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Workplace Flexibility and Istitutions in Europe. A Tale of Two Countries.

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Workplace Flexibility and Institutions in Europe. A Tale of Two Countries.

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Abstract

This paper studies the determinants of the joint adoption of employment, wage and working time flexibility in workplaces, paying attention to the existence of complementarities. To better understand the role of country-specific institutional features, we compare the adoption of flexibility in Italy and Great Britain, two EU countries characterized by quite different product and labour market regulation. Empirical analysis based on establishment-level data shows that the probability of adopting any forms of flexibility is highly influenced by both firm characteristics and institutional variables, mainly by employment protection, union power and firm-level bargaining. Country-specific patterns also emerge: in Italy employment and wage flexibility are complement and they are both substitute for time flexibility; in Great Britain the flexibility mix is less clear cut. These results suggest that both policy makers and social partners should be aware that incentives or restrictions to specific forms of flexibility are likely to produce effects also on the use of other flexible work arrangements.

Key words: flexibility, complementarities, institutions, multivariate probit

JEL Codes: J41 J49, J59

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1. Introduction

In the last decades firm organization has been changing substantially. The concept of "flexible" firm has been formally defined in literature in the Eighties to describe the organizational changes occurred in most firms in response to skill biased technological progress, market globalization and changes in customers demand. Many studies focused on the definition of the main features of the flexible firm, emphasizing the role of flexibility in the production process, human resources management, innovation and the overall organization. The organizational form emerging in the last decades has also been seen as the natural evolution of the traditional Fordistic firm, whose mass production and rigid-hierarchical structure was no longer competitive in emerging competitive and turbulent markets.

Within the socio-economic debate on flexibility, sociological and management studies point out that profit-maximizing firms want to adopt a certain (optimal) mix of flexibility, characterized by a specific combination of different flexible work arrangements (such as employment, wage, working time and functional flexibility). The optimal mix of flexibility depends on firms' and markets characteristics, but also on the institutional context (in terms of economic, social and political institutions) prevailing in the country where the firm is located.

Economic empirical literature on flexibility is very rich, but the bulk of the work has been traditionally focused on each single type of flexible work arrangement (mainly employment, wage or working time flexibility), without explicitly considering eventual interactions and the role of market regulation. Only a strand of research on the determinants of organizational change and the adoption of new human resources practices (the so called "High Performance Workplace Practices") has been studying the existence of interrelations between different forms of work practices (such as team work, flexible job assignments, Total Quality Management, employee involvement, flat hierarchical structure, etc.). According to most of these studies, new work practices are generally complement and adopted in clusters. However, even in this case the role of institutions is generally neglected.

The aim of this work is to study the determinants of the joint adoption of employment, wage and working time flexible arrangements, paying attention to the existence of complementarities and the role of the institutional context. To properly take into account the effect of the country-specific environment, the empirical analysis will be carried out comparing the behaviour of firms located in two countries, Italy and Great Britain, characterized by a quite different institutional mix.

2. Flexibility in Italy and the UK: a comparative analysis of the institutional setting

According to international comparisons, Italy and the UK are characterized by quite different welfare systems and institutions, such that the first is usually ranked among the "rigid" EU countries, while the second belongs to the group of the flexible (or deregulated) ones.

Table 1 summarizes the main features of regulation of employment, wage and working time flexibility in Italy and the UK.

Overall, flexibility is much more regulated in Italy than in the UK, regardless of the type of flexibility considered. The differential in the degree of regulation between the two countries seems particularly relevant in the case of employment protection and fixed-term contracts, while more common patterns emerge in the regulation of working time flexibility, mainly in the case of the most innovative working time schedules (such as flexitime, hours accounts and annualized hours).

The comparative analysis points out the role of unions, public support and EU policies in explaining cross-countries institutional differences and their evolution over time.

In Italy the use of flexibility is generally limited to specific situations, defined either by law or by collective agreements. Firm-level bargaining (and hence local union representatives) plays a crucial role in the actual implementation of flexibility within the firm, mainly in the case of wage flexibility. Individual employment relationships are relevant only in the case of high-skill workers and managers.

The overall picture is quite different in the UK, where the progressive decline of unions power have also shifted the level of bargaining: collective employment rights have been replaced by individual ones and the overall bargaining process has been decentralized at the plant and individual level. Thus employment, wage and working time flexibility are often adopted by the employers without consulting the local unions or other workforce representatives.

Public support has traditionally played an important role in the diffusion of flexibility in the UK, where increased flexibility in the labour market has been used as a key tool in different governments strategy to tackle simultaneously unemployment and inflation over the last two decades (Deakin and Reed 2000). Several forms of performance-related pay schemes have been supported since the Eighties mainly through tax exemptions, thus favouring their wide diffusion. On the contrary, only in the Nineties the Italian national government has started to support the use of wage flexibility within a wider income policy approach: the adoption of performance-related pay schemes at the firm level should be used to share

productivity gains with the employees, while minimum wage increases centrally bargained (by industry) should be coherent with inflation targets set by the government in agreement with social partners (and in line with the convergence Maastricht Treaty parameters). In both countries public support of working time flexibility is a more recent issue and it is related to equal opportunities and work-life balance policies.

The European Employment Strategy and the implementation of the EU Directives on the regulation of the labour markets (such as the 1997 Directive on part-time work and the 1999 Directive on temporary employment) are favouring the introduction of some regulation in the most flexible countries, such as the UK, mainly with the aim of preventing discrimination of atypical workers and the abuse of bargaining power by the employers[1]. On the contrary, Italy is now going through a transitional stage between extreme rigidity and flexibility (Bertola and Ichino 1995), but recent reforms have actually been introduced "at the margin", involving some specific groups of the population (mainly the young, women and those in the most disadvantaged regions), without touching the iper-protection guaranteed to those with permanent contracts (the core dependent workers, usually family heads).

At the moment, despite of the recent moves toward, respectively, flexibility in Italy and regulation in the UK, the institutional mix in the two countries is still quite different. Furthermore, empirical evidence on the long run features of labour market institutions in Italy and the UK shows that some of the current differences are actually persistent over time (Nickell 1997; Nickell et al. 2001).

3. Review of the empirical literature

Economic empirical literature on the use of employment, wage and working time flexibility is very rich, but the bulk of the work has been focused on each single type of flexible work arrangement.

The idea that different work arrangements could be either complement or substitute and that firms usually adopt an optimal bundle of work practices became a central issue in the empirical literature on organizational change. Starting from the seminal paper by Milgrom and Roberts (1990) arguing that the impact of a system of human resource practices will be greater than the sum of its parts because of the synergic effects of bundling practices together, a strand of empirical literature focuses on the estimation of the relationships existing between

[1] Despite of the general principle of equal treatment, temporary workers may be actually discriminated in terms of wages and working conditions and employees may be forced to work long hours (Booth et al., 2002).

different work arrangements. Most of these studies agree upon the existence of relevant complementarities between high performance work practices (such as team work, flexible job assignments, Total Quality Management, decentralization of responsibilities, etc.), which are usually adopted in clusters (Osterman 1994 and 2000; Ichniowski and Shaw 1995). For example, incentive pay plans seem to positively influence employees' performance only when coupled with flexible job design, employee participation, training and employment security (Ichniowski et al.1997). In the same way, it has been argued that introducing a profit sharing plan for all workers in a firm may have little or no impact on firm performance unless it is linked with other practices that address the inherent free rider problem associated with corporate wide profit sharing plans, such as careful employee recruiting and team work (Kandel and Lazear 1992). In the case of Italy, a specific survey on a representative sample of manufacturing Northern firms showed that the bundle of work practices might be quite complex, including on average fifteen work arrangements such as a flatter organisational design, team working, information sharing, training measures, performance-based compensation schemes and participative industrial relations (Cristini et al. 2003).

These results seem to show that there is no clear consensus on the exact components of the optimal bundle and there are several combinations of work practices that can lead to similar performance outcomes (Dyer and Reeves 1995).

Furthermore, the concept of flexibility is only implicitly considered in this strand of research, since the firm using these types of new work practices (the so called "modern" or "post-fordistic" firm) is generally characterized by a more flexible organization than the traditional fordistic firm (Lindbeck and Snower 2000).

Relevant empirical contributions on the features of the flexible firm come from sociological and management studies. In particular, some research on organizational flexibility studied the linkages between numerical and functional flexibility, testing empirically the "core-periphery" model developed by Atkinson (1984). In the British case, there seems to be little evidence on the actual use of this strategy in firms organization (Hakim 1990). Empirical evidence actually shows that the recent growth in the number of part-time and temporary workers is more linked to macro-economic structural changes (such as the relative growth of the service sector) than to specific policy choices at the firm level (Pollert 1988). Italian evidence on a sample of small-medium firms seems to partly support the "core-periphery" model in the late Nineties, but traditional working time flexibility (overtime in expansion and temporary lay-offs in recession) is still the most common form of labour adjustment used to cope with demand fluctuations (Negrelli and Quaratino 2000).

According to the extensive review reported in Kalleberg (2001), two organizational models seems to better describe than the "core-periphery" model how firms simultaneously combine functional and numerical flexibility: internal organizational labour utilization systems and organizational network.

In the first model, the two forms of flexibility are combined within the firm to obtain different "human resource portfolios" (Sherer 1996). Empirical evidence shows that firms actually adopt different mixes of human resource relationships, in which functional and numerical flexibility have quite different weights. Furthermore, temporary workers are a quite heterogeneous group, including both low skilled individuals lacking of any job security and others lacking of security at a specific workplace, but having relatively secure employment within the firm (Smith 1994).

Firms can reach a certain degree of flexibility also creating external relations with other companies (organizational networks). The Italian industrial districts and the network of IT firms in the Silicon Valley are empirical evidence of this model. Also the recent upsurge of outsourcing and subcontract of production phases, maintenance, repair, clerical and other "non strategic" activities in some firms located in most industrialized countries (mainly USA, UK, Canada) is coherent with this model (Harrison and Kelley 1993; Hunter et al. 1993; Campa and Goldberg 1997; Cappelli and Neumark 2001).

