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DECENTRALISED BARGAINING, CONTINGENT PAY AND UNIONS: NEW EVIDENCE FROM ITALY

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Decentralised bargaining and performance related pay: new evidence from a panel of Italian firms

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ABSTRACT

Purpose: This paper examines two institutional aspects closely related: (i) the extent to which collective bargaining has been decentralized at firm or district level; (ii) the extent to which, at this level of bargaining, Performance Related Pay (PRP) have been used.

Design/methodology/approach: On the basis of a unique database, which contains recent information on nationwide sample of firms, panel estimates aimed at identifying the main factors which have favoured the adoption of the second level of bargaining and PRP are presented.

Findings. unions, after size, is the main factor associated to the probability of the second level of bargaining and PRP. Significant estimates are also found for training.

Research limitations/implications ï Further research based on additional data should enable us to identify causal effects.

Practical implications: It offers new evidence to evaluate ongoing reform proposals to implement firm-level agreements more tailored to firmsô specific needs.

Originality/value our estimates are based on a unique dataset which contains recent information and a nationwide sample of firms, representative of the whole Italian economy (other studies on Italy are more limited in scope, since they focus on specific sectors or regions). Second, it addresses the question of training, an aspect so far not examined in relation to PRP in Italy.

JEL Classification: J33; J51

Keywords: Performance ï related pay, unions

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1. Introduction[1]

In many EU member states some steps in the direction of replacing centralized bargaining by local bargaining have been moved in recent years. One of the aims of this process has been that of flexibilising wage systems and connecting rewards more closely to the requirements of individual enterprises. (European Commission, 2011, p. 131) Indeed, too rigid wage setting and working conditions cause low workforce motivation and productivity and low cost competitiveness for firms involved in global competition.

In Italy, however, this process has had limited implementation and up to now wage-setting takes place mainly trough industry-wide bargaining at national level. Indeed, one the mandates of the ECB includes among measures as óessentialsô to solve the deep Italian crisis, ñthe need to further reform the collective bargaining system allowing firm-level agreements to tailor wages and working conditions to firmsô specific needs and increasing their relevance with respect to other layers of negotiation.ò (Trichet and Draghi, 2011)

As well known, for Italy, evidence on the coverage of decentralised agreements and diffusion of performance related pay (PRP) is limited and dated. This offers the motivation of our paper. We examine decentralized bargaining and diffusion of contingent pays on the basis of a unique dataset obtained by merging information from two different sources: firm-level information on workplace practices provided by ISFOL, the Italian Institute for the Development of Vocational Training for Workers, and balance-sheet data from the Bureau Van Dijk AIDA archive. On the basis of this merged dataset, containing a wealth of information on national scale on firm and employee characteristics, we perform panel estimates aimed at identifying the main factors which have hindered or favoured decentralised agreements and PRP. It seems a crucial issue in a phase in which the Italian system of industrial relations is under pressure and reform proposals have been advanced, in 2009 and 2011, in order to enlarge the diffusion of local arrangements, at company or district level[2].

The paper is organised as follows. Section 2 discusses related literature and briefly describes the Italian institutional setting. Section 3 presents the data that has been used, descriptive statistics, estimation strategy and results for the whole economy. Section 4 performs the econometric analysis by distinguishing industrial and service sector. Section 5 concludes.

2. Background discussion

2.1 Motivation

This paper is aimed at studying the main factors behind the adoption of Second Level Bargaining (SLB) and Performance Related Pay (PRP) schemes in a country, such as Italy, which began to reveal, from the mid Nineties, sizeable slowing in labour productivity growth, on a scale without equal in other European

[1]This paper was presented at the AIEL, XXVI National Conference Università Cattolica del Sacro Cuore, Milano, 15-16 September 2011. We are grateful to the discussant Leonello Tronti and other participants to the conference for their useful comments. All errors remain ours.

[2]The 22 January 2009 agreement was signed by the government, national employers' associations and the trade unions, with the exception of CGIL (one of three main national representative organizations of employees). The agreement designs new rules for wage setting in order to amplify the importance of the variable component. A second agreement, which moves in this direction, has been approved by the main trade unions and the industrial business associations on June 28 2011 and further measures to implement enterprise level negotiations are currently a matter of political debate.

economies. The potentials and limitations of its bargaining and incentive system may contribute to explaining these disappointing performances, thus making Italy an interesting case study.

Our estimates concern both SLB *and* PRP. The reason behind our choice is that even if in principle all firms can potentially introduce PRP schemes, in Italy they are usually bargained with local unions and they are part of a local (usually firm-level) agreement. The probability of introducing a PRP scheme is then highly correlated with the probability of adopting a firm-level agreement. In light of these considerations, we compare estimates for the determinants of SLB *and* PRP in order to verify if the probability of contingent pay is explained by the same forces behind adoption of the decentralized bargaining.

We analyse the role of *firm characteristics* (size, sectoral specialisation, geographical location, past performances, innovation and training strategies) but particular concern is devoted to the influence of training and innovation. The question is whether the diffusion of decentralisation of pay setting is motivated by strategical requirements of individual companies to improve the skills of their workforce and enhance (product and process) innovation.

Recent analyses of *innovation* call for increasing interest on the relation between firm propensity to innovation and work practices (Michie and Sheehan, 1999, 2003; Laursen and Foss 2003; Vinding 2004). This new literature points out that innovation is positively associated with participative labour relations and workers motivation, as tested recently for a region of the Italian economy (Gritti and Leoni, 2011)[3]. For the latter case, the authors estimate that the combination of work practices that is most conducive to innovation consists in industrial relations of ófparticipatoryô type (p. 22) and, among others, individual or collective bonuses linked to enterprise performance.

In our case we will extend the analysis to the whole Italian economy and verify the association between adoption of compensation packages linked to firm performance and *training*. We expect that the need of tailoring working condition to the firm specific needs (thorough the second level of bargaining) may be more relevant when the fraction of trained employees is higher; in addition, workers representation may influence this expected association, since their attitude to improve working conditions and job security may strengthen beneficial effects of training, thus amplifying the expected link between training and diffusion of firm-level agreements.

The contribution of this paper is thus to verify for the first time, at least for the Italian economy, this potential positive effect. Only in a related recent study for the German case (Kriechel et al. 2011), but focussed on explaining *training intensity* rather than *bargaining intensity*, it has been confirmed the positive influence of works councils and in any case no estimates, as said above, are available for the Italian economy.

A second, related issue, concerns the role of *union* strategies, to identify how much their attitudes may contribute in explaining the (limited) diffusion of local agreements and contingent pays. As known, the role of unions on the probability of adoption of PRP is controversial. Some studies found that in unionised plants, incentive payments, accompanied by joint decision-making, may be more likely present, leading to better results in terms of firm performances (Black and Lynch, 2001). Also, there is new evidence that even in low unionised economies, such as the UK, worker representations are perceived by employers as institutions capable of improving firm performance, as found by Bryson and Forth for the UK (2009). Other studies argue, however, that employeesô representatives may inhibit variable payments, which in principle may

[3] The analysis of Gritti and Leoni (2011) is based on a database of a sample of 166 manufacturing firms located in the Lombardy region (Italy).

reduce wage compression, since one aim of unionsô strategy is limiting pay heterogeneities and easing wage compression (Addison and Hirsch, 1989).

In addition, we are interested to test the role of a joint effect *unions-training* on encouraging decentralised bargaining and PRP. So far, existing literature has considered the association between unions and training and some direct and un-direct links have been advocated: through the wage structure or labour turnover (the indirect link) or through the negotiation of training (the direct link), with unclear final results. Some of the arguments concerning the un-direct link are the followings. The ability of firms to finance training may be limited when union power leads to excessive wage demands; furthermore, wage compression or premiums that compensate seniority rather than merits, more frequent in unionised companies, may reduce the same incentives of employees to improve their skills (Becker, 1964; Mincer, 1981, Acemoglu and Pischke, 1999) On the other hand, in unionized firms, constructive institutional responses overcome free rider problems of group incentives, increase workersô commitments and reduce voluntary labour turnover (Booth and Chatterji, 1998), all these channels may explain why under the presence of unions, which guarantees higher commitment and low labour turnovers, managers find convenient to offer higher levels of training to their employees.

