

# Labor Market Flexibility and Inequality: The Changing Skill-Based Temporary Employment and Unemployment Risks in Europe

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In this article we use comparative micro data for 15 European countries covering the period 1992-2007 to study the impact of labor market reforms on the skill-related individual risk of holding a temporary contract and the risk of being unemployed. Our results indicate no general increase in either of these skill gaps. Using two-step multilevel analyses, we show that in the case of high protection of regular contracts, lowering restrictions on the use of temporary contracts increases the relative temporary employment rates of low-skilled workers. However, this kind of partial deregulation, which has been implemented in the majority of Western European countries, has not translated into decreasing unemployment risks of the low-skilled vis-à-vis medium- and highly-skilled persons.

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## Introduction

European labor markets have been confronted with several interrelated structural changes. International competition and globalization have pushed employers to replace low-skilled workers with workers from low-wage economies. Skill-biased technological change and economic restructuring have changed the skill composition of the labor force (Acemoglu 2002). It is generally assumed that these combined structural trends have reduced the relative demand for low-skilled labor.

Economists maintain that while in the United States these shifts have been compensated by rising skill-based wage inequality, in Europe they have translated into high levels of low-skilled unemployment because rigid labor market institutions have prevented the necessary wage adjustments (e.g., Blau and Kahn 2002). Opposing this viewpoint, DiPrete et al. (2006) develop the sociological perspective that European labor markets have absorbed market uncertainties by allocating an increasingly large proportion of unskilled workers to temporary jobs. Thus, instead of increasing low-skilled unemployment, the adaptation has resulted in a rising level of skill-related inequality in terms of job security.<sup>1</sup> DiPrete et al. present empirical evidence for their hypothesis in the case of France: between 1992 and 2003, the French labor market was characterized by an increasing concentration of low-skilled workers in insecure jobs, while at the same time the skill-divide in unemployment remained unchanged. The authors related these patterns to employment protection legislation reforms, which

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eased regulations on temporary contracts, while maintaining the high protection of regular contracts. Moreover, they explicitly call for comparative research to empirically test this putative nexus of EPL reforms and the evolution of skill-based inequalities.

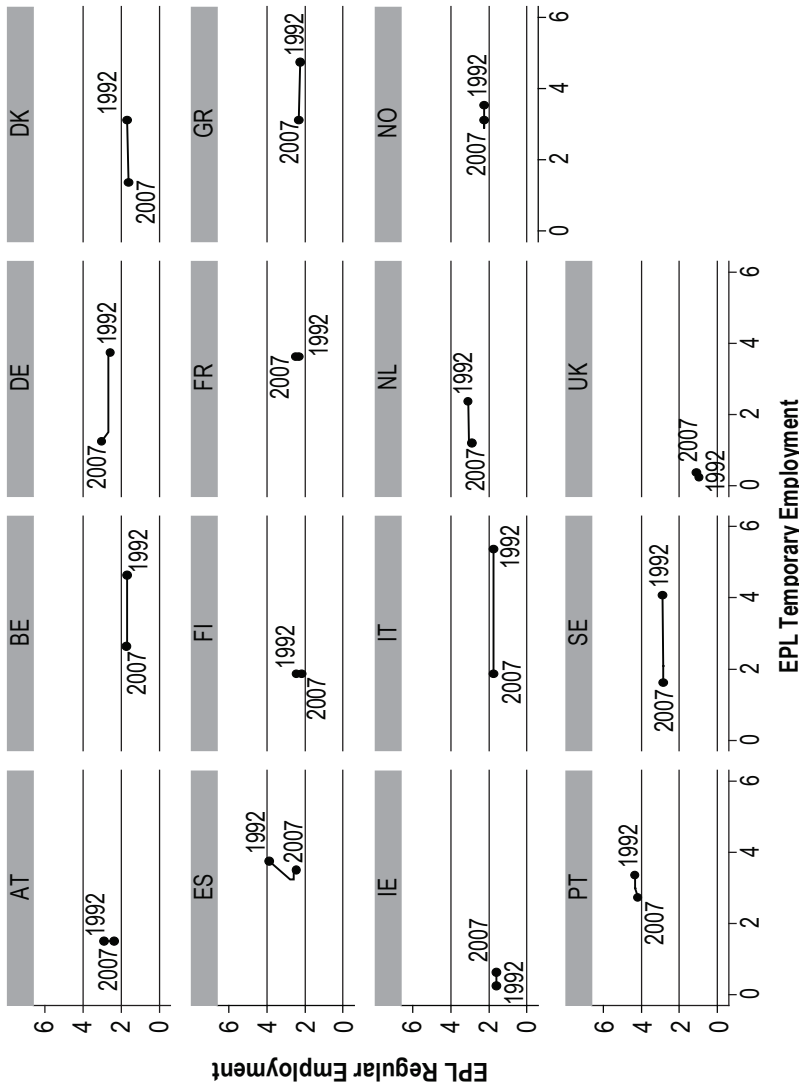
However, while some studies are concerned with the overall effect of EPL or reforms thereof (Booth et al. 2002; Kahn 2010; OECD 2004; Polavieja 2006), there is still almost no research that investigates the trends in skill-related temporary employment and unemployment risks and the impact of EPL reforms in a comparative perspective. Using data from seven OECD countries, Kahn (2007) reports that more stringent protection of permanent contracts raises the relative incidence of temporary employment for the low skilled, while regulations on temporary employment have no effect on the skill gap. However, his study ignores changes in institutions as well as macro-structural trends over time. Moreover, though Kahn (2010) also investigates the impact of reforms on the skill gap in the sphere of temporary employment, his analysis does not allow one to draw sound conclusions due to low numbers of observations.

The present article, therefore, complements previous studies with a more detailed investigation of changes in the skill divide in temporary employment and unemployment. In a multilevel design, it evaluates the impact of EPL reforms, taking into account other structural and institutional conditions. Using harmonized data for 15 Western European countries from the European Labor Force Survey, we are able to analyze the period from 1992 through 2007. This is an improvement over earlier studies, which are restricted to shorter time periods and/or fewer countries. Specifically, we use a new set of EPL indicators which take the exact timing and size of reforms into account (Venn 2009) to model macro-level influences across countries and time.