The main limits of these contributions are that they are often based on single case studies and they usually don't consider the role played by either working time or wage flexibility.

In the case of Italy, only one study specifically focuses on the existence of interrelations between employment, wage and working time flexibility. Using a representative sample of around 1100 manufacturing firms with at least 50 employees, Casadio and D'Aurizio (2001) show that the link between working time flexibility and the other forms of flexible work arrangements is quite complex and crucially depends on the definition of time flexibility used. The use of annualized hours is in fact substitute for both employment and wage flexibility, while the use of flexible standard weekly hours (depending on production needs) is complement to them[2]. More in general, firms tend to exploit mainly one form of flexibility (for instance, wage flexibility), imposing less variability to their employees in the other work

[2] In the case of annualized hours, a unique standard weekly working time is defined by contract (e.g., 40 hours per week), while in the case of flexible standard weekly hours the latter can vary over the year (e.g., 44 hours for 6 moths; 36 hours for the remaining 6 months). In both cases, workers are allowed/forced to vary their working time during the year and paid overtime is reduced.

dimensions (employment and time flexibility). Despite of the new insights offered by these results, the definition of working time flexibility seems too restrictive, since it does not include the use of other traditional tools, such as overtime and temporary lay-offs. Furthermore, the role of institutional factors, such as unions, employment protection and firm-level bargaining is neglected.

4. The empirical specification

The objective of the empirical analysis is to study the determinants of different forms of flexibility, paying specific attention to both the role of institutional factors and the relationship existing between the different forms of flexible work arrangements.

More specifically, we consider three forms of flexibility: employment (E), wage (W) and working time (T) flexibility.

In order to capture the existence of complementary/substitution effects between them, one might insert the remaining forms of flexibility (for instance, wage and working time flexibility) among the regressors of a model explaining the adoption of a certain flexible work arrangement (in our example, employment flexibility). However, since the choice of the different work arrangements is simultaneously determined, the flexibility-related regressors are endogenous and estimates are biased.

One way to solve the problem is to assume that the adoption of flexible work arrangements follows a sort of "evolutionary path", such that some forms of flexibility will be likely adopted once other forms are already in use (Casadio and D'Aurizio 2001; Cristini et al. 2003). This approach is however based on some aprioristic restrictive assumptions and it might be hardly defensible on the basis of the actual (cross-country heterogeneous) empirical evidence[3].

In order to take into account of both endogeneity and the existence of correlations in the adoption of different forms of flexibility, we adopt a sort of Seemingly Unrelated Regressions (SUR) approach: we estimate the probability of adopting each form of flexibility using a reduced form equation (i.e., not including the other forms of flexibility among the regressors), but we explicitly model and estimate correlation between the unobservables.

[3] An alternative approach is to use Instrumental Variable estimators. It's however very difficult to find good and valid instruments (in our case, variables affecting directly only one form of flexibility) in cross-section establishment level data.

In particular, we specify a trivariate probit model as follows:

$$
\begin{aligned}
& y_{im}^{*} = \beta_{m}^{'} X_{im} + \varepsilon_{im} \qquad\qquad m = E,W,T \\
& y_{im} = 1 \quad if \;\; y_{im}^{*} > 0 \; and \; 0 \; otherwise \\
& \varepsilon_{im} \sim Tri\,\mathrm{var}iate\; Normal\,(0,V) \qquad with\; \rho_{i}^{2} = 1 \quad and \quad \rho_{ik} = \rho_{ki}
\end{aligned}
\qquad [1]
$$

where the dependent variables are binary (dummy) indicators and the three error terms are jointly distributed as a trivariate normal, each with mean of zero and variance-covariance matrix V, where all the variances (i.e., the values on the leading diagonal) are equal to 1 and the correlation terms are symmetric.

The sign of the correlation terms should inform us about the type of relationship existing between the flexible work arrangements considered: in case of positive correlation between the unobservables we may infer that the two forms of flexibility considered are complement, while in the opposite case they are likely to be substitute.

In this case, the log-likelihood function depends on the trivariate standard normal distribution, involving trivariate normal integrals which are not directly computable, but that can be evaluated using simulation methods (Cappellari and Jenkins 2003).

The most popular simulation method to evaluate multivariate normal distribution function is the Geweke-Hajivassilou-Keane (GHK) smooth recursive conditioning simulator (Börsch-Supan et al. 1992; Börsch-Supan and Hajivassiliou 1993; Keane 1994; Hajivassiliou and Ruud 1994).

Estimates obtained with the GHK simulator are consistent as the number of draws and the number of observations tend to infinity. In order to reduce the finite sample bias, the sample size should increase with the number of equations. The main drawbacks of this estimator are its slowness in convergence and the sensitivity of its results to the number of draws (and to the choice of the seed of the random number generator). However, it has been shown that, for fairly large samples (i.e., some thousands of observations), estimates should be less sensitive if the number of draws approximates the square root of the sample size (Börsch-Supan and Hajivassiliou 1993).

5. The data

The empirical analysis is based on establishment-level data sets for both Italy and the UK.

The choice of the two samples was driven by the need to get both comparable data and detailed information on industrial relations and institutions at the workplace level.

In light of these objective, in the case of Italy we used a representative sample of more than 2800 metalworking firms surveyed in 1997 by the national sectoral employer association (Federmeccanica)[4]. Since the survey is done on a yearly basis mainly for wage bargaining purposes, it contains a lot of information on both firm organization (employment stock and flows, workforce composition, wage levels and composition, the number of hours worked and the main feature of working time, production organization, etc.) and institutions, mainly related to local bargaining and industrial relations (such as the share of unionized workers, the presence of union representatives among the employees, the number of union organizations, the use of a firm contract, etc.).

In the case of the UK, we used establishment-level data provided by the Workplace Employees Relation Survey (WERS) in 1998. The analysis is actually limited to Great Britain, since the survey covers all the British workplaces with at least 10 employees and it is aimed at mapping the system of workplace employee relations, capturing eventual changes in the system over time. The survey is composed by three different questionnaires: one referred to the management, one to unions/workers representatives and one to a sample of employees. For our purposes, we used the data from the management survey, which provides detailed information on firm organization (firm ownership, product organization, performance at the workplace, employment level and flows, workforce composition, recruiting and training, wage levels, working time features, ect.) and institutions, mainly in terms of local industrial relations and employees relationships (consultation and communication, representation at work, collective disputes and procedures, etc.). Overall, 2191 establishments were surveyed, covering the manufacturing sector, services and public administration[5]. In order to obtain results comparable to the Italian case, analysis is restricted to the 299 manufacturing establishments.

In the next sections, a brief description of the relevant variables is presented.

Defining flexibility

The first task of the empirical analysis was to obtain similar definitions of employment, wage and working time flexibility for both Italy and Great Britain on the basis of the available data. Detailed definitions and summary statistics are reported in Annex I.

[4] 2962 establishments were surveyed in 1997, but the presence of missing data for some of the relevant variables reduced the sample to 2842 observations.

[5] Only agriculture, forestry and fishing, and coal mining have been excluded.

In general, the three definitions were driven by the concept of voluntary firm choice: all the flexible work arrangements considered are not imposed by law or any other regulations, but they are the result of a decision-making process (eventually bargained) at the firm level.

For this reason, we used a quite strict definition of employment flexibility, considering the use of fixed-term and temporary contracts. We did not extend the definition including the presence (or the lack) of employment protection, since in Italy this is imposed by law in the establishments with more than 15 employees: given the establishment size, it is not a firm choice whether being subject to this regulation or not. Furthermore, in Italy the use of temporary help contracts was officially allowed only in 1997, hence the Italian definition of employment flexibility actually considers only the use of fixed-term contracts, including the special work-training contract available for the youngest workers.

Wage flexibility considers performance-related pay schemes, either individual or group-based, both cash and deferred. The British definition includes also employee share ownership schemes. This definition is aimed at capturing the adoption of any form of variable wage scheme linking actual pay to any targets measuring either individual or firm performance in a broad sense.

The definition of time flexibility includes both the adoption of innovative flexible working time schedules and the extensive use of traditional working time arrangements, such as overtime and temporary lay-offs. Time flexibility considers then the use of annualized hours, flexitime and flexible working weeks. Furthermore, we considered as firms adopting flexible working time arrangements those with a normal working week (including overtime) longer than 48 hours in Britain and those with a relative high use of overtime in Italy. In the Italian data set the definition of time flexibility includes also the use of temporary lay-offs.

Explaining the adoption of flexibility

The second part of Annex I reports the explanatory variables used in the empirical analysis. These variables can be grouped into three main categories: firm characteristics; industrial relations and institutions; other work arrangements.

The first group of variables captures the main features of production and work organization, such as establishment size (also as a part of a multi-plant firm), incidence of exports, trends in sales growth, labour productivity, average wage level, composition of the workforce by gender, skill, age and nationality.

The variables related to industrial relations and institutions are aimed at measuring the actual union power, the main characteristics of firm-level bargaining and the existence of

employment protection, either by law or by agreement. In particular, union power is measured both in terms of union membership and presence of union representatives within the establishment. The effect of union coordination is captured by the presence of different union organizations, while the climate of industrial relations is measured through the use of strikes. Employment protection refers to firing restrictions of workers employed with standard contracts. These restrictions are regulated by law in Italy (1970 *Statuto dei lavoratori*), through firm policy of guaranteed job security or no-compulsory redundancies in the Britain.

The last group of variables refers to the existence of specific work arrangements other than those captured by the three forms of flexibility discussed above, namely: the use of outsourcing or sub-contractors, the presence of part-time workers and the use of shifts.

