}\right)_{it} - a_1\left(\frac{TC}{w_{ft}}\right)_{it} + X_{it}\gamma + \alpha_i + \varepsilon_{it} \text{ where i=1…..N, t=1997-2001}$$

Since we are reasonably sure that the tax credit *TC* is exogenous[3], its coefficient sets a benchmark for the evaluation of the trade off between contract flexibility and wages.

3. **Subsidy to open-end contracts**

Like many other OECD countries, Italy has attempted to reduce the negative effects of fixed-term contracts[4]. The strategy adopted sought to increase the mobility out of fixed-term contracts by providing fiscal incentives to firms that either transform temporary into permanent positions or directly hire workers under open-end contracts. There are several examples of this strategy[5]. However, until the year 2000 these incentives have been small and often targeted to particular areas, firm types or worker categories.

The Italian Finance Law for the year 2001 (issued at the end of 2000) provided instead a new incentive in the form of a general, automatic and quite generous tax credit to all firms hiring workers with open-end contracts. In particular, this provision stated that every firm hiring a new worker on a permanent basis would be rewarded with a tax credit of about € 413 (€ 620 for workers in the South) per month and per worker from the hiring moment until the end of December 2003[6]. This new tax credit applies to all new hires taking place from October 2000. Thus, for a southern worker hired in October 2000 and retained until December 2003 each firm will receive about € 24,200. The tax credit is awarded only if both worker and firm are eligible. A worker is eligible if he/she is at least 25 years old and not working with an open-end contract in the 24 months before the hiring. A firm is eligible if the newly hired worker raises the overall level of permanent employment - at the firm level - above the average recorded in the period between October 1999 and September 2000. The tax credit can be claimed against any kind of taxes, such as income tax, social security contributions, value-added tax. Furthermore, it can be

[3] So should be the ratio since there is almost no firm component in the wages of fixed-term contracts; they are set centrally by national collective bargaining and can be taken as exogenous for any given firm.
[4] Cipollone and Guelfi (2003) provide a full review of figures and regulation about fixed-term contracts in Italy.
[5] For example, the incentives to transform training-employment contracts into permanent ones or the tax credit for small firms hiring permanent workers in economically depressed areas.
[6] The contribution provided by this subsidy is large: the percentage reduction in per-capita labour costs due to the tax credit (using data for the year 2000) ranges from about 9.3 per cent in the banking sector in the central and northern regions of the country to almost 60 per cent in the agricultural sector in the South. On average, in the private non-farm sector the reduction amounts to about 30 per cent in the South and 16 per cent in the central and northern regions.

passed on to different fiscal years. Last, but not least, this tax credit can be cumulated with other existing subsidies.

The new tax credit seems to have been very successful in 2001. According to the figures collected by the Ministry of Finance (and reported by the Ministry of Labour, 2001), between January and December 2001 the forgone revenues, because of the tax credit, increased from 0 to more than 0.7 per cent of the monthly flow of social security contributions. This involved 188,000 workers in November 2001, that is about 1.2 per cent of total employees. Labour force surveys confirm this indication.

4. **Data description**

Estimation has been carried out on the micro-data collected by Federmeccanica (the Italian federation of private engineering firms) for its annual national survey on the situation of the engineering industry. Designed in 1976 to fulfil the information duties agreed upon with the trade unions in the sector collective agreement signed in that same year, this survey provides yearly data on a wide set of variables covering several different aspects both at the firm and plant level. Though the survey has experienced several changes over time both in the topics chosen and/or in the detail required, information on the structure and dynamics of both employment and average earnings is available (though with different in-depth possibilities) from the very first year of data collection. Nonetheless, micro-data in electronic form are only available starting from the second half of the 1990s. For our purposes we chose to select the years 1997, 1998, 1999 and 2001 (no survey was carried out in the year 2000). For each of these four years, the survey provides a quite rich and detailed set of information on:

- the structure of participating firms: number of firms, local units and employees by size, industry and geographical region;
- the structure and dynamics of employment: employment stock, hirings and separations by gender, qualification (blue collars vs. white collars), firm size, contract type (permanent vs. fixed-term), as well as industry;
- earnings: average nominal monthly wages by firm size, industry and worker's qualification (blue collars vs. white collars); annual premia, incentive pay as well as total annual average wages.
- working hours: contractual working hours by firm size, industry and shift type, overtime work, hours lost because of absenteeism, actual working hours;
- strikes, union representation, company bargaining: hours lost because of strike by firm size and industry, degree of unionization by firm size, industry and geographical region,

local units with union representatives, number of firms with company bargaining as well as the results of the last company bargaining round.