### Employment Protection Reforms within Europe

Many European labor markets have reacted to changes in the macro-economic conditions with institutional adjustments. In particular, deregulating the use of temporary work contracts is assumed to have introduced a new tool for redistributing labor adjustment costs and is viewed as an important new source of flexibility (and inequality) in European labor markets (DiPrete 2005; DiPrete et al. 2006; Gash and McGinnity 2007). However, instead of a common European pattern, there have been different responses to the structural changes, which suggest that trends in labor market inequalities might also differ between countries (Barbieri 2009; Maurin and Postel-Vinay 2005). In order to gain an impression of the institutional heterogeneity, Figure 1 shows the trends in EPL for permanent and for temporary employment over the period 1992-2007. It is important to distinguish these two dimensions of employment protection. While the EPL indicator for permanent employment measures the procedural difficulties (e.g., length of notification period) and direct costs (e.g., severance payments) involved in dismissing workers, the EPL indicator for temporary employment measures restrictions on the use, maximum duration and maximum number of consecutive temporary contracts, as well as restrictions with respect to temporary work agencies. Both indicators take into account restrictions stemming from legisla-

Figure 1. Trends in Employment Protection Legislation 1992-2007



Note: Graphical illustrations based on the OECD indicators of employment protection for temporary and permanent employment, which theoretically range between 0 (least stringent) and 6 (most restrictive), see Venn (2009).

tion may be easiest to accomplish politically because it is supported by permanent workers as well as the unemployed, and neither of these two groups is directly affected by the reforms (Cahuc and Postel-Vinay 2002). Some of these deregulation efforts were targeted at specific groups in the workforce and focused either on the age divide or on the skill divide in the workforce (Barbieri 2009). For example, the Southern European countries experienced a deregulation of the use of temporary contracts aimed specifically at labor market entrants (Barbieri and Scherer 2009). Along with reforms of temporary employment relationships, the levels of EPL for permanent employment were lowered in four countries (Austria, Finland, Portugal, Spain) and slightly raised in three countries (Germany, Greece and the United Kingdom).

Given these substantial changes in EPL in most European countries, the question arises as to whether or not the EPL reforms have affected skill-based inequalities. From a theoretical perspective, there are several reasons to believe they have.

### Theory and Research Hypotheses

When analyzing the impact of EPL on skill-related inequality patterns, it is important to explain this macro-level relationship through a micro-founded analysis of employees' and employers' behavior (Coleman 1990; Polavieja 2003). Moreover, it seems to be important to distinguish between the regulations concerning permanent jobs and those regarding temporary contracts, because these regulations presumably affect individual labor market outcomes differently.

#### *The Effect of EPL on the Risk of Holding a Temporary Job*

Employers can use temporary jobs for different reasons. In line with previous studies on functional characteristics of temporary employment (Booth et al. 2002; Polavieja 2003, 2005), we examine three of these reasons.

In labor markets with strict regulations concerning permanent contracts, employers face higher firing costs for permanent workers, both in terms of higher direct costs (severance payments) and indirect costs (procedural difficulties). From an employer's point of view, under conditions of strict EPL it might be cheaper to hire workers using temporary contracts, which eliminate potential firing costs because such contracts expire. According to this cost-saving argument, employers will build a *buffer stock* of temporary jobs, making it possible to respond to market volatilities without having to dismiss any of the core workers (Polavieja 2003). In this perspective, temporary jobs are an integral part of labor segmentation, dividing the workforce into insiders (permanent workers) and outsiders (temporary workers), especially if firing costs for permanent jobs are high. Furthermore, the cost-saving argument can also be related to the problem of correctly assessing workers' productivity, which employers face in recruiting. In such cases, employers might use temporary contracts as a *screening device* (e.g., Korpi and Levin 2001): after a certain probationary period, the contract will be converted into a permanent one if the worker's productivity proves to be satisfactory. If, however, a worker's productivity is too low, the employer might simply allow the

contract to expire. Thus, in this perspective, temporary jobs can be seen as entry ports into insider positions. Again, employers will be more likely to use this function of temporary jobs if firing costs for permanent jobs are high.

Employers may also find it profitable to use temporary contracts as an *incentive mechanism*: by offering the possibility of converting a temporary contract into a permanent one, employers can use temporary contracts as an efficient effort-eliciting tool (Güell 2000; Polavieja 2003). The incentive mechanism is particularly powerful when employment protection of permanent jobs is high, simply because in this case the employees' gain from having a temporary contract converted into a permanent one is correspondingly high. Moreover, as Polavieja (2003, 2005) argues, the buffer effect might reinforce the incentive effect, and vice versa.

According to these arguments, higher levels of EPL for permanent jobs will be associated with higher rates of temporary employment. However, there are reasons to assume that the risk of holding a temporary contract is unevenly distributed across skill groups—especially if firing costs for permanent workers are high. The main argument is that high monitoring costs as well as a high degree of task specificity will reduce employers' benefits from both the buffer and the incentive effect of temporary employment (Polavieja 2003). This is typically the case for highly-skilled jobs, which, in an environment of high monitoring costs, usually require longer-term relationships to provide the foundation of investments into specific human capital (Goldthorpe 2000). By contrast, employers' potential to make efficient use of the buffer and the incentive effect of temporary employment is much higher for low-skilled jobs, where monitoring costs and skill specificity are low. Thus, if firing costs are high due to strict regulations for permanent contracts, employers will replace permanent jobs with temporary ones, but will do so especially in the area of low-skilled work. Moreover, although screening via temporary jobs might become more important in the case of high firing costs, this will presumably not offset the aforementioned process. Hence, higher levels of employment protection for regular jobs can be expected to increase the relative rate of temporary employment for low-skilled workers.

While strict regulation of permanent contracts creates incentives for the use of temporary contracts, the regulation of temporary employment defines the barriers to this use. Weakening the regulations on temporary jobs can be expected to increase the overall rate of temporary contracts. Specifically, if the restrictions on temporary employment are lowered, there are increased options for employers to hire workers into temporary buffer jobs that did not exist before (*job creation effect*), but employers will also replace permanent workers with temporary workers (*substitution effect*). Furthermore, employers have incentives to use cycles of repeated/prolonged temporary jobs as an alternative to firing or conversions, which creates *trap effects* for the employees.

All three effects will increase the stock of temporary workers in both the low-skilled and the high-skilled segments, but we expect more pronounced effects in the low-skilled segment. First, the creation of temporary jobs in order to build up a buffer stock and increase the incentive effect will more likely occur in the low-skilled segment.

Moreover, the job creation effect for the highly skilled is presumably moderate at best because of the already high employment rate of that group. Second, employers will replace permanent low-skilled workers, in particular, with temporary workers because unskilled tasks, in contrast to highly-skilled tasks, are almost as easy to perform for new hires as for experienced workers. Third, since the buffer and incentive mechanisms of temporary jobs are more often used for the low-skilled segment, the trap effect will be more pronounced for low-skilled workers.

It seems reasonable to assume that the effect of reforms concerning temporary employment will depend on dismissal protection for permanent workers (Blanchard and Landier 2002). If there are no reasons for employers to use temporary contracts because employment protection for regular contracts is very low, lowering the barriers to flexible temporary contracts will not bring about a substantial change in the overall rate of temporary employment, nor will it significantly alter the skill gap in temporary employment. By contrast, if dismissal costs are rather high because of highly protected permanent contracts, then lowering the restrictions on the use of temporary contracts will increase employers' propensity to make use of this flexible employment type. However, following the buffer stock-incentive-screening argument, this will in turn affect the skill gap in temporary employment to the disadvantage of the low-skilled worker. Thus, we expect the effects of temporary employment reforms on the skill divide to be particularly pronounced in those countries that have high levels of EPL for permanent employment.

