Two Tier Reforms of Employment Protection: a Honeymoon Effect?

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Abstract

Contrary to predictions of most economic theory, labor market reforms increasing flexibility "at the margin" have been recently paying out in terms of employment growth. This paper argues that these two-tier labor market reforms have a transitional "honeymoon", job creating effect, which has been so far largely ignored by the literature. By definition, the honeymoon cannot go on for ever and there are already indications that the job generation potential of these asymmetric reforms is fading away. The paper studies the transitional effects of two tier reforms in a standard dynamic model of labor demand under uncertainty. The model developed in this paper predicts that in the aftermath of reforms, beyond an increase in employment there should be a reduction in both the mean and the variance of labor productivity. Based on firm-level data on Italy in the period 1995-2000, we find evidence that firms with temporary workers experienced lower growth in productivity.

- Key Words: Labor Demand, Firing Costs, Employment Protection Reform.
- JEL classification: J30

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1 Introduction

Over the last few years several European countries, and notably most Mediterranean countries (the so called Olive belt countries) experienced protracted employment growth despite moderate output growth. This performance stands in sharp contrast with the "jobless growth" of the eighties and mid nineties. While the charateristic of employment growth have been investigated in the literature, the current growthless job creation is a largely unrecorded. In particular, Garibaldi and Mauro (2002) found that the employment intensity of growth in Europe increased from the second half of the nineties, but to date no satisfactory explanation has been offered for this marked change.

In this paper we provide an explanation for growthless job creation, which is based on the asymmetric labor market reforms in the area of Employment Protection Legislation (EPL) carried out in several European countries in the 1990s. Such reforms gave rise to two-tier systems, as the increase labor market flexibility of several European countries, over and beyond Mediterranean countries, took place mainly through a series of *marginal* reforms that liberalised the use of fixed-term contracts leaving largely untouched the legislation applying to the stock of workers employed under open-ended contracts. After the reforms, the use of fixed term contracts for new hires, which had been largely restricted up to the early eighties in Spain and the early nineties elsewhere, become more and more flexible over time.

While the effects of EPL on labor demand have been thoroughly investigated, the literature has devoted much less attention to the analysis of the effects of such two-tier reform strategies. The traditional analysis goes back to the framework of labor demand under uncertainty pioneered by Nickell (1986) and extensively analysed by Bentolila Bertola (1990) and Bertola (1990). In general, one should not expect any sizeable permanent employment effect associated to EPL reforms. The reduction in EPL is bound to increase employment volatility over the business cycle, but should not have any obvious effect on average labor demand. This is because EPL affects both the creation and the destruction margins, incentives to hire and to dismiss workers, and there is no reason to believe a-priori that one effect could dominate the other. The political economics of marginal reforms has been extensively analysed by Saint-Paul (1997, 2000) who showed that marginal labor market reforms offer a viable mechanism to win the political opposition of insider workers. More recently, Blanchard and Landier (2002) argued that the macroeconomic effects of marginal flexibility may be perverse, since their key effect would work through high turnover in fixed-duration jobs, leading in turn to higher, not lower, unemployment. Similar results were obtained by Cahuc and Postel-Vinay (2002). While these studies focus mainly on the steady state effects of the reforms, little research has been carried out on the transitional dynamics of EPL reform, and no research at all on the productivity effects of reforms.

This paper looks empirically and theoretically into the temporary effects of marginal EPL reform. Theoretically, it focuses on a standard labor demand problem under uncertainty and argues that a move from a

fully rigid to a two-tier regime should indeed be associated with a temporary increase in employment, and a fall in average productivity. Empirically, it uses macro data to analyse the employment and output dynamics in several countries that experienced marginal EPL reforms, and micro data on a panel of Italian firms to look closely at the employment and output dynamics of the reform.

The results are as follows. Theoretically, the paper goes back to a pure labor demand framework, and solves a dynamic and stochastic labor demand problem with decreasing return to scale, natural turnover and large firing costs. In such a setting, employment dynamics is described by instantaneous hiring in favorable business conditions followed by optimal inertia through natural turnover in adverse business conditions. When temporary contracts are suddenly introduced, the firm exploits any hiring flexibility in good business conditions, but it does not exploit dowwnard flexibility in bad times, since it is constrained by the stock of insider workers. As a result, the lower the employment attrition, the larger is the employment increase during the transition. A honeymoon effect in employment emerges. Eventually, the employment gains are dissipated by the decline of insider workers. The model predicts also a fall in average productivity in the aftermath of the reform, as a consequence of decreasing marginal return. As the firm expands in good periods, its employment pool expands along a downward sloping labor demand, with additional workers that are less productive at the margin. In such a setting, average productivity should naturally fall eventually, as the firm gains also downward flexibility, inducing a fall in average productivity.

Empirically, we first provide the key macro facts of employment behaviour in countries that experience marginal reform. We find that countries having introduced flexibility of the margin experienced an increase in the employment content of growth. We also find that temporary contracts (including fixed-term contracts) accounted for a large component of the jobs created after the reforms. In the second part of the paper, we use firm-level data to assess some of the key empirical implications of our analysis. In particular we find that in the aftermath of the reforms at the firm level employment dynamics increased while average productivity declined. The behavious of the standard deviation of productivity is also consistent with the theoretical predictions. Finally, we also test the impact of temporary contracts on the productivity differences, and find a negative and significant effects, even when controlling for workforce education and sectoral dummies.

The paper proceeds as follows. Section 2 presents the basic stylized facts of employment and output dynamics in countries that experienced marginal labor market reform. Section 3 presents the main theoretical intuition in a toy model of labor demand without attrition, while Section 4 presents the more general dynamic model and performs a set of simulations. Section 5 uses micro data on a panel of Italian firms to look at some empirical implications of the model.

2 Employment Gains and Marginal Reforms: The Basic Facts

Economic theory on the effects of Employment Protection Legislation yields predictions as to labor market adjustment in environments having a varying strictness of EPL involving *all* workers. However, many EPL reforms are asymmetric in that they change regulations only for a subset of the eligible population. As discussed extensively by Saint-Paul (1997), this unbundling of reforms is a viable strategy when there are strong political obstacles to reforms.

This asymmetric institutional transformation is well characterised by Figures 1 and 2. The first analyses the evolution of an OECD indicator of the strictness of EPL (OECD, 2004) for regular workers since the late 1980s and up to 2003. The second figure concerns the evolution of regulations on fixed-term contracts over the same time-period. As shown by the charts, a very few countries are located below the bisecting line through the origin in the first figure, suggesting that norms on regular workers were not changed, while quite many countries liberalised regulations on fixed-term contracts. A few of these countries, namely Belgium, Italy, The Netherlands, Sweden as well as Spain and Portugal up to the mid-1990s reduced their EPL following precisely this two-tier strategy, that is, kept EPL for regular workers unchanged and liberalised temporary contracts. Portugal and Spain more recently also reformed "regular contracts", and Spain tightened regulation on fixed-term contracts (contractos temporales) moving away from this dual regime approach.

There are a three stylized facts on the aftermath of these reforms.

1. Employment increased after the reforms.
2. The employment content of growth increased (involving a declining labor productivity growth).
3. The contribution to employment growth of temporary contracts (mainly, but only, fixed-term contracts) varied between 35% to more than one-hundred per cent (it occurred even in countries where regular contract declined).

Figure 4 characterises employment and output behavour after the reforms in the countries implementing this dual-track strategy. Reforms liberalising fixed-term contracts are denoted by vertical continuous lines[1], while reforms moving in the opposite direction are denoted by dotted lines. A number of regularities seem to emerge from this analysis. The first fact is that all of these countries experienced positive employment growth in the aftermath of reforms. The reforming Olive Belt countries (Italy, Spain and Portugal) in particular moved from negative to positive employment growth. More important still, employment growth generally outpaced output growth often inverting a trend of rising labor productivity. The increase in the employment content of growth is further documented by Table 18 in Annex 2, providing rolling apparent elasticities of employment to output. The experience of Spain, the country with the longest record in this

[1] The dates were located by using the frdb inventory of social policy reforms (see www.frdb.org for details).