In addition, a direct link is represented by collective bargaining over training, more likely in unionised firms. In condition of uncertainty, workers tend to invest in firm-specific skills only when the employment relationship is expected to last, otherwise they invest in portable skills (Wasmer, 2006); in such environments protection offered by unions may count.

In our empirical analysis we attempt to address these issues by testing whether firms who have invested in training and in the productivity of the ómatchô with their employees will be more oriented to share the returns of these investments, thus showing higher propensity to adopt compensation packages linked to company performance.

2.2. The Italian institutional setting and previous empirical evidence

Italy is characterized by a two-tier bargaining regime, designed by the July 1993 Agreement. In this new institutional setting, national contracts at sectoral level, linked to the target inflation rate, should have guaranteed the purchasing power of wages, whereas the decentralised bargaining should have distributed wage premiums, linked to productivity or company results. In addition, decentralised bargaining (at firm or district level) also had to deal with a number of additional issues such as working time, training, labour organisation, union relations. This institutional setting should have provided enough space to wage compensation schemes linked to efficiency gains, thus promoting reorganisation and innovation of productive processes.

However, implementation of decentralised bargaining has been modest and it is widely held that the original aims of the 1993 Agreement have been accomplished only on a limited scale (Tronti, 2010). The reform of this setting, partially modified by the 22 January 2009 and the June 28 2011 agreements[4], are still object of current debates and new rules aimed at amplifying the importance of the decentralised level of negotiations and variable remuneration schemes are called for. The present paper, which refers to years

[4]The 2009 agreement (Accordo Quadro Riforma degli Assetti Contrattuali, 22 January 2009) was signed by the government, national employers' associations and the trade unions, with the exception of CGIL (one of three main national representative organizations of employees). One of the main points of disagreement concerns the possibility for enterprise negotiations to define procedures and conditions for modifying, entirely or partly, also temporarily, specific elements (economic and normative) of sectoral collective agreements on wages. In this way it becomes possible to set up levels of remuneration below those determined by national wage bargaining agreements.

preceding the mentioned recent changes, offers a contribution to the current debate and gives a detailed portrait of company level experiences reached in 2005 and 2007, more than ten years after the 1993 Agreement. It also contributes at identifying the main firmsô and workersô characteristics which have favoured or contrasted the adoption of incentive company bonuses.

A number of official studies have tried to explore the application of the bargaining rules for the decentralised level of negotiations introduced in Italy with the 1993 Agreement. The first official national survey on employee financial participation, undertaken in 1997 by the Italian Statistical Institute (ISTAT), showed the limited diffusion of firm-level agreements, which in 1995-96 involved only 9.9% of companies with at least 10 employees and 38.8% of total employment. In addition, a vast majority of the total amount of workers involved in company arrangements, 73.4%, were employed in the industrial sector, while the majority of firms adopting new practices were located in the North. Concerning the wage components, ISTAT estimated that the number of workers involved in financial participation in company results in 1995-96 was around 23% of the total population of Italian workers, while the other most important pay scheme, the individual production bonus, was paid to only 12.5% of employees. ISTAT did not replicate its survey undertaken in 1999, which remained a *una - tantum* inquiry.

Other sparse and fragmented information was made available from other sources for the last decade. The Bank of Italy, even if did not perform any specific investigations, integrated its Invid questionnaire (created to explore different issues), with some questions on the incidence of decentralised agreements and bonuses linked to enterprise performance. According to this source, there is evidence for declining importance over time of local bargaining: since 2000 the share of employees covered by second-level agreements fell from 36% to 22% in companies with 20-49 workers and from 77% to 68% in firms with 50 or more workers (Bank of Italy Annual Report on 2008). This database makes evident also another weakness, namely the marginal importance of PRP, as it represented only 4% of the total compensation package (Casadio, 2008, 2010).

Falling trends, over a period of nine years from 1998 to 2006, are reported by the archive company contracts available from the CNEL (the National Economic and Labour Council), and relative to a representative sample of over 1,000 companies employing more than 100 workers. In addition, the annual surveys carried out by the Federmeccanica, the Italian Federation of Metalworking Employers, show even for a leader in terms of participatory practices a meaningful change in PRP: in periods of complementary agreements renewals, the incidence of bargaining among large companies fell from 51% in 2000 to 37% in 2004, while among the smaller from 50% to 22%.

Lastly, a comparative perspective is made available by two international surveys which confirm these declining trends: the CRANET (an e-survey on a sample selected randomly from the population of companies with at least 200 employees), and the European Working Conditions Survey-EWCS (a household survey conducted for 29 countries, EU-27 plus Croatia and Turkey, covering nearly 30,000 workers). Both sources document for many EU countries increasing average values of percentages of employees and firms involved in PRP schemes, such as profit sharing, but with some exceptions: Italy is one of them.

However, the evidence described so far has been mainly limited in terms of their coverage by company size or sector. It may be enriched by the ISFOL surveys, as seen below.

3. Data and descriptive statistics

3.1 Data

Our empirical study is based on a nationally representative sample of manufacturing and non manufacturing firms, obtained by merging information from two different sources: balance-sheet data from the Bureau Van Dijk AIDA archive and firm-level information on performance-related pay and other workplace practices from the ISFOL Employer and Employee Surveys (RIL).

The ISFOL-RIL surveys are firm surveys which collected cross-sectional information relative to 2005 and 2007 about personnel organization, recruitment strategies, position of employees, training investments, presence of unions, adoption of PRP schemes and other workplace characteristics. It refers to firms operating in the non-agricultural private sector, and includes both partnership and limited companies.

For what regards our key variables both SLB and PRP variable are dummy variables simply indicating the existence or not of a second level of bargaining and in this case, the presence of a PRP scheme of some kind[5]. As far as unions are concerned, the respondent firm is asked whether there is a form of employee representation of any kind in the firm[6]. We thus have a second dummy variable indicating the presence of unions at firm level. Furthermore, we have information about the workplace characteristics and business strategies of each firm (for a detailed definition of the variables see the Appendix).

In order to link information concerning workersô characteristics to indicators of firm performance and accounting variables, a sub-sample of the RIL dataset was merged using company tax codes with balance-sheet information from the AIDA archive relative to the period 2005-2007. As the AIDA database contains the annual accounts for limited companies which had turnovers of over 100,000 Euros in 2004, the merged RIL-AIDA sample is representative only in the case of limited companies. Also, we exclude firms with less than ten employees, applying a filter to retain only those characterized by a minimum level of organisational structure.

3.2 Descriptive statistics

In this section we perform a descriptive analysis of the RIL-AIDA merged sample for the year 2005 and 2007. To begin with, Table 1 reports the incidence of second level of bargaining (SLB) and PRP. The results show that the spread of SLB is modest, on average in 17% and 14% of firms in 2005 and 2007, respectively. Moreover, in 2005 and 2007, only 11% and 10% of firms have PRP schemes, thus confirming the limited spread of PRP agreements; indeed, even in firms with SLB, these schemes are not common practice and involve only a fraction of this population (59% and 67%, respectively). Unions, captured by the presence of the two distinct workersô representation channels, are present, on average, in one fourth of firms of our sample.

[5]Each sampled firms in RIL survey is asked whether or not a firm level contract is adopted. In case of positive answer each is then asked to indicate whether the firm level contract consists of the adoption of PRP or, alternatively, other not better specified aspects of the second level bargaining. Unfortunately, we do not know whether the different types of schemes are based on firm-, group- or individual- performance. Besides, the dataset does not provide statistics on how many workers in the firm receive PRP or whether these schemes are offered to all or to a selected group of employees (managers, blue- collars, or all workers).

