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ABSTRACT

The Impact of Employment Protection on the Industrial Wage Structure*

This paper tests whether the job security offered by stricter employment protection legislation (EPL) undermines positive compensating wage differentials that would otherwise be paid. Specifically, we ask whether industries with relatively more need for layoffs and labour flexibility have lower wages in countries where stricter EPL protects workers from layoffs. We find this generally to be true for a large sample of industries in the major OECD countries over 1984-2005, particularly for wages of unskilled workers. However, we also find that where workers are well organised, they can take advantage of EPL to secure higher wages.

JEL Classification: I24, J31, J41, J50, J63, J83, K31, K51, L51, M50

Keywords: employment protection legislation, labour regulation, compensating wage differentials, education and inequality, labour organisation, layoffs

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1. Introduction

Laws restricting employers' ability to terminate workers raise fundamental issues for the labour market (Epstein 1984). Many countries have such "employment protection laws" (EPL) to answer employee concerns about arbitrary employer behaviour. These concerns are serious, judging for example by the efforts of unions in Italy to preserve the Workers Statute provision that requires reinstatement (not only compensation) of workers adjudged to be unfairly dismissed.[1] Article 30 of the Charter of Fundamental Rights of the EU (Official Journal 2000) also states that: "every worker has the right to protection against unjustified dismissal". Yet limiting firms' rights to downsize has far-reaching implications, and EPL may decrease both employment and earnings. The possible disemployment effects of EPL have been much studied without much consensus (see the review by Piton and Rycx 2018). However, the wage effects of EPL, considered here, are just as important but have received less attention.

EPL changes job security in some industries but not others, implying that wages will adjust to reflect the changes. According to the theory of compensating wage differentials (CWDs), wages adjust downwards because workers accept wage reductions in return for job security. At the same time, those employers in turbulent industries that need employment flexibility will push for wage reductions to reduce costs as EPL takes away this margin of flexibility. These industries originally attracted workers to their high layoff jobs by paying the higher wages associated with compensating differentials. If wages adjust downwards with EPL, then adverse employment effects should be cushioned, as workers will in a sense be paying in part for their extra security. These are far-reaching consequences, and in fact Sherwin Rosen (1986, p 641) has said that the theory of compensating wage differentials may claim to be "the fundamental (long run) equilibrium construct in labor economics". Effects of EPL on the wage structure are thus important both for EPL policy and for labour theory.

In practice, it has proven difficult to test for wage consequences for many reasons discussed below. Of particular concern for the study of EPL, is that it is a countrywide policy. Cross-country comparisons of EPL and wages cannot easily be given a causal interpretation. It is true that progress can be made by exploiting variations within the country, for example, when small firms are excluded from EPL we would expect their wages to rise (see Leonardi

[1] Unions can easily put a million people on the streets of Rome (see Povoledo 2014), and similarly in Paris (Nossiter 2016). Politicians reduce EPL at their peril as shown by the murder of Marco Biagi (Paparella and Rinolfi, 2002)

and Pica 2013). However, our paper pursues a different method of identification, using industry variation within countries to devise a test. We take advantage of the industry-based EU KLEMS dataset (O'Mahony and Timmer 2009) to use variation within industry and countries in an approach first proposed by Rajan and Zingales (1998). Our industry variation follows Topel's (1984) idea that a fundamental characteristic of a job is its unemployment risk as proxied by its industry layoff rate. Then if a country's EPL becomes stricter, it follows that the industries with intrinsically high layoff rates that "need" employment flexibility (see Bassanini et al. 2009 and 2013; also Micco and Pages 2006) will push for lower wages. For their part, workers in these industries should be willing to accept lower wages given the newly lower unemployment risk.

To proxy an industry's technological need for layoffs, we use industry data on layoff rates from the US and UK under the assumption that the more flexible labour markets in these countries best reflect an industry's intrinsic employment risks. In these countries, the Fabricated Metals industry, for example, is dynamic with high layoff rates (see Table 3 below) implying strict EPL should make labour adjustment costly. On the other hand, the utilities such as Electricity and Gas should be relatively unaffected because they are stable with an intrinsically low layoff rate. We assume that the same industries in high EPL countries have the same intrinsic need for layoffs (though their actual layoff rates are lowered by EPL – see below). Thus, we predict that industries with higher needs have lower wages in countries with high EPL. [2]

For example, an industry such as Fabricated Metals, with intrinsically high layoffs, should have relatively higher wages than utilities, with much less need, in countries with less strict EPL (we use the OECD measure, explained below). As an illustration, Table 1a compares Austria with high EPL, and Denmark with low EPL. We see in the top panel, that Denmark's Fabricated Metals log hourly wage was 2.9, similar to its wage in utilities. However, in Austria the log wage in Fabricated Metals was only 2.53, which is 28 points lower than in utilities. This simple comparison illustrates how EPL may affect relative wages of industries in the way predicted. We test for this result systematically below.

[2] In the finance literature, Alimov (2015) uses the country-industry interaction method to show that high labour turnover industries have to pay more for bank loans in countries with high EPL. Related research by Caballero et al (2013) and Haltiwanger et al. (2014) applies the method to show EPL reduces industry job flows, and Caroli and Godard (2013) show EPL improves some measures of health.

Closer examination reveals the importance of a further factor: worker organisation. It is likely to be the case that strongly organised workers can use the security provided by EPL to negotiate higher wages (Martins 2009, Van der Wiel 2010, Weinschenk 2017). Then, far from decreasing, wages can increase with EPL. In our empirical work, we develop an index of worker organisation based on the percentage of firms in an industry that have formal works councils, interacting this with the coverage of collective agreements (an economy-wide variable). We find that the reaction of wages to EPL is indeed sensitive to worker organisation, particularly for unskilled workers, which is reasonable. This finding helps reconcile the literature's divergent results from country studies of the reaction of wages to EPL, since some countries have higher levels of worker organisation than do others.

In the following, we first set out a competitive framework to introduce the concept of CWDs and show how they interact with EPL. We then survey the literature's results on CWDs associated with job security, using the results to build our estimating equations as discussed in section 4. In the remaining sections, we discuss the data and present the results.

2. The literature and our hypotheses

EPL raises the costs that firms face when terminating workers, and supply and demand factors each then point to a wage fall, given competition. EPL reduces the pain of job loss by requiring extra severance pay, and also reduces the probability of loss *per se* by requiring extra procedures such as consultation over "unfair" grounds for dismissal (see Venn 2009). Still, since the expected value of job loss is reduced by both methods, we can take them together as improving employment security. Stricter EPL should then mean that workers accept lower wages in accordance with Adam Smith's (1977) famous discussion of equalising wage differences. But how much lower? Competitive theory (see Rosen 1986 or Lazear 1990) predicts that the equalising wage difference depends upon the distribution of preferences for job security, and the reservation wage of workers close to the margin of choice within this distribution. As security is improved, the more risk-averse workers will sort into the industry (as in the Carpenter et al. (2017) experiments discussed below). Importantly, those with higher human capital will also sort into the industry since good job security is a "normal" good (see

Hwang et al 1992)[3]. This is a problem for causal inference, because aspects of human capital such as ability and motivation are not fully measurable, and their omission makes job security endogenous in the wage equation. In other words, as job security is improved, more able and higher earning workers will move into the industry and push up wages, damping down the wage fall due to the change in the nature of the job itself.

On the demand side, EPL can be seen as a form of tax on terminations (see Summers 1989, and more recently Almeida and Carneiro 2012). To paraphrase Rosen (1986), high layoff rates must be productive if they are observed in the market, and hence they cannot be cheaply reduced. A firm will compare the costs of reducing layoffs, given its technology, with the savings in labour costs. Then, if it is compelled to reduce layoffs and/or pay more for reducing them, the implication is that the increased costs of reducing layoffs outweigh the lower costs associated with reduced wages, so overall costs must rise due to EPL. We would therefore expect the demand for workers to fall. In a competitive market, the decline in demand and increase in supply will mean a decline in wages. If the cost to firms of the stricter EPL equals the value to workers (see Almeida and Carneiro 2012 for a simple model), then the decline in wages measures the value to the marginal workers of the new EPL, and there will be no change in employment. However, if firm costs are higher than worker valuations of the new benefits, employment will fall, and the decline in wages will overstate the value of EPL to the workers. As noted above, in fact research on EPL's employment effects is contentious because its effects happen with long lags, up to 5 years (Holt and Hendrickson 2017). The important point remains that a fall in wages consequent upon EPL could be due to both the tax effect on employers and changes in the value of the job to workers. Yet, EPL has clearly made the previously high lay-off and low layoff jobs more similar and the resulting matching by workers and firms should shrink the wage differences between them.

