Reforms, labour market functioning and productivity dynamics: a sectoral analysis for Italy.*[1]

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Abstract

Over the last two decades Italy registered notable improvements in the functioning of labour market. However, such improvements have been accompanied by a deterioration in terms of productivity and competitiveness. This paper provides some evidence in this respect evaluating to what extent labour market reforms might have influenced the poor productivity performance of the Italian economy over the period 1980-2008. We show that labour market deregulation had a negative effect on aggregate labour productivity through both the within and the reallocative components. Our results show that the increased flexibility in the use of temporary contract has led to a lower productivity (level and to a lesser extent growth rate) in all sectors, with a higher impact on those industries with a higher flexibility need. Conversely, the use of temporary contracts has a significant lower effect in industries with higher skill content. The negative effect of the reforms on the reallocative capacity is stronger in those industries with a higher flexibility need that are also the relatively lower productivity sectors in the period 1993-2008.

1. Introduction

In the last two decades Italy registered notable improvements in the functioning of labour market. Better results in terms of both unemployment and job creation were achieved probably as a result of several reforms which were adopted in the eighties and nineties to modify labour market institutions towards a higher degree of flexibility. The Italian labour market has been for decades one of the world's most regulated, with quite stringent legislation on firings. However, over the past two decades, Italy's labour market has undergone substantial reforms. Some flexibility-oriented reforms took place in the early eighties, with the introduction of temporary apprenticeship contracts (1984) and norms aimed to ease limitations to real wage flexibility (1986). Since the early 90s number of more substantial reforms have been introduce which have led to some important changes in the regulation of labour market by reducing employment protection levels by facilitating the use of temporary forms of employment and enhancing wage flexibility. Such improvements in labour market performance, however, seem to have been accompanied by deterioration in terms of productivity and competitiveness (Codogno, 2009; Lucidi, 2008). Italian labour productivity growth started to diverge from the trend of other industrialized countries at the end of the 1990s, a phenomenon that does not appear to be cyclical, but a sign of a structural deterioration of Italian competitiveness (Ciriaci and Palma, 2008; Ferrari *et al*. (eds.), 2007; Faini and Sapir, 2005). While the impact of labour market reforms on labour utilisation and aggregate unemployment rate has been documented in a number of works[2], the effects of such reforms on productivity (both in levels and growth) is still an open issue. As the impact of a deregulation in both wage setting and on labour productivity is, in principle, ambiguous, and the empirical evidence is quite inconclusive, structural labour reforms are typically supported on the grounds of promoting an efficient use of labour resources (OECD, 2006).

Our aim is to provide evidence in this respect evaluating to what extent labour market reforms might have influenced the poor productivity performance of the Italian economy over the period 1980-2008.

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[2] Unemployment benefits, tax wedges and several group-specific policies have been found to have an unambiguous effect on the aggregate employment rate and unemployment rate. See OECD (2006) for an exhaustive review of the main empirical results.

The paper is organized as follows. In the next session we discuss the theoretical motivations and previous empirical evidence. In session 3 we report some stylized facts. In session 4 we discuss the empirical strategy and session 5 reports the results, Session 6 concludes.

2. Theoretical background and previous empirical evidence

2.1 Theoretical considerations

While the impact of labour market reforms on labour utilisation and aggregate unemployment rate has been documented in a number of works3, the effects of such reforms on productivity (both in levels and growth) is still an open issue. It has been argued, in fact, that certain labour market reforms that increase labour utilization may, at the same time, reduce productivity growth. The OECD (2007), for instance, showed the existence - among OECD countries - of a structural negative correlation between the growth rates of labour utilization and measured average productivity over the period 1970-2005.

As a matter of fact, employment growth may be associated with lower average labour productivity mainly due to the entrance in the market of low-skilled workers and job (thereby reducing the average quality of the labour supply), or simply because of the presence of diminishing return to labour for a given capital stock (the so called composition effect in Bassanini and Venn, 2008; Nickel and Bell, 1996). Anyway, the presence of composition effect does not necessarily mean that the productivity of incumbents (jobs and workers) cannot benefit from a better functioning labour market. In fact, any slowdown in average labour productivity resulting from a change in employment is, by far, a statistical artefact and does not imply that individual productivity has fallen (OECD, 2007).

Labour market regulation can also directly affect productivity through policies that (1) influence incentives for workers or firms to invest in training or education (by altering the stock of human capital); (2) improve the quality of job matching (by increasing the efficiency of labour resource allocation); (3) encourage the movement of resources between declining or emerging firms/industries/activities (by helping firms respond

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[3] Unemployment benefits, tax wedges and several group-specific policies have been found to have an unambiguous effect on the aggregate employment rate and unemployment rate. See OECD (2006) for an exhaustive review of the main empirical results.

quickly to changes in demand or technology); (4) reduce social conflict (by influencing workers' willingness to align their behaviours with their employers' targets); and (5) make labour more expensive (by influencing the direction of technological change).

However, it is generally difficult to establish, a priori, whether policies are likely to affect the level of productivity, its growth, or both, and in which direction. For instance, strict statutory or contractual employment protection for regular workers act on the one side as a signalling device to workers about firm commitment increasing workers' effort and incentives to invest in firm-specific human capital. Furthermore, there is a strand of the literature supporting the idea that higher job protection and, consequently, a cooperative relationship between management and employees, may positively affect firm performance and productivity (Naastepad and Storm, 2005; Michie and Sheenan, 2001 and 2003; Huselid, 1995). On the other side, employment protection legislation (EPL hereafter) increases the cost of firing, and therefore increases the cost of adapting quickly to the emergence of new technologies, impedes flexibility and slows the movement of labour resources into new high-productive activities. Hence, stringent EPL may be an obstacle to the reallocation of activity across industries and to risk-taking inducing a 'sclerosis' in the production structure (Cingano et al., 2010). Ichino and Riphahn (2005) and Riphahn (2004) claim that layoff protection might also affect productivity by reducing worker effort because there is less threat of layoff in response to poor work performance or absenteeism.

As far as restrictions on temporary contracts are concerned, they may positively affect labour productivity by reducing opportunities to substitute temporary for permanent workers, increase incentives for firms that typically hire temporary workers to train their employees, and increases workers' incentive to acquire firm's specific skills (Albert et al., 2005). At the same time, however, they reduce firms' ability to adapt quickly to changes in technology or product demand and by reducing temporary employment, reduce workers' incentives to invest in human capital to escape job insecurity. Besides, as stressed by Blanchard and Landier (2002), in the case of labour reforms at the margin, namely reforms that facilitate the entrance of incurrents in the job market (allowing firms to hire workers on fixed-duration contracts) rather than decrease firing costs of the incumbents, the overall effect may be perverse. In fact, the main effect may be high turnover in fixed-duration jobs, leading in turn to higher, not

lower unemployment. And, even if unemployment comes down, workers may actually be worse off, going through many spells of unemployment and fixed duration jobs, before obtaining a regular job. Furthermore, it may be argued that this higher turnover might have a perverse effect on labour productivity (Lucidi, 2008).

A similar adverse effect on productivity and incentives to acquire skills is induced by centralised wage-setting arrangements as workers may be unable to capitalise on their investments through higher wages. Furthermore, they weaken the links between productivity gains and wage growth, reducing incentives for workers to implement productivity-enhancing work practices (Belot et al., 2002). On the other side, it can be argued that centralised wage-setting arrangements compress wage relativities and reduce poaching (Almeida-Santos and Mumford, 2005), and may speed the process of structural change by making declining industries relatively less profitable and emerging industries relatively more profitable than under decentralised wage-fixing arrangements.

Finally, a general wage moderation and labour flexibility may negatively affect aggregate demand and through this channel labour productivity. In the literature, the high degree of association between rapid output growth and productivity growth across national industrial sectors is known as Verdoorn's Law (Verdoorn, 1949)[4]: every time the market expands, this enhances the division of labour and of the production process in smallest and specialized stages which favours the use of more mechanized methods inducing an increase of labour productivity (McCombie et al., 2002)[5]. Furthermore, as from a Schumpeterian point of view, innovative firms compete better in a high-cost environment, wage flexibility may be efficiency-distorting allowing low-productive firms to "survive" and compete on the base of price-competitiveness and "low-road" practises (Antonucci and Pianta, 2002).