### *The Effect of EPL on Unemployment*

What are the consequences of EPL reforms for skill-related unemployment patterns? While some researchers have related strict EPL to persistently high unemployment rates in Europe, the empirical evidence is rather mixed (Nickell 1997). However, previous research does not distinguish between the effects of reforms in regulations on permanent and temporary contracts. In general, one can expect stricter protection of permanent contracts to produce two opposing effects, which cancel each other out (Bentolila and Bertola 1990). On the one hand, stricter regulations reduce employers' capacity to dismiss workers, thus stabilizing employment relationships. On the other hand, this makes employers less willing to hire job seekers. This joint effect reduces the variability of employment, while having no effect on the average employment level. However, Esping-Andersen (2000) argues that a strict labor market regulation is likely to have its most visible effects on the composition, rather than the level, of unemployment (see also OECD 2004). One can assume that high firing costs will particularly affect the low-skilled segment by reducing employers' willingness to employ low-skilled workers. At the same time, employers will use temporary jobs in order to increase the buffer stock and incentive effects for low-skilled workers, which increases the unemployment risks faced by this group. Accordingly, we expect that lowering/increasing the levels of employment protection for permanent contracts will lead to a fall/rise in the relative incidence of unemployment among the low skilled.

Finally, with respect to the effects of loosening the regulations on temporary jobs while keeping the regulation of permanent jobs at high levels, theoretical predictions seem to be less clear (Cahuc and Postel-Vinay 2002). This kind of partial deregulation will, in particular, increase the temporary employment rate among the low skilled through job creation, substitution and trap effects. While job creation effects would lower the unemployment rate of the low skilled, substitution and trap effects would not. Because employers have fewer incentives to convert temporary contracts into permanent ones if firing costs are high, low-skilled temporary workers face a higher risk of becoming unemployed compared to workers holding permanent contracts.<sup>2</sup> Thus, if job creation effects dominate among the low skilled, the skill divide in unemployment will—*ceteris paribus*—decrease when restrictions on the use of temporary employment are lowered. However, if substitution and trap effects are predominant among the low skilled, the higher turnover rate may even lead to higher relative unemployment for low-skilled workers. Thus, while deregulating the use of temporary contracts in countries with strict regulation of permanent jobs should lead to larger skill gaps in temporary employment, the impact on the skill gap in unemployment is theoretically ambiguous.

## Research Design

### *Data*

We use data from the European Labor Force Survey 1992-2007, which provides standardized, cross-sectional information on individuals compiled from national labor force surveys (Eurostat 2007). The EULFS covers a longer time period and provides a much higher number of observations than any of the other European surveys. Data are available for 15 Western European countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain Sweden and the United Kingdom.<sup>3</sup> We restrict the sample to people ages 25-54, who are either employed or unemployed according to the definition of the International Labour Organization. By excluding younger and older persons, we reduce the number of specific work arrangements such as early retirement schemes, training contracts and active labor market programs, which would require a separate analysis. Furthermore, young people's choice between temporary and permanent contracts is often affected by schooling opportunities, which calls for a separate analysis of youth employment (Kahn 2007). The group of employed people is restricted to dependent workers, because contract status is not defined among the self-employed. Using these restrictions, the average number of observations per year ranges from about 8,400 for Denmark to about 160,000 for Germany.

### *Variables at the Individual Level*

The first central variable defining the type of employment contract is coded 1 for temporary contracts and 0 for permanent contracts. Temporary employment is charac-

terized by the agreement between employer and employee on the objective conditions under which a job ends, such as a specific date, the completion of a task, or the return of another employee who has been temporarily replaced. In particular, this applies to occasional, casual or seasonal workers, temporary agency workers, workers on probationary periods, training contracts and workers under contract for a specific task (Eurostat 2007). The second central binary-coded variable is unemployment, which follows the ILO definition of (un)employment.

The set of explanatory variables contains personal demographic and education characteristics. Standard demographic variables that need to be controlled for in the models to account for compositional changes in the workforce are gender and age (Kahn 2007).<sup>4</sup> Gender is dummy-coded, whereas age is grouped in five-year intervals. The level of education is measured in terms of a collapsed version of the International Standard Classification of Education, which distinguishes three levels: lower secondary (ISCED 0-2); upper secondary and post-secondary, non-tertiary education (ISCED 3-4); and tertiary education (ISCED 5-6). These three levels of educational qualifications form our skill groups for the following analyses.<sup>5</sup>

### *Variables at the Contextual Level*

While many previous studies have used an overall EPL index to investigate the effect of reforms, we explicitly differentiate between the regulations governing permanent and temporary contracts. Furthermore, we use a recently-published, time-varying version of these indicators (Venn 2009). Thereby we also overcome the shortcomings of many previous studies, which limit themselves to time-constant measures. In view of the changes in the regulations of many European countries, it is necessary to take both the exact timing and the magnitude of the reforms into account.<sup>6</sup>

In order to disentangle the effects of labor market deregulation, we control for other time-varying institutional and structural conditions that might affect the distribution of insecure jobs and unemployment (Table 1). First, we control for collective bargaining coverage as a proxy for union power in negotiating wages and employment conditions, which has been shown to be another labor market institution that shapes the distribution of individual risks of holding a temporary contract (Kahn 2007; Polavieja 2006). Moreover, unions may introduce wage floors, which hinder wage adjustments that would be necessary to integrate the unemployed into the labor market (Lindbeck and Snower 1988). Second, it can be assumed that in countries with pronounced active labor market policies, a larger proportion of low-skilled persons are actually engaged in training programs, job rotation schemes and subsidized work, all of which are usually temporary in nature. ALMP measures are also expected to reduce the risks of unemployment for low-skilled people because their explicit aim is to reintegrate people into the work force. We measure the size of active labor market programs on a yearly base, using the proportion of GDP that is actually spent on them (OECD 2010).

Third, in order to account for macro-structural influences, we control for national GDP growth as a proxy for the general labor market conditions (World Bank 2010).



