Institutions and firms' adjustments: measuring the impact of courts' delays on job flows and productivity[*]

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Abstract

Labour market rigidity is not only the result of legislative provisions, but it is determined by the institutional framework at large. We argue that courts' delays in settling labour disputes affect the actual strictness of employment protection legislation by increasing the expected firing costs. We exploit the variation in the length of labour trial across Italian judicial districts and the fact that the Italian firing legislation prescribes different (firing) regimes for firms above the 15-employees threshold in order to provide evidence on the impact of courts' delays on job reallocation and firms' productivity. We show that in those judicial districts with longer trials, job turnover is significantly lower. This occurs through lower job destruction and, to a less extent, job creation. We also find a detrimental impact of courts' delays on labour productivity of firms above the 15-employees threshold. Such effect is stronger in sectors with a higher flexibility requirement.

Key words: Courts, length of trials, EPL, employment, job flows, labour productivity

JEL Classification: D24, J63; K31; K41

1   Introduction

A growing attention is recently being devoted to the role of institutions in affecting labour market adjustments and firms' production decisions. Since the seminal contribution by Mortensen and Pissarides (1994), labour reallocation is considered crucial in determining labour market outcomes through the capacity of the firm to quickly adjust to exogenous shocks. In a world where agents (firms and workers) are heterogeneous and the matching process between vacancies and workers is costly, when a shock hits the economy the desired allocation of jobs among firms and sectors changes, leading to job destruction on the one hand and to the creation of new vacancies on the other. As long as the reallocation of workers and jobs across industries and firms is important for productivity, policy and institutional factors which hinder the firm-worker match also affect firms' and aggregate economic performance.

Firms' capacity to reallocate labour depends on the strictness of employment protection legislation (EPL). A higher degree of workers protection has been shown to unambiguously reduce both job creation and job destruction (Hopenhayn and Rogerson, 1993; Mortensen and Pissarides, 1994; Pissarides, 2000). A more controversial issue is how this effect translates into changes in productivity at firm level. In a standard search model of labour market with Nash bargaining, the presence of firing costs on the one hand, reduces the productivity threshold at which firms dismiss their workers with a negative effect on productivity; on the other, it increases the productivity threshold at which firms hire workers, with an opposite effect on overall productivity. Moreover, firing restrictions may positively impact firm productivity through human capital specific investments and learning-by-doing.

While the theoretical literature has made headway in exploring the role of employment protection as a determinant of labour market flows, the empirical research has to grapple with the difficulty of determining correct measures of firing costs. Indeed, the degree of effective labour market rigidity is not only the result of legislative rules, but it also depends on the institutional environment at large. Most empirical studies on the impact of dismissal costs on job reallocation and productivity are based on aggregate EPL indexes constructed by the OECD,[1] which measure the strictness of the legislation on workers' dismissal for various countries (Venn, 2009).[2] According to the OECD

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[1] The OECD index for employment protection legislation is one of the most widely used in the empirical studies on the economic effects of labour market regulation. Apart from the OECD index, other indicators of the stringency of labour regulation have been developed. Such indicators, which generally cover a larger set of countries than the OECD index or a longer period of time, have been constructed by either by the World Bank or by individual researchers (see for example Blanchard and Wolfers, 2000; Belot and van Ours, 2004; Botero et al 2004).

[2] Among the others, Salvanes (1997), Messina and Vallanti (2007) and Cingano et al. (2010) use the OECD EPL index to assess the impact of firing costs on job reallocation and its components. Scarpetta (2002), Bassanini et al. (2009) and Cingano et al. (2010) employ the OECD index to study the causal relationship between firing costs and productivity.

index, in 2008 Italy ranked broadly mid-field in the OECD comparison (25th out of 40 countries) with the EPL indicator being 1.89 against an OECD average of 1.94. There is, however, a large consensus that Italian labour market is one of the most regulated among the European countries.[3] This apparent disconnection between the OECD indicator and the perceived rigidity of the Italian labour market is attributed to the fact that *de jure* indicators, such as those constructed by the OECD, fail to capture the *de facto* impact of other institutional factors, which may nonetheless play a significant role on the extent of job protection.

A prominent role in how laws are actually enforced is that played by the judiciary. According to the OECD (2013), costly, complex or time-consuming legal processes can add significant costs and burdens to firms, which can ultimately be a drag on economic activity. EPL does not escape this rule. Lengthy judicial proceedings on workers' dismissals directly translate into higher firing costs for firms by affecting all the legal expenses and any financial penalties that may be imposed by a judge; the extent to which firing costs depend on the length of labour trials varies according to country-specific institutions. Moreover, lengthy trials are particularly costly in countries, such as Italy, where legislation leave judges large discretion in determining the actual enforcement of the rules and the outcome of the trial. In this respect, the length of labour trials can add uncertainty on both the employee and the employer, thus increasing further firing costs. As a result of these forces, the perceived and actual cost of enforcing dismissal rules can be very different even across countries with similar employment protection legislation.

In this paper, we investigate to what extent firing costs due to judicial efficiency matter for job turnover rates and firms' productivity. In our analysis, we rely on an indicator of judicial efficiency, which is constructed as the duration of trials concerning labour disputes in the private sector.[4] On empirical grounds, the uncertainty and costs associated with longer trials have shown to reduce the efficiency of credit markets (Jappelli et al. 2005; Fabbri, 2007), firms' size (Kumar, 1999; Giacomelli and Menon, 2013), trade flows (Nunn, 2007) and in general economic development (Chemin, 2009 and 2012). However, the impact of the length of trial on labour reallocation and productivity is still largely an unexplored issue.[5] Our analysis contributes to the existing empirical literature on the

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[3]Based on survey data, the World Economic Forum's recent competitiveness report (2014) ranks Italy 49th among 144 countries and near the bottom on most labor-market related indicators. Moreover, restrictive labor regulations is indicated as one of the most problematic factors for doing business.

[4]In order to evaluate the efficiency of labour courts, we should also take into account other aspects of the judicial system, such as the number and complexity of cases faced by the court and the quantity and quality of financial and human resources (e.g. number of judges) devoted to justice. In our analysis the focus is mainly on trial length. The reason for this is twofold. From an economic point of view, trial length translates directly into higher firing costs for the firm when the firing decision is ruled out to be unfair by the judge. Moreover, it is correlated with other aspects of performance as, for example, confidence and fairness of individuals in the justice system (World Bank, 2012; Palumbo et al, 2013). Trial length is used as a proxy for judicial efficiency in a number of papers assessing the effect of judicial performance on economic outcome. See among the others Fabbri (2010) and Nunn (2007).

[5]In a recent paper, Fraisse et al. (2011) examine various indicators characterizing the enforcement of labour regulation and find a causal effect of judicial case outcomes on job flows.

effect of (actual) regulation on job reallocation and productivity along several dimensions.

First, by working on data from a single country, i.e. Italy, we are able to isolate the effects of firing restrictions from those of other (time-varying) institutional features of the labour market, such as, for example, wage compression (Bertola and Rogerson, 1997).[6] Italy is a centralized country, which means that the legal procedures regarding labour litigations are homogenous across the national territory. Nevertheless, it displays wide variation in judicial efficiency across courts districts. Moreover, by focusing on the same country, we can construct comparable job flows and productivity indicators using a firm-level harmonized database.[7]

Second, we focus on a dimension of dismissal costs which is not (entirely) captured by the traditional EPL indicators, i.e. the component of firing costs which is related to the length of labour trials. Typically, the Italian labour courts take much longer to decide on cases than most other countries and a large proportion of cases are appealed, which delays final decisions for firms and workers even longer.[8] More disaggregated data for Italy show that the length of trial is not homogenous throughout the country. We exploit the heterogeneity in courts' efficiency across 26 Italian judicial districts and estimate the impact of the duration of labour trials on job flows (job creation and job destruction) and, ultimately, firms' productivity.

There are a number of issues concerning the identification of a causal effect of the duration of labour trials on job turnover and productivity. First and foremost, both the duration of labour trials and firms' production decisions may be driven by some unobserved factors such as, for example, the degree of local economic development and the quality of (local) institutions. Second, the fact that a higher rate of job reallocation may cause an increase in the number of dismissal suits brought to court creates the conditions for a reversed channel of causation between job reallocation and the length of trials.

Our identification strategy exploits the fact that in Italy EPL provisions are more stringent for firms above the 15-employees threshold and that the differential of firing cost between large and small firms increases with the length of the judicial procedure. A number of studies have exploited the variation in employment protection legislation across firms of different sizes within Italy. Boeri and Jimeno (2005) study the effect of employment protection on lay-off probabilities by comparing small and large firms. Garibaldi et al (2004), and Schivardi and Torrini (2008) assess the effects

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[6]Boeri and Jimeno (2005) stress the importance of using data referred to the same country and exploiting any time-series available for regulations.

[7]A fundamental problem of the existing cross-country analysis of job flows is the lack of harmonized data at firm level in terms of the source of the data (administrative versus survey), unit of observation (firms versus establishments), sector coverage and period of observation (expansions versus recessions).

[8]The OECD (2012) reports that, on average, the length of the process of dispute resolution is about 23 months in first level court (4 months in Germany) and the number of dismissal cases appealed is about 59% (3% in Germany). According to the World Bank Doing Business report 2012, Italy ranks 158th in the Enforcing Contract statistics with 1210 days from filing a case to the enforcement of judgement.

of employment protection on the size distribution of Italian firms, by looking at the probability of firm size adjustments around the 15 employee threshold. Similarly, Hijzen et al (2013) analyse the effect of different EPL provision on the composition of workforce, worker turnover and productivity of firms above and below the 15 employees threshold. All these papers identify the effect of employment protection by exploiting the fact that Italian firms with fewer than 15 employees are subject to lower dismissal costs than firms with more than 15 employees. Other studies exploit both the discontinuity in EPL at the 15 employees threshold as well as the temporal variation in the legislation, in order to assess the effect of reforms on job flows (Kluger and Pica, 2008), wages (Leonardi and Pica, 2013), productivity and capital deepening (Cingano et al, 2015). Our study builds on these prior works in one major respect. Differently from the papers mentioned above, the aim of our analysis is to isolate the economic effects of the varying degree of efficiency of labour courts from the effect of the labour legislation itself, by exploiting both the discontinuity of EPL at the 15-employees threshold as well as cross-district, over-time variation of labour courts' efficiency (and then firing costs). As far as we know, the impact of labour courts' delay on the rigidity of the labor market is still an unexplored issue in the economic literature.

In our empirical analysis, we also control for the potential endogeneity of our indicator of labour courts' efficiency by using a set of instruments which are shown to be disconnected from local business conditions as well as from the functioning of other courts in the same judicial district (e.g. civil courts). These include the number of judges' decisions concerning labour disputes of civil servants that are appealed before the Court of Appeal (the so-called "appeal rate")[9] and the number of vacant positions in local labour courts; the latter depends on the interplay between the personal characteristics of judges and the criteria on the basis of which the Consiglio Superiore della Magistatura (CSM), the judiciary self-governing body, jointly approves the transfer (which give rise to the vacancy).

As an additional check, following the well-established approach developed by Rajan and Zingales (1998), we construct an indicator of employment reallocation requirement at industry level based on the UK job flows. If the duration of labour trials is a relevant dimension of firing costs, we should find evidence of the fact that large firms requiring more reallocation perform relatively better when labour trials are faster.

