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Rational responses to poorly designed policies: The case of subsidies to Open-End Contracts in Italy

By

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Abstract

In this paper we look to tax credit policy as an instrument to foster hiring with open-end rather than with fixed-term contracts. In particular, we examine a specific regulation adopted in Italy in the year 2000 (Credito d'Imposta). This policy offers a generous and automatic tax credit to all firms hiring workers with open-end contracts. The eligibility criteria are very mild for both firms and workers. Our results seem to indicate, both formally and empirically, that firms rationally used this subsidy to hire under open-end contracts almost only those workers who would have been hired under such a contract regardless the subsidy, even though after a short transition into temporary employment. Our estimates suggest that, compared to 2000, in 2001 the subsidy did increase the probability to be hired with an open-end contract, conditional on being hired, but in a rather uneven way across workers. The probability rose of about 10 per cent for workers with a college degree, of about 4 per cent for people with high school, while did not change or might have even slightly declined for workers with middle school or less.

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1. Introduction

In the past few years fixed-term contracts have gained the center stage in the economic debate on labor market reforms in Europe. Two major features have drawn the highest attention; the first refers to the magnitude of the phenomenon; in few years temporary jobs have become the major novelty of European labor market Landscape. Table 1 shows that in many OECD countries a sizeable share of employees work under Fixed Term contract. They still represent a little share in some country (such as Ireland, UK, Luxemburg, Hungary) but in the majority of the case they account for at least about 10 per cent of employees; in few countries these share are even higher: 32.1, 20.4, 20.4 per cent in Spain, Portugal and Turkey respectively. Only ten year earlier Temporary occupation represented a much smaller fraction of employment. The second feature refers to the fact that in several important instances – such as Austria, Czech Republic, Finland, France, Germany, Italy - a sizeable portion of the newly created jobs in the '90 has taken the form of Fixed term Contracts (Table 1)

This rapid expansion has fuelled researchers' effort to understand the effects of fixed term contracts on labor market outcome. At this stage there exists indeed an unsettled dispute in the literature concerning their effectiveness. On the one hand it is suggested that, by introducing some form of flexibility into an otherwise highly regulated labor market, they tend to provide young workers with a stepping-stone towards permanent employment (Booth, Francesconi, Franck 2000 for UK; Contini, Pacelli and Villosio for UK, Germany and Italy). On the other hand, there is increasing evidence that they might represent a "dead-end", in that they further segment the labor market between insiders holding open-end contracts and outsiders confined at the margins, between repeated spells of unemployment and fixed-term contracts (Blanchard and Landier 2001 for France, Güell 2002a and Güell and Petrongolo (2002), Amuedo-Dorantes (2000, 2001) for Spain, Istat 2000 for Italy).

In its 2002 Employment Outlook, OECD attempts to strike a fair balance suggesting that "Depending on the country considered, between one-third and two-thirds of temporary workers [including Temporary Help Agency workers] moves into a permanent job within

a two-year time interval, suggesting some potential for upward mobility. The other side of the coin is that one out of five temporary workers drops out of employment in the succeeding two years and there is some evidence that employers provide less training to temporary than to permanent workers" (OECD 2002).

This kind of concerns led policy makers in the recent years to intervene on fixed-term contracts in an attempt to reduce their negative effects, while retaining their positive sides. OECD (Employment Outlook 2002) indicates that government have intervened by setting restrictions to the use of temporary contracts (and the degree of employment protection accorded to "permanent" employees), or by establishing equal-treatment standards requiring employers to harmonize pay or fringe benefits between temporary and permanent employees, and finally by providing employers with incentives to either hire certain disadvantaged job-seekers on temporary jobs or move them into permanent jobs.

Notwithstanding these legislative activities best practices are yet to be found and there seems exist a substantial uncertainty about the best way to go, perhaps because of the lack of clear-cut evidence from empirical research.

As in others countries, fixed-term contracts received in Italy a great deal of attention from policy makers, business associations as well as unions. In the '90s the adoption of fixed term contract has been encouraged by widening their scope and by easing their regulatory burden; at the same time firms have received incentives to transform temporary into permanent jobs[1]. However the policy design has not been always fully coherent and it might have induced unwanted and not trivial negative implications.

In this paper we examine the effects of the most important and recent financial incentive of this kind, i.e. a generous tax credit granted to firms that choose to hire workers under

[1] In Spain this same strategy has been adopted since the second part of the '90s is same strategy pattern with two important Laws (Royal Decree 8/1997 and Royal Decree 9/1997) which reduce social security contribution and dismissal costs for employers who transform temporary into permanent contracts (Amuedo-Dorantes 2000, 2001).

open-end contracts. We ask two questions. Firstly we want to evaluate the increase of an average worker's probability to be hired with an open end contract because of this new incentive. Secondly we investigate whether this increase is homogenous across workers or if some specific labor market group benefited the most. In other words we ask weather the new incentive created additional opportunities to enter permanent jobs for every body or rather induced an inter-temporal substitution effect, so that firms hired people they would have hired regardless the incentive by simply anticipating choices that they would have made in any case later on down the road.

Our results seem to show, both formally and empirically, that the inter-temporal substitution effect has prevailed: firms rationally used this subsidy to hire under open-end contracts almost exclusively those workers they would have hired in a permanent job regardless the subsidy, even though after a short transition into temporary employment. Our estimates suggest that, compared to 2000, in 2001 the subsidy increased the probability of being hired with an open-end contract, conditional on being hired, but in a rather uneven way across workers. The probability rose of about 10 per cent for workers with a college degree, of about 4 per cent for people with high school, while did not change or might have even slightly declined for workers with middle school or less.

The rest of this paper is organized as follows. Section 2 defines the context, by highlighting the basic facts about fixed-term contracts in Italy with special regards to regulation, figures as well as reasons for concern. Section 3 explains in some detail the nature of the tax credit provision put forward in Italy at the end of 2000. We focus the attention on the regulatory aspects, the incentive magnitude and its actual usage. Section 4 presents a simple conceptual framework that helps to predict what type of workers turns out to benefit most from the tax credit provision. Section 5 describes the information we use to take these predictions to the data. This assessment is carried out in section 6 in a preliminary, descriptive way. Section 7 extends the analysis of section 6 through a simple econometric framework to estimate the effects of the new regulation on the probability of being hired with an open-end contract. Section 8 concludes.

2. Context. Basic facts about fixed-term contracts in Italy: regulation, figures, concerns.

2.1 Regulation

As a general rule the Italian Law prohibits any time limitation to a labor contract except for some specific circumstances clearly stated by the Law itself[2]. These exceptions are 1) seasonal activities; 2) temporary replacement of an employee on leave; 3) occasional activities which are time predetermined and not usually carried out by the firm; 4) special contracts requiring different skills that are not usually provided by the firm; 5) special skills in the movie and airline industries; 6) technical and administrative top management[3].

A fixed-term contract can be renewed only once under special circumstances for at most the same original duration and in any case with worker's agreement. If the contract extends beyond the original duration, the corresponding wage rate has to be increased of 20 per cent for each day following the deadline up to the 10th day, and of 40 per cent thereafter. Moreover, if the contract goes beyond the 30th day after the deadline it is automatically considered an open-end contract.

Alongside with this type, there are special fixed-term contracts that are designed to provide young workers with work experience along with formal training (Apprenticeship and Work and Training contracts, "Apprendistato e Contratti di Formazione Lavoro"). The duration of these contracts stretches from 18 months to 4 years; they can be signed by workers from 16 to 32 years old (with different duration and regulation depending on age and level of education). They are different in nature from the normal fixed-term contracts as they are thought of as stepping-stones into permanent employment for younger workers. Because of this special status they are rewarded with lower than regular

[2] This general rule was true until a new law was passed in the summer of 2001. Since then, fixed-term contracts are not regarded any longer as an exception to the general rule but are awarded equal dignity as permanent contracts as long as there exist valid technical-organizational reasons for their adoption. A complete history of the regulation of fixed-term contracts is presented in Appendix 1.

[3] For a full description of the regulation for these and other types of contracts, see Ministero del Lavoro 2001.

social security contributions for amounts that differ according to contract type, firm size, economic sector and geographical area and range from a minimum of 25 per cent and a virtual maximum of 100 per cent.

An important feature of the Italian institutional setting is that a great deal of labor market regulation is left to the negotiation between business organizations and unions. The law sets indeed the general framework, while the actual details are decided in the national sector contracts. Thus, even in the absence of normative intervention there might be important changes in the actual regulation of specific issues. A pivotal example of this pattern is the fixed-term contract regulation. In the early 1990s, national sector contracts set ceilings to fixed-term contract adoption at the firm level at around 5 to 7 per cent of employment in the manufacturing sector and 10 per cent in the construction and retail industries. However, actual usage was below these ceilings because unions managed to narrow the set of specific situations in which fixed-term contracts were allowed. As the industrial relation climate became less conflicting in the 1990s, unions agreed to widen the scope for temporary jobs and relax the constraint on their maximum usage. For example, in 1998 ceilings were substantially increased up to 20 per cent in construction and 25 per cent in the chemical sector (Bank of Italy 2000).

2.2 Figures

Fixed-term contracts have become a relevant feature of the Italian labor market in the 1990s. From the second half of the seventies up until the early 1990s, they have been a non trivial but constant share of total employment, concentrated in the agricultural sector. In the second half of the 1980s this share grew because of the introduction of the Work and Training contracts in 1984, but the actual take-off occurred between 1993 and 1999 when they have been growing at a double-digit rate from 6.1 to 9.8 per cent of total employees (Fig.1). In this same period they represented the only expanding type of employment and accounted for the virtually whole growth of dependent employment (Fig.2). This increase was encouraged by the easing of the existing constrains established by national labor contracts.

In 2000 their expansion has been accompanied by a recovery of permanent employment that picked up as a consequence of the strong up-turn in labor demand, especially in the northern regions of the country[4].

Fixed-term contracts tend to be equally distributed among males and females, mostly young (in 2001, 60 per cent are less than 35 years old; Table 2), with lower than average years of schooling (half of them hold at most a middle school degree), working in the services (63 per cent in 2001) and agriculture (12 per cent). The great majority of people (44.4 per cent in 2001) holding a fixed-term contract do so because they could not find a job with an open-end contract (heading "*No better opportunities*" in Table 2). About one-third is in an Apprenticeship and Work and Training type of contracts.

2.3 Concerns

In many OECD countries fixed-term contracts have been welcomed as a mean to foster younger workers' opportunities to gain access to their first job. However, they are also source of concern since they might lead to an increase in worker's insecurity and precariousness (OECD 2002). These same reasons for concern seem to hold true in Italy. The growth of precarious jobs has been paralleled by an expansion in the share of low-paid workers among all employees. As illustrated in Figure 3, this share went up from 8 per cent in 1989 to more than 18 per cent in 1998, reversing the trend of the previous 15 years (Brandolini et. alt. 2001).

We cannot directly and immediately attribute this reversal to the spread of fixed-term contracts, although we do have evidence that people in temporary jobs earn less and work fewer hours than people in permanent jobs. In Table 3 we computed the differential in log hourly wages and worked hours between workers with open-end contracts and workers with temporary jobs (distinguishing between fixed-term contracts and workers hired by Temporary Help Agencies), using the Bank of Italy Survey on Household Income and Wealth for the year 2000. The raw differential suggests that males in fixed-

[4] In 2000, as many as 6.6 per cent of firms in the north-eastern regions and 3.4 in the north-western ones denounced they could not find workers (Bank of Italy 2001). For a discussion of the mismatch measure in Italy, see Brandolini and Cipollone 2001.

term jobs (Temporary Help Agency jobs) earn 32 (43) per cent less than those with open-end contracts. The adjusted differential shrinks considerably but remains sizeable: 12 per cent for fixed-term and 21 per cent for Temporary Help Agency workers. About the same story holds true for females in temporary jobs; the wage differential for those in fixed-term occupations is considerably smaller and not significantly different from zero once adjusted for observable characteristics.

The wage differential cumulates with the hours of work differences to further widening the overall annual earnings gap between workers in permanent and temporary jobs.
On average, a male worker with a fixed-term contract works 530 hours less than a correspondent open-end contract worker. This gap reduces to 390 hours when worker's characteristics are taken into account, but it still remains quite sizeable. About the same pattern can be observed for females.

Mobility out of fixed-term employment seems to be rather low. In October 1999 out of 100 workers whose first job was a temporary job, 38 were still in a temporary position after three years (20 in the same initial job and 18 in a different fixed-term job, Table 4), 38 exited the employment status either into unemployment or out of the labor force, 4 have changed status into self-employment and 21 gained access to permanent positions.
Workers whose first job was a permanent position faced much brighter prospects; after three years 90 per cent of them were still into permanent employment (81.3 per cent in the same job and 8.8 in a different one), 1.3 per cent moved into self-employment, 1.8 into a temporary occupation and 6.8 per cent exited the employment status. Self-employed workers faced similar probabilities.

After 5 years from the first job the chances for fixed-term workers look slightly better: 36 per cent of them have gained access to an open-end contract, 27 remained in a temporary occupation (10 per cent in the same job and 17.2 in a new fixed-term contract) and 30 per cent exited into either unemployment or inactivity. These figures would imply an annual transitional probability into permanent occupation of about 11.5 per cent that translates into an average waiting time of about 8.7 years. This is a considerably longer period than

that suggested by OECD, and it similar to that reported by Blanchard and Landier for France (8.2 year for young workers in 1996) and that reported by Amuedo-Dorantes for Spain (8.3 for all workers in 1996).

Low mobility does not only affect marginal workers; rather it is quite widespread. Table 5 reports transitions from fixed-term contracts (towards all status in the labor market) by some basic worker characteristics. Compared to females, males show slightly better chances to enter open-end jobs but, at the same time, they tend to suffer higher risks to exit employment. Holding a college degree, as opposed to a high school degree, does not improve the probability to gain access to permanent employment in the first three years after entering the first job. However, more years of schooling seem to reduce the risk of exiting employment while workers with shorter education appear doomed at the margins of the market, wandering between unemployment and temporary occupations. Indeed, even after 5 years from the first job, 40 per cent of them are either unemployed or inactive while 25 per cent find themselves into transient jobs.

3. Subsidy to open-end contracts: regulation, magnitude, usage

3.1 Regulation

Likewise many other OECD countries, Italy has attempted to reduce the negative effects of fixed-term contracts. The strategy adopted aims at increasing 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 were small, often targeted to particular areas, firm types or worker categories.

The fiscal law for the year 2001 (issued at the end of 2000) has instead provided a new incentive in the form of an automatic, general and very generous tax credit to all firms hiring workers with open-end contracts. In particular, this provision states that for each new worker permanently hired, firms will be granted a tax credit of about 400 euros (600

for workers in the South) for every single month from the hiring moment until December 2003. 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 23.400 euros. The tax credit is awarded only if both worker and firm are eligible. A worker is eligible if he is at least 25 years old and has not been working under an open-end contract in the 24 months preceding her/his hiring. A firm is eligible if the new worker increases the level of open-end contracts - in the firm - over the average recorded in the period October 1999-September 2000. The tax credit can be claimed against any kind of taxes such as income tax, social security contributions, value-added tax. It can be passed over to different fiscal years.

3.2 Magnitude

The contribution is quite generous. Figure 4 depicts the percentage reduction in the labor cost (year 2000) by sector and geographical area[6]. This reduction is variable because the tax credit is a fixed amount that only increases for southern workers, while average labor cost differs both across sectors and geographical areas. The evidence shows that labor cost reduction ranges from 9.2 per cent in the banking sector of the central and northern regions to almost 60 per cent in the agricultural sector of the South. On the average of the private, no-farm sector the reduction amounts to more than 30 per cent in the South and to 16 per cent in the central and northern regions. These estimates understate the effect of the tax credit because labor cost data refer to an average worker, while the correct reference should be the labor cost of a new young worker, which is usually below the average. It should be mentioned however that national accounts also include estimates of the labor cost in the underground economy, which is most likely smaller than the legal labor cost for a new entrant; however, this effect only attenuates underestimation.

3.3 Usage

[5] For example, incentives to the transformation of training and work contracts into permanent ones and the tax credit for the permanent hiring of small firms in economically depressed areas.

[6] The computation has been carried out in Brandolini and Cipollone (2001) at the Bank of Italy as a part of the background work for the annual report for the year 2000. Labor cost figures are those of the national accounts and the North-South divide was computed on the basis on the regional accounts, providing figures broken down by geographical areas up to 1998.

The new tax credit seems to have been very successful in 2001. We have two sources of information about the actual usage of this new instrument. The first source is the Labor Force Survey, which provides data on the number of hired employees distinguishing between open-end and fixed-term contracts. Figure 5 extends the numbers of Figure 2 to the year 2001. It reports the quarter to quarter absolute growth of total employees by type of contract from 1993 to 2001. It suggests that in January 2001[7] - i.e. the first survey since the new tax credit was in force -, fixed-term contracts halted their expansion, which had been the only source of growth of dependent employment since 1993; in October 2001 the number of fixed-term contracts was smaller than one year before. It must be remarked however that a slow-down had already occurred in 2000, but most of it was due to the strong labor demand that, especially in the northern regions, turned the labor market into a seller market, thereby allowing workers to negotiate hires with open-end contracts[8]. In 2001, open-end contracts went up and fully compensated the slow-down in fixed-term contracts. It represents the strongest increase of permanent employment since 1993 and looks quite remarkable given the sharp slow-down in the economic activity registered in 2001 (the value-added growth in the private sector fell from 4.2 to 2.5 per cent between 2000 and 2001).

The second source of information consists of the figures collected by the Ministry of Finance (and reported by the Ministry of Labor (2001)), keeping track of the foregone revenues due to the tax credit. Figure 6 shows these foregone revenues as a share of total social security contributions in 2001 and the correspondent number of involved workers. Between January and November 2001, the monthly flow of foregone revenues increased from 0 to more than 0.6 per cent of the monthly flow of social contributions. This implied 175.000 involved workers in November 2001, that is about 1.1 per cent of total employees. These figures suggest the tax credit has been a large success, much beyond the 83.000 workers initially foreseen for the entire subsidized period (October 2000-December 2003).

[7] Italian Labor Force Surveys are conducted in the first week of, respectively, January, April, July, and October.

[8] Maya Guell (2002b) explains this effect in an efficient wage context in which the type of contract offered to the workers is a discipline device.

4. Who is better off? A simple conceptual framework

In this section we set up a simple conceptual framework to answer the following question: will all workers equally benefit from the tax credit? In other words, will firms choose to hire all types of workers, regardless of their observable characteristics? The simple framework we use suggests this is not the case. It shows indeed that the best workers (in terms of their observable characteristics) will be most probably hired with open-end contracts. These workers are those the firm would have most likely hired on a permanent basis even in the absence of this subsidy, perhaps after a period of temporary employment. At the same time less able workers, perhaps those who really need to be helped in finding a permanent job would not be affected by the new tax credit and could be even harmed by it.

4.1 Setting

Suppose the firm does not know the productivity of new workers. Let *y* be worker's productivity when matched with a job and assume this value is drawn from one out of the following two alternative productivity distributions *G(y)*: either a uniform $[0,y_H]$ or a uniform $[0,y_L]$. To make things simpler, let us assume the second distribution is degenerate to 0.