The number of answering firms ranges from a minimum of 2,194 in 2001 to a maximum of 2669 in 1997. However, we restricted the sample to firms with only a single plant and selected among them only those having answered to all four survey waves[7]. Therefore we end up with 534 firms, but not all of them are actually present every year because of some missing observations. Table 1.bis includes some basic information about the most important variables used in the empirical analysis. On average, our firms turn out to be of medium size with about 120 employees; nominal monthly average wages amount to around 1,500 Euros with salaries paid to open-end employee being about 38 per cent higher than those remunerating fixed-term workers. This only represents an approximation since we do not have information on individual worker's wages, nor on the average wage by type of contract. We discuss in full length the construction of this relative wage measure in the section presenting our empirical results.

On average our firms hire about 15 people every year, which corresponds to an inflow rate of about 13 per cent; about half of the newly hired employees are hired with a fixed-term contract. It is interesting to note that in 2001 the share of fixed-term contracts dropped by almost 4 percentage points.

Finally the tax credit was worth about 20 per cent of the average wage paid for fixed-term contracts.

5. **Results**

In the actual estimation we use a slightly modified version of equation (2):

$$(3)\ \left(\frac{H_{ft}}{H}\right)_{it} = a_0 + a_1\left(\frac{w_{oe}}{w_{ft}}\right)_{it} + a_2\left(\frac{TC}{w_{ft}}\right)_{it} + X_{it}\gamma + \alpha_i + \varepsilon_{it} \text{ where i=1…..N, t=1997-2001,}$$

where we allow for a different coefficient for the relative wage and the tax credit. Moreover, we slightly changed the definition of the dependent variable to avoid loosing all those observations for which there were only fixed-term hires.

The definition of the relative wage deserves some discussion. As explained in the data description section, we do not have the actual wage of people working under a fixed-term contract. However, we do have average wages for each of the 16 job types corresponding to the different contractual positions[8] defined by the sector collective agreements signed in the period under review. These positions are grouped into three main categories (blue-collars, intermediate

[7] We concentrated on one-plant firms because for some crucial variable such as the wage we only have information at the firm but not at the plant level.

[8] We do not consider apprenticeship, which is a special contract targeted to young workers.

positions, and white-collars) and within each group they are ranked from the lowest to the highest skilled one. As a proxy for the wage of fixed-term contracts, we use the average wages of the two least skilled groups among the blue-collars and the least skilled workers among the white-collars. We use the remaining categories to compute the wages for open-end workers. Using this wage measure, we found that in our sample fixed-term workers earn about 26 per cent less than open-end ones, a number which is not far from the differential estimated using data from the Bank of Italy Survey on Household Income and Wealth[9].

Estimation results of equation (3) are reported in table 2. We specified several models, differing to each other in the number of controls. All models include firms' fixed effects. In the simplest specification (model 1), which only includes year dummies as control variables, we estimate an impact of relative wages of 0.14 which implies that a 10 per cent reduction in the wage of open-end workers reduces the hiring share of fixed-term workers by about 1.4 percentage points; in order to gauge the size of the effect, it is useful to remind that in our sample new fixed-term contracts amount to about 52 per cent of new open-end contracts[10]. A more intuitive way to read this result is to say that for a firm the possibility to hire one worker with a fixed-term contract out of hundred total hires is equivalent to a 5.4 per cent reduction in the wage of an open-end job[11].

The impact of the tax credit was larger than that of the relative wage: when the tax credit was worth 10 per cent of the wage of a fixed-term contract, the share of open-end contracts dropped by about 2.1 percentage points; this implies that firms require a 3.6 per cent wage cut for a permanent worker in order to reduce by 1 per cent the share of new workers hired under fixed-term contracts.