Our hypothesis then is that strict EPL reduces the difference in wages between industries with intrinsically low layoff rates such as utilities, and industries with intrinsically high rates such as Fabricated Metals. Prior to EPL, the industries with low layoff rates offer job security and pay lower wages, ceteris paribus, than industries with high layoff rates. As noted, the difference in wages gives the CWD required to persuade individuals at the margin – with

[3] The demand for health spending, for example, increases with earnings (see Hall and Jones 2007). Leon and Miguel (2013) also find a relatively low demand for workplace safety in less developed countries, which they attribute to lower earnings.

just low enough aversion to layoff risk - to work in the insecure industries. These must pay the higher wages since they cannot provide lower layoffs as cheaply as, say, utilities. Yet, when required by stricter EPL to provide lower layoffs, the jobs in these industries will be viewed by workers as more nearly similar to utilities and the need to pay a compensating differential will be reduced. Thus, the classic theory of equalising wage differences predicts that the wage difference between the intrinsically secure and insecure industries will fall with stricter EPL. At the same time, as noted, to correctly interpret wage declines following stricter EPL as revealing a CWD, we must also take account of employment changes.

It is also important to allow for worker skill differences, for several reasons. First, the unskilled are more likely to work in the high risk industries, and so will be more affected by EPL. It is their wages that can be expected to vary most. Second, as discussed, stricter EPL can be expected to attract the skilled to work in risky industries. Hence, strict EPL countries can be expected to have a more skilled workforce in risky industries than low EPL countries, and it is necessary to allow for this (which we do using worker education). Third, and related, on the demand side, strict EPL is likely to cause employers to become more selective and raise their hiring/promotion standards into permanent jobs (see Kahn 2018, also Daniel and Siebert, 2005). Unskilled workers are less likely to meet these standards, providing is a further force to bring skilled workers into the risky industries when EPL is strict[4]. In sum, we hypothesise that EPL's effect in reducing the wage difference between naturally secure and insecure industries will be exhibited mainly in unskilled wages.

The empirical literature has generally not tied EPL influences to the structure of wages. This gap might be expected since not only is EPL difficult to measure, but so are the determinants of wages – inadequate control meaning job risk becomes endogenous. Hence, care needs to be taken in individual wage studies to control for ability (Hwang et al., 1992) and all the other wage determining factors, using panel data for example (for an early study using this method, see Duncan and Holmlund, 1983; more recently see Corneliben 2009, and Böckermann et al., 2011), or data on identical twins (Böckermann et al., 2018). An advantage of our industry-based data is that many hard-to-measure individual factors will be averaged out.

[4] As a further effect, Lazear; (1990, p705) predicted that EPL would lower hours worked, since it causes full-timers to be substituted by temps and part-timers (see also Anagnostopoulos and Siebert 2015, and also Cahuc et al 2016), who work fewer annual hours. Below we indeed find EPL generally reduces hours worked with stronger effects for the unskilled.

A related concern is that cross-national differences in other policies such as unemployment insurance (UI) can influence the original pattern of CWDs, since workers are less affected by insecurity if they are insured (as proposed by Topel 1984; see Ellul et al 2018 recently). By focusing on estimates that are within country-industry and over time, we hope to hold such relatively stable cross-country differences constant.

Table 1b gives research findings on equalizing wage differences for job security, starting with the influence of EPL itself on wages. There are not many studies, and results are mixed. Some (e.g. Cervini-Pla et al 2014, Del Bono and Weber 2006, Leonardi and Pica 2013, Ordine et al. 2017) find the expected link between lower EPL and higher wages, but others find no effect (Autor et al. 2006), or even the opposite, as reported by Martins (2009) and Van der Weil (2010). However, as noted above, stricter EPL may make unionised or otherwise organised workers more powerful, because jobs are better protected, and the result is higher wages. This bargaining power explanation is put forward both by Van der Weil (2010) and Martins (2009). At the same time, Bertola's (1990) early classic paper on EPL points to lower wage levels given labour productivity in high EPL countries, just as we hypothesise.

Panel b) considers equalising wage differences for job insecurity more broadly. Most striking is Carpenter et al's (2017) recent experiment which demonstrates that laboratory "firms" that offer employment risk are indeed required to pay more, and this CWD falls as expected when risk-tolerant "workers" are allowed to sort into the riskier firms. The fall illustrates Rosen's (1986, p657) point that the measured CWD only represents the marginal worker's valuation of a disamenity, which might be very different from the average, depending upon the distribution of preferences. In contrast to these strong results, the recent study by Yu (2018) given in row 16, finds that job insecurity is associated with lower rather than higher earnings. However, the data here come from 41 disparate countries (e.g. including the Phillipines, Bulgaria and South Africa, together with OECD countries), and there is no time variation. The general point that Panel b) conveys is that tight control of unmeasurables either via panel methods (Bockermann et al 2011, Corneliben et al 2011, Ellul et al 2018), or restriction by occupation (Heywood 1989 or Moretti 2000) is necessary. One also needs to allow for plausible moderating influences on the CWD, in particular worker skill and worker power- noting that the power of organisation is itself difficult to measure (union density being misleading).

3. Equation Specification and Implementation

Our initial analysis focuses on the impact of EPL on wages with the following specification:

$$lnw_{cit} = \alpha + \beta_1 EPLlay_{cit}^{base} + \gamma' \mathbf{X}_{ciT} + \eta_c + \eta_i + \eta_T + \eta_{ci} + \eta_{cT} + \varepsilon_{cit} \qquad (1)$$

Here, w_{ciT} is the real wage for the c-th country, the i-th industry, and T-th period, where we estimate across two periods as explained below. $EPL^{base}{}_{ciT}$ is the product of EPL_{cT}, the time-varying index of regular worker EPL by country and $layoff^{base}{}_{i}$, the i-th industry annual lay-off rate for a base unregulated country such as the United States or the UK; and **X** is a vector of Mincer-type gender, age and education control variables.[5] We expect β_1, the effect of $EPLlay^{base}$, to be negative as is consistent with our CWD interpretation.

An important component in (1) is the extensive set of fixed effect dummies, η, that vary by country, period and industry. The one-way industry, country and period fixed effects η_i, η_c, and η_T are usual for our type of panel data to control for industry, country and period characteristics. Then the two-way country-industry fixed effects variables, η_{ic}, sweep out unmeasured factors influencing wages and EPL within each country-industry pair (ie, changes in education composition of industries with EPL, or unmeasured political influences which might push EPL up and wages down). In other words, we adopt a strict fixed effect specification that also sweeps out economy-wide labour market factors such as unemployment benefits or taxes that are generally included in aggregate labor market studies (e.g. Nickell 1997). Finally, the country-period fixed effects variables, η_{cT}, allow for country-specific period effects such as might follow particular country shocks. (In sensitivity analysis below, we include yet further industry-period fixed effects.) In this saturated model, the variation we explain comes from changes in $EPLlay^{base}$ across periods within country-industry cells.

Given these controls, we expect β_1 to be negative to reflect the loss of the CWD for job insecurity as EPL increases. However, it is necessary also to allow for the power of worker organisation. As noted above, well-organised workers and unions might use strict EPL to raise wages. Hence, we also investigate a specification that allows the EPL effect to vary by level of worker organisation, as shown below:

[5] In some specifications, we also include TFP as a control, to allow for EPL's presumed adverse effects on productivity and thereby labour demand. Some of these results are shown in Table 6 below, and do not change the EPL coefficients materially.

$$ln\, w_{ciT} = \alpha + \beta_1 EPLlay^{base}{}_{ciT} + \beta_2 EPLlay^{base} \times Org_{ciT} + \beta_3 Org_{ciT} + \gamma' \mathbf{X}_{cit} + fixed\ effects + \varepsilon_{ciT} \quad (2)$$

Here, worker organisation power is given by Org, and we expect β_2, the coefficient on the interaction with Org to be positive, leaving β_1 which is the wage effect when Org is zero to be negative, while the effect of organisation power on its own, β_3, should be positive.

Further, we also investigate a specification of (2) which distinguishes between skilled and unskilled workers. This distinction should be important, and in particular we expect unskilled wages to be more responsive to EPL. Moreover, if skilled workers are attracted into previously insecure industries by higher EPL, this move will bias our measures of the decline in CWDs. Keeping skilled and unskilled separate alleviates this problem.