Given workers' observable characteristics, each firm assigns each new worker a probability λ to be drawn from $[0,y_H]$. There exist two types of contracts in this economy, namely fixed-term and open-end contracts. They both last two periods. With the first type firms hire a new worker in the first period, observe her/his productivity and then decides whether to hire the worker for the second period or let her/him go. In this last case no firing cost has to be born. We finally assume that in the second period there is no need to fire the worker.

With the second type of contract (open-end contract), firms face the same sequence of decisions: they hire a new worker in the first period, observe her/his productivity and then

decide whether to hire the worker or let her/him go. However, in the latter case a firing cost has to be born. As in the fixed-term case, in the second period there is no need to fire the worker. Wages are exogenously given to firms[9].

4.2 The value of contracts

In order to decide which contract to offer to each worker, firms need to compute the value of both contracts.

The value to a firm of a fixed-term contract is given by:

$$V_{FT} = E(y) - w_1 + P(hired) * \frac{1}{(1+r)}\left[E\left(y \mid hired\right) - w_2\right] \qquad (1)$$

that is the sum of the expected profits from the two periods. Second period expected profits depend on the probability that workers will be retained and on the expected productivity of the retained workers. Since we assumed that worker's productivity has a uniform [0, y_H] distribution with probability λ and 0 with probability (1- λ), then it follows that

$$E(y) = \lambda \frac{y_H}{2};$$

$$p(hired) = 1 - p(fired) = 1 - [\lambda G(\bar{y}_{FT}) + (1-\lambda) * 1] = \lambda[1 - G(\bar{y}_{FT})] = \lambda\left(\frac{y_H - \bar{y}_{FT}}{y_H}\right)$$

$$E\left(y \mid hired\right) = \left(\frac{y_H + \bar{y}_{FT}}{2}\right)$$

and $\bar{y}_{FT}$ is the cut-off level of productivity below which firm fires the worker.

Each firm has to choose this cut-off level of productivity ($\bar{y}_{FT}$) and needs to compute the threshold λ below which the contract value turns out to be negative (so that no worker with an attached λ below this threshold is going to be hired). The optimal value of cut-off productivity is $\bar{y}^*_{FT} = w_2$ [10]. This implies the firm will enjoy extra profits for any worker retained in the second period. The threshold value for λ is

$$\lambda^*_{FT} = \frac{2 w_1 y_H (1+r)}{y_H^2 (1+r) + (y_H - \bar{y}^*_{FT})^2} \qquad (2)$$

[9] We remove this assumption later on.

[10] This value is derived by maximizing the value function with respect to $\bar{y}_{FT}$.

To make sense this value needs to be less than one[11] .

The value to a firm of an open-end contract is instead:

$$V_{OE} = E(y) - w_1 - (1 - P(hired))* C + P(hired) * \frac{1}{(1+r)}[E(y \mid hired) - w_2] \qquad (3)$$

where C is the firing cost. The only difference between this value and the one assigned to a fixed-term contract is the expected firing cost $(1 - P(hired))* C$, which has to be born at the end of the first period.

Given our productivity assumptions, the following holds for an open-end contract

$$E(y) = \lambda \frac{y_H}{2};$$

$$p(hired) = 1 - p(fired) = 1 - [\lambda G(\bar{y}_{OE}) + (1-\lambda)*1] = \lambda[1 - G(\bar{y}_{OE})] = \lambda\left(\frac{y_H - \bar{y}_{OE}}{y_H}\right)$$

$$E(y \mid hired) = \left(\frac{y_H + \bar{y}_{OE}}{2}\right)$$

The value of this contract is then maximum when

$$\bar{y}^*_{OE} = w_2 - (1+r)C \qquad (4)$$

Notice that this value lies below that of fixed-term contracts; thus firms would retain in the second period a worker, who would be fired in case of temporary employment. This happens because when the firm retains a worker it saves on firing costs. With this value of cut-off productivity the threshold for the probability λ turns out to be

$$\lambda^*_{OE} = \frac{2(w_1 + C)y_H(1+r)}{y_H^2(1+r) + (y_H - \bar{y}^*_{OE})^2} \qquad (5)$$

which is always greater than the threshold corresponding to fixed-term contracts.

Notice moreover that bearable firing costs have an upper bound, that is

$$C^{max} = \frac{w_2}{1+r} = \frac{\bar{y}^*_{FT}}{1+r} \qquad (6)$$

[11] This constraint poses an upper bound to the first period wage; the bound to the second period wage is the highest productivity value y_H If the second period wage is higher than this value, no worker will be hired for the second period.

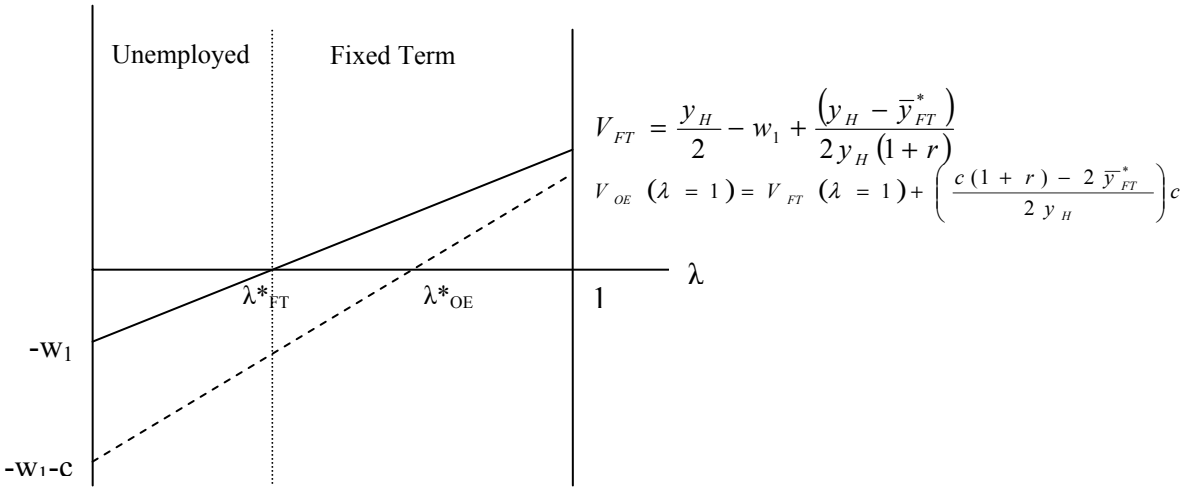
that derives from the observation that the lowest value of $\bar{y}^*_{OE}$ is zero.

Using the fact that $\bar{y}^*_{OE} = w_2 - (1+r)C = \bar{y}^*_{FT} - (1+r)C$, it is possible to write the value of one contract as a function of the value of the other one, i.e.

$$V_{OE} = V_{FT} + \lambda\left[\frac{C^2(1+r)}{2y_H} + \frac{\left(y_H - \bar{y}^*_{FT}\right)}{y_H}C\right] - C \qquad (7)$$

This relationship is shown in Graph 1.

Graph 1: the Labor Market Before the Subsidy



Two facts are here worth noting. The first one is that open-end contracts are dominated by fixed-term contracts for every value of λ; this result captures in a simple way the idea that all new workers enter employment with a fixed-term job, a feature which does not appear too far from the Italian experience in the 1990s. The second notable fact is that the slope of the value of open-end contracts with respect to the quality index λ is higher than the correspondent slope for fixed-term contracts. In other words as λ increases, the value of the first contract grows faster than the value of the second one. This happens because of the reduction in the expected firing costs. However, this second effect does not overcome the reduction in the overall values due to firing costs.

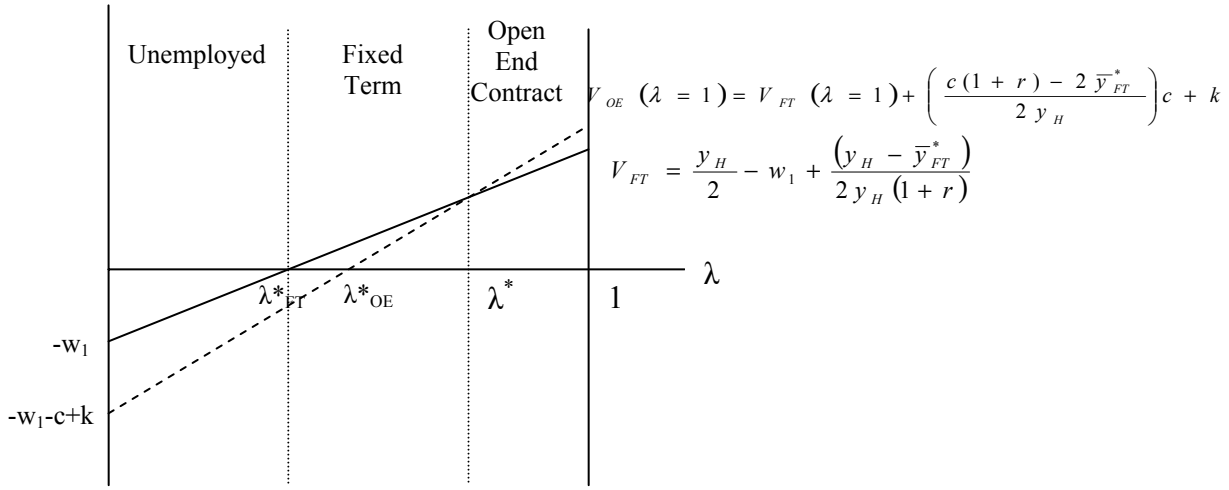
4.3 The effect of the subsidy

Let us now introduce the subsidy to open-end contracts in the form of a lump sum K given in the first period to each firm hiring workers with such contracts. Thus, the value of an open-end contract will be shifted upwards by an amount K for any given level of λ:

$$V_{OE} = V_{FT} + \lambda\left[\frac{C^2(1+r)}{2y_H} + \frac{\left(y_H - \bar{y}^*_{FT}\right)}{y_H}C\right] - C + k \qquad (8)$$

If the subsidy is nor too small or too high[12], the value of an open-end contract will be shifted in such a way to ensure the coexistence of the unemployed, fixed-term contracts and open-end contracts (Graph 2).

Graph 2: The Labor Market after the Reform



The decision rule implied by this new setting is:

- Do not offer workers any contract if $\lambda \leq \lambda^*_{FT}$;
- Offer a fixed-term contract if $\lambda^*_{FT} < \lambda \leq \lambda^*$;
- Offer an open-end contract if $\lambda^* < \lambda$;

Thus, newly hired open-end workers are those the firm assigns the highest probability λ and are probably those who are most likely retained in the second period. This result does not come as a surprise given that firms try to balance off the subsidy (that is identical for

[12] In particular the lowest level of K has to be such that $V_{OE} - V_{FT} > 0$ when evaluated at $\lambda = 1$; this value is $K_{\min} = \left(\frac{2\bar{y}^*_{FT} + (1+r)C}{2y_H}\right)C$. The highest value of K has to be such that $V_{OE} - V_{FT} \leq 0$ when evaluated at $\lambda = \lambda^*_{FT}$. This value is $K_{max} = \left(1 - \lambda_{FT}\left(\frac{y_H - \bar{y}^*_{FT}}{y_H}\right)\right)C - \frac{\lambda_{FT}(1+r)C}{y_H}$. It is true that $Kmax > Kmin$ for all C.

all workers) with the additional expected firing costs; since these costs are smaller for expected better workers, these are the ones preferred by firms. Thus, the policy intervention we are examining seems to foster the probability of being permanently employed for people who have the highest chance to be employed in permanent jobs regardless the subsidy, even though after one period of temporary employment.

4.4 Extensions

This paragraph is devoted to illustrate the consequences for the model when we allow for endogenous wage in the second period. In this section we present the major results[13]. The criterion we adopted to let the wage determined within the model is the fact that in the second period wages are equal to the outside opportunities for workers as measured by the average productivity of not employed workers. With this rule, before the introduction of the subsidy there exists a unique equilibrium and the wage turns out to be a value lower than the expected productivity of workers and the quality index threshold is different than zero.

The results are less clean when we introduce the subsidy. In this case the model might have either no equilibrium, or one or two equilibria. However this last case can be ruled out on the basis that we are interested in those equilibria in which both contracts are implemented.

The last question we address concerns the comparison between the pre- and post-subsidy wages. Results show that pre-reform wages are higher than the post-reform wages. This effect depends on the fact that, because of the firing costs, the productivity threshold for an open-end contract is lower. Thus, the major effect of endogenous wages is given by the fact that, by lowering the overall wage, the subsidy has a small effect on total employment.

5. The Data.

[13] The formal development of the model is long and space consuming. Thus we report it in the Appendix 2.

In order to verify whether the new subsidy has having any effect on the level and composition of new workers' flow, we resorted to the Labor Force Survey and defined as new hires those employees who have been holding their current job for less than 13 months[14]. For the moment being, the last available labor force survey refers to October 2001. Thus, all new workers selected from this survey are potentially covered by the new subsidy (since it was granted starting from October 2000). To avoid problems related to seasonal patterns, we chose the October survey of every year comprised in our sample (i.e. from 1993 on). Finally, we only included new hires into the private, no farm sector[15].

These selection rules leave us with a number of observations that ranges from a lowest 3593 in 1993 (representing just over 1 million new hires) to a highest 5474 in 2000 (representing 1.6 million new workers, Table 6). In 2001, less than two-thirds of new workers were hired with open-end contracts. This share was 71 per cent in 1993. This decline has been mirrored by a corresponding increase in fixed-term contracts of the Apprenticeship and Work and Training type, whose share went from 8.2 in 1993 to 14.4 in 2000, before falling to 10.8 per cent in 2001[16]. Fixed-term contracts due to lack of better opportunities represented a steady 15 per cent of all new contracts. In 2001, 53 per cent of new workers were males. This share was about 60 per cent at the beginning of the 1990s and has been constantly declining since. More than 50 per cent of newly hired workers were less than 30 years old (60 per cent in 1993), and their decline is due to workers younger that 20, only partially compensated by workers in their twenties. It is interesting to note that a steady 10 per cent of new hires consists of workers 45 years and older.

From 1993 to 2001, the share of newly hired workers with a low level of education (middle school or less) declined of about 14 percentage points. At the same time the

[14] To compute this tenure variable we used the question "When did you begin to work with the current employer?"
[15] To be precise we excluded sectors ("branca di attività economica") coded "01" and "10" in the LFS.
[16] In May 1999 the European Commission established that Work and Training contracts for people older than 25 (29 for people with a college degree) could not be granted any longer the entire social contribution reduction. There is some evidence that this provision has reduced the number of these contracts in the year 2000.

shares of high school and college graduates rose respectively of about 10 and 5 percentage points. Most of the growth was driven by the service sector.

6. A preliminary look at the evidence.

This section provides a preliminary evidence that firms most probably used the tax credit to selectively hire under open-end contracts only particular types of workers who, according to their own observable characteristics, look the most suitable to be hired into permanent jobs regardless the subsidy. In this preliminary presentation of the evidence we look at the share of both new open-end contracts by age and level of education and fixed-term contracts by reasons for holding such a contract.

6.1 Question one: did the share of new open-end contracts increase?

Our simple model suggests that, because of the new subsidy, the share of open-end contracts should have gone up. The first question we pose is therefore whether in 2001 there has been an increase in the share of open-end contracts and, perhaps more importantly, whether this increase has been stronger for the eligible workers (i.e. people 25 years and older) than for the remaining groups. Table 6 answers the first part of the question, as it shows that the share of open-end contracts increased of 2 percentage points (from 62.5 to 64.5) between 2000 and 2001. This synchronism is particularly remarkable since before 2000 this share was declining almost steadily.

To answer the second part of the question figure 7 tries to evaluate which worker group turns out to be responsible for this increase. The figure plots the share of open-end contracts for different age groups between 1993 and 2001. Again, one could read the rise in the share for all workers. However, we found evidence that the share for the eligible workers (25 years and older) increased slightly more than the control group (workers less than 25 years old). Most of the growth in the share of the eligible group is due to the youngest people: the share of workers 25 to 40 years old went from 64.3 to 67.5 per cent that is 1.2 percentage points above the average increase.

To summarize, two main facts can be recorded: i) the share of open-end contracts increased between 2000 to 2001, thereby inverting a previous declining trend; ii) the

treated group – especially the younger component - enjoyed a higher growth than the control group. Both results square with our priors.

6.2 Question two: for which group did the share of new open-end contracts increase? Evidence from the years of schooling

What kind of workers did the firm hire with open-end contracts in 2001? Figure 8 tries to answer this question by comparing the average number of schooling years of, respectively, new permanent and new fixed-term workers between 1993 and 2001. Before 2001 the relative level of education of permanent workers was smaller than one for all age groups. It declined until 1995, with a small recovery in the following years even if the overall changes were quite small until 1999. In 2000, people with more years of schooling entered open-end contracts more frequently than before, bringing about the first sizable rise in the overall level of education for these contracts. In 2001 an analogous increase took place. Thus, it may appear that the increase in the relative quality of open-end contracts preceded the subsidy. Nonetheless, a closer look at the age composition reveals that in the year 2000 there was an almost equal size increases in both treated (eligible) and control groups (less than 25 years old). By contrast, in 2001 relative education remained constant for the control group while it rose further for the treated group, especially for the older ones (40 years and older).

This evidence seems therefore to support the idea that, compared to the previous years, in 2001 firms chose to hire under open-end contracts people with more years of education. This increase was however limited to people 25 years and older.

6.3 Question two: for which group did the share of new open-end contracts increase? Evidence from the age distribution

Figure 9 shows the age distribution of new open-end contracts as a share of total new hires. We divided the overall share into 5 year brackets, ranging from 15 to 65 years old. The sum over the 10 age brackets gives the total share plotted in figure 7. The overall age structure appears stable overtime, except for the decline in the share of the 19-24 age

group and the rise of the 25-29 year olds in 2001. The latter increase is remarkable both in size and given the relative stability of the previous years.

6.4 Question three: what type of fixed-term contract declined?

Figure 10 illustrates the share of fixed-term contracts by reasons for holding such a contract among workers 25 years and older (the category "*other reasons*" includes the answer "*don't want an open-end contract*"). The crucial fact to note here is that the drop in the total share is not evenly distributed across contract types but is fully concentrated in the Apprenticeship and Work and Training category. In the previous years (at least since 1993), this type of fixed-term contracts never declined.

This pattern can be interpreted as evidence of the fact that firms, while hiring more people with open-end contracts, selected those workers they would have alternatively hired with a Work and Training Contract, which usually represents the main avenue towards permanent employment. Thus, this would imply that firms used the subsidy to anticipate what they would have done later on.

However, it must be stressed that a part of this decline could also be the consequence of the 1999 provision of the European Commission, recalled in footnote 13. The major effect of such a provision should have been recorded in the year 2000 rather than in 2001, but we can anyway allow for this additional explanation without altering the basic message of our conclusion.