The overall effect of the tax credit, which on average was worth 21 per cent of the wage associated to a fixed-term contract, accounts for a reduction of about 4 percentage points in the share of new workers hired with a temporary contract.

Adding more controls increases the magnitude of the effect of both the relative wage and the tax credit. Controlling for the size of firms increases both coefficients in absolute value, suggesting that in larger firms both the wage gap between temporary and permanent workers and the labour cost cut induced by the tax credit were bigger. Controlling for the business cycle (model 3) does not alter our results.

[9] Using these data for the year 2000, Cipollone and Guelfi (2003) estimate a 32 per cent raw differential for males and a 9 per cent one for females.

[10] This fraction is similar to the value (56%) found using the labor force surveys covering the same period of time (see Cipollone Guelfi 2003, table 6)

[11] The math is the following: a change in the wage paid to open-end contracts that is worth a 10 per cent of the wage paid to fixed-term ones changes the share of fixed-term contracts by 1.4 percentage points. A 10 per cent of a fixed-term contract wage is equivalent to a 7.4 per cent of an open-end contract wage. Therefore a 1 per cent in total hirings is worth a 5.3 (=7.4/1.47) per cent of open-end contract.

Firms' fixed effects control for time-invariant firms' characteristics. However, relative wages and the share of hires under fixed-term contracts may be both influenced by shocks that are specific to a given year and a specific location. To control for these effects, we included in the regression a full set of geographical (Model 4) dummies in interaction with year dummies. These new controls while raising the sensitivity of temporary contracts to relative wages leave the overall message unchanged.

Overall the results suggest that firms evaluate the possibility of hiring under fixed-term contracts a 1 per cent of total new hires as equivalent to a 4-5 per cent cut in the wages of permanent workers.

There is a disturbing feature in these results. On the basis of our conceptual framework we would have expected similar coefficients for the relative wage and the tax credit. While we cannot reject statically the null hypothesis that they are equal (as shown by the p-values in table 2), they appear to be different at least from an economic point of view. We investigated this issue to reconcile these numbers with our expectation.

A possible reason behind the difference in the two slopes might be that our controls are insufficient to get rid of all potential sources of endogeneity. As a matter of fact it could be the case that both the relative wage and the share of fixed-term hires react to some firm-year specific shock that we do not control for. Consider as an example Figure 1. Suppose that firms face an upward sloping (relative) supply curve for fixed-term and open-end contracts. Equilibrium before the tax credit is in A. The tax credit opens a wedge between the relative wage faced by workers (WRW) and that faced by the firms (WRF). Firms move upward along their demand curve reducing the relative number of fixed-term contracts (they move to B); in contrast the relative supply does not change because the relative wage that matters for workers has not changed. The introduction of the tax credit produces an excess of the relative supply of fixed-term contracts. As a consequence relative wages might react. It is reasonable to think that wages associated with open-end contracts are those that adjust because permanent workers have a stronger bargaining power.

In order to control for this kind of endogeneity problem we adopted an instrumental variables approach. The instruments we used for open-end and fixed-term wages are the contractual wages for the two types of contract[12]. We supplement these instruments with a large set of information about firm's unionization and company-level contractual activity[13]. When instrumented, the effect of the relative wage becomes larger and almost doubles in three out of

[12] Since we know the contractual wages for all workers' categories, we construct the instruments following the same procedure we used for the relative wage and relative tax credit, using contractual rather than actual wages.

[13] This set of instruments includes a dummy for the existence of a company-level contract, the total union membership and the membership of the three most representative unions in the country, the value of possible benefits, the parameters used to compute these benefits and the procedures used to divide them among employee.

four specifications (table 3). This downward bias affecting the fixed effect estimates might be understood along the lines suggested by figure 1: firms wishing to enjoy the benefits of the tax credit have to hire a larger share of workers under open-end contracts. In presence of an upward (relative) supply curve there will be an upward pressure on relative wages. Because of this confounding factor the coefficient of relative wages can be biased downward.