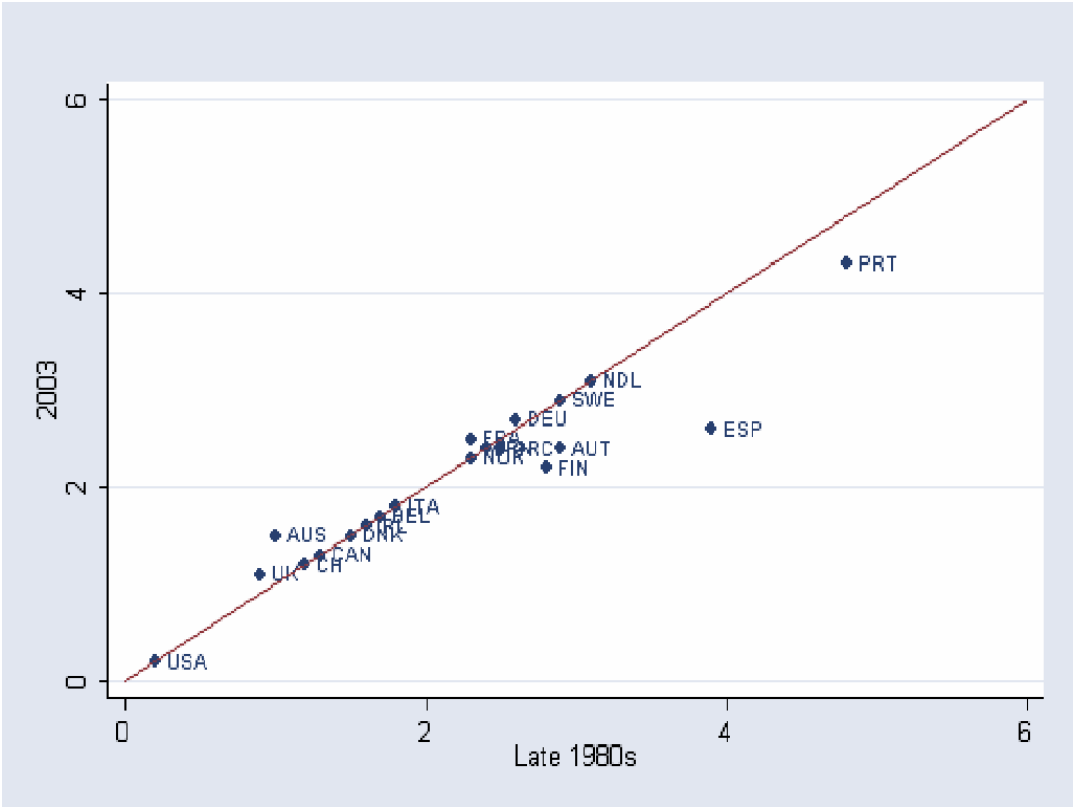


Figure 1: Index of regulation of regular employment

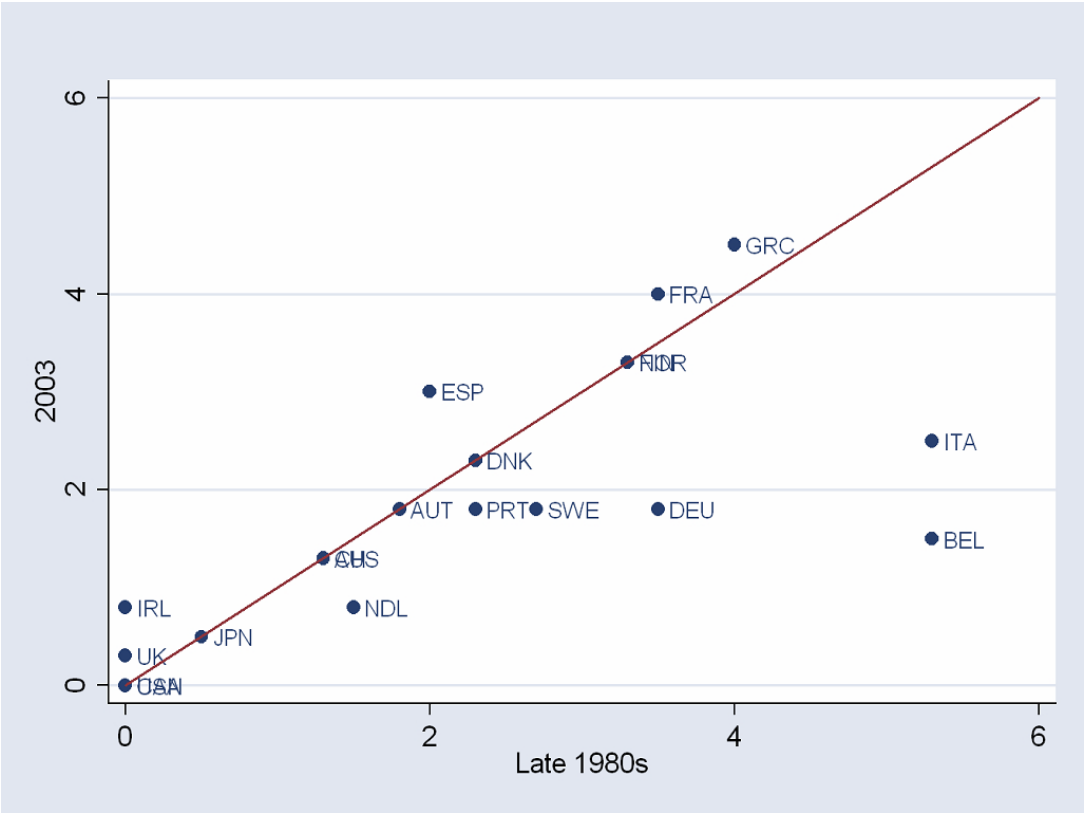
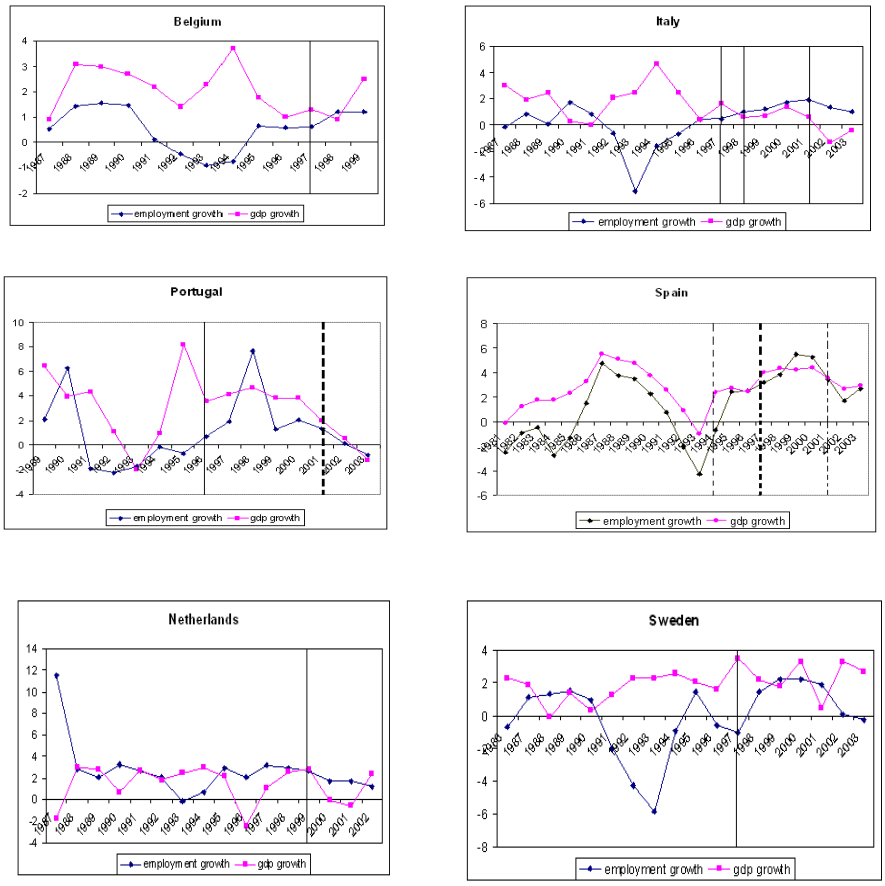


Figure 2: Index of regulation of fixed-term contracts

	Pre Reform		Post Reform	
	Period	Average Growth	Period	Average Growth
Belgium	92-96	0,91	97-04	0,98
Spain	81-85	..	85-04	3,07
Italy	92-96	-0,24	97-04	1,29
Netherlands	92-97	1,11	98-04	1,09
Portugal	92-95	-0,3	97-04	1,7
Sweden	95-96	-0,77	97-04	1,19

Source: European Commission and fRDB database

Figure 3: Employment Growth Before and After the Reform



Notes:
Vertical continuous lines: reforms liberalizing FTC
Vertical dotted lines: reforms not liberalizing FTC
Vertical bold lines: reforms reducing EPL for regular contracts

Figure 4: Evaluations of employment and output

two-tier reform strategy however suggests that the effect of reform of employment growth tend to fade away over time.