[6] In Italy, two distinct channels are present; the plant-level union representation structure- Rappresentanza Sindacale aziendale, RSA- and the unitary workplace union structure (Rappresentanza sindacale unitaria, RSU. In details, the Italian Workplace representation profile may be sketched out as follows. ñThe Workersô Statute of 1970 gives the workers the right to organise a plant-level union representation structure (Rappresentanza sindacale aziendale, RSA). The tripartite agreement of July 1993 introduced ï in addition to the RSA ï a so called unitary workplace union structure (Rappresentanza sindacale unitaria, RSU). This body is elected by all employees, but representatives are usually elected through trade union lists. Therefore, it includes features of both works councils (the broad active electorate) and trade union bodies (the almost exclusive inclusion of trade union representatives). In general, it can be associated with trade union bodiesò (EIRO, 2009).

As for the other characteristics of our sample, Table 1 shows that more than one half of companies implement innovation projects, the share of trained workers is around 40% while the share of workers with fixed- term contracts represents 10% of total employment for both 2005 and 2007.

[INSERT Table 1]

As known, PRP schemes are bargained with local unions and they are part of a local (usually firm-level) agreement, hence a main divide exists between companies with or without SLB, which is a precondition for PRP. However, we are also interested to verify if a divide also exists inside the group of firms with SLB, but *with* or *without* PRP. The next step is then to compare three distinct groups of firms: i) companies without a firm-level contract; ii) with a firm level contract but without PRP; iii) with firm-level contract and with PRP.

Table 2 presents a summary description of these three groups and allows verifying their different profiles (size, union, sectors, personnel characteristics) as well as the log of value added per employee, i.e. a proxy of firmsô performances.

[INSERT Table 2]

Table 2 and 3 make immediately evident that the characteristics of firms which adopt SLB (and within this group, the characteristics of those firm with PRP) are clearly different from the characteristics prevailing in firms without SLB. In particular, what typifies the typical portrait of SLB firms is that they made more use of trained employees and are characterized by higher incidence of union presence with respect to NO SLB firms.

They are also more successful in terms of added value levels, more active on grounds of outlays in innovation projects, greater involved, as said above, in offering training opportunities, but not exempt from paying PRP to the more protected (male and unionised) workforce component and make less use of fixed-term contracts with respect to firms without SLB (in 2005 8% versus 11% and, in 2007, 6% versus 10%). Lastly, the female component appears to be more ósegmentedô in SLB firms or in SLB firms without PRP contracts.

Concerning workforce composition in terms of job qualifications and tasks performed, there are not striking differences since the incidence of managerial, supervisory, white-collar and blue-collar workers is similar in all groups of firms.

ISFOL data also confirm the existence of ample differentials by region, sector and firm size. A crucial aspect is the higher diffusion of PRP contracts, adopted by larger companies, located in Northern Italian regions and operating in the industrial sector (manufacturing, mechanics, textile), whereas PRP agreements are less present in services. These disparities, already shown by the survey carried out by the national statistics office for the mid-1990s (ISTAT, 1999), are still persistent and reveal heterogeneity in company strategies and in their utilisation of wage flexibility. It is remarkable an unequal sectoral distribution, ranging, for instance in 2005, from 28% of PRP firms in manufacturing to 2% in Transport and communication.

Last, notice a substantial inertia in firm strategies comparing 2005 and 2007, probably because of the short time period under study.

[INSERT Table 3]

The different profile of PRP firms, with respect to that of other two groups, is a stimulus to ascertain the actual motivations behind the adoption of company wage variable agreements.

4. Econometric analysis

4.1. The model

The empirical analysis of probability of SLB and PRP is performed by using the unobserved effect probit model. Then we estimate the following equation:

(1) $$\Pr(y_{it}=1 \mid X_{it},\alpha_i)=\Phi(X_{it}\beta+\alpha_i) \qquad \text{with t=2005,2007}$$

where y_{it} is the dependent variable indicating whether firm adopt firm level bargaining or PRP, Φ is cdf of the normal distribution, X_{it} contains the workplace characteristics supposed to affect the dependent variable and α_i is the time invariant unobserved effect.

In particular we use a conditional maximum likelihood approach to estimate a *pooled probit model* of equation (1) by imposing $\alpha_i=\alpha$ and a *random effect probit model* by assuming α_i and X_{it} are independent and that $\alpha_i=\alpha$ is normally distributed: $\alpha_i \mid X_{it} \approx N(0,\sigma_\alpha)$.

Actually applying fixed effect estimations is not a suitable empirical strategy in our case. This is because fixed effect binary outcomes model in short panel usually leads to inconsistent estimation for the parameters β and σ_α (Wooldridge, 2001). Further we expect that fixed effect estimates are poorly efficient, since key variables in our sample show, over the period 2005-2007, little *within* variation as compared to *between* variation.

In this context we use estimates separately the probability of adoption firm level bargaining and PRP by using substantially the same explanatory variables. The aim is to verifying how the similar workplace characteristics and firm performance affect differently the propensity to decentralized bargaining between firms and workers and, within a decentralized scheme, to adopt PRP.

Further, as main focus is to analyze how the presence of union ñfiltersò the impact of training on the probability to adopt firm level bargaining and PRP, we estimate the following specification of equation(1):

(1ô)

$$\Pr(y_{it}=1 \mid X_{it},\alpha_i)=\Phi(\beta_1\, union_{it}+\beta_2\, train_{it}+\beta_3\, train_{it}*union_{it}+X_{it}\delta+\alpha_i)$$

where $union_{it}$ is a dummy variable which indicates the presence of union at firm level, $train_{it}$ is the share of trained workers and the vector X_{it} represents other workplace characteristics that may affect SLB and PRP (for details see Appendix).

4.1 Results

The main findings of the econometric analysis are shown in Tables 4 and 5, where the estimates of the marginal effects are reported both for *pooled probit* and *random effect probit models*. In general, comparing Table 4 and 5 we note that many of the variables which are significantly associated with firmsô choice of

adopting SLB also increases the probability of PRP agreements. Some factors deserve particular attention: industrial relations and human capital practices, workforce features and firms characteristics in terms of sector of activity and geographical location.

[INSERT Table 4]
[INSERT Table 5]

Labour relations and workplace practices

One of the most robust results of our estimates concern industrial relations. In particular estimating equation (1ô) without interactive terms we find that the presence of union at the establishment level is associated to a higher probability of signing local agreements of more than 30%, both with pooled and random probit estimates (see column *a* and *c* of Table 4). The union variable retains also a significant positive impact on PRP, even if of smaller magnitude: according to both pooled and random probit estimates, the probability of adoption of PRP is higher, more than 10%, in establishments where workers representatives are present (see column *a* and *c* of Table 5).

Similarly, the training intensity generates higher probability to adopt SLB, being the marginal effects associated to the share of trained workers equal to 0.10 and 0.09 for pooled and random probit estimates, respectively (see columns *a* and *c* of Table 4). The marginal effect of trained workers on PRP is also positive and statistically significant; in this case pooled and random probit estimates are equal to 0.06 and 0.03, respectively (see columns *a* and *c* of Table 5).

With additional specifications, we test the presence of a joint effect óunions *and* trainingô. Both *pooled* and *random effect* estimates show that unionsô attitude to sign local agreements and PRP is higher *under* training, more significantly in case of PRP estimates. For PRP estimates, training loses its significance as single determinant, but the interaction term (unions *and* training) passes the 5% level of significance (see columns *b* and *d* of Tables 4 and 5).

Of course, some of the above results are expected. For example, it is well known, given the characteristics of the Italian institutional settings, that firm level bargaining are mainly negotiated with unions. However, the literature on employee financial participation (Pérotin and Robinson, 2003) widely discusses the negative trade union attitudes to the various forms of PRP, but this evidence does not find support in our case.

In addition, as mentioned above, economic theory has traditionally shown that training provided at company level encourages workers and firms to bargain over the expected returns of firm specific skills accumulation (Hashimoto, 1982). What it is more interesting is how the presence of union ófiltersô the training investment in affecting firm level bargaining. The rational behind this result is that risk bearing, implicit in the employment relationship characterized by firm-specific skills accumulation, is less beyond workersô control under union governance, which may play a positive role in insulating employees from the risk of non portable skills. Indeed, the specificity of their investments makes workersô outside options quite low in case of displacement, as argued by Wasmer (2006), but bargaining over training, in unionized firms, may assure some form of employment protection.