Our index of regular worker EPL uses the OECD measure (see OECD 2004, and Venn 2009) of 21 items concerning the procedures and costs involved in dismissing individuals or groups of workers with open-ended contracts. Procedures include notification and consultation requirements, including consultation of third parties such as works councils. Costs include severance pay, and compensation if a dismissal is found to be unfair (and other administrative and legal difficulties, as envisaged by Epstein 1984). There are also extra delays and costs for collective dismissals. The sub-components are weighted and aggregated to form a composite index ranking from 0 (least strict) to 6 (most strict). This index is widely used in the literature, and available for OECD countries annually, starting in 1984 (described in Venn, 2009). We use "regular" worker EPL, excluding the temporary worker EPL measure as is usual in the literature (e.g. Alimov 2015) [6]. The index is given in Figure 1, which shows the large variation across countries. However, it is clear that the index shows only modest time variation with jumps at discrete periods. Initially, we used the full panel of annual observations in our analysis, but it was evident that standard methods such as the use of autoregressive or error correction models would lead to spurious results when the annual time variation in EPL is most often zero, with large values when the series jumps.

[6] See also Bassanini et al (2009), who show that TFP only responds to regular worker EPL. The OECD also publish a separate indicator for "temporary worker EPL" which measures the costs and difficulties of hiring workers on fixed-term or temporary work agency contracts. However, the idea of protecting temporary workers by putting obstacles in the way of their re-employment is contradictory – thus, the extent of temporary employment does not decline and may even increase with the strictness of temporary worker EPL (see, for example, Booth et al 2002).

Given these time series problems using the annual EPL index, we base our regressions on two cross sections for 1985-94, and 1995-2005, rather than use the annual data (see Nickell's (1997) similar analysis of OECD unemployment). These approximate 10-year averages smooth out noise, and are less affected by the jumpy changes in EPL. They have the added advantage that we do not need to model the timing of the impacts of EPL on wages, which would require strong assumptions (see Sarkar 2013 for different employment models, and also Holt and Hendrickson 2017).

4. Data

We draw data from a number of different sources. Our main source for wages and employment is the EU KLEMS database (O'Mahony and Timmer, 2009), which contains harmonised data on outputs, inputs and productivity on an industry basis annually for a sample of EU countries and the US. Following Bassanini et al (2009) we exclude industries where output is likely to be mis-measured (financial intermediation, and coke, refined petrol and nuclear fuel) including the public sector and sectors with much public sector involvement (health care, education and public administration). We also restrict analysis to the 11 countries (listed in Table 2) which have reliable capital measures, so as to permit calculation of TFP which might be an important control since studies have shown EPL to reduce productivity (see Bassanini et al 2009, and Bjuggren 2018). The final sample covers 19 industries in manufacturing and market services (listed in Table 3) in 11 major OECD economies (including Germany only post-1992), and includes about two-thirds of the average country's workforce. Summary statistics are given in Table 2.

From Table 2 we see that real average hourly wages are $19 (1995 US$) for the whole sample, and much lower for low skilled (defined as those with junior secondary education ending at age 16, $14) than for the high skilled (university or equivalent, $27). From the employment figures we see that the average industry has 8% of its workers in the high skill group, and 28% low skilled, with medium-skill making up the balance. Annual hours worked average 1723 hours per year for the skilled group, similar to the 1727 figure for unskilled, so there is no evidence here of lower labourforce attachment (e.g. part-time or temporary) amongst the unskilled.

Table 2 also shows the important EPL variable, and its interaction with the layoff variable ($EPLlay^{base}$). This central interaction is our measure of the higher involuntary turnover

that makes EPL bite. In practice, we take the average of US and UK layoff rates for each of our industries around 2000[7], as summarised in Table 3. As noted above, high layoff rates as in Textiles (8.17) or Electrical and Optical Equipment (7.33), at the top of the list in Table 3, signify high involuntary turnover, making it cost-effective to pay CWDs. At the other extreme are the utilities, Electricity, Gas and Water (2.7%), which are obviously stable. Similarly, Hotels and Restaurants together with Wholesale and Retail trade (3 to 4%), have high worker voluntary quit rates and thus have far less need to layoff. These industries would offer little in the way of compensating differentials before EPL and should be largely unaffected. About one-third of the workforce in our sample work in industries in the upper quartile of the layoff rate distribution (see Table 3's notes). These are the workers who we argue would be most affected by strict EPL in the absence of worker bargaining power.

We prefer our layoff measure to capture the bite of EPL but note other measures exist. Conti and Sulis (2016) use industry education requirements. The argument here is that industries with highly educated workers are more likely to be near the technology frontier, and have their ability to adjust to technology change hampered by EPL. While plausible, this measure will not do for our purpose since we wish to distinguish the effects of EPL by education. A further possibility is the industry "total worker reallocation rate", the sum of worker hires and separations (used by Bassanini et al 2013). However, this variable exhibits quite a different pattern, since hotels, for example, have high worker reallocation, but most of this is voluntary, so layoffs are low, implying EPL should not matter. The opposite is the case, for example, for Electrical and Optical, which has low worker reallocation, but a high layoff rate. We show sensitivity tests with these other variables later.

Considering worker bargaining power next, relevant variables are also summarised in Table 2. Worker bargaining power is likely to be important but cannot be measured by union density (averaging 37%) which in practice varies almost inversely with collective bargaining coverage (averaging 74%). The variable we construct measures formal employee representation in works councils or similar bodies (ECS 2009). This variable is only available for 2008[8], but

[7] The US rates are averaged for 2001-03, and the UK for 1997-2003, as listed in Bassanini et al (2008, Table A3), and have a high rank correlation, 0.87. Note that layoff rates outside the UK and US are lower, as expected: the average layoff rate for France and Germany is only 2.8%, compared with the UK and US average of 4.9% (see OECD 2009, chapter 2). Below (Table 6) we report sensitivity analyses using different layoff and related dismissal measures.

[8] The variable we use indicates whether the firm has a formal employee representative, including whether there is a representative at the headquarters in the case of a multi-site organisation. It is available only for 8 broad industry

has country and industry variation, and as can be seen 45% of firms in the average industry have such representation. We then interact this variable with Visser's (2009) measure of collective bargaining coverage to give a country-industry-time varying bargaining power variable. Figure 2's scatter of this variable against EPL aids interpretation, and we see for example that Finland, Belgium, Austria and the Netherlands have some industries at the highest end, around 8, while the UK and particularly the US (due to low national bargaining coverage) gather at the other end. Country/industries with high worker power tend also to have strict EPL, but there remains wide variation.

Given that EPL is measured as an ordinal index - based on categories and country rankings - it is useful to map it onto a cardinal variable such as severance pay, the focus variable for Lazear's (1990) original study. Figure 3 shows a reasonably close link. A movement of the EPL index from 1 to 2 corresponds to about 6 months extra severance pay for a "deserving" individual who is dismissed. While we do not use this mapping in the empirical analysis, it conveys what a unit change in EPL might mean in practice.

5. Results

Total workforce wage effects.

We begin with results for the total workforce, and take up the expected stronger effects for unskilled workers in the next section. Table 4 presents the results for the total workforce for both hourly and annual wages. The difference between these two measures is annual average hours per worker that can also be affected by EPL as discussed later. We start in column 1 with a parsimonious specification as in equation (1), excluding the $EPLlay^{base}\times Org$ term, and using a simple set of country, industry and time dummies. We see that the $EPllay^{base}$ coefficient is then essentially zero, 0.001. There is much the same result when we separately add the full set of industry × country, and country × period fixed effects in column 2, or the $EPLlay^{base}\times Org$ control in column 3. However, as shown in column 4, when we add both the full set of dummies and the $EPLlay^{base}\times Org$ variable as in our equation (2), we obtain highly significant coefficients for $EPLlay^{base}$, -0.036, and for $EPLlay^{base}\times Org$, 0.008. The same pattern is apparent for annual wages in column 5 which shows a negative coefficient for $EPLlay^{base}$, -0.050,

sectors, running the manufacturing industries into one – but retains the essential distinction between manufacturing, services, construction and utilities. This variable is weighted using the dataset's proportional weighting factor, and averaged over the industry. The EU survey did not cover the USA, so we use BLS union density data by industry as the measure of worker union power. This variable has the important industry union variation that we require, in particular registering the lower (higher) worker power within services (utilities) relative to manufacturing.

counterbalanced by positive for $EPLlay^{base} \times Org$, 0.009. Thus, our preferred specification (although we will provide many sensitivity tests) points to EPL compressing the wage structure, as hypothesised.