Table 2 points out another common denominator of these country experiences, namely the strong contribution offered by temporary contracts (including fixed-term contracts, according to the definition provided by Eurostat) to job creation after the reforms: in Spain the increase of the stock of "temporary workers" was almost 2,5 times larger than the increase in the overall stock of jobs, pointing to strong substitution of permanent with fixed-term contracts. In the other countries liberalising less than Spain the use of these contractual types, the contribution of temporary contracts to job creation is of the order of 35 to 60 per cent. Notice further that The Netherlands is the only country where employment growth did not accelerate after

the reforms (the growth rates reported in parentheses). This is because this country had already embarked on a large scale substitution of full-time with part-time jobs in the decade before the reforms of EPL. Notice that employment growth was not concentrated in low educated positions. With the exception of Portugal, Eurostat (2005) records a decline in the total number of employed persons with primary or lower educational attainments. This is relevant in discussing the labor productivity developments in the various countries.

Contribution to Employment Growth of Temporary		
	Pre Reform	Post Reform
BELGIUM	pre (1987-1996)	post (1997-2004)
$\Delta E^{(1)}$	318000 (0.92)	301000 (0.98)
ΔE Temp	27000 (1.72)	108000 (0.37)
ΔE Temp/ ΔE (%)	8.49	35.88
SPAIN	pre (1981-1986)	post (1987-1995)
ΔE	-586000 (-0.70)	852000 (0.68)
ΔE Temp	1226000 -	2033000 (15.69)
ΔE Temp/ ΔE (%)	-	238.62
ITALY	pre (1987-1996)	post (1997-2004)
ΔE	-563000 (-0.25)	2107500 (1.30)
ΔE Temp	387000 (5.31)	728420 (7.71)
ΔE Temp/ ΔE (%)	-	34.56
NETHERLANDS	pre (1987-1998)	post (1999-2004)
ΔE	1557000 (2.22)	500750 (1.1)
ΔE Temp	352000 (6.62)	241000 (4.99)
ΔE Temp/ ΔE (%)	-	48.13
PORTUGAL	pre (1987-1995)	post (1996-2004)
ΔE	-124000 (-0.39)	683080 (1.71)
ΔE Temp	-272000 (-6.62)	403830 (12.94)
ΔE Temp/ ΔE (%)	-	59.12
SWEDEN	pre (1987-1996)	post (1997-2004)
ΔE	-63000 (0.78)	373000 (1.19)

Source: Eurostat

Employees with temporary contracts are those declare themselves as having a fixed term employment contract or a job which will terminate if certain objective criteria are met such as completion of an assignment or return of the employee who was temporarily replaced.

(1) Avarage yearly rate in parentheses

3 Marginal Reforms in a Toy Model of Labor Demand

3.1 Permanent Contracts with Fixed Wages

We first work with a very simple model without attrition and discounting, in the spirit of Schivardi (2000) and Garibaldi (2006). The model is studied in Garibaldi (2006). The toy model, albeit too simplistic, allows us to derive the intuition to our main results, that will be more formally derived in the the dynamic model presented in the next section.

- Labor is the only factor of production. There are decreasing returns to scale and the production function is

$$y = A^i \log l,$$

  where l is labor, y output and A_i is the productivity level;

- There are business fluctuations in the productivity at the firm; A^i assumes only two values $A^h > A^l$. Shocks to the productivity are *i.i.d.* In every period there is a probability p that productivity be equal to A^h and a probability $1-p$ that productivity be equal to A^l; we refer to periods in which the productivity is A^h as good times, while periods in which the productivity is equal to A^l are bad times. Fluctuations in A_i are akin to fluctuations in the marginal product

- In the toy model there is neither discounting (at rate $r > 0$) nor natural turnover (at rate δ)

- The wage is fixed and equal to w and the price that the firm charges for simplicity is set equal to 1 and does not change between good and bad times.

- The key firm decision is the quantity of labor to be hired.

- We consider initially two different scenarios under which the firm operates. The flexible/temporary regime and the rigid regime

- In the *flexible regime*, hiring and firing can take place at no cost, and the firm can choose its employment level after observing the realization of the value of A. The firm in the flexible regime hire workers on a *temporary basis* and can freely dismiss workers at no costs.

- In the *rigid regime*, the firm can only choose the average employment, and the firm can offer only permanent contracts that can never be broken. Firing is unboundly expensive.

- In the next section we consider an additional regime, mainly the *buffer regime*, which involves the possibility that the firm combines temporary and permanent contracts.

Flexible Regime or First Best. Let's first consider first the behavior of the firm if there were no restrictions on the type of contracts and the firm could choose employment after observing the productivity level. Optimal employment in this case would be simply the textbook static problem of labor demand, with the wage rate equal to the marginal product so that

$$l = \begin{cases} \frac{A^l}{w} & \text{if } A = A^l \\ \frac{A^h}{w} & \text{if } A = A^h \end{cases}$$

The flexible firm chooses the level of employment after having observed the level of productivity. Since the wage is fixed and equal to w, the flexible firm will fire (hire) $\Delta l = \frac{A^h - A^l}{w}$ when the economy moves from high (low) productivity to low (high) productivity. Because the economy experiences, on average, a fraction p of high productivity periods and a fraction $(1-p)$ of periods of low productivity, the average employment in the long run will be

$$\overline{l}^F = \frac{(1-p)A^l + pA^h}{w}$$

Rigid Regime. Let us now examine the behavior of the firm when it is forced to hire only permanent contracts that can never be broken. The rigid firm can only choose the employment that maximizes the expected value of the profits. This implies that the employer R will solve the following expected profit maximisation problem

$$\Pi^R = Max_L \left\{ [(1-p)A^l + pA^h] \log l - wl \right\}.$$

The first order conditions allow to derive the value of employment in the rigid country R. as

$$\overline{l}^R = \frac{(1-p)A_L + pA_H}{w}$$

The value $\overline{l}^R$ is some average between the level of employment in the flexible country during the expansions and its level during recessions. Moreover, $\overline{l}^R$ coincides with A^l/W if the economy is always in low productivity ($p = 0$). If layoffs are not allowed, the firm in the rigid regime does not experience any fluctuation as a result of variations in the productivity level.

We are now in the position to derive three important empirical implications on the effect of the employment protection regimes.

- **Implication 1**: the average employment of the rigid regime is the same as in the flexible regime
- **Implication 2**: the volatility of employment is higher in the flexible regime.
- **Implication 3:** the firm in the flexible regime is more efficient and makes more profits.

Implication 1 is immediately verified. We have seen that $\overline{L}^R = \overline{L}^F$, or that average employment in the flexible regime is the same as in the firm in the rigid environment. Implication 2 is also easy to show. By construction, in the R economy there are no employment variations, while the F economy fires (hires)

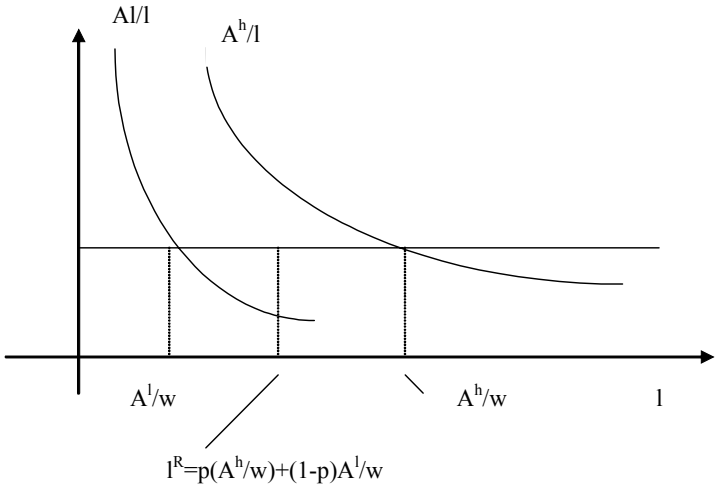


Figure 5: Employment in Flexible and Rigid Regime

$\Delta L = \frac{A^h - A^l}{W}$ labor when the economy moves from high (low) productivity to low (high) productivity. Implication 3 is also easy to demonstrate. It is enough to realize that the employment level chosen by the F employer in each period is the only level that maximizes profits *in each period*. Consequently, in each period profits are higher in the flexible regime. With the same level of employment, the firm is able to make, on average, a higher level of profits. In other words, the firm in the flexible regime is more efficient.