In addition, one potential role of workersô representatives is helping employees to protect the quasi-rents they have obtained by job-related training and human capital investments. Indeed, ample divergences may be found in beneficial effects of training since, in some cases, the magnitude of wage gains is *only half* as that on productivity, as shown by Dearden, Reed and Van Reenen (2005). Thus enterprise wage agreements may lower the divergences between the overall gains of workplace training.

Workforce characteristics

The other control variables for workersô characteristics are the same used for descriptive statistics and are standard in the related literature (see for example, Gürtzgen, 2009). Estimations control for worker heterogeneity, such as gender and membership three occupational groups (managers and supervisors, white- and blue-collars). We also control whether an individual is employed on a fixed term contract and is trained. The hypothesis is that the heterogeneity of workers (differentiated by gender, tenure and skills) will influence the relationships we are testing.

We obtain that neither blue-collars, nor white-collars have eligible conditions in terms of decentralised and PRP contracts; this finding contrasts with other countriesô experiences, where employeesô financial participation is more probable for blue-collar jobs, as in Germany (Heywood and Jirjahn 2002), or for white-collars, as found in the UK (Robinson and Wilson, 2006) and Finland (Arranz-Aperte and Heshmati, 2003). These disparities do not appear in Italian enterprises,

Conversely, workforce composition by gender plays a significant role, at variance with other country experiences: a higher percentage of female employees lowers the probability of both firm level bargaining and contingent pay. A cautionary explanation is necessary, since the percentage of women is very likely to be correlated with unobserved (or omitted) firm characteristics. In any case, in Italy, the negative correlation between the percentage of female workers and the spread of integrative bargaining schemes has some points in common with the traditional literature of economic discrimination against women in the labour market (Naticchioni and Ricci, 2009). This interpretation finds support from comparisons from other countries. A case in point is France, where firm-level agreements, set independently of union influence, benefit women particularly (Fakhfakh and FitzRoy, 2004). Analogous benefits are obtained by the female component in a country such as Germany, where collective bargaining plays a great role: in this economy, the wage premium obtained by works councils, around 11%, is also higher for women than for men (Addison *et al.* 2006).

Firm characteristics

As expected, firm *size* significantly influences the probability of decentralised agreements and PRP: firms with at least 250 employees have more than 50% probability to sign this kind of agreements with respect to the smallest ones (those with less than 15 employees) and nearly 30% more probability to adopt PRP. Similar effects are obtained for industry and services and are coherent with other studies that signal the crucial role that size, which explains, more than sectoral specialisation, major Italian differences and gaps with respect to their major foreign competitors (Pagano and Schivardi 2003; Brandolini and Bugamelli, 2009).

It is reasonable that as firm size increases, collective local negotiations are more likely needed to coordinate complex organisational structures, which call for adopting rules tailored to large firm specific needs and not set by sectoral contracts. Notice also that national contracts set the tariff wage, in Italy equivalent to the minimum wage, which varies by sector and qualification, but not by firm size; hence, the local bargaining offers the possibility of creating a wage drift for larger companies.

It must be added that in related literature on PRP, the expected role of size is not clear cut since two opposite effects are conceivable. On one hand, asymmetric information and monitoring costs increase with firm size and explain the positive correlation. On the other hand, for collective bonuses opportunistic behaviour and free-riding arguments are more frequent in large firms, since horizontal mutual monitoring and peer pressure are more difficult, thus generating an opposite, negative correlation (Prendergast 1999). On

empirical grounds, international evidence on collective incentive schemes (Pérotin and Robinson, 2003). In our economy, we obtain as found for US and Germany, that contingent pays are positively related to size (Jones and Pliskin 1997; Heywood, and Jirjahn 2002).

Performance and innovation

SLB and PRP are positively conditioned by productive performance, as formalized by the (log of) value added per employee. However, in PRP estimates, the smaller magnitude obtained for the related coefficient (also with respect to SLB estimates), signal that concession agreements, adopted in firms with higher óability to pay,ô have had limited influence.

One further result in order concerns innovation: Table 4 and 5 reveal that the dummy variable which captures the adoption of (product and process) innovation activities play a significant role, of small magnitude, only as determinant of SLB, but not on the PRP probability. It reveals that risky situations are not conducive to wage flexibility, as also confirmed by the non significant effects of volatilities of sales on PRP.

It seems to mark an impasse in those trends towards implementation organisational flexibility, which emerged in Italy from similar studies for previous years. These studies showed that firms offering PRP invested more than others and implemented innovative plans which needed cooperative relationships to deal with those organizational changes (Biagioli and Curatolo, 1999) or were ñon average good performers in the process of making changes to technology and work organisationò (Amisano and Del Boca, 2004, p.464). It does not seem true for the last years.

Geographical location

Our results also show that regional differentials in our sampled period are still significant, even after controlling for an ample set of covariates: decentralised agreements and PRP are more likely adopted in Northern regions; in addition these same regions are not fully homogenous as North-East shows higher probability of both SLB and PRP with respect to North-West (the omitted area). The results also confirm a substantial stagnation and inertia in regional imbalances since similar differentials for probabilities of local bargaining were found by Checchi and Pagani (2004) on the basis of a data-set surveyed in 1995 by EUROSTAT.

Sectors

We also control for the role of sectors. Table 4 reports estimates for SLB for the whole economy and shows that all industries, with respect to the omitted category (quarrying, distribution of gas, and others) have lower probabilities to sign local agreements (Table 4). Concerning PRP, as shown by Table 5, the differences are lower: the manufacturing sector, traditionally a leader in wage setting, is not characterized by a significant difference with respect to the omitted one. Additional findings for the role of firm sectoral specialization are shown below.

5. Disaggregated analysis: industry and service sectors

We replicate the econometric analysis by separating industry and services. The results of *pooled* and *random effect* probit estimates of equation (1ô) are displayed in Table 6 and 7 for industry and in Table 8 and 9 for services.

For industry, all estimates confirm previous main results: the presence of unions and the intensity of training investment, considered separately, are positively associated with the probability of adoption of SLB

and PRP. In particular, the marginal effects obtained with pooled and random probit estimates for union is higher than 0.30 for SLB and about 0.20 for PRP, (see columns *a* and *c* of Table 6 and 7). Conversely, the interaction term *union*trained workers* is no more statistically significant (with the only exception of pooled probit estimates for PRP).

Concerning other firm and workforce characteristics, pooled and random probit estimates suggest that productivity and firms size favour the adoption of SLB and PRP, while the share of females and geographical location in Southern region discourage SLB. Interestingly, innovation does no exert a significant positive role in enhancing SLB and PRP, while the negative marginal effects on PRP associated to the share of fixed terms workers is statistically significant with pooled probit estimates.

For services, Tables 7 and 8 show that the marginal effects of union on SLB and PRP estimates are similar in magnitude to those found for the industrial sector, in all specifications. Conversely, training intensity has lower association with SLB, at least when the interaction terms are not included (see columns *a* and *c* of Table 8 and 9). However, the introduction of the interaction term offers a different picture: the share of trained workers exerts a positive impact on SLB only in unionized firms, conversely, training and its joint effect with unions are not statistically significant on PRP (see columns *b* and *d* of Table 8 and 9). In other terms, training intensity exerts a positive role in enhancing SLB mainly when it is organized in unionised firms, while the presence of unions does not significantly increase the impact of training on PRP.
In services, in comparison with industry, we obtain a more significant role of innovation on SLB, and of productive performances on PRP. Furthermore, the female component, whose presence significantly reduces the probability of SLB and PRP in manufacturing, is not significant in estimates for the services sector. Lastly, the professional structure of the workforce remains not statistically significant for both sectors.

[INSERT Table 6]
[INSERT Table 7]
[INSERT Table 8]
[INSERT Table 9]

6. Conclusions

Weakness of decentralisation of bargaining and incentive devices in Italy is confirmed from descriptive statistics obtained from our database, which is the first to provide information on a nationally representative sample of manufacturing and services companies, of all sizes.