7. The effects of the subsidy on the probability of being hired with an open-end contract

7.1 Empirical specification and identification strategy

In this section we use a simple econometric model to evaluate whether the subsidy has any causal effect on the probability of being permanently hired. We want to address two specific questions: 1) did the subsidy increase the probability of being hired with an open-end contract? And if so, by how much? 2) Is the effect stronger for people with higher probability to access lasting jobs (even in the absence of the subsidy)? The econometric specification adopted to answer these two questions is a simple probit

model, in which the probability of being hired with an open-end contract depends on age, schooling and a series of other demographic characteristics, year dummies and a dummy that takes value 1 if the worker is eligible for the subsidy and zero otherwise. We also include an interaction between this dummy and the worker's schooling years:

$$Pr(\ Hiredwithaopenend Contract\ ) = \Phi\left(x_{it}'\beta\right)$$

$$x_{it}'\beta = \beta_o + \beta_1 Eligible_{it} + \beta_2 Eligible_{it} * schooling_{it} + g(schooling_{it}, age_{it}) + demografic\ characteristics_{it} + yeardummies \qquad (1)$$

The value of the coefficient β_1 provides an answer to question 1, as it measures the average additional effect of being eligible for the subsidy on the probability of being hired with a permanent contract. The value of the coefficient β_2 provides instead an answer to question 2 if we are willing to assume that education is an indicator of the likelihood to be hired with an open-end contract. It measures the additional effect (over β_1) of having a given level of education.

On the basis of both our conceptual framework and the preliminary look at the evidence we expect both coefficients to be positive, implying that the subsidy increased the chances to be hired with an open-end contract with a stronger effect for more educated people.

Before turning to the actual estimation of the empirical model we still need to clarify two issues. The first one deals with the conditioning population we are referring to in estimating equation (1). As we explained in the data description section, we only have access to cross-section data and therefore we cannot evaluate transitions from different labor market status into employment. We are able to identify new hires because of a specific question in the questionnaire but we do not know where they come from. They can be transiting from any status into employment, including from open-end to open-end contracts. As a matter of fact, the share of this last type of transitions should be of some importance given that more than 10 per cent of newly hired workers are 45 or older (table 5). Given this sample limitation we can only condition on the population that has actually been hired in the past 12 months. Hence our estimates refer to the probability of being hired with an open-end contract, conditional on having been hired in the past 12 months.

The second issue refers to the strategy we used to identify β_1 and β_2. Here several approaches can be adopted; they are summarized in Table 7. The first strategy, referred to as W1, exploits only overtime differences in the share of open-end contracts for the treated group, which in this case we assume include all workers 25 years and older. Thus the effect of the subsidy in 2001 would be the difference between this year and a reference year in the share of open-end contracts for the treated group. The second strategy, referred to as W2, is also a within age group strategy and identifies the effect of the subsidy as the difference between the value of the coefficient in 2001 and the corresponding value in another reference year. It differs from W1 in that it restricts the treated group to workers 25 to 40 years old who, we believe, should be the more sensitive to the new regulation. These strategies might deliver very misleading results if the rise in the probability of being hired with open-end contracts is also shared by other age group that cannot be affected by the subsidy, namely workers younger than 25. In this case there should be some other reason, common to all workers that explains the registered increase.

To control for those possibly common effects we include in the sample people who do not belong to the treated group. The next three strategies, referred to as AW1, AW2 and AW3, serve this purpose. Here the identification relies on both within (differences in age group effects overtime) and across age group (differences in effect of different gruops in the same year). In particular strategy AW1 is a diff and diff estimator that identifies the effect of the subsidy as the 2001 change, with respect to some reference year, of the difference between the effect of cohort "25 and older" and the cohort "younger than 25". Strategy AW2 is also a diff and diff estimator that uses as treated only workers 25 to 35 years old in 2001 and as control group the remaining workers between 15 and 65 years old. Finally, the strategy AW3 is similar to AW2 except that the control group only includes people older than 36.

7.2 Results.

Before taking model (1) to the data we need to specify the function *g()* and comment on the demographic characteristics that have been included. The *g()* function is specified as

a cubic in age, a quadratic in schooling and the interaction between the two variables. The demographics include gender, regional dummies and marital status. We estimate such model under all the 5 strategies depited in table 7. Results are shown in table 8.

The overall message coming out from the 5 models is that, when the reference year is 2000, the average effect (β_1) is zero for the average workers, while the effect is more relevant for the youngest among the eligible workers.

In detail, results suggest that in year 2001 the probability of being hired with an open-end contract went up anything between 0.7 to 4.2 percentage points depending on the model (heading "*Treated*" in the table). The effect would be smaller (often negative), had we chosen as reference a year before 1998. Moreover, only in two out of five cases the coefficient is statistically different than 0. The average effect is clearly zero in the AW1 model; this means that for the average worker the subsidy did not change the probability of being hired as a permanent worker when considering that people younger than 25 experienced a similar increase, even without being affected by the subsidy. However, when we restrict the treated group to people between 25 and 35, we find a bigger effect both in the overtime comparison (2 percentage points in model W2) and in the diff and diff specification (3.3 in model AW2). This result means that the subsidy did not have effect on people older than 35 even if they were eligible. It also explains why we did not find any effect of the subsidy in model AW1: the effect for the 25-35 year olds is washed out by the lack of effect for the older workers. This explanation is supported by the results of the AW3 model, where we directly compare only subgroups of the eligible population. For an average worker aged 25 to 35 years the probability of being hired in a permanent job went up of 4.2 percentage point between 2000 and 2001 when compared to a worker 36 or older.

When we address the second question - whether the effect of the subsidy differs across workers (β_2, heading "*treated*educ*" in the table) - we get a clearer answer: one year of education above the average increases the probability to be a permanent worker of 1 percentage point. This marginal effect implies that for a college graduate the probability

was from 7 to 9 percentage points higher in 2001 compared with the 1990s; for a high school graduate the increase was about 2-3 percentage points. For less educated workers, instead, these estimates suggest that the effect might even be negative: for a middle school graduate the probability reduction is about 2 to 3 percentage points with respect to average workers, which implies, with respect to 2000, an overall small negative effect (including β_1). In sharp contrast with the average effect, the interaction between treatment and schooling effect (β_2) is very stable across specifications (it ranges from .96 1.2 percentage point) and always precisely estimated.

One additional comment on table 8 is necessary to explain the negative slope of the education variable on the probability to be hired with a permanent contract. The effect is due essentially to the fact that by controlling for age, workers with more years of schooling, compared to workers with less education, either they have been searching for shorter time or are facing their first work experience, which is more likely to occur in a temporary job.

7.3 Robustness checks

7.3.1. Check of the function form

In order to evaluate the robustness of our results we estimated equation (1) with a fully non parametric specification that allows for one dummy for each age, each level of schooling and the interaction of the two sets of dummies; in addition we include gender, regional and marital status as well as year effects. However we regrouped the schooling variable in three levels: college or more, high school, middle school or less[17].

This fully non-parametric specification seems to confirm most of the results of the more structured model (table 9). The effect for people with middle school or less (which in this specification can be directly read looking at the heading "*treated*") is zero in all but AW1 specification where it is negative but still poorly estimated. The effects for high school

[17] College or more also includes degrees granted after 2-3 years of college studies (Diplomi Universitari e Lauree Brevi); high school also includes technical high school degrees which are acquired in 2 or 3 years rather than the usual 5 after middle school.

graduates range from 3 to 4.6 percentage points. Larger values are found when we restrict treated cohort to younger workers (25-35 years old). However the small t-stats of these estimates point to the fact that, again, the effects are weak. In contrast, the effects are stronger and precisely estimated when we look at college graduates. For this group, estimates range from 10.4 to 11 percentage points.

7.3.2. Check of the identification strategies

We run an additional set of controls that address the following question. We need to be sure that the effects we have identified in 2001 for the treated cohort were absent in the years immediately before, say in 2000 and 1999. Otherwise the additional probability of being hired with an open-end contract cannot be attributed to the subsidy that is in force only since the end of 2000. To carry out this control we estimated equation (1) under the same specification discussed above but adding to every year (1993 to 2000) a dummy for the same group of people who, in 2001, were eligible for the subsidy. We also include the usual interaction with the years of schooling. This specification allows us to estimate one β_1 and β_2 for each of the years 1993 to 2001; thus direct comparison of this marginal effect would provide an answer to our concerns. In table 10 we report the results of this estimation for all our strategies.

For the average effects (β_1) table 10 tells about the same story of the previous two tables. When we use only within age group differences (Models W1 and W2) we obtain virtually the same results of the previous model since (β_1) is simple the year effect. The estimates of the effect for the year 2001 are small, positive (1.8 and 2.9 per cent increases in the probability) and hardly different from zero; however it compares with a zero effect for the years from 1998 to 2000. Again the effects are stronger when we exclude older workers from the treated group. The effect in 2001 is not different from the previous years when we include in the control group workers 15-24 year old (Model AW1), meaning that the small increases we registered for the treated in model W1 and W2 were not specific to that group. In contrast in the other two models (AW2, AW3) the small average effect is still there in the new specification. Indeed we find a positive marginal

effect in the years 1998-2000, but the differences between 2001 and these previous years remain in the order of magnitude of 2 to 3 percentage points.

In contrast, results change when we look at the interaction with the years of schooling. Two results need to be highlighted: the marginal effect for the year 2001 - with respect to 2000 - of the interaction term halves with respect to the estimate in table 8[18] and it seems to be the case that firms began to hire people with higher schooling level even before the subsidy was in place. These results apparently weaken our story. However the rises in the marginal effect for the year 2000 can be fully accounted for with the sharp rises in the labor demand, mainly in the northern regions of the country: firms facing labor force scarcity competed over workers by offering permanent contracts. Whatever the reasons behind the year 2000 rise might be, it is interesting to note that firms selected again better educated workers. This suggests that are the best educated workers those who exploit more promptly favorable shifts in the probability of being hired in a permanent position. In some sense this observation can represent an implicit confirmation of our story.

Before providing statistical evidence of this labor demand explanation we want to make one more comment on table 10. The interaction effect is smaller than that of table 8 when referred to the year 2000, but equal or even stronger when referred to almost every other year. Thus, if we can provide an explanation for 2000 results we have also confirmed the results of table 8.

To ground our speculation for the year 2000 into statistical evidence we have run two additional tests: the first one entails re-estimating the model (we chose specification AW1) after adding to the specification of table 10 a set of interaction effects between treated, years of schooling, and northern regions. The idea is to use the northern regions dummies to control for labor shortage that was most severe in these regions (Fig.11). With this new specification the effect for the year 2000 disappears: the marginal effect for that year is identical to that of the previous years (1.04 in 2000, 0.95 in 1999 and 1.12 in 1998, see column three of table 11). At the same time the dummy for the year 2000 in

[18] The differences between 2001and 2000 vary from 0.5 to 0.7 in the 5 models.

the northern area is the highest in the whole period (it was zero in that year and about -.01 per cent in the preceding period). Moreover the marginal effect for the year 2001 rises of about .3 percentage points compared to the basic specification; the difference with the year 2000 goes back to about 1 percentage point for every additional year of education above the average, that is the basic value we found in table 8.

In the second test we directly use an indicator of labor shortage to control for labor demand. The indicator is the share of firms in the manufacturing sector that in the forth quarter of each year registered difficulties in recruiting workers. It is plotted in Figure 11. Using the interaction of this indicator with the years of schooling, we obtain about the same result of the previous control specification. The year 2000 effect disappears and the gap between 2001 and 2000 is again around 1 percentage point for every additional year of schooling.

Overall we read the outcomes of our robustness checks as supportive of our results that we have summarized in figure 12. In synthesis we believe that these results suggest firms did use the subsidy to hire new workers with open-end contracts but they were very selective in choosing workers. The differences in the average effect (β_1) across the five specifications suggest they mostly hired young workers (25 to 35 years old), and the interaction between treated group and years of schooling tells they mostly selected highly educated people. Since this group is the most likely to hold a permanent contract, regardless the subsidy, our results might suggest that the new subsidy fostered the probability of being hired with a permanent contract of those people who would have been hired in such a position even without the support of tax-payers' money. In other words the new incentive did not created additional opportunities to enter permanent jobs for every body but rather induced an inter-temporal substitution effect so that firms hired people they would have hired regardless the incentive simply anticipating choices that they would have made in any case later on down the road.

8. Conclusions.

In this paper we examined the effects of a new normative provision put forward in Italy at the end of 2000 to foster employment with open-end rather than fixed-term contracts. We provided basic information about temporary contracts in Italy; in addition we explain why they might be a source of concern and how the policy maker are trying to reduce the negative side effects of fixed term contract while retaining the positive side. One attempt in this direction is the tax credit we examined in this paper. The effects of this new provision are examined both formally and empirically. We ask two basic questions: weather the new incentive created additional opportunities to enter permanent jobs, and whether these chances were available for every worker or rather they were limited to specific groups. In other words we addressed the issues of whether the provisions induced simply an inter-temporal substitution effect thereby firms took advantage of the government's financial support by anticipating hires of people they would have hired regardless the incentive.

Our analytical and empirical framework is not specific to the Italian case and might prove useful to analyze similar programs that have been adopted throughout most European countries in order to foster hiring into permanent rather than temporary employment.

Our estimates suggest that the substitution effect has most likely prevailed. Results seem to indicate that firms rationally used this subsidy to hire with permanent contracts almost exclusively young, well educated workers; perhaps those who would have been hired with such contract regardless the subsidy, even though after transition into temporary employment. Our estimates suggest that, compared to the previous year, in 2001 the subsidy did increase the probability of being hired with an open-end contract, conditional on being hired, but in a rather uneven way across workers. The probability rose about 10 per cent for workers with a college degree, about 4 per cent for people with high school, while did not change or might have even slightly declined for workers with middle school or less. The empirical evidence squares with the formal prediction.

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Appendix 1: Fixed Term Contract Regulation, historical overview

1. The origins of fixed-term contracts

According to the Italian labor law, open-end contracts have always been the rule. However, in the 1920s Italian legislation already provided for the possibility to set a time limitation to labor contracts, the only condition being the existence of a "special relation" between employer and employee[19]. This provision was then included in the 1942 Civil Code (atr.2097). Originally, the adoption of contracts of limited duration implied strong differences in worker treatment: according to the Private employment act of 1924 and, later on, to the first version of the 1942 Civil Code, fixed-term workers were not entitled to most of the rights an open-end worker usually had (e.g. holidays, longevity pay, Christmas bonus). In order to avoid the fraudulent use of these flexible contracts[20], in 1962 a specific legislation for fixed-term contracts (l.230/1962) was introduced, which established a general ban for the adoption of fixed-term contracts except for a very specific list of circumstances, namely[21] : i) seasonal activities[22]; ii) temporary replacement of an employee on leave; iii) occasional activities which are time predetermined and not usually carried out from the firm; iv) special contracts, requiring skills that are not usually provided by the firm; v) top management. Therefore, instead of

[19] See art.1, co.2, R.D.L. 1825/24 ("Il contratto di impiego privato può anche essere fatto con prefissione di termine; tuttavia saranno applicabili in tal caso le disposizioni del presente decreto che presuppongono il contratto a tempo indeterminato, quando l'aggiunzione del termine non risulti giustificata dalla specialità del rapporto ed apparisca invece fatta per eludere le disposizioni del decreto").

[20] The 1950s registered a strong expansion of temporary work, helped by the increasing weakness of trade unions. This phenomenon looked more and more unacceptable, given the strong economic growth phase Italy was experiencing.

[21] See l. 230/1962, art.1, co.1-2 ("Il contratto di lavoro si reputa a tempo indeterminato, salvo le eccezioni appresso indicate. E' consentita l'apposizione di un termine alla durata del contratto: a) quando ciò sia richiesto dalla speciale natura dell'attività lavorativa derivante dal carattere stagionale della medesima; b) quando l'assunzione abbia luogo per sostituire lavoratori assenti e per i quali sussiste il diritto alla conservazione del posto, semprechè nel contratto di lavoro a termine sia indicato il nome del lavoratore sostituito e la causa della sua sostituzione; c) quando l'assunzione abbia luogo per l'esecuzione di un'opera o di un servizio definiti e predeterminati nel tempo aventi carattere straordinario od occasionale; d) per le lavorazioni a fasi successive che richiedono maestranze diverse, per specializzazioni, da quelle normalmente impiegate e limitatamente alle fasi complementari od integrative per le quali non vi sia continuità di impiego nell'ambito dell'azienda; [….]") and art.4 ("E' consentita la stipulazione di contratti di lavoro a tempo determinato purchè di durata non superiore a cinque anni, con i dirigenti amministrativi e tecnici, i quali possono, comunque, recedere da essi trascorso un triennio e osservata la disposizione dell'art.2118 c.c.").

[22] In order to delimit the area of application of this hypothesis, a decree was issued in 1963 providing a rigid list of activities which could be thought of as "seasonal" (e.g. agricultural activities, but also summer movie workers).

representing a valid alternative, the adoption of temporary contracts is only recognized as an eventual exception. This law was also very restrictive as far as the possibility of renewal was concerned: in particular, it established that fixed-term contracts could only be renewed once and for a time period not exceeding the original one. In case of renewals exceeding 30 days the original deadline, contracts were automatically converted to open-end ones. Unlike the previous regulations, it also extended to fixed-term workers some of the guarantees previously recognized only to permanent workers.

2. The normative evolution of fixed-term contracts during the 1970s and 1980s

The 1962 law has been representing the basic reference for temporary work regulation in the last forty years. Starting from 1977, however, its original rigidity has been partly smoothed overtime through a series of normative interventions, aiming at progressively expanding the application area of fixed-term contract. The worsening condition of the Italian labor market led indeed policy makers to partially abandon the traditional negative view on temporary work, which could represent at that time a useful flexible tool to fight against rising unemployment. For example, compared to the original list of "exceptions" to open-end contracts provided by the first paragraph of the 1962 law, the possibility to hire under fixed-term contracts in case of particular activity hikes was progressively extended to the tourist and commerce sectors (law 876/1977), and later on to the remaining part of the economy (law 79/1983). Besides, the increasing need for labor market flexibility led in 1984 to the introduction of special types of temporary contracts specifically designed to facilitate the initial entry into the labor market (particularly for the youth) and hence partially departing from the general rule in order to escape its rigidity. In particular, two different contract typologies were introduced – the Apprenticeship contract and the Work and Training contract – both aiming at providing work experience together with professional training to young workers (16 to 24 years old in case of Apprenticeship contracts, 16 to 32 years old in case of Work and Training contracts) entering the labor market. According to the law, the duration of these contracts can range from 18 months to 4 years, with different length and rules according to worker's age and education. Unlike the original idea of fixed-term contracts, these contract models have been thought of as "stepping stones" towards permanent

employment and thus enjoy a favorable tax treatment. In particular, firms hiring under these special contractual forms are rewarded through lower social contributions, where the magnitude of this reduction ranges from 25 per cent to 100 per cent according to the specific type of contract, the size of the firm, the economic sector as well as the geographical area.