3.2 Flexible Contracts with a Stock of Insiders

Let us now consider a change in regime. Starting from the rigid setting, we let the firm enjoy a first degree of marginal flexibility. We assume that unexpectedly the firm can hire and fire workers on a temporary basis, but, at the same time, it cannot break the existing stock of permanent contracts. In reality, such contracts do expire thorugh natural turnover, but we first assume that this possibility is not available to the firm.

Formally, we have a stock of permanent workers equal to l^R that can never be broken and are a constraint to the firm. If the firm has suddenly the option to have temporary workers, the firm should exploit this possibility. The firm in good times should hire temporary workers up to the optimal employment level in good times, and dismiss such workers in bad times. Three key results emerge

- Average Employment Increases Permanently
- Average Productivity Falls Permanently
- Average Profits Increase Permanently

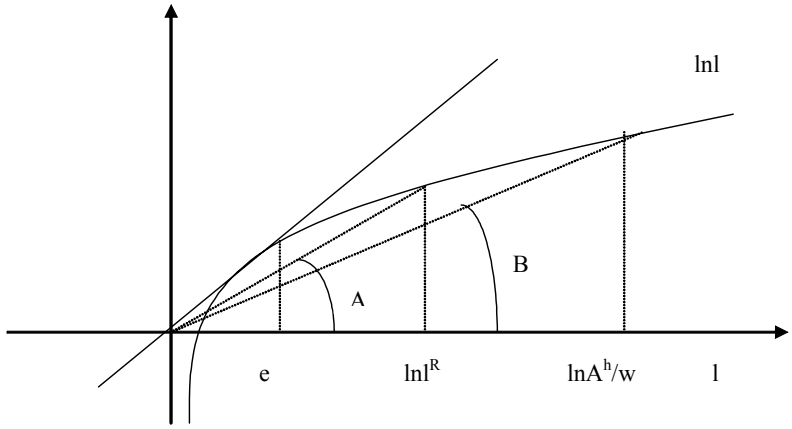


Figure 6: Average Productivity with a Two Tier Reform

The results are easy to establish. The stock of temporary contracts in good times is given by

$$l^{temp} = \frac{(1-p)(A^h - A^l)}{w}$$

so that average employment l^w is given by $l^w = l^r + pl^{temp} = \frac{A^h}{w}$

The results on average productivity

$$(\frac{y}{l})^R = \frac{pA^h \ln l^R + (1-p)A^l \ln l^R}{l^R}$$

while

$$(\frac{y}{l})^W = (1-p)\frac{A^l \ln l^R}{l^R} + p\frac{A^h \ln \frac{A^h}{w}}{\frac{A^h}{w}}$$

For $(\frac{y}{l})^R > (\frac{y}{l})^W$ it is necessary that

$$\frac{\ln L^R}{L^R} > \frac{\ln \frac{A^h}{w}}{\frac{A^h}{w}}$$

which is satisfied as long as $\frac{A^h}{w} > e$. The figure below provides a graphical representation of this result

The results on profits are also self-evident. Since the firm enjoys the maximum profits in good times and get in bad times the same profits as in the traditional regime.

4 The Honeymoon Effect in a Dynamic Model with Attrition

Now the sequence of events and the decision rules are as follows:

- At t the firm observes the productivity state A_t which is and iid shock taking two values $A_t = A^h$ and $A_t = A^l$;
- Conditional on observing A_t the firm then decides on hiring and firing;
- Firing is initially impossible, or it is so costly that it never happens in equilibrium;
- There is, however, employment attrition at rate δ, where δ is the spontaneous (and costless) attrition of additional employment through quits and retrirements;
- Firm employment decisions are governed by the expected present discounted profits of a an additional unit of labor. Formally, labor's marginal contribution to expected profits is given by

$$V(l_t, A_t) = E_t[\sum_{\tau=t}^{\infty}(\frac{1}{1+r})^{\tau-t}(\frac{1}{1+\delta})^{\tau-t}(\frac{A_t}{l_t} - w)]$$

In general, if F is the fixed cost of shedding labor, the employment dynamics is described by the following inequalities

$$-F \leq V(l_t, A_t) \leq H$$

with $V() = H$ when it is optimal to hire and $V = -F$ when it is optimal to fire. Conversely, when V lies inside the boundaries of F and H inaction is the optimal labor demand, and the firm let employment adjust through natural attrition. In our model there are no hiring costs so that $H = 0$, and F is arbitrarily large (so that it is never optimal to fire).

Under our very specific productivity shocks, with only two values of the productivity parameter A_t, the optimal policy is such that the firm hires in good times and let employment decline by natural turnover in bad times. The firm will have a target employment in good times, that we label L^u so that the employment dynamics reads

$$L_t = \begin{cases} l^u & \text{if } A = A^h \\ (1-\delta)L_{t-1} & \text{if } A = A^b \end{cases}$$

where downsizing with natural attrition takes place as long as $L_t > \frac{A^b}{w}$ where $\frac{A^b}{w}$ is optimal employment in bad times in the frictionless scenario. To find l^u one needs to take into account of all possible employment paths in the future, so that the marginal shadow value for a firm in good times reads

$$V(A^g, L^u) = \frac{A_g}{l^u} - w + \tag{1}$$
$$+ \left[\sum_{\tau=1}^{\infty} \frac{1}{(1+r)^{\tau}(1+\delta)^{\tau}} \left[p(\frac{A_g}{l^u} - w) + (1-p) \left(A_b \sum_{j=0}^{\tau-1} \frac{\binom{\tau-1}{j}(1-p)^j p^{(\tau-1)-j}}{Max[l^u(1-\delta)^{j+1}; \frac{A^g}{b}]} - w \right) \right] \right]$$

where the value functions should be interpreted as follows. The first term on the right-hand-side is simply the current marginal profits, while the square brackets refer to the future expected profits. In each period, there is a probability p that the firm jumps back to the employment level l^u and a probability $1-p$ that business conditions be unfavourable. In the latter case, the firm let employment decline at rate δ. Yet, the size of the marginal loss in that case depends on how long the firm has been experiencing an unfavorable business condition. The longer the spell, the longer the profit losses, and the Bernoulli distribution takes into account of all such possibilities. Finally, the max term in the denominator considers the possibility that the sequence of employment losses leads the firm to an employment level lower than the optimal employment in bad times.

Considering the probability of hitting the lower bar through attrition as infinitesimal, the previous expression reads

$$V(A^g, l^u) = \frac{A_g}{l^u} - w + \left[\sum_{\tau=1}^{\infty} \frac{1}{(1+r)^\tau (1+\delta)^\tau} \left[\frac{A_g}{l^u} + \frac{A^b}{l^u}\frac{(1-p)}{(1-\delta)}\left(\frac{(1-p)}{(1-\delta)} + p\right)^\tau - w\right]\right]$$

The value l^u is the solution to the equation

$$V(A^g, l^u) = 0$$

After few steps of algebra (see the appendix) and taking into account that

$$\begin{aligned}\sum_{\tau=0}^{\infty} \frac{1}{(1+r)^\tau (1+\delta)^\tau}\left(\frac{(1-p)}{(1-\delta)} + p\right)^\tau &= \frac{1}{1-\frac{1-p\delta}{(1+r)(1+\delta)(1-\delta)}} \\ \sum_{\tau=0}^{\infty} \frac{1}{(1+r)^\tau (1+\delta)^\tau} &= \frac{1}{1-\frac{1}{(1+r)(1+\delta)}}\end{aligned}$$

the optimal employment level in good times reads

$$l^u = \frac{A_g(1-p) - \frac{(1-p)A^b}{(1-\delta)} + \frac{pA_g(1+\delta)(1+r)}{\delta+r+r\delta} + \frac{(1-p)A^b(1+\delta)(1+r)}{(1+\delta)(1+r)(1-\delta)-(1-p\delta)}}{\frac{w(1+\delta)(1+r)}{\delta+r+r\delta}}$$

Three comparative static results follows

$$\begin{aligned}\frac{\partial l^u}{\partial w} &< 0 \\ \frac{\partial l^u}{\partial r} &> 0 \\ \frac{\partial l^u}{\partial \delta} &> 0\end{aligned}$$

The first result is obvious, and is consistent with any labor demand model (Hamermesh, 1996). The second and third results are more interesting but also not surprising. The larger the discount rate r, for given δ, the lower the costs in terms of future profits associated to be stuck with a larger stock of employment, hence the larger employment in good times . Finally, the larger the attrition rate, for given interest rate, the faster is future job destruction in bad times, and the lower the cost associated to having a larger workforce in good times