Evidence on basic characteristics of Italian firms show that the group adopting decentralised bargaining *and* PRP is quite different from others. In this group, consisting of larger and best performing firms, collective action- through the presence of unions- is much higher and more intense their training activities.

Our panel estimates allow making further steps to ascertain main factors behind decentralised bargaining and contingent pays and suggest some major conclusions.

First, we find evidence that firm level agreements and PRP are positively related to *unions*, whose presence, after company size, is the major determinant of adoption of the second level of bargaining and contingent pay, thus suggesting that PRP are not introduced on a unilateral basis, but through the organised action promoted by workersô representatives.

Second, the contribution of this paper is to ascertain for the first time, at least for the Italian economy, the role of strategies oriented to training. In some related studies for other economies, but focussed on explaining

training intensity rather than *bargaining intensity*, it has been confirmed the positive influence of works councils in Germany or of profit sharing in the UK (see respectively, Kriechel et al. 2011, Gielen, 2011, Green and Heywood, 2011), and in any case no estimates are available for the Italian economy. All our findings show the positive association of *training* with the probability of decentralised negotiations and PRP. In addition, a *joint* positive effect of training and unions, found in PRP estimates, suggests that the protective role of workersô representation becomes more relevant in conditions of human capital investments due to job-related training.

Third, as expected, we find that greater firm *size*, location in North-Eastern regions, smaller share of female workers are all factors associated with a higher propensity to resort to firm level agreements and contingent pay. These results, which give a picture of the Italian bargaining system not radically changed much over the past years, must be integrated with the role played by the sectoral dimension, i.e. by low probabilities of adoption of local bargaining and PRP in services, and in descending order in industry. Indeed, in contrast with experiences of other countries, as those examined by Addison et al. (2009), we obtain lower probabilities of signing firm level agreements in the tertiary sector; it is a remarkable result since services is the key industry where productivity increases, obtained through good human resource practices, should be more necessary; this is particularly true for Italian private services, the only country-sectoral case, which over the period 1995-2008 was characterized by a negative productivity growth in EU13 (Damiani, Pompei and Ricci, 2011)

Both employees and firms may lack proper incentives to invest in training for various reasons: fear of separation, imperfect observability in training activities, conflictual relations in sharing benefits from these investments. As shown for other countries, various institutional devices, ñare designed to make workers more willing to invest in firm- and industry-specific skills that *increase* their dependence on particular employers and their vulnerability to market fluctuationsò (Estevez et al., 2001). In our model economy one potential device could be represented by the óvoiceô option exerted by unions, thorough company agreements. However, in Italy, the potential role of ónegotiatedô responses, to counter the effects of limited training activities, and contrast poor productivity performances, is only limited exploited and it is the main message of the present paper.

Table 1: Descriptive statistics of the whole sample

	2005		2007		2005-2007	
	mean	st. dev.	mean	st. dev.	mean	st.dev.
Second level bargaining	0.17	0.38	0.14	0.35	0.16	0.36
PRP	0.11	0.31	0.10	0.30	0.10	0.30
% trained	0.19	0.31	0.20	0.32	0.20	0.31
Union (0/1)	0.24	0.43	0.22	0.42	0.23	0.42
Innovation (0/1)	0.57	0.50	0.63	0.48	0.60	0.49
% female	0.34	0.25	0.29	0.25	0.32	0.25
% managers	0.07	0.10	0.04	0.07	0.05	0.09
% white collar	0.44	0.31	0.35	0.28	0.40	0.30
% blue collars	0.49	0.31	0.62	0.30	0.55	0.31
% fixed term contracts	0.10	0.13	0.09	0.16	0.09	0.15
ln(value added)	10.55	0.75	10.79	0.54	10.67	0.66
sd_dev_sales	0.17	0.11	0.19	0.11	0.18	0.11
Seniority	21.47	15.06	23.54	15.65	22.51	15.39
Firm size						
15< employees	0.39	0.49	0.38	0.49	0.39	0.49
14 <employees<50	0.46	0.50	0.47	0.50	0.46	0.50
49<employees<250	0.13	0.33	0.12	0.32	0.12	0.33
> 249employees	0.03	0.16	0.03	0.16	0.03	0.16
Macro-region						
North West	0.35	0.48	0.34	0.48	0.35	0.48
North East	0.26	0.44	0.28	0.45	0.27	0.45
Centre	0.20	0.40	0.21	0.40	0.20	0.40
South	0.19	0.39	0.17	0.38	0.18	0.38
Sector						
Quarrying; gas, water and gas distribution; others	0.02	0.13	0.01	0.12	0.02	0.12
Textile	0.14	0.35	0.13	0.34	0.13	0.34
Manufacturing	0.17	0.38	0.18	0.39	0.18	0.38
Mechanics	0.15	0.36	0.15	0.36	0.15	0.36
Construction	0.14	0.35	0.15	0.35	0.15	0.35
Trade, hotels and rest.	0.16	0.37	0.18	0.39	0.17	0.38
Transport and com.	0.04	0.19	0.05	0.22	0.04	0.21
intermediation and Business services	0.07	0.26	0.09	0.29	0.08	0.27
Education, health and public services	0.11	0.31	0.05	0.21	0.08	0.27
N. of Observations	3320		3455		6775	

Source: RIL-AIDA ; descriptive statistics with sample weights

Table 2: Descriptive statistics of the firms without and with firm level contracts, and with or without PRP, 2005

	without SLB		with SLB			
			PRP		No PRP	
	mean	st. dev	mean	st. dev	mean	st. dev
% trained	0.17	0.30	0.29	0.34	0.27	0.33
Union (0/1)	0.13	0.33	0.87	0.33	0.68	0.47
Innovation (0/1)	0.55	0.50	0.70	0.46	0.65	0.48
% female	0.35	0.25	0.26	0.21	0.34	0.30
% managers	0.07	0.10	0.06	0.09	0.08	0.11
% white collars	0.44	0.31	0.46	0.28	0.42	0.30
% blue collars	0.49	0.32	0.48	0.29	0.50	0.29
% fixed term contracts	0.10	0.14	0.08	0.10	0.08	0.10
ln(value added)	10.51	0.73	10.88	0.65	10.54	0.97
sd_dev_sales	0.17	0.11	0.15	0.11	0.18	0.12
Seniority	20.09	13.83	29.86	19.13	25.23	17.23
Firm size						
15< employees	0.45	0.50	0.06	0.24	0.21	0.41
14 <employees<50	0.47	0.50	0.40	0.49	0.37	0.48
49<employees<250	0.07	0.26	0.40	0.49	0.34	0.47
> 249 employees	0.01	0.09	0.13	0.34	0.07	0.26
Macro-region						
North West	0.35	0.48	0.35	0.48	0.41	0.49
North East	0.24	0.43	0.42	0.49	0.32	0.47
Centre	0.20	0.40	0.15	0.35	0.15	0.36
South	0.21	0.41	0.09	0.28	0.12	0.33
Sector						
Quarrying; gas, water and gas distribution; others	0.01	0.11	0.05	0.21	0.03	0.16
Textile	0.14	0.34	0.15	0.35	0.16	0.37
Manufacturing	0.16	0.37	0.27	0.44	0.14	0.35
Mechanics	0.14	0.35	0.27	0.44	0.14	0.35
Construction	0.16	0.37	0.02	0.14	0.09	0.29
trade, hotels and rest.	0.17	0.38	0.11	0.31	0.16	0.37
transport and comm..	0.04	0.20	0.02	0.15	0.02	0.14
Intermediation and Business services	0.07	0.25	0.08	0.27	0.07	0.25
Education, health and public services	0.11	0.31	0.05	0.22	0.19	0.39
N. of observations	2368		665		287	