The $EPLlay^{base}$ coefficient results from interaction of two continuous variables and deserves careful interpretation. It is simplest to take unit changes in both variables. Conveniently, a unit change in EPL corresponds approximately to the inter-quartile range across the country EPL distribution. The country at the 25^{th} percentile of the EPL distribution is Denmark and the country at the 75^{th} percentile is Austria, so we can think of comparing these countries to give the unit variation in EPL, which is about 6 months severance pay as noted. As for the $layoff^{base}$ variable, a unit change is one percentage point along the layoff rate distribution shown in Table 3, corresponding for example to the difference between Food Beverages and Tobacco (3.50 per cent annually), and Transport Equipment (4.54 per cent). Then the hourly wages coefficient for $EPLlay^{base}$ in column 4, -0.036, implies that wages fall by -3.6% for unit changes in EPL and layoff rates, when worker organisation is low (Org=0). In the simple case, Food Beverages and Tobacco are unaffected by EPL in both Denmark and Austria, and so have the same wage level. Hence, our estimates imply that Transport Equipment has projected annual wages that are 3.6% lower in Austria than in Denmark, holding constant the effect of worker organisation.

Bringing in worker organisation takes account of the possibility that better organised workers can exploit strict EPL to negotiate higher wages. Column 4's estimates show that the effect of EPL on the hourly wage becomes zero when Org= 4.5 (=0.036/0.008), which is at about the median of our observations. In other words, high organisation prevents wages falling with EPL in high layoff industries, as would be expected from the bargaining power theory.

The other coefficients in Table 4 look reasonable. We see that hourly wages show a positive and nearly significant reaction to worker organisational power in most specifications. The large negative coefficient for the female employment share disappears in our preferred specification in columns 4 and 5. The age and skill effects are as expected. A high proportion of older workers in a country-industry significantly increases wages when controlling for all the fixed effects, as does a high proportion of high-skilled workers.

Skilled vs unskilled. As noted, it is important to distinguish between high and low skilled groups, since EPL is arguably more relevant to the low skilled. Also worker organisation is more relevant for them. Results for the skilled are shown in Table 5a, and for the unskilled in Table 5b. As before, we present a range of specifications, from the simple to the full. We see in Table 5a that $EPLlay^{base}$ has a weak effect on skilled hourly wages, even in the fullest specification, shown in column 4, suggesting there is no CWD here. For annual wages, EPL effects are stronger and in column 5 we see the familiar pattern of a negative $EPLlay^{base}$ coefficient, -0.036, counterbalanced by a positive interaction, 0.004. The indication here is therefore that EPL for skilled workers only affects annual hours worked.[9]

The lack of skilled hourly wage variation with EPL is shown graphically in Figure 4a. We see clearly that the reduction in skilled hourly wages with EPL is not significant at any level of worker organisation. Worker organisation also has little effect, as might be expected. On the other hand, Figure 4b shows that the skilled annual wage is reduced significantly by EPL, whatever the level of worker organisation, as we have noted.

Results for unskilled workers are very different. Table 5b shows marked effects of EPL on hourly wages when using the full set of controls. In column 4, the $EPLlay^{base}$ coefficient is -0.045, implying a 4.5% fall in hourly wages per unit change in EPL (as usual, given a unit difference in industry layoff rates) when worker organisation is zero. At the same time, as worker organisation increases, the large coefficient on $EPLlay^{base}\times$Org, 0.010, takes hold. Figure 4a shows that the more than 4% reduction in wages associated with EPL at low levels of organisation turns to a significant 3% increase at high levels. For unskilled workers there is thus arguably a CWD effect at low organisation levels, with a strong countervailing effect when worker organisation strengthens.

Unskilled annual wages, like skilled, are somewhat more sensitive to EPL than hourly wages. This again points to the reduced working hours caused by strict EPL when organisation is low. Column 5 shows large coefficients on $EPLlay^{base}$, -0.062, and on $EPLlay^{base}\times$Org, 0.021. Figure 4b illustrates. The annual wage reduction accompanying a unit change in EPL (given the unit difference in industry layoff rates) is now about 6% at low levels of organisation, moving

[9] W = A/H where W = hourly wages, A = annual wages and H = annual hours worked, so lnH = lnA – lnW Thus differences in annual and hourly wage changes with EPL simply show how hours worked change

towards a positive 1% at high levels. Hence, for unorganised unskilled workers, EPL brings both a fall in hours and a reduction in hourly wages. On the other hand, highly organised unskilled workers are not disadvantaged by EPL, since their annual earnings may even increase (Figure 4b), implying that any changes in hourly rates and working hours reinforce each other.

Changes in annual hours worked associated with EPL are interesting. It is true that the changes in (log) annual and hourly earnings already discussed are all that we need, since changes in hours worked are simply the difference. Still, it is convenient to have a clear picture of hours. Figure 4c gives the relevant graph (from the regressions in Appendix Table A1). We see that skilled and unskilled hours are both reduced in much the same way by EPL. The fall is about -1.5% at low levels of organisation, fading to around zero at high levels. Thus, we have different hourly wage movements with EPL for skilled and unskilled, yet similar annual hours worked movements, which is difficult to reconcile with a simple "two tier" labour market theory.

Three caveats need to be entered at this point. First, total hours worked by unskilled workers appear to decline much more than skilled with EPL The picture is given in Figure 4d, and we see that the decline is over 10% at low levels of organisation, almost twice as much as skilled hours. Unskilled workers are more severely affected in this sense. The second caveat is that employment is difficult to model. Strict EPL might not affect total employment but rather cause a substitution of temporary for permanent work (Cahuc et al 2016), and there are anyway long lags (Holt and Hendrickson 2017). Our estimates for hours worked per worker, and total hours worked are therefore exploratory. Third, it must be remembered that our organisation power variable does not have a skill dimension. We are more likely to be misled in measuring worker organisation effects for the skilled labour market where worker power is less relevant. In sum, we have good evidence that the unskilled hourly wage structure is compressed by EPL, but less strong evidence about differential employment effects, so cannot come to a definite conclusion about "two tier" markets. Still the balance of the evidence points to unskilled markets being more affected by EPL than skilled, as hypothesised.

Sensitivity.

We now establish whether our results are robust to alternative measure of layoffs, to alternative specifications and also to including TFP as a control since TFP influences wages. Table 6 shows several experiments using different measures of the layoff rate, or the dismissal rate

(also an alternative measure of involuntary turnover), or the total worker reallocation rate (the sum of hires and separations), or layoff rates for French and German industries. These last two should be wrong (and so are placebo tests), since these layoff rates include mainly voluntary movements.

Row 1 repeats the results from Table 4 and 5, for unskilled hourly and total annual wages for convenience. Here we used the average of UK and US layoff rates as our measure of baseline involuntary turnover. In row 2, we repeat the estimation, using exactly the same (full) specification, this time including TFP as a control. As can be seen, we obtain similar results with a significant negative coefficient for annual wages, -0.056, on the cross-product with EPL, and a positive coefficient, 0.011, on the triple product including Org. Coefficients for hourly wages are also similar. Row 2a repeats row 1's specification and includes a full set of industry×period dummies, again with little change Next, in row 3, we repeat the regression, this time using the US layoff rate alone. Here, we again obtain similar annual wage results with a significant negative coefficient, -0.034, on the cross product with EPL, and a positive coefficient, 0.006, on the triple product. Again, the hourly wage coefficients are similar. Row 4 repeats the exercise excluding the US, in case of contamination since US layoff rates are used in conjunction with US wage and employment data. However, the results are nearly identical. Rows 5 and 6 repeat the procedure, this time using UK layoff rates, and again we have similar results.

In the final rows of Table 6, we turn to completely different measures of worker terminations. In row 7, we use the industry dismissal rates as published by Bassanini et al (2013), and find similar basic results, which is appropriate since dismissals are involuntary. Row 8 then shows findings using the dismissal rates as published by Caroli et al (2014), again with no substantive change. Finally, the penultimate row demonstrate what happens when we use the industry total worker reallocation rates, which measure total turnover in the industry, voluntary and involuntary. As discussed, the problem here is that some industries such as hotels have high worker turnover, but much of this is voluntary, and so firms in the industry are not constrained by EPL. As we can see, using this variable, the effects of EPL are zero. We take this as a placebo test, as a largely voluntary measure should not capture where EPL bites. Finally, in row 10 we use French and German industry layoff rates. Results are insignificant as expected since layoffs in these countries are affected by EPL, and largely reflect voluntary

movement. Hence, we conclude that our results are robust to sensible definitions and show the wage effects of EPL's restrictions on firms' freedom to dismiss.