6. Comparative descriptive statistics

Table 2 presents the incidence of each type of flexibility (and each possible combination) in Italy and Great Britain. In the British case statistics refer to both the whole sample and the manufacturing sector, being the latter more comparable with the Italian metalworking sector. The table shows that the majority of firms in both countries adopt some flexible work arrangements and the share of non flexible firms doesn't differ significantly between the two countries (around 20%). Nonetheless, only 10% of the Italian establishments and 6-7% of the British ones adopt all the three forms of flexibility considered. The majority of the firms in both countries adopts no more than two forms of flexibility together, with some differences in the predominant mix in the two countries. In Italy fixed-term contracts are the most common form of flexibility, while in Britain wage flexibility (mainly in the form of cash profit related bonuses) is more common than both employment and working time flexibility. The latter is the least used form of flexibility in both countries (with a larger gap in Italy) and they usually go with employment (Italy) or wage flexibility (Great Britain).

Referring to the manufacturing sector for Britain, employment with wage flexibility represents the most common combination in both countries (around 19% of the sample). Overall, this evidence is consistent with differences in labour market regulation. For example in Italy, where strict firing restrictions are imposed by law in medium-large establishments, the use of fixed-term contracts is more common than in Britain. In the latter, public support has been favouring the relatively large diffusion of performance-related pay schemes.

The table also reveals that some combinations of flexibility are more likely than others, suggesting that some sort of substitution/complementary effects do exist.

Table 3 reports the main features of the average "rigid" and "flexible" establishments in the two countries. The table clearly shows that the establishment size is positively correlated with the adoption of any type of flexible arrangements in both countries, while different patterns emerge in the case of the institutional variables. In fact, in Italy flexible establishments are more involved in local bargaining and more unionized, regardless of the measure of union power considered. The role of industrial relations is not so clear cut in Britain, where flexible establishment are more likely to be involved in bargaining and to have workers joining any union organizations, but the incidence of both union membership and union representatives is lower than in rigid establishments[6]. Flexible establishments are more likely to be subject to some forms of employment protection in both countries, even if in Britain this is generally much less binding than in Italy. The composition of the workforce doesn't seem to differ significantly between the two groups within the two countries, with the exception of the incidence of white collars, which in Britain is much higher in flexible establishments than in the others (31% vs 24%). Flexible establishments are also more likely to use other form of work arrangements, in particular outsourcing and shifts in Italy, outsourcing and part time in Britain.

7. Econometric results

Annex II reports the estimates of the trivariate probit model with simulated maximum likelihood discussed in section 4 for Italy (table 1) and Britain (table 2)[7]. Several specifications and functional forms have been tested, starting with a parsimonious model with only organizational factors (column 1), adding some institutional variables (column3), trying alternative measures of union power and bargaining coordination (column 5 and 7), using the complete set of institutional variables (column 9) and controlling for the effect of other work arrangements (column 11)[8].

[6] Note that the difference in the share of local union representatives may be partly due to the effect of integer numbers when shares are computed using relatively small quantities at the numerator.

[7] The use of Stata mvprobit routine by Cappellari and Jenkins is acknowledged.

[8] Further specifications have been estimated, introducing also the wage level and/or using alternative functional forms for both the establishment size and the unionization rates. The results obtained don't differ significantly from those presented in the Annex.

Given the sample size available for Britain (around 300 observations) and the sensitivity of estimates to the number of draws in finite samples, we estimated the model with the British sample trying different number of draws, ranging from 50 to 300. According to these results, estimates are not statistically different with a number of draws equal to 100 or higher[9]. The GHK simulator was then applied using 100 draws with the British data, while in case of Italy the size of the sample (around 2850 observations) allowed us to choose a number of draws close to the square root of the sample size (i.e., 55 draws).

Table 4 presents the results obtained with the preferred specification for both countries, with the whole set of institutional variables[10]. The figures in the table confirm the important role played by both the establishment size and institutions in determining the adoption of any forms of flexibility. However, the relative effect of these factors varies both by country and by type of flexibility within each country.

In general the probability of adopting any forms of flexibility increases with the establishment size. This effect is particularly relevant in the case of employment flexibility. Only in the case of working time flexibility in Britain the establishment size has a negative effect on the probability of adoption.

The effect of the other organizational variables is less clear cut and it changes with the type of flexible work arrangement considered. For instance, being part of a multi-plant company in Italy decreases the probability of adopting employment flexibility, while it increases the probability of introducing performance-related pay schemes. This results suggests that in highly regulated countries, the possibility to move workers between different establishments in multiplant firms seems then an alternative form of employment flexibility[11]. This is not true in Great Britain, where the estimates for the multiplant variable are very similar in sign and magnitude to those obtained for the establishment size variable.

Establishment characterized by relatively high levels of labour productivity are less likely to be flexible in Italy (albeit the estimates are usually not statistically significant), while they are more likely to adopt time flexibility in Britain. This confirms that British employers often use work-life balance policies to award labour for productivity gains (EIRO 2001b).

[9] Results are available from the author upon request.

[10] The preferred specification include all the controls except for the other work arrangements, that are likely to be endogenous.

[11] In line with this result, multiplant establishment are also characterized by lower turnover.

Short-run growing establishments are more likely to be overall flexible, even if in Italy they are less likely to introduce working time flexibility.

The variables related to workforce characteristics provide a quite composite picture, with a relatively higher importance of gender and skills in Italy, skills and nationality in Great Britain. In both countries employment flexibility increases with the incidence of white collars, suggesting that employment flexibility may be used for quite heterogeneous jobs in terms of skill contents. In the case of Italy, the negative sign of the women-related coefficient in the time flexibility equation might be explained reminding that part-time work is not included in the definition of the dependent variable. It is then likely that part-time jobs are preferred to other flexible working time arrangements in firms with a high incidence of women, as it is also suggested by the negative effect of the incidence of part-time workers on the probability of adopting time flexibility (column 11, table 1 in Annex II).

The probability of adopting any forms of flexibility is highly influenced by institutional variables, mainly by employment protection, union power and firm-level bargaining.

Employment protection, either imposed by law as in Italy or bargained at the firm level as in Britain, increases the probability of adoption of all the three forms of flexibility considered. However, its effect is more relevant on the adoption of employment flexibility in Italy, time flexibility in Britain: Italian firms respond to binding firing restrictions using fixed-term contracts, while British firms adopting policies of guaranteed job security are also more likely to introduce more flexible working time.

Most of the differences between the two countries are explained by the different impact of industrial relations variables on the probability of being flexible.

In Italy, the presence of union members produce positive effects on the probability of using both employment and wage flexibility, while it does not affect significantly the probability of adopting time flexibility. This role of unions is reinforced if we measure union power through the presence of union representatives in the workforce. Variables related to the incidence of union members or local representatives point out that unions have a positive effect on the adoption of flexibility, but relatively high unionization rates (and/or share of local union representatives) tend to oppose it, mainly when unions can actually bargain over its introduction within the establishment. Firm-level bargaining has a strong positive effect on the probability of adopting wage flexibility because performance-related pay schemes are generally the result of local wage bargaining.

In Great Britain, the effect of union membership or local union representatives is usually not statistically significant. Interesting results are obtained for working time flexibility, whose

probability of adoption increases with the presence of union members, but it declines with the share of local union representatives in the workforce. Nonetheless, the size of the first effect completely offsets the latter, thus confirming that unions are generally in favour of 'family friendly' or 'work-life balance' initiatives. With the partial exception of employment flexibility, firm-level bargaining does not play any significant role in determining the mix of flexibility within the firm.

To sum up, in Italy the introduction of wage flexibility goes through firm-level bargaining, while employment and time flexibility can also be adopted by the firm without the approval of local union representatives, who usually oppose the use of fixed-term contracts. Even if the latter effect is present also in British workplaces, industrial relations are less relevant than in Italy, mainly if union power is measured by union membership.

In any case, the presence and incidence of local union representatives actively involved in bargaining and consultations within the firm seems to represent a better measure of the actual union power at the firm level, thus casting some doubts on studies measuring union power only through union membership.

The overall institutional context is also influential on the mix of flexibility adopted in each country. Estimates of the correlation coefficients between the unobservables reported in table 5 show that in Italy employment and wage flexibility are complement and they are both substitute for time flexibility. The mix of flexibility is less clear cut in Britain: the relation between wage flexibility and either employment or time flexibility is not statistically different from zero, while employment and time flexibility seem complement, suggesting that these two tools are probably used within the same firm for different group of workers. In both countries the likelihood ratio test strongly allows to reject the null hypothesis of no correlation; this result confirms the existence of relevant relationships between the different forms of flexible work arrangements available in the firm policy kit. The comparison between the two countries seems also to suggest that the presence of high labour market regulation and strong institutions favour the emergence of more common patterns in the use of flexibility at the firm level.

Predicted joint probabilities: estimated "flexible" and "rigid" workplaces

The estimates discussed in the previous section can be actually used to obtain some useful predictions on the joint probability of adoption (or non-adoption) of employment, wage and working time flexibility.

More specifically, using the model presented in table 4, we predicted the joint probability of all success and all failures for each observation in the two samples and then we calculated the average joint probabilities by specific firm characteristics and institution in both countries. These average predicted joint probabilities are reported in table 6.

According to our estimates, the average and the median joint probabilities don't differ significantly between Italy and Britain: on average, in both countries the probability of adopting all the three types of flexibility is around 7-10%, while the probability of adopting none of them is around 20-21%. However, some relevant differences emerge when we look at the joint probabilities by firm characteristics. For example, the probability of all success increases in both countries with the establishment size, but in Italy the pace of growth is higher than in Britain.

With few exceptions, both joint probabilities don't change significantly with the composition of the workforce in either country.