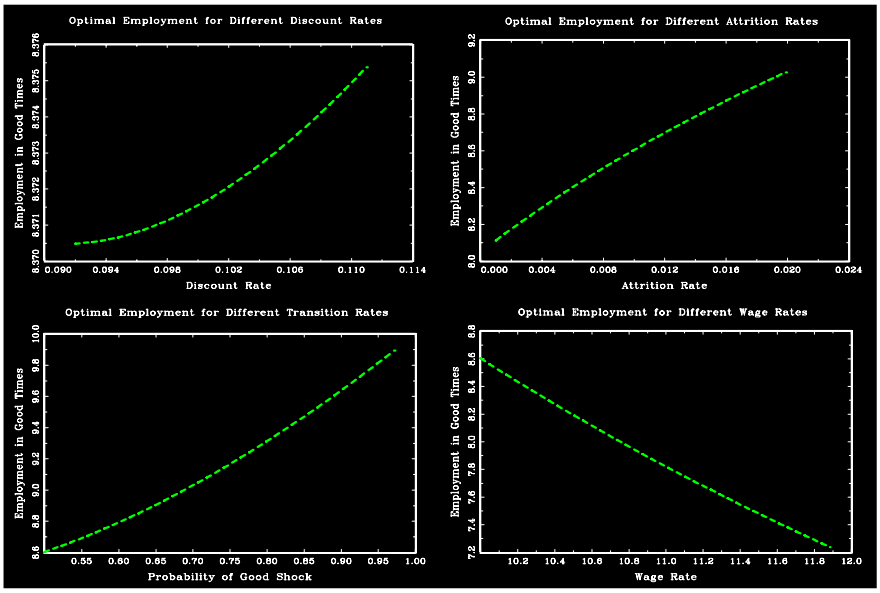


Figure 7: Optimal Employment in Good Times for Different Parameter Values

4.1 A Two-tier Regime in the Dynamic model

We now assume that at time $t = T^*$ the firm can hire workers on a temporary basis, but it cannot fire the stock of permanent workers l^u. In good times the firm will hire workers on temporar contracts up to the point at which the marginal product is equal to the wage. In bad times, the firm will not use any temporary workers and will let permanent workers to decline at the attrition rate. The total stock of employment in this dual regime at any time t is given by

$$l_t^{tot} = l_t^{temp} + l_t^{perm}$$

where the permanent workers will decline at the attrition rate while the temporary workers will be used as a buffer stock so that

$$l_t^{perm} = (1 - \delta) l_{t-1}^{perm}$$

and

$$l_t^{temp} = l_t^{temp} = \begin{cases} \frac{A^g}{w} - l_{t-1}^{perm} & \text{if } A = A^h \\ 0 & \text{if } A = A^l \end{cases}$$

This transition dynamics will take place as long as the firm will reach a position in which the stock of permanent workers is identical to the frictionless employment level in good times, so that $l_{t++k}^{perm} = \frac{A^b}{w}$. From that point onwards, firm dynamics will be identical to a frictonless equilibrium.

4.2 A Simulation of Firm Dynamics

We simulate the employment dynamics of firm employment over the transition from a rigid regime to a two tier regime. Our emphasis is on the effects of a two tier regime on total employment, temporary employment, and particularly on productivity and employment elasticity to output. The spirit of our simulations is simply to derive testable empirical implications. They are not truly calibrations of a model, which is partial equilibrium.

We consider a firm that starts out in the high productivity regime and whose employment dynamics is described by the dynamic model of the previous section. This is the rigid regime and no firing is allowed. After 30 periods, there is an unanticipated regime change, and temporary contracts are allowed. We call this regime the transition phase. Eventually, as the stock of insiders hired with a permanent contracts phase out by natural turnover, the firm enters the new regime.

In the simulations, we keep track of the dyanamic behaviour of total employment, average productivity, temporary employment, permanent employment. The time profile of a typical firm is described by Figures 8 and 9. In each figure the time profile of total employment, labor productivity, temporary employment and permanent employment is reported. While the time profile of temporary and permanent employment is fairly intuitive, the aim of the this exercise is to characterise the profile of total labor productivity. During the transition, total employment increases and average productivity falls. The opposite pattern takes place for the standard deviation. Wheras the standard deviation of employment increases, driven by hiring on temporary contracts, the standard deviation of labor productivity falls.

A more quantitative simulations is the one offered in Table 1, where we report summary statistics obtained by 100 iterations of the time profile described in Figures 8 and 9. The exercise offers implications as to the mean and standard deviation of employment and labor productivity in the aftermath of the introduction of a two tier regime

The following remark summarizes our main findings.

Remark 1 *The transition from a rigid to a two tier regime features a honeymoon effect involving:*

- A permanent reduction of the inaction region, hence of the share of firms not adjusting employment levels;
- A temporary positive effect on average employment, and an increase in its standard deviation;
- A temporary negative effect on average productivity, and a decline in its standard deviation;
- A temporary and permanent effect on profits.

The next section uses microdata from Italy to assess these empirical implications.