3. The EU Directive on Temporary Contracts and the latest Italian reform

In 1999 the European Union issued a specific Directive of temporary work, aiming at facilitating the adoption of this contractual form across the Member States. After two years, in August 2001, Italy implemented this Directive through a legislative act which represents the first actual reform of the existing regulation in 40 years. Indeed, for the first time the new regulation explicitly rejects the negative prejudice towards fixed-term contracts. In particular, it succeed in overcoming the original principle according to which "if none of the listed exceptions apply", then "the contract has to be considered an open-end one". Through this reform the Italian law system changes from a situation where every employer could hire under fixed-term contracts only if some very precise and limited circumstances apply to one in which the possibility to put a duration limit to a contract is merely conditioned to the existence of "technical, productive, organizational as well as substitution reasons". At the same time, worker's guarantee is ensured through the provision according to which these reasons must be explicitly (through a written act) stated by the employer. Therefore, this new regulation inverts the logic of the previous one in that the new decree specifically lists the hypotheses under which a fixed-term contract cannot be adopted. Moreover, it delegates to the collective bargaining process at the sector level the task to establish the quantitative limits, even though it explicitly lists a number of cases which must be excluded from any limitation (e.g. fixed-term contracts signed during start-ups).

Appendix 2: the model with endogenous wages

In this appendix we extend the model presented in the text by endogenizing second period wages. We first review the model in the main text and then we introduce the wage determination mechanism.

1 Setting

Suppose the firm does not know the productivity of new workers. Let y be worker's productivity when matched with a job and assume this value is drawn from one out of the following two alternative productivity distributions $G(y)$: either a uniform $[0,y_H]$ or a uniform $[0,y_L]$. To make things simpler, let us assume the second distribution is degenerate to 0.

Given workers' observable characteristics, each firm assigns each new worker a probability λ to be drawn from $[0,y_H]$. There exist two types of contracts in this economy, namely fixed-term and open-end contracts. They both last two periods. With the first type firms hire a new worker in the first period, observe her/his productivity and then decides whether to hire the worker for the second period or let her/him go. In this last case no firing cost has to be born. We assume that in the second period there is no need to fire the worker.

With the second type of contract (open-end contract), firms face the same sequence of decisions: they hire a new worker in the first period, observe her/his productivity and then decide whether to hire the worker or let her/him go. However, in the latter case a firing cost has to be born. In the second period there is no need to fire the worker.

We assume that first period wage w_1 is exogenously set[23], while second period wage w_2 is endogenously determined.

2 The value of contracts

In order to decide which contract to offer to each worker, firms need to compute the value of both contracts.

The value to a firm of a fixed-term contract is given by:

$$V_{FT} = E(y) - w_1 + P(hired) * \frac{1}{(1+r)}\left[E\left(y \mid hired\right) - w_2\right] \qquad (1)$$

that is the sum of the expected profits from the two periods. Second period expected profits depend on the probability that workers will be retained and on the expected productivity of the retained workers. Since we assumed that worker's productivity has a uniform [0, y_H] distribution with probability λ and 0 with probability (1- λ), then it follows that

$$E(y) = \lambda \frac{y_H}{2};$$

$$p(hired) = 1 - p(fired) = 1 - [\lambda G\left(\bar{y}_{FT}\right) + (1-\lambda) * 1] = \lambda[1 - G(\bar{y}_{FT})] = \lambda\left(\frac{y_H - \bar{y}_{FT}}{y_H}\right)$$

$$E\left(y \mid hired\right) = \left(\frac{y_H + \bar{y}_{FT}}{2}\right)$$

and $\bar{y}_{FT}$ is the cut-off level of productivity below which firm fires the worker.

Each firm has to choose this cut-off level of productivity ($\bar{y}_{FT}$) and needs to compute the threshold λ below which the contract value turns out to be negative (so that no worker with an attached λ below this threshold is going to be hired). The optimal value of cut-off productivity is $\bar{y}^*_{FT} = w_2$ [24]. This implies the firm will enjoy extra profits for any worker retained in the second period. The threshold value for λ is

$$\lambda^*_{FT} = \frac{2 w_1 y_H (1+r)}{y_H^2 (1+r) + (y_H - \bar{y}^*_{FT})^2} \qquad (2)$$

To be meaningful this value needs to be less than one[25] .

The value to a firm of an open-end contract is instead:

---

[23] This is a common assumption in the related literature. Autor (2001) in a model on firing normalizes first year wage to zero.

[24] This value is derived by maximizing the value function with respect to $\bar{y}_{FT}$.

[25] This constraint poses an upper bound to the first period wage; the bound to the second period wage is the highest productivity value y_H. If the second period wage is higher than this value, no worker will be hired for the second period.

$$V_{OE} = E(y) - w_1 - (1 - P(hired))* C + P(hired) * \frac{1}{(1+r)}[E(y \mid hired) - w_2] \qquad (3)$$

where C is the firing cost. The only difference between this value and the one assigned to a fixed-term contract is the expected firing cost $(1 - P(hired))* C$, which has to be born at the end of the first period.

Given our productivity assumptions, the following holds for an open-end contract

$$E(y) = \lambda \frac{y_H}{2};$$

$$p(hired) = 1 - p(fired) = 1 - [\lambda G(\bar{y}_{OE}) + (1 - \lambda)* 1] = \lambda[1 - G(\bar{y}_{OE})] = \lambda\left(\frac{y_H - \bar{y}_{OE}}{y_H}\right)$$

$$E(y \mid hired) = \left(\frac{y_H + \bar{y}_{OE}}{2}\right)$$

The value of this contract is then maximum when

$$\bar{y}^*_{OE} = w_2 - (1+r)C \qquad (4)$$

Notice that this value lies below that of fixed-term contracts; thus firms would retain in the second period a worker, who would be fired in case of temporary employment. This happens because when the firm retains a worker it saves on firing costs. With this value of cut-off productivity the threshold for the probability λ turns out to be

$$\lambda^*_{OE} = \frac{2(w_1 + C)y_H(1+r)}{y_H^2(1+r) + (y_H - \bar{y}^*_{OE})^2} \qquad (5)$$

which is always greater than the threshold corresponding to fixed-term contracts.

Notice moreover that the bearable firing costs have an upper bound, that is

$$C^{max} = \frac{w_2}{1+r} = \frac{\bar{y}^*_{FT}}{1+r} \qquad (6)$$

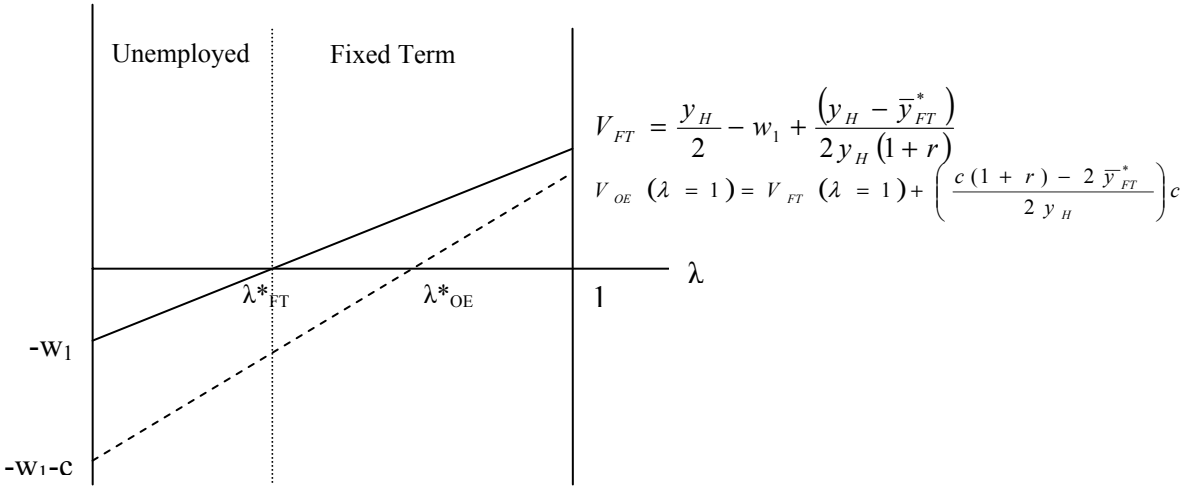
that derives from the fact that the lowest value of $\bar{y}^*_{OE}$ is zero.

Using the fact that $\bar{y}^*_{OE} = w_2 - (1+r)C = \bar{y}^*_{FT} - (1+r)C$, it is possible to write the value of one contract as a function of the value of the other one, i.e.

$$V_{OE} = V_{FT} + \lambda\left[\frac{C^2(1+r)}{2y_H} + \frac{\left(y_H - \bar{y}^*_{FT}\right)}{y_H}C\right] - C \qquad (7)$$

This relationship is shown in Graph 1.

Graph a1: the Labor Market Before the Subsidy



Two facts are here worth noting. The first one is that open-end contracts are dominated by fixed-term contracts for any value of λ; this result captures in a simple way the idea that all new workers enter employment with a fixed-term job, a feature which does not appear too far from the Italian experience in the 1990s. The second notable fact is that the slope of the value of open-end contracts with respect to the quality index λ is higher than the correspondent slope for fixed-term contracts. In other words, as λ increases the value of the first contract grows faster than the value of the second one. This feature is due to the fact that, as the quality index λ rises, the value of open-end contract increases more than the value of fixed-term contract because of the reduction in the expected firing costs. However, this second effect does not overcome the reduction in the overall values due to firing costs.

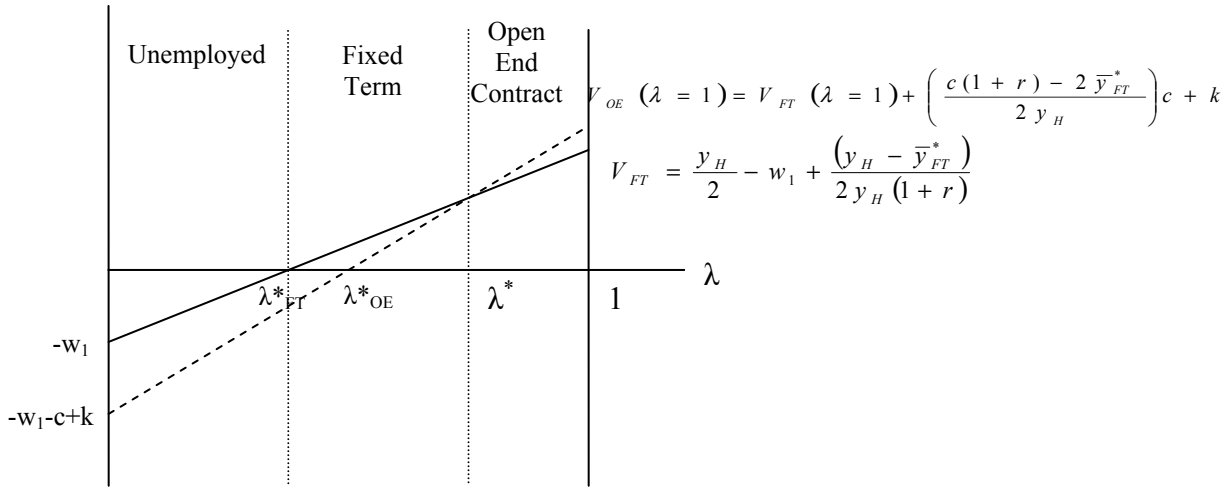
3 The effect of the subsidy

Let us now introduce the subsidy to open-end contracts in the form of a lump sum $\boldsymbol{K}$ given in the first period to each firm hiring a worker with such contract. Thus, the values of an open-end contract will be shifted upwards by an amount $\boldsymbol{K}$ for any given level of $\boldsymbol{\lambda}$:

$$V_{OE} = V_{FT} + \lambda\left[\frac{C^2(1+r)}{2y_H} + \frac{\left(y_H - \bar{y}^*_{FT}\right)}{y_H}C\right] - C + k \qquad (8)$$

If the subsidy is nor too small or too high[26], the value of an open-end contract will be shifted in such a way to ensure the coexistence of the unemployed, fixed-term contracts and open-end contracts (Graph 2).

Graph a2: The Labor Market after the Reform



The decision rule implied by this new setting is:

- Do not offer workers any contract if $\lambda \leq \lambda^*_{FT}$;
- Offer a fixed-term contract if $\lambda^*_{FT} < \lambda \leq \lambda^*$;
- Offer an open-end contract if $\lambda^* < \lambda$;

[26] In particular the lowest level of $\boldsymbol{K}$ has to be such that $\boldsymbol{V_{OE} - V_{FT} > 0}$ when evaluated at $\boldsymbol{\lambda = 1}$; this values is $K\min = \left(\frac{2\bar{y}^*_{FT} + (1+r)C}{2y_H}\right)C$; The highest value of $\boldsymbol{K}$ has to be such that $\boldsymbol{V_{OE} - V_{FT} \leq 0}$ when evaluated at $\boldsymbol{\lambda = \lambda^*_{FT}}$. This values if $K_{max} = \left(1 - \lambda_{FT}\left(\frac{y_H - \bar{y}^*_{FT}}{y_H}\right)\right)C - \frac{\lambda_{FT}(1+r)C}{y_H}$. It is true that $\boldsymbol{Kmax > Kmin}$ for all $\boldsymbol{C}$.

The important fact to note is that the new people hired under open-end contracts are those the firm assigns the highest probability λ and hence are those who are most likely retained in the second period. This result does not come as a surprise given that firms try to balance off the subsidy (identical for all workers) with the additional expected firing costs; since these costs are smaller for expected better workers, these are the ones preferred by firms. Thus, the policy intervention we are examining fosters the probability of being employed into a permanent position for people who have the highest chance to be employed in permanent jobs regardless the subsidy, even though after one period of temporary employment.

4 Pre-reform wage determination

We assume that second period wages are set by a workers' participation constraint. That is second period wage is equal to the worker's outside opportunity as measured by the expected productivity of not employed workers.

Thus we have three equilibrium conditions:

1) A labor demand condition (derived from the maximization of the value of the fixed term contract):

$$\overline{y}_{FT} = w_2 . \qquad \textbf{(9)}$$

2) A firm participation condition that defines the minimum level of λ below which the value of the fixed term contract is negative:

$$\lambda_{FT} = \frac{2 w_1 y_H (1 + r)}{y_H^2 (1 + r) + (y_H - \overline{y}_{FT})^2} \qquad \textbf{(2)}$$

3) Workers' participation condition:

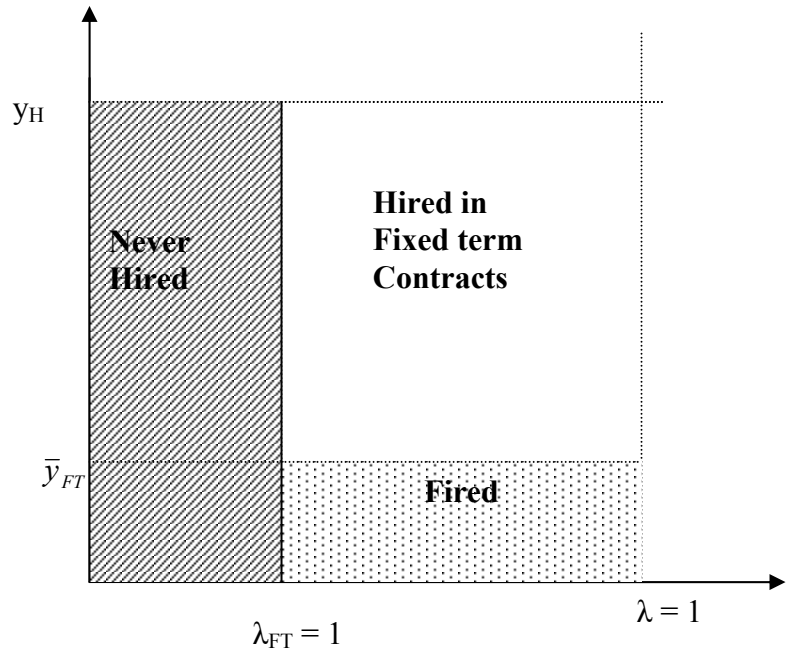
$$w_2 = E(y \mid unemployed \quad) \qquad \textbf{(10)}$$

Equilibrium wage is obtained by solving simultaneously these three equations

The only element we need in order to solve system ***(9),(2),(10)*** is the expected productivity of the unemployed. To this end we go through a small detour.

Graph a3 represents the market structure before the reform.

Graph a3: Workers distribution among labor market status before subsidy



The graph shows that workers will not be hired when their attached λ is smaller than λ_{FT}; they will be fired if their attached λ is larger than λ_{FT} and the observed productivity is less than $\bar{y}_{FT}$; they will be hired otherwise. This classification serves to compute the expected productivity of non employed workers and thereby an analytical expression for equation ***(10)***.

The expected productivity of unemployed workers is a weighed average of the expected productivity of never hired and fired workers. It is worth to recall that we are assuming that the distribution of *y* and *λ* are independent. For the first group the expected productivity is

$$E[y \mid never\ hired] = E[y \mid \lambda \le \lambda_{FT}] = \frac{\lambda_{FT}}{2}\frac{y_H}{2}$$

The number of never hired workers is $\lambda_{FT}\frac{y_H}{y_H} = \lambda_{FT}$.

The expected productivity of workers not hired is the average productivity of all workers discounted by the fact that their quality indicator is less than the threshold level λ_{FT}
The expected productivity of fired worker is

$$E[y \mid fired] = E[y \mid \lambda > \lambda_{FT}, y < \bar{y}_{FT}] = \frac{1+\lambda_{FT}}{2}\frac{\bar{y}_{FT}}{2}$$

that is the product of the expected productivity of those with productivity level less than $\bar{y}_{FT}$ and the expected value of the quality indicator when λ is larger than the threshold λ_{FT} .The number of fired workers is $(1-\lambda_{FT})\frac{\bar{y}_{FT}}{y_H}$.

The expected productivity of unemployed workers is then obtained by aggregation:

$$E[y \mid unemployed] = \frac{\lambda_{FT}^2 y_H^2 + (1-\lambda_{FT}^2)\bar{y}_{FT}^2}{4\lambda_{FT} y_H + 4(1-\lambda_{FT})y_{FT}^2};$$

the aggregation weights are the shares of never hired and fired workers on the sum of the two ($\lambda_{FT} + (1-\lambda_{FT})\frac{\bar{y}_{FT}}{y_H}$).

Table 1a synthesizes workers' and their productivity distribution among labor market status. For completeness we included hired workers.

Table 1a: number of workers and expected productivity in different labor market status.