Source: RIL-AIDA ; descriptive statistics with sample weights

Table 3: Descriptive statistics of the firms without and with firm level contracts, and with or without PRP,2007

	without FLC		with FLC			
			PRP		no PRP	
	mean	st. dev.	mean	st. dev	mean	st. dev.
% trained	0.20	0.32	0.24	0.32	0.23	0.34
Union (0/1)	0.14	0.35	0.87	0.33	0.40	0.49
Innovation (0/1)	0.62	0.49	0.73	0.45	0.64	0.48
% female	0.29	0.25	0.24	0.20	0.32	0.25
% managers	0.03	0.07	0.06	0.08	0.05	0.09
% white collars	0.35	0.29	0.32	0.22	0.34	0.27
% blue collars	0.62	0.31	0.62	0.25	0.61	0.30
% fixed term contracts	0.10	0.16	0.06	0.09	0.13	0.20
ln(value added)	10.76	0.54	11.03	0.49	10.82	0.49
sd_dev_sales	0.19	0.11	0.15	0.09	0.20	0.15
Seniority	22.11	14.04	34.96	21.45	27.58	19.97
Firm size						
15< employees	0.43	0.49	0.03	0.18	0.28	0.45
14<employees<50	0.48	0.50	0.37	0.48	0.48	0.50
49<employees<250	0.08	0.28	0.44	0.50	0.17	0.38
> 249 employees	0.01	0.10	0.16	0.36	0.08	0.27
Macro-region						
North West	0.34	0.47	0.43	0.50	0.34	0.47
North East	0.28	0.45	0.34	0.47	0.24	0.43
Centre	0.20	0.40	0.18	0.38	0.29	0.46
South	0.18	0.39	0.06	0.23	0.14	0.34
Sector						
Quarrying; gas, water and gas distr., others	0.01	0.10	0.04	0.19	0.02	0.14
Textile	0.12	0.33	0.18	0.38	0.19	0.39
Manufacturing	0.18	0.38	0.28	0.45	0.11	0.31
Mechanics	0.14	0.35	0.27	0.44	0.14	0.35
Construction	0.16	0.37	0.02	0.14	0.13	0.34
Trade, hotels and rest.	0.20	0.40	0.07	0.26	0.18	0.39
Transport and comm..	0.05	0.22	0.08	0.27	0.08	0.26
Intermediation and business services	0.09	0.29	0.04	0.21	0.12	0.33
Education, health and public services	0.05	0.22	0.02	0.13	0.03	0.16
N. of observations	2680		560		215	

Source: RIL-AIDA ; descriptive statistics with sample weights

Table 4: Probability of adoption SLB, 2005-2007. Marginal effects

	POOLED PROBIT						RE PROBIT					
	dy/dx		st er	dy/dx		st er	dy/dx		st er	dy/dx		st er
	(a)			(b)			(c)			(d)		
% trained	0.102	***	0.016	0.058	**	0.027	0.090	***	0.016	0.053	**	0.023
Union (1/0)	0.353	***	0.014	0.333	***	0.017	0.364	***	0.018	0.342	***	0.020
% trained*union				0.078	**	0.035				0.067	**	0.031
Innovation (1/0)	0.035	**	0.012	0.036	**	0.012	0.031	**	0.010	0.032	**	0.010
% female	-0.166	***	0.027	-0.165	***	0.027	-0.156	***	0.026	-0.156	***	0.026
% white collars	-0.058		0.075	-0.056		0.076	-0.077		0.060	-0.077		0.061
% blue collars	-0.042		0.073	-0.041		0.074	-0.065		0.059	-0.064		0.059
% fixed term contracts	-0.027		0.045	-0.027		0.045	-0.038		0.039	-0.038		0.039
ln(value added)	0.030	***	0.009	0.030	***	0.009	0.025	**	0.009	0.025	**	0.009
st. dev. sales	0.115	*	0.063	0.117	*	0.063	0.099	*	0.057	0.101	*	0.057
Seniority	0.002	***	0.000	0.002	***	0.000	0.002	***	0.000	0.002	***	0.000
14<employees<50	0.057	**	0.020	0.058	**	0.020	0.053	**	0.018	0.054	**	0.018
49<employees<250	0.220	***	0.026	0.221	***	0.026	0.249	***	0.031	0.251	***	0.031
> 249 employees	0.416	***	0.037	0.416	***	0.037	0.525	***	0.050	0.525	***	0.050
North East	0.034	**	0.015	0.034	**	0.015	0.033	**	0.015	0.034	**	0.015
Centre	-0.024		0.016	-0.024		0.016	-0.021		0.014	-0.021		0.014
South	-0.097	***	0.015	-0.096	***	0.015	-0.078	***	0.012	-0.078	***	0.012
Textile et al.	-0.057	**	0.028	-0.058	**	0.028	-0.052	**	0.022	-0.052	**	0.022
Chemistry et others.	-0.057	**	0.027	-0.058	**	0.027	-0.050	**	0.021	-0.051	**	0.021
Manufacturing	-0.055	**	0.027	-0.057	**	0.027	-0.052	**	0.022	-0.053	**	0.022
Construction	-0.100	***	0.024	-0.101	***	0.024	-0.082	***	0.016	-0.082	***	0.016
Trade, hotels and rest.	-0.082	***	0.025	-0.083	***	0.025	-0.068	***	0.018	-0.068	***	0.019
Transport and comm.	-0.016		0.035	-0.017		0.035	-0.020		0.029	-0.020		0.029
Intermediation and business services	-0.078	**	0.025	-0.079	***	0.025	-0.069	***	0.017	-0.070	***	0.017
Education, health and public services	-0.126	***	0.020	-0.128	***	0.020	-0.094	***	0.014	-0.095	***	0.014
Year 2007	-0.092	***	0.010	-0.092	***	0.010	-0.085	***	0.010	-0.086	***	0.010
sigma_u							0.977		0.070	0.975		0.070
Rho							0.488		0.036	0.487		0.036
Wald chi2	1628.28			1652.03			671.21			672.51		
Prob > chi2	0.00			0.00			0.00			0.00		
Pseudo R2	0.36			0.3650								
N. of observations	6848						6848					
N. of groups							4085					

Note: Omitted variables: North West, quarrying, % managers, year 2005, firm with less than 15 employees; standard error adjusted for firm clusters; *** significant at 1%, ** at 5%, * at 10%; regressions performed with no sample weights

Table 5: Probability of adoption PRP, 2005-2007. Marginal effects

	POOLED PROBIT						RE PROBIT					
	dy/dx		st er	dy/dx		st er	dy/dx		st er	dy/dx		st er
	(a)			(b)			(c)			(d)		
% trained	0.056	***	0.010	0.017		0.020	0.030	***	0.007	0.011		0.012
union (1/0)	0.253	***	0.013	0.235	***	0.015	0.198	***	0.017	0.182	***	0.018
%trained*union				0.055	**	0.024				0.027	*	0.014
innovation (1/0)	0.011		0.007	0.012		0.007	0.007	*	0.004	0.007	*	0.004
% female	-0.092	***	0.017	-0.092	***	0.017	-0.052	***	0.012	-0.053	***	0.012
% white collars	0.008		0.048	0.008		0.049	-0.005		0.024	-0.005		0.024
% blue collars	-0.002		0.046	-0.003		0.047	-0.013		0.023	-0.013		0.024
% ftshare	0.006		0.030	0.007		0.030	0.005		0.016	0.006		0.016
ln(value_added)	0.024	***	0.006	0.024	***	0.006	0.012	***	0.004	0.012	***	0.004
sd_dev_sales	0.063		0.043	0.066		0.043	0.027		0.022	0.029		0.023
seniority	0.001	***	0.000	0.001	***	0.000	0.000	***	0.000	0.000	***	0.000
14<employees<50	0.034	**	0.016	0.035	**	0.016	0.018	**	0.009	0.019	**	0.009
49<employees<250	0.147	***	0.024	0.148	***	0.024	0.108	***	0.022	0.110	***	0.022
> 249 employees	0.312	***	0.040	0.314	***	0.040	0.308	***	0.052	0.310	***	0.052
North East	0.040	***	0.011	0.040	***	0.011	0.023	***	0.007	0.024	***	0.007
Centre	-0.022	**	0.009	-0.022	**	0.009	-0.012	**	0.005	-0.012	**	0.005
South	-0.062	**	0.008	-0.062	***	0.008	-0.029	***	0.005	-0.029	***	0.005
Textile et al.	-0.036	**	0.017	-0.037	**	0.017	-0.018	**	0.007	-0.018	**	0.008
Chemistry et al.	-0.024		0.018	-0.025		0.018	-0.012		0.008	-0.012		0.008
Manufacturing	-0.025		0.018	-0.026		0.018	-0.013		0.008	-0.013		0.008
Construction	-0.083	***	0.009	-0.084	***	0.009	-0.034	***	0.006	-0.034	***	0.006
Trade, hotels and rest.	-0.054	***	0.013	-0.055	***	0.013	-0.025	***	0.006	-0.025	***	0.006
Transport and comm.	-0.027		0.019	-0.027		0.019	-0.012		0.008	-0.012		0.008
Intermediation and business services	-0.052	***	0.013	-0.052	***	0.013	-0.024	***	0.006	-0.024	***	0.006
Education, health and public services	-0.074	***	0.010	-0.075	***	0.010	-0.030	***	0.006	-0.031	***	0.006
Year 2007	-0.025	***	0.006	-0.025	***	0.006	-0.013	***	0.004	-0.013	***	0.004
sigma_u							0.976		0.078	0.972		0.078
Rho							0.488		0.040	0.486		0.040
Wald chi2	1278.04			1309.23			516.70			518.93		
Prob > chi2	0.00			0.00			0.00			0.00		
Pseudo R2	0.39											
N. of observations	6781						6781					
N. of groups							4077					