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[4] This law, in its simplest form, can be interpreted to reflect the prevalence, especially in manufacturing industries, of both static and dynamic economies of scale or increasing returns in the widest sense (McCombie and Thirlwall, 1994).
[5] As far as Italy is concerned, numerous works found significant support for this aggregate demand-labour productivity link. *See* for instance Gambacorta (2004) and McCombie *et al.* (2002).

2.2 The empirical evidence on the impact on productivity of labour market reforms

The empirical works aiming at assessing the overall effect of labour market institutional framework on productivity and competitiveness are generally based on cross countries comparisons and relate cross country institutional differences to aggregate productivity. In general, very few studies go beyond country-level data and, typically, researchers focusing on a single country rely on firm level data. The empirical results are generally not conclusive.

As a matter of fact, there is little and quite inconclusive empirical evidence of a productivity effect of EPL, namely the set of mandatory restrictions governing the recruitment and dismissal of employees. In fact, depending on the cross-country/industry approach used and the countries analyzed, results suggest both positive and negative effects. In this regards, Nickell and Layard (1999; p. 3065) reckoned that 'there seems to be no evidence that either stricter labour standards or employment protection lowers productivity growth rates. If anything, employment protection lowers productivity growth if it is associated with other measures taken by firms to enhance the substantive participation of the workforce'.

Scarpetta and Tressel (2004) analyse the effects of employment protection law and centralized bargaining on firm productivity and dynamics using harmonized data for 17 manufacturing industries in 18 countries, over the period 1984-1998. Their final conclusion is that strict employment protection law has a significant negative impact on productivity only in countries with an intermediate degree of centralisation/coordination in wage bargaining. Bassanini et al. (2008) examined the impact of EPL on productivity in OECD countries, using annual cross-country aggregate data on the degree of regulations and industry-level data on productivity from 1982 to 2003 on 11 OECD countries. They concluded that dismissal regulation have significant negative impact on total factor productivity.

OECD (2007) using a sample of 18 OECD countries over the period 1982-2003 shows that firing restrictions have a small negative impact on productivity growth but that no clear conclusion can be drawn about the impact of EPL for temporary contracts. Autor et al. (2007) exploit the variability of firing restrictions and its successive reforms across US states to find they have a modest negative impact on labour productivity and TFP

growth in US firms. Similar findings are provided by Cingano et al. (2008) who, using Italian data, examined a 1990 reform that raised dismissal costs for firms with less than 15 employees. Similarly, Cingano et al. (2009) assess the effect of EPL on investment, capital-labour ratio and labour productivity using a cross-country firm-level dataset. They estimated the role of EPL looking at whether its impact is greater in industries where, in the absence of regulations, job reallocation is higher. However, their results on the consequences of the 1990 Italian reform for firms' productivity are inconclusive. Lucidi (2008) finds a robust negative relation between labour market flexibility in Italy and firms productivity growth mainly due to a reduction of the incentives to innovation and internal training and lower workplace cooperation. Lucidi (2008) empirically tested the relationship between labour flexibility and productivity growth using Italian firms' level data. The main finding is that firms exhibiting a higher share of temporary workers in their workforces and characterized by a higher rate of labour turnover achieved a slower growth of labour productivity (value added per worker) over the period 2001-2003. Using a difference-in-difference estimator on industry-level data for several OECD and non-OECD countries, Micco and Pages (2006) find a negative relationship between layoff costs and the level of labour productivity. Similarly, Ichino and Riphan (2001) and Riphan (2004) find that EPL in Germany induces a significant increase of absenteeism, probably reducing productivity.

Another strand of the literature emphasizes the effects of EPL on reallocation via entry and exit of firms. Hopenhayn and Rogerson (1993) show how the distortion induced by firing restrictions pushes firms to use resources less efficiently: as a result employment levels adjust at a lower speed and productivity is reduced. Samaniego (2006) claims that firing restrictions are more costly in industries characterized by quick technological change (for instance, ICT). Countries where regulations are more stringent will therefore tend to specialize in industries with a slow rate of technical change, a conclusion that properly suits the Italian case. Similarly, Bartelsman and Hinloopen (2005) - using data for 13 OECD countries for the period 1991-2000 - find that EPL has a significant negative effect on investments in ICT. In particular, they conclude that EPL reduces the incentive for firms to invest in innovative activities with high returns and a high risk of failure because firms want to avoid the risk of paying high firing costs. A recent work by Dew-Becker and Gordon (2008) analyzes the

relationship between employment and productivity across the EU15 over the period 1970-2006 and found that there is a strong and robust negative correlation between the growth of labour productivity and employment per capita. Moreover, the authors quantified the effect of the policy and institutional variables on both employment per capita and productivity growth. They reached the conclusion that EPL and unemployment benefits both have significant effects on productivity after controlling for employment[6].

Finally, a number of works (OECD, 2007; Daveri and Jona-Lasinio, 2005) stressed that if the purpose of the analysis is to investigate the effects of labour market reforms on productivity and competiveness dynamics, the "sectoral" dimension must be considered. In fact, while labour reforms are defined at an aggregate level, their impact is likely to differ across industries. For instance, Nickell and Layard (1999) stressed that labour market rigidity may have negative effects on productivity because it hampers the reallocation of labour from old and declining sectors to new and dynamic ones. The sectoral level analysis allows to indentify the effects of labour market reforms based on the assumption that sectors more exposed to external competition or characterized by a larger technological need for reallocation benefit more in terms of productivity and efficiency when internal labour market is more flexible and competitive (Cingano et al., 2009). In general, as stated by Bassanini et al. (2008), EPL is more likely to be binding in some industries than others.

3. Labour market facts and Italian labour productivity growth trends

3.1 Labour market reforms

The process of liberalisation of the Italian labour market was gradual and occurred as a sequence of incremental reforms started in the early 1980s (see Table 1).

TABLE 1AROUND HERE

The first wave of reforms can be dated back to the mid-80s with the introduction of temporary apprenticeship contracts (1984) and norms aimed to ease limitations to real

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[6] The result that unemployment insurance might raise productivity is not original to this paper: Acemoglu and Shimer (1999b, 2000) develop a model of employment with matching where higher unemployment benefits give firms incentives to create better matches, and therefore higher productivity. Similarly, EPL, by making employer-employee relationships last longer, could increase job-specific human capital.

wage flexibility (1986). However, it is in the early 90s that the deregulation process had a substantial acceleration partly triggered by the economic and political crisis. In 1991 a new law specified the procedures for collective firing, and it set new limits to the use of the "*Cassa Integrazione Guadagni*".[7] The following year the automatic indexation of wages to inflation (*Scala Mobile*) was definitively abolished. In 1993, the so-called Giugni agreement between the government, the unions and the employers' associations introduces a comprehensive reform of wage bargaining in order to reduce inflation and to achieve higher wage flexibility. The aim of the agreement was to allow for regional differences (without excluding national co-ordination) in productivity levels and make wages more responsive to firms/individuals' performance and skill levels. The new collective bargaining structure was organised on two levels: national (centralised) level for the adjustments of wages to inflation dynamics and firm/regional level for the regulation of productivity-related pay schemes. In 1997, a series of reforms by Labour Minister Treu ("Pacchetto Treu") formalised the evolving flexibility arrangements in the Italian productive sectors. The reforms eased the regulation of apprenticeship schemes, part-time employment, and temporary contracts. Moreover they introduced private temporary work agencies, which even if rather limited in scope, introduced modern job matching services in an environment dominated by an inefficient public employment service. The use of fixed-term (interim) work arrangements, albeit subject to conditions such as restricting their application for low-skilled workers, boomed in subsequent years. In 1999, the rules concerning the use of interim contracts for unskilled jobs were eased (this condition having been largely ignored in any event). Finally in mid-2001, the new government extended the possibility and terms for use of temporary contracts, aligning Italy with EU directives. In 2003, "Biagi Law" reinforce some of the measures already introduced with Treu reform. It allowed private employment agency to compete with public ones on wider range of services, extended the use of staff-leasing contract and regulated the use of part-time work and non-standard forms of employment relationships.