Table 1: Summary Statistics on Macro-Level Control Variables

	CBC (in %)		ALMP (% of GDP)		GDP Growth (in %)		Service Sector Share (in %)		KOF Economic Globalization Index				
	1992	2007	1992	2007	1992	2007	1992	2007	1992	2007			
Austria	99.0	99.0	.4	.7	1.9	3.4	2.2	63.3	69.7	67.7	72.1	89.3	81.2
Belgium	96.0	96.0	1.1	1.2	1.1	2.8	2.1	67.3	75.0	72.5	89.4	91.9	92.3
Germany	68.0	63.0	1.2	.7	1.2	2.5	1.5	60.0	67.3	64.5	61.5	75.5	69.2
Denmark	69.0	82.0	1.4	1.3	1.7	1.8	2.3	71.5	74.7	72.9	75.6	88.6	83.9
Spain	77.0	80.0	.7	.7	.6	3.8	3.1	60.2	68.9	65.2	69.3	82.1	78.2
Finland	81.6	90.0	1.4	.9	1.1	4.4	3.0	67.6	70.6	69.3	76.7	87.3	82.9
France	93.2	95.0	1.0	.9	1.1	2.2	2.0	67.2	75.0	71.5	68.7	78.4	73.2
Greece	80.0	85.0	.2	.1	.2	4.0	3.2	66.7	72.6	70.6	58.7	75.2	67.9
Ireland	45.0	45.0	1.1	.6	1.0	6.0	6.8	65.3	71.3	68.4	87.1	93.9	92.3
Italy	82.0	80.0	.3	.5	.8	1.5	1.4	59.7	65.1	63.4	55.7	75.7	68.9
The Netherlands	85.0	82.0	1.4	1.1	1.7	3.5	2.6	71.1	76.6	74.1	86.8	92.4	91.3
Norway	72.0	72.0	1.3	.6	4.2	3.7	3.2	73.3	77.1	75.3	79.0	76.9	79.2
Portugal	75.0	62.0	.6	.5	1.1	1.8	2.0	63.4	65.2	63.0	67.1	85.0	79.6
Sweden	90.0	92.0	2.4	1.1	2.0	4.0	2.7	72.8	76.5	74.0	85.0	89.4	86.6
United Kingdom	48.0	34.8	.5	.3	.4	3.0	2.8	68.9	78.1	74.0	71.1	78.6	77.6

Sources: CBC provided by Visser (2009), GDP share of ALMP from OECD (2010); GDP annual growth rate (World Bank 2010); service sector share measures share of employment in service sub-sectors G to Q according to the NACE classification in our EULFS sample (own calculations); KOF economic globalization index measures the degree of globalization as a weighted index of actual flows (such as trade flows or foreign direct investments) and economic restrictions (such as import barriers or trade taxes) (Dreher et al. 2008). Data entries in columns “1992” refer to 1992 or the first year of observation of the country in our EULFS sample.

For example, Holmlund and Storrie (2002) show that depressed labor market conditions will create incentives for firms to use—and to exert pressure on individuals to accept—temporary contracts. Moreover, bad economic conditions can be expected to increase the risks of unemployment among the low skilled, in particular, because they are the first to be dismissed during recessions.

Fourth, because previous research has shown that temporary jobs are concentrated in the service sector, we use the proportion of persons in our sample employed in service sub-sectors G to Q (following the NACE classification scheme) as a measure of the size of the service sector. Finally, we use the KOF economic globalization index (Dreher et al. 2008) in order to account for several macro-structural trends that have been expected to reduce the demand for low-skilled jobs. The impact of globalization on social inequality and labor has been highlighted in recent sociological debates (Mills 2009).

### *Statistical Method*

Since the EULFS consists of individual-level surveys for each country and year, the data can be represented as a hierarchical, three-level structure, where level-1 units are individuals nested within time points (level 2) and countries (level 3). In this manner, we can investigate how individual-level, skill-related temporary employment and unemployment risks have developed over time within each of the 15 countries and how this change can be explained by time-varying institutional and macro-structural conditions. A general three-level model can be written as follows:

$$Y_{ijt} = \beta_{0jt} + \sum_{p=1}^P \beta_{pjt} X_{pijt} + v_{ijt} \quad (1)$$

where  $Y_{ijt}$  is the dependent variable (temporary employment or unemployment risk) for an individual  $i$  nested in country  $j$  and time  $t$ .  $X_{pijt}$  are  $P$  individual-level predictors like age, gender and skill groups, and  $v_{ijt}$  is an individual-level disturbance term. The coefficients  $\beta_{pjt}$  vary across countries and time and this variation is modeled as a function of  $Q$  (time-varying) country-level variables  $Z_{qjt}$  and a country-level error term  $\varepsilon_{pjt}$  (level 2 and 3):

$$\beta_{pjt} = \gamma_{p0} + \sum_{q=1}^Q \gamma_{pq} Z_{qjt} + \varepsilon_{pjt} \quad (2)$$

Multilevel models can be estimated using two strategies, the relative advantages and practicality of which are dependent on the data structure (Franzese 2005). On the one hand, both equations can be estimated simultaneously; on the other hand, in a two-stage approach, the individual-level parameters can be estimated first within each country for each year and then, in a second stage, be used as dependent variables for the macro-level regression. The two-step approach provides a very flexible specification because all individual-level effects are allowed to vary across countries and time

without imposing any further distributional assumptions. In contrast, simultaneous multilevel models assume a multivariate normal distribution of the error terms, which cause computational problems, especially in the case of binary outcomes and large sample sizes. In our empirical study, simultaneous models did not converge due to the complex three-level data structure with a large number of cross-level interactions and error terms. At the same time, the argument that simultaneous estimations have the advantage of “borrowing strength” across units does not apply in our case because of the large sample sizes within each macro-level unit. Finally, because level-1 parameters are easy to display graphically, both description and outlier diagnostics are simplified when using the two-step procedure. Thus, we implemented the two-step procedure.

Specifically, the first step involves running separate binomial logit models for each country and time point, which estimate the effects of individual-level attributes (age group, education, gender) on the likelihood of holding a temporary contract and of being unemployed, respectively. In the second step, we examine the impact of macro-factors on the skill-related temporary employment and unemployment risks. This second stage consists of pooled time-series cross-section data. We use this structure to estimate panel models with country fixed effects, which has the advantage of holding constant those country-specific effects that do not vary over time. Not doing so may bias the results, a problem that is likely to have occurred in many previous cross-country studies. Moreover, in these panel models we allow for fixed-time effects in order to capture unobserved period-specific effects on the skill-related temporary employment and unemployment risks.

Finally, because we use estimated parameters from the first stage as dependent variables in the second stage, the analysis should also account for the uncertainty of these estimates. Hence, in the case of an estimated dependent variable, the second stage regression residuals can be thought of as having two components: the sampling error that is connected to estimating  $\beta_{pjt}$  and the macro-level error term. As suggested by Lewis and Linzer (2005), this model can be estimated by a feasible generalized least square approach.