Labor Market Status	Number of workers	Expected Productivity
Hired	$(1-\lambda_{FT})\frac{y_H - \bar{y}}{y_H}$	$E[y \mid \lambda > \lambda_{FT}, y \geq \bar{y}_{FT}] = \frac{1+\lambda_{FT}}{2}\frac{\bar{y}_H + \bar{y}_{FT}}{2}$
Unemployed	$\lambda_{FT} + (1-\lambda_{FT})\frac{\bar{y}_{FT}}{y_H}$	$E[y \mid unemployed] = \frac{\lambda_{FT}^2 y_H^2 + (1-\lambda_{FT}^2)\bar{y}_{FT}^2}{4\lambda_{FT} y_H + 4(1-\lambda_{FT})y_{FT}^2}$
Never Hired	$\lambda_{FT}\frac{y_H}{y_H}$	$E[y \mid \lambda \leq \lambda_{FT}] = \frac{\lambda_{FT}}{2}\frac{y_H}{2}$
Fired	$(1-\lambda_{FT})\frac{\bar{y}_{FT}}{y_H}$	$E[y \mid \lambda > \lambda_{FT}, y < \bar{y}_{FT}] = \frac{1+\lambda_{FT}}{2}\frac{\bar{y}_{FT}}{2}$

With this result at hand we can rewrite equation ***(10)*** as

$$w_2 = E[y \mid unemployed] = \frac{\lambda_{FT}^2 y_H^2 + (1-\lambda_{FT}^2)\bar{y}_{FT}^2}{4\lambda_{FT} y_H + 4(1-\lambda_{FT})\bar{y}_{FT}} \qquad \textbf{(10')}$$

and we can compute the equilibrium values for wage and for the two thresholds.

To solve the system we first note that it can be reduce to two equations in the λ, w_2:

$$\lambda = \frac{2 w_1 y_H (1+r)}{y_H^2 (1+r) + (y_H - w_2)^2} \qquad \textbf{(2')}$$

and

$$w_2 = \frac{\lambda^2 y_H^2 + (1-\lambda^2) w_2^2}{4\lambda\ y_H + 4(1-\lambda) w_2} \qquad \textbf{(10'')}$$

where we have dropped the subscript FT to simplify notation.

Condition ***(2')*** describes λ as a quadratic, continuous and concave function of w that in the relevant range *[0, Y_H]* is increasing from $\frac{2(1+r)w_1}{y_h(2+r)}$ for $w_2=0$ to $\frac{2w_1}{y_h}$ when $w_2=Y_H$.

In graph a4 we plotted it assuming that w_1 is such that $\frac{2w_1}{y_H} < 1$.

Condition (10'') can be regarded as describing as a second degree equation in λ whose coefficients depend on w_2:

$$-\lambda^2 (y_H^2 - w_2^2) + (4 y_H w_2 - 4 w_H^2)\lambda + 3 w_2^2 = 0$$

The solutions to this equation are two functions of λ in w_2, one positive and the other negative valued in the relevant range of w_2. The positive[27] one is

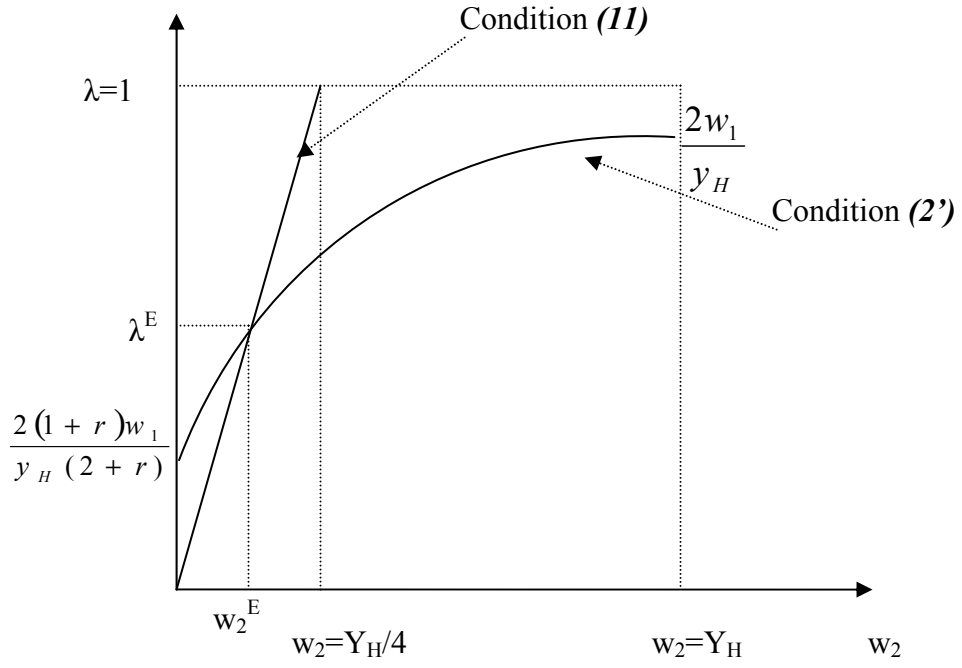
$$\lambda = \left[1 + \sqrt{1 + \frac{3(y_H + w_2)}{4(y_H - w_2)}}\right] \frac{2w_2}{y_H + w_2} \qquad \textbf{(11)}$$

This is an increasing function of w_2, which grows from a minimum of 0 for $w_2=0$ to 1 for $w_2 = \frac{y_H}{4}$. This is the relevant range of admissible solutions.

[27] The negative solution is $\lambda = \left[1 - \sqrt{1 + \frac{3(y_H + w_2)}{4(y_H - w_2)}}\right] \frac{2w_2}{y_H + w_2}$ which decreases with w_2

While the analytical solution is a rather messy expression that is obtained by equating *(2')* and *(11)*, it is easy to see that the solution is the crossing point of these two curves. It occurs for values of λ positive and less than one (provided that w_1 is not too large) and for wage lower than the unconditional mean of the productivity distribution ($\frac{y_H}{4}$). A simple representation of the equilibrium is shown if Graph a4.

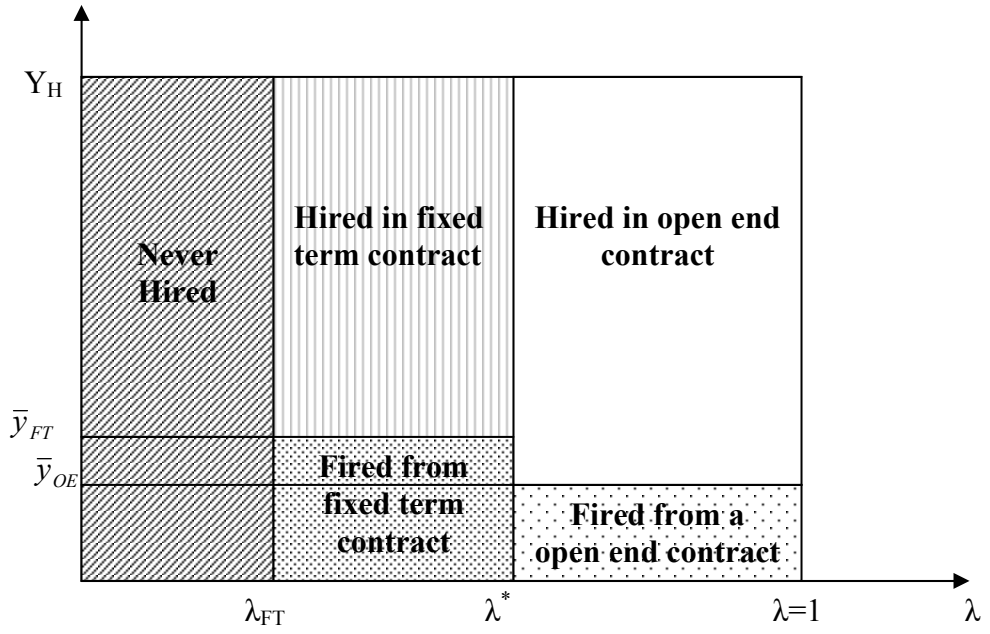
Graph a4. The equilibrium before the subsidy



5 Post-reform wage determination.

After reform wage determination follows closely the logical development of the previous paragraph. However because of the coexistence of two types of contracts we have two additional variables to take care of: the threshold levels for λ and y for the open end contract. These two additional conditions complicate the algebra but the basic features of the model remain unchanged. As we did in the previous paragraph we begin by showing a graphical representation of workers' distribution among labor market status.

Graph a5: Workers distribution among labor market status after the subsidy



This graph shows that workers will never be hired in either contracts when their quality index is smaller than λ_{FT}; they will be hired in a temp contract if their quality index is between λ_{FT} and λ^* (that is the level of the quality index above which the value of the open end contract is positive and larger than the value of the fixed term contract) but will be fired if their observed productivity turns out to be less than $\bar{y}_{FT}$. Finally workers will be hired into open end positions if λ is larger than λ^* but will be retained only if their productivity is above the threshold $\bar{y}_{OE}$.

The equilibrium in this model is a vector of 5 numbers that solves the following system of equations[28]:

1) A labor demand for fixed term contract (identical to condition ***(9)***):

$$\bar{y}_{FT} = w_2 \qquad \textbf{(12)}$$

2) A labor demand for open end contract:

$$\bar{y}_{OE} = w_2 - c(1+r) \qquad \textbf{(13)}$$

[28] To be more precise we also require that the solution have economic meaning which implies several restrictions on sets of the admissible solutions. Thus we requires that $1 > \lambda^* > \lambda_{FT} > 0$ and $y_H \geq \bar{y}_{FT} > \bar{y}_{OE} > 0$.

3) A firm participation constraint for the fixed term contract which identifies the minimum level of λ below which the value of the fixed term contract is negative (identical to condition ***(2)***):

$$\lambda_{FT} = \frac{2 w_1 y_H (1 + r)}{y_H^2 (1 + r) + (y_H - \bar{y}_{FT})^2} \qquad \textbf{(14)}$$

4) A condition which warrants the coexistence of both fixed term and open end contracts

$$\lambda_{FT} < \lambda^* = \frac{2 y_H (c - k)}{[(1 + r)c + 2(y_H - \bar{y}_{FT})]c} < 1 \qquad \textbf{(15)}$$

5) A workers' participation condition (identical to condition ***(10)***):

$$w_2 = E(y \mid unemployed) \qquad \textbf{(16)}$$

Again to solve the system we need an analytical expression for condition ***(16)***.

The expected productivity of unemployed workers is a weighted average of the productivity of those never hired, of those fired from a temp contract and of those fired from an open end contract. As before for the first group the expected productivity is the average productivity of all workers discounted by the fact that their observed quality index is less than the λ_{FT} threshold:

$$E[y \mid never\ hired] = E[y \mid \lambda \le \lambda_{FT}] = \frac{\lambda_{FT}}{2}\frac{y_H}{2}$$

The number of these workers is $\lambda_{FT}\frac{y_H}{y_H} = \lambda_{FT}$. For workers laid off from a temp contract the expected productivity is the product of the expected value of the quality index when this is in the range (λ_{FT}, λ^*] and the expected productivity of those with y smaller than $\bar{y}_{FT}$:

$$E[y \mid fired\ fron\ FTC] = E[y \mid \lambda_{FT} < \lambda \le \lambda^*, y < \bar{y}_{FT}] = \frac{\lambda^* + \lambda_{FT}}{2}\frac{\bar{y}_{FT}}{2}$$

Their number is $(\lambda^* - \lambda_{FT})\frac{\bar{y}_{FT}}{y_H}$. Finally the expected productivity of workers fired from a open end contract is the product of the expected value of the quality index when this is in the range (λ^*,1] and the expected productivity of those with y smaller than $\bar{y}_{OE}$:

$$E[y \mid fired\ from\ OEC] = E[y \mid \lambda^* < \lambda \le 1, y < \bar{y}_{OE}] = \frac{1+\lambda^*}{2}\frac{\bar{y}_{OE}}{2}$$

Their number is $(1-\lambda^*)\frac{\bar{y}_{OE}}{y_H}$.

The expected productivity of unemployed workers is obtained by aggregating these three productivities using as weights the shares of each group on total number of workers out of work. Thus condition ***(16)*** is

$$w_2 = E(y \mid un.) = \frac{\lambda_{FT}^2 y_H^2 + (\lambda^{*2} - \lambda_{FT}^2) y_{FT}^2 + (1-\lambda^{*2})[y_{FT} - c(1+r))]^2}{4[\lambda_{FT} y_H - \lambda_{FT} \bar{y}_{FT} + (y_{FT} - c(1+r)) + \lambda^* c(1+r))]} \quad \textbf{(16')}$$

We have used relation ***(12)*** and ***(13)*** so that $\bar{y}_{OE} = \bar{y}_{FT} - c(1+r)$. The complete description of workers and productivity distribution among labor market status is provided by Table a2.

Using the fact that $\bar{y}_{OE} = \bar{y}_{FT} - c(1+r)$ and that $w_2 = \bar{y}_{FT}$ we are left with a system of three conditions that - if a solution exists - provides an equilibrium value for the two thresholds λ^* and λ_{FT} and for second period wage. However to keep the analysis along the same lines as in the pre-reform case (discussed in the previous paragraph), we now derive a condition that ties the two thresholds λ^* and λ_{FT} in such a way to grant the coexistence of both contract for each given level of the subsidy.

Let K_{FT} be the value of the subsidy that equates the value of the fixed term and the open end contract for $\lambda=\lambda_{FT}$. Consider next a marginally lower level of the subsidy K'. In this case the level of λ which equates fixed term end open end contract's value is $\lambda^* > \lambda_{FT.}$ The difference $\lambda^*-\lambda_{FT.}$ has the following form:

$$\lambda^* - \lambda_{FT} = -\frac{k' - k_{FT}}{c\left[\frac{1+r}{2y_H}c + \frac{y_H - w_2}{y_H}\right]} = \frac{\Delta k_{FT}}{c\left[\frac{1+r}{2y_H}c + \frac{y_H - w_2}{y_H}\right]} \equiv m \quad \textbf{(17)}$$

We can always find a level of ΔK_{FT} which grant the coexistence of both contract unless $\lambda_{FT}=1$.

Table 2a: workers and expected productivity in different labor market status.

Labor Market Status	Number of workers	Expected Productivity
Hired	$(1-\lambda_{FT})\frac{y_H-\bar{y}_{FT}}{y_H}+(1-\lambda^*)\frac{\bar{y}_{FT}-\bar{y}_{OE}}{y_H}$	$E(y \mid hired)=\frac{(1-\lambda_{FT}^2)(\bar{y}_H^2-\bar{y}_{FT}^2)+(1-\lambda^{*2})(\bar{y}_{FT}^2-\bar{y}_{OE}^2)}{4[(1-\lambda_{FT})(\bar{y}_H-\bar{y}_{FT})+(1-\lambda^*)(\bar{y}_{FT}-\bar{y}_{OE})]}$
Into FTC	$(\lambda^*-\lambda_{FT})\frac{y_H-\bar{y}_{FT}}{y_H}$	$E[y \mid \lambda_{FT}<\lambda\le\lambda^*, y\ge\bar{y}_{FT}]=\frac{\lambda^*+\lambda_{FT}}{2}\frac{y_H+\bar{y}_{FT}}{2}$
Into OEC	$(1-\lambda^*)\frac{y_H-\bar{y}_{OE}}{y_H}$	$E[y \mid \lambda^*<\lambda\le 1, y\ge\bar{y}_{OE}]=\frac{1+\lambda^*}{2}\frac{y_H+\bar{y}_{OE}}{2}$
Unemployed	$\lambda_{Ft}+(\lambda^*-\lambda_{FT})\frac{\bar{y}_{FT}}{y_H}+(1-\lambda^*)\frac{\bar{y}_{OE}}{y_H}$	$E(y \mid un.)=\frac{\lambda_{FT}^2 y_H^2+(\lambda^{*2}-\lambda_{FT}^2)y_{FT}^2+(1-\lambda^{*2})y_{OE}^2}{4[\lambda_{FT}y_H+(\lambda^*-\lambda_{FT})\bar{y}_{FT}+(1-\lambda^*)\bar{y}_{OE}]}$
Never Hired	λ_{FT}	$E[y \mid \lambda\le\lambda_{FT}]=\frac{\lambda_{FT}}{2}\frac{y_H}{2}$
Fired from FTC	$(\lambda^*-\lambda_{FT})\frac{\bar{y}_{FT}}{y_H}$	$E[y \mid \lambda_{FT}<\lambda\le\lambda^*, y<\bar{y}_{FT}]=\frac{\lambda^*+\lambda_{FT}}{2}\frac{\bar{y}_{FT}}{2}$
Fired from OEC	$(1-\lambda^*)\frac{\bar{y}_{OE}}{y_H}$	$E[y \mid \lambda^*<\lambda\le 1, y<\bar{y}_{OE}]=\frac{1+\lambda^*}{2}\frac{\bar{y}_{OE}}{2}$

Using this manipulation into condition ***(16')*** leaves us with a system of two relationships that relate the quality threshold level for the fixed term contract λ_{FT} and the second period wage w_2. The first relation is again condition ***(14)*** which is identical to condition ***(2').*** We have discussed it in the previous paragraph. Therefore we concentrate on the second relationship which is obtained by using ***(17)*** into equation ***(16)*** to get

$$-\lambda_{FT}^2\left(y_H^2-\tilde{w}_2^2\right)+\lambda_{FT}\left(4w_2y_H-4\tilde{w}_2w_2-2mw_2^2+m\tilde{w}_2^2\right)+4mw_2^2+4\tilde{w}_2w_2-4m\tilde{w}_2w_2-m^2w_2^2-\tilde{w}_2^2+m^2\tilde{w}_2^2\equiv-\lambda_{FT}^2\alpha(w_2)+\lambda_{FT}\beta(w_2)+\gamma(w_2)=0$$

where $\tilde{w}_2=w_2-c(1+r)$. This relationship traces the values of λ as a function of w_2

and qualitatively it has the same characteristics of the analogous relationship for the pre-reform case. It has two sets of solutions, one with positive values for λ in the relevant range of w_2 and one that has the negative solutions. We concentrate only on the set of positive solutions:

$$\lambda_{FT} = \frac{\beta(w_2)}{2\alpha(w_2)}\left[1+\sqrt{1+\frac{4\alpha(w_2)\gamma(w_2)}{\beta^2(w_2)}}\right] \qquad \textbf{(18)}$$

This solution has however several characteristic such that no equilibrium, one, or more than one equilibrium are all possible depending on the value of the parameters.

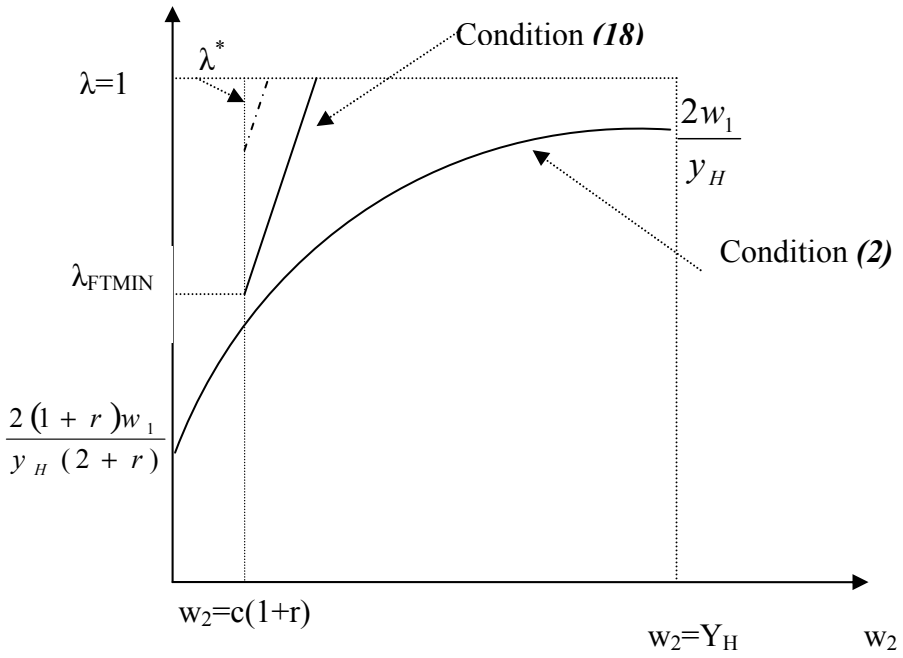
The first characteristic is the fact that since $\bar{y}_{OE} = w_2 - c(1+r)$ then the lowest meaningful value for w_2 is $c(1+r)$; let λ_{FTmin} be the correspondent value of λ. If for this minimum wage level the correspondent value of λ generated from condition ***(2')*** is lower than λ_{FTmin} then there might be no equilibrium (Graph a5a).