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[7] A peculiar feature of Italian labour market is the limited scope of the unemployment insurance. Unemployment benefits in Italy are traditionally low and available to a limited number of workers. Workers in large manufacturing however can benefit of a short-term wage replacement benefits known as "*Cassa Integrazione Guadagni*" (CIG).The CIG was originally introduced by a private agreement between employers' associations and unions and it is based on private and government contributions. It provides benefits proportional to wages in case of an involuntary reduction in working time or temporary layoffs. Peculiarly, workers who benefit of CIG, are nor regarded as unemployed even in case of total suspension of activity.

In Table 2, we report the indicators for labour market institutional settings and the share of temporary contracts[8] in the three periods of major reforms and in the pre-reform years.

TABLE 2 AROUND HERE

The table shows two indicators of job protection: employment protection of regular workers (i.e. workers with open ended contracts) and employment protection on temporary jobs. The index of employment protection on regular workers includes legal restrictions on dismissals and the extent of compensations in case of redundancy. Employment protection on temporary contracts concerns the rules and limitations in the use of temporary forms of employment. Regarding the institutional framework governing the wage bargaining system, the indicators reported in Table 2 consider two dimensions: the degree of centralization of the bargaining process and the extent of coordination across the social parties (unions, the employers' associations and the Government). Overall, information reported in Table 2 shows a clear trend toward a higher degree of labour market liberalization both in the use of flexible forms of employment and in the decentralization of the bargaining process. Two facts are noteworthy. First, the reforms appear to have provided flexibility through the liberalization of the use of temporary form of employment rather than the relaxation of employment protection for permanent workers. In fact, the firing rules on regular contracts have remained unchanged over the period. Conversely, the regulation of temporary contracts was eased with the consequence of increasing the share of temporary employment by almost 6 percentage points since the beginning of the reforms process (column 3). Second, the decentralization of wage bargaining, formalized with the Giugni agreement in 1993, has been accompanied by an increase in the coordination across the social parties, which has resulted in a change in the industrial relations environment and led to a period of "institutional" wage moderation.[9]

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[8] Labour market intuitional indexes are from OECD (2008, 2004) and from ICTWSS database, Visser (2007). See note on Table 2 for detailed data descriptions.
[9] See Torrini and

As the labour market became more flexible, its performance improved markedly. During the 1995-2000 period, participation and employment rates rose by 2½ and 3 percentage points, respectively, partially reversing the trends earlier in the decade, while three-quarters of the total employment growth was registered in 1998-2000. A strong initial expansion of "atypical" work contracts, i.e. part-time and fixed-term (Table 2), tended to favour women, youths and unskilled workers. The rise in female participation and employment rates (by 4 percentage points each) was particularly steep and the employment rate of youth (25-30) increased by 3 percentage points since 1997. Regarding the composition of the labour force by education attainment, data show an increase in the employment rate of low and middle skilled workers (by 2 and 3 percentage points) since the 1997 Treu Reform, while the employment rate of skilled workers has declined by almost 3 percentage points.[10]

3.2 Labour productivity growth decomposition

The Italian labour productivity growth started to decline substantially since the mid 1990s: it was 2.2 percent in 1980-95 and it slowed down to 0.4 percent in 1995-2008 (ISTAT, 2009). At that time, by the beginning of the 1990s, Italy experienced also a number of labour market reforms aimed at improving the functioning of the labour market.

The interrelation between labour market reforms and productivity developments in Europe has been analyzed by R. Gordon and I. Dew-Becker (2008). They assumed that there is a negative trade-off between productivity and employment growth in Europe. Their idea is that labour market reforms might have helped to stimulate job creation but they might have also had a negative impact on labour productivity growth in those countries where the labour demand was relatively more inelastic.

In this section we provide descriptive evidence in this respect looking at the Italian labour productivity growth over the last thirty years, focusing on three periods of relevant labour market reforms introduced by the Italian government.

As a first step, we investigate whether the declining labour productivity trend over the whole period is the result of insufficient resource reallocation away from slow-growing

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[10] The educational attainment concerns the highest level of education or training successfully completed. 'Low' refers to ISCED 0/1/2, 'medium' refers to ISCED 3, and 'high' refers to ISCED 5/6/7 (Source: Eurostat, 2010).

industries or if instead is the consequence of the loss of dynamism of industries which used to grow fast in the past. We start decomposing aggregate labour productivity growth into the contribution of each industry taking into account three different effects: within industry, level reallocation and interaction effects.

Any given industry may contribute to aggregate productivity growth in two ways.

Suppose first that the level of labour productivity in industry j is the same as the economy-wide average. Then aggregate labour productivity growth is simply the weighted average of each industry's labour productivity growth, with the industry fixed weights equal to the nominal value added shares in some base (usually initial) year. In this economy, the higher the growth rate of productivity in each individual industry, the higher the growth rate of productivity in the aggregate. This is the within-effect of industry productivity growth on aggregate productivity growth. In this economy, resource reallocation across industries would not affect the growth rate of aggregate productivity, for there would be no efficiency gains to reap from such reallocation.

If instead, as is regularly the case in most countries, the various industries differ as to levels or growth rates of productivity, then resource reallocation across industries does have an impact on aggregate productivity, holding other things constant. This reallocation (or "between" industries) effect may positively contribute to aggregate growth if industry j is expanding (respectively, contracting) employment/hours worked and, in parallel, its level or growth rate of productivity is higher (respectively, lower) than the economy-wide average. In this case, the reallocation effect is positive. If labour moves to industries less productive (or growing at a slower pace) than the average, the reallocation effect is instead negative.

The formula to implement such decomposition is from Foster, Haltiwanger and Krizan (2001). It is as follows:

$$\frac{LP_T - LP_0}{LP_0} = \frac{\sum_j w_{j0}\left(LP_{jT} - LP_{j0}\right)}{LP_0} + \frac{\sum_j \left(w_{jT} - w_{j0}\right)\left(LP_{j0} - LP_0\right)}{LP_0} + \frac{\sum_j \left(w_{jT} - w_{j0}\right)\left[\left(LP_{jT} - LP_{j0}\right) - \left(LP_T - LP_0\right)\right]}{LP_0} \quad (1a)$$

where LP_{jt} is the level of labour productivity in industry j (aggregate if industry index is missing) at time t and w_{jt} is the employment share in industry j at time t. The first

summation on the right-hand side is the within effect (namely, the intra-sectoral effect), the second summation is the level reallocation effect and the third summation is the growth reallocation effect (these two last summations account for a structural-change effect). The jth component of the three pieces of the equation above represents the overall contribution of industry j to aggregate productivity growth.

By means of this decomposition the observed reallocation effect is referred only to the shift of workers between industries.

3.2.1 Results

The decomposition was carried out for four time periods (1980-1987, 1988-1993, 1994-2001 and 2001-2008) resorting to ISTAT - National Account data at 2digit sectoral level. Labour productivity is measured as value added per FTE employed person. Results are reported in Table 3 below. The results show that the cumulated growth of labour productivity over the period 1980-1987 was slightly above 12 percent, decreased a bit both in 1988-1993 (9.4 percent) and in 1994-2001 (7.2 percent) and declined sharply to 0.6 percent in 2001-2008 (Table 3).

TABLE 3 AROUND HERE

The reallocative component accounts for the bulk of productivity trends in three periods out of four. As stated above, the reallocative effect grasps the gain (or loss) in aggregate labour productivity stemming from a rise (or fall) in the employment share of an industry with productivity levels higher (lower) than the national average. Thus these data indicate that accordingly with the major labour market reforms there was a significant shift of employment away from less productive sectors to higher productivity industries with the exception of the last period, when the within (negative) effect dominates. Between 1980 and 1987, aggregate productivity was driven by manufacturing sector contributing for 6.9 percentage points and by agriculture for 3.9 percentage points. Services accounted only for 0.8 percentage points. In the following period, instead, the service sectors as a whole contributed for the largest share of aggregate productivity accounting for 4.6 percentage points while manufacturing contributed for 2.8 percentage points. The role of the manufacturing

sector was entirely of the within type while the contribution of the services is more mixed with Trade accounting for a within effect of 2.6 percentage points and Financial services for a reallocation effect of 2.0 percentage points. This is the result of the reallocation of manufacturing employment away to other industries or to the unemployment pool at a rate of 2.5 percent over the period (Figure 1). On the contrary, employment in business services grew by 7.2 percent in 1988-93, absorbing both agriculture and manufacturing employment.