## Empirical Results

### *Trends in the Skill Divide: Results of the Level 1 Regressions*

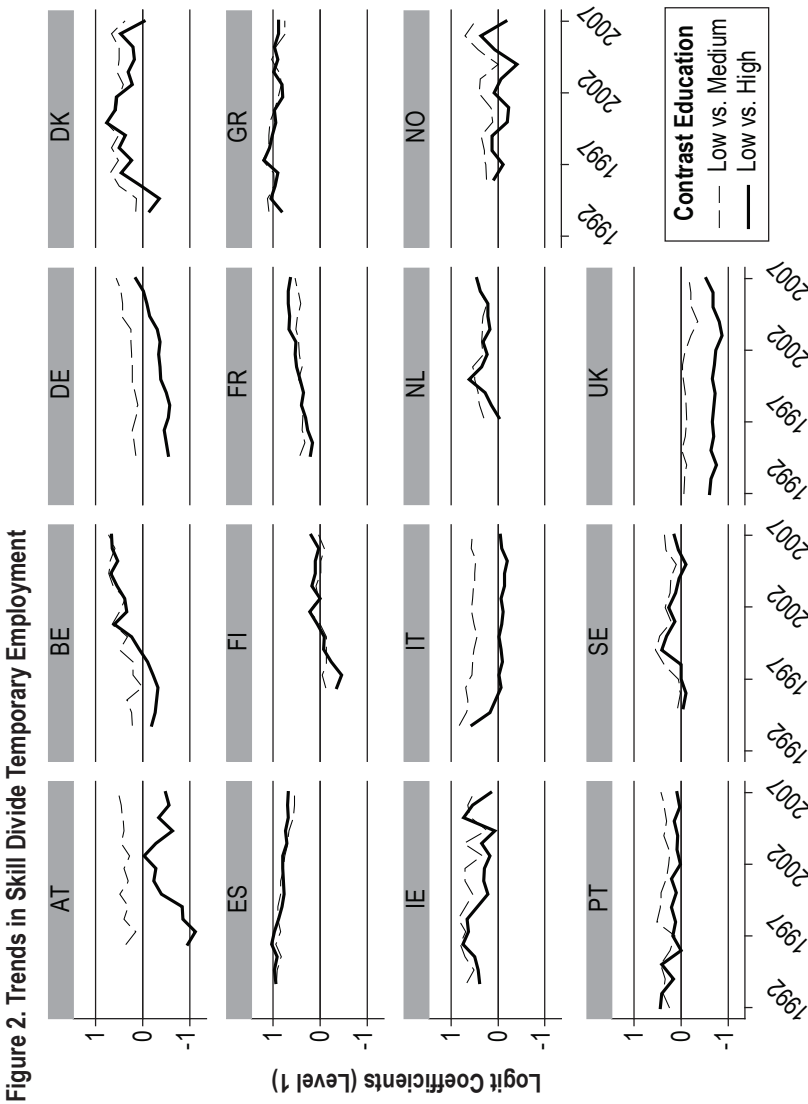
Figure 2 displays the trends in the skill divide for temporary employment relationships by plotting the estimated logit coefficients of the level-1 regressions. These coefficients express the risk of holding a temporary contract that low-educated people face compared to medium- or highly-educated workers, adjusted for age and gender effects. Coefficients greater (smaller) than zero indicate a higher (lower) risk for low-educated workers relative to the comparison group (either medium or highly-educated people).<sup>7</sup> As can be seen from this figure, in many countries, low-educated people face the highest relative risk of holding a temporary contract instead of a permanent one. Spain and Greece have a skill divide that works to the detriment of low-educated people. In Greece from 1992 through 2007, the average odds of holding a temporary contract

were more than 2.5 times higher for low-educated people compared to those with higher levels of education. In only 2 out of the 15 countries, namely Finland and the United Kingdom, was the risk of temporary employment for low-educated people no higher than the average. At the same time, in some countries, low-educated workers are not the only group affected by temporary employment. As the results show, in Italy the risk of holding a temporary contract is higher for both low- and highly-educated workers (i.e., there is a distinct U-shaped risk pattern across educational groups). This pattern can also be found in countries such as Austria and Germany, although in these countries highly-educated people face an even higher risk of holding a temporary contract than low-educated workers.

With respect to changes in the skill divide for temporary employment, the results indicate heterogeneous development in Western Europe. Clearly, there are countries which have witnessed a change in the skill divide to the detriment of low-educated workers. In Belgium and Germany, low-educated people have experienced a worsening of their chances of finding a permanent job compared to both medium- and highly-educated workers. In Austria, Finland and France, the relative temporary employment risks for low-educated workers have also increased, but only when low-educated workers are compared to highly-educated people. However, the skill divide in temporary employment fluctuated without a trend in 7 of the 15 countries. In three countries, namely Spain, Italy and Ireland, the relative chances for low-educated workers have even improved since 1992.<sup>8</sup> Thus, over the observed time period, Western European societies apparently did not experience a general trend towards an increase in skill divides for temporary employment relationships. In fact, the degree of this kind of education-based inequality has evolved in different ways. The extent to which these patterns can be explained by EPL reforms and changing macro-structural conditions is the subject of the level-2 analyses.

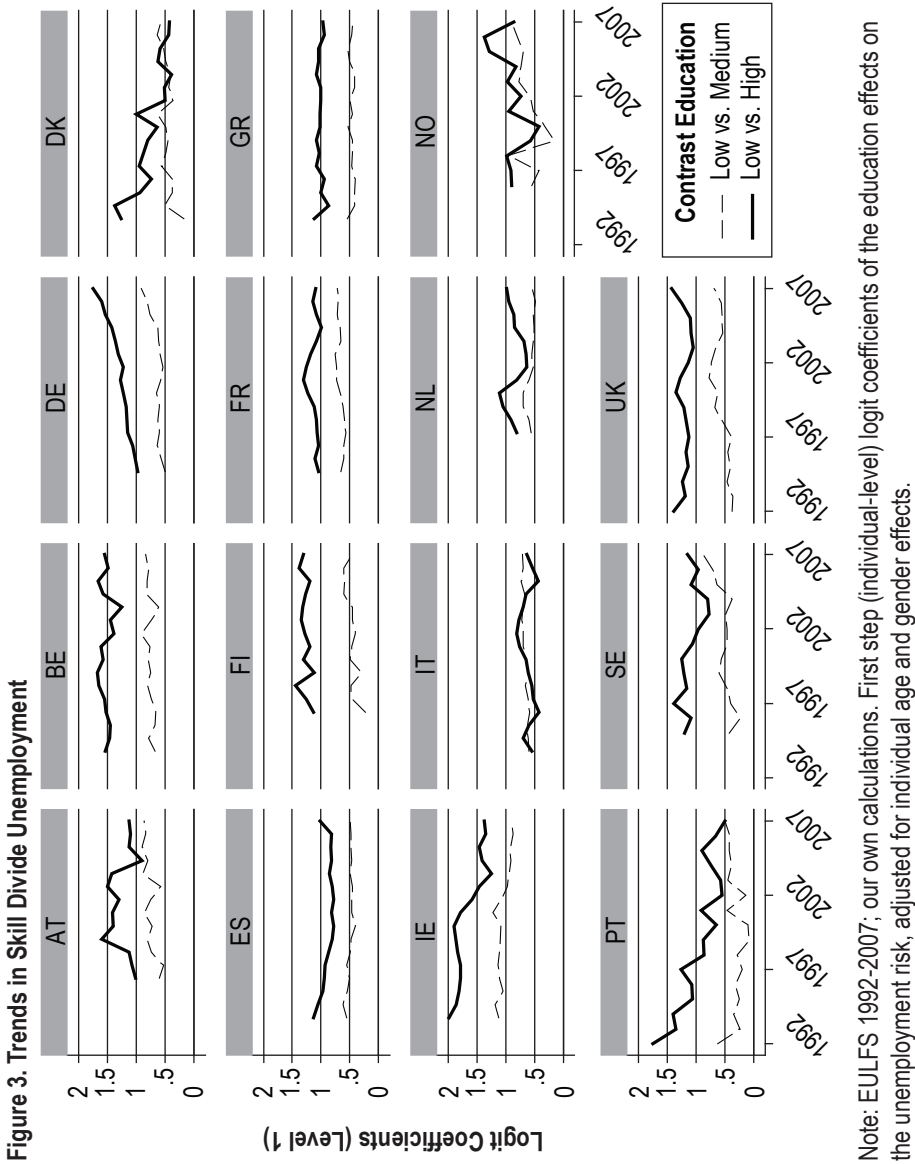
Did the relative risks of unemployment for low-educated people develop in a similar way to the risks of holding a temporary contract for this group? To answer this question, Figure 3 displays the estimated logit coefficients of the level-1 regressions which express the risk of being unemployed faced by low-educated people compared to medium- or highly-educated workers. First of all, and with respect to the overall degree of the skill divide, the results show that in all of the countries under study low-educated people face the highest risk of being unemployed. Moreover, in most of these countries, the risks of unemployment are lowest for the group of people holding higher education degrees. Thus, with only three exceptions (Italy, the Netherlands, Norway), the risk of being unemployed gradually decreases with the level of education. Interestingly, this pattern can even be found for those countries where highly-educated workers face the highest risk of being hired on a temporary basis (Austria, Germany and the United Kingdom). This result supports the notion that temporary employment relations serve different purposes in different segments of the labor market (Gash and McGinnity 2007; Giesecke and Groß 2003, 2004) and thus tend to have heterogeneous effects on the employment careers of people holding this kind of employment contract.