With these new estimates the gap between the effect of the relative wage and that of the tax credit shrinks considerably and the p-value associated with the null that the two coefficients are equal is always larger than 85 per cent. However the relative wage coefficient is not precisely estimated. The reduction in the labour cost of an open-end worker that firms consider to be equivalent to the possibility of hiring a 1 per cent of new workers with a fixed-term contract drops below 4 per cent (estimates range from 2.7 to 3.4 depending on the specification). Coefficients on the relative tax credit do not change in a significant way.

In the estimates of table 3 we instrumented only relative wages. We did not instrument the relative tax credit on the ground that wages paid to fixed-term workers (the denominator of the relative tax credit) are basically equal to the contractual minimum wages for low-skilled workers. While this is a reasonable assumption, we can remove it running an IV estimate that includes the relative tax credit among the endogenous variables (along with relative wages). Results are reported in table 4 and suggest there might be a downward pressure on the wages associated with fixed-term contracts which induced an upward bias in the coefficients. However the effect seems to be small and does not change the overall picture.

6. **Implication for aggregate wages**

The results of the previous section can be helpful to explain the rather puzzling dynamics observed in the recent years in Italian employment. Between 1995 and 2003 total employment in the Italian private sector grew by 1.25 million workers, i.e. a 7.5 per cent overall increase. In the same period value added rose by 13.5 per cent. The ex-post elasticity was 0.55, a very large and unprecedented value for the Italian standards; in the previous 15 years employment declined by 4.5 per cent while the output increased by 37 per cent. Wage moderation and the introduction of flexible contracts have been invoked to explain this new feature of the Italian economy. Indeed real wages remained basically constant over the period 1995-2002 (they actually increased by 0.5 per cent over the whole period) and the share of fixed-term contracts on all newly hired employees grew from 34 to 42 per cent. However, the actual importance of the inflow of flexibility for the expansion of employment has yet to be quantified. Our results of the previous section can be a first step in this direction. They indicated that for firms the growth of fixed-term contracts was equivalent to a 23 per cent cut in the wage of an open-end worker.

7. **Conclusion**

In this paper we estimated the value that firms attach to flexible labour contracts. We relay on a panel of Italian firms operating in the engineering sector in the period 1997-2001. We estimated a demand curve for flexible contracts relative to that for permanent contracts exploiting an exogenous variation in the labour cost of open-end jobs.

We found that firms appraise the possibility to hire a 1 per cent of new workers with temporary contracts as much as a 3 per cent reduction in the wage paid to permanent jobs. Since the share of fixed-term contracts on all newly hired employees grew between 1995 and 2003 by 8.5 percentage points (from 33.7 to 42.2 per cent), this inflow of flexibility into the Italian labour market was worth as much as a drop of about 23 per cent in the wage of permanent workers. This labour cost cut faced by the firms might explain the large increase in Italian employment, which otherwise remains rather puzzling in the light of the slow growth of output.

Tables and figures

Table 1

HIRES BY TYPE OF CONTRACT AND SKILL LEVEL IN THE ITALIAN ENGINEERING INDUSTRY, YEARS 1999-2001

(Percentage points)

	Composition by type of contract		Share of Blue Collar
	Blue Collar	White Collar	
Fixed-term	74.0	28.3	87.5
Part-time	1.6	1.7	71.4
Open-end, full time	24.4	70.0	48.2
Total hires	100.0	100.0	72.7

Source: Own computations on Federmeccanica

Table 1.bis

BASIC SAMPLE CHARACTERISTICS

	1997		1998		1999		2001	
	Mean	Std	Mean	Std	Mean	Std	Mean	Std
Employees	116.8	171.9	118.44	172.7	122.5	179.9	126.6	186.3
Monthly Wages[1]	2608	401	2749	390	2836	462	3012	473
Open-end contract[1]	2672	431	2821	400	2902	470	3081	494
Fixed-term contract[1]	1977	179	2052	189	2103	324	2195	232
Relative wages (open-end relative to fixed-term wage)	1.35	.189	1.38	.164	1.39	.22	1.41	.205
Hires	15.8	25.14	15.32	27.9	17.7	34.4	14.7	21.9
Open-end contracts	5.3	9.6	5.4	8.4	6.0	11.5	6.8	10.6
Fixed-term contracts	10.5	21.4	9.9	23.6	11.7	28.8	8.0	14.9
Share of fixed-term	.56	.35	.53	.35	.52	.36	.48	.34
Tax credit relative to wages of fixed-term contracts	_	_	_	_	_	_	.21	.18
Number of firms with non missing observations	402		402		364		358	

[1] Thousands of liras

Source: Own computations on Federmeccanica.