Note: Omitted variables: North West, quarrying, % managers, year 2005, firm with less than 15 employees; standard error adjusted for firm clusters; *** significant at 1%, ** at 5%, * at 10%; regressions performed with no sample weights

Table 6: Probability of adoption SLB, 2005-2007. Industrial sector. Marginal effects

	POOLED PROBIT						RE PROBIT					
	dy/dx		st er	dy/dx		st er	dy/dx		st er	dy/dx		st er
	(a)			(b)			(c)			(d)		
% trained	0.128	***	0.024	0.098	**	0.037	0.124	***	0.024	0.092	**	0.037
union (1/0)	0.363	***	0.018	0.351	***	0.021	0.383	***	0.023	0.369	***	0.026
% trained*union				0.054		0.049				0.057		0.048
innovation (1/0)	0.013		0.017	0.013		0.017	0.014		0.016	0.014		0.016
% female	-0.211	***	0.041	-0.211	***	0.041	-0.214	***	0.044	-0.214	***	0.045
% white collars	0.027		0.128	0.033		0.128	-0.012		0.113	-0.007		0.113
% blue collars	0.063		0.124	0.068		0.125	0.020		0.110	0.026		0.110
% fixed term contracts	-0.214	**	0.078	-0.212	**	0.078	-0.212	**	0.074	-0.211	**	0.074
ln(value added)	0.052	***	0.013	0.052	***	0.013	0.051	***	0.014	0.051	***	0.014
st.dev. sales	-0.093		0.102	-0.098		0.102	-0.102		0.111	-0.108		0.112
seniority	0.002	***	0.000	0.002	***	0.000	0.002	***	0.000	0.002	***	0.000
14< employees<50	0.093	***	0.028	0.094	***	0.028	0.092	***	0.028	0.093	***	0.028
49<employees<250	0.286	***	0.035	0.287	***	0.035	0.351	***	0.045	0.353	***	0.045
> 249 employees	0.550	***	0.043	0.550	***	0.043	0.703	***	0.054	0.703	***	0.054
North East	0.040	*	0.021	0.040	*	0.021	0.039	*	0.022	0.038	*	0.022
Centre	-0.029		0.022	-0.029		0.022	-0.032		0.021	-0.032		0.021
South	-0.083	***	0.023	-0.083	***	0.023	-0.076	***	0.020	-0.075	***	0.020
Textile et others	-0.086	**	0.034	-0.087	**	0.034	-0.086	**	0.030	-0.087	**	0.030
Manufacturing	-0.090	**	0.031	-0.091	**	0.031	-0.086	***	0.026	-0.087	***	0.026
Chemistry et others	-0.080	**	0.033	-0.081	**	0.033	-0.083	**	0.030	-0.084	**	0.030
Construction	-0.139	***	0.030	-0.140	***	0.030	-0.125	***	0.022	-0.126	***	0.022
Year 2007	-0.105	***	0.014	-0.105	***	0.014	-0.106	***	0.016	-0.106	***	0.016
sigma_u							1.02		0.09	1.018		0.090
rho							0.51		0.04	0.509		0.044
Wald chi2	1077.34			1084.56			420.89			422.03		
Prob > chi2	0.000			0.000			0.000			0.000		
Pseudo R2	0.39			0.39								
N. of groups							2494			2494		
N. of observations	4187			4187			4187			4187		

Note: Omitted variables: North West, quarrying, % managers, year 2005, firm with less than 15 employees; standard error adjusted for firm clusters; *** significant at 1%, ** at 5%, * at 10%; regressions performed with no sample weights

Table 7: Probability of adoption PRP, 2005-2007. Industrial sector. Marginal effects

	POOLED PROBIT						RE PROBIT					
	dy/dx		st er	dy/dx		st er	dy/dx		st er	dy/dx		st er
	(a)			(b)			(c)			(d)		
% trained	0.061	***	0.015	0.016		0.029	0.037	***	0.011	0.010		0.020
union (1/0)	0.266	***	0.016	0.250	***	0.018	0.215	***	0.022	0.199	***	0.023
% trained*union				0.062	*	0.035				0.039		0.024
innovation (1/0)	0.004		0.012	0.004		0.012	0.005		0.007	0.004		0.007
% female	-0.148	***	0.029	-0.148	***	0.029	-0.094	***	0.022	-0.095	***	0.022
% white collars	0.038		0.082	0.043		0.083	0.010		0.049	0.013		0.050
% blue collars	0.050		0.079	0.055		0.080	0.012		0.048	0.015		0.048
% fixed term contracts	-0.105	*	0.054	-0.102	*	0.054	-0.053		0.034	-0.052		0.034
ln(value added)	0.032	***	0.009	0.032	***	0.009	0.018	**	0.006	0.018	**	0.007
st. dev. sales	0.071		0.076	0.068		0.077	0.042		0.047	0.040		0.047
Seniority	0.001	**	0.000	0.001	**	0.000	0.001	**	0.000	0.001	**	0.000
14 employees<50	0.055	**	0.023	0.056	**	0.023	0.032	**	0.015	0.033	**	0.015
49<employees<250	0.205	***	0.033	0.206	***	0.033	0.176	***	0.036	0.178	***	0.036
> 249employees	0.420	***	0.053	0.421	***	0.053	0.467	***	0.074	0.469	***	0.074
North East	0.050	***	0.016	0.050	***	0.016	0.033	**	0.012	0.033	**	0.012
Centre	-0.033	**	0.013	-0.033	**	0.013	-0.020	**	0.008	-0.020	**	0.008
South	-0.077	***	0.013	-0.077	***	0.013	-0.042	***	0.008	-0.042	***	0.009
Textile et al.	-0.040	*	0.024	-0.042	*	0.025	-0.024	*	0.013	-0.025	*	0.013
Chemistry et others	-0.029		0.024	-0.031		0.024	-0.017		0.013	-0.018		0.013
Manufacturing	-0.030		0.024	-0.032		0.024	-0.019		0.013	-0.020		0.013
Construction	-0.113	***	0.015	-0.114	***	0.015	-0.057	***	0.011	-0.058	***	0.011
year 2007	-0.025	**	0.010	-0.025	**	0.010	-0.014	**	0.007	-0.014	**	0.007
sigma_u							0.996		0.096	0.996		0.096
Rho							0.498		0.048	0.498		0.048
Wald chi2	808.87			823.13			348.24			348.460		
Prob > chi2	0.000			0.000			0.000			0.000		
Pseudo R2	0.403			0.404								
N. of groups							2487			2487		
N. of observations	4146			4146			4146			4146		