The panel dimension of our data also allows to control for unobserved heterogeneity among sectors and judicial districts via fixed effects. Therefore, our main results are not driven by cross-sectional differences among districts, such as cultural, economic and social characteristics that may

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[9]Since the 1998 reform labour disputes involving public sector workers - which were previously sued before the administrative courts - are now discussed within the labour courts. The rate of appeal of public workers suits not being related to labour market adjustments which occur in the private sector. Nevertheles, it contributes to the overall bulk of disputes which are to be settled by labour courts.

impact on both labour market adjustments, firms' productivity and the efficiency of courts. Finally, our results are also robust to the inclusion of district-specific and industry-specific time dummies, which captures any (time and district variant) omitted factors - such as local economic development and informal institutions[10] - which could influence both productivity and judicial efficiency.

Our core results suggest that courts' efficiency significantly affects employment adjustment costs by reducing the average job reallocation in judicial districts. At firm level, we find a negative effect of trials' length on firms' productivity. Consistently with our expectations, trials' length does not affect the productivity of firms below the 15 employees threshold (as it should, given that judicial dimension of firing costs does not depend on trials' length for this category of firms), but turns to be negative and significant for firms above the threshold. This lends further support to our identification strategy, which exploits the fact that trials' length affects differently firms of different size. Finally, the duration of labour trials has a larger negative impact on those firms operating in sectors with a higher reallocation requirement. We also show that all our results are robust to different instruments we use in the regressions.

The rest of the paper is organized as follows. The next section illustrates the causation channels from labour courts' delay to job reallocation and firms' labour productivity. Section 3 presents the main characteristics of the data. Section 4 sets out the empirical methodology. The main results of the article are presented in Section 5. In Section 6 we provide some robustness checks and Section 7 concludes.

2 Judicial efficiency, job flows and firm productivity

The efficiency of the judicial system influences firms' employment decisions and productivity through its impact on dismissal costs. For employers, delays in trials over labour disputes can add significantly to the cost of dismissing workers for at least two important reasons. First, longer trials directly imply higher monetary costs for firms since in many countries the employer is required to compensate the unfairly dismissed employee with the full foregone wages and social contributions for the length of time between the dismissal and the decision of the judge. In Italy, firms have also to pay a fine to the social security system for the delayed payment of welfare contributions up to 200 percent of the original amount due. The dependence of actual dismissal costs on the duration of trials also implies that firing costs can vary considerably within country as a result of differences in courts' delays. For example, focusing on *ex post* firing costs and using a formula suggested by Garibaldi and Violante (2005), the computed *ex post* firing costs are 36 months wages in Trento (with an average length of labour trials of 313 days) versus 160 months wages in Salerno (with an average length of labour

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[10]Guiso et al. (2004) show that informal institutions vary widely across Italian regions producing significant economic effects.

trials of 1397 days). Hence, the cost of dismissing a worker for a firm located in the judicial district of Salerno is more than 300% higher than in Trento.[11]

Second, not all the costs of courts' inefficiency have a monetary dimension. The duration of labour trials can also be source of further uncertainty on both the employee and the employer. Independently of the judge's final decision, as long as a suit is not settled, the full extent of the costs related to the worker's dismissal (which can also encompass the reintegration of the dismissed worker) is not known to firms; such protracted uncertainty about the future can hinder, at least temporarily, the labour adjustment process thus hampering job reallocation.[12]

Theoretical models offer clear predictions regarding the effects of firing costs on employment adjustments. In a standard search and matching model, the searching process is costly both for firms and workers. Firing costs protect existing jobs, thus reducing job destruction; however, they also undermine job creation as firms anticipate costly dismissals. By decreasing both job creation and job destruction higher firing costs unambiguously reduce job reallocation.

Nevertheless, from a theoretical point of view, the effect of higher firing costs on productivity is less clear cut. On the one hand, in a standard search and matching model, the presence of dismissal costs will reduce the productivity threshold at which workers and firms decide to terminate their relationship, and this causes a decrease in firms' average productivity. On the other, given that the worker-vacancy match implies the presence of quasi-rents, which are typically allocated between workers and firms through a Nash bargaining mechanism, an increase in firing costs reduce firms' outside options.[13] This induces a rise in the reservation productivity (below which firms do not hire) and potentially increases firm's average productivity since less productive matches are not realized (Lagos, 2006; Autor, 2007).

There are other channels through which the presence of dismissal costs can impact firms' productivity. When firing is costly, the firm has a lower incentive to undertake risky investments with high returns and high risk of failure in order to minimize the likelihood of paying firing costs. In this

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[11] Garibaldi and Violante (2005) calculate the *ex post* firing costs of an Italian firm with more than 15 employees that fires a blue collar worker with 8 years tenure, as follows:

$$FC = nw + (\tau^s + \tau^h + \phi)nw + sp + lc$$

where n is the number of months which it takes to reach a court decision, w are the monthly gross wage, τ^s and τ^h are the social and health insurance contribution respectively, ϕ is the penalty rate on forgone contributions, sp are the mandatory severance payments and lc are legal costs. The *ex post* firing costs in the example are estimated in the worst possible scenario, that is once the case has been taken to court and the judge's verdict is favorable to the worker. If we consider the probability of an off-court agreement and the fact that not all the individual layoffs are ruled unfair by the judge, the computed (*ex ante*) firing costs fall to 15 months wages in Trento and 65 months wages in Salerno. However, the difference in costs between Trento and Salerno remains unchanged in relative terms. This example clearly shows that, quantitatively, trial length may represent a large component of the total firing costs.

[12] In a recent paper Bloom (2009) shows how higher uncertainty causes firms to temporarily pause their investment and employment decisions.

[13] When a firm is bargaining the wage with a continuing employee, the threat point in the bargaining process is the value of an unfilled vacancy minus the firing cost that the firm must pay if the negotiation is not successful.

respect, Bartelsman and Hinloopen (2005) find that EPL has a significant negative effect on investments in ICT. Analogously, Saint-Paul (2002) argues that high firing costs may induce secondary innovation that improves existing products rather than introducing more innovative ones. Capital accumulation is another channel through which the extent of firing costs may affect productivity. Again, an increase in firing costs has an ambiguous effect on capital to labour ratio. On the one hand, stricter dismissal rules may induce a substitution effect from labour to capital (Besley and Burgess, 2004). On the other hand, EPL strengthens workers' bargaining power and exacerbate hold-up problems related to the investment activity, resulting in less investment and capital stock per worker (Bertola, 1994; Garibaldi and Violante, 2005).

Finally, dismissal costs influence productivity since it affects employees' behaviour and incentives. Belot et al. (2007) show that an increase in the stability of the employment relationship induces workers to invest in productivity-enhancing human capital, which would otherwise be suboptimal because of the hold-up problem. Conversely, by using a standard model of efficiency wages Ichino and Riphahn (2005) claim that when firing become more costly for the firm workers tend to exert less effort since there is less threat of layoff in response to shirking.

3 The institutional background and the identification strategy

3.1 Labour courts in Italy

In the Italian Judicial System, labour disputes are sued before the Labour Court, a division of the Civil Court specialized in labour suits, and can be appealed before the Court of Appeal. The civil courts have a seat in the main towns of each province[14] in areas called "circondario" (167 in the Italian territory), while the labour courts and the courts of appeal have a seat in the districts; there are 26 districts in Italy, each grouping several courts areas (circondari). Court districts are located in the region main town (administrative centre) with the exception of four regions which are Lombardia (two districts), Puglia (two districts), Calabria (two districts) and Sicily (two districts).[15] In Italy, labour proceedings are assigned to courts on a geographical basis. In particular, in labour disputes, the court's jurisdiction is always determined by the residence of the firm, irrespective of who initiates the legal action.

Although the labor trial takes place within the civil trial, there are important differences between the two procedures: the labor trial is faster and the judge has more inquiring powers as compared to the civil judge. The first instance and the appeal take place within the same district both for civil and labour trials: a case issued in the first instance by an ordinary Court may be appealed to

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[14] In Italy, a province (provincia) is an administrative territorial unit at an intermediate level between a municipality (comune) and a region (regione).

[15] In the paper we will refer to districts and regions interchangeably.

the Court of Appeal of the same district to which the originating Court belongs. The last instance takes place before the Corte di Cassazione, which is based in Rome.

Until 1998, labour courts presided over disputes involving private sector workers only, while the labour trials involving workers in the public sector took place before the administrative courts, according to the old view of "public administration supremacy". In the late 90s a series of reforms were passed aiming at bringing public sector employment under private law rules; only from 1993 employment in the public sector is on a contractual basis (and no more the result of an administrative deed of appointment). As a part of this legislation, the 1998 law established that labour suits concerning civil servants had to be settled within ordinary labour courts.

However, there are still important differences between public and private employment which can impact on labour trials. Although in principle the law concerning the termination of labour relations apply to both sectors, there are formal and *de facto* features which make dismissal in the public sector a much more complex and unlikely outcome. First, in case of dismissals for economic causes, while private sector workers terminate their labour relationships, civil servants usually enters in a procedure ("mobilità") aimed at placing them in a new public office[16]; this procedure aims both at improving the labour organization and curbing costs. Second, dismissals in public employment are also hindered by law provisions which impose a special responsibility on the public sector manager who, in case of unfair dismissal of a worker, can be personally liable for the economic damage caused by the dismissal. Moreover, the public sector manager himself has a different status as compared to the private sector manager. The latter can be fired if he has not been able to achieve the targets set by the firm or in case of loss of trust; on the contrary, the public manager has the same juridical status as the employee and hence cannot be dismissed for poor performance or lack of trust. This provision abides by the concept of the "stability" of employment in the public sector, which is a major feature of Italian public administration.[17]

3.2 The identification strategy

3.2.1 Firing costs and the 15 employees threshold

According to Italy's Statuto dei Lavoratori, passed in 1970, an individual dismissal is legal only when it satisfies a just cause, e.g. it can be justified by an objective reason (concerning the production activity for example) or subjective reasons, which are mainly related to misconduct on the part of the worker. The worker has always the right to appeal the firm's decision and the final outcome

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[16]Only after two years of "mobilità", if the prodedure has been unsuccesful or the worker has refused the labour relation can terminate.

[17]The protection granted to civil servants - differently from private sector workers - is the subject of intense debate in Italy. In many cases the idea of the stability of the employment in the public sector has an impact also on the productivity of civil servants; for example, from 2004 to 2008 the difference in the average annual rate of absenteeism between the public and private sector workers has been around 32%.

ultimately depends on the court's ruling on the specific case. If the worker does not appeal the firing decision, or if the dismissal is ruled fair, the legislation does not impose any severance payment to the firm.[18] Conversely, when the dismissal is ruled unfair, the judge imposes a specific compensation on the firm.

The maximum compensation to which unlawfully fired workers are entitled to varies with firm size in two important dimensions. For firms with less than 16 employees, the unfairly dismissed worker must be compensated with a fixed severance payment that varies between 2.5 and 6 months of salary independently on the length of judicial procedure and with no obligation of reinstatement of the dismissed worker. Conversely, for firms with more than 15 employees, to which Article 18 of the Statuto dei Lavoratori applies, the worker is entitled to a compensation equal to forgone wages, social security and health insurance contributions for a period from the date of the dismissal to the judicial settlement of the case (with a minimum of 5 months and with no upper limits). Moreover he/she can choose either to be reinstated in the firm or to be paid an additional financial compensation of 15 months of salary.[19] This implies that: (a) firing costs for firms above the 15 employees threshold are always higher than those for smaller firms; and (b) the cost of unfair dismissals increases with the duration of the labour trial only for firms with more than 15 employees . Therefore, the monetary burden of lengthy judicial proceedings is substantially higher for firms with more than 15 employees.