The second characteristic is the fact that equation ***(18)*** is not a monotonic increasing function of w_2 in the relevant range $[c(1+r), y_H]$. In particular it is an increasing function for w_2 less than a critical value[29] and a declining function for higher values. Therefore we can have two equilibria for the same set of parameter (graph a5b). This multiplicity of equilibrium can be removed if we take as admissible only equilibrium which grants the coexistence of both contract, because the second equilibrium in general occurs fro values of w_2 that implies λ^* larger than 1 (graph a5b).

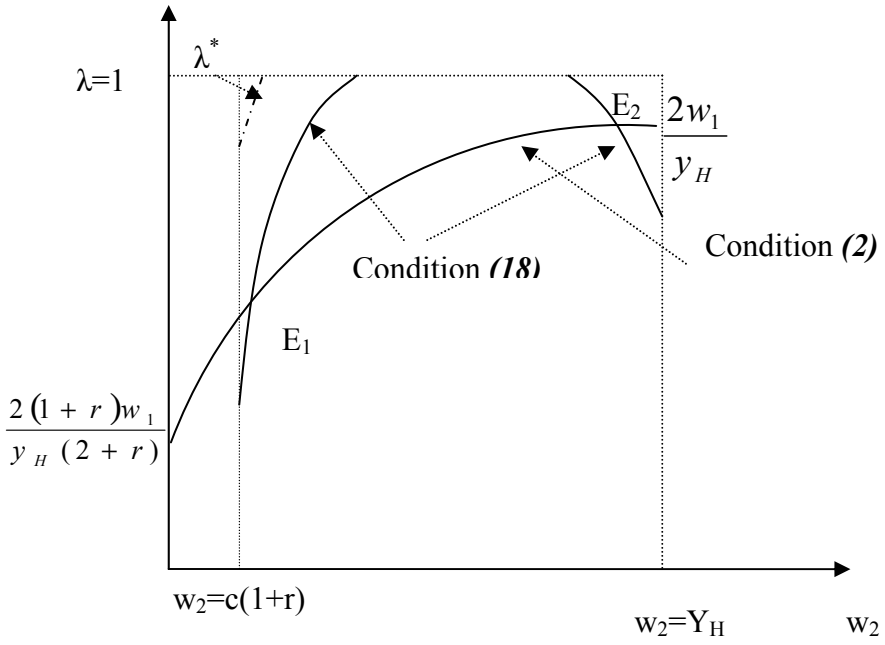
The one equilibrium case is show in graph a5c.

Graph a5a. Post reform analysis: No equilibrium case.

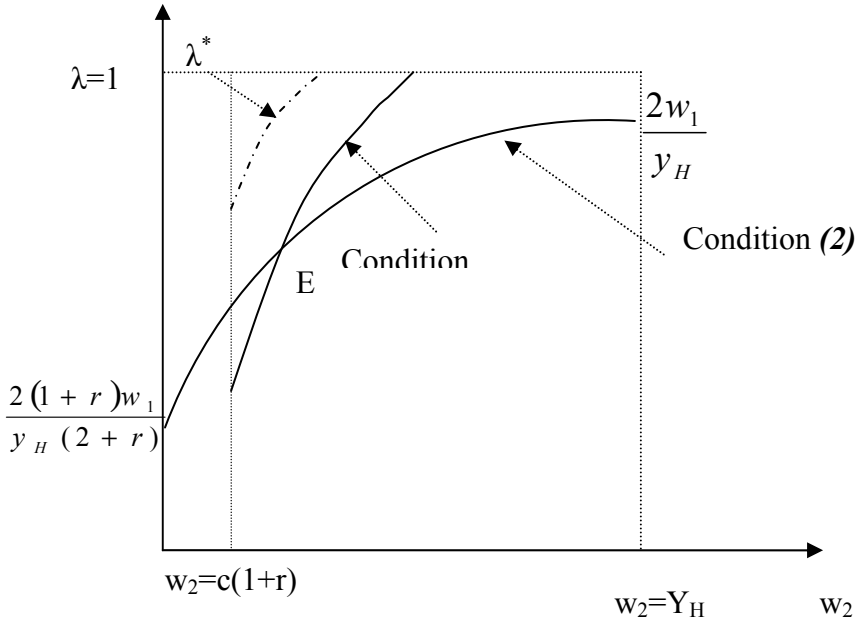
[29] In particular the slope of function $\beta(w_2)$ is positive for w_2 less than $\frac{4y_H + 2(1+r)(2-m)}{2(4+m)}$ and negative for w_2 above this threshold



Graph a5b. Post reform analysis: Two equilibria case.



Graph a5c. Post reform analysis: one equilibrium case.



6 Comparison between pre and post subsidy equilibria.

The last question we want to address concerns the comparison between the pre and post subsidy wages. To this end we first notice that since condition ***(2')*** is common to both pre and post equilibria we only need to compare ***(11)*** with ***(18)***. The analytical expression for the difference between the two functions is rather massy. Therefore we simulated the wage differences for some parameter value (compatible with the existence of a equilibrium and the coexistence of both contract). The simulations show that the pre reform wages are higher than the post reform wage. This effect depends on the fact that because of the firing costs the productivity threshold for the open end contract is lower. Thus the major effect of endogenous wages is the fact that by lowering the overall wage the subsidy has a small effect on the total employment.

Table 1

Fixed Term Contracts In OECD Countries;
Share And Contribution To Employment Growth 1990-2000
(*Percentage Points*)

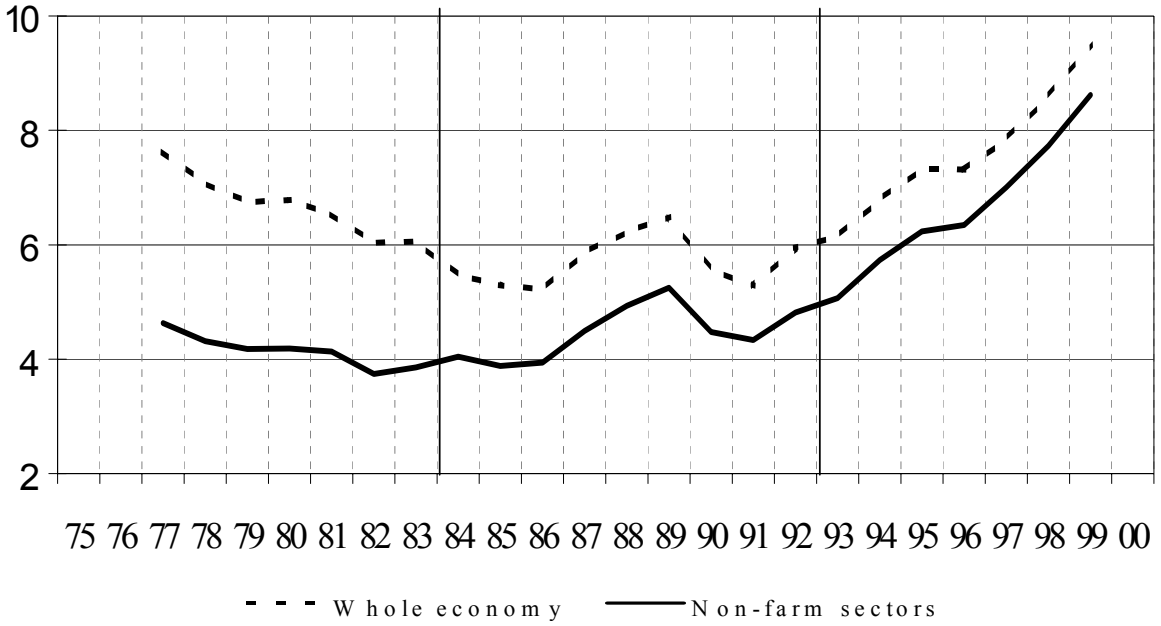
	Employment Growth contributions			Share of temp Job of dependent employment	
	Temp jobs	Permanent Jobs	Total	1990	2000
Austria[d]	2.0	-0.9	1.1	6.0	7.9
Belgium	5.3	12.4	17.7	5.3	9.0
Canada[f]	2.3	7.0	9.3	11.3	12.5
Czech Republic[b]	2.4	-5.4	-2.9	5.5	9.3
Denmark	-0.1	5.0	4.8	10.8	10.2
Finland[a]	4.4	2.7	7.1	13.2	16.5
France	5.9	3.9	9.9	10.4	14.5
Germany[a]	2.4	-4.5	-2.1	10.3	12.6
Greece	-1.0	19.5	18.5	16.6	13.1
Hungary[f]	2.2	5.5	7.7	5.6	7.0
Iceland[a]	38.3	-20.8	17.5	14.7	45.3
Ireland	-1.6	48.9	47.4	8.5	4.4
Italy	4.8	-6.0	-1.2	5.2	10.1
Japan	3.8	7.6	11.4	10.6	12.9
Luxemburg	0.6	16.6	17.2	3.6	3.7
Mexico[d]	3.0	24.2	27.2	23.1	20.5
Netherlands	9.9	15.2	25.1	7.6	13.8
Norway[e]	-2.8	10.8	8.0	12.9	9.3
Portugal	3.9	4.8	8.7	18.3	20.4
Slovak Republic[c]	1.8	-2.2	-0.4	2.9	4.9
Spain	10.2	14.4	24.7	29.8	32.1
Sweden[d]	1.7	5.0	6.6	12.4	14.6
Switzerland[a]	-1.4	0.8	-0.5	13.0	11.7
Turkey	14.1	25.8	39.9	14.4	20.4
United Kingdom	1.9	4.6	6.5	5.2	6.7

b) 1991-2000; c) 1993-2000; d) 1994-2000; e) 1995-2000; f) 1996-2000; g) 1997-2000;

Source: OECD Employment Outlook , 2002

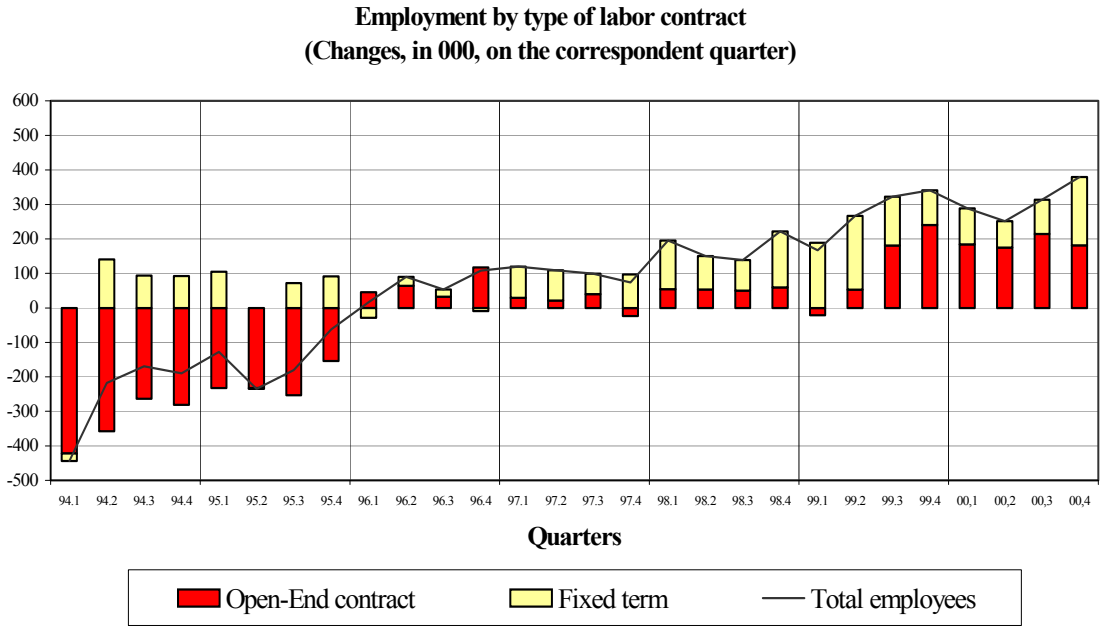
Figure 1

Employees With Fixed-Term Contract As A Share Of All Employees
(*Percentage Points*)



Source: Bank of Italy, annual report for year 2000

Figure 2



Sources: Authors' calculation on Labour Force Survey data

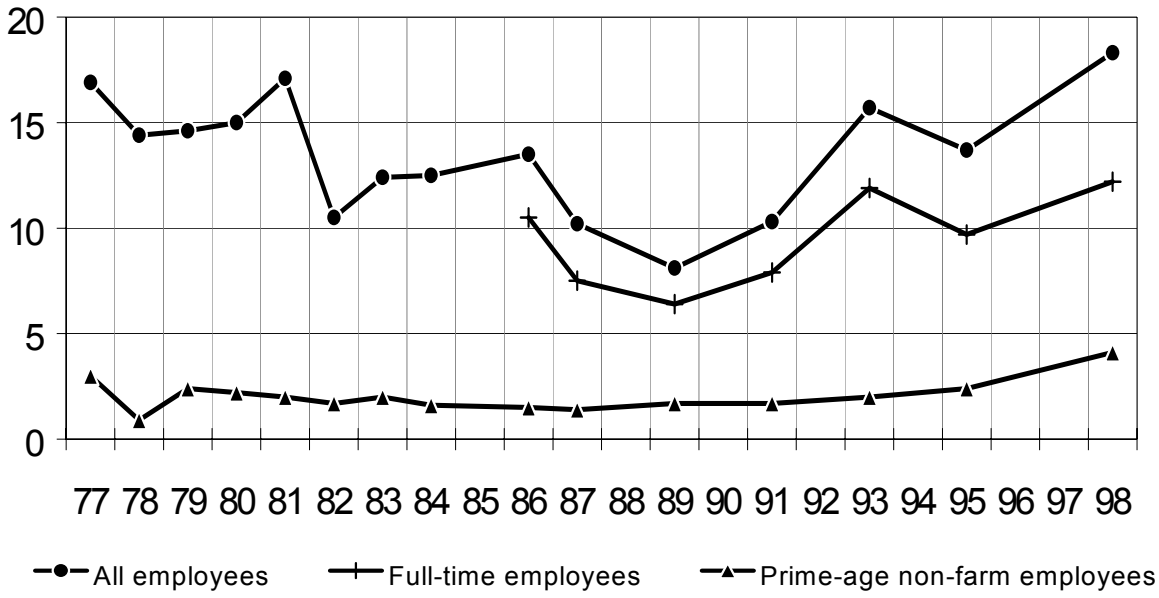
Table 2
Basic Characteristics Of Fixed Term Contracts In Italy[1]
(*Percentage Points*)

	1993	1994	1995	1996	1997	1998	1999	2000	2001
By gender									
Males	51.2	52.9	52.5	54.3	53.9	53.4	52.3	51.9	50.4
Females	48.8	47.1	47.5	45.7	46.1	46.6	47.7	48.1	49.6
By Age									
15-19	10.5	9.0	8.8	8.1	7.2	7.3	6.5	6.2	5.7
20-24	22.9	21.8	22.2	22.1	21.0	21.8	21.6	19.5	18.0
25-29	19.1	20.6	19.9	19.7	20.2	19.5	20.0	19.5	20.3
30-34	14.2	14.2	16.0	16.3	17.3	16.4	16.3	15.9	15.8
35-39	10.0	10.6	10.1	11.1	11.1	11.3	11.7	13.2	13.6
40-44	6.8	7.5	7.3	7.5	7.7	8.3	8.7	9.0	9.5
45 and over	16.5	16.4	15.7	15.2	15.5	15.4	15.2	16.8	17.1
By School level									
Middle school or less	63.9	60.0	58.4	56.4	54.8	52.3	49.8	48.0	48.0
High School	28.4	31.3	32.3	34.2	34.6	36.8	38.2	39.5	39.4
College	7.6	8.7	9.3	9.3	10.6	10.9	12.0	12.4	12.6
By Sector									
Agriculture	20.8	18.7	18.0	16.2	13.7	12.9	12.1	11.1	11.7
Manufacturing	14.9	16.6	17.6	17.5	17.9	19.3	18.1	18.4	17.1
Construction	12.4	11.5	10.7	10.9	11.1	9.9	8.8	8.4	8.4
Services	51.9	53.2	53.7	55.4	57.3	57.9	60.9	62.1	62.8
By Reasons for Fixed Term Contract									
Work and Training	23.6	23.3	23.3	24.5	24.8	29.9	32.3	31.4	29.2
No better opportunities	51.7	52.3	51.0	49.9	49.3	45.3	40.7	43.1	44.4
Don't want a Open End Contract	7.2	5.4	5.2	4.8	4.7	3.9	4.6	4.3	4.3
Other reasons	17.5	19.0	20.5	20.8	21.2	20.9	22.4	21.2	22.1
As share of employees	6.1	6.8	7.3	7.3	7.9	8.6	9.5	10.1	9.8

(1) Workers 15-65 year old
Sources: Authors' calculation on Labour Force Survey data

Figure 3

Share Of Low-Paid Workers In Italy, 1977-1998
(*Percentage Points*)



Sources: Brandolini et. Alt. 2001

Table 3
Log Hourly Wage And Hour Differentials In Year 2000[1]

	Log of hourly wage		Annual hours of work	
	Males	Females	Males	Females
Unadjusted				
Fixed term	-.324 (.026)	-.089 (.030)	-533.3 (25.96)	-588.77 (32.69)
Temporary	-.433 (.079)	-.365 (.092)	-258.6 (78.21)	-261.93 (100.50)
Adjusted[2]				
Fixed term	-.117 (.023)	.019 (.028)	-391.3 (27.39)	-394.89 (29.71)
Temporary	-.211 (.068)	-.213 (.082)	14.60 (78)	-9.17(86.87)

1) References are wages and hours of Workers in Open End contracts, standard error in parenthesis._. 2) Controls include age, age square, a full set of dummies for education (8 categories), for marital status (4 categories), for geographical area (3 categories), dummy for part time

Sources: Authors' calculation on Bank of Italy Survey on Household Income and Wealth

Table 4
Transitions Among Labour Market Status In Italy. October 1999
(*Percentage Points*)