All the joint probabilities estimated by institution confirm the results discussed above: the joint probability of all success (all failures) are much higher (lower) in establishments with a firm contract or union members or local union representatives or employment protection. The effect of institutions is particularly relevant when they are simultaneously present: the probability of adopting all the three types of flexibility in establishments without union members, local union representatives and employment protection is in fact lower than 1% in Italy, around 4% in Britain; it reaches 18% in Italy, 35% in Britain in unionized establishments with local union representatives and employment protection. The opposite trend emerges for the probability of not adopting any flexible work arrangements. Only where local union representatives in Britain are present this trend is reversed: the probability of not being flexible at all is in fact higher in establishments with local union representatives (25% and 19% respectively). Local union representatives in British establishments actually seem to produce quite heterogeneous situations, increasing the joint probability of both all success and all failures.

The presence of less clear patterns in Great Britain than in Italy by union incidence is clearly depicted in figure 1, where we plotted the estimated joint probabilities by union density and incidence of local union representatives in the workforce. In Italy, the probability of using the three types of flexibility is roughly bell-shaped: it increases up to a certain level (around 50%) and then it starts decreasing. In the case of Great Britain, the points are much more scattered in the diagram, such that the bell-shaped trend is less evident than in Italy and it touches its peak at a lower level of union density (around 20%). Heterogeneity in the British

case is even more evident when we plot the joint probabilities by incidence of local union representatives, while in Italy the joint probability of using all the three types of flexibility clearly declines when the incidence of local union representatives increases.

Predicted marginal probabilities and establishment "types"

Other than joint probabilities, it is interesting to look at marginal probabilities for each type of flexibility. In particular, we estimated the three marginal probabilities starting from the same "basic" type of establishment in both countries and then we analyzed how the marginal probabilities change, varying just one workplace characteristic at a time.

The results of this exercise are reported in table 7.

The basic type is a small establishment (10 employees), without unions, employment protection and firm-level bargaining. This is characterized by a relative high probability of using employment and time flexibility in Italy (40% and 25% respectively), wage and time flexibility in Britain (13% and 21% respectively).

A higher number of employees seems to influence mainly the probability of using fixed-term contracts in both countries, but in British establishments the introduction of employment flexibility is combined with a significant reduction of the probability of using time flexibility.

Given a certain number of employees, in Italy the introduction of employment protection increases significantly only the probability of adopting fixed term-contracts (from 69% to 77%), while in Britain all the three marginal probabilities increase significantly, registering the highest changes in the case of wage flexibility (from 31% to 77%).

The further introduction of union membership (assuming that 30% of the workforce is unionized) does not produce significant effects in Italy, while in Britain the probability of using time flexibility increases dramatically (from 22% to 86%) and the probability of using fixed-term contracts declines (from 53% to 32%). The latter effect is reinforced where local union representatives are present (assuming they constitute 3% of total workforce). Their presence makes actually all the three marginal probabilities to decline in Britain, to increase in Italy. Firm-level bargaining has a strong effect on the adoption of wage flexibility in Italy (whose probability increase from 15% to 65%), on the adoption of both employment and time flexibility in Britain (with an increase from 4% to 16% in the first case, a reduction from 70% to 59% in the second case).

The pictures of the average marginal probabilities by union density (panel a of figure 2) and incidence of local union representatives (panel b of figure 2) show that the bell-shaped trend emerging for the joint probability of using all the three types of flexibility in Italy is

mainly determined by the effect of union density on the marginal probability of using wage flexibility. If union presence is measured through the incidence of local union representatives, the relation is instead clearly negative both for wage and employment flexibility. The marginal probability of using time flexibility doesn't seem significantly influenced by union presence, regardless how the latter is measured. As in the case of the joint probabilities, the scattered points in the diagrams highlight that the relation between union presence and marginal probabilities is less clear cut in Great Britain.

Counterfactual simulation

To better understand how the general institutional context prevailing in a certain country can influence the probability of adopting these specific forms of flexibility, we also estimated the three marginal probabilities for the average and the median establishment of each country in case they were located in the other country. In other words, we estimated the marginal probability for the Italian (British) average and median establishment using the coefficient estimated for the British (Italian) sample. Results are reported in the last rows of table 7. They show that both the country of location and the main establishment features do matter in influencing the probability of marginally using each type of flexibility. If the Italian average establishment were located in Great Britain, it would marginally use more extensively all the three types of flexibility considered, mainly wage and time flexibility. With the exception of employment flexibility, these results emerge also in the case of the median establishment. On the other side, if the British average and median establishment were located in Italy, they would likely adopt more time flexibility and much less wage flexibility, while the marginal probability of using fixed-term contracts slightly decreases only for the average establishment.

In general, Italian establishments would be probably more flexible if they were located in Britain and they would use more wage flexibility. On the contrary, British establishments would be less likely to adopt performance-related pay schemes if they were located in Italy, but they would probably use more time flexibility.

The fact that in Italy the introduction of flexible wages is strictly linked to firm-level bargaining might explain this differential: if the firms are allowed to adopt performance-related pay schemes without consulting union representatives, they will be more likely to do so. Nonetheless, a generally less regulated environment (such as the British labour market with respect to the Italian one) seems to increase the marginal use of any types of flexibility.

8. Concluding remarks

The main aim of this paper was to study the determinants of the flexibility mix at the workplace, highlighting both the existence of complementarities between the different forms of flexibility and the role of institutions.

To better understand the role of country-specific institutional environment, the empirical analysis was based on the comparison between Italy and Great Britain, two countries characterized by quite different product and labour market institutions.

Results from the empirical analysis based on establishment-level data show that the probability of adopting any forms of flexibility is highly influenced by both firm characteristics and institutional variables, mainly by employment protection, union power and firm-level bargaining.

In Italy wage flexibility is usually bargained at the firm level, while employment and time flexibility can also be adopted by the firm without the approval of local union representatives, who usually oppose the use of fixed-term contracts. Even if the latter effect emerges also in British workplaces, in Great Britain union power is less relevant than in Italy, mainly if it is measured by union membership, because flexible work arrangements are often directly introduced by the management.

The overall institutional context is also crucial in determining the flexibility mix in each country. In Italy employment and wage flexibility are complement and they are both substitute for time flexibility. In Great Britain, the relation between the three forms of flexibility is less clear cut. This result suggests that the presence of high labour market regulation and strong institutions favour the emergence of more “standard” and clearer patterns in the use of flexibility at the firm level.

The general institutional context partly prevents the use of wage flexibility in Italy, while in Britain the existing low regulation of standard contracts doesn’t actually require the extensive use of other forms of employment flexibility. Working time flexibility, both as innovative practices (such as annualized hours or flexible working week) and traditional ones (such as an extensive use of overtime), appears to be the form of flexibility easiest to introduce in both countries, mainly when it does not have to be bargained with unions (as in the case of overtime) or when both unions and workers might favour its introduction in a work-life balance perspective.

The institutional mix and public support/restrictions to specific forms of flexibility are then two key elements in determining the actual mix of flexibility adopted by the firms. However, the existence of complementary/substitution effects between the different forms of flexibility

can make marginal interventions ineffective, as in the case of policy complementarities (Coe and Snower 1997). For example, since employment and wage flexibility are complement in Italy, public support to wage flexibility might be ineffective if the use of fixed-term and temporary contracts is too regulated. More in general, incentives or restrictions to specific forms of flexibility are likely to produce effects on the use of the other forms of flexibility: these effects should be taken into account by both governments in implementing structural reforms and management and unions in bargaining at the firm level.

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Table 1

The regulation of flexibility in the Nineties in Italy and the UK

	ITALY	**UK**
Employment flexibility (fixed-term and temporary contracts)	• strict regulation of the use of fixed-term contracts • special fixed-term contracts for the young (apprenticeship and CFL) • temporary work & related agencies regulated by law only since 1997 ➢ In 2000 10% of total employment was on fixed-term contracts (+3.5 percent points than in 1990)	• no regulation of fixed term contracts and temporary work • pay and working conditions discrimination ➢ In 2000 6.7% of total employment was on fixed-term or temporary contracts (+1.2 percent points than in 1990)
Wage flexibility (performance-related pay schemes)	• profit and productivity-related pay schemes bargained at the firm level • strong government and social partners support since 1993 (within Italian strategy to join the European Monetary Union); some fiscal incentives. ➢ In 1995-96 10% of the firms with at least 10 employees and 39% of total employment was involved in PRP schemes	• profit and productivity-related pay schemes often introduced w/o bargaining • most common form: profit related-pay schemes; use of employees share ownership • strong government support since the 80 ➢ In 1998 58% of workplaces had at least one type of flexible wage scheme
Working time flexibility (flexitime, annualized working hours and great use of overtime)	• relatively new topic in firm bargaining (at least if different from working time reduction) • more attention to work-life balance and women needs (flexitime, hours accounts, vertical part-time, etc.), but production needs still predominant • new (more flexible) regulation on parental and training leaves • unions try to combine higher working time flexibility with a reduction in overall working hours, greater worker's autonomy in the utilisation of the time off and employment creation, mainly through constraints on overtime work. ➢ In 1995-96 50% of firms made an extensive use of overtime. At the end of the Nineties innovative forms of working time flexibility (annualized hours and flexible standard working week) were adopted by 56% of manufacturing companies with more than 50 employees and a firm contract.	• tradition of "long hours"; great use of overtime and long working weeks • different forms of working time flexibility, mainly part-time and flexitime, not always bargained with local unions • government support to work-life balance • unions are generally in favour of 'family friendly' or 'work-life balance' initiatives but suspicious that flexible working time could be used to reduce their bargaining power • high rate of unionization among workers using flexitime ➢ At the end of the Nineties 23% of manufacturing establishments made an extensive use of overtime (with a normal working week longer than 48 hours including overtime), while one out of four establishments used some other forms of flexible working arrangements (annualized hours and flexitime).

Source: our adaptation on ILO (1998) and EIRO (2001a, 2001b, 2002).