Figure 1 illustrates the firing cost structure for small firms (blue line) and large firms (red line) depending on trial duration. Large firms pay higher firing costs than smaller firms for any length of the trial as the minimum level of firing costs for large firms (indicated by the dashed line in the Figure) is always above that for smaller firms. If the duration of the trial is below 5 months, the firing cost differential between the two groups is constant. If, however, the unfavorable verdict for the firm comes after 5 months, the firing costs gap widens since the foregone earnings component of firing costs increase for large firms but not for the smaller ones.

FIG. 1 AROUND HERE

Previous studies which exploit the discontinuity in EPL at the 15 employees threshold are mainly focused on identifying the overall effect of EPL on firm's employment decisions and productivity, without distinguishing between the two dimensions of firing costs we discussed above. The identification strategy adopted in these works is based on the overall firing cost differential between large and small firms at the average duration of labour trial in Italy (28 months in our sample), which is just one value on the kinked curve depicted in Figure 1. Differently, our empirical strategy allows

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[18]When the layoff is ruled fair, a common practice in Italy is that the labour union pays all the legal costs.

[19]The recent reform of the Italian labour market, in force since July 18, 2012, has changed some of the rules related to the termination of the employment relationship. In particular, also for firms with more than 15 employees, it has been restricted reinstatement to certain specific cases of unfair or unjustified dismissal and introduced an upper limit up to 24 months' salary to the compensation a firm has to pay in case of unfair dismissal. The change in legislation does not affect our estimates, since our data covers the period 2006-2010.

us to identify the extent to which the inefficiency of the judiciary system affects firms' firing costs in addition to other possible components of firing costs due to the presence of EPL itself, which, in our econometric specification, is 'absorbed' by the presence of firm fixed effects. More specifically, our identification scheme is based on the idea that different firms (below and above threshold) are affected by trials' length in different ways, i.e. longer trials directly translate into higher monetary costs for firms with more than 15 employees, but not for smaller firms. Lengthy trials do not imply any additional costs to small firms, since the maximum compensation to be paid in case of unfair dismissal is fixed and known ex ante by the firm. This implies that small firms may even take advantage of courts' inefficiency through discounting, since the duration of the labour trial would imply a delay in the payment of the fixed compensation due to the dismissed worker.[20]

The discontinuity in firing legislation at the 15-employees threshold should allow us to isolate the effect of interest (the impact of labour trials' length on productivity) from other (unobserved) factors (such as the degree of local economic development, quality of (local) institutions, etc.) that affect all firms within the same judicial districts.

3.2.2 The instrumental variables

In order to corroborate our results and control for the potential endogeneity of the indicator of judicial inefficiency, we also present two-stage least squares (2SLS) estimates using the following instruments for the duration of labour trials. These include: 1) the appeal rate of courts' decisions (i.e. the ratio between the number of suits in the appeal stage and the number of the outgoing suits in the first-instance stage) regarding labour disputes of civil servants and 2) the number of vacant positions in labour courts at district level.

The rate of appeal of courts' decisions concerning civil servants' labour disputes is correlated with trials' length for private sector workers as it contributes to the overall bulk of disputes which are to be settled by (labour) courts: higher numbers of appeals imply more cases to be handled by courts and thus more congestion. Our instrument does not suffer from reverse causality issues (higher job reallocation - in the private sector - may increase labour suits and hence give raise to longer trials), nor is a factor that matters for firms' adjustment decisions. However, a possible source of bias could still arise if the appeal rate of courts' decisions referred to civil servants' working disputes were driven by district-level (unobserved) variables which also affect our dependent variables. This could happen

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[20]Given the probability that a separation is ruled unfair by the judge, the expected firing costs of small firms varies from 0 (in case of favorable verdict) to a maximum of 6 months foregone earnings. A longer trial horizon then reduces the expected discounted value of firing costs (and their variance) due to the discounting effect. Therefore, even when small firms are risk adverse, lengthy labour trials have a potential positive effect on firms' turnover and productivity. Differently, for large firms, the increase in time horizon has two opposite effects on both the expected value and variance of firing costs. On the one hand, it affects large firms' expected firing costs and variance through a positive direct effect on workers' compensation in case of unfavorable verdict. On the other, the negative discounting effect is still at work as in small firms. We control for both effects in our estimations.

if, for example, the appeal rate, which can be taken as a proxy of the quality of courts' decisions, were correlated with the quality of (local) institutions, which may also affect firms' productivity. If this were the case, we should, however, also expect a significant degree of correlation between the rate of appeal for civil servants suits and that for private sector workers. This does not seem to be the case as the districts with relatively 'high' appeal rates of public sector workers' suits tend to differ significantly from those with 'high' appeal rates of suits for workers in the private sector; moreover, the correlation rate between the two variables is negative and not significant as shown in Figure 2.

FIG.2 AROUND HERE

This suggests that omitted variables that can also affect firm-level outcomes (territorial cultural or economical patterns) might not be a major concern.

Our second instrument is the number of vacant positions at district level, i.e. positions in the organograms which are left vacant (for transfer of the judge) and not yet filled. This instrument is correlated with the length of trials (the fact that some positions in a district may be unfilled increases courts' congestion within that district) and also satisfies the exclusion restriction as the transfer of judges from one office to another is the result of a number of decisions taken by agents at different levels of the judiciary hierarchy who respond to different sets of incentives. The transfer generally follows a three-step procedure: i) the publication of vacant positions to be filled ii) the request of the judge who is willing to be transferred and occupy the vacant position; iii) the approval by the self-governing body of the judiciary, the Consiglio Superiore della Magistatura (CSM).

Vacancies within judicial districts primarily arise due to transfers of judges to others district or to other offices, i.e. career advancements, or to retirement. Once a vacant position is created, the judge who is willing to be transferred has to apply to the CSM; as a general rule, judges cannot be transferred to a different assignment or district without their consent.[21] Once applications are received, the CSM decides on the basis of a competitive procedure among candidates. The criteria for the CSM collegial decision are the following: competence, which is assessed on the basis of the functions so far carried out and the judge's capacities; the judge's health status and his/her family members' (offsprings, spouse, parents and brothers/sisters if leaving with the judge, in some cases relatives and relatives-in-law); family ties; merit (which also depends on the fact that in the past the judge has occupied vacancies for which an urgent procedure had been set up or vacancies

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[21]An important feature of the Italian judicial system is the principle of "inamovibilità", according to which a judge can be transferred to a different Court or to a different assignment only upon his/her consent. The principle of "inamoviblità" is a constitutional provision aiming at assuring the independence of the judiciary, which could be undermined should a judge be compelled to quit his/her activity for suspension or transfer. There are some ecceptions namely the need to cover vacancies in cases established by law, as disciplinary actions or for reasons of "incompatibilità ambientale", i.e. the judge is considered incompatible with the workplace. The judge can appeal the CSM decision in all cases.

for which no application had been received); seniority.[22] Therefore, the complexity of the transfer procedure, to which the decisions taken by different agents contribute, is such that the number of vacant positions in each district ends up to be independent from (local) factors that might also affect firm-level outcomes.

Such conclusion is also supported by the data in our sample (see descriptive statistics in Table 1 below), which show no clear territorial pattern in the number of unfilled vacant positions (expressed both in units and as a ratio of the total number of judges). Moreover, Figure 3 displays the sample correlation between the average number of vacant positions (normalized to the number of judges in office) and the level of income per capita (as a proxy for the degree of local economic development). The correlation is virtually zero. This supports our conclusion that the openings/closeness of a vacant position in the labour courts is a complex process which is not related to local institutional and economic characteristics.

FIG.3 AROUND HERE

The two instruments will be used in the IV regressions both separately and jointly, together with a full set of district and district-year dummies (depending on the specification considered), thus producing three sets of estimates. The results are remarkably robust to every specification. Moreover, in all regressions we control for differences in the economic development at district level by including among the regressors district per capita income (GDP), and for the overall quality of the judiciary by using as a regressor the length of civil trials. Finally, depending on the specification considered, we show that our results are also robust to the inclusion of a full set of district-year and sector-year dummies. In this way, we can rule out any possible source of bias arising from (time and district variant) omitted factors - not already captured by the regional income per capita - which could influence both productivity and judicial inefficiency, thus yielding further support to our identification strategy.

3.2.3   Sector reallocation requirement

We finally provide additional evidence of causality by exploiting the industry dimension of our data and applying a well-established approach pioneered by Rajan and Zingales (1998). The basic idea is that if courts' delays affect firm productivity through the firing cost channel, then the effect should be larger for firms operating in sectors with a higher reallocation requirement , which in turn depends on the technological characteristics or on the incidence of aggregate shocks (Bertola, 1992).

A major issue is to define a measure of industry reallocation requirement which is not related to the employment protection provision. In line with a number of labour studies adopting a similar

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[22]See the "Circolare 15098 of November 30, 1993 and subsequent amendments. Health status and familiy ties are not taken in consideration for top positions, such as for example the Supreme Court.

approach (Micco and Pages, 2004; Bassanini et al., 2009 ; Cingano et al., 2010), we use the average job reallocation rates computed at the industry level over the period 1992-2000 for a frictionless labour market (in our case for the UK) as a proxy for the "intrinsic" reallocation requirement of a particular industry. The UK appears a natural benchmark because the UK labour market is much less regulated in comparison to other OECD countries.[23] Our testable hypothesis is that firms in sectors with a higher degree of "intrinsic" reallocation requirement are more affected by the increase in firing costs induced by labour court delays.

4 Data sources and descriptive statistics

4.1 Courts' data

The Italian Ministry of Justice publishes annual data on labour trials for private and public sector workers at district level covering the period from 2007 to 2010.[24] In both cases, data are available on the flows of suits initiated during the year ("newly filed"), the flows which are closed every year ("closed") and the stock of pending suits every year ("pending") in first instance (FI) and in the appeal stage (A) for each of the 26 Italian judiciary districts. Following a formula used by the Ministry of Justice and the Italian National Institute of Statistics (ISTAT), the average number of days of trial can then be calculated as the ratio between the stock of cases (pending cases at the beginning plus pending cases at the end of the year) and the incoming plus outgoing flows (newly files plus closed).[25]

This formula allows us to estimate the days of trial within each stage of judgement. In order to take account of the overall days of trial for the first instance and the appeal stages using the same criterion, one should sum all the pending cases at the beginning and at the end of the year in the two stages and divide it by the sum of the inflows and outflows in the two stages. However, this procedure has a drawback as it does not take into account the sequentiality of the two trials, i.e. the fact that a suit which is closed before the courts of the first instance case can enter or not the appeal phase.

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[23] The data on gross job reallocation for the UK (the frictionless economy) are taken from Messina and Vallanti (2007) job flows database, which provides cross-country comparable job flows statistics for 24 sectors and 13 EU countries over the period 1990-2001.

[24] Jappelli et al. (2005) use similar data to estimate the effetcs of judicial inefficiency on credit markets.

[25] Since data on the actual duration of legal proceedings are not available, the Ministry of Justice uses information on caseflows, to calculate an index for trial duration, as follows:

$$DLT_t = \frac{P_{t-1} + P_t}{F_t + C_t} \times 360$$

where P_{t-1} and P_t are the number of cases pending at the beginning and at the end of the year, respectively; F_t is the number of new cases filed during the year; C_t is the number of cases that reached the final judgment during the year.

This measure is widely used in the economic literature in cross-country and with-in country studies. See, for example, Djankov et al. (2003) for a cross-country study; Jappelli et al. (2005) and Giacomelli and Menon (2012) on the effect of Italian courts' efficiency on the performance of credit market and firm size respectively.