6. Conclusions

We set out to investigate the effect of EPL on a country's industrial wage structure. Our reasoning has been based on the observation that jobs with a high risk of layoff require high compensation, other things equal. These added wages are the reason workers accept otherwise equal jobs with a higher risk of layoff. The aim of EPL is to reduce this risk. EPL should therefore reduce the difference across industries in layoff rates, and so reduce the need for CWDs for layoff risk. Specifically, we have hypothesized that EPL reduces the difference in wages between turbulent industries with intrinsically high layoff rates, where EPL bites, and industries with low rates.

To test this prediction, we use a new methodology based on within-country differences between industries over time, and we have four main results. First, given low worker organisation, we have found that when EPL goes up, wages indeed go down significantly in the industries with intrinsically high layoff rates. The effect is economically important. At low levels of worker organisation, an extra unit of EPL implies 3.6% lower hourly wages in an industry with a one percentage point higher layoff rate. Actually, the inter-quartile difference in industry layoff rates is two percentage points, so a realistic economic estimate of the EPL effect would be of the order of a 7.2% lower hourly wage in the intrinsically turbulent industries relative to stable industries. This reaction proves remarkably robust to the exact definition of EPL bite as long as one concentrates on involuntary separations, as one should.

Second, we have found that the skilled and unskilled labour markets are distinctly different. Figure 4a demonstrates the marked unskilled hourly wage declines in response to EPL in dynamic industries (holding constant the worker power factor, discussed below). Skilled hourly wages barely move. The marked unskilled wage movement is consistent both with EPL costing more for the unskilled (employers become more selective), and being of more benefit to the unskilled (they, after all, are more likely to be laid off than the skilled). As for the skilled, above we hypothesised that EPL might simply be irrelevant for them, and our hourly wage results are consistent with this.

Third, we have also found that EPL causes a decline in annual hours worked by skilled workers that is similar to that for unskilled (Figure 4c), and this hardly squares with the markets being so different. However, we should also remember that total hours worked by unskilled workers appears to decline much more with EPL than skilled hours (Figure 4d), even though hours per worker move similarly. The decline in unskilled total hours, and hence job opportunities, backs up the two-tier interpretation. Small wage and employment declines with EPL in skilled markets can be explained in terms of EPL bringing definite – though small - costs to firms, and few benefits to skilled workers, which is quite possible. By contrast, in unskilled markets, both firm costs and worker benefits appear large, though firm costs are larger if we are to accept that unskilled employment really falls. More research with larger datasets is required to fully test for differences in skilled and unskilled employment responses to EPL, which is not a distinction usually made in employment studies.

Fourth, we have found that worker organization moderates the effect of EPL. Our results here may help resolve contrary findings in the literature. We find worker groups in high layoff industries, particularly the unskilled, experience a downward movement of wages as EPL becomes stricter, so long as worker power is relatively low. This would be compatible with Leonardi and Pica's (2013) Italian result that relates to small firms, anticipated to have low worker power. At the same time, we find the downward wage effect of EPL is dampened and even reverses as worker power increases. This result would be compatible with the positive link between EPL and wages in Van der Weil's (2010) study for the Netherlands where industries generally exhibit high worker organisation[10]. Our finding that worker organisation prevents wages falling could also account for the marked employment composition effects (substitution of permanent workers by temporary) found in Cahuc et al's (2016) study of France and Spain where worker organisation is high. Inflexible wages cannot act as a cushion here. However, our finding that employment, both skilled and unskilled increases (or at least is stable) with EPL, when organisation is high, does not fit with a story that unskilled temps are edging out the skilled – though the employment effect could be due to extra temporary jobs, or extra small firms. Further research is needed, bringing the important temporary-permanent distinction into the data.

[10] In Italy there is more variation according to our measure of organisation, with low power particularly in construction and wholesale and retail.

Our estimation helps inform the policy trade-offs associated with adopting strict EPL. Reduced layoff probability is obviously a benefit for covered workers, mainly the unskilled (though some would prefer the higher wages). Weighted against this is the need for firms in dynamic industries to reduce earnings given the loss of an important margin of adjustment and flexibility. Given the new inability to trade increased layoff probability for higher wages, workers, specifically less organized workers, will largely accept this wage reduction. It is true that – in addition to reduced wages for less organized permanent workers – we would expect firms to seek additional margins of flexibility such as hiring more temporary and part-time workers and so reducing hours. Here our evidence points to a small decline both in annual hours worked per worker, and a larger decline in total unskilled hours. This suggests that EPL is inefficient in the sense that EPL costs firms more than it is valued by (unskilled) workers. In these circumstances, the decline in wages that we observe will be greater than the value of the increased job security to the workers, ie the CWD. At the same time, it is important to recognise that the decline in wages helps cushion the effects of EPL on unskilled employment, a fact that perhaps has received too little attention.

Finally, there seem clear distributional consequences of the benefits and costs associated with adopting strict EPL. The costs of reduced earnings and hours seem disproportionately borne by the less organized workers and also by the less skilled. The higher skilled are not much affected, so it is easy to see how a coalition in favour of maintaining or strengthening EPL can develop (see Emmenegger 2009). In other words, the original system of CWDs gave less educated workers a way to trade risk for earnings. These are the workers whose wages are reduced, and who now face a risk of becoming temporary workers – in the bottom tier. Those secure workers with greater education are unlikely to have made that trade in the first place, and hence are not affected.

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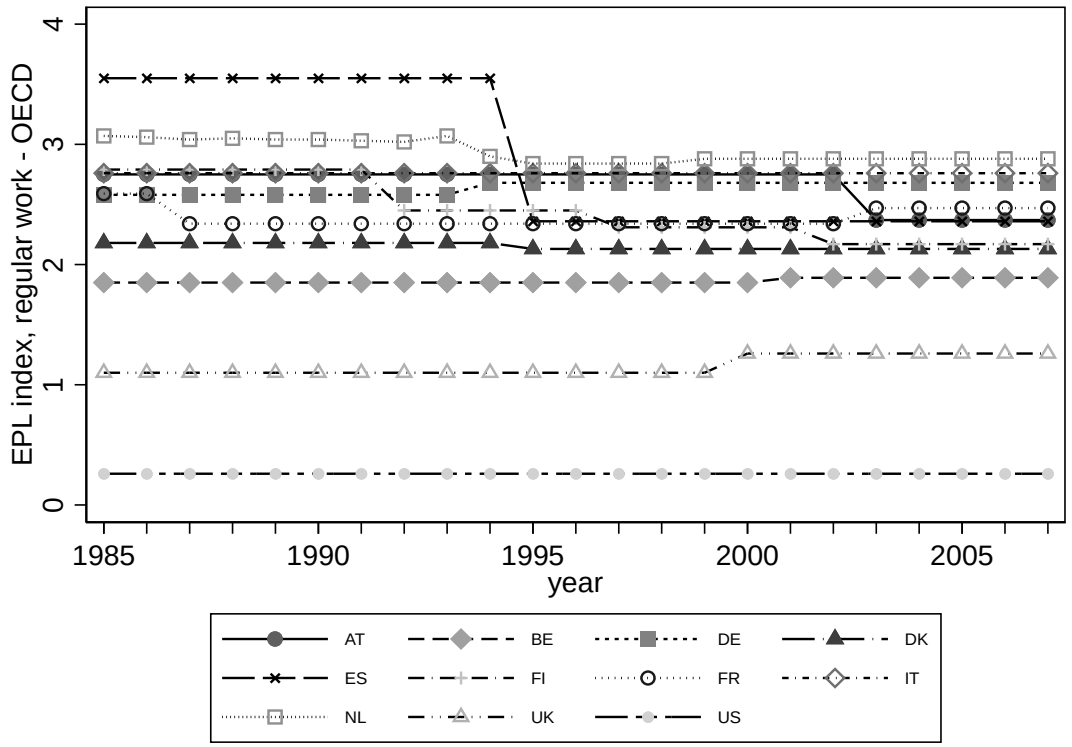

Figure 1: OECD indicator for strictness of dismissal of employees on regular contracts