Table 2
The use of flexibility
(% of total sample)

	Italy	Great Britain*	
		All sample	Manufacturing
no flexibility	20.3	19.7	19.9
only employment flex	23.3	14.6	7.7
only wage flex	6.1	20.7	17.6
only time flex	7.9	9.6	14.5
employment and wage flex	19.4	11.5	19.1
employment and time flex	9.7	13.0	4.4
wage and time flex	3.4	5.0	9.8
all three types of flex	10.0	6.1	7.0
TOTAL	100.0	100.0	100.0
employment flex	62.4	45.1	38.3
wage flex	38.7	43.2	53.4
time flex	31.0	33.6	35.7

* Weighted data

Table 3
Firms characteristics by adoption of flexibility, Italy and Great Britain

	Italy				Great Britain			
	No flexibility		Flexibility		No flexibility		Flexibility	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Firm characteristics								
n. employees	30.49	89.33	182.17	599.61	47.55	8.30	121.01	18.86
export (1=yes)	0.52	0.50	0.71	0.45	0.49	0.13	0.42	0.07
multiplant (1=yes)	0.08	0.28	0.16	0.36	0.49	0.13	0.53	0.07
short run growth (1=yes)	0.55	0.50	0.68	0.47	0.36	0.11	0.61	0.06
high labour prod (1=yes)	0.23	0.42	0.21	0.41	0.47	0.13	0.38	0.07
% women	20.98	17.89	19.51	16.99	26.39	7.40	27.73	3.65
% white collars	31.40	21.79	32.58	21.47	23.95	4.27	31.14	2.63
% immigrants	2.27	7.52	1.90	5.67	1.24	0.54	3.48	0.91
older workers*	6964	4665	8085	4478	18.20	2.95	19.09	1.86
Industrial relations & institutions								
unionized (1 = yes)	0.42	0.49	0.79	0.41	0.33	0.14	0.49	0.07
% unionized workers	14.95	23.31	28.94	23.61	21.44	10.14	15.88	2.13
multiple union organizations	0.18	0.39	0.53	0.50	0.01	0.01	0.14	0.03
firm contract	0.17	0.37	0.59	0.49	0.35	0.14	0.40	0.07
strike (1=yes)	0.10	0.30	0.42	0.49	0.00	0.00	0.01	0.00
firm union representatives	0.21	0.40	0.63	0.48	0.30	0.14	0.22	0.04
% firm union representatives	1.65	5.14	2.57	3.19	5.56	4.05	1.00	0.25
Employment Protection**	0.46	0.50	0.86	0.34	0.00	0.00	0.02	0.01
Other work arrangements								
outsourcing (1=yes)	0.51	0.50	0.63	0.48	0.75	0.09	0.86	0.06
% part timers	3.54	7.66	2.27	4.44	6.17	3.34	7.17	3.03
shifts (1=yes)	0.12	0.32	0.40	0.49	0.53	0.12	0.33	0.05
N observations	577		2265		35		264	

* proxy for Italy (TFR per worker); % workers aged 51 or older for Great Britain

** establishments subject to EP legislation in Italy; establishments adopting some voluntary forms of EP in Great Britain

Table 4
The determinants of the adoption of Employment, Wage and Working time flexibility, Italy and Great Britain
Trivariate Probit estimates

	ITALY						GREAT BRITAIN					
	Flex E		Flex W		Flex T		Flex E		Flex W		Flex T	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Firm characteristics												
log(n. employees)	0.3347	7.9	0.1584	3.5	0.1415	4.1	1.2311	7.2	0.2685	1.4	-0.5438	-3.0
export	0.0306	0.5	0.0169	0.2	-0.0849	-1.5	0.2665	1.0	-0.5982	-2.2	0.5755	2.0
multiplant	-0.4532	-5.5	0.1982	2.2	0.0223	0.3	0.7600	2.3	0.4893	1.6	-0.5170	-1.8
high lab prod	-0.1193	-1.8	-0.0436	-0.6	-0.0336	-0.5	-0.1489	-0.5	0.0451	0.1	0.6953	2.6
short run growth	0.1810	3.3	0.0904	1.3	-0.0536	-1.0	0.5806	2.1	0.3433	1.4	0.4052	1.7
% women	2.9E-05	0.0	-0.0048	-2.6	-0.0043	-2.6	-0.0055	-0.9	0.0001	0.0	0.0057	0.9
% white collars	0.0032	2.4	-0.0004	-0.2	-0.0044	-3.4	0.0255	2.8	0.0095	1.2	-0.0043	-0.5
% immigrants	0.0060	1.4	-0.0062	-1.1	0.0125	3.1	0.0264	2.2	0.0178	0.9	-0.0011	-0.1
% old (proxy)	-5E-05	-7.2	-4E-07	0.0	2E-05	2.4	-0.0046	-0.4	0.0050	0.4	-0.0002	0.0
Ind. relations & institutions												
firm contract	-0.0777	-1.0	1.4419	17.4	-0.0062	-0.1	0.6601	1.8	0.2890	0.6	-0.2715	-0.8
unionized	0.2336	2.2	-0.1763	-1.3	0.0743	0.7	-0.2703	-0.7	0.3687	0.6	1.4789	3.4
% unionized workers	-0.0007	-0.1	0.0110	1.9	-0.0024	-0.5	-0.0073	-0.3	-0.0050	-0.2	0.0159	0.7
sq. % unionized workers	-4E-05	-0.8	-0.0001	-1.8	2E-05	0.4	0.0000	0.0	0.0001	0.3	-0.0002	-0.9
firm union representatives	0.4603	3.9	0.4919	3.9	-0.0190	-0.2	-1.4941	-2.9	-0.2030	-0.4	-0.2189	-0.5
% firm union representatives	-0.0378	-3.0	-0.0313	-2.1	0.0091	0.9	0.0730	2.1	-0.0473	-1.3	-0.0913	-2.4
multiple unions	-0.1293	-1.8	0.0904	1.2	0.0988	1.4	0.5042	1.6	-0.1489	-0.4	0.5549	1.8
strike	0.0140	0.2	0.1910	2.6	-0.0268	-0.4	4.0869	9.1	-0.0418	-0.1	0.0066	0.0
employment protection	0.2705	3.1	0.1471	1.2	0.0459	0.5	0.6608	0.9	1.2425	1.9	1.4018	2.0
constant	-1.0584	-8.6	-2.2442	-14.3	-0.9821	-8.7	-6.4150	-7.8	-1.7188	-1.5	0.5737	0.6
Wald chi2			1718.7						387.3			
(d.f.)			54						54			
N. Obs			2842						297			

z statistics are derived from robust s.e. Number of draws; 55 Italy, 100 Great Britain. Sampling weights were used with WERS data.

Table 5
Estimated correlation coefficients of unobservables

	ITALY		GREAT BRITAIN	
	Coef.	z	Coef.	z
ρ(Employment, Wage)	0.1435	3.5	0.1387	0.9
ρ(Employment, Time)	-0.0752	-2.2	0.3887	2.6
ρ(Wage, Time)	-0.0952	-2.4	-0.1844	-1.3
Likelihood ratio test all rhos=0	22.84		40.20	
Prob>chi2	0.0000		0.0000	

Table 6
Predicted joint probabilities

	ITALY		GREAT BRITAIN	
	Joint probability:			
	all 1s (highest flex)	all 0s (no flex)	all 1s (highest flex)	all 0s (no flex)
Average	0.0989	0.2061	0.0721	0.2075
Median	0.0386	0.1478	0.0370	0.1466
N. employees:				
<10	0.0019	0.5486	n.a.	n.a.
10-19	0.0093	0.3907	0.0120	0.3313
20-49	0.0462	0.1961	0.0664	0.2148
50-99	0.1193	0.0882	0.0901	0.1842
100-499	0.2114	0.0355	0.1353	0.0841
≥500	0.3563	0.0109	0.1297	0.0088
% women*				
low	0.1074	0.1925	0.0684	0.2001
high	0.0845	0.2293	0.0782	0.2196
% white collars*				
low	0.1037	0.1997	0.0572	0.2551
high	0.0904	0.2176	0.0973	0.1271
% immigrants*				
low	0.1016	0.2142	0.0685	0.2197
high	0.0877	0.1716	0.0881	0.1525
% old workers*				
low	0.0624	0.243	0.0834	0.2218
high	0.1369	0.1676	0.0584	0.1903
firm contract				
no	0.0128	0.3342	0.0609	0.2275
yes	0.1851	0.0778	0.0899	0.1757
unions				
no	0.0085	0.4013	0.0385	0.2570
yes	0.1364	0.1252	0.1106	0.1508
local union representatives				
no	0.0144	0.3538	0.0617	0.1949
yes	0.1730	0.0767	0.1064	0.2493
employment protection				
no	0.0036	0.4915	0.0679	0.2102
yes	0.1267	0.1230	0.3691	0.0182
union & local repr & ep				
no	0.0021	0.5124	0.0368	0.2579
yes	0.1776	0.0689	0.3540	0.0195