In order to account for the sequentiality of the two trials, we sum of the average days of trial for the first instance and for the appeal (calculated using the Ministry formula) where the appeal days are weighted by the number of ingoing suits at the appeal stage relatively to the number of outgoing suits at the first stage:

$$Length = DLT_{rt}^{FI} + S_{rt} \times DLT_{rt}^{A} \tag{1}$$

where DLT are the days of labour trials in the first instance (FI) and in the appeal (A) in district r at time t and S is the ratio of newly filed suits before the Appeal Courts in district r at time t on the suits closed at first instance in district r at time $t-1$. S ranges from 0 to 1 and takes into account the fact that not all the suits which are decided upon by the Court of first instance reach the appeal courts. Therefore, S can be interpreted as a proxy for the probability that the first instance judgment is appealed.[26]

From the Ministry of Justice database we also draw annual data on the length of civil trials and on the rate of appeal in Labour Courts in suits involving civil servants, i.e. the ratio of incoming suits in the appeal stage on the outgoing suits in the first instance case. Finally, annual data on the number of judges appointed to Labour Courts at district level as well as on the positions left vacant for transfer of a judge from 2007 to 2010 are taken from the CSM database.[27]

Data on the Courts are matched with the information on income and population at district level provided by ISTAT.

Table 1 reports some descriptive statistics concerning the Labour Courts; in all cases tables refer to average annual data from 2007 to 2010. Columns 1-2 report our indicator of judicial efficiency in relation to private sector labour trials for the 26 judicial districts, which are ranked from the most to the least efficient. The data show a great territorial heterogeneity in the duration of trials; for example, the length of trial in the less efficient district (Bari, 1433 days) is more than six time longer as compared to the more efficient district (Torino, 224 days). Columns 3-4 shows the rate of appeal of labour suits involving public sector workers; here the extreme values are recorded in Reggio Calabria (0.08) and Ancona (0.48) while the rate of appeal in Torino is close to the average with Bari falling a few positions behind. Finally, vacant positions in Labour Courts at district level are shown in the last columns, in absolute values (5-6) and normalized to the number of judges

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[26] Our index does not consider the additional days of trial (which add to the total length) due to the possibility that suits are discussed before the Supreme Court. This is because at this stage no heterogeneity could be observed at district level; hence days of trial calculated according to our index can understate the effective length of trial. Also, our index does not take into account the period between the first suit and the appeal. However, the time which elapses between the two stages also depends on the decision of the party who appeals, which is not related to the courts' efficiency.

[27] The CSM database does not provide information on vacant positions for the judicial district of Campobasso.

(7-8). Note that number of vacant positions in Naples (12) and in Rome (7.25) is much higher than the average; this is explained by the differences in the size of the Courts, which are much larger in Naples and Rome. When the number of judges is taken into account, the number of vacancies in Naples lies slightly above the average (0.12 against 0.10) while Rome is below (0.07).[28]

TABLE 1 AROUND HERE

Table 2 (columns 1-2) reports the average duration of civil trials at district level and districts are ranked using the efficiency criterion in the Labour Courts as in the previous table. The least efficient district in the civil trial is Reggio Calabria (3029 days) while the more efficient is Trento (588 days). Finally, columns 2-3 show the average and standard deviation of regional per capita GDP in the period 2007 to 2010. Important territorial differences between the North and the South of the country emerge, with the Northern regions of Lombardia (Milano and Brescia), of Trentino Alto Adige (Trento) and of Emilia Romagna (Bologna) ranking highest, followed by Lazio (Rome). All the districts which are ranked above the average are located in the Northern or Central (Rome, Firenze and Ancona) part of Italy, while no Northern district falls under the average.

TABLE 2 AROUND HERE

4.2 Firms' data and job flow statistics

Firm level data are drawn from Aida (Analisi Informatizzata delle Aziende Italiane) produced by Bureau van Dijk (BvD). BvD collects balance sheet data from the national Chambers of Commerce. The version of Aida used in our analysis includes all Italian firms that have reported their financial statement to the national Chamber of Commerce in the period 2007-2010, for a total of more than 800,000 Italian firms operating in all productive sectors. Apart from balance sheet data, Aida provides a wide range of financial and descriptive information (industry and activity codes, firm age, etc.) and the number of employees. Moreover, AIDA gives information on the location of firms at a municipality level, allowing the match of firms' data with the courts' database.

The Aida database has a drawback, as it does not allow to distinguish between newly created firms and firms that simply enter the sample at a given period t but were already operating in the period before; similarly, it is not possible to identify firms' closures from firms that exit the sample for other reasons. Therefore, we have restricted the analysis to continuing firms, e.g. firms that are in the sample for at least two consecutive periods. Given this limitation and after cleaning the database from outliers and missing information, our final sample consists of around 160,000 private firms operating in both the manufacturing and non manufacturing sectors.[29] Observations

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[28] In our estimations, absolute differences in the size of the Courts are accounted for using district and firm fixed effects, depending on specifications.

[29] The sectors are: (1) Agriculture, forestry and fishing; (2) Mining and quarrying; (3) Food, beverages and tobacco;(4) Textiles; (5) Wood products; (6) Paper products, publishing and printing; (7) Refined petroleum, nuclear fuel and chemical products; (8) Rubber and plastic products; (9) Other non-metallic products; (10) Basic metals

are annual and cover the period from 2007 to 2010. Labour productivity is obtained as value added per worker.

Unfortunately, data on job creation (hirings) and job destruction (separations) at firm level are not available from AIDA. We then follow the literature (Salvanes, 1997; Gomez et al, 2004) and calculate yearly job creation (JC), job destruction (JD) and job reallocation (JR) rates at the district-industry level using the number of employees at the end of the budget year. Job flows statistics are then defined for narrow cells, obtained as the crossing of 20 productive sectors, 20 districts and 4 years (between 2007 and 2010).[30]

Finally, data on gross job reallocation for the UK (the frictionless economy) are taken from the Messina and Vallanti (2007) job flows database, which provides cross-country comparable job flows statistics for 13 EU countries for the years 1992-2001. This indicator is industry specific and time invariant and it is constructed as the average job turnover rate in the UK for each sector over the period 1992-2000.

Table 3 reports summary statistics of firm variables, job creation (JC), job destruction (JD) and job reallocation (JR) and job reallocation requirement ($flex$).

TABLE 3 AROUND HERE

In our sample the average firm is 11 years old, has a value added per worker of around 64 thousands euros and employs 34 workers. Firm size distribution is significantly skewed as shown by the low value of the median which is equal to 9 employees. A major feature of the Italian productive structure is that the size of firms is quite small. In our sample 71% of firms have 15 workers or less and micro firms (with less than 6) account for around 44% of the sample. These figures show that firms below the 15-employees threshold are well represented.[31]

Finally, the average rates of job creation and job destruction are around 3%, with an overall job turnover equal to 7.1%. As expected, job reallocation in the frictionless economy (the UK), which is our proxy for industry reallocation requirement, is almost 3 percentage points higher than in Italy. From Table 4, which reports the reallocation requirement by production sectors, Real estate and renting, computer, R&D emerges as the industry with the highest flexibility index with Construction following close behind. On the opposite side of the flexibility ranking we find Electricity, gas and

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and fabricated metal products; (11) Machinery and equipment; (12) Electrical and optical equipment; (13) Transport equipment; (14) Other manufacturing sectors; (15) Electricity, gas and water supply; (16) Construction; (17) Wholesale and retail trade, Repairs; (18) Hotels and restaurants; (19) Transport and communications; (20) Other services. The financial and public sectors are excluded from the analysis.

[30] The Davis et al. (1996) methodology is used to compute job flows statistics. Technical details can be found in Appendix 1.

[31] Our sample characteristics and coverage are in line with that employed in Hijzen et al. (2013) constructed using data from administrative sources (INPS and the ISTAT-ASIA database). Although our database and the one used in Hijzen et al. (2013) are obtained from two different data sources, they are vary similar in terms of the average number of employees, industry, and geographical coverage.

water supply and Paper products; Publishing and Printing sectors.

TABLE 4 AROUND HERE

5 Empirical specifications

5.1 Job flows

As discussed in the previous sections, labour courts' inefficiency increases the cost of dismissing a worker as well as the uncertainty on the outcome of a judge's decision; by this way it raises firing costs and hinders labour reallocation. To isolate the effect of trail length on firm adjustments, we estimate the effect of our variable of interest on job reallocation, and then on job creation and job destruction separately.

Apart from firing costs, labour adjustments can be influenced by other institutional and economic factors which could in principle also affect judicial inefficiency. Although district fixed effects allows us to handle unobserved heterogeneity at district level, in the regressions we also control for (time variant) differences in real per capita income among Italian districts in order to account for the potential endogeneity resulting from the influence of underlying economic conditions on the variables included in the model. Differences in the pace of development may indeed have an impact both on the quality of institutions (judicial efficiency) and on their outcome. Finally, we also control for the judicial inefficiency in the civil trials at district level which may impact on of firms' decisions related to inputs adjustments.

Since job flows statistics are measured at industry-district level, the model specification is the following:

$$JF_{srt} = \beta_1 length_{rt} + \beta_2 civil_{rt} + \beta_3 income_{rt} + \beta_4 X_{srt} + \mathbf{D}\boldsymbol{\eta} + u_{srt} \qquad (2)$$

where JF_{srt} are the job flow rates, i.e. job reallocation (JR), job destruction (JD) and job creation (JC), $length_{rt}$ is the length (in log) of labour trials, $civil_{rt}$ is the length (in log) of civil trials, $income_{rt}$ is the (log of) real per capita income, X_{srt} are district-sector time variant firm characteristics, and the indices s, r, t refer to the industry, the district and the time period respectively. D is the matrix of dummies that includes district-by-year and industry-by-district dummies while u_{srt} is the error term. Industry-by-year dummies control for differential trends in job flows by type of economic activity; for example, throughout all districts some industries may experience faster job reallocation than others. Industry-by-district dummies capture cross district differences in the structure of each industry.[32]

Since the intensity of job reallocation depends on various firm-specific characteristics, with job creation being negatively associated with firms' age and size, the set of controls X_{srt} include the

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[32]Standard errors are clustered at district level to deal with concerns of serial correlation.

log of the average age of the firm (*age*) and dummies (*size*16 − 50; *size*51 − 250; *size*251−) for the three size groups: between 16 and 50 employees, between 51 and 250 employees, and larger than 251 employees, respectively. Firms with less than 15 employees represent the base group. As discussed in the previous section, *length* is instrumented with the number of judges vacant positions in Courts and the rate of appeal of trials in the public sector labour suits. Both instruments, which have a district-year dimension, are used separately and jointly to assess the robustness of our results.[33]

5.2 Labour productivity

In a second set of regressions we estimate the effect of labour courts' inefficiency on firm labour productivity using firm level data. At firm level, the size of firms plays a significant role in moderating the impact of courts inefficiency on productivity. In our analysis, we exploit the fact that according to the Art. 18 of the "Statuto dei Lavoratori" (Law 300), firms with more than 15 employees have to reinstate workers and pay their foregone wages for the entire period of the judicial procedure in case of unfair dismissals. Differently, firms with less than 16 employees have to pay a fixed severance payment without any reinstatement. The legal costs of unfair dismissals for firms below the threshold of 15 employees are then unrelated to the length of trials, while the expected firing costs increase with the trial length for firms above the 15-employees threshold. We exploit the discontinuity of legislation at the 15-employees threshold to identify the causal effect of trial length on productivity.

As in the job flows regressions, in order to control for the fact that labour courts' inefficiency can be related to the local economic development and to the inefficiency of courts at large, we also include district per capita income and the length of civil trials among the controls. Moreover, estimating the impact of judicial inefficiency at firm level allows us to enrich our controls on productivity. Given that (time variant) differences in the regional underlying economic conditions (as GDP per capita) may not necessarily capture all the factors affecting firm productivity (e.g. those factors related to the institutional environment at large), depending on the specification considered we include a full set of district-by-year and sector-by-year dummies. In this way we can rule out any possible source of endogeneity arising from (time and district variant) omitted factors - not already captured by the income per capita - which could influence both productivity and judicial inefficiency.