FIGURE 1 AROUND HERE

In 1994-2001, as shown in table 1, four labour market reforms entered into force giving full legal recognition to different contractual forms of part-time and temporary jobs. In the same period, labour productivity growth slowed down a bit and it was driven by a positive reallocative component in business services and a comparable positive within component in both manufacturing and trade. However, once real estate has been taken away from the business services, the reallocation effect becomes smaller and the within component turns to be the driving component of labour productivity growth[11].

In 2001-2008, labour productivity growth fall down to a small 0.6 percent as the result a negative within component accounting for -1.1 percentage points, because of the zeroing of manufacturing contribution (0.2 percentage points) and of the negative sign of the contribution from market services (-1.8 percentage points). On the other hand, the reallocation component counterbalances these effects providing a positive contribution of 2.0 percentage points. Here we might catch the effect of the extension of the use of temporary contracts that allowed more competition between private and public agencies on a larger variety of services. This might be one of the potential explanations for the still increasing employment share (3.5 per cent over the period) in the business service sectors (Figure 2).

FIGURE 1 AROUND HERE

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[11] As suggested by OECD in its productivity measurement guidelines, real estate has to be excluded because a significant proportion of its value added consists of "*Imputed rent of owner-occupied dwellings*". Since this is a pure National Accounts imputation with no buyers and sellers nor any associated labour input, the inclusion of *"Real Estate Activities"* can distort productivity measures; particularly as volume growth of owner-occupied dwellings is differs from that for other business services, (OECD, 2005).

Our industry decomposition indicates that the bulk of the productivity slowdown is of a within type associated with a positive reallocation effect over the whole period. Thus the productivity slowdown, has already showed in Daveri Jona Lasinio, (2005), has been mainly driven by a within effect in manufacturing and by a reallocative effect in market services.

4. Empirical strategy and data

The aim of the empirical analysis is to assess the impact of the labour market reforms which have been introduced in Italy in the last three decades on aggregate labour productivity, through two main channels: the within component and the reallocative component. Following the discussion in the previous section, we consider the evolution over the last three decades of three main indicators of labour market institutions: an indicator of hiring and firing costs (EPL index) and two indicators of the industrial relations regime, capturing the level at which wage bargaining occurs (being centralised, intermediate or decentralised at firm level) and the degree of coordination amongst employers and unions.

The empirical analysis develops according to two main steps. In the first step we evaluate the effects of the labour market reforms on the within component of the aggregate productivity growth by estimating the effect of labour market deregulation on both the level and growth rate of labour productivity. In the second step we analyse the effects of reforms on the sector reallocative capacity.

4.1 Labour market reforms and industry productivity

Our empirical approach follows the difference-in-differences technique first proposed by Rajan and Zingales (1998). The basic idea is to exploit the fact that labour market reforms which were common to all sectors, may have had a different impact according to industry characteristics. In particular, the effects of reforms towards a higher degree of flexibility may be stronger in sectors with a higher degree of "intrinsic flexibility need" but also the impact of larger flexibility induced by the reforms may differ across

sectors according to the characteristics of human capital employed in each sector (high skill versus low skill human capital).

In line with a number of labour studies adopting the Rajan and Zingales approach (Micco and Pages, 2004; Bassanini et al., 2009 ; Cingano et al., 2010), we use job reallocation rates computed at industry level for a frictionless labour market (in our specific case for the UK) as a proxy for the "intrinsic flexibility need". The underlying assumption is that, in a deregulated environment, labour reallocation is mainly driven by country-invariant industry-specific factors such as the technological characteristics of production processes and the dynamics of the global demand for the industry. Following this approach we are able to differentiate the effect of reforms according to the intrinsic reallocative characteristics of each sectors and estimate more precisely their impact on productivity over the sample period.

We also interact our indicators of labour market reforms with a dummy which identifies sectors with a larger endowment of high skilled workers in order to capture differences in the impact of reforms in high skilled occupations and jobs. For example, firms may react differently to reforms which imply a deregulation in the use of fixed-term contracts, depending on the types of jobs they create. For jobs in which a good match with the worker entails a large gain in productivity (the "high skilled" jobs), firms use fixed-term contracts to screen workers, allowing them to experiment without paying a high dismissal cost if the worker is not a good match. In this case a deregulation of fixed-term contracts would be beneficial in terms of productivity gains. For jobs in which match quality is less important (mainly in low-skilled sectors), fixed-term contracts provide flexibility against potential productivity shocks or a reduction in labour costs, implying a substitution between temporary and permanent forms of employment. [12]

Finally, we distinguish between manufacturing and services in order to verify whether and to what extent labour market reforms may explain the differences in the productivity trends between them observed since the late 90s.

We then estimate the following linear regression model:

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[12] Empirical evidence is provided in a number of papers, among the others Casquel and Cunyat (2004) and Guell and Petrongolo (2007) for Spain, and Booth et al. (2000) for the UK.

$$Y_{jt} = Z_t\delta + (Z_t \times \sec_j)\gamma + X_{jt}\lambda + \mu_j + \varepsilon_{jt} \qquad (1)$$

Where Y_{it} is labour productivity (level and growth rate) of sector j at time t; Z_t are time-varying indexes of labour market institutions; sec_j are sector (time invariant) characteristics (manufacturing vs. service industry or intrinsic JR index or human capital endowment). The X_{jt} are sectoral specific characteristics (among the other an industry-specific time trend) and μ_i are industry fixed effects. In equation (1), the parameter γ measures the differential productivity effect between industries (for example the difference between a sector characterized by a high degree and a low degree of intrinsic reallocation) originated by a change in the institutional variable, while δ represents the main effect of a change in the institutions on productivity.

4.2 Labour market institutions and the productivity–enhancing reallocation

In the next step, we aim to assess whether and to what extent the labour market reforms affect the reallocative component of aggregate productivity by enhancing labour reallocation in favour of relative more productive sector. Following Brown and Earle (2004, 2006), we can express the reallocative component in equation *(1a)* as a covariance:

$$\sum \Delta\omega_{jt}(LP_{jt-1} - LP_{t-1}) = n\,\mathrm{cov}(\Delta\omega_{jt}, LP_{jt-1} - LP_{t-1}) \qquad (2)$$

The effect may also be computed as β from the following OLS regression:

$$\Delta\omega_{jt} = \alpha + \beta \frac{LP_{jt-1} - LP_{t-1}}{nVar(LP_{jt-1} - LP_{t-1})} + \upsilon_{jt} \qquad (3)$$

In this equation, $\hat{\beta}$ can be interpreted as the responsiveness of the industry size adjustment to its relative productivity, scaled so that the responsiveness is measured in terms of its contribution to aggregate productivity growth: if markets work well to reallocate resources across sectors, then $\hat{\beta}$ will be high, while if the reallocation process is sclerotic, then $\hat{\beta}$ will be low.

This specification allows us to express $\hat{\beta}$ as a function of institutional indicators and sectoral characteristics (manufacturing vs. service industry or intrinsic JR index or

human capital endowment) in order to estimate the impact of changes in the institutions on the extent of productivity-enhancing reallocation.

We then estimate the following specification:

$$\Delta\omega_{jt} = \beta D_{jt} + \delta(D_{jt} \times \sec_j) + (Z_t \times D_{jt} \times \sec_j)\gamma + \mu_t + \mu_j + \varepsilon_{jt} \qquad (4)$$

where $D_{jt} = \dfrac{LP_{jt-1} - LP_{t-1}}{nVar(LP_{jt-1} - LP_{t-1})}$.

The coefficient γ of the triple interaction term captures the effect of reforms on the reallocative component in sectors characterized by different types of activity (manufacturing versus services), intrinsic reallocation intensity or different human capital endowment. We also control for time (μ_t) and industry (μ_i) fixed effects.