Table 2

ESTIMATES OF THE EFFECT OF TAX CREDIT AND RELATIVE WAGES ON THE SHARE OF WORKERS HIRED WITH FIXED-TERM CONTRACTS

(Dependent variable: share of new hires with a fixed-term contract[1]: fixed effect panel estimation)

	Model 1	Model 2	Model 3	Model 4
Relative wage[2]	.138	.148	.147	.165
	(.067)	(.067)	(.067)	(.068)
Tax credit[3]	-.206	-.282	-.288	-.251
	(.094)	(.099)	(.099)	(.108)
Firm's fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Firm's size[4]		Yes	Yes	Yes
Control for cycle[5]			Yes	Yes
Years*geographical dummies				Yes
N. observations	1553	1553	1553	1553
N. Firms	534	534	534	534
P-values of the test on equality between relative wage and tax credit coefficients (Null= equality of coefficients)	.54	.25	.24	.42
Equivalence between fixed-term and wage reduction implied by relative wage coefficient[6]	5.4	5.0	5.0	4.5
Equivalence between fixed-term and wage reduction implied by relative tax credit coefficient[6]	3.6	2.6	2.6	2.9

[1] Hires with fixed-term contracts relative to total hires. [2] Wage of open-end relative to fixed-term workers. [3] Money value granted by the tax credit relative to the wage of fixed-term workers. [4] Linear and quadratic terms. [5] Hours of overtime work, hours of Wage Supplementation Found and hours of strike. [6] Percentage reduction in the wage of an average open-end contract that firms judge to be equivalent to the possibility of hiring a 1 per cent of total new hires with fixed-term contracts.

Source: Own computations on Federmeccanica.

Table 3

ESTIMATES OF THE EFFECT OF TAX CREDIT AND RELATIVE WAGE ON THE SHARE OF WORKERS HIRED WITH FIXED-TERM CONTRACTS

(Dependent variable: share of new hires with fixed-term contracts[1]; instrumental variables fixed effect panel estimation[2])

	Model 1	Model 2	Model 3	Model 4
Relative wage[3]	.243	.268	.273	.221
	(.236)	(.237)	(.239)	(.239)
Tax credit[4]	-.215	-.294	-.296	-.265
	(.096)	(.102)	(.102)	(.105)
Firm's fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Firm's size[5]		Yes	Yes	Yes
Control for cycle[6]			Yes	Yes
Years*geographical dummies				Yes
N. observations	1553	1553	1553	1553
N. Firms	534	534	534	534
P-values of the test on equality between relative wage and tax credit coefficients (Null= equality of coefficients)	.90	.91	.92	.85
Equivalence between fixed-term and wage reduction implied by relative wage coefficient[7]	3.1	2.8	2.7	3.4
Equivalence between fixed-term and wage reduction implied by relative tax credit coefficient[7]	3.4	2.4	2.4	2.6

[1] Hires with fixed-term contract relative to total hires. [2] Instrumented variables: relative wage; instruments include relative contractual wages, tax credit, dummies for the existence of company-level contracts, total union membership and the membership of the three most representative unions in the country, the value of benefits, the parameters used to compute these benefits and the procedures used to divide them among the employees. [3] Wages of open-end relative to fixed-term workers. [4] Money value granted by the tax credit relative to fixed-term workers' wage. [5] Linear and quadratic terms. [6] Hours of overtime work, hours of Wage Supplementation Found and hours of strike. [7] Percentage reduction in the wage of an average open-end contract that firms judge to be equivalent to the possibility of hiring a 1 per cent of total new hires with fixed-term contracts.

Source: Own computations on Federmeccanica.