With regard to changes in the skill divide over time, our findings provide no evidence for the assumption of a general trend towards an increase in the relative risks of unemployment for low-educated people. Instead of increasing, the skill divide has remained more or less stable or has even decreased in most of the countries under study. Thus, Western European labor markets have not reacted as predicted, for example by Blau and Kahn (2002). There is also little support for the claim that higher levels of low-skilled unemployment were prevented by increasing the allocation of low-educated workers to temporary jobs. As the results suggest, stable or decreasing levels of relative risks of unemployment for low-educated people are not associated with higher risks of temporary employment for this group. Of the five



Note: EULFS 1992-2007; our own calculations. First step (individual-level) logit coefficients of the education effects on the risk of holding a temporary contract, adjusted for individual age and gender effects.

countries that experienced a growing skill divide in temporary employment, none shows a shrinking skill divide in unemployment. In fact, two clear counter examples are offered by Germany and Spain where, for low-educated people, both risks—that of unemployment and that of temporary employment—either increased (Germany) or decreased (Spain). In terms of statistical correlation, it turns out that the association between the relative risk of unemployment and the relative risk of temporary employment for the low-skilled is very weak—both overall and within countries.<sup>9</sup> Finally, even in the nine countries that lowered restrictions on the use of temporary employment, the trend in the skill divide in unemployment is not homogeneous:



while the employment chances of the low skilled have improved in Denmark and Portugal, they have deteriorated in Germany and have remained fairly stable in the other countries. These results already cast some doubt on the notion that reforms in the area of temporary employment have helped to improve the employment chances of low-educated people. In order to investigate this matter more thoroughly, we now turn to the results of the macro-level regression models.

### *The Effect of EPL Reforms: Results of the Macro-Level Regressions*

In the second step, the estimated logit coefficients of the level-1 regression models are to be regressed on institutional and macro-structural factors. In addition to the EPL indicators, which measure the degree of regulations for permanent and temporary employment, respectively, the models contain five macro-control variables. In order to test our hypotheses, we specified two models: in Model 1 the effect of EPL for temporary employment on the skill divide is estimated to be the same across all levels of EPL for permanent employment relations. This assumption is relaxed in Model 2. Each of these models is estimated using country-fixed effects (i.e., the regression coefficients refer to the effect of changes in the level of EPL *within* a specific country). Additionally, the models account for common unobserved time effects across countries by allowing for time-fixed effects. Moreover, two different estimation methods are used: while the first method (FE) ignores uncertainty stemming from estimating the skill divide at level 1, the second method (FE EDV) explicitly treats the logit coefficients as an estimated dependent variable. The results of these macro-level regressions can be found in Table 2 (skill divide in temporary employment) and in Table 3 (skill divide in unemployment), respectively.

As the results in Model 1 (Table 2) show, deregulation in the area of temporary employment amplifies the skill divide in temporary employment.<sup>10</sup> This holds true for the contrast of low vs. both medium and high levels of education. However, these results are based on the assumption that the effect of reforms on temporary employment is the same for all levels of EPL permanent employment. We would expect the effect of lowering the restrictions on the use of temporary employment relations to be particularly strong whenever the restrictions on the dismissal of permanent workers are high. To test this idea, we specified the model such that the effect of EPL for temporary employment is allowed to vary between low and high levels of EPL for permanent employment, respectively (Model 2).<sup>11</sup> The respective interaction term measures the additional effect of a deregulation of temporary contracts in countries with high employment protection of permanent contracts (compared to the effect of deregulation of temporary contracts in countries with low employment protection of permanent contracts). The results of this model indicate that the effect of reforms in the area of temporary employment depends on the level of EPL for permanent employment: while for high EPL levels lowering the restrictions on the use of temporary employment tends to increase the skill divide, such an effect cannot be found in low levels of EPL for permanent employment. This pattern appears for both educational

contrasts and for both estimation methods. The only exception is the FE model for the low vs. high education contrast, where the point estimate has the expected sign, but the corresponding significance level is slightly below conventional thresholds.

With respect to the effect of EPL for permanent jobs—measured by the effect of the continuous EPL variable for permanent employment—the results reveal that, in line with both our hypothesis and the findings of Kahn (2007), higher restrictions on dismissals tend to increase the relative incidence of temporary jobs for low-skilled workers. Obviously, employers are inclined to use temporary contracts, particularly

**Table 2: Macro-Level Determinants of the Relative Temporary Employment Rates of the Low Skilled**

	Low vs. Medium Levels of Education			Low vs. High Levels of Education		
	MI	FE	FEEDV	MI	FE	FEEDV
EPL regular	.07 (.92)	.08 (1.13)	.11+ (1.73)	.17 (1.56)	.18+ (1.70)	.20* (2.02)
EPL temporary	-.04* (-2.06)	-.03 (-1.27)	-.01 (-.63)	-.05+ (-1.77)	-.04 (-1.20)	-.03 (-1.05)
EPL temporary x High EPL regular		-.10* (-2.03)	-.11** (-2.75)		-.10 (-1.39)	-.12+ (-1.76)
GDP Growth	.00 (.48)	.01 (.76)	.01 (.75)	.00 (.31)	.01 (.57)	.01 (.56)
Collective Bargaining	.00 (.11)	-.00 (-.71)	.00 (.19)	.01+ (1.96)	.02* (2.32)	.01* (2.18)
Active labor Market policy	-.04 (-.69)	-.07 (-1.12)	-.03 (-.48)	-.01 (-.11)	.02 (.19)	.02 (.20)
Size of service Sector	-.01 (-1.38)	-.01 (-.99)	-.01 (-1.35)	.03* (1.98)	.03+ (1.88)	.03+ (1.91)
KOF globalization Index	-.01* (-2.00)	-.01* (-2.17)	-.01* (-2.26)	-.01 (-.91)	-.01 (-1.01)	-.01 (-1.34)
R <sup>2</sup> (within)	.11	.13	.17	.17	.18	.18