4.3 Data

Productivity is measured as industry valued added per employment (full time equivalent) using data available from ISTAT National Accounts at a two digit industry classification while information on skill composition at sectoral level are provided by the EUKLEMS database. Our analysis is focused on the non agricultural business sectors. For this reason we exclude industries characterized by a large share of public employment such as health care service and education. We also exclude energy and utility, real estate, and renting and business activities. Our final sample includes information for 18 industries over a period of 27 years (1980-2008). [13]

Aggregate data on EPL and the wage bargaining centralization index are from OECD database (OECD, 2007). The EPL indicator considered in the analysis is the index of the regulation of temporary contracts and available form 1982 to 2008. The index of the degree of centralization of the wage bargaining system is available from 1982 to 2004.[14] The index for coordination of wage bargaining is taken from the ICTWSS Database compiled by Visser.[15]

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[13] The availability of data on labour market institutions restrict the analysis to the period from 1982 to 2003 in some specifications.

[14] We extrapolate the OECD index of the degree of the centralization for the years 2004-2008 in order to cover all the period. Results do not not change significantly.

[15] The ICTWSS database (Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts) covers four key elements of modern political economies in advanced capitalist societies: trade unionism, wage setting, state intervention and social pacts. The database contains annual data for 34 countries for the period 1960-2007. Data and a description of the content of the database are publicly available on http://www.uva-aias.net/208.

Finally the data on gross job reallocation for the UK are taken from Messina and Vallanti (2007) job flows database, which provides cross-country comparable job flows statistics for 13 EU countries over the period 1990-2001. The UK appears a natural benchmark because labour market regulations are very light in comparison to other OECD countries. Previous works have used gross job reallocation (the sum of creation and destruction rates) as a measure of reallocation intensity within a given sector in order to capture the simultaneous creation and destruction of jobs in a given period of time.[16] However, sectors which are experiencing large changes in employment (either positive or negative) may be characterized by high gross job reallocation rates without any simultaneous creation and destruction of jobs. In order to circumvent this difficulty, we consider a closed related measure of reallocation which is the excess job reallocation.[17] Excess job reallocation is calculated as the difference between gross reallocation and the absolute value of the net employment change. It captures the reallocation over and above the amount necessary to accommodate changes in the sectoral employment over a given period of time.[18]

5. Estimation results

5.1 Reforms and labour productivity

We start evaluating the effects of the labour market reforms on the within component of the aggregate productivity growth by estimating the impact of labour market deregulation on both the level and growth rate of labour productivity at sectoral level. As a preliminary evidence (see Table 4), we simply include three dummies, one for each period of major reforms as discussed in the previous sections, in order to capture any significant change in the trend of labour productivity over the period.

TABLE 4 AROUND HERE

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[16] Among the others, see Cingano et al. (2010)

[17] In our sample the cross sector correlation of gross employment reallocation and excess employment reallocation is 0.89. Results obtained using gross job reallocation as an indicator of "sectoral intrinsic flexibility" are qualitatively and quantitatively similar and are available from the authors under request.

[18] See Messina and Vallanti (2007) for details on the construction of job flows statistics at industry level used in the analysis. See Devis et al. (1996) for a general discussion on job flows indices.

We also interact the reform period dummies with the sectoral characteristics (manufacturing, high skilled and high reallocative sectors in columns 2, 3 and 4 respectively) to detect any differential impact of the change in the institutional settings on labour productivity in different groups of sectors. In all specifications we include also a trend variable in order to control for a common pattern of productivity over the period of analysis. The results in Table 4 show that during the first period and second period of reforms productivity increased significantly especially in manufacturing and high skilled sectors, while the trend appears to reverse in correspondence with the third wave of reforms. Another interesting result is that the increase in labour productivity registered during the second period of reforms is less strong in high-reallocative sectors which should have benefited more from the liberalization. In order to better assess the effect of changes in the labour market institutional settings, we estimate a second set of regressions (Table 5) substituting the period dummies with the indicators for employment protection legislation on temporary contracts (EPL), wage bargaining centralization (CENT) and coordination (COOR).

TABLE 5 AROUND HERE

The results unambiguously show that labour productivity is negatively affected by a relaxation of the rules governing the use of temporary contract. Such negative effect is smaller in high skilled sectors, and becomes quantitatively stronger in sectors with a higher intrinsic reallocation. The marginal effect of reducing the EPL index by 1 unit ranges from -2.5% for the sector at 10th percentile of the distribution of the "flexibility need" (Transport, storage and communication) to -4% for the sector at the 90th percentile (Manufacture of electrical and optical equipment).[19] The magnitude of the effects is not negligible, and lies around 5.6% of the difference in labour productivity of high relative to low-reallocative sectors over the period considered. Looking at the wage bargaining institutional framework, the process of decentralization appears to have led to some significant increase in labour productivity in sectors which employ a larger share of high skilled workers and in sectors with a lower reallocative need.

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[19] In our sample, the meadian sectoral excess job reallocation is 0.06.

The impact of labour market institutions on productivity growth appears to be less neat (see Table 6 and Table 7). In general, the first period of reforms registers a slight increase in the growth rate of productivity in services and low reallocative sectors, while productivity growth declines in the third period of reforms. When we consider the impact of specific institutional indicators, a larger degree of flexibility in the use of temporary forms of employment (lower EPL) has no significant effect on the rate of growth of productivity, while low-reallocative sectors have benefited more in terms of productivity growth from the decentralization of the wage setting process.

Finally, in Tables from 8 to 11 we explore the effects of the reforms on capital deepening (level and growth). The results in Table 9 and Table 11 show that the decrease in EPL on temporary contract reduces the capital labour ratio in the high job reallocation industries, implying substitution of capital for labour in sectors where the impact of the reforms is expected to be stronger. This result is in line with the theoretical prediction that a reduction in labour costs (which is a consequence of the liberalization in the use of temporary contracts) imply a substitution of capital with more labour, and then a decline in capital deepening. Interestingly, the results shows that the positive effects on productivity of the decentralization of the bargaining process in high skilled sectors goes through an increase in the use of capital stock relative to labour input.

5.2 Reforms and reallocation

Here we look at the results of the second set of our estimates aimed at investigating the impact of institutional changes on the extent of productivity-enhancing reallocation. First, we test whether there are differential effects of reallocation according to some sectoral characteristics and then we look also at the impact of labour market reforms. Table (10) reports the results for the aggregate average reallocation effect. Column (1) shows that at the aggregate level, the average reallocation effect is positive and significant at 1 percent and it accounts for 0.04 pp of yearly labour productivity growth. The reallocation effect is instead negligible in manufacturing confirming the major role of the within effect that drove the manufacturing contribution to labour productivity growth over the whole period (Table 3). The reallocation is not related with the industrial skill content since the coefficient in table (10) column (3) is not

significant. In column (4) we test whether the productivity-enhancing reallocation has different impacts according to the degree of "flexibility needs" across sectors. The coefficient of the interaction term is negative and significant at 5 percent indicating that in those industries where the flexibility need is higher the reallocative component contribute less to sectoral productivity growth.

Table (11) reports the complete set of estimates of equation (4) to test the link between institutional changes and productivity-enhancing reallocation taking into account some sectoral characteristics. Column (1) shows that at the aggregate level, EPL does not have any impact on the reallocative capacity of industries while the decentralization of the wage bargaining process appears to negatively affect the reallocative component. Column (3) reports the results for manufacturing as opposed to services. The EPL interaction coefficients are significant at 1 percent level and indicate that a lower regulated labour market reduces the reallocative capacity of services while it does not have any impact on manufacturing. Then, column (5) shows that the industry reallocative responsiveness to institutional reforms is not driven by the sectoral human capital endowment. Finally, in those sectors where the "flexibility need" is relatively higher; instead, a lower degree of regulation produces a negative impact on the reallocative capacity of sectors.