The model specification is as follows:

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[33]In this set of regression we cannot use the threshold of 15 employees to identify the effect of trial duration on flows, since with aggregate data (as it is the case for job flows statistics) is not possible to separate observations above and below the threshold (which is defined at firm level). However, we can still exploit the wide variation in judicial efficiency across courts districts and time to estimate the average effect of trial length on job flows at district level.

$$Y_{fst}^r = \beta_1 length_t^r + \beta_2(length_t^r \times size_f^r) + \beta_3 civil_t^r + \beta_4 income_t^r + \eta_f$$
$$+ X_{sft}^r \gamma + \mathbf{D}\boldsymbol{\eta} + u_{fst}^r \qquad (3)$$

where Y_{fst}^r is the (log) of labour productivity; $size_f^r$ is a dummy variable which takes value 1 for large firms i.e. firms with number of employees larger than 15, and zero otherwise;[34] X_{fst}^r are a set of other controls, η_f stands for firm fixed effects which "absorbe" any time-invariant unobservable attributes at firm level, and in particular the effect of the different (time-invariant) EPL) regime that applies to firms above and below the 15 employees threshold. The indices s, r and t refer to industries, districts and time respectively. D is the matrix of dummies that includes, depending on the specification considered, district-by-year and industry-by-year dummies while u_{srt} is the error term. The coefficient on $length_t^r$ gives the common effect of trial length on small and large firms due to discounting, while the interaction term $length_t^r \times size_f^r$ captures the differential effect of firing costs induced by the length of trials on large firms productivity. Here again the variable $length$ is instrumented with the number of judge vacant positions and and the appeal rate of trials in the public sector labour suits, while the interaction $length_t^r \times size_{fs}^r$ is instrumented by interacting each instruments with the dummy $size_{fs}^r$.

We then check the robustness of our results by applying a well established approach introduced by Rajan and Zingales (1998). Our testable hypothesis is that the differential effect of firing costs related to court delays for firms above and below the 15-employees threshold is larger in industries with a higher flexibility requirement.

The model specification is the following:

$$Y_{fst}^r = \beta_1(length_t^r \times flex_s) + \beta_2(length_t^r \times size_f^r) + \beta_3(length_t^r \times size_f^r \times flex_s)$$
$$+ X_{fst}^r \gamma + \eta_f + \mathbf{D}\boldsymbol{\eta} + u_{fst}^r \qquad (4)$$

where $flex_s$ is the extent of "intrinsic" job reallocation in industry s, X_{fst}^r are a set of other controls as in model 3, η_f stands for firm fixed effects and the matrix D includes a full set of district-by-year and industry-by-year dummies. The coefficient β_3 of the third-level interaction term ($length_t^r \times size_f^r \times flex_s$) captures the differential effect of lengthy labour trials on produc-

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[34]We define firms as small if they have less than 15 employees in all years and large if they have more than 15 employees in all years. The results we report below are robust to this alternative definition of firm size and are available upon request.

tivity for firms above and below the 15-employees threshold, in sectors with a different reallocation requirement. If our assumption is correct, the differential effect is negative and increases (in absolute terms) with the sector flexibility requirement ($flex_s$), i.e. the coefficient β_3 is negative.

6   Results

6.1   Courts' delays and job reallocation

We first estimate the impact of labour trial length on job flows as in equation 2. Table 5 reports the results of regressing job reallocation, job destruction and job creation rates on the duration of labour trials using the set of instruments discussed in the previous sections - i.e. judges' vacant position (columns 1 to 3) and the rate of appeal in suits involving only public sector workers (columns 4-6), both separately and jointly (columns 7-9).[35]

TABLE 5 AROUND HERE

The results in Tables 5 show that the coefficient on labour trail length is always negative and significant regardless of the instrument set used, showing that court delays have a negative and significant impact on job reallocation. In accordance with previous empirical results, the effect of firing costs on job creation and job destruction is not symmetric, and the overall impact on job turnover is mainly driven by a reduction of job destruction and, to a less extent, of job creation (Gomez et al, 2004). In particular, the impact on the rate of job reallocation and job destruction is always statistically significant while the effect on job creation is smaller and turns significant only when the two instruments are jointly used (column 9).

In economic terms, the estimated coefficients are sizeable. The point estimates of the coefficient when both instruments are considered simultaneously (columns 7-9) is -0.070 for job reallocation, -0.059 for job destruction and -0.011 for job creation. We can quantify this effect by computing the estimated increase of job flows that would result from moving from a district at the 95th percentile (less efficient) to the 5th percentile (more efficient) of the inefficiency distribution (that is from the district of Salerno to the district of Trento in our sample). Reducing the length of labour trials by almost 76% in Salerno would lead to a 5.4 percentage points increase in JR, 4.5 percentage points increase in JD and 0.9 percentage points increase in JC.

Interestingly, the length of civil proceedings has an opposite effect on job flows, through an increase in job destruction, with an unambiguous negative effect on net employment creation. This result reinforces our findings, that is labour and civil courts' inefficiency affects labour dynamics through different channels, the former by increasing firing costs and then dampening both job destruction and job creation, the latter by negatively affecting contract enforcement and then reducing

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[35] The stata module xtivreg2 (Schaffer, 2010) is used for all instrumental variable regressions in this paper.

investment and employment growth.[36]

Our results remain remarkably robust to the different instruments used to control for the potential endogeneity of the duration of trials, thus yielding support to our identification strategy. The relevant statistics to test the validity (relevance and orthogonality) of the instruments, and the associated *p-values*, are given in the last panel of Table 5. The F statistic for the relevance of instruments is above the 'rule of thumb' threshold of 10 in all specifications, and the overidentification test does not reject the null that the instruments are uncorrelated with the error term.

Table 6 reports the coefficients of the instruments of the first-stage regression (column 1) and of the reduced-form regressions (columns 2, 3 and 4).

TABLE 6 AROUND HERE

The first-stage results show that, as expected, both instruments are positively and significantly correlated with the duration of labour trials. Moreover, in the reduced form regressions, both judge vacant positions and the rate of appeal of civil servant legal disputes have a negative and significant effect on job destruction, resulting in a reduction of job turnover, while job creation rate is not significantly affected.

Finally, Table 7 displays the results of estimating equation 2 with OLS.

TABLE 7 AROUND HERE

The OLS coefficients of labour trial length in the job reallocation and job destruction equations (column 1 and column 2) turn to be not significant and the point estimates are lower in absolute value than in the IV estimation. This seems to suggest that the OLS coefficients are downward biased for the presence of reverse causality, stemming from the fact that a higher rate of job destruction in a given court may lead to a higher number of dismissal cases brought to court and by this way to an increase in court congestion and trial length. Conversely, reverse causality is less of a problem for the job creation equation as it is confirmed by the OLS results. Indeed, Column 3 shows that the effect of trial length on job creation remains marginally significant and quantitatively similar to the one estimated in the IV regressions.

6.2 Courts' delays and productivity

In Table 8 we report the effect of trial length on labour productivity at firm level estimated as in equation 3, using all sets of instruments shown so far. As the variable measuring courts' delays varies both across districts and time, we are able to control for any time-invariant unobserved firm characteristics by the use of firm fixed effects, thus fully exploiting the firm level dimension of the dataset.

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[36]Similar results are reported in Giacomelli and Manon (2012), who find that the length of civil proceedings has a negative effect on firms' growth and employment.

TABLE 8 AROUND HERE

We find that the length of labour trials is associated with a lower level of labour productivity for firms exceeding 15 workers. The coefficient of the interaction term is always negative and significant (columns 2, 5 and 8) and the overall elasticity estimated for large firms varies from 0.042 to 0.049 depending on the instrument(s) used in the estimation. Conversely, the effect due to discounting is positive thought not statistically significant for firms below the 15-employees threshold. Based on the coefficients reported in column 8, the estimated differential elasticity for firms above the 15 employees threshold is -0.051. This implies that if the labour court in Salerno was as efficient as in Trento, this would increase labour productivity by almost 4 percent in large firms relative to small firms.

The differential impact of firing costs related to court delays on productivity for firms above and below the 15-employees threshold is remarkably robust to the inclusion of district-by-year dummies (columns 3, 6 and 9). In this specification the main effect ($length$) is not included because it is absorbed by the district-year dummies, which also capture all time variant and district specific factors that may affect simultaneously the efficiency of labour courts and firms' productivity. The stability of the coefficient on the $length \times size$ interaction term when adding district-year dummies provides further reassurance that the estimated differential effect is not driven by any possible source of bias arising from district-time variant omitted factors.

Here again the instruments satisfy the orthogonality conditions in all specifications, and the Anderson canonical correlation statistic rejects the null hypothesis of zero correlation between the endogenous regressors and the instruments suggesting that the instruments we consider are adequate to identify our equations.

The results of first-stage and reduced form regressions are shown in Table 9.

TABLE 9 AROUND HERE

The coefficients of the first stage regressions show that both instruments are positively correlated with our endogenous regressors (columns 1, 2 and 3). Moreover, the reduced form regressions confirm that both judge vacancies and the rate of appeal decrease productivity of firms above the 15-employees threshold, while the effects on smaller firms is less clear cut (columns 4 and 5).

Finally, following the Rajan and Zingales approach, we analyze the effect of courts' delays on firm productivity taking into account the sector intrinsic need for labour flexibility. The empirical strategy, outlined in equation 4, consists in evaluating whether the differential effect of trial length on small and large firms, we estimated in the first set of regressions, depends on the sectors reallocation requirement.

Table 10 shows that the length of trials decreases labour productivity for firms operating in

sectors where the need for labour flexibility is higher, as shown by the negative - although not always significant - coefficient for the interaction with flexibility (columns 2 and 3). More interesting, the impact of courts' delay on labour productivity is stronger for larger firms operating in sectors with a higher need for labour turnover, as shown by the negative and highly significant coefficient for the triple interaction term (column 4). Quantitatively, the effect of increasing courts' efficiency in Salerno as in Trento would be an increase of labour productivity in large firms relative to small firms ranging from 3.1 percent for firms in a low job reallocation sector, i.e. the sector at the 5th percentile of the reallocation distribution (Paper products, publishing and printing with the $flex$ index equal to 0.069) to 4.8 percent for firms in a high reallocation sector, i.e. the sector at the 95th percentile (Construction with the $flex$ index equal to 0.139).[37] These results are in line with those in Cingano et al. (2010), which, using firm level data and exploiting cross country and cross sector variation in the OECD EPL index, show a sizable and negative impact of firing costs on labour productivity in high reallocation industries.

TABLE 10 AROUND HERE

Figure 4 plots the predicted differential effect of trial length on productivity of large firms relative to small firms in industries with different reallocation requirement and 95% confidence intervals.

FIGURE 4 AROUND HERE

The thick line stands for the predicted differential effect of courts' delays on labour productivity as a function of the reallocation requirement, i.e. $\frac{\partial^2 Y_{fst}^r}{\partial length_t^r \partial size_{fs}^r} = \widehat{\beta}_2 + \widehat{\beta}_3 flex_s$, and the dotted lines are 95% confidence intervals. According to Figure 4, the predicted difference in the response of productivity to trial length is negative and, in general, statistically significant for all values of $flex$.[38] Moreover, the differential effect on productivity between firms below and above the threshold increases, in absolute terms, with the sector reallocation requirement, confirming that the higher the flexibility need, the stronger the impact of the length of trial on large firms relative to small ones.

Finally, in Table 11 we present the OLS estimates of equations 3 and 4 and compare them with the IV results.