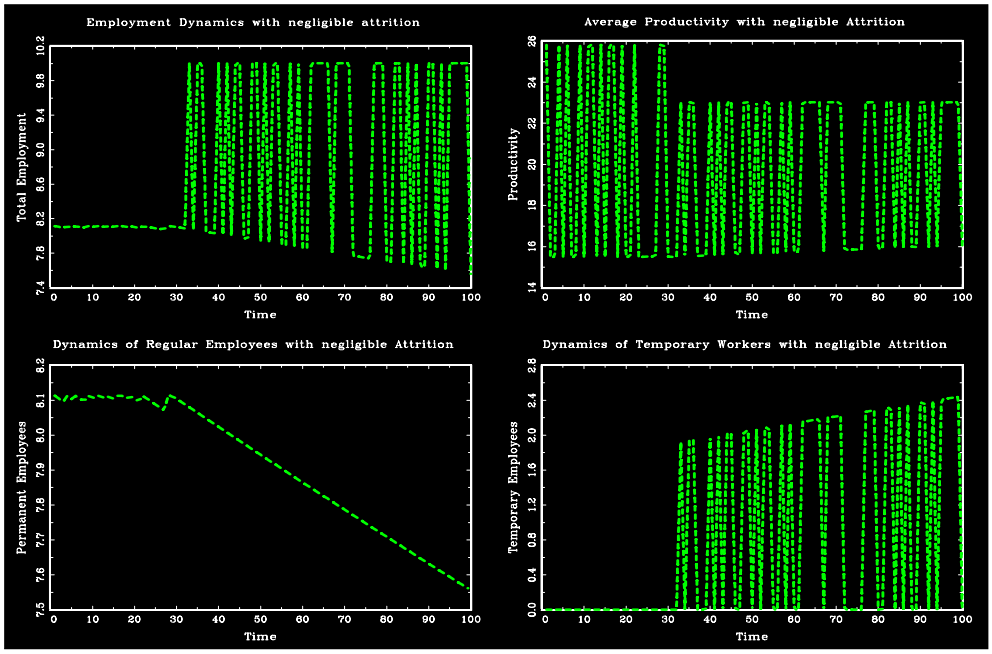


Figure 8: Firm dynamics with a two tier regime and negligible attrition

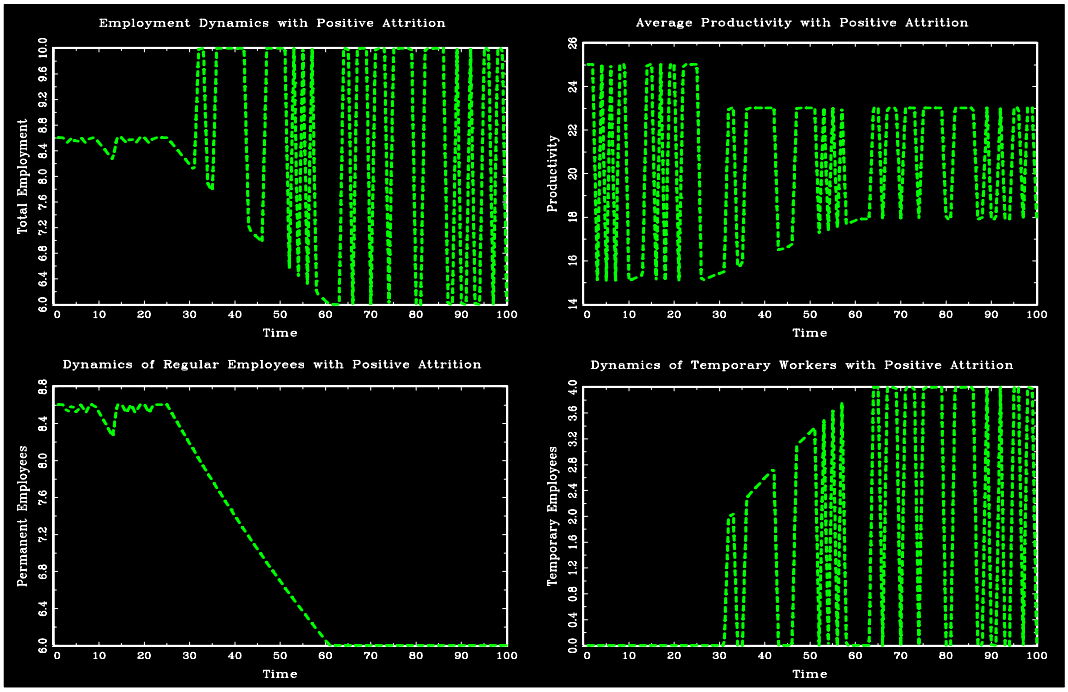


Figure 9: Firm employment dynamics with a two-tier regime and positive attrition

Table 1: Employment and Productivity Effectst

	Employment	Productivity	Employment	Productivity
	δ=0.005		δ=0.010	
Rigid [a]*: mean*	8.31	20.62	8.53	20.35
Rigid : st.dev.	(0.01)	(0.79)	(0.04)	(0.87)
Transition [b]	8.55	19.83	8.61	19.81
Transition: st.dev.	(0.18)	(0.39)	(0.24)	(0.56)
New Regime [c]	7.96	20.42	8.04	20.53
New Regime: st.dev.	(0.69)	(0.88)	(0.31)	(0.40)

Average results based on 100 iterations of 3 regimes

Parameters: A_h 100.00 ;$A_l = 60.00$;$w = 10.00$;$p = 0.50$

(a), No firing and permanent workers decline by attrition

(b), Temporary Contracts Allowed

(c), Pure two tier

Results based on 100 iterations of firm time profile over the 3 regime

Source: Authors' calculation

5 Back to the Data

These empirical implications of the model can be tested against firm-level data on Italy [2]. The data come from a survey administered by Capitalia since 1992 and covering roughly 4500 Italian firms with an average size of 263 employees. The questionnaire elicits information on the size and composition of the workforce, hires and separations, by educational attainment and by main contractual type. It is also matched to data on the firm's balance sheet, so that it is possible to obtain information on firm level value added and productivity. The survey was carried out at 3-years intervals, asking respondents (generally the head of the personnel of the firm) also for retrospective information on employment stocks and flows. Besides the repeated cross-sections, there is a smaller panel of roughly 850 firms, for which we have observations covering the entire period 1995-2000. Most of the ensuing analysis is concentrated on this panel as inferences from the cross-sectional sample are likely to be significantly affected by changes in the composition of the sample[3]. Descriptive statistics for two cross-sectional samples (1995-7 and 1998-2000) and for the 1995-2000 panel are reported in Table **??**. As can be seen, in the cross-sectional sample there are important variation in the average size of firms (declining over time, due to a higher coverage of small units, whose share increases from 27 to 40 per cent) and in the share of firms using temporary contracts (which are used mainly by large firms). We feel therefore reassured in carrying out our analysis by working on the 1995-2000 panel, having an average size of firms of roughly 150 employees (increasing over time) and with about one-fourth of units using temporary contracts both in 1995 and 2000.

The first implication that we want to test is that the Italian two-tier reform strategy should have reduced

[2] See Lugaresi (.) for a detailed description of the database.

[3] There is, for instance, a very large variation in the average size of firms in the repeated cross-section. In the period 1992-94, the average size is 243, in 1995- 97 it is 120, in 1998-2000 88 and in 2000-2003 144.

Descriptive statistics from the Repeated Cross-Sections and from the Panel 1995-2000.

	1995-1997 Mean	1998-2000 Mean	1995-2000 Mean	1995-2000 S D
Variation in value added 1995-2000	-	-	2,94	25,85
Mean Temporary workers 1995-2000	-	-	4,10	19,57
Firms Using Temporary Workers in 1995	22,99 %	-	27,99 %	-
Firms Using Temporary Workers in 2000	-	21,99 %	24,49%	-
Firms ever Using Temporary Workers	31,22 %	25,30 %	68,66 %	-
Traditional Sectors	41,78 %	52,22 %	51,31 %	-
Sectors with Scale Economies	27,62 %	18,14 %	18,51 %	-
Specialized Sectors	25,68 %	24,34 %	26,68 %	-
High/Technology Sectors	4,91 %	5,30 %	3,50 %	-
Average employment in 1995	112,78	-	143,12	315,74
Average employment in 2000	-	87,75	159,29	364,37
Firms with less than 21 Employees	27,15 %	40,58 %	17,35 %	-
Firms with 21 to 50 Employees	36,98 %	37,32 %	35,57 %	-
Firms with 51 to 250 Employees	25,35 %	15,45 %	32,80 %	-
Firms with 251 to 500 Employees	5,92 %	3,82 %	8,16 %	-
Firms with more than 500 Employees	4,60 %	2,82 %	6,12 %	-
Share of Unskilled Employees 1997	61,25 %	-	59,08 %	-
Share of Unskilled Employees 2000	-	59,62 %	53,05 %	-
Firms observed	4497	4680	686	-

Figure 10: Descriptive Statistics

the inaction region, that is, the percentage of firms keeping employment levels unchanged from year to year. Figure 11 plots the average yearly percentage of firms that did not increase or reduce their workforce by more than 2% in each year section. It is evident that inaction region fell in the aftermath of 1995, when temporary contracts began to be liberalized.

Our second implication is that average employment should increase whilst the cross-sectional standard deviation should decrease during the honeymoon. Figure 12 reproduces average employment levels of firms in the repeated cross-section. It also plots (dotted lines) one standard deviation above and below the sample means in each period. Both average employment and the standard deviation are increasing over time. Both observations are consistent with the model. [4].

The third implication of the model has to do with the evolution of labor productivity. Our model predicts that i) average, firm-level, labor productivity should decline and ii) the cross-sectional dispersion of labor productivity levels should increase during the honeymoon. The continuous line in Figure **??** describes the evolution of the average value added per full-time worker[5] in the panel. The dotted lines depict one standard deviation above and below the sample means. There is no clear patterns in the overall sample. Nevertheless, when we distinguish between the dynamics of average productivity of those firms who used at least for one-year or never used temporary contracts, we observe (Figure **??**) that average productivity is increasing more in firms who did not use temporary contracts then in those who did use it. Figure **??** also

[4] The coefficient of variation (controlling for scale effects on the cross-sectional variation) is also increasing.

[5] The pattern does not change if we measure the labor input in terms of headcounts.