Initial labour market status ↓	Labour market status at October 1999					
	Same job	Different job				Total
		Self-employed	Open-end contract	Fixed- term contract	Unemployed and Inactive	
			After three year from the first job			
Self-employed	82.2	3.4	3.5	1.7	9.2	100
Employee with an open-end contract	81.3	1.3	8.8	1.8	6.8	100
Employee with a fixed-term contract	20.3	3.6	20.8	17.6	37.8	100
All	62.4	2.3	11.6	6.7	16.9	100
			After five year from the first job			
Self-employed	79.3	5.1	7.5	2.8	5.3	100
Employee with an Open-end contract	71.0	2.8	16.3	2.2	7.8	100
Employee with a fixed-term contract	9.9	6.1	36.4	17.2	30.4	100
All	54.6	4.2	20.5	6.7	13.9	100

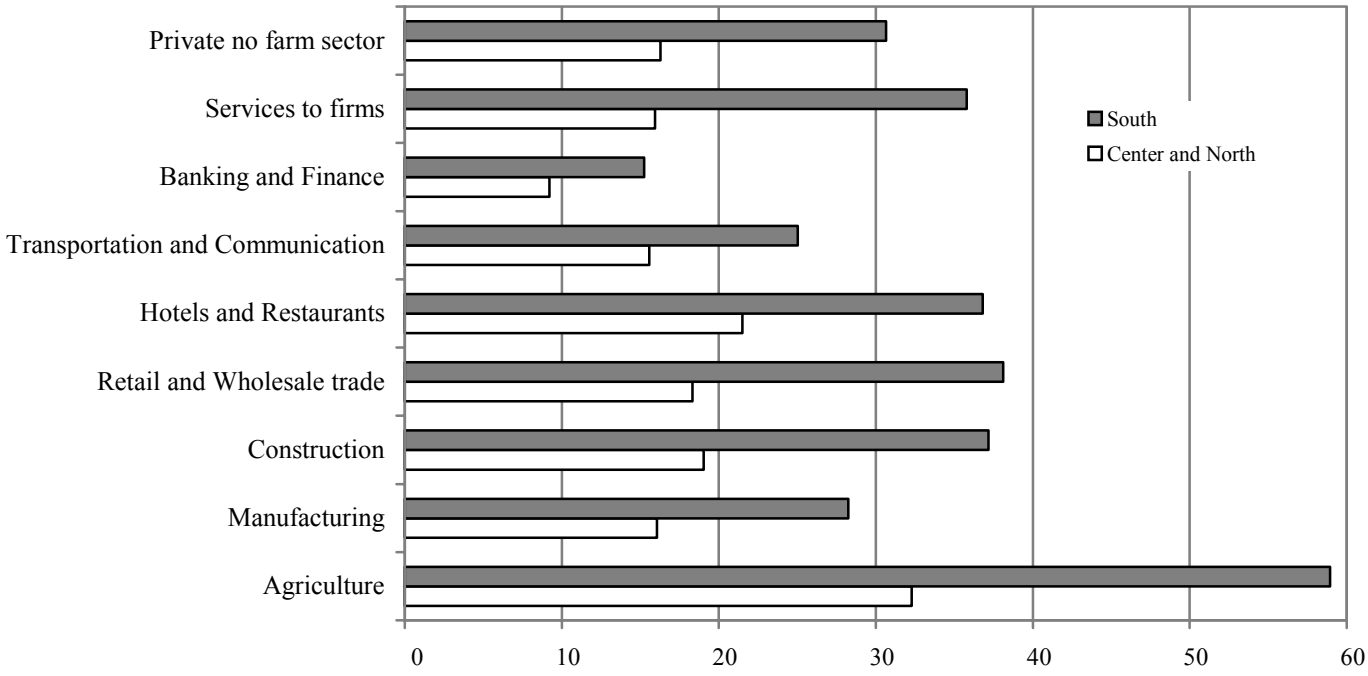
Source: Istat, annual report for 1999

Table 5
Transitions Out Of Fixed Term Contracts. October 1999
(*Percentage Points*)

Persons entered the labour market with fixed-term contract	Labour market status at October 1999					
	Same job	Different job				Total
		Self-employed	Open-end contract	Fixed- term contract	Unemployed and Inactive	
			After three year from the first job			
Male	19.2	3.3	23.2	14.6	39.7	100
Female	21.4	3.8	18.3	20.7	35.8	100
College graduate	43.2	3.8	23.0	17.2	12.9	100
High school graduate	14.9	5.2	23.3	18.0	38.9	100
8th grade graduate	18.5	0.7	15.4	16.9	48.5	100
All	20.3	3.6	20.8	17.6	37.8	100
			After five year from the first job			
Male	8.0	6.2	38.3	19.6	27.9	100
Female	12.1	6.1	34.1	14.2	33.5	100
College graduate	17.1	12.5	38.1	19.6	12.7	100
High school graduate	8.0	5.1	40.4	17.9	28.5	100
8th grade graduate	10.7	5.8	28.6	15.0	40.0	100
All	9.9	6.1	36.4	17.2	30.4	100

Source: Istat, annual report for 1999

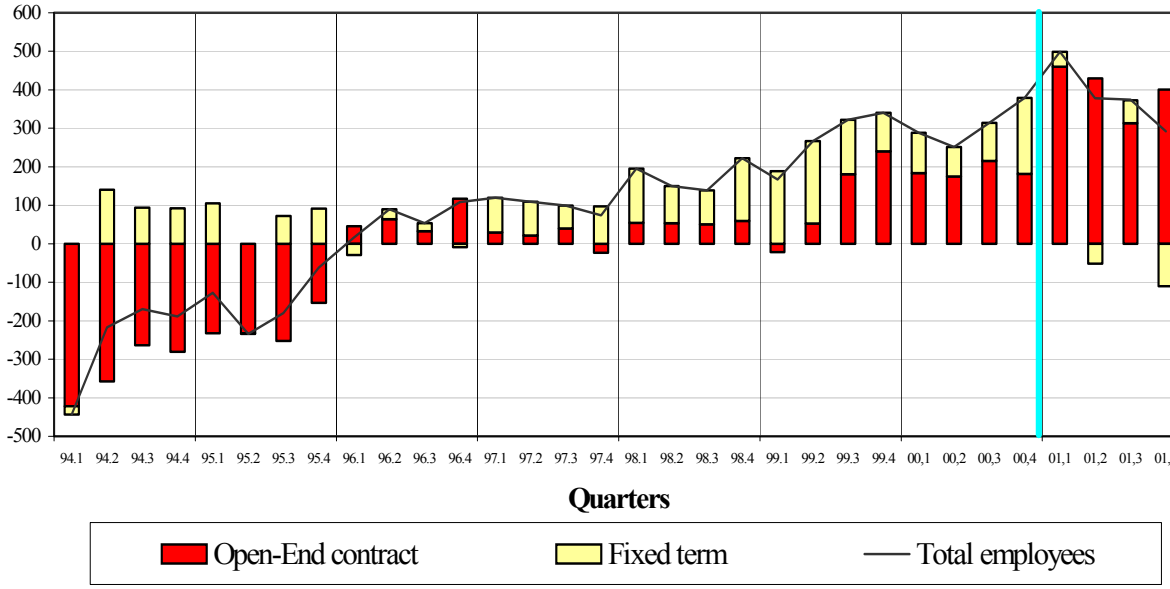
Figure 4
Reduction In The Labor Cost Due To The Tax Credit By Area And Sector
(*Percentage Points*)



Sources: Brandolini Cipollone 2000

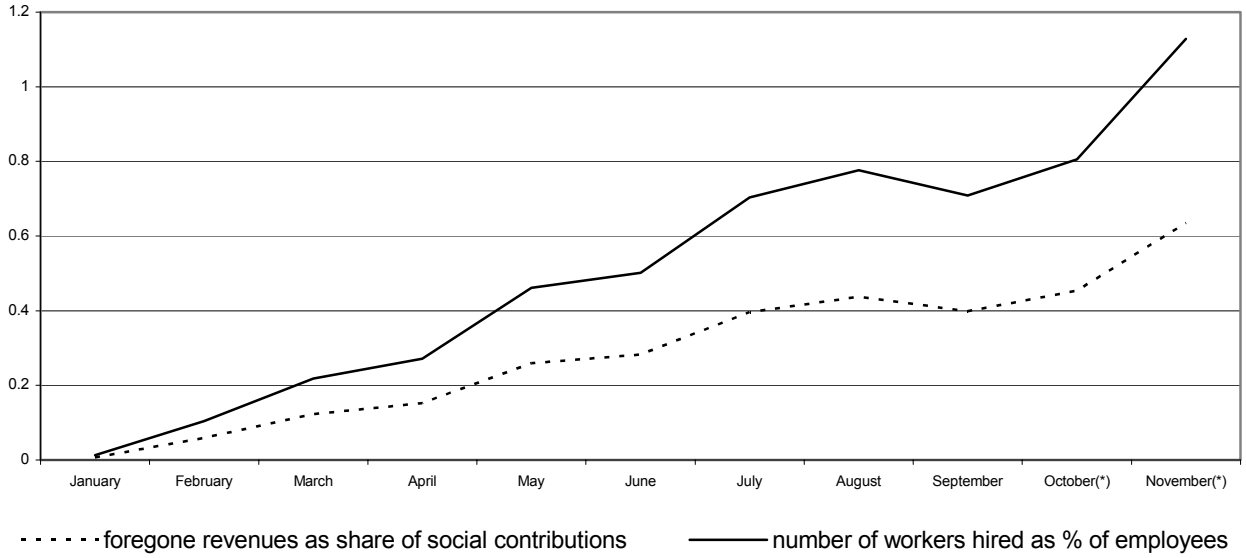
Figure 5

Emplyoment by type of labour contract
(Changes, in 000, on the correspondent quarter)



Sources: Authors' calculation on Labour Force Survey data

Figure 6
Usage Of Tax Credit: Evidence From Fiscal Data For Year 2001
(*Revenues Figures Are Flows, Workers Figures Are Stocks*)



Sources: Authors' calculations on Ministry of Labor (2002) and Istat

Table 6
Basic Characteristics Of The Sample
(*Percentage Points*)

	1993	1994	1995	1996	1997	1998	1999	2000	2001
By gender									
Males	59.5	59.0	58.8	58.7	58.6	57.3	56.6	54.0	53.0
Females	40.5	41.0	41.2	41.3	41.4	42.7	43.4	46.0	47.0
Age									
15-19	11.9	11.4	10.4	9.0	8.1	7.7	7.3	7.3	6.2
20-24	28.1	27.3	26.7	26.4	26.1	26.5	24.6	23.4	21.5
25-29	19.4	20.2	19.8	22.6	22.3	22.7	23.1	22.5	24.4
30-34	14.3	14.4	16.4	15.8	16.2	16.9	17.1	16.6	16.8
35-39	9.6	10.4	9.7	9.7	10.5	10.2	10.3	12.2	12.3
40-44	6.2	6.5	7.1	7.2	5.9	6.7	7.9	7.7	8.5
45 and over	10.6	9.8	10.0	9.3	10.8	9.3	9.8	10.3	10.5
School level									
Middle school or less	57.2	55.5	54.9	51.6	50.0	46.9	45.8	43.1	43.2
High School	34.9	36.3	37.9	39.9	40.3	42.2	42.5	45.5	43.6
College	7.9	8.2	7.2	8.4	9.7	10.9	11.7	11.5	13.2
Sector									
Manufacturing	30.0	33.3	34.9	31.9	32.2	31.7	29.0	28.8	26.9
Construction	16.3	14.1	14.0	14.3	14.2	12.4	12.1	10.7	10.7
Services	53.7	52.6	51.1	53.8	53.6	55.9	58.9	60.5	62.5
Type of Contract									
Open End contracts	71.4	68.5	69.7	67.1	66.4	62.5	63.3	62.5	64.5
Fixed term contracts	28.6	31.5	30.3	32.9	33.6	37.5	36.7	37.5	35.5
Work and Training	8.2	8.0	9.0	9.9	10.1	14.5	14.1	14.3	10.8
No better opportunities	14.0	15.5	13.4	14.6	15.0	14.9	13.2	14.4	14.9
Don't want a O. E.C.	1.2	1.1	1.2	1.0	1.3	1.3	1.2	1.6	1.4
Other reasons	5.2	6.9	6.7	7.3	7.1	6.8	8.2	7.2	8.3
Number of workers	1,033,806	1,180,133	1,363,629	1,305,653	1,319,812	1,482,466	1,516,225	1,619,386	1,560,900
Number of Observations	3,593	4,072	4,779	4,519	4,533	5,084	5,167	5,474	5,146

Sources: Authors' calculation on Labour Force Survey data

Figure 7
Share Of Open End Contracts On Total New Contracts

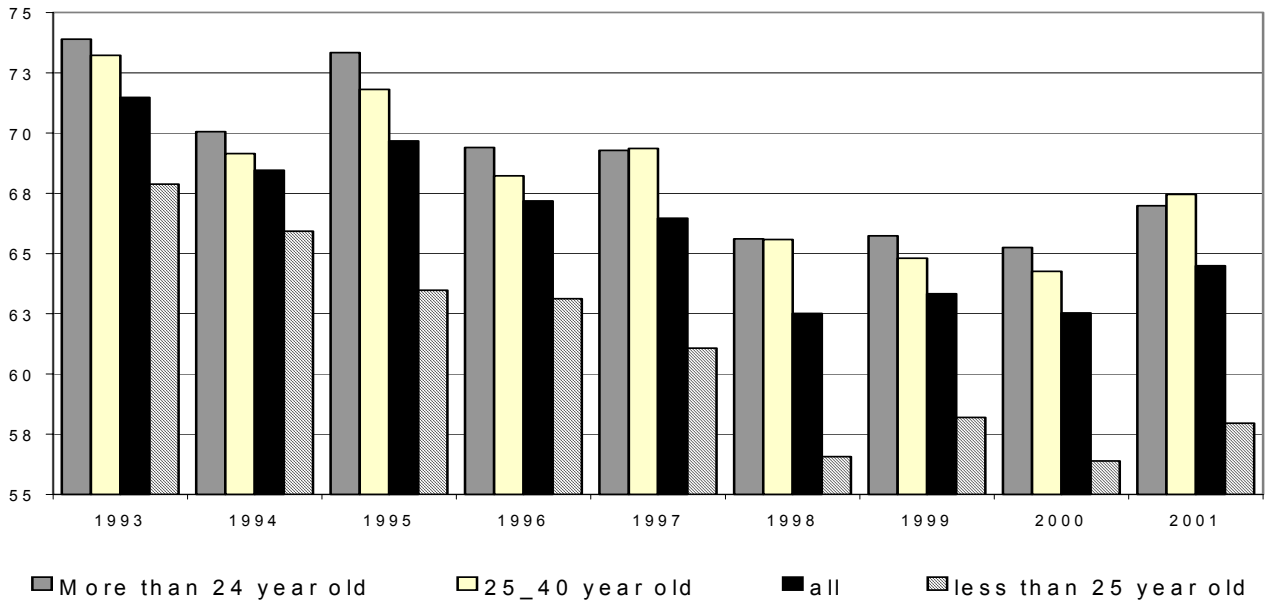


Figure 8
Years Of Schooling Of The New Hires With Open End Contracts Relative To New Hires With Fixed Term Contracts

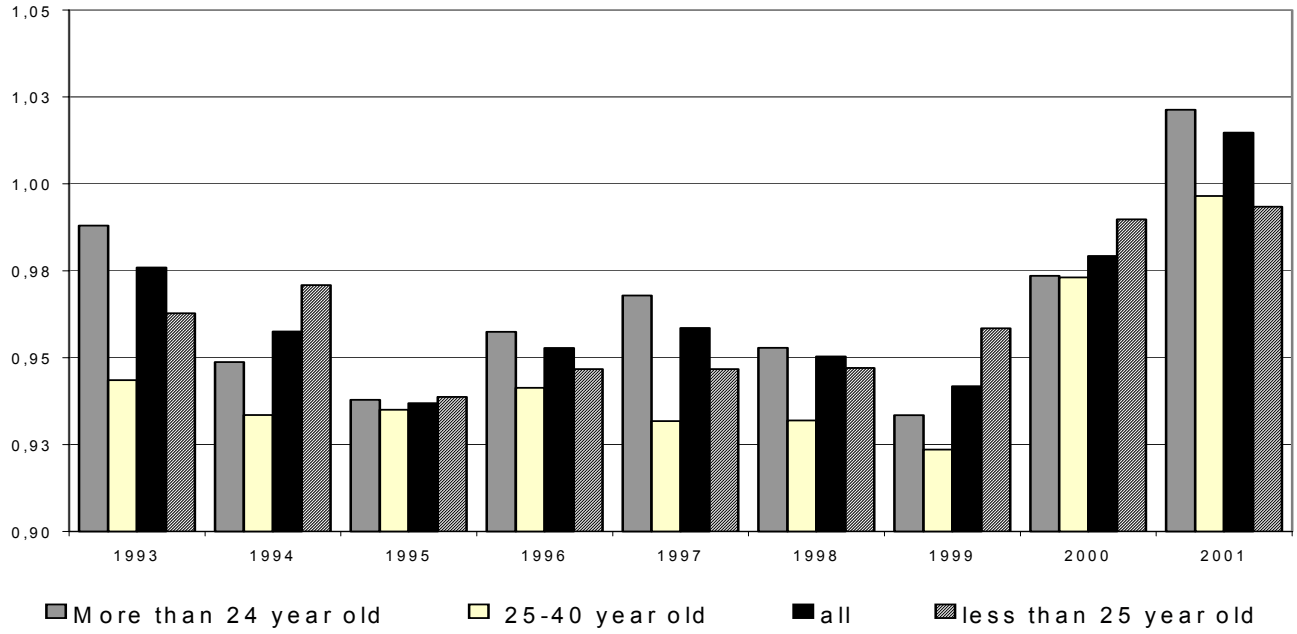
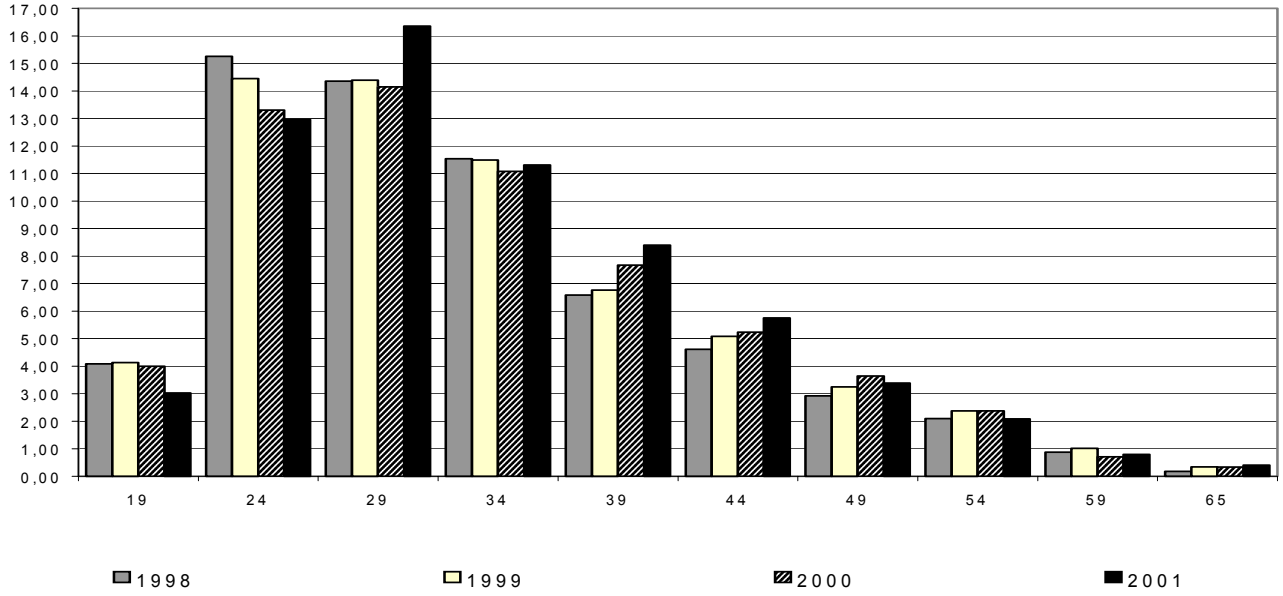
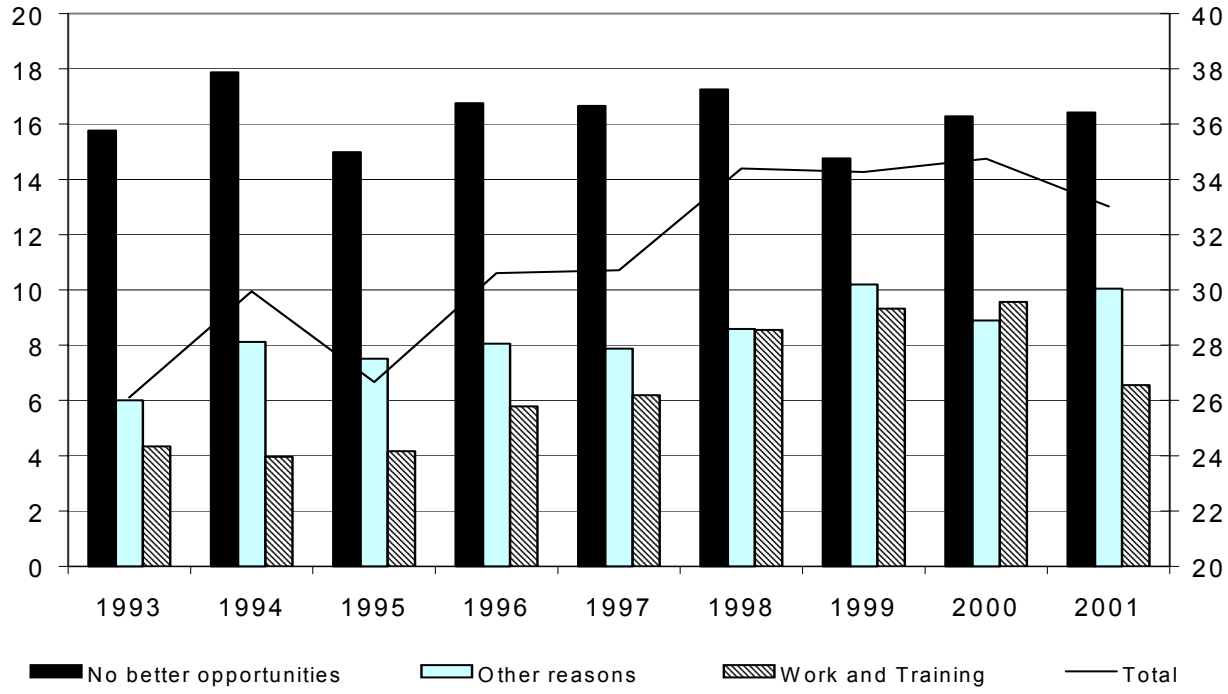