Table 4

ESTIMATES OF THE EFFECT OF TAX CREDIT AND RELATIVE WAGE ON THE SHARE OF WORKERS HIRED WITH FIXED-TERM CONTRACTS

(Dependent variable: share of new hires with fix term contracts[1]; instrumental variables fixed effect panel estimation[2])

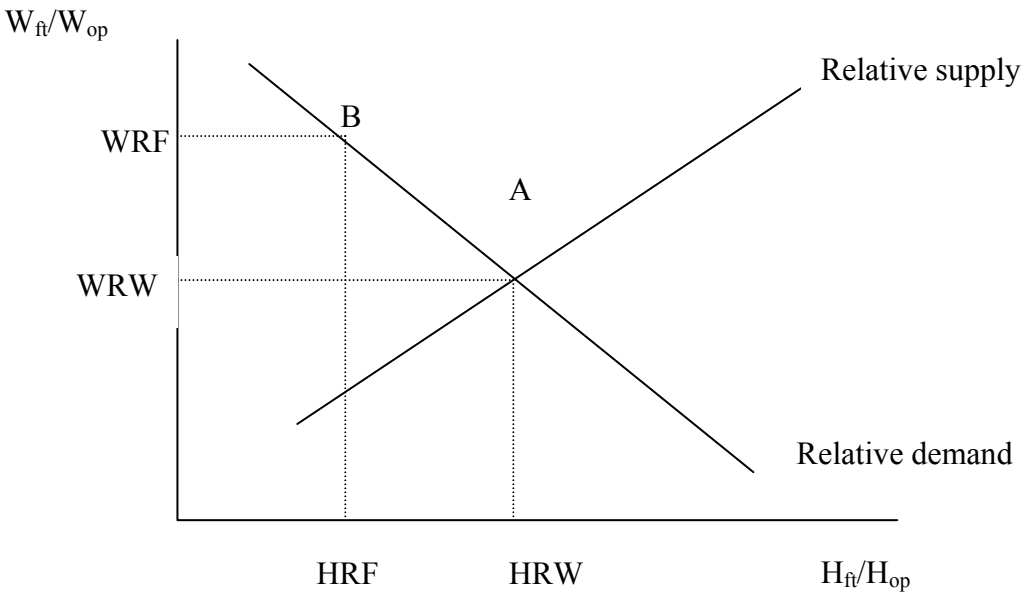
	Model 1	Model 2	Model 3	Model 4
Relative wage[3]	.242	.267	.271	.217
	(.237)	(.237)	(.238)	(.240)
Tax credit[4]	-.220	-.304	-.306	-.287
	(.096)	(.102)	(.103)	(.105)
Firm's fixed effects	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Firm's size[5]		Yes	Yes	Yes
Control for cycle[6]			Yes	Yes
Years*geographical dummies				Yes
N. observations	1553	1553	1553	1553
N. Firms	534	534	534	534
P-values of the test on equality between relative wage and tax credit coefficients (Null= equality of coefficients)	.93	.87	.88	.77
Equivalence between fixed-term and wage reduction implied by relative wage coefficient[7]	3.0	2.8	2.7	3.3
Equivalence between fixed-term and wage reduction implied by relative tax credit coefficient[7]	3.4	2.5	2.5	2.8

[1] Hires with fixed-term contract relative to total hires. [2] Instrumented variables: relative wage and tax credit; instruments include relative contractual wages, tax credit relative to fixed-term contractual wages, dummies for the existence of company-level contracts, total union membership and the membership of the three most representative unions in the country, the value of benefits, the parameters used to compute these benefits and the procedures used to divide them among employees. [3] Wage of open-end relative to fixed-term workers. [4] Money value granted by the tax credit relative to fixed-term workers' wage. [5] Linear and quadratic terms. [6] Hours of overtime work, hours of Wage Supplementation Found and hours of strike. [7] Percentage reduction in the wage of an average open-end contract that firms judge to be equivalent to the possibility of hiring a 1 per cent of total new hires with fixed-term contracts.

Source: Own computations on Federmeccanica.

Figure 1

THE TAX CREDIT EFFECTS ON RELATIVE LABOUR DEMAND



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