TABLE 11 AROUND HERE

The OLS coefficient on the main effect ($length$ in columns 1 and 2) is positive and significant. The point estimates tend to be larger than the IV estimates suggesting that the potential endogeneity of the regressor leads to a downward bias in the estimate of the overall negative effect of court delays

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[37]In these set of estimates we include district-year dummies which absorb, among the others, also the main effect of trial duration ($length$) which is district specific (and time varying). The estimated coefficients on the $length \times size$ and $length \times size \times flex$ interactions are very similar when we include the main effect and drop the district-year dummies. These results are available from the authors upon request.

[38]In the estimation with judge vacant positions as only instrument, the differential marginal effect is negative and quantitative similar though less precisely estimated for firms in sectors below the 25 percentile of the flexibility requirement distribution.

on productivity. Conversely, the OLS and 2SLS the coefficients on the interaction term $length \times size$ is almost the same in all specifications also when district-year dummies are not included among the controls. These results lend support to our identification strategy and suggest that omitted variables might not be a major concern in estimating the differential effect of trial length for firms above the 15-employees threshold.

6.3   Robustness of results to changes in the sample

Finally, we check the sensitivity of our main results to the exclusion of specific sectors and districts in the regressions. Figure 5 and Figure 6 show the impact of dropping one industry at the time and one district at the time on the average impact of courts' delays on job turnover[39] and productivity, respectively.

FIGURE 5 & FIGURE 6 AROUND HERE

In this exercise, we focus on our baseline specifications as reported in columns (7)-(9) of Table 5 and column (8) of Table 8.

With regard to job reallocation and job destruction, Figure 5 shows that dropping one sector at the time never turns the sign of our variable of interest, which remains negative in all the regressions. Moreover, the coefficients are always statistically significant at the 10% level. Similarly, our estimates are stable when specific districts are excluded as the estimated effect retains its negative sign and remain significant at standard levels in all cases. The sensitivity analysis also confirms that trial length tends to exert a negative impact on job creation, although the results are, in general, not statistically significant.

Figure 6 reports the coefficients of trial length on firm productivity, for small and large firms, and the estimated large-small firms differential. Again the estimated effects reported in the text are remarkably stable when specific districts and sectors are excluded from the sample. In particular the estimated impact of trial length is never statistically significant for small firms, and is negative and statistically significant for large firms. Consistently, the differential effect retains its negative sign and is always highly statistically significant at standards level of testing.

7   Conclusions

We assess the impact of courts delays on labour market adjustments as a factor influencing the strictness of firing costs, thus highlighting a cause of within-country variation in the costs and enforcement of EPL. We argue that labour courts' inefficiency is an important dimension of *de facto* EPL to the extent that delays in legal trials concerning labour disputes can add significantly to the

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[39]The same exercise has been repeated for job creation and job destruction. The estimated coefficients are robust to changes in the sample composition along both the district and industry dimensions. Results are available upon request.

cost of dismissing workers. So far, this aspect has been largely neglected by the existing research. We provide evidence that courts' inefficiency - measured by the average length of trials - implies *per se* an high economic cost for labour market in terms of misallocation of resources and productivity.

Exploiting the variability of the length of labour trials across Italian judicial districts and the discontinuity of the firing legislation at the 15-employees threshold, we show that the length of trial significantly reduces job flows and this effect translates into a reduction in labour productivity at firm level. The latter effect is related to firms' flexibility requirement, being stronger for firms in high reallocation sectors. All our results are remarkably robust to different set of instruments used in the regressions and to the inclusion of time-district dummies, which capture any possible source of endogeneity arising from district-specific and time-variant omitted factors.

Overall, the evidence points to the fact that the duration of judicial proceedings should not be overlooked as a component of firing cost in future studies. Our findings also have important policy implications. Any reforms aimed at reducing the strictness of the employment protection legislation should also consider the role played by courts' efficiency in enforcing them as well as how these reforms interact with the complexity and length of legal procedures, the latter being an important dimension of actual EPL.

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A   APPENDIX 1

A.1   Job flows statistics

We follow Davis et al. (1996) in defining job flows statistics. Denote the level of employment at firm f in period t with n_{ft} and let Δn_{ft} be the change in employment between period t and $t-1$. Let S^+ be the set of firms in sector S with $\Delta n_{ft} > 0$ and S^- be the set of firms in sector S with $\Delta n_{ft} < 0$. We calculate job creation by summing employment changes in S^+. Correspondingly, job destruction is calculated by summing all the (absolute) changes in S^-. Rates of job creation and job destruction are obtained by dividing by the size of sector. Firm size at time t is calculated as the average employment between period t and $t-1$, i.e. $x_{ft} = 0.5(n_{ft} + n_{ft-1})$. Accordingly, the sector size is defined as

$$X_{st} = \sum_{f \in S} x_{ft}$$

Job creation and job destruction can equivalently be expressed as the size-weighted average over firms' growth rates as follows:

$$JC_{st} = \sum_{f \in S_t^+} g_{ft} \frac{x_{ft}}{X_{st}}$$

$$JD_{st} = \sum_{f \in S_t^-} |g_{ft}| \frac{x_{ft}}{X_{st}}$$

where $g_{ft} = \frac{\Delta n_{ft}}{x_{ft}}$ is the growth rate of employment in firm f and period t.[40]

The sum of the job creation and job destruction rates is the job reallocation rate (JR). It gives the total number of employment positions reallocated in the economy in a given period of time.

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[40] The growth measure defined above is monotonically correlated with the conventional measure defined as the change in employment divided by the lagged employment, and the two measures are approximately the same for small growth rates. Moreover, unlike the conventional measure, which ranges from —1 and $+\infty$, this measure of growth rate is symmetric around zero, being bounded in the interval [-2,2], allowing employment expansions and contractions to be treated symmetrically

Table 1: Length of labour trials[1], rate of appeal in the public sector and judges' vacant positions, by judicial districts

	Labour trial length[3] (days)		Rate of appeal[4]		Vacant positions[5]			
					Vacancies		Per number of judges	
Districts[2]	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.	Mean	St. Dev.
TORINO	224	18.32	0.28	0.05	1.75	0.96	0.08	0.05
TRENTO	313	43.72	0.36	0.09	0.75	0.50	0.25	0.17
MILANO	389	43.84	0.31	0.04	2.75	1.50	0.07	0.04
GENOVA	492	80.41	0.26	0.07	1.25	1.50	0.07	0.09
CAMPOBASSO	499	91.41	0.45	0.20	-	-	-	-
BRESCIA	554	54.01	0.41	0.03	0.50	0.58	0.04	0.05
FIRENZE	646	56.61	0.37	0.06	1.25	0.96	0.06	0.05
TRIESTE	735	87.08	0.30	0.05	0.25	0.50	0.05	0.10
BOLOGNA	768	47.79	0.26	0.04	2.25	0.96	0.12	0.05
CATANZARO	777	83.77	0.22	0.13	1.50	0.58	0.08	0.03
ANCONA	782	116.23	0.48	0.05	1.00	1.41	0.17	0.21
ROMA	826	63.25	0.30	0.11	7.25	3.30	0.07	0.03
VENEZIA	827	69.79	0.33	0.08	2.25	1.71	0.12	0.09
PALERMO	875	150.99	0.26	0.10	1.25	1.26	0.09	0.10
NAPOLI	889	57.56	0.14	0.07	12.00	2.94	0.12	0.04
L'AQUILA	913	86.40	0.37	0.10	0.00	0.00	0.00	0.00
CALTANISSETTA	1046	274.34	0.37	0.12	0.50	1.00	0.25	0.50
POTENZA	1080	109.81	0.30	0.15	0.25	0.50	0.08	0.17
CAGLIARI	1098	46.40	0.15	0.04	0.50	1.00	0.06	0.13
PERUGIA	1165	134.62	0.38	0.13	0.50	0.58	0.10	0.12
REGGIO CALABRIA	1177	963.74	0.08	0.01	1.00	0.82	0.10	0.08
MESSINA	1200	148.80	0.30	0.11	1.00	1.41	0.11	0.16
CATANIA	1309	57.34	0.19	0.05	2.50	1.29	0.14	0.08
LECCE	1325	282.44	0.22	0.07	2.00	0.82	0.08	0.03
SALERNO	1397	715.30	0.26	0.07	2.25	1.26	0.15	0.10
BARI	1433	288.06	0.24	0.25	2.50	0.58	0.08	0.02
Average	852.84	354.32	0.29	0.13	1.96	2.75	0.10	0.13

Note. [1] Excluded the appeal stage before the Supreme Court. [2]Districts are ordered following an efficiency ranking.
Source: [3] [4]Source: Ministry of Justice website and authors' calculations. [5]Ministry of Justice database and authors' calculations.

Table 2: Length of civil trials and average income per capita, by judicial districts

Districts[1]	Civil trial length[2] (days)		Income per capita[3] (000)	
	Mean	St. Dev.	Mean	St. Dev.
TORINO	875	32.42	24.44	1.51
TRENTO	588	18.20	28.36	0.88
MILANO	1295	20.40	28.71	1.33
GENOVA	1386	27.86	23.72	0.87
CAMPOBASSO	1344	32.69	17.36	0.81
BRESCIA	1425	57.87	28.71	1.33
FIRENZE	1522	61.08	24.14	0.77
TRIESTE	1029	76.95	25.30	1.46
BOLOGNA	1828	49.51	27.70	1.53
CATANZARO	2120	153.63	14.25	0.40
ANCONA	1679	38.09	22.79	1.09
ROMA	2149	158.33	26.78	1.01
VENEZIA	1781	64.03	25.96	1.42
PALERMO	1602	101.85	14.37	0.47
NAPOLI	2108	103.84	14.18	0.46
L'AQUILA	1522	84.69	18.59	0.85
CALTANISSETTA	1517	68.69	14.37	0.47
POTENZA	2002	90.64	15.76	0.51
CAGLIARI	1524	36.50	16.87	0.43
PERUGIA	1246	117.70	20.90	1.19
REGGIO CALABRIA	3029	134.10	14.25	0.40
MESSINA	2564	72.43	14.37	0.47
CATANIA	2060	107.56	14.37	0.47
LECCE	1820	37.97	14.61	0.50
SALERNO	1784	60.45	14.18	0.46
BARI	2126	102.52	14.61	0.50
Average	*1689.23*	*514.39*	*19.99*	*5.65*

Note. [1] Districts are order following the same ranking as in Table 1.
Source: [2] Ministry of Justice website and authors' calculations. [3]ISTAT, National Accounts.

Table 3: Descriptive statistics on firm variables and job flows

	Mean	St. Dev.	p10	p50	p90
VA per worker (000)	63.94	298.99	27.84	50.51	114.00
Firm size	33.94	505.08	2	9	52
>15 employees (dummy)	0.29	0.45	-	-	-
Firm age	10.65	6.14	5	17	26
JR	0.074	0.038	0.035	0.065	0.128
JC	0.034	0.024	0.010	0.030	0.068
JD	0.040	0.032	0.011	0.032	0.080
Reallocation requirement	0.099	0.020	0.069	0.088	0.135

Note. *Source:* AIDA database and authors' calculations. Reallocation requirement at the industry level is constructed using data from Messina and Vallanti (2007)

Table 4: Reallocation requirement, by industry

Industry	*flex*
Electricity, gas and water supply	0.066
Paper products, publishing and printing	0.069
Refined petroleum, nuclear fuel and chemical products	0.078
Other non-metallic products	0.082
Food, beverages and tobacco	0.084
Transport and communications	0.085
Wood products	0.086
Basic metals and fabricated metal products	0.086
Textiles	0.087
Rubber and plastic products	0.088
Transport equipment	0.089
Machinery and equipment	0.089
Other manufacturing sectors	0.094
Electrical and optical equipment	0.098
Wholesale and retail trade; Repairs	0.101
Mining and quarry	0.105
Hotels and restaurants	0.112
Agriculture, forestry and fishing	0.119
Construction	0.135
Real estate and renting, computer, R&D	0.145
Average	*0.099*

Note. The flexibility requirement (*flex*) is defined as the average job reallocation rate computed for UK industries in the period 1992-2001. Source: Messina and Vallanti (2007).