Figure 9
Age Distribution Of Share Of Open End Contract On Total New Hires



Sources: Authors' calculation on Labour Force Survey data

Figure 10
Share Of The Fixed Term Contracts On Total New Hires (1)



(1) Workers 25 year and older

Sources: Authors' calculation on Labour Force Survey data

Table 7
Identification Strategies

	Model	**Treated**	**Sample**	**Control**
Within age group identification	W1	Aged 25 or more in 2001	Aged 25 or more in 1993-2001	Aged 25 and older in 2000-1993
	W2	Aged 25-35 in 2001	Aged 25-35 in 1993-2001	Aged 25-35 in 2000-1993
Across+within age group identification	AW1	Aged 25 or more in 2001	Aged 15 or more in 1993-2001	Aged 15-24 in 2001-1993 + 25 and older in 2000-1993
	AW2	Aged 25-35 in 2001	Aged 15 or more in 1993-2001	Aged 15-24 and 36 or more in 2001-1993+25 and older in 2000-1993
	AW3	Aged 25-35 in 2001	Aged 25 or more in 1993-2001	Aged 36 or more in 1993-2001 + 25 and older in 2000-1993

Table 8
Probability Of Being Hired With An Open End Contract Conditioning On Being Hired In The Previous 12 Months[1]

	Model W1		Model W2		Model AW1		Model AW2		Model AW3	
	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat
treated	.016	1.37	.021	1.27	.007	0.45	.033	2.10	.042	2.36
treated*educ^2	.010	4.28	.011	3.57	.011	4.76	.012	3.79	.010	3.16
Age	.016	0.88	.331	.72	.045	6.44	.043	6.01	.013	.74
Age2	-.003	-0.68	-.001	-.68	-.001	-4.97	-.001	-4.59	.000	-.50
Age3	.000	0.53	.000	.64	.000	4.04	.000	3.74	.000	.35
Educ	-.001	-0.15	-.005	-.40	-.018	-3.57	-.019	-3.82	-.003	-.51
Educ2	-.001	-6.08	-.001	-5.70	-.001	-5.42	-.001	-5.55	-.001	-6.06
Age*educ^2	.001	5.06	.001	2.60	.001	9.99	.001	10.75	.001	5.68
Female	-.133	-20.6	-.110	-13.25	-.096	-18.15	-.096	-18.15	-.133	-20.6
1993	.077	5.80	.057	3.20	.087	7.97	.087	8.00	.078	5.85
1994	.040	3.12	.033	1.97	.055	5.25	.056	5.26	.041	3.15
1995	.069	5.76	.063	3.93	.063	6.23	.063	6.24	.070	5.79
1996	.032	2.61	.027	1.65	.041	4.00	.041	4.02	.032	2.63
1996	.032	2.67	.030	1.82	.034	3.33	.034	3.34	.033	2.69
1998	.003	0.28	.010	.62	.002	.28	.003	.30	.036	.31
1999	.004	0.39	-.001	-.09	.007	.75	.008	.76	.005	.40
2000	Reference		Reference		Reference		Reference		Reference	
2001	--		--		.012	.77	-.000	-.03	-.014	-.87
Number of observations	27847		16490		42367		42367		27847	

1. Probit model. ME stands for marginal effect. Data are from the October survey of each year, includes regional and marital status dummies._. 2. Scaled by the mean.

Table 9
Probability Of Being Hired With An Open End Contract Conditioning On Being Hired In The Previous 12 Months; Non Parametric Specification [1]

	Model W1		Model W2		Model AW1		Model AW2		Model AW3	
	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat	M.E.	t-stat
Treated	-.009	-.57	-.008	-.034	-.024	-1.20	-.006	-0.27	.007	0.29
Treated*high school	.029	1.49	.045	1.71	.031	1.55	.046	1.72	.043	1.69
Treated*college	.105	4.43	.107	3.62	0.11	4.51	.109	3.60	.104	3.58
High school	-.251	-.73	.035	.96	.214	0.96	.214	0.96	-.251	.345
College	-.486	-1.57	-.069	-1.44	-.457	-1.49	-.396	-1.35	-.416	-1.43
Female	-.133	-20.45	-.109	-13.11	-.096	-18.06	-.096	-18.08	-.133	-20.47
1993	.075	5.58	.056	3.14	.085	7.82	.085	7.82	.075	5.60
1994	.039	3.06	.034	1.96	.055	5.23	.055	5.23	.039	3.08
1995	.069	5.70	.063	3.90	.063	6.20	.062	6.20	.069	5.72
1996	.032	2.64	.027	1.65	.042	4.10	.042	4.11	.033	2.67
1996	.034	2.76	.030	1.87	.035	3.44	.035	3.44	.034	2.78
1998	.003	.29	.011	.68	.003	0.29	.003	.29	.004	.31
1999	.005	.46	-.001	-.04	.007	0.77	.007	.77	.006	.47
2000	Reference		Reference		Reference		Reference		Reference	
2001	--		--		.015	0.94	.004	.33	-.009	-.56
Number of observations	27817		16490		42335		42335		27817	

1. Probit model. ME stands for marginal effect. Data are from the October survey of each year, includes age dummy fully interacted with school dummies: includes also regional and marital status dummies

Table 10

Probability Of Being Hired With An Open End Contract Conditioning On Being Hired In The Previous 12 Months. Specification With Treated Group For Each Year [1]

		W1		W2		aw1		aw2		aw3	
		M.E.	T stat	M.E.	T stat	M.E.	T stat	M.E.	T stat	M.E.	T stat
Average effect											
	2001	0.018	1.5	0.029	1.74	0.016	0.84	0.039	2.49	0.057	2.82
	2000	Reference		Reference		0.018	1.02	0.020	1.26	0.027	1.3
	1999	0.007	0.6	0.011	0.67	0.013	0.74	0.018	1.15	0.024	1.12
	1998	0.005	0.4	0.018	1.11	0.024	1.34	0.039	2.48	0.050	2.39
	1997	0.034	2.79	0.038	2.23	0.021	1.13	0.021	1.26	0.022	1.01
	1996	0.034	2.72	0.036	2.15	0.002	0.11	0.007	0.4	0.019	0.83
	1995	0.070	5.75	0.073	4.44	0.046	2.5	0.033	1.97	0.015	0.64
	1994	0.041	3.16	0.041	2.36	-0.013	-0.68	-0.006	-0.33	0.014	0.59
	1993	0.081	6.01	0.064	3.53	0.009	0.41	-0.021	-1.04	-0.028	-1.05
Interaction with school (2)											
	2001	0.006	2.18	0.005	1.26	0.017	5.05	0.013	3.94	0.005	1.16
	2000	0.002	0.31	0.001	0.05	0.010	2.95	0.008	2.23	0.000	-0.11
	1999	-0.006	-2.03	-0.009	-2.15	0.004	1.09	-0.002	-0.54	-0.009	-2.29
	1998	-0.003	-1.08	-0.006	-1.45	0.007	2.02	0.002	0.5	-0.006	-1.52
	1997	-0.001	-0.35	-0.006	-1.27	0.009	2.45	0.002	0.5	-0.006	-1.37
	1996	-0.003	-0.93	-0.008	-1.69	0.007	1.93	0.000	-0.02	-0.008	-1.84
	1995	-0.007	-2.03	-0.010	-2.23	0.003	0.9	-0.002	-0.61	-0.010	-2.3
	1994	-0.005	-1.65	-0.005	-1.13	0.005	1.29	0.003	0.65	-0.006	-1.28
	1993	0.000	0.1	-0.004	-0.89	0.010	2.71	0.003	0.82	-0.005	-0.95
Year effect											
	2001					0.020	1.11	0.009	0.68	-0.003	-0.16
	2000					Reference		Reference		Reference	
	1999					0.013	0.73	0.013	1.05	0.014	0.76
	1998					0.001	0.04	-0.001	-0.1	-0.007	-0.4
	1997					0.034	1.92	0.037	2.86	0.040	2.13
	1996					0.052	2.99	0.050	3.83	0.043	2.23
	1995					0.047	2.74	0.063	4.9	0.082	4.43
	1994					0.074	4.22	0.068	5.11	0.052	2.66
	1993					0.094	5.3	0.103	7.62	0.110	5.49

1. Model specified in table 8. Probit model. ME stands for marginal effect. Data are from the October survey of each year; In addition to the reported variable models includes cubic in age, quadratic in year of schooling, interaction between age and year of schooling, female dummy and regional and marital status dummies._. 2. Scaled by the mean.

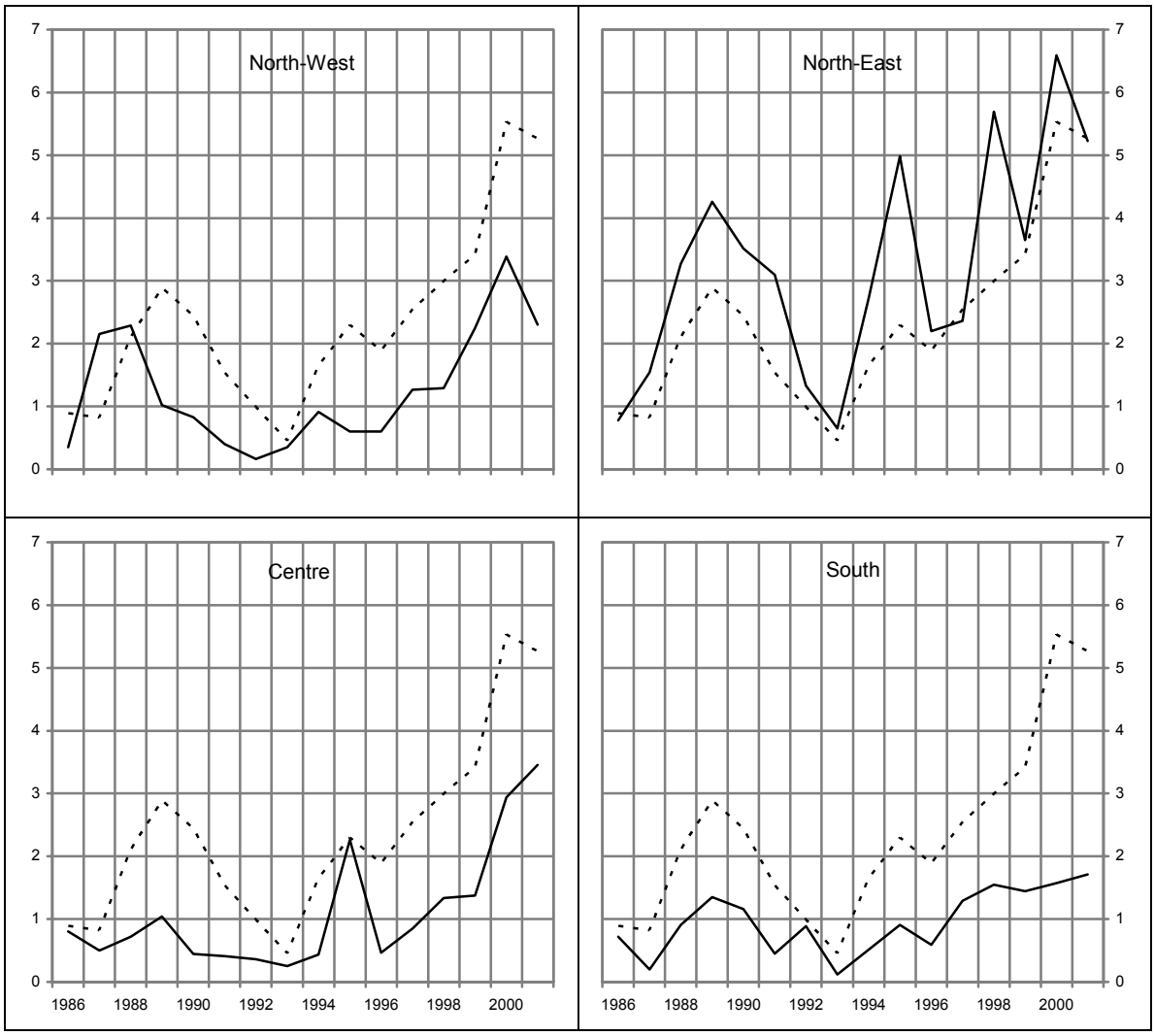
Table 11
Probability Of Being Hired With An Open End Contract Conditioning On Being Hired In The Previous 12 Months. Specification With Treated Group For Each Year[1]; Explaining Year 2000 Effects

		Model AW1					
		Basic		Basic and controls for northern regions		Basic and controls labor shortage	
		M.E.	T stat	M.E.	T stat	M.E.	T stat
Average effect	2001	0.016	0.84	0.017	0.9	0.017	0.91
	2000	0.018	1.02	0.018	1.02	0.021	1.17
	1999	0.013	0.74	0.015	0.84	0.015	0.86
	1998	0.024	1.34	0.025	1.43	0.023	1.32
	1997	0.021	1.13	0.023	1.24	0.020	1.09
	1996	0.002	0.11	0.002	0.11	0.002	0.09
	1995	0.046	2.5	0.050	2.74	0.046	2.54
	1994	-0.013	-0.68	-0.013	-0.67	-0.013	-0.67
	1993	0.009	0.41	0.011	0.52	0.011	0.54
Interaction with school(2)	2001	0.017	5.05	0.020	4.95	0.012	3.31
	2000	0.010	2.95	0.010	2.62	0.002	0.46
	1999	0.004	1.09	0.010	2.4	-0.004	-0.87
	1998	0.007	2.02	0.011	2.86	0.007	2.06
	1997	0.009	2.45	0.015	3.51	0.012	3.14
	1996	0.007	1.93	0.008	1.83	0.014	3.29
	1995	0.003	0.9	0.014	3.15	0.008	2.01
	1994	0.005	1.29	0.007	1.51	0.006	1.7
	1993	0.010	2.71	0.018	4.14	0.018	3.94
Labor shortage indicator* schooling(2)						0.004	3.1
Interaction with school (2) in the northern regions	2001			-0.005	-1.21		
	2000			-0.001	-0.16		
	1999			-0.011	-2.53		
	1998			-0.009	-2.02		
	1997			-0.012	-2.46		
	1996			-0.002	-0.34		
	1995			-0.019	-3.82		
	1994			-0.003	-0.62		
	1993			-0.017	-2.95		
Year effects	2001	0.020	1.11	0.020	1.11	0.021	1.18
	2000						
	1999	0.013	0.73	0.013	0.74	0.013	0.76
	1998	0.001	0.04	0.001	0.04	0.004	0.22
	1997	0.034	1.92	0.034	1.92	0.037	2.11
	1996	0.052	2.99	0.052	2.99	0.055	3.16
	1995	0.047	2.74	0.047	2.75	0.049	2.85
	1994	0.074	4.22	0.074	4.22	0.076	4.36
	1993	0.094	5.3	0.094	5.3	0.094	5.29

1. Model AW1 of table 10. Probit model. ME stands for marginal effect. Data are from the October survey of each year; In addition to the reported variable models includes cubic in age, quadratic in year of schooling, interaction between age and year of schooling, female dummy and regional and marital status dummies._. 2. Scaled by the mean.

Figure 11

Share Of Manufacturing Firms With Difficulties In Recruiting Labor Force



----- Italy —Specified geographical area

Source: Isae

Figure 12

Estimated Change In Probability Of Being Hired With An Open End Contract For The Treated Group (Reference: Year 2000).