Note: Omitted variables: North West, quarrying, % managers, year 2005, firm with less than 15 employees; standard error adjusted for firm clusters; *** significant at 1%, ** at 5%, * at 10%; regressions performed with no sample weights

Table 8: Probability of adoption SLB, 2005-2007. Service sector. Marginal effects

	POOLED PROBIT						RE PROBIT					
	dy/dx		st er	dy/dx		st er	dy/dx		st er	dy/dx		st er
	(a)			(b)			(c)			(d)		
% trained	0.069	***	0.021	0.004		0.035	0.056	**	0.019	0.009		0.028
Union (1/0)	0.349	***	0.024	0.308	***	0.029	0.351	***	0.029	0.311	***	0.033
% trained*union				0.119	**	0.046				0.088	**	0.039
Innovation (1/0)	0.046	**	0.015	0.049	***	0.015	0.038	**	0.012	0.041	***	0.013
% female	-0.128	***	0.031	-0.128	***	0.031	-0.108	***	0.028	-0.109	***	0.028
% white collars	-0.110		0.081	-0.113		0.082	-0.108	*	0.061	-0.111	*	0.062
% blue collars	-0.111		0.079	-0.114		0.080	-0.107	*	0.059	-0.110	*	0.060
% fixed term contracts	0.061		0.044	0.059		0.044	0.038		0.038	0.038		0.038
ln(value added)	0.009		0.011	0.009		0.011	0.004		0.010	0.005		0.010
st. dev. Sales	0.144	**	0.067	0.156		0.067	0.113	**	0.055	0.123	**	0.056
Seniority	0.001	**	0.000	0.001	**	0.000	0.001	**	0.000	0.001	**	0.000
14<employees<50	-0.002		0.025	-0.002		0.025	0.001		0.021	0.001		0.021
49<employees<250	0.110	**	0.035	0.110	**	0.035	0.108	**	0.035	0.109	**	0.035
>249 employees	0.200	***	0.051	0.199	***	0.051	0.221	***	0.062	0.220	***	0.061
North East	0.011		0.020	0.012		0.020	0.013		0.018	0.014		0.018
Centre	-0.016		0.020	-0.018		0.020	-0.011		0.017	-0.012		0.018
South	-0.093	***	0.018	-0.092	***	0.018	-0.068	***	0.014	-0.069	***	0.014
Trade, hotels and rest.	-0.066	***	0.021	-0.066	***	0.020	-0.051	**	0.017	-0.051	**	0.017
Transport and comm..	-0.068	***	0.020	-0.070	***	0.020	-0.053	***	0.015	-0.055	***	0.015
Education, health and public services	-0.115	***	0.020	-0.117	***	0.020	-0.084	***	0.017	-0.086	***	0.017
Year 2007	-0.081	***	0.014	-0.083	***	0.014	-0.068	***	0.013	-0.070	***	0.013
sigma_u							0.84		0.11	0.831		0.112
rho							0.42		0.06	0.408		0.065
Wald chi2	541.63			566.72			247.2			248.6		
Prob > chi2	0.000			0.000			0.000			0.000		
Pseudo R2	0.33			0.33								
N. of groups							1621			1621		
N. of observations	2661			2661			2661			2661		

Note: Omitted variables: North West, intermediation and business services, % managers, year 2005, firm with less than 15 employees; standard error adjusted for firm clusters; *** significant at 1%, ** at 5%, * at 10%; regressions performed with no sample weights

Table 9: Probability of adoption PRP, 2005-2007. Service sector. Marginal effetcs

	POOLED PROBIT						RE PROBIT					
	dy/dx		st er	dy/dx		st er	dy/dx		st er	dy/dx		st er
	(a)			(b)			(c)			(d)		
% trained	0.047	***	0.012	0.017		0.024	0.020	**	0.008	0.010		0.011
Union (1/0)	0.244	***	0.022	0.220	***	0.026	0.184	***	0.029	0.165	***	0.031
% trained*union				0.044		0.029				0.016		0.014
Innovation (1/0)	0.015	*	0.008	0.016	*	0.008	0.006		0.004	0.007		0.004
% female	-0.042	**	0.018	-0.043	**	0.018	-0.019	*	0.010	-0.019	**	0.010
% white collar	-0.014		0.046	-0.016		0.047	-0.010		0.018	-0.011		0.019
% blue collars	-0.038		0.045	-0.040		0.046	-0.021		0.018	-0.023		0.019
% fixed term contracts	0.053	**	0.026	0.053	**	0.026	0.023		0.013	0.024	*	0.014
ln(value. added)	0.015	**	0.007	0.015	**	0.007	0.006	*	0.003	0.006	*	0.003
st. dev. Sales	0.036		0.040	0.041		0.041	0.009		0.017	0.011		0.018
Seniority	0.000	*	0.000	0.000	*	0.000	0.000		0.000	0.000		0.000
14<employees<50	0.004		0.019	0.005		0.019	0.003		0.008	0.003		0.008
49<employees<250	0.065	**	0.028	0.067	**	0.028	0.035	*	0.019	0.037	*	0.020
> 249 employees	0.147	**	0.047	0.149	***	0.047	0.107	**	0.048	0.110	**	0.049
North East	0.023	*	0.013	0.023	*	0.013	0.011		0.007	0.012		0.007
Centre	-0.005		0.012	-0.006		0.012	-0.003		0.005	-0.003		0.005
South	-0.038	***	0.010	-0.038	***	0.010	-0.014	**	0.006	-0.014	**	0.006
Trade, hotels and rest.	-0.003		0.013	-0.003		0.013	-0.001		0.005	-0.001		0.005
Transport and com.	0.041	**	0.020	0.042	**	0.021	0.025	*	0.013	0.026	*	0.014
Education, health and public services	-0.032	**	0.011	-0.033	**	0.011	-0.010	*	0.005	-0.010	*	0.006
Year 2007	-0.032	***	0.008	-0.033	***	0.008	-0.014	**	0.006	-0.015	**	0.006
sigma_u							0.942		0.143	0.931		0.143
rho							0.470		0.076	0.464		0.076
Wald chi2	496.74			515.92			151.640			154.010		
Prob > chi2	0.000			0.000			0.000			0.000		
Pseudo R2	0.36			0.37								
N. of groups							1620			1620		
N. of observations	2635			2635			2635			2635		

Note: Omitted variables: North West, quarrying, % managers, year 2005, firm with less than 15 employees; standard error adjusted for firm clusters; *** significant at 1%, ** at 5%, * at 10%; regressions performed with no sample weights

Appendix

Table A1: variable definition

Productivity	Log of the valued added (source AIDA) and deflated by the value added deflator (source, ISTAT).
Training	Proportion of trained on total employment
Firm Size	Total number of employees divided in four classes by size
SLB	Dummy variable that equals to 1 if the firm adopts second level bargaining, 0 otherwise
PRP	Dummy variable that equals 1 if the firm adopts PRP payments of any kind, 0 otherwise.
Unions	Dummy variable that equals 1 if in the firm there is a worker representation on any kind, 0 otherwise
% Female	Proportion of females on total employment
% Managers	Proportion of managers and supervisors on total employment
% White-collars	Proportion of white collars on total employment
% Blue-collars	Proportion of manual workers on total employment
% Fixed-term	Proportion of fixed-term workers on total employment
St.dev. sales	Average value of standard deviation of sales over the period 2002-2005, calculated by cells (organized for each 2-digit industry and firm size) the firm belongs to
North-West	Dummy variable that equals 1 if the firm is localized in North-Western regions, 0 otherwise.
North-East	Dummy variable that equals 1 if the firm is localized in North-Eastern regions, 0 otherwise.
Centre	Dummy variable that equals 1 if the firm is localized in Central regions, 0 otherwise.
South	Dummy variable that equals 1 if the firm is localized in Southern regions, 0 otherwise.

Sources: AIDA and ISFOL-RIL Survey for 2005 and 2007

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