6. Conclusions

The labour market deregulation has a negative effect on aggregate labour productivity through both the within and the reallocative components. Our results show that the increased flexibility in the use of temporary contract has led to a lower productivity (level and to a lesser extent growth rate) in all sectors, with a higher impact on those industries with a higher flexibility need. The marginal effect of reducing the EPL index by 1 unit, ranges from -2.5%, for the sector at 10th percentile of the distribution of "flexibility need" (Transport, storage and communication) to -4% for the sector at the 90th percentile (Manufacture of electrical and optical equipment). Conversely, the use of temporary contracts has a significant lower effect in industries with higher skill content. This result confirms the theoretical prediction that the use of fixed-term contracts can produce different results in term of productivity losses according to the types of jobs they create. For "high skilled" jobs firms use them to screen employees

with a beneficial effect on the firm-worker match (this is mainly the case for jobs created in high skilled industry). On the other hand, in sectors with a high flexibility need, fixed-term contracts provide flexibility against negative productivity shocks and a reduction in labour adjustment costs, implying a substitution between temporary and permanent forms of employment and substitution between labour and capital. Moreover the extensive use of temporary form of employment appears to have favoured the access to the labour market of the so called marginal low-productive workers (basically women, youth and unskilled workers) and/or have made profitable the creation of jobs and activities with a low skills requirement.

The negative effect of the reforms on the reallocative capacity is stronger in those industries with a higher flexibility need that are also the relatively lower productivity sectors in the period 1993-2008. At the same time these sectors experienced a larger increase in employment as a result of the deregulation process.[20] Such decline in the reallocative capacity is then the result of reforms that favoured higher job creation in industries which benefited more from the reduction in the adjustment costs of the labour force. However, this has also implied an increase in the relative economic importance of sectors characterized by slower productivity dynamics with an overall negative impact on the aggregate productivity growth.

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[20] The productivity growth differentials between the higher (above the 90th percentile) and lower (below the 10th percentile) flexibility need sectors is on average 0.5 percentage points, while higher flexibility need flexibility sectors experienced an average increase in employment 6 percentage points higher than sectors with lower flexibility need.

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TABLE 1. Labour Market Reforms in Italy (breaking points)

	Reform description
1984-1987	Reduction in the wage indexation and introduction of part-time and training contracts (Contratti di formazione e lavoro)
1991-1993	New procedures for collecting firing and limits to the use of Cassa Integrazione e Guadagni, abolishment of indexation (1992), Giugni agreement (1993) which introduces two-tiers wage bargaining (centralized and at firm level)
1994-1995	Extension of the training contracts (Contratti di formazione e lavoro) to a wider range of situations and the collaboration contracts are introduced (no firing and hiring costs)
1998	Pacchetto Treu: new atypical contracts such as job-sharing and staff leasing, use of temporary worker agency
2000	Reform of TWA extends the use of TWA and removes restrictions concerning unskilled workers
2001	Fixed term contracts are extended to regular employees
2003	Legge Biagi provides a common framework to atypical contracts and extends further the use of TWA

TABLE 2. Labour Market Institutional Indicators

	EPL regular contracts[a]	EPL temporary contracts[b]	Share of temporary contracts[c]	Centralization index[d]	Coordination index[e]
1980-1986	1.77	5.38	5.24	3	2.86
1987-1992	1.77	5.38	5.93	2	2.33
1993-2000	1.77	4.60	8.07	2	4.00
2001-2007	1.77	1.99	11.63	2	4.00

Note: (a) EPL regular contracts: measures the costs of dismissals of redundant workers and includes legal restrictions on dismissals and the extent of compensations in case of redundancy.; (OECD, 2004). (b) EPL temporary contracts: measures the restrictions on the use of temporary employment by firms, with respect to the type of work for which these contracts are allowed and their duration (scale: 1-6); OECD (2004). (c) Temporary contracts covers fixed-term workers, temporary work agency (TWA) workers and other occasional forms of work arrangements. (d) Centralization index: the dominant level(s) at which wage bargaining takes place (scale: 1- 3); OECD (2004). (e) Coordination index: coordination of wage bargaining (scale1-5). 4=mixed industry and economy-wide bargaining (key unions and employers associations set pattern for the entire economy); 2=mixed industry- and firm level bargaining, with weak enforceability of industry agreements; ICTWSS database (Visser, 2007).

TABLE 3. Labour Productivity Growth Decomposition

	1980-1987				1988-1993				1994-2001				2001-2008			
	within	reall.	inter.	total	within	reall.	inter.	total	within	reall.	inter.	total	within	reall.	inter.	total
Agriculture and fishing	0.013	0.025	0.000	0.039	0.010	0.011	- 0.000	0.020	0.007	0.009	- 0.000	0.016	0.005	0.007	- 0.001	0.011
Industry	0.067	0.007	- 0.006	0.069	0.028	0.000	- 0.000	0.028	0.028	- 0.001	- 0.001	0.026	0.002	- 0.001	- 0.000	0.001
Construction	0.005	0.001	0.000	0.006	- 0.001	- 0.000	- 0.000	- 0.001	0.001	- 0.001	- 0.000	0.001	- 0.003	- 0.002	- 0.000	- 0.005
Trade, hotels and restaurants, transport and communication	- 0.001	- 0.003	- 0.004	- 0.007	0.026	0.001	- 0.000	0.026	0.032	- 0.000	0.000	0.032	- 0.004	- 0.000	- 0.000	- 0.004
Financial intermediation and real estate, renting and business activities	- 0.050	0.100	- 0.035	0.015	- 0.001	0.023	- 0.001	0.020	- 0.028	0.038	- 0.010	0.000	- 0.014	0.016	- 0.002	0.001
Real estate, renting and business activities	*- 0.043*	*0.115*	*- 0.043*	*0.029*	*- 0.013*	*0.024*	*- 0.003*	*0.008*	*- 0.035*	*0.047*	*- 0.016*	*- 0.004*	*- 0.021*	*0.016*	*- 0.004*	*- 0.009*
Other services	0.002	0.001	- 0.003	0.001	0.004	- 0.001	- 0.001	0.001	0.001	0.000	0.000	0.002	0.003	0.000	- 0.000	0.004
Total	**0.037**	**0.131**	**-0.046**	**0.122**	**0.065**	**0.032**	**-0.004**	**0.094**	**0.042**	**0.046**	**-0.011**	**0.077**	**-0.011**	**0.020**	**-0.003**	**0.006**

Note: The definitions of within (**within**), level reallocation (**reall**.) and interaction term (**inter**.) are given in the main text

TABLE 4. Labour Productivity: Period Dummies

Dep. var.= LP		**man**	**hs**	**ejr**
	(1)	(2)	(3)	(4)
per1	0.071	-0.056	0.039	0.060
	(4.01)***	(1.53)	(1.62)	(0.64)
per2	0.056	0.066	0.052	0.322
	(3.18)***	(3.21)***	(2.74)***	(5.94)***
per3	-0.069	-0.055	-0.083	0.013
	(3.26)***	(1.76)*	(3.37)***	(0.17)
per1 x sect		0.066	0.061	0.139
		(4.14)***	(1.91)*	(0.11)
per2 x sect		-0.012	0.007	-3.518
		(0.74)	(0.45)	(5.13)***
per3 x sect		-0.018	0.027	-1.082
		(0.64)	(1.32)	(1.10)
Observations	518	518	518	518
R-squared	0.90	0.90	0.90	0.90
Industry	yes	yes	yes	yes
trend	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include an aggregate trend and industry fixed effects. LP is the (log of) value added per worker (FTE). The period dummies are defined as follows: **per1**= 1 if year> 1986, 0 otherwise; **per2**= 1 if year> 1992, 0 otherwise; **per3**= 1 if year> 2000, 0 otherwise. Sect is **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 5. Labour Productivity: Institutional Indicators

Dep. var.= LP		**man**	**hs**	**ejr**
	(1)	(2)	(3)	(4)
EPL	0.032	0.025	0.038	-0.029
	(3.53)***	(2.18)**	(4.10)***	(1.11)
CENT	-0.053	0.048	-0.024	-0.176
	(1.42)	(0.87)	(0.61)	(1.37)
COORD	0.009	0.007	0.009	0.067
	(0.99)	(0.43)	(0.84)	(1.84)*
EPL x sect		0.009	-0.015	0.815
		(0.92)	(2.14)**	(2.54)**
CENT x sect		-0.071	-0.073	1.629
		(1.54)	(1.82)*	(0.98)
COORD x sect		0.003	0.001	-0.772
		(0.21)	(0.11)	(1.58)
Observations	466	466	466	466
R-squared	0.92	0.92	0.92	0.92
Industry	yes	yes	yes	yes
trend	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include an aggregate trend and industry fixed effects. LP is the (log of) value added per worker (FTE). EPL is the employment protection legislation on temporary contracts; CENT is an indicator for the centralization of the wage bargaining process; COORD is an indicator for the coordination of the wage bargaining process. Sect is for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 6. Labour Productivity Growth: Period Dummies