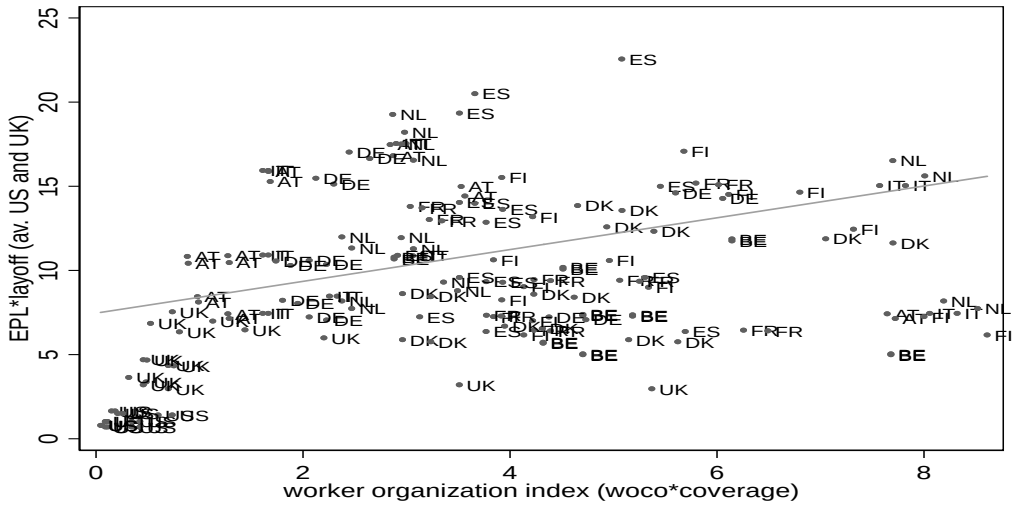

Figure 2: Worker organizational power and EPL, 1st period average (1985-94)
(Note: the European Company Survey, which is the basis for ORG, distinguishes 8 sectors, taking all 12 manufacturing industries as a single sector)

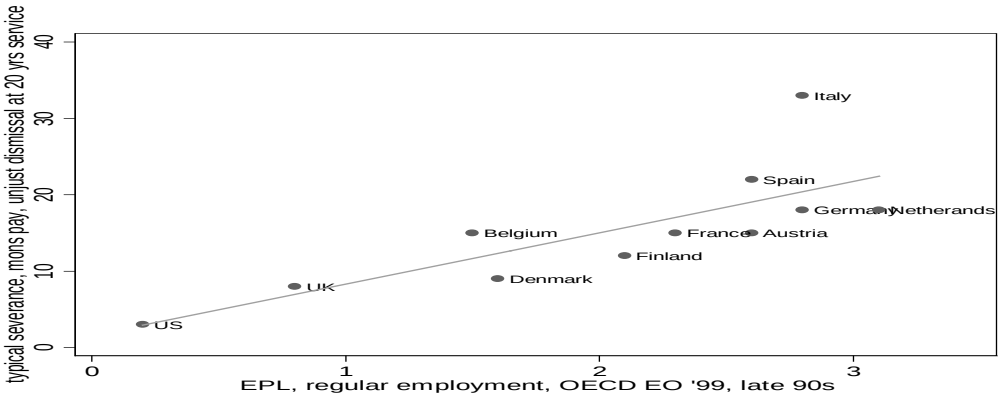

Figure 3: Mapping the EPL index onto Severance Pay

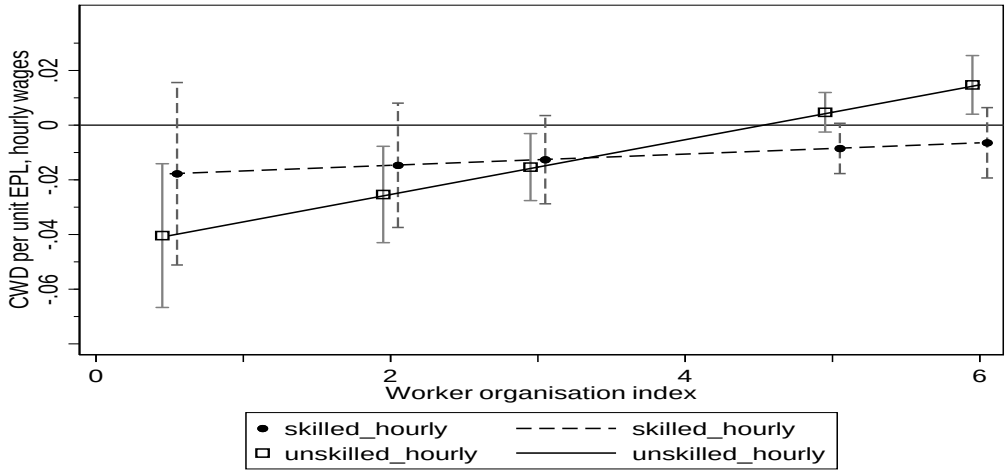

Figure 4a: Marginal effects of EPL with 95% CIs, hourly wages, skilled vs unskilled workers

Note: the points for the Worker Organisation Index correspond to the bottom and top deciles and quartiles, and the median.

Figure 4b: Marginal effects of EPL with 95% CIs, annual wages, skilled vs unskilled workers

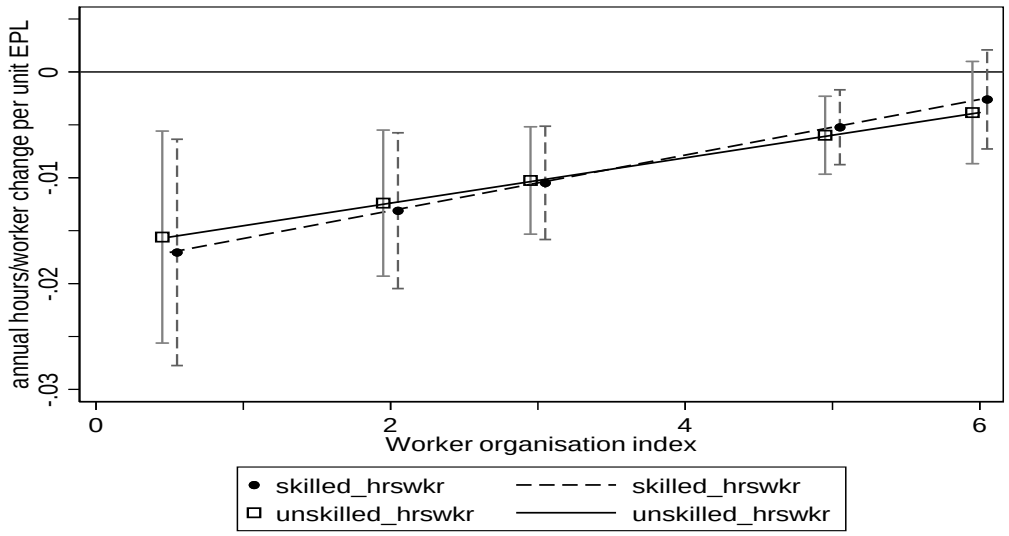

Figure 4c: Marginal effects of EPL with 95% Cis, annual hours/worker, skilled vs unskilled workers

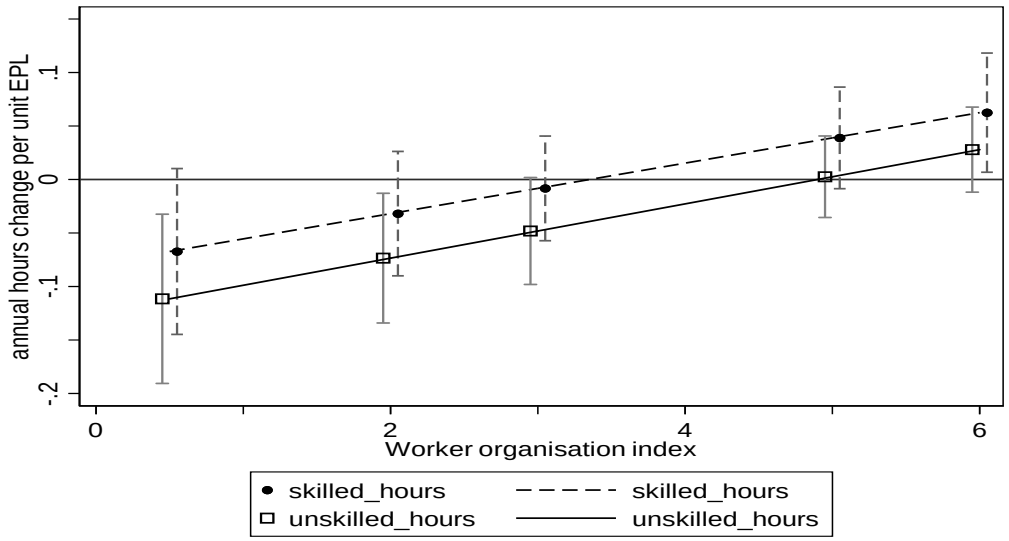

Figure 4d: Marginal effects of EPL with 95% Cis, total hours worked, skilled vs unskilled workers

Notes: Worker organisation varies from 0 (lowest) to 8 (highest) as explained in the text. Datapoints for worker organisation corresponding to the top and bottom percentilesand middle 3 quartiles are shown.