N = 217  
 Source: EULFS 1992–2007; our own calculations.  
 Notes: +p < .10 \*p < .05 \*\*p < .01 \*\*\*p < .001, t-values in parentheses. Second step (macro-level) estimation results using fixed effects (FE) versus fixed effects with a correction for the insecurity of the estimated dependent variable (FEEDV). All models include fixed time-effects (not shown). The main effects of employment protection legislation for permanent employment, and EPL for temporary employment enter models 1 and 2 as continuous regressors. The interaction term in Model 2 uses a binary classification of countries with low and high employment protection of permanent contracts. See Table 1 for descriptions of other covariates.



in the case of low-skilled workers, if they are confronted with high firing costs for permanent contracts. This effect of reforms in the area of EPL for permanent contracts is more pronounced for the contrast of low- vs. high-skilled workers.

Finally, our results show that, there are only a few significant effects of the other macro-level indicators.<sup>12</sup> For example, the larger the service sector, the stronger the relative concentration of low-skilled workers in temporary jobs, which supports our expectations. Moreover, CBC as a proxy for union power significantly increases the relative risk of holding a temporary contract for low-educated people compared to their highly-educated counterparts. This is in line with other studies (Kahn 2007; Polavieja 2006), which show that institutions such as collective bargaining tend to protect labor market insiders, and thus promote segmentation along the lines of age, education and gender.

In the next step, the results provide no support for the notion that lowering restrictions on the use of temporary employment can help to reduce the skill-divide in unemployment (Table 3). While deregulating the use of temporary contracts does not help to reduce the relative unemployment risks of low-skilled workers compared to medium-skilled workers, it actually increases the skill divide in unemployment between low-skilled and highly-skilled workers. This holds whether or not the effect is allowed to vary between low and high levels of EPL for permanent employment (Model 1 vs. Model 2). Thus, it seems that the kind of reforms implemented by the majority of Western European countries have not only not led to an improvement in the relative employment chances of low-skilled people but have actually resulted in a worsening of the relative employment chances of low-skilled people. Clearly, substitution and trap effects have prevailed over job creation effects, when comparing the unemployment risks of low- and highly-skilled workers.

Of course, it remains an open question as to what extent the skill divide in unemployment would have changed if these labor market reforms had not been carried out. To answer such a question, we would need to employ a counterfactual research design to compare the evolution of the skill divide for a reform and a non-reform situation in the same or a comparable country. Although implementing a detailed counterfactual evaluation is beyond the scope of this article, we have tried to shed some more light on this issue by re-estimating our models, this time specifying a linear time trend that was allowed to differ between reform and non-reform countries<sup>13</sup> (results not shown). For the distinction between low and medium levels of education, there has been no general time trend, either towards a growing or towards a shrinking skill divide in unemployment. Moreover, there is no empirical evidence that the skill divide has evolved differently in reform and non-reform countries. For the contrast of low vs. high levels of education, we find an overall time trend towards a diminishing skill divide in unemployment. Here again, reform and non-reform countries do not seem to have experienced a different development. However, closer inspection reveals that the skill divide decreased in Ireland and the United Kingdom, whereas it remained unchanged in France. Thus, the answer to the question of what would

have happened to the skill divide amongst the unemployed if labor market reforms had not been implemented seems to depend on the choice of country.

While we cannot find any positive effect for reforms in the area of temporary employment, there is clear evidence that EPL reforms for permanent employment do have an impact on the skill divide in unemployment. As indicated by the estimates, a

**Table 3: Macro-Level Determinants of the Relative Unemployment Rates of the Low Skilled**

	Low vs. Medium Levels of Education				Low vs. High Levels of Education			
	MI	FE	FEEDV	MI	FE	FEEDV	FE	FEEDV
EPL regular	.08 (1.40)	.10* (2.12)	.09* (2.09)	.16* (1.99)	.16* (1.98)	.18** (2.71)	.16* (1.98)	.19** (2.86)
EPL temporary	-.01 (-.56)	-.01 (-.62)	-.01 (-.99)	-.06* (-2.54)	-.06* (-2.35)	-.06** (-3.26)	-.06* (-2.35)	-.06** (-2.76)
EPL temporary × High EPL regular		.03 (.76)	.03 (1.12)		-.01 (-.10)		-.01 (-.10)	-.04 (-.89)
GDP growth	.01 (1.18)	.01 (.83)	.01 (.87)	.05*** (4.41)	.05*** (4.39)	.05*** (4.54)	.05*** (4.39)	.05*** (4.52)
Collective bargaining	.00 (.38)	-.00 (-.27)	-.00 (-.74)	-.01 (-1.30)	-.01 (-1.18)	-.01 (-1.14)	-.01 (-1.18)	-.00 (-.77)
Active labor market policy	.03 (.60)	-.00 (-.12)	-.02 (-.49)	.13+ (1.85)	.13+ (1.85)	.11+ (1.77)	.13+ (1.82)	.12+ (1.93)
Size of service sector	.01 (1.42)	.01 (1.29)	.01 (1.45)	.06*** (4.64)	.06*** (4.61)	.06*** (4.71)	.06*** (4.61)	.06*** (4.50)
KOF globalization index	.00 (.27)	.00 (.85)	.00 (.94)	-.01 (-1.37)	-.01 (-1.37)	-.00 (-.47)	-.01 (-1.37)	-.00 (-.50)
R <sup>2</sup> (within)	.17			.38			.38	

N = 217

Source: EULFS 1992-2007; our own calculations.

Notes: +p < .10 \*p < .05 \*\*p < .01 \*\*\*p < .001, t-values in parentheses. For further explanations, see Table 2 notes.

one-unit decrease in the corresponding EPL index is associated with a reduction in the skill divide of the order of .10 logit points (low vs. medium levels of education) and of about .18 logit points (low vs. high levels of education), respectively. This finding, which corroborates previous research (Esping-Andersen 2000; OECD 2004), suggests that high levels of employment protection for permanent workers affect the structure of unemployment by worsening the employment chances of the low skilled.