Dep. var.= dLP		man	hs	ejr
	(1)	(2)	(3)	(4)
per1	0.003	0.037	0.009	0.056
	(0.53)	(3.65)***	(1.17)	(1.98)**
per2	0.003	0.013	0.000	0.014
	(0.37)	(1.40)	(0.01)	(0.55)
per3	-0.020	-0.018	-0.021	-0.062
	(2.82)***	(1.86)*	(2.48)**	(2.38)**
per1 x sect		-0.043	-0.012	-0.693
		(3.83)***	(1.07)	(1.87)*
per2 x sect		-0.013	0.005	-0.147
		(1.56)	(0.65)	(0.45)
per3 x sect		-0.003	0.001	0.551
		(0.28)	(0.14)	(1.69)*
Observations	500	500	500	500
R-squared	0.16	0.22	0.16	0.17
Industry	yes	yes	yes	yes
trend	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include an aggregate trend and industry fixed effects. dLP is labour productivity growth rate. The period dummies are defined as follows: **per1**= 1 if year> 1986, 0 otherwise; **per2**= 1 if year> 1992, 0 otherwise; **per3**= 1 if year> 2000, 0 otherwise Sect is for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 7. Labour Productivity Growth: Institutional Indicators

Dep. var.= dLP		man	hs	ejr
	(1)	(2)	(3)	(4)
EPL	0.005	0.002	0.005	0.016
	(1.61)	(0.49)	(1.42)	(1.94)*
CENT	-0.011	-0.045	-0.016	-0.088
	(1.10)	(3.30)***	(1.46)	(3.16)***
COORD	0.007	0.003	0.005	0.014
	(2.35)**	(0.65)	(1.77)*	(1.35)
EPL x sect		0.004	0.001	-0.145
		(1.44)	(0.33)	(1.44)
CENT x sect		0.043	0.014	1.027
		(3.57)***	(1.17)	(2.88)***
COORD x sect		0.005	0.003	-0.102
		(1.32)	(0.75)	(0.73)
Observations	466	466	466	466
R-squared	0.18	0.23	0.18	0.19
Industry	yes	yes	yes	yes
trend	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include an aggregate trend and industry fixed effects. dLP is labour productivity growth rate. EPL is the employment protection legislation on temporary contracts; CENT is an indicator for the centralization of the wage bargaining process; COORD is an indicator for the coordination of the wage bargaining process. Sect is for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 8. Capital to Labour Ratio: Period Dummies

Dep. var.= KL		man	hs	ejr
	(1)	(2)	(3)	(4)
per1	0.156	0.011	-0.014	0.088
	(9.39)***	(0.35)	(0.66)	(1.28)
per2	0.184	0.044	-0.004	0.269
	(16.06)***	(1.86)*	(0.19)	(5.07)***
per3	0.142	-0.052	-0.017	0.101
	(10.27)***	(1.77)*	(0.76)	(1.50)
per1 x sect		-0.003	0.058	-1.075
		(0.10)	(1.80)*	(1.21)
per2 x sect		-0.025	0.072	-3.265
		(1.23)	(3.52)***	(4.86)***
per3 x sect		0.029	-0.031	-1.744
		(1.00)	(1.13)	(1.98)**
Observations	505	505	505	505
R-squared	0.95	0.96	0.96	0.96
Industry	yes	yes	yes	yes
trend	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include an aggregate trend and industry fixed effects. KL is the capital to labour ratio. The period dummies are defined as follows: **per1**= 1 if year> 1986, 0 otherwise; **per2**= 1 if year> 1992, 0 otherwise; **per3**= 1 if year> 2000, 0 otherwise Sect is for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 9. Capital to Labour Ratio: Institutional Indicators

Dep. var.= KL		man	hs	ejr
	(1)	(2)	(3)	(4)
EPL	0.006	0.009	0.004	-0.070
	(0.59)	(0.75)	(0.46)	(2.92)***
CENT	-0.024	-0.049	0.010	-0.194
	(0.74)	(1.16)	(0.33)	(2.48)**
COORD	0.014	0.019	0.005	0.075
	(1.61)	(1.52)	(0.54)	(2.47)**
EPL x sect		-0.004	0.003	0.997
		(0.43)	(0.32)	(3.36)***
CENT x sect		0.032	-0.088	1.251
		(0.82)	(2.30)**	(2.15)**
COORD x sect		-0.007	0.024	-0.810
		(0.54)	(1.86)*	(2.04)**
Observations	468	468	468	468
R-squared	0.96	0.96	0.96	0.96
Industry	yes	yes	yes	yes
trend	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include an aggregate trend and industry fixed effects. KL is the capital to labour ratio. EPL is the employment protection legislation on temporary contracts; CENT is an indicator for the centralization of the wage bargaining process; COORD is an indicator for the coordination of the wage bargaining process. Sect is for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 10. Capital to Labour Ratio Growth: Period Dummies

Dep. var.= dKL		**man**	**hs**	**ejr**
	(1)	(2)	(3)	(4)
per1	-0.009	0.033	-0.001	0.060
	(2.16)**	(4.70)***	(0.11)	(2.56)**
per2	-0.004	-0.000	0.013	-0.012
	(1.32)	(0.06)	(2.20)**	(0.67)
per3	-0.007	0.010	0.013	0.018
	(2.07)**	(1.52)	(1.99)**	(1.05)
per1 x sect		-0.039	0.009	-0.763
		(5.43)***	(1.03)	(2.53)**
per2 x sect		0.012	-0.011	0.271
		(1.80)*	(1.49)	(1.18)
per3 x sect		-0.004	-0.013	-0.149
		(0.58)	(1.98)**	(0.67)
Observations	487	487	487	487
R-squared	0.18	0.23	0.21	0.20
Industry	yes	yes	yes	yes
trend	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include an aggregate trend and industry fixed effects. dKL is the growth rate of the capital to labour ratio. The period dummies are defined as follows: **per1**= 1 if year> 1986, 0 otherwise; **per2**= 1 if year> 1992, 0 otherwise; **per3**= 1 if year> 2000, 0 otherwise Sect is for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 11. Capital to Labour Ratio Growth: Institutional Indicators

Dep. var.= KL		man	hs	ejr
	(1)	(2)	(3)	(4)
EPL	0.001	0.001	-0.001	-0.002
	(0.45)	(0.36)	(0.59)	(0.29)
CENT	0.002	-0.024	0.005	-0.040
	(0.40)	(3.87)***	(0.80)	(1.70)*
COORD	0.006	-0.001	0.006	-0.004
	(3.31)***	(0.30)	(2.78)***	(0.48)
EPL x sect		0.000	0.007	0.036
		(0.15)	(3.07)***	(0.52)
CENT x sect		0.034	-0.007	0.564
		(5.90)***	(0.89)	(1.87)*
COORD x sect		0.009	0.001	0.135
		(3.22)***	(0.25)	(1.19)
Observations	468	468	468	468
R-squared	0.21	0.26	0.23	0.21
Industry	yes	yes	yes	yes
trend	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include an aggregate trend and industry fixed effects. dKL is the growth rate of the capital to labour ratio. EPL is the employment protection legislation on temporary contracts; CENT is an indicator for the centralization of the wage bargaining process; COORD is an indicator for the coordination of the wage bargaining process. Sect is for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 12. Reallocative Component and Industry Characteristics

Dep. var.= dw		**man**	**hs**	**ejr**
	(1)	(2)	(3)	(4)
D	0.0004	0.0039	0.0004	0.0056
	(3.07)***	(3.96)***	(2.89)***	(2.14)**
D x sect		-0.0038	0.0001	-0.0729
		(3.75)***	(0.25)	(2.03)**
Observations	502	502	502	502
R-squared	0.18	0.36	0.19	0.23
Industry	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include industry fixed effects. dw is change in share. D is the lagged deviation of the industry's productivity from the aggregate productivity divided by the variance. Sect is for for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 13. Reallocative Component: Period Dummies