Table 1a: Impact of EPL in high and low layoff industries (an illustration)

Real hourly log wages, unskilled workers, averaged over 1984-2005			
	Denmark (low EPL)	Austria (high EPL)	Difference, Denmark - Austria
Utilities (low layoffs: wages not affected by EPL)	2.84	2.81	0.03
Fabricated metals (high layoffs: wages potentially reduced)	2.90	2.53	0.37
Difference, Metals – Utilities	0.06	-0.28	
Difference in difference			0.34

Notes: Austria is approximately 1 unit higher than Denmark on tne OECD's EPL index in the late 1990s (see Figure 3); Utilities are low layoff, Fabricated metals are high (Table 3).

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Table 1b: Findings for wage differentials linked to job insecurity and EPL

Author	Dataset	Findings
a) Wage Studies of EPL		
1. Autor et al (2006)	US monthly CPS	EPL not linked to wages: State adoption of the implied contract exception to employment at will (i.e., stricter EPL) links to about 1% lower employment-population, but no wage effect
2. Cervini-Pla et al (2014)	Spanish social security data:	Lower EPL and higher wages: increased wages (particularly for new hires) after a reduction in EPL in 1997 caused by lower severance payments for unfair dismissal
3. Del Bono and Weber (2008)	Austrian panel	Lower EPL and higher wages: CWD for seasonal work (which is insecure) is equal to about 11% of the wage
4. Leonardi and Pica (2013)	Italian Social Security data	Lower EPL and higher wages: wage decline in small firms which experienced an increase in EPL in 1990; most wage decline for young blue collars and low wage workers, also new hires
5. Martins (2009)	Annual census of Portuguese firms	Lower EPL and lower wages: smaller wage increase 1991-99 in small firms (<20) whose EPL was reduced in 1989 compared to larger firms whose EPL remained the same
6. Ordine et al (2017)	Italian Work Histories data	Lower EPL and higher wages: permanent workers' wages increased after 1997 law allowed temporary agency work
7. Van der Weil (2010)	Dutch Socio-economic panel	Lower EPL and lower wages: increased wages after an increase in EPL caused by longer notice terms introduced by a new Dutch law in 1999.
b) Wage Studies of job insecurity		
8. Bryson et al (2012)	WERS 2004	Worker anxiety links to higher wages, suggesting a CWD for insecurity; but link remains even controlling for effort suggesting high wages cause anxiety
9. Böckermann et al (2011)	Finnish longitudinal linked employer-employee data	Firms with high worker turnover ("churn") pay a CWD of 2%, though centralised wage bargaining in Finland restricts emergence of higher pay differentials
10. Carpenter et al (2017)	Laboratory experiment	Riskier laboratory "firms" (with 25% chance of failure) pay significantly more than safe, with the difference falling as risk-tolerant "workers" sort into riskier firms.
11. Corneliben (2009)	German Socio-economic panel 1984-2003	CWD for "some worries about job security" implies a pay increase of 90%, with "strong worries" even higher
12. Ellul et al (2018)	Panel of publicly listed firms, 41 countries	Job security is higher (ie., layoffs lower) in family-owned firms, which have a wage discount of up to 6% in country/periods with low UI, the discount falling as UI increases.
13. Heywood (1989)	US QES	Blue-collar workers with previous layoff experience and reporting their job insecure earn 20 percent more
14. Moretti (2000)	US Agricultural Worker Survey 1992-95	Agricultural workers with higher risk of involuntary unemployment earn 15% more.
15. Topel (1984)	US monthly CPS 1977-80	For private sector workers, each point of anticipated unemployment (based on past layoff experience) raises wages 2.5%, the amount falling as UI increases
16. Yu (2017)	International Social Survey Programme, 32 countries, 2005	Higher self-reported job insecurity reduces earnings, controlling for an extensive set of job and individual characteristics

Table 2. - Summary statistics (period: 1985-2005, 11 countries, 19 industries).

	Mean	Std Dev
Hourly wage, (1997 $), all workers	18.9	5.7
Hourly wage, (1997 $), low skill	14.4	4.6
Hourly wage, (1997 $), high skill	27.0	8.9
High skill employment proportion (tertiary education)	0.08	0.07
Low skill employment proportion (lower secondary education)	0.30	0.19
Older worker employment proportion (55 and older)	0.18	0.05
Young worker employment proportion (25 and under)	0.28	0.08
Female worker employment proportion	0.31	0.12
Annual hours/worker - high skill	1,723	218
Annual hours/worker - low skill	1,727	219
EPL index, regular workers	2.19	0.83
$EPLlay^{base}$: interaction of EPL×$layoff^{base}$	10.9	5.4
Cov: collective bargaining coverage (% country labourforce)	74	24
Woco:formal worker representation eg works councils (% firms in industry)	45	23
Worker organisation index (org=cov×woco) (/1000)	3.5	2.1
Interaction: EPL×org	56	35
Union density (%)	37	22
TFP level (1997 $)	2301	1656
Female employment proportion	0.31	0.11
Young worker (<25) proportion	0.28	0.8
Old worker (>55) proportion	0.17	0.05

Notes. The countries in our sample are Austria, Belgium, Denmark, Finland, France, Germany (post 1992), Italy, Netherlands, Spain, the UK and the US. The 19 industries (excluding public sector) are given in Table 3.

The average wage per industry-country-year is calculated from the EU KLEMS figure for nominal labour compensation, using a consumption deflator to convert wages to real terms, and then using a PPP exchange rate, also from EU KLEMS to convert to 1995 US dollars. To derive the hourly wage, total real compensation is divided by total hours.

Headcount is measured as thousands of persons employed per industry.

The EPL measure is the OECD measure, taking a scale of 1-6: see text

EPL×layoff is the cross-product of the regular worker EPL index and the averaged US and UK industry layoff rates (shown in Table 3) – see text.

Collective bargaining coverage (cov), and union density (union) are Visser's measures (2009)

The worker representation measure (woco) is based on the European Company Survey (2009), giving the percent of firms in the industry with formal worker representation, supplemented by union density data by industry in 2000 for the US

Total factor productivity (TFP) is the EU KLEMS measure. The database reports the TFP as an index set at 1997=100 for each industry/country observation. We estimate TFP levels for the US as the ratio of output to weighted inputs for a base year, set equal to 1997. TFP values relative to the US in 1997 then measure values in other countries in the base year (see Inklaar and Timmer 2008). Finally we use the TFP index from EU KLEMS relative to 1997 for each country and industry to estimate TFP levels backwards and forwards in time.

Table 3. – The Sample of industries and the their layoff rates

Code	Industry	Lay-off rates, average UK and US	
17-19	Textiles, Leather and Footwear	8.17	
30-33	Electrical and Optical Equipment	7.33	
20	Wood and Cork Processing	6.59	
36-37	Manufacturing Nec; Recycling	6.36	
F	Construction	5.68	75th percentile
27-28	Basic Metals and Fabricated Metal	5.59	
64	Post and Telecommunication	5.45	
29	Machinery Nec	5.41	
25	Rubber and Plastics	5.23	
26	Other Non-Metallic Mineral	5.11	
34-35	Transport Equipment	4.54	
21-22	Pulp, Paper, Paper , Printing and Publishing	4.42	
51	Wholesale Trade	3.96	
60-63	Transport and Storage	3.94	
24	Chemical Products	3.57	25th percentile
15-16	Food , Beverages and Tobacco	3.50	
H	Hotels and Restaurants	3.07	
52	Retail Trade	2.70	
E	Electricity, Gas and Water Supply	2.70	
Average		4.92	

Notes: US lay off rates are for, 2001-2003, CPS Displaced Worker Supplement (Bassanini et al 2008, Table A3). Layoff is defined as a worker losing his/her job because of plant closing/moving, insufficient work, or position abolished - similar to the UK concept of redundancy.. UK redundancy rates are computed from the Quarterly Labour Force Survey 1997-2003

Memo: Approximately 30% of the workforces across our countries work in industries with intrinsically high potential layoff rates above 5.6**.** "Potential" because in practice layoff rates outside the UK and US are much lower: the average layoff rate for France and Germany is only 2.8% (see OECD 2009, chapter 2).