Table 5. The effect of labour trial length on job flows: IV regressions

Instrument(s):	Judges' vacant positions			PA rate of appeal			Judges' vacant positions & PA rate of appeal		
	JR	JD	JC	JR	JD	JC	JR	JD	JC
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
length	-0.077*	-0.061*	-0.006	-0.062**	-0.056**	-0.006	-0.070***	-0.059***	-0.011*
	(0.041)	(0.031)	(0.016)	(0.019)	(0.023)	(0.016)	(0.021)	(0.023)	(0.006)
civil length	0.076*	0.082*	-0.008	0.061**	0.078**	-0.017	0.069**	0.079**	-0.010
	(0.045)	(0.045)	(0.031)	(0.023)	(0.028)	(0.019)	(0.025)	(0.028)	(0.019)
income	0.008	-0.016	0.022	0.012	-0.010	0.022	0.009	-0.016	0.025
	(0.015)	(0.026)	(0.022)	(0.014)	(0.027)	(0.023)	(0.015)	(0.026)	(0.022)
size16-50	-0.000	0.001	-0.001	-0.003	-0.001	-0.002	-0.001	0.001	-0.002
	(0.004)	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)
size51-250	-0.002	-0.004	0.002	-0.005	-0.007	0.002	-0.003	-0.004	-0.002
	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)
size251-	-0.005	-0.008	0.002	-0.007	-0.008*	0.001	-0.006	-0.008*	-0.002
	(0.004)	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
age	-0.000	-0.000	-0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.006)	(0.005)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	1974	1974	1974	2039	2039	2039	1974	1974	1974
Sector x Year	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector x District	YES	YES	YES	YES	YES	YES	YES	YES	YES
First-stage statistics:									
Kleibergen-Paap F-test	56.72			20.03			33.75		
Sargan test	-			-			0451		
pvalue	-			-			*0.502*		

Notes: Robust standard errors in parenthesis are clustered at the district level.
 ***significant at 1%, **significant at 5%, *significant at 10%.

Table 6. First stage regressions and reduced form regressions:
The effect of labour trial length on job flows

Dep. Variable:	First stage regressions	Reduced form regressions		
	length	JR	JD	JC
	(1)	(2)	(3)	(4)
Instrument: Judges' vacant positions				
Vacant positions	0.009***	-0.001**	-0.001*	0.000
	(0.003)	(0.000)	(0.000)	(0.000)
Instrument: PA rate of appeal				
PA rate of appeal	0.034***	-0.002*	-0.002**	0.000
	(0.007)	(0.001)	(0.001)	(0.001)
Instruments: Judges' vacant position & PA rate of appeal				
Vacant positions	0.007***	-0.001**	-0.001*	0.000
	(0.003)	(0.000)	(0.000)	(0.000)
PA rate of appeal	0.026***	-0.001	-0.002*	0.000
	(0.007)	(0.001)	(0.001)	(0.001)

Notes: All the regressions also include civil length, income, age and size
dummies. Robust standard errors in parenthesis.
 ***significant at 1%, **significant at 5%, *significant at 10%.

Table 7. The effect of labour trial length on job flows: OLS regressions

	JR	JD	JC
	(1)	(2)	(3)
length	-0.015***	-0.007	-0.008**
	(0.004)	(0.004)	(0.003)
civil length	0.024	0.026*	-0.002
	(0.016)	(0.016)	(0.011)
income	0.010	-0.012	0.022
	(0.017)	(0.030)	(0.026)
size16-50	-0.004	-0.004	-0.001
	(0.003)	(0.005)	(0.002)
size51-250	-0.006	-0.008**	0.002
	(0.004)	(0.004)	(0.003)
size251-	-0.007	-0.008	0.001
	(0.005)	(0.006)	(0.004)
age	-0.000	-0.000	-0.00
	(0.000)	(0.000)	(0.000)
r2	0.686	0.550	0.553
N	2039	2039	2039
Sector x Year	YES	YES	YES
Sector x District	YES	YES	YES

Notes: Robust standard errors in parenthesis are clustered at the district level.
 ***significant at 1%, **significant at 5%, *significant at 10%.

Table 8. The effect of labour trial length on firm productivity: IV regressions

Instrument(s):	Judges' vacant positions			PA rate of appeal			Judges' vacant positions & PA rate of appeal		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
length	-0.019	0.010	-	-0.014	0.003	-	-0.019	0.003	-
	(0.099)	(0.032)	-	(0.061)	(0.033)	-	(0.022)	(0.053)	-
length x size		-0.052***	-0.052**		-0.051***	-0.050***		-0.051***	-0.050***
		(0.001)	(0.001)		(0.001)	(0.001)		(0.002)	(0.002)
civil length	-0.055	-0.062**	-	-0.058	-0.054**	-	-0.055	-0.053**	-
	(0.082)	(0.025)	-	(0.017)	(0.025)	-	(0.020)	(0.050)	-
regional income	0.325**	0.359***	-	0.326***	0.345***	-	0.3265***	0.348***	-
	(0.136)	(0.051)	-	(0112)	(0.052)	-	(0.047)	(0.109)	-
Obs.	458145	458145	458145	459479	459479	459479	458145	458145	458145
N. Firms	154658	154658	154658	155115	155115	155115	154658	154658	154658
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector x Year	YES	YES	YES	YES	YES	YES	YES	YES	YES
District x Year	NO	NO	YES	NO	NO	YES	NO	NO	YES
First-stage statistics:									
Kleibergen-Paap F-test	146.7	4303.3	1923.4	380.53	3182.6	3385.5	2541.8	790.3	137.3
Sargan stat.	-	-	-	-	-	-	0.011	2.606	2.558
p-value	-	-	-	-	-	-	*0.991*	*0.271*	*0.109*

Notes: Robust standard errors in parenthesis are clustered at the district level in columns (1) ,(2) , (4), (5), (7) and (8) and at the firm level in columns (3), (6) and (9). All specifications include employment as an indicator of firm size.
***significant at 1%, **significant at 5%, *significant at 10%.

Table 9. First stage regressions and reduced form regressions:
The effect of labour trial length on firm productivity

	First stage regressions			Reduced form regressions	
Dep. Variable:	length	length	length x size	productivity	productivity
Instrument: Judges' vacant positions					
vacancies	0.012***	0.011***	-0.116***	-0.000	0.006
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
vacancies x size		0.003***	0.521***		-0.027***
		(0.000)	(0.002)		(0.001)
Instrument: PA rate of appeal					
Rate of appeal	0.242***	0.243***	-3.711***	-0.003	0.187***
	(0.002)	(0.002)	(0.016)	(0.007)	(0.008)
Rate of appeal x size		-0.003	14.348***		-0.725***
		(0.003)	(0.018)		(0.009)
Instruments: Judges' vacant position & PA rate of appeal					
vacancies	0.011***	0.010***	-0.048***	0.000	0.002***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
vacancies x size		0.003***	0.221***		-0.012***
		(0.000)	(0.001)		(0.001)
Rate of appeal	0.228***	0.234***	-3.402***	-0.004	0.167***
	(0.002)	(0.002)	(0.015)	(0.008)	(0.008)
Rate of appeal x size		-0.026***	12.878***		-0.642***
		(0.003)	(0.019)		(0.010)

Notes: All the regressions also include civil length, regional income, and employment. Robust standard errors in parenthesis.
 ***significant at 1%, **significant at 5%, *significant at 10%.

Table 10. The effect of labour trial length on firm productivity depending on sector flexibility requirement: IV regressions

Instrument(s):	Judges' vacant positions			PA rate of appeal			Judges' vacant positions & PA rate of appeal		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
length x flex	-0.285	-0.188	-0.192	-0.275	-0.171	-0.175	-0.267*	-0.181	-0.172
	(0.253)	(0.248)	(0.248)	(0.252)	(0.246)	(0.240)	(0.157)	(0.155)	(0.154)
length x size	-	-0.052***	-0.013	-	-0.051***	-0.018***	-	-0.050***	-0.018***
	-	(0.001)	(0.007)*	-	(0.001)	(0.003)	-	(0.001)	(0.004)
length x size x flex	-	-	-0.385***	-	-	-0.421***	-	-	-0.321***
	-	-	(0.071)	-	-	(0.052)	-	-	(0.052)
Obs.	458145	458145	458145	459479	459479	459479	458145	458145	458145
N. Firms	154658	154658	154658	155115	155115	155115	154658	154658	154658
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Sector x Year	YES	YES	YES	YES	YES	YES	YES	YES	YES
District x Year	YES	YES	YES	YES	YES	YES	YES	YES	YES
First-stage statistics:									
Kleibergen-Paap F-test	7401.2	3719.4	2539.4	1639.4	1130.4	2680.1	2541.8	790.3	137.3
Sargan stat.	-	-	-	-	-	-	0.010	4.360	5.943
p-value	-	-	-	-	-	-	*0.903*	*0.114*	*0.111*

Notes: Robust standard errors in parenthesis are clustered at the sector –district level in columns (1), (4) and (7) and at the firm level in columns (2), (3), (5), (6), (8) and (9). All specifications include employment.
 ***significant at 1%, **significant at 5%, *significant at 10%.

Table 11: The effect of labour trial length on firm productivity: OLS regressions

Dep. Variable: labour productivity (log)

	(1)	(2)	(3)	(4)	(5)	(6)
length	0.014	0.031				
	(0.013)	(0.006)***				
length × size		-0.053	-0.053		-0.053	-0.020
		(0.001)***	(0.001)***		(0.001)***	(0.005)***
length × flex				-0.203**	-0.087	-0.086
				(0.093)	(0.091)	(0.091)
length × size × flex						-0.328
						(0.045)***
civil length	-0.077	-0.076				
	(0.034)**	(0.016)***				
income	0.348					
	(0.102)***					
size	0.056	0.053	0.053	0.056	0.053	0.053
	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.009)***	(0.008)***
r2	0.036	0.099	0.101	0.038	0.101	0.101
N	311272	311272	311272	311272	311272	311272
Firm FE	YES	YES	YES	YES	YES	YES
Sector x Year	YES	YES	YES	YES	YES	YES
District x Year	NO	NO	YES	YES	YES	YES

Notes: Robust standard errors in parenthesis are clustered at the district level in columns (1) and (2), at the sector- district level in column (3) and at the firm level in columns (3), (5), and (6). All specifications include employment.
 ***significant at 1%, **significant at 5%, *significant at 10%.