* low is below the average; high is above the average

Table 7
Predicted marginal probabilities by firm type

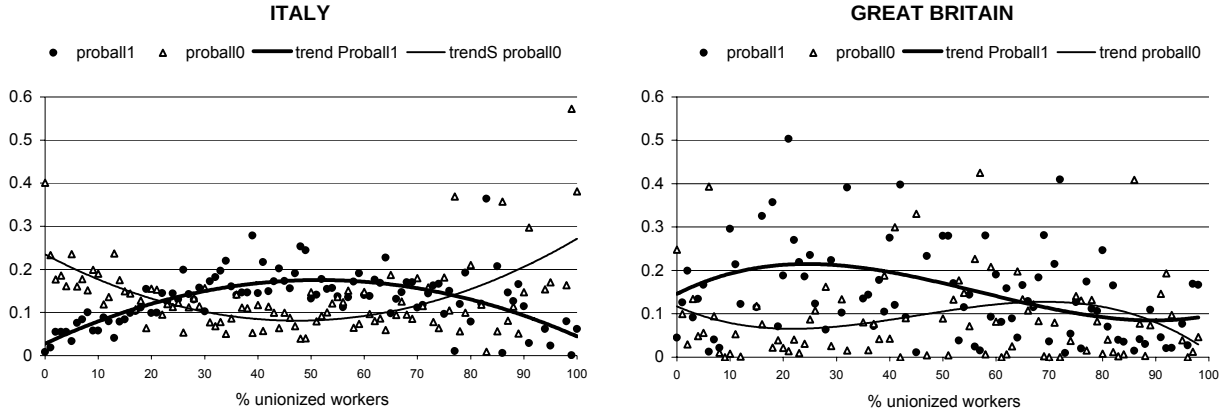
	ITALY			GREAT BRITAIN		
	E flex	W flex	T flex	E flex	W flex	T flex
a) Basic type*	0.3996	0.0285	0.2537	0.0002	0.1343	0.2085
b) Like a), but with n. employees=15	0.4523	0.0324	0.2725	0.0011	0.1592	0.1507
c) Like a), but with n. employees=100	0.6947	0.0571	0.3680	0.2667	0.3123	0.0192
d) Like c), but with employment protection	0.7788	0.0809	0.3856	0.5381	0.7718	0.2182
e) Like d) but with 30% unionized workers	0.8263	0.1029	0.3954	0.3208	0.8445	0.8575
f) Like e) but with 3% local union representatives	0.9047	0.1548	0.3987	0.0428	0.7502	0.7080
g) Like f) but with firm contract	0.8892	0.6569	0.3960	0.1592	0.8356	0.5906
Avg establishment	0.7806	0.3975	0.3537	0.7401	0.6102	0.2117
Median establishment	0.8399	0.1488	0.2766	0.4282	0.6595	0.0718
Avg establishment like if it were in the other country**	0.9075	0.8321	0.7171	0.6290	0.2574	0.3379
Median establishment like if it were in the other country**	0.0412	0.7413	0.9893	0.4366	0.0969	0.3009

*Establishment with 10 employees, no export, no multiplant, no high lab prod, no short run growth, no women, no white collars, no immigrants, no old workers, no firm contract, no unionized workers, no local union representatives, no strike, no EP.

** marginal probabilities estimated with the British model for the average and median Italian establishments and viceversa

Figure 1 - Predicted joint probabilities by unionization rate and incidence of local union representatives.

a) By union density



B) By incidence of local union representatives

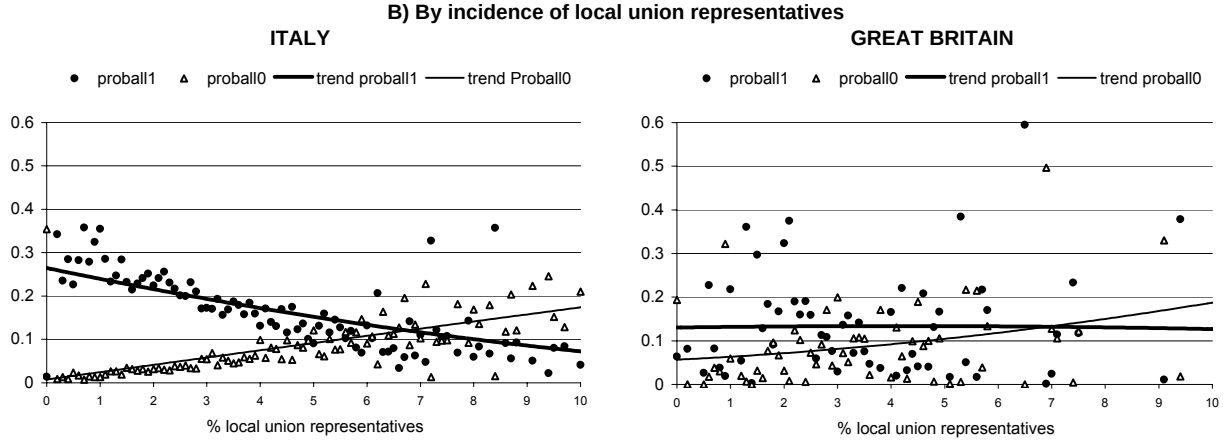
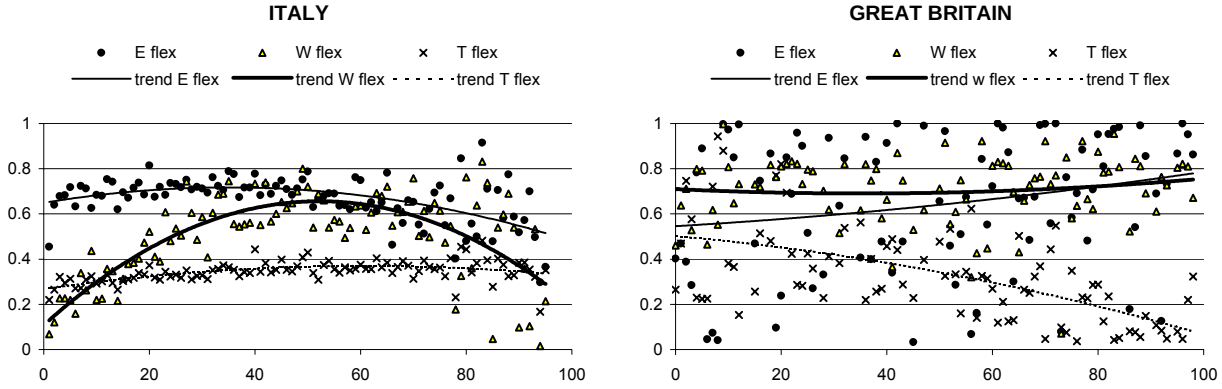
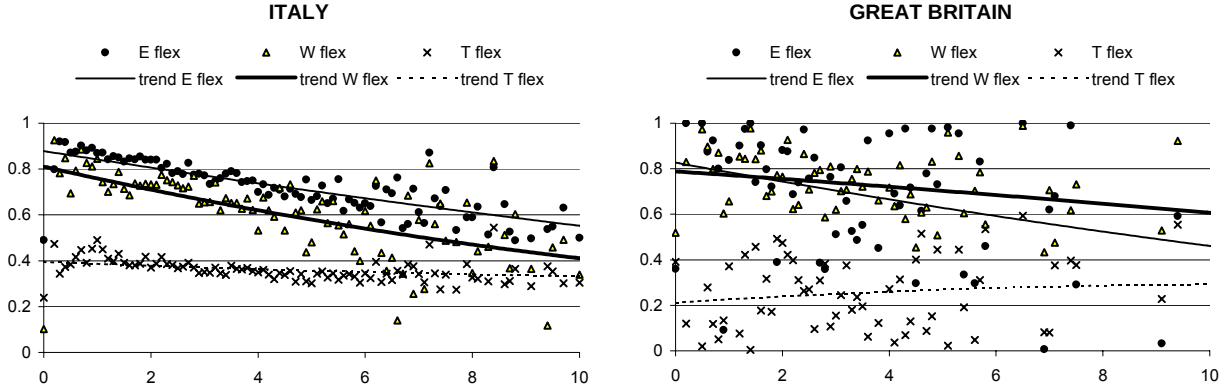


Figure 2 - Predicted marginal probabilities by unionization rate and incidence of local union representative

a) By union density



B) By incidence of local union representatives



ANNEX I

Variables used in the empirical analysis: description and summary statistics

	ITALY - FEDERMECCANICA 1997			GREAT BRITAIN - WERS 1998		
Dependent variables:	*Description*	*Mean*	*S.d.*	*Description*	*Mean*	*S.d.*
Employment flexibility	Dummy equal to 1 if the establishment adopts fixed-term contracts (including CFL).	0.624	0.485	Dummy equal to 1 if the establishment adopts fixed-term or temporary contracts	0.386	0.055
Wage flexibility	Dummy equal to 1 if the establishment adopts performance-related pays schemes	0.387	0.487	Dummy equal to 1 if the establishment adopts profit-related pay or deferred profit sharing schemes or employee share ownership plans or individual or group performance-related schemes	0.535	0.062
Time flexibility	Dummy equal to 1 if the establishment adopts annualized hours or flexible working week or number of overtime hours per workers higher than the average + 1 standard deviation or temporary lay offs	0.310	0.462	Dummy equal to 1 if the establishment adopts annualized hours or flexitime or normal working week for full-time employees (including overtime) longer than 48 hours	0.362	0.065
Firm characteristics:						
logdim	ln(n. employees)	3.825	1.355	ln(n. employees)	3.815	0.125
export	Dummy equal to 1 if the establishment exports part of its production	0.671	0.470	Dummy equal to 1 if the market for the main product is primarily international	0.433	0.062
multiplant	Dummy equal to 1 if the establishment belongs to a multiplant firm	0.143	0.350	Dummy equal to 1 if the establishment belongs to a multiplant firm	0.525	0.062
short run growth	Dummy equal to 1 if sales have been increasing over the last year	0.651	0.477	Dummy equal to 1 if sales have been increasing over the last year	0.559	0.059
high labour prod	Dummy equal to 1 if labour productivity greater than the sector's average	0.217	0.412	Dummy equal to 1 if labour productivity is better than average (management assessment)	0.395	0.061
% women	n. women / n. employees*100	19.807	17.181	n. women / n. employees*100	27.435	3.260
% white collars	n. white collars / n. employees*100	32.341	21.535	n. managers, professionals, technical staff and clerks / n. employees*100	30.008	2.310
% immigrants	n. immigrants/ n. employees*100	1.971	6.090	n. employees from non white ethnic groups/ n. employees*100	3.029	0.739
older workers	severance pay (TFR) per worker, Thousand Euros	7857	4538	n. employees aged 51 or over/ n. employees * 100	18.857	1.597
Industrial relations & institutions:						
unionized	Dummy equal to 1 if any workers are union members	0.712	0.453	Dummy equal to 1 if any workers are union members	0.466	0.061
% unionized workers	n. unionized workers / n. employees*100	26.099	24.209	n. unionized workers / n. employees*101	16.948	2.766
multiple union organizations	Dummy equal to 1 if workers are members of different union organizations	0.461	0.499	Dummy equal to 1 if workers are members of different union organizations	0.117	0.019
firm contract	Dummy equal to 1 if a firm contract is adopted	0.502	0.500	Dummy equal to 1 if a firm contract is adopted	0.386	0.060
strike	Dummy equal to 1 if there was any strikes in the last year	0.355	0.479	Dummy equal to 1 if there was any strikes in the last year	0.007	0.002
firm union representatives	Dummy equal to 1 if any workers are union representatives	0.546	0.498	Dummy equal to 1 if any workers are union representatives	0.232	0.042
% firm union representatives	n. union representatives / n. employees * 100	2.383	3.690	n. union representatives / n. employees * 101	1.898	0.947
Employment Protection	Dummy equal to 1 if the establishment is subject to the national employment protection law (“Statuto dei lavoratori”)	0.781	0.414	Dummy equal to 1 if the establishment adopts a policy of guaranteed job security or no-comulsory redundandicies for some groups of workers	0.014	0.006
Other work arrangements:						
outsourcing (1=yes)	Dummy equal to 1 if the establishment uses sub-contractors for part of its production	0.604	0.489	Dummy equal to 1 if the establishment uses sub-contractors for part of its production or other auxiliary services	0.836	0.050
% part timers	n. part-time workers / n. employees*100	2.530	5.280	n. part-time workers / n. employees	6.957	2.506
shifts (1=yes)	Dummy equal to 1 if the establishment uses shifts	0.343	0.475	Dummy equal to 1 if the establishment uses shifts	0.375	0.052