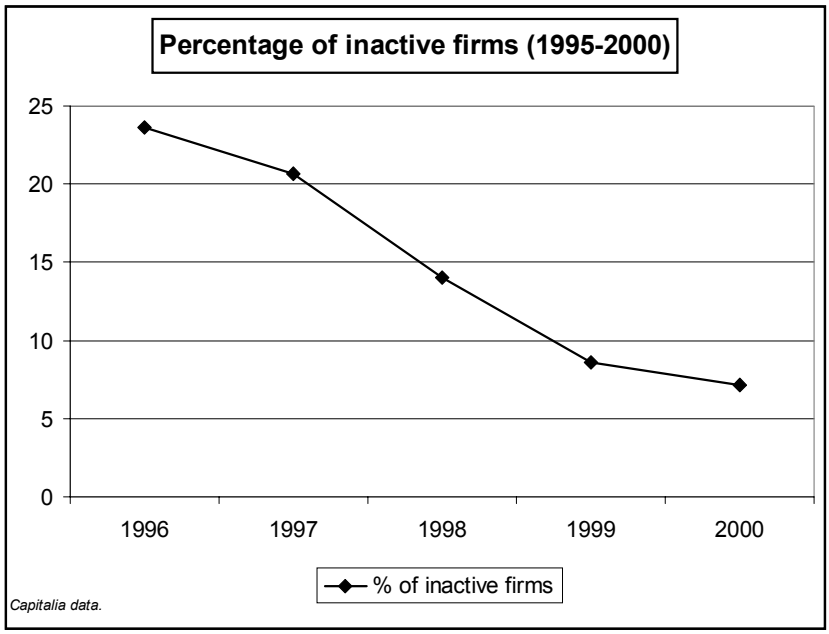


Figure 11: Percentage of Inactive Firms

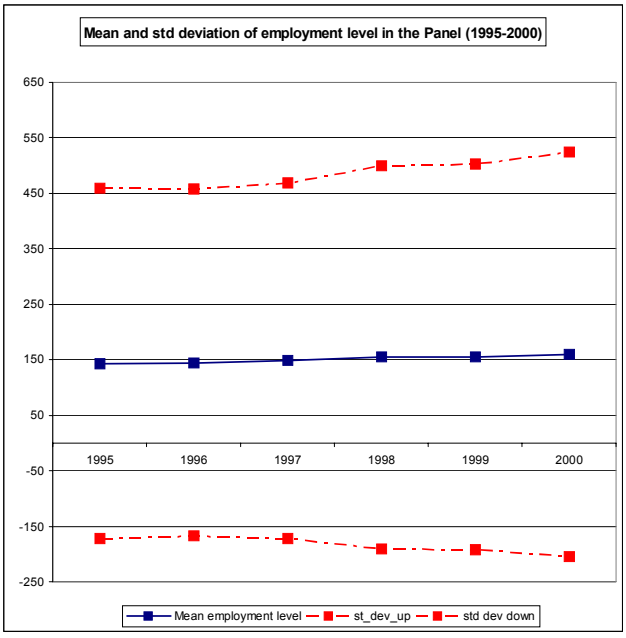


Figure 12: Mean and Standard Deviation of Employment

shows that the standard deviation has a divergent pattern, with an increase in firm no using temps (left axis) and a marked reduction among firms using temporary contracts (right axis). These results are consistent with our theoretical perspectives.

The decline in labor productivity can be due to a variety of factors, including changes in the composition of the workforce, e.g., the entry of low-skilled workers, which could also have been favoured by the spread of flexible work contracts. A number of authors (including, e.g., Daveri, 2004) attributed the rather poor labor prosuctivity performance of Europe in the last decade, to compositional factors, such as inflows into employment of workers with low-educational attainments. As the dataset provides information on educational attainments of the workforce, it is possible to evaluate the role played by these competing explanations for declining labor productivity. Figure 16 displays the results of a regression where the dependent variable is the variation in labor productivity per worker and the explanatory variables include the firm-specific average number of fixed-term contracts in the total workforce, the number of workers with primary or lower levels of education as well as sectoral dummies, defined on the basis of the Pavitt classification.[6] The coefficient for the stock of temporary workers is negative and statistically significant, while there is no significant effect of sectoral dummies or of the educational attainments of the workforce. The effect of temporary workers on productivity survives also when we include size specific dummies. It should be stressed that the negative effects of the spread of fixed-term contracts on labor productivity is a distinguishing implication of our model. Table 17 report the regressions in which the dependent variables are expressed in first differences rather than in levels. The results do not seem to change, suggesting that firms that used more fixed-term contracts experienced a larger decline in average productivity than the other firms in the sample. Although the fact that for some firms the use of fixed-term contracts was not an option, we are, of course, aware of the fact that TEMPORARY is itself an endogenous variable for several firms. Thus, our regressions should be interpreted as tests as to whether the correlation between labor productivity and use of fixed-term contracts survives under multivariate correlation analyses.

6 Conclusions

Existing models of EPL do not yield implications as to the effects of labor market reforms increasing flexibility only "at the margin", the dominant type of reforms of EPL occurred in European countries in the 1990s. In this paper we develop a dynamic labor demand model under uncertainty to analyse the effects of these two-tier labor market reforms on employment and labor productivity. We show that these reforms have a transitional “honeymoon”, job creating effect, which contributes to explain the progress made by many countries, notably the Olive belt ones, towards the Lisbon employment target. We also find that labor

[6] THe number of observations in the Table with regressions is larger the number of observations in the summary statistics since the regressions use initial and final years only and have fewer missing values.

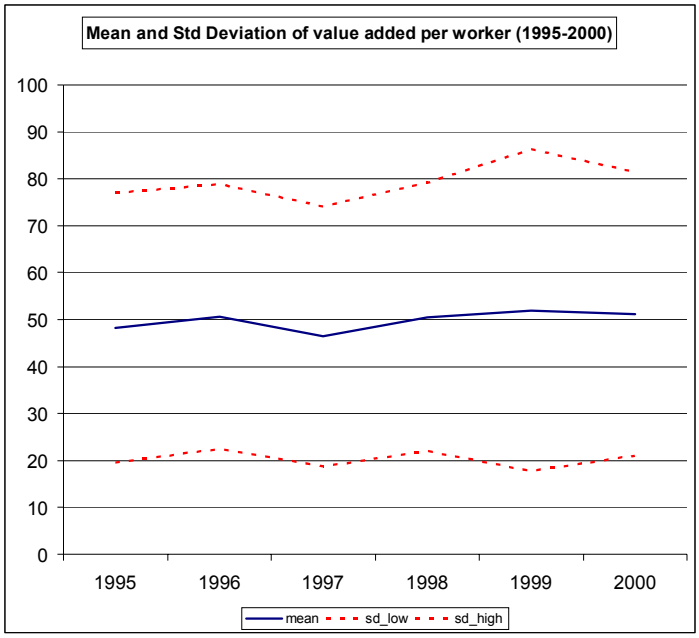


Figure 13: Mean and Standard Deviation of Value Added per Worker

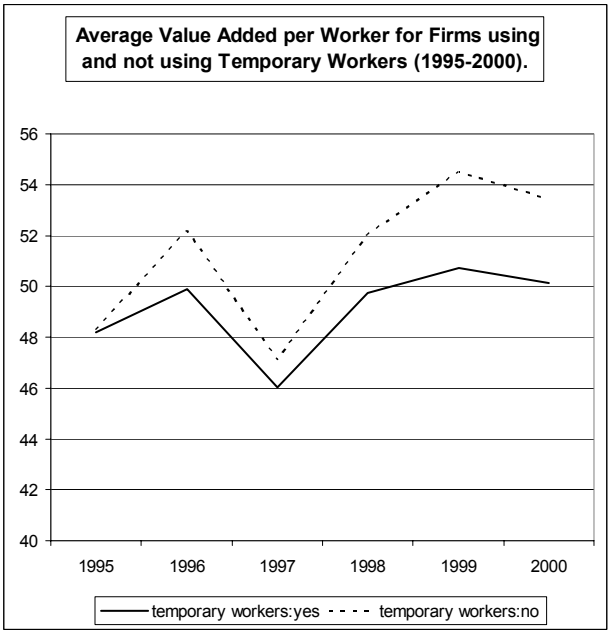


Figure 14: Average Value Added for Firms Who used and did not used temporary contracts

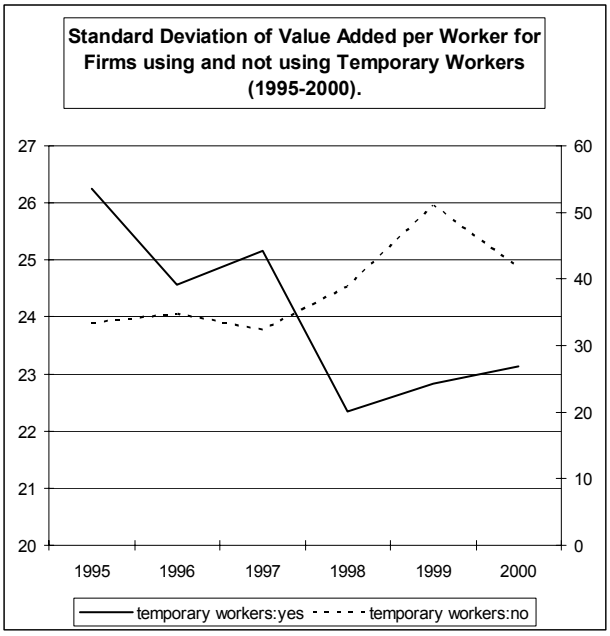


Figure 15: Standard Deviation of Value Added per Worker of Firms Who did use and did not use temporary contracts

Changes in Labour Productivity and Temporary Worker: 1996-2000

	Dependent: Change Value Added per Worker \1			
	I	II	III	IV
Temporary \2	-0,22	-0,22	-0,37	-0,42
	0,008	0,009	0	0
Low Skills \3	-0,03	-0,035	-0,021	-0,02
	0,26	0,27	0,5	0,49
Investment \4	-	-	-	0,01
				0,91
Sectoral Dummies	NO	YES	YES	YES
Size Dummies	NO	NO	YES	YES
R^2	0,013	0,014	0,04	0,053
Observations	843	843	843	630