Table 4: Effects of EPL on real wages, total workforce
(period averages for 1985-94 and 1995-2005)

Dep variable: log real wage	Hourly wage				Annual wage
	1	2	3	4	5
$EPLlay^{base}$	0.001 (0.004)	-0.002 (0.005)	0.007 (0.007)	-0.036*** (0.012)	-0.050*** (0.012)
Worker Organisation (ORG)	0.015* (0.008)-	0.04 (0.03)-	0.04** (0.013)	0.04 (0.03)	0.002 (0.028)
$EPLlay^{base} \times Org$			-0.002 (0.001)	0.008*** (0.003)	0.009*** (0.002)
Female employment proportion	-0.37*** (0.13)	-0.04 (0.18)	-0.36*** (0.13)	0.00 (0.19)	0.05 (0.19)
Age >49 employment proportion	0.21 (0.36)	0.60*** (0.23)	0.17 (0.35)	0.64*** (0.22)	0.70*** (0.20)
Age <30 employment proportion	-0.17 (0.21)	-0.19 (0.16)	-0.21 (0.22)	-0.17 (0.15)	-0.29* (0.16)
High skill employment proportion	0.51** (0.25)	1.37*** (0.26)	0.48** (0.25)	1.4*** (0.24)	1.20*** (0.24)
Low skill employment proportion	-0.44*** (0.15)	0.07 (0.15)	-0.45*** (0.15)	0.14 (0.15)	-0.03 (0.15)
Industry, country and period dummies	YES		YES		
Industry × country, and country×period dummies		YES		YES	YES
R^2	0.793	0.984	0.794	0.985	0.986

Observations 418

Notes: All regressions are estimated via Stata's PCSE (panel-corrected standard errors) programme, using fixed effects, with correction for heteroscedasticity. Two time periods are used, 1985-1994 and 1995-2005. Standard errors are given in parentheses, with *** p<0.01, ** p<0.05, * p<0.1.

Proportions correspond to the given skill category, e.g. female skilled (low-skilled) employment proportion among all high (low) skill workers in the high (low) skill wage regression. Similarly, for example, the young (<30) proportion in the high skill regression is the skilled young as a proportion of all skilled.

Skill is measured by education, with high-skilled (low-skilled) have tertiary (lower-secondary) education, and the medium-skilled are in between, not shown.

Table 5a: Effects of EPL on real wages, Skilled
(period averages for 1985-94 and 1995-2005)

Dep variable:log real wage	Hourly wage				Annual wage
	1	2	3	4	5
$EPLlay^{base}$	-0.006 (0.005)	-0.010** (0.005)	0.006 (0.008)	-0.020 (0.019)	-0.036** (0.017)
Worker Organisation (ORG)	0.005 (0.010)-	-0.015 (0.05)-	0.039* (0.02)	-0.018 (0.044)	-0.046 (0.042)
$EPLlay^{base} \times Org$	-		-0.002* (0.001)	0.002 (0.004)	0.004 (0.003)
Female employment proportion	-0.62*** (0.19)	-0.09 (0.15)	-0.62*** (0.19)	-0.09 (0.16)	-0.12 (0.16)
Age >49 employment proportion	0.83*** (0.24)	0.15 (0.13)	0.83*** (0.23)	0.15 (0.13)	0.16 (0.14)
Age <30 employment proportion	0.53** (0.25)	-0.31* (0.18)	0.51** (0.25)	-0.30* (0.18)	-0.27* (0.17)
Industry, country and period dummies	YES		YES		
Industry × country, and country×period dummies		YES		YES	YES
R^2	0.698	0.978	0.700	0.978	0.981
Observations	418				

Notes: See Table 4. Panel-corrected standard errors with heteroscedasticity correction.

Table 5b: Effects of EPL on real wages, Unskilled
(period averages for 1985-94 and 1995-2005)

Dep variable: log real wage	Hourly wage				Annual wage
	1	2	3	4	5
$EPLlay^{base}$	0.001 (0.005)	-0.001 (0.004)	0.04 (0.010)	-0.045*** (0.015)	-0.062*** (0.014)
Worker Organisation (ORG)	-0.016 (0.016)	0.014 (0.041)	-0.01 (0.03)	0.03 (0.040)	-0.022 (0.04)
$EPLlay^{base} \times Org$			-0.005 (0.002)	0.010*** (0.003)	0.021*** (0.003)
Female employment proportion	-0.59*** (0.19)	0.22 (0.16)	-0.59*** (0.19)	0.27* (0.15)	0.21 (0.17)
Age >49 employment proportion	0.07 (0.22)	0.54*** (0.16)	0.05 (0.22)	0.54*** (0.16)	0.60*** (0.156)
Age <30 employment proportion	-0.05 (0.22)	-0.25** (0.12)	0.05 (0.25)	-0.24** (0.12)	-0.22* (0.12)
Industry, country and period dummies	YES		YES		
Industry × country, and country×period dummies		YES		YES	YES
R^2	0.579	0.985	0.579	0.985	0.986
Observations	418				

Notes: See Table 4. Panel-corrected standard errors with heteroscedasticity correction.

Table 6: Sensitivity

		Dep variable: log real annual wage, all workers		Dep variable: log real hourly wage, unskilled	
	X-rate	EPL×X-rate	EPL×X-rate ×Org	EPL×X-rate	EPL×X-rate ×Org
1	Layoff rate, average UK & US (repeated from Tables 4 and 6)	-0.050*** (0.012)	0.009*** (0.002)	-0.045*** (0.014)	0.010*** (0.003)
2	As 1, but including TFP as a control	-0.056*** (0.012)	0.011*** (0.002)	-0.054*** (0.014)	0.012*** (0.003)
2a	As 1, but including also industry×period dummies	-0.050*** (0.012)	0.013*** (0.002)	-0.047*** (0.016)	0.011*** (0.003)
3	Layoff rate, US	-0.034*** (0.011)	0.006** (0.0025)	-0.030** (0.015)	0.006** (0.0033)
4	Layoff rate, US, excluding the US	-0.034*** (0.011)	0.006** (0.0025)	-0.031** (0.013)	0.007** (0.0032)
5	Layoff rate, UK	-0.060*** (0.012)	0.011*** (0.003)	-0.056*** (0.015)	0.013*** (0.003)
6	Layoff rate, UK, excluding the UK	-0.060*** (0.012)	0.012*** (0.003)	-0.044*** (0.014)	0.011*** (0.0030)
7	Dismissal rate (Bassanini)	-0.039*** (0.008)	0.007*** (0.002)	-0.028*** (0.0010)	0.007*** (0.002)
8	Dismissal rate (Caroli)	-0.058*** (0.013)	0.010*** (0.003)	-0.049*** (0.017)	0.011*** (0.004)
9	Worker reallocation rate	0.0002 (0.0008)	-0.0004 (0.0004)	0.0006 (0.0009)	0.0002 (0.0006)
10	Layoff rate, average FR & DE	-0.015 (0.010)	0.001 (0.003)	-0.014 (0.021)	0.004 (0.003)

Notes: See Tables 4 and 6. The table gives the coefficients on the EPL terms in equations of the form given in Table 4.. All equations have the full set of dummies, and the other controls shown in Table 4.

Sources: Layoff rates by industry, UK and US are from Bassanini et al. (2009)

Dismissal rate, Caroli, uses US dismissal rates by industry (mean value for 2000-2006), from Caroli (2014), app table a4

Dismissal rate – uses US dismissal rates by industry, from Bassanini et al's (2013), web dataset

Worker reallocation rate – uses US total worker reallocation rates (hires plus separations) by industry, from Bassanini et al's (2013) web dataset

Layoff rate, average FR & DE – uses average layoff rates for France and Germany from OECD (2009) Figure 2.5

Table A1: The effect of EPL on employment – log annual hours/worker
(period averages for 1985-94 and 1995-2005)

	Total workforce	Skilled	Unskilled
$EPLlay^{base}$	-0.015*** (0.006)	-0.018*** (0.006)	-0.017*** (0.006)
Worker Organisation (ORG)	-0.036*** (0.012)	-0.029*** (0.01)	-0.026*** (0.010)
$EPLlay^{base} \times Org$	0.002 (0.001)	0.0026** (0.001)	0.0021* (0.001)
Female employment proportion	0.051 (0.07)	-0.02 (0.05)	-0.07 (0.06)
Age >49 employment proportion	0.0 6 (0.09)	0.006 (0.04)	0.06 (0.05)
Age <30 employment proportion	-0.11** (0.06)	0.03 (0.06)	0.002 (0.04)
High skill employment proportion	-0.20*** (0.07)		
Low skill employment proportion	-0.18*** (0.06)		
Industry x country and country x time period dummies	Yes	Yes	Yes
Obs	418	418	418
R^2	0.988	0.989	0.988

Notes: Panel-corrected standard errors with heteroscedasticity correction. See also the Notes to Table 4.