ANNEX II

Table 1 - Trivariate probit estimates, sensitivity tests, Italy

Simulated Maximum Likelihood, GHK Simulator

Number of Draws: 55

	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
flex employment												
log(n. employees)	0.4789	17.9	0.3992	11.4	0.4092	10.9	0.3274	8.1	0.3347	7.9	0.3275	7.5
export	0.0526	0.9	0.0307	0.5	0.0327	0.6	0.0332	0.6	0.0306	0.5	0.0049	0.1
multiplant	-0.5187	-6.3	-0.4805	-5.9	-0.4773	-5.8	-0.4635	-5.7	-0.4532	-5.5	-0.4500	-5.5
high lab prod	-0.1123	-1.7	-0.1092	-1.7	-0.1113	-1.7	-0.1162	-1.8	-0.1193	-1.8	-0.1121	-1.7
short run growth	0.1628	3.0	0.1716	3.1	0.1749	3.2	0.1726	3.1	0.1810	3.3	0.1818	3.3
% women	0.0002	0.1	0.0002	0.2	0.0002	0.1	0.0005	0.3	0.0000	0.0	-0.0004	-0.2
% white collars	0.0036	2.7	0.0033	2.4	0.0033	2.5	0.0036	2.8	0.0032	2.4	0.0033	2.4
% immigrants	0.0060	1.5	0.0058	1.4	0.0060	1.4	0.0061	1.5	0.0060	1.4	0.0056	1.3
% old (proxy)	-0.0001	-7.6	-0.0001	-7.3	-0.0001	-7.3	0.0000	-7.2	0.0000	-7.2	0.0000	-7.1
firm contract			-0.0216	-0.3	-0.0152	-0.2	-0.0966	-1.4	-0.0777	-1.0	-0.0831	-1.1
unionized			0.2210	2.1	0.2383	2.3			0.2336	2.2	0.2384	2.3
% unionized workers			0.0013	0.3	0.0023	0.5			-0.0007	-0.1	-0.0009	-0.2
sq. % unionized workers			-0.0001	-1.1	-0.0001	-1.3			0.0000	-0.8	0.0000	-0.7
firm union representatives							0.4466	4.1	0.4603	3.9	0.4502	3.8
% firm union representatives							-0.0386	-3.0	-0.0378	-3.0	-0.0365	-2.9
multiple unions					-0.1127	-1.6			-0.1293	-1.8	-0.1297	-1.8
strike					0.0340	0.5			0.0140	0.2	0.0070	0.1
employment protection			0.2463	2.9	0.2390	2.8	0.3221	3.8	0.2705	3.1	0.2781	3.2
outsourcing											0.0743	1.3
% part timers											0.0046	0.9
shifts											0.0506	0.7
constant	-1.2385	-11.7	-1.2169	-11.2	-1.2461	-10.9	-1.0360	-8.7	-1.0584	-8.6	-1.0873	-8.6
flex wage												
log(n. employees)	0.5550	18.8	0.2702	7.8	0.2330	6.3	0.1937	4.5	0.1584	3.5	0.1094	2.4
export	0.1709	2.8	0.0334	0.5	0.0276	0.4	0.0296	0.4	0.0169	0.2	-0.0170	-0.2
multiplant	0.1670	1.9	0.2038	2.3	0.1685	1.9	0.2475	2.8	0.1982	2.2	0.1990	2.2
high lab prod	-0.0360	-0.5	-0.0383	-0.5	-0.0303	-0.4	-0.0552	-0.7	-0.0436	-0.6	-0.0480	-0.6
short run growth	0.0458	0.8	0.0817	1.2	0.0834	1.2	0.0867	1.3	0.0904	1.3	0.0727	1.1
% women	-0.0043	-2.6	-0.0048	-2.6	-0.0047	-2.5	-0.0050	-2.7	-0.0048	-2.6	-0.0050	-2.6
% white collars	-0.0022	-1.5	-0.0003	-0.2	-0.0004	-0.2	-0.0009	-0.5	-0.0004	-0.2	0.0011	0.6
% immigrants	-0.0037	-0.8	-0.0069	-1.2	-0.0061	-1.1	-0.0064	-1.1	-0.0062	-1.1	-0.0078	-1.3
% old (proxy)	0.0000	4.7	0.0000	0.0	0.0000	-0.1	0.0000	0.3	0.0000	0.0	0.0000	0.1
firm contract			1.5319	19.4	1.4902	18.5	1.5066	19.0	1.4419	17.4	1.4331	17.4
unionized			-0.1023	-0.8	-0.1208	-0.9			-0.1763	-1.3	-0.1520	-1.1
% unionized workers			0.0178	3.2	0.0146	2.5			0.0110	1.9	0.0109	1.8
sq. % unionized workers			-0.0002	-2.8	-0.0001	-2.3			-0.0001	-1.8	-0.0001	-1.8
firm union representatives							0.5768	4.9	0.4919	3.9	0.4506	3.6
% firm union representatives							-0.0305	-2.1	-0.0313	-2.1	-0.0271	-1.9
multiple unions					0.1019	1.3			0.0904	1.2	0.0719	0.9
strike					0.2070	2.9			0.1910	2.6	0.1766	2.4
employment protection			0.1388	1.1	0.1556	1.3	0.1202	1.0	0.1471	1.2	0.1699	1.4
outsourcing											0.0752	1.1
% part timers											0.0028	0.4
shifts											0.2923	3.9
constant	-2.7349	-21.3	-2.5756	-18.1	-2.4651	-16.8	-2.3323	-15.5	-2.2442	-14.3	-2.2227	-13.6

	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
flex time												
log(n. employees)	0.1607	7.3	0.1376	4.8	0.1294	4.2	0.1498	4.5	0.1415	4.1	0.1796	4.9
export	-0.0685	-1.2	-0.0807	-1.4	-0.0830	-1.4	-0.0804	-1.4	-0.0849	-1.5	-0.0965	-1.6
multiplant	0.0155	0.2	0.0286	0.4	0.0259	0.3	0.0236	0.3	0.0223	0.3	0.0326	0.4
high lab prod	-0.0372	-0.6	-0.0340	-0.5	-0.0330	-0.5	-0.0354	-0.6	-0.0336	-0.5	-0.0290	-0.5
short run growth	-0.0525	-1.0	-0.0519	-0.9	-0.0546	-1.0	-0.0496	-0.9	-0.0536	-1.0	-0.0436	-0.8
% women	-0.0046	-2.8	-0.0045	-2.7	-0.0044	-2.7	-0.0044	-2.7	-0.0043	-2.6	-0.0032	-1.9
% white collars	-0.0045	-3.5	-0.0044	-3.4	-0.0044	-3.4	-0.0043	-3.4	-0.0044	-3.4	-0.0054	-4.1
% immigrants	0.0127	3.1	0.0126	3.1	0.0124	3.0	0.0128	3.1	0.0125	3.1	0.0140	3.3
% old (proxy)	0.0000	2.7	0.0000	2.5	0.0000	2.5	0.0000	2.5	0.0000	2.4	0.0000	2.3
firm contract			0.0035	0.1	-0.0023	0.0	0.0030	0.0	-0.0062	-0.1	0.0005	0.0
unionized			0.1026	1.0	0.0839	0.8			0.0743	0.7	0.0591	0.6
% unionized workers			-0.0011	-0.2	-0.0020	-0.4			-0.0024	-0.5	-0.0022	-0.4
sq. % unionized workers			0.0000	0.3	0.0000	0.4			0.0000	0.4	0.0000	0.5
firm union representatives							0.0050	0.1	-0.0190	-0.2	0.0206	0.2
% firm union representatives							0.0095	1.0	0.0091	0.9	0.0060	0.6
multiple unions					0.0995	1.4			0.0988	1.4	0.1217	1.7
strike					-0.0249	-0.4			-0.0268	-0.4	-0.0204	-0.3
employment protection			0.0563	0.7	0.0618	0.7	0.0556	0.7	0.0459	0.5	0.0159	0.2
outsourcing											0.0767	1.4
% part timers											-0.0167	-2.7
shifts											-0.2756	-4.0
constant	-0.9669	-10.2	-0.9807	-9.8	-0.9559	-9.1	-0.9919	-9.2	-0.9821	-8.7	-1.0332	-8.9
ρ(Employment, Wage)	0.1287	3.5	0.1525	3.8	0.1553	3.8	0.1398	3.4	0.1435	3.5	0.1421	3.5
ρ(Employment, Time)	-0.0755	-2.3	-0.0783	-2.3	-0.0767	-2.3	-0.0751	-2.2	-0.0752	-2.2	-0.0733	-2.2
ρ(Wage, Time)	-0.0751	-2.1	-0.0941	-2.4	-0.0955	-2.4	-0.0932	-2.4	-0.0952	-2.4	-0.0845	-2.2
Likelihood ratio test												
all rhos=0	21.37		24.84		25.28		22.10		22.84		20.87	
Prob>chi2	0.0001		0.0000		0.0000		0.0001		0.0000		0.0001	
Wald chi2	1041.2		1664.0		1693.1		1709.9		1757.2		1803.9	
(d.f.)	27		42		48		39		54		63	
N. Obs	2842		2842		2842		2842		2842		2842	