\1 Change in Value Added per worker
\2 Temporary Workers Between 1996 and 2000
\3 Low Skill Workers Between 1997 and 2000
\4 Real investiment between 1996 and 2000

Figure 16: Changes in Labor Productivity and Temporary Workers

	Dependent: Change Value Added per Worker \1			
	I	II	III	IV
Change Temporary \2	-0,26	-0,27	-0,25	-0,3
	0,07	0	0,001	0,001
Change Low Skills \3	-0,013	-0,01	-0,009	-0,01
	0,52	0,5	0,6	0,6
ChangeInvestment \4	-	-		-0,001
				0,7
Sectoral Dummies	NO	YES	YES	YES
Size Dummies	NO	NO	YES	YES
R^2	0,013	0,018	0,03	0,043
Observations	843	843	843	677

\1 Change in Value Added per worker
\2 Change in Temporary Workers Between 1996 and 2000
\3 Change in Low Skill Workers Between 1997 and 2000
\4 Change in real investiment between 1996 and 2000

Figure 17: Changes in Labor Productivity and Changes in Temporary Workers

productivity should decline during this transition and obtain other empirical implications as to the cross-sectional and time-series variation of productivity and employment, which are tested against firm-level data on Italy.

The implications of the model are supported by our analysis. If policymakers takes it seriously, they should be aware that this honeymoon cannot go on for ever and that other reforms are needed if they want to make further progress towards Lisbon.

7 References

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8 Annex 1: The Formal Derivation of the Buffer Stock Model

The firm choose l^{temp} so that

$$\begin{aligned} \Pi &= p[A_H \log(l^{perm} + l^{temp}) - w(l^{perm} + l^{temp})] + (1-p)[A_L \log l^{perm} - w l^{perm}]. \\ \text{s.t. } l^{perm} &= \frac{(1-p)A_L + pA_H}{w} \end{aligned}$$

The first order conditions are

$$\frac{\partial \Pi}{\partial l^{temp}} = 0 \qquad \frac{pA_h}{l^{perm} + l^{temp}} = w$$

So that

$$\begin{aligned} l^{temp} &= \frac{A_h}{w} - l^{perm} \\ l^{temp} &= \frac{(1-p)(A^h - A^l)}{w} \end{aligned}$$

while substituting this into the first equation

$$\begin{aligned} \frac{pA_h}{L^{perm} + L^{temp}} + \frac{(1-p)A_l}{L^{perm}} &= w \\ pw + \frac{(1-p)A_l}{L^{perm}} &= w \\ L^{perm} &= \frac{A_l}{w} \end{aligned}$$

so that substituting the expression for L^{perm} we get

$$\begin{aligned} L^{perm} + L^{temp} &= \frac{A_h}{w} \\ L^{temp} &= \frac{A_h - A_l}{w} \end{aligned}$$

Considering the probability of hitting the lower bar through attrition as infinitesimal, the previous expression reads

$$V(A^g, l^u) = \frac{A_g}{l^u} - w + \left[\sum_{\tau=1}^{\infty} \frac{1}{(1+r)^\tau (1+\delta)^\tau} \left[\frac{A_g}{l^u} + \frac{A^b}{l^u} \frac{(1-p)}{(1-\delta)} \left(\frac{(1-p)}{(1-\delta)} + p \right)^\tau - w \right] \right]$$

The value l^u is the solution to the equation

$$V(A^g, l^u) = 0$$

Some math for the appendix

$$\frac{A_g}{l^u}+\sum_{\tau=1}^{\infty}\frac{1}{(1+r)^\tau(1+\delta)^\tau}\frac{pA_g}{l^u}+\frac{(1-p)}{(1-\delta)}\frac{A^b}{l^u}\sum_{\tau=0}^{\infty}\frac{1}{(1+r)^\tau(1+\delta)^\tau}\left(\frac{(1-p)}{(1-\delta)}+p\right)^\tau-\frac{(1-p)}{(1-\delta)}\frac{A^b}{l^u}=\sum_{\tau=0}^{\infty}\frac{1}{(1+r)^\tau(1+\delta)^\tau}w$$

Adding and substracting $\frac{pA_g}{l^u}$ and $\frac{(1-p)A^b}{(1-\delta)l^u}$ the problem becomes

$$\frac{A_g(1-p)}{l^u}+\frac{pA_g}{l^u}\sum_{\tau=0}^{\infty}\frac{1}{(1+r)^\tau(1+\delta)^\tau}+\frac{(1-p)A^b}{(1-\delta)l^u}\sum_{\tau=0}^{\infty}\frac{1}{(1+r)^\tau(1+\delta)^\tau}\left(\frac{(1-p)}{(1-\delta)}+p\right)^\tau-\frac{(1-p)A^b}{(1-\delta)l^u}=\sum_{\tau=0}^{\infty}\frac{1}{(1+r)^\tau(1+\delta)^\tau}$$

Since all series converge, we have that

$$\begin{aligned}\sum_{\tau=0}^{\infty}\frac{1}{(1+r)^\tau(1+\delta)^\tau}\left(\frac{(1-p)}{(1-\delta)}+p\right)^\tau &= \frac{1}{1-\frac{1-p\delta}{(1+r)(1+\delta)(1-\delta)}}\\ \sum_{\tau=0}^{\infty}\frac{1}{(1+r)^\tau(1+\delta)^\tau} &= \frac{1}{1-\frac{1}{(1+r)(1+\delta)}}\end{aligned}$$

and the key equation becomes

$$\frac{A_g(1-p)}{l^u}-\frac{(1-p)A^b}{(1-\delta)l^u}+\frac{pA_g}{l^u}\frac{(1+\delta)(1+r)}{\delta+r+r\delta}+\frac{(1-p)A^b}{l^u}\frac{(1+\delta)(1+r)}{(1+\delta)(1+r)(1-\delta)-(1-p\delta)}=\frac{w(1+\delta)(1+r)}{\delta+r+r\delta}$$

so that the optimal employment in good times reads

$$l^u=\frac{A_g(1-p)-\frac{(1-p)A^b}{(1-\delta)}+\frac{pA_g(1+\delta)(1+r)}{\delta+r+r\delta}+\frac{(1-p)A^b(1+\delta)(1+r)}{(1+\delta)(1+r)(1-\delta)-(1-p\delta)}}{\frac{w(1+\delta)(1+r)}{\delta+r+r\delta}}$$

9 Annex 2: Rolling Apparent Employment to Output Elasticities

The table below reproduces the rolling apparent elasticity of employment to output in the reform countries. In particular $\eta_t = \frac{(E_t-E_0)/E_0}{(Y_t-Y_0)/Y_o}$ where E denotes total employment and Y real GDP while the subscript 0 the initial year if the pre-reform and post-reform periods. To give an example, in Belgium, the apparent elasticity for 1994 is defined as $\eta_{1964} = \frac{(E_{1964}-E_{1986})/E_{1986}}{(Y_{1964}-Y_{1986})/Y_{1986}}$ while the elasticity in the year 2000 is $\eta_{2000} = \frac{(E_{2000}-E_{1997})/E_{1997}}{(Y_{2000}-Y_{1997})/Y_{1997}}$

year	**Belgium**	**Italy**	**Netherlands**	**Portugal**	**Sweden**
1986	0.16	0.19			
1987	-0.27	0.07			
1988	-0.09	0.26	0.33		
1989	0.16	0.09	0.38	0.40	
1990	0.20	0.21	0.59	0.42	
1991	0.32	0.28	0.64	0.57	
1992	0.36	0.06	0.79	0.11	
1993	0.34	-0.03	0.78	0.06	
1994	0.29	-0.10	0.71	0.02	
1995	0.31	-0.13	0.65	-0.01	
1996	0.29	-0.09	0.66	0.01	-1.20
1997	0.29	-0.05	0.69	**0.44**	-0.88
1998	**0.24**	**0.38**	0.68	**1.01**	**0.20**
1999	**0.83**	**0.56**	0.68	**0.80**	**0.42**
2000	**0.71**	**0.58**	**1.01**	**0.74**	**0.41**
2001	**0.56**	**0.71**	**1.23**	**0.76**	**0.72**
2002	**0.54**	**0.85**	**1.47**	**0.76**	**0.63**
2003	**0.48**	**0.94**	**1.39**	**0.80**	**0.56**
2004	**0.50**	**0.99**	**0.99**	**0.75**	**0.42**

Figure 18: Apparent Employment to Output Elasticity