Dep. var.= dw	(1)	man (2)	hs (3)	ejr (4)
D	0.0005	0.0056	0.0005	0.0056
	(3.41)***	(5.70)***	(3.23)***	(2.13)**
D x sect		-0.0053	0.0012	-0.0703
		(5.44)***	(3.98)***	(1.97)**
D x per1	-0.0001	0.0020	-0.0001	-0.0003
	(2.23)**	(1.57)	(2.09)**	(0.36)
D x per2	0.0000	-0.0008	0.0000	0.0015
	(0.57)	(1.04)	(0.72)	(2.46)**
D x per3	-0.0000	-0.0022	0.0000	-0.0007
	(0.01)	(4.06)***	(0.02)	(1.45)
D x per1 X sect		-0.0020	-0.0011	0.0027
		(1.59)	(2.83)***	(0.26)
D x per2 X sect		0.0008	-0.0004	-0.0202
		(1.05)	(1.33)	(2.46)**
D x per3 X sect		0.0022	-0.0000	0.0100
		(4.04)***	(0.15)	(1.48)
Observations	502	502	502	502
R-squared	0.18	0.36	0.19	0.23
Industry	yes	yes	yes	yes

Note: Robust standard errors in parentheses. All the regressions include industry fixed effects. dw is change in share. D is the lagged deviation of the industry's productivity from the aggregate productivity divided by the variance. The period dummies are defined as follows: **per1**= 1 if year> 1986, 0 otherwise; **per2**= 1 if year> 1992, 0 otherwise; **per3**= 1 if year> 2000, 0 otherwise Sect is for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

TABLE 14. Reallocative Component: Institutional Indicators

Dep. var.= dw		man	hs	ejr
	(1)	(2)	(3)	(4)
D	0.0003	0.0097	0.0003	0.0062
	(2.47)**	(1.96)*	(2.56)**	(1.70)*
D x sect		-0.0096	-0.0028	-0.0829
		(1.93)*	(2.60)***	(1.63)
D x EPL	-0.0000	0.0007	-0.0000	-0.0001
	(0.42)	(3.85)***	(0.64)	(0.71)
D x CENT	0.0001	-0.0022	0.0001	0.0000
	(2.26)**	(1.28)	(2.18)**	(0.03)
D x COORD	0.0000	-0.0004	0.0000	0.0003
	(1.62)	(0.92)	(1.63)	(1.19)
D x EPL x sect		-0.0007	0.0001	0.0035
		(3.84)***	(1.47)	(1.75)*
D x CENT x sect		0.0022	0.0011	0.0008
		(1.29)	(3.84)***	(0.07)
D x COORD x sect		0.0004	-0.0000	-0.0044
		(0.94)	(0.36)	(1.12)
Observations	468	468	468	468
R-squared	0.18	0.37	0.19	0.22
Industry	yes	yes	yes	yes

Note: Note: Robust standard errors in parentheses. All the regressions include industry fixed effects. dw is change in share. D is the lagged deviation of the industry's productivity from the aggregate productivity divided by the variance. EPL is the employment protection legislation on temporary contracts; CENT is an indicator for the centralization of the wage bargaining process; COORD is an indicator for the coordination of the wage bargaining process. Sect is for **man**, **hs** and **ejr** in column (2), (3) and (4) respectively; **man** is a dummy with value 1 for manufacturing industry, 0 otherwise; **hs** is a dummy with value 1 for high skilled sectors (share of workers with an underground degree or more above the median), 0 otherwise; **ejr** is the average industry excess job reallocation calculated for the UK sectors over the period 1990-2000.
 * significant at 10%; ** significant at 5%; ***significant at 1%.

Figure1. Industry Labour Share: Period 1 vs. Period 2

Sectoral labor shares - Rif 1
(yearly average rates of growth)

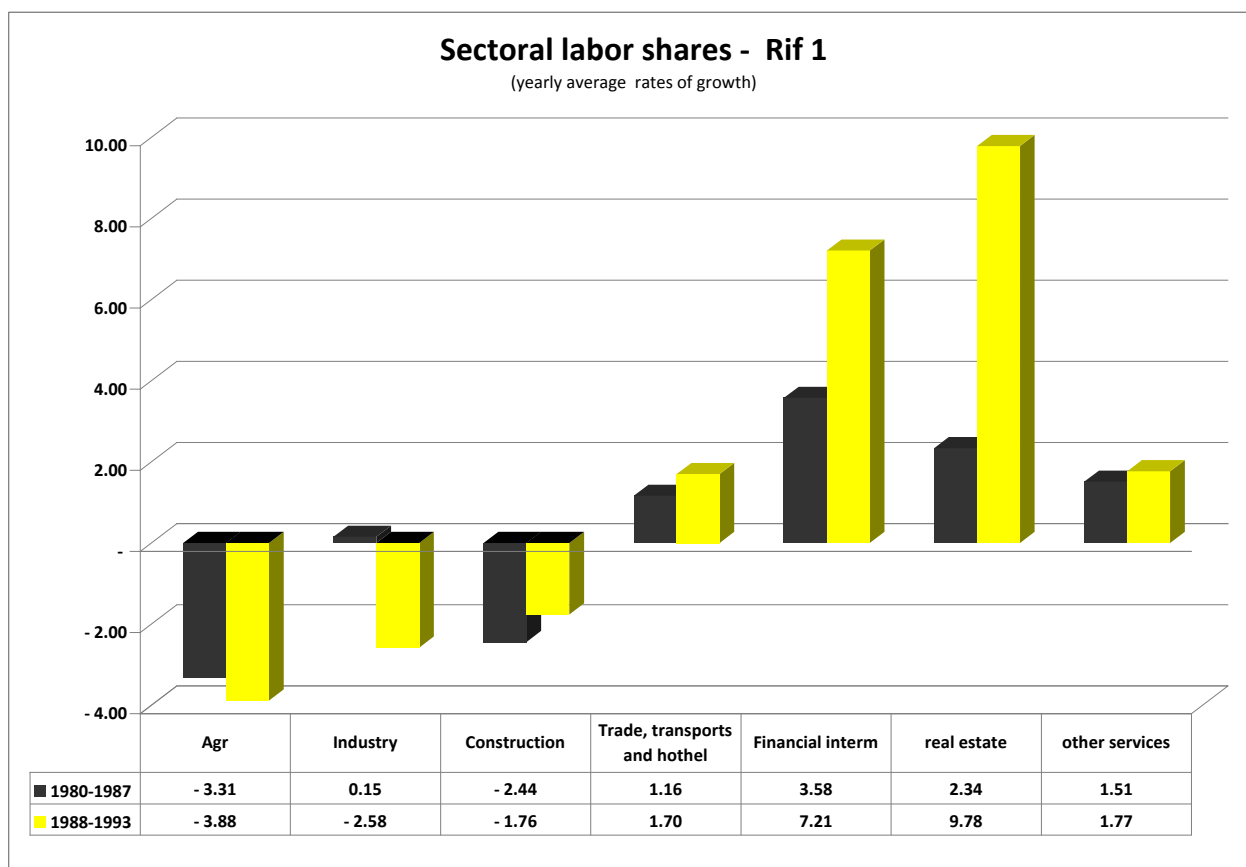|	Agr	Industry	Construction	Trade, transports and hothel	Financial interm	real estate	other services
■ 1980-1987	- 3.31	0.15	- 2.44	1.16	3.58	2.34	1.51
■ 1988-1993	- 3.88	- 2.58	- 1.76	1.70	7.21	9.78	1.77

Figure1. Industry Labour Share: Period 3 vs. Period 4

Sectoral labor shares - Rif 2 & Rif 3

(yearly average rates of growth)

	Agr	Industry	Construction	Trade, transports and hothel	Financial interm	real estate	other services
■ 1994-2001	- 3.38	- 1.31	1.05	- 0.24	2.90	3.42	1.34
■ 2002-2008	- 2.86	- 1.02	0.54	0.04	3.54	4.94	- 0.04