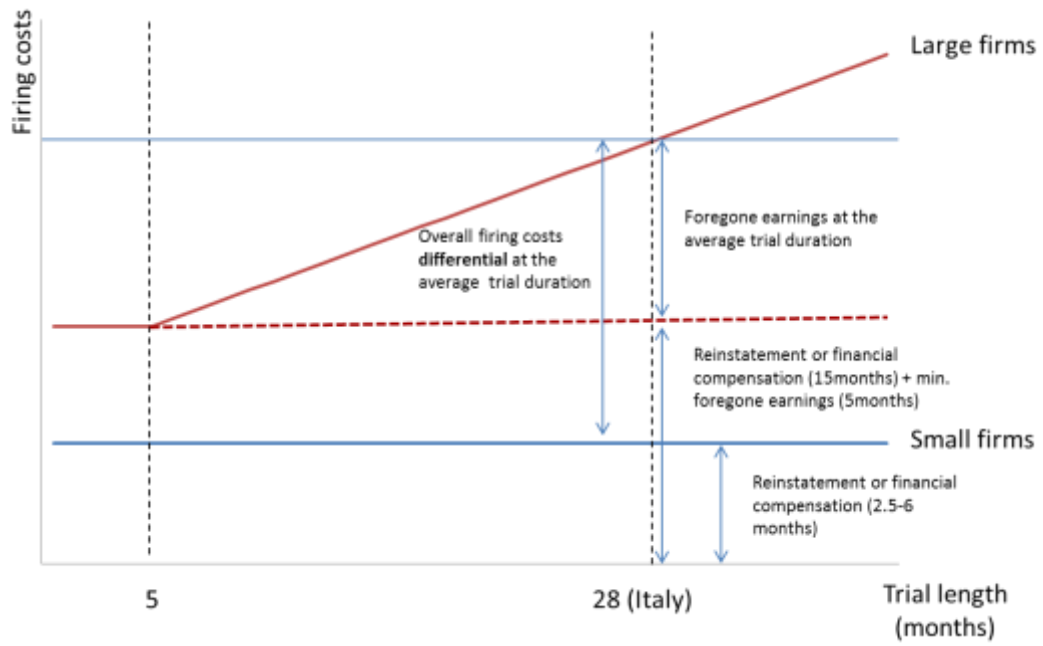Figure 1. Expected firing costs: large versus small firms.

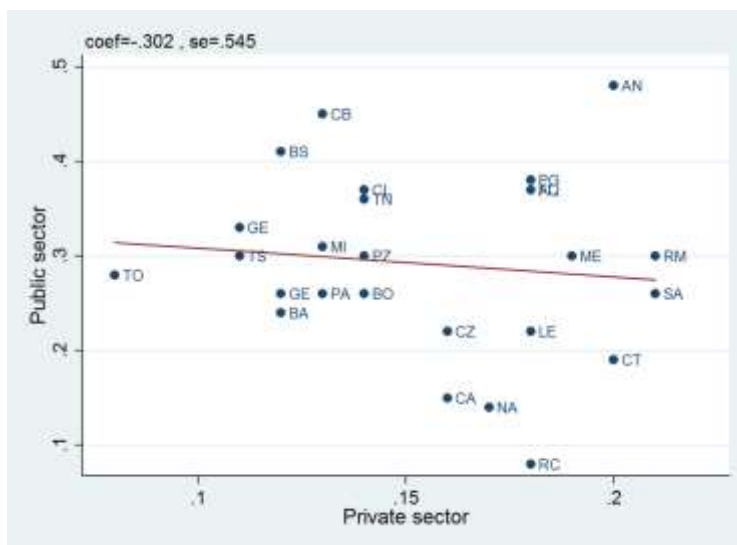Figure 2. Appeal rates of public sector and private sector suits

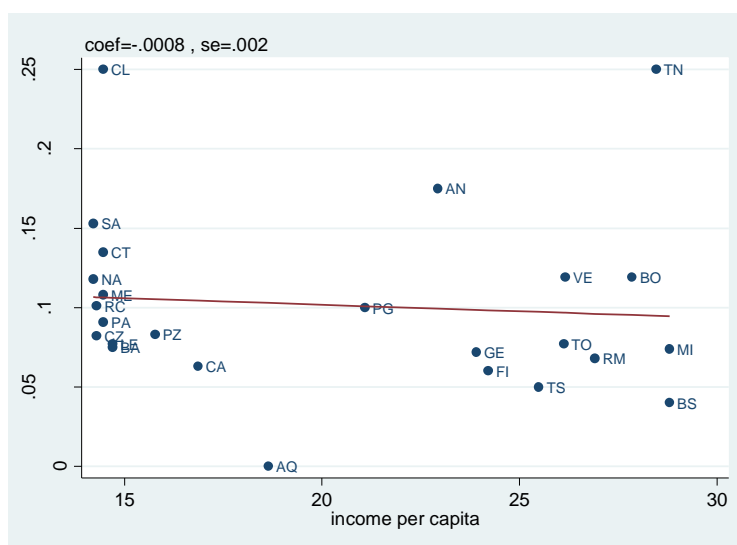Figure 3. Vacancies-judges ratio and per capita income by judicial district
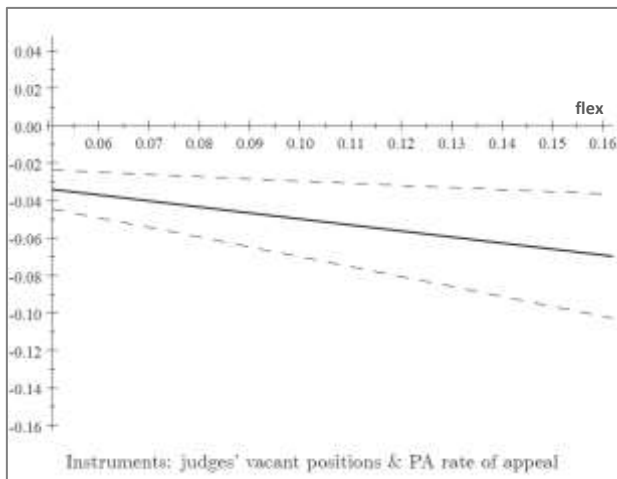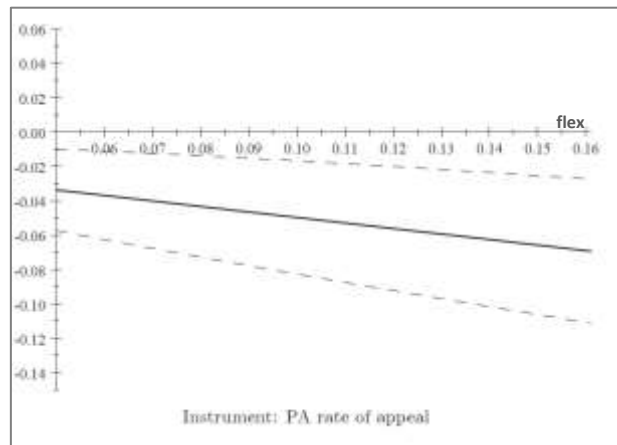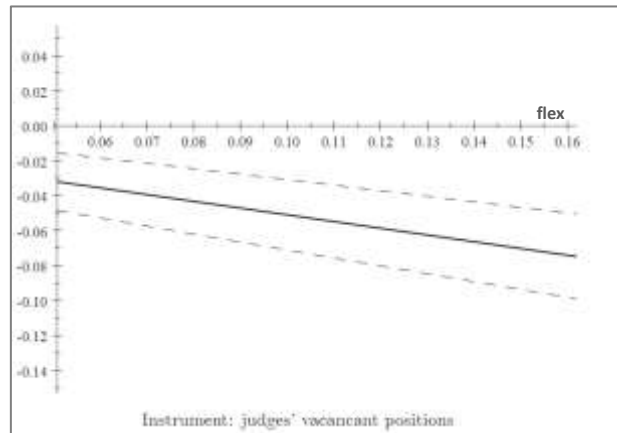
Figure 4. The differential effect of labour trials length for firms above the 15 employees threshold as a function of their flexibility requirement.

Instrument: judges' vacancant positions

Instrument: PA rate of appeal

Instruments: judges' vacant positions & PA rate of appeal

– – – – – – 95% confidence interval

Figure 5. Sensitivity Analysis: Estimated coefficient on labour trial length and 90% confidence intervals, excluding one district or one industry at a time. Job reallocation.
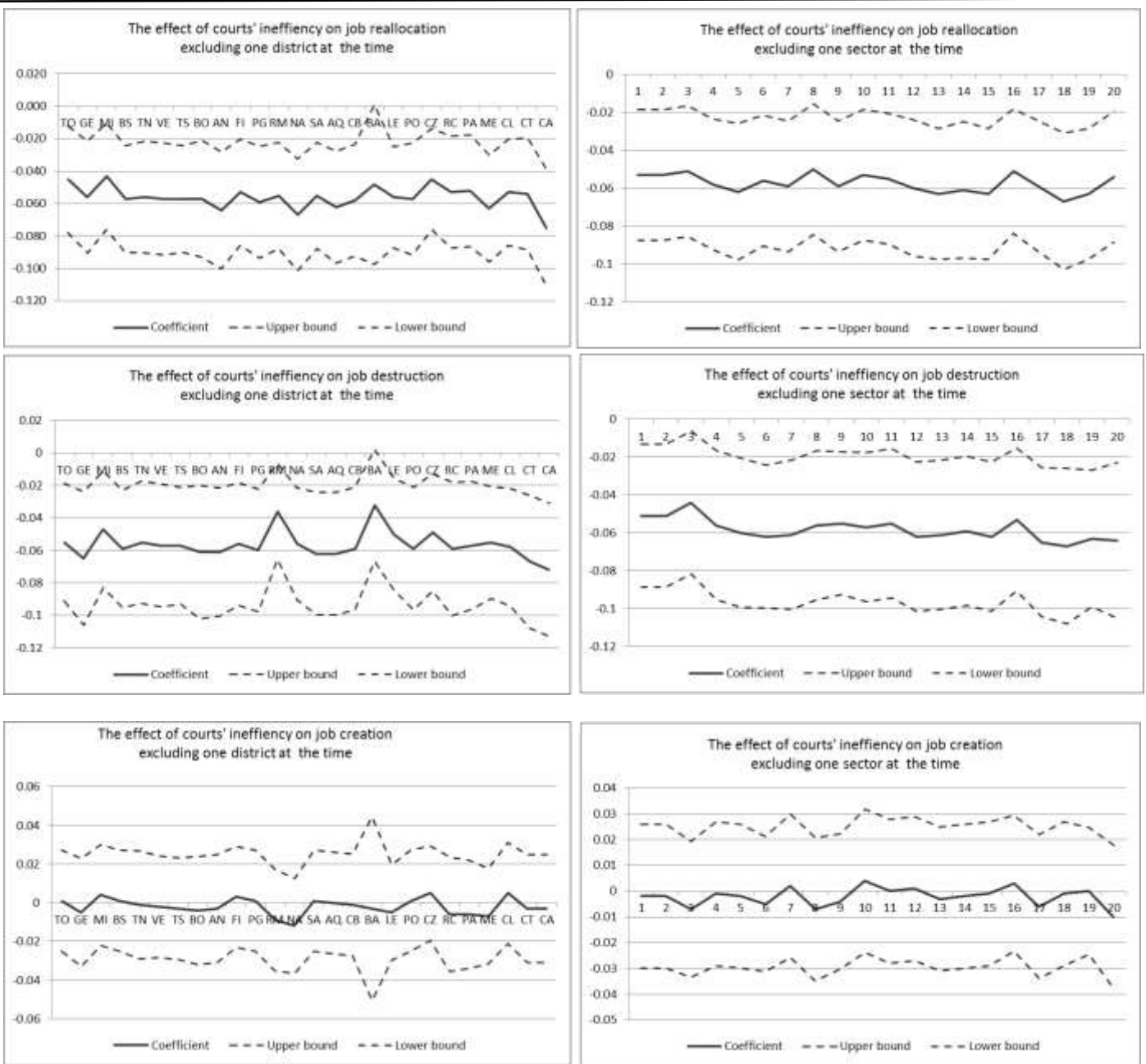
Figure 6. Sensitivity Analysis: Estimated coefficient on labour trial length and 90% confidence intervals, excluding one district or one industry at a time. Job reallocation. Firm productivity