ANNEX II

Table 2 - Trivariate probit estimates, sensitivity tests, Great Britain

Simulated Maximum Likelihood, GHK Simulator

Number of Draws: 100

	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
flex employment												
log(n. employees)	0.8922	8.6	1.0807	8.1	1.0365	7.6	1.2762	7.7	1.2311	7.2	1.1551	6.2
export	0.3300	1.3	0.2534	1.0	0.2483	0.9	0.3139	1.3	0.2665	1.0	0.2662	1.0
multiplant	0.7949	2.4	0.7280	2.2	0.7254	2.2	0.7786	2.4	0.7600	2.3	0.7734	2.4
high lab prod	-0.2654	-0.9	-0.2096	-0.7	-0.2157	-0.7	-0.1369	-0.4	-0.1489	-0.5	-0.1949	-0.6
short run growth	0.5921	2.2	0.5718	2.1	0.5646	2.0	0.5986	2.2	0.5806	2.1	0.6983	2.6
% women	-0.0069	-1.2	-0.0075	-1.3	-0.0076	-1.3	-0.0058	-1.0	-0.0055	-0.9	0.0039	0.6
% white collars	0.0252	2.7	0.0235	2.6	0.0231	2.5	0.0273	3.0	0.0255	2.8	0.0301	3.4
% immigrants	0.0248	2.1	0.0269	2.3	0.0256	2.2	0.0265	2.1	0.0264	2.2	0.0258	2.1
% old (proxy)	-0.0074	-0.6	-0.0042	-0.4	-0.0041	-0.4	-0.0064	-0.6	-0.0046	-0.4	-0.0055	-0.5
firm contract			0.4662	1.4	0.4579	1.4	0.5783	1.7	0.6601	1.8	0.8215	2.4
unionized			-0.2856	-0.7	-0.2818	-0.7			-0.2703	-0.7	-0.3722	-0.9
% unionized workers			-0.0216	-1.2	-0.0237	-1.2			-0.0073	-0.3	-0.0073	-0.3
sq. % unionized workers			0.0001	0.5	0.0001	0.5			0.0000	0.0	0.0000	0.0
firm union representatives							-1.7205	-3.6	-1.4941	-2.9	-1.7094	-3.2
% firm union representatives							0.0578	1.8	0.0730	2.1	0.0717	2.0
multiple unions					0.3998	1.3			0.5042	1.6	0.6068	1.9
strike					3.8001	9.3			4.0869	9.1	3.8408	8.6
employment protection			0.7566	0.9	0.7526	0.9	0.7565	1.0	0.6608	0.9	0.7193	1.0
outsourcing											0.5579	1.4
% part timers											-0.0265	-1.7
shifts											0.4224	1.3
constant	-5.1238	-7.9	-5.6425	-8.1	-5.4530	-7.7	-6.7248	-7.8	-6.4150	-7.8	-7.0251	-7.3
flex wage												
log(n. employees)	0.2978	2.5	0.3156	2.4	0.3168	2.1	0.2782	1.6	0.2685	1.4	0.3199	1.7
export	-0.7186	-2.7	-0.6506	-2.5	-0.6494	-2.5	-0.6663	-2.5	-0.5982	-2.2	-0.5565	-2.1
multiplant	0.4916	1.6	0.4551	1.5	0.4550	1.5	0.4468	1.5	0.4893	1.6	0.4414	1.5
high lab prod	-0.0143	0.0	0.0247	0.1	0.0257	0.1	0.0658	0.2	0.0451	0.1	0.0648	0.2
short run growth	0.4365	1.7	0.3792	1.5	0.3797	1.5	0.3654	1.5	0.3433	1.4	0.3766	1.5
% women	-0.0003	-0.1	0.0001	0.0	0.0002	0.0	-0.0003	-0.1	0.0001	0.0	0.0031	0.4
% white collars	0.0096	1.3	0.0097	1.3	0.0097	1.3	0.0092	1.2	0.0095	1.2	0.0098	1.2
% immigrants	0.0230	1.0	0.0205	1.0	0.0205	1.0	0.0174	0.9	0.0178	0.9	0.0170	0.8
% old (proxy)	0.0066	0.5	0.0065	0.5	0.0066	0.5	0.0058	0.4	0.0050	0.4	0.0055	0.4
firm contract			0.2888	0.6	0.2889	0.6	0.4071	0.9	0.2890	0.6	0.3407	0.7
unionized			0.4213	0.7	0.4204	0.7			0.3687	0.6	0.3226	0.6
% unionized workers			-0.0185	-0.7	-0.0183	-0.7			-0.0050	-0.2	-0.0047	-0.2
sq. % unionized workers			0.0001	0.5	0.0001	0.5			0.0001	0.3	0.0001	0.3
firm union representatives							-0.1475	-0.3	-0.2030	-0.4	-0.2494	-0.4
% firm union representatives							-0.0420	-1.1	-0.0473	-1.3	-0.0428	-1.1
multiple unions					-0.0112	0.0			-0.1489	-0.4	-0.1722	-0.5
strike					0.0669	0.1			-0.0418	-0.1	-0.2029	-0.3
employment protection			0.8977	1.7	0.8987	1.7	1.1909	1.9	1.2425	1.9	1.2172	2.0
outsourcing											0.4197	1.2
% part timers											-0.0085	-0.9
shifts											-0.1883	-0.6
constant	-1.7113	-2.1	-1.8953	-2.1	-1.9026	-1.9	-1.6555	-1.5	-1.7188	-1.5	-2.2605	-1.9

	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z	Coef.	z
flex time												
log(n. employees)	-0.2154	-1.6	-0.2874	-2.0	-0.4014	-2.6	-0.3609	-2.0	-0.5438	-3.0	-0.5724	-3.1
export	0.0644	0.2	0.4748	1.6	0.4669	1.6	0.1779	0.6	0.5755	2.0	0.5475	2.0
multiplant	-0.5642	-1.9	-0.6088	-2.1	-0.6057	-2.1	-0.6472	-2.2	-0.5170	-1.8	-0.4737	-1.7
high lab prod	0.6053	1.9	0.6211	2.2	0.6193	2.2	0.7080	2.4	0.6953	2.6	0.6796	2.5
short run growth	0.6130	2.2	0.4954	1.9	0.4854	2.0	0.4942	1.8	0.4052	1.7	0.4363	1.9
% women	0.0040	0.6	0.0056	0.9	0.0056	0.9	0.0033	0.5	0.0057	0.9	-0.0006	-0.1
% white collars	-0.0029	-0.4	-0.0036	-0.4	-0.0043	-0.5	-0.0040	-0.5	-0.0043	-0.5	-0.0030	-0.4
% immigrants	0.0121	0.9	0.0076	0.7	0.0046	0.4	0.0042	0.3	-0.0011	-0.1	0.0058	0.5
% old (proxy)	0.0066	0.5	0.0056	0.5	0.0050	0.4	0.0034	0.3	-0.0002	0.0	-0.0043	-0.4
firm contract			-0.2514	-0.8	-0.2635	-0.8	0.3934	1.0	-0.2715	-0.8	-0.2950	-0.9
unionized			1.4838	3.4	1.5044	3.5			1.4789	3.4	1.5782	3.8
% unionized workers			-0.0030	-0.1	-0.0078	-0.4			0.0159	0.7	0.0176	0.8
sq. % unionized workers			-0.0001	-0.5	-0.0001	-0.5			-0.0002	-0.9	-0.0002	-1.0
firm union representatives							0.4564	0.9	-0.2189	-0.5	-0.2218	-0.5
% firm union representatives							-0.0757	-1.9	-0.0913	-2.4	-0.0972	-2.5
multiple unions					0.8722	2.3			0.5549	1.8	0.5209	1.7
strike					0.1311	0.2			0.0066	0.0	0.2639	0.3
employment protection			0.9045	1.6	0.8207	1.4	1.2662	1.9	1.4018	2.0	1.4850	2.0
outsourcing											-0.2123	-0.6
% part timers											0.0177	1.5
shifts											0.2061	0.7
constant	-0.1118	-0.1	-0.3887	-0.5	0.0580	0.1	0.4497	0.4	0.5737	0.6	0.7900	0.9
ρ(Employment, Wage)	0.1577	0.9	0.1577	1.0	0.1595	1.0	0.1233	0.7	0.1387	0.9	0.1227	0.8
ρ(Employment, Time)	0.2506	1.5	0.3801	2.7	0.3798	2.7	0.3018	1.8	0.3887	2.6	0.4115	3.0
ρ(Wage, Time)	-0.0727	-0.4	-0.1565	-1.0	-0.1385	-0.9	-0.1217	-0.7	-0.1844	-1.3	-0.1572	-1.1
Likelihood ratio test												
all rhos=0	44.29		47.21		40.17		44.01		40.20		38.68	
Prob>chi2	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Wald chi2	191.5		339.4		825.5		215.6		387.3		10008.3	
(d.f.)	27		42		48		39		54		63	
N. Obs	297		297		297		297		297		297	