Finally, looking at the effects of the macro-level control variables, we find that these characteristics do not seem to exert an effect on the relative unemployment rates of low-skilled workers when compared to medium-skilled workers. For the contrast of low- vs. highly-skilled workers, the results indicate that sectoral change in terms of an expanding service sector increases the skill-gap in unemployment. Furthermore, the relative risk of unemployment for low-educated people increases if GDP growth accelerates. An improvement in economic conditions seems to be especially beneficial for those with a high level of education: they appear to profit most from the creation of new jobs. Finally, we find that higher ALMP expenditures increase the skill divide in unemployment. This could be interpreted as the result of successful integration of highly-skilled unemployed workers thanks to training programs, or as the result of deterioration in the employability of the low-skilled unemployed due to unsuccessful training programs. However, the result requires careful interpretation because of the policy endogeneity problem of ALMP (Nickell 1997).

## Conclusions

The great majority of Western European countries have experienced a deregulation of the labor market over the last two decades. These institutional changes have been predominantly partial EPL reforms, which substantially reduce restrictions on the use of temporary employment but leave restrictions on the dismissal of permanent workers more or less unchanged. Drawing on a data set covering 15 Western European countries over the period 1992-2007, we analyzed the consequences of these reforms for skill-based inequalities in the individual risk of holding a temporary contract and of being unemployed, respectively.

We find no evidence for a general trend towards an increase in the risks of skill-related unemployment, contrary to what is suggested by economists such as Blau and Kahn (2002), nor can we confirm the findings of DiPrete et al. (2006), who predict an increase in the skill divide in temporary employment. Our results cast doubt specifically on the economists' perspective: the skill divide in unemployment has remained more or less stable or has even diminished in most of the countries studied. Regarding developments in the skill-related risks of holding temporary contracts, our results indicate heterogeneous trajectories in Europe, with a change in the skill divide to the detriment of low-educated workers, at least in some of the countries studied. As our focus was on education-based skill levels rather than occupation-based skill levels, it would be interesting to investigate the extent to which the results differ if the actual skill level of the job is taken into account.

We related the trends in skill-related inequality in the labor market to reforms of employment regulations. In doing so, we analyzed reforms in the area of EPL for both permanent and temporary contracts and found empirical support for distinguishing between these two dimensions of EPL. We find that, when it comes to the effect that reforms of temporary employment have on the skill divide in temporary employment, an important factor is the level of EPL for permanent employment. There is robust evidence which suggests that only when EPL levels are high does lowering the restrictions on the use of temporary employment tend to increase the skill divide, while partial deregulation processes seem to have no effect if permanent contracts have low levels of protection. With respect to the effect of EPL for permanent jobs, we find support for our expectation that higher levels of restrictions on dismissal tend to increase the relative incidence of temporary jobs for low-skilled workers. Obviously, when confronted with strict dismissal regulations and high firing costs for permanent contracts, employers tend to resort to temporary contracts, particularly in the case of low-skilled workers.

In line with previous research, our findings suggest that higher levels of employment protection for permanent workers affect the structure of unemployment by worsening the employment chances of the low skilled. In contrast, deregulating the use of temporary contracts has not positively affected the skill divide in unemployment. We tried to gain even more insight into this issue by looking at time trends in reform and non-reform countries separately. Based on our simulation results, we conclude that the skill divide in unemployment would have decreased or at least remained stable if reforms in the area of temporary employment had not been introduced. This suggests that lowering restrictions on the use of temporary employment has not helped to reduce the skill divide in unemployment.

All these results cast doubts on the supposition that labor market reforms would have a positive effect for the group of low-skilled people, a supposition that in many cases has served as a specific justification for such reforms. Instead of leading to an improvement in the relative employment chances of low-skilled people, reforms of temporary employment appear to have increased their risk of holding a temporary contract, rather than being granted a permanent contract. Ultimately, this suggests that the main effect of lowering restrictions on the use of temporary employment has been to replace low-skilled permanent jobs with temporary jobs. This conclusion is well supported by the findings of Kahn (2010), which show that EPL reforms in the area of temporary jobs have not led to an increase in total employment but have instead encouraged the substitution of temporary for permanent jobs. Given the substantial negative socio-economic consequences of temporary employment (Giesecke and Groß 2003, 2004; Kalleberg et al. 2000), this development clearly threatens to increase social inequality.

## Notes

1. Similar predictions can be derived from the work of Breen (1997) or Goldthorpe (2000), who claim that growing economic uncertainties are shifted through the pre-existing social inequalities of educational resources and occupational class.

2. At the same time, the increased use of temporary contracts as screening mechanisms for highly-educated employees should not overly increase their unemployment risks.
3. The data for Belgium, Denmark, Greece, Ireland, Italy, Portugal, Spain and the United Kingdom cover the period 1992-2007. The observation period starts slightly later for the other countries due to limited data availability: France (1993); Austria, Finland and Sweden (1995); the Netherlands, Norway (1996). Because the EULFS data for Germany have only been available since 2002, we add data from harmonized German labor force surveys for the years 1993-2001.
4. Nevertheless, it is also of crucial importance to understand the impact of EPL reforms on the relative incidence of temporary contracts for different age groups. However, in order to simplify this analysis, this issue is left for future research.
5. We do not use occupations as our skill measure because information on education is more reliable in the EULFS, and non-hierarchical occupation categories do not allow for a clear ordering of skills.
6. While Kahn (2010) considers the timing of EPL reforms, he treats all reforms as if they were of the same magnitude, which is clearly a problematic assumption, given actual developments in Europe (see Figure 1).
7. To ensure readability of figures 2 and 3, we refrain from showing confidence intervals. However, all statements made in the text rest on statistical significance tests (i.e., reported differences are statistically significant at the 5 percent level).
8. These results are partly at odds with the findings of Maurin and Postel-Vinay (2005), who report an increase of the skill divide between 1995 to 2001 in the United Kingdom, France, Germany and Portugal, and a decrease in Greece and Denmark. However, their results might differ from ours because of different data sources (ECHP vs. EULFS), a different binary skill measure and different sample restrictions (they look at men ages 20-65 in the private sector).
9. With respect to the contrast of low vs. medium skill levels, overall correlation amounts to .14, while within-country correlation is about .28. The corresponding numbers for the contrast of low vs. high skill levels are -.08 and .20, respectively.
10. To interpret the results correctly, it is important to keep in mind that higher (lower) values on the EPL index correspond to higher (lower) restrictions on the use of temporary employment.
11. We classified countries as being either a high or a low EPL case, where this distinction is based on a value of 2.4 as the cut-off point, which is close to the sample median as well as the sample mean. Sensitivity analyses show that the results are fairly robust against moderate variation of this cut-off point. Importantly, by using a country-specific classification, the “main” effect of being a low or a high EPL country cannot be estimated in fixed-effects models as this characteristic is time-invariant within a specific country, thus it is fully absorbed by the country-fixed effect. Instead, we incorporate a continuous measure of EPL for permanent employment in order to identify the effect of a change in EPL for permanent employment within a specific country.
12. Sensitivity analyses show that reported results on the effects of EPL reforms do not change substantially when the macro-level control variables are removed.
13. For our observational period, France and the United Kingdom can clearly be classified as non-reform countries. Moreover, given the fact that the Irish labor market has been confronted with only small increases in EPL, we also classified Ireland as a non-reform country. For these three countries we estimated the time trends both separately and jointly.

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