Causes and Consequences of Job Insecurity in Modern Societies

Temporary Employment, Employment Protection Legislation, and Turnover Intentions in a Comparative Perspective

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FRAMEWORK AND GENERAL INTRODUCTION

Causes and Consequences of Job Insecurity in Modern Societies: Temporary Employment, Employment Protection Legislation, and Turnover Intentions in a Comparative Perspective

1. Introduction

One main research objective of sociology has always been to study social inequalities and identify their causes. Security is a basic human need (Maslow, 1943), and work is an important area of life. Employment provides not only financial resources but also social status and social interactions. The unequal distribution of this central resource – security – in an important domain of life – work – can be seen as a significant dimension of social inequality. Job insecurity is defined as the perceived probability of the employees to involuntarily lose their current job (e.g. Anderson and Pontusson, 2007). This perception has a huge effect on the individuals' overall well-being (Buffel et al., 2015; Dawson et al., 2017) their families' well-being and mental health (e.g. Bubonya et al., 2017). Research has also shown that job insecurity impairs individuals' ability to plan ahead and make long term commitments such as marriage, buying residential property, or having children (Lozza et al., 2013). Also, for sociological research on mobility and inequality, job insecurity is a crucial factor. Research considers the occupation and the associated prestige and income, together with education to be the central determinants of socioeconomic status. This is reflected in existing sociological stratification measures such as the ISEI (International Socio-Economic Index of Occupational Status), ISCO (International Standard Classification of Occupations), and the EGP (Erikson-Goldthorpe-Portocarero) typology. In this context, job insecurity can be seen as potential mobility initiated or forced upon the employee by the employer.

When looking at causes for social inequality, the impact of institutions has always been a focus of sociological research (see, e.g. Kalleberg, 2009). One such societal institution is employment protection legislation (EPL), which is a central focus of this dissertation. The term EPL subsumes several independent sub-dimensions: On the one hand, EPL contains employment protection (against dismissal) for regular employees (EPLreg) and, on the other hand, regulations that determine the conditions under which temporary employment is permitted (OECD, 2014b). These regulations are made by the legislature, reflect influences from different stakeholders within society, and usually includes a clear path dependence (Emmenegger, 2011). On the one hand, contingency on previous policy decisions and, on the other hand, on the structure of other institutions, such as the education system.

This dissertation focusses on the causes of the unequal distribution of job security in a comparative perspective with a strong focus on the institutional setting of EPL and the consequences of insecurity connected to the labor market in terms of turnover intentions.

In general, in the last decade, job insecurity increased due to the pressure of globalization. However, there are huge country-differences regarding the distribution of job insecurity within the country. Many countries have implemented partial or targeted reforms simplifying the use of temporary contracts while leaving employment protection for permanent employees intact (Maurin and Postel-Vinay, 2005), this strategy increased the share of temporary employment in these countries. Having a fixed-term employment contract that automatically ends at a certain date is one of the main factors causing job insecurity (e.g. Erlinghagen, 2008). Research has pointed out that not only the fixed-term employment risk overall but also the risk between certain groups differ between societies (e.g. Gebel and Giesecke, 2016). In some countries, such as the UK, the rate of fixed-term employment was below 6% in 2012, while in Spain it was 25% (OECD, 2014a). When looking at the risks of specific groups – while the temporary employment risk for new hires was about 25% in the UK, in Spain it was almost 90% (OECD, 2014a), indicating a strong inequality between labor market entrants and older employees.

And also the consequences of fixed-term employment are expected to differ (e.g. Scherer, 2009) since both aspects – risk and consequences – depend on institutional settings at the national level. Here again, we have the example of Spain where the sharp rise in the unemployment rate in the wake of the 2008 recession was mainly due to the reduction of temporary jobs (OECD, 2014a), which highlights the transfer of entrepreneurial risk towards fixed-term employees, while permanent employees were far less affected. Also, the transition rates from temporary to permanent employment differs vastly – while it was only about 20% in Spain (within three years), it was about 50% in the UK.

But how can these differences be explained? Here, EPL is expected to be one of the decisive factors (e.g. Berglund, 2015; Chung and van Oorschot, 2011; Gebel and Giesecke, 2016; Scherer, 2009). EPL has a wide-ranging impact on societal inequality due to its impact on the distribution of jobs and job security and is frequently discussed as a cause of inequality for example due to contributing to the spread of temporary employment (Gash and McGinnity, 2007). Strict protection against dismissal is regarded as one of the main causes for the dualisation of the labor market into well-placed, protected insiders and unprotected poorly placed outsiders (see, e.g. Chung and Mau, 2014; OECD, 2014a).

Therefore, the previously mentioned partial reform strategy or asymmetric liberalization (OECD, 2014a) drove a wedge between the two segments of the labor market. It has been especially detrimental for labor market entrants, as it disproportionally increased youth unemployment and temporary employment risk (e.g. Breen, 2005; Gebel and

Giesecke, 2016), while employees, who were already established in the labor market were far less affected. Therefore, it can be regarded as a cohort or generational inequality. There has been some call for debate to relieve this labor market duality (e.g. OECD, 2014a). However, a wide societal debate is so far missing.

Scientific research and debate on the effects of EPL are therefore essential, given its expected impact on inequality within society on the one hand and on the other hand the fact that it can be directly changed by the legislature (in contrast to the unemployment rate for example).

In this dissertation, several open issues within this research field are addressed: Substantively this dissertation focusses on questions surrounding job insecurity. Study 1 looks at one central consequence of job insecurity – turnover intentions – and investigates the question of how job insecurity, employability and irreplaceability affect this outcome and also how they interact. It can be shown that both job insecurity and employability increase turnover intentions, indicating that flexible labor markets might also lead to high turnover initiated by employees.

Additionally, open questions on the distribution of security in the labor market and the role of EPL will be tackled. More specifically, this dissertation focusses on the unequal distribution of perceived job security between temporary and permanent employees in a cross-national perspective and examines the specific role of EPL as a cause for this gap (Study 2, Study 3), a question where previous research has come to contradicting results (Chung and van Oorschot, 2011; Chung, 2016). It can be shown that the difference between temporary and permanent employees increases with both dimensions of EPL (EPLreg and EPLtemp). For the effect of EPL on the distribution of objective job insecurity, its effect on the fixed-term employment risk of labor market entrants is examined (Study 3). Here we find – as the hypotheses suggest, that as expected – strict EPLreg increases the temporary employment risk of temporary employees and also a short trial period increases temporary employment risk.

Methodological, these two studies (Study 2 and 3) also address the question of how to measure EPL and argue, why the most commonly used EPL-measure, the Index proposed by the OECD (OECD, 2014b), is invalid and develop a theory-driven new indicator to measure EPLreg and also to validate this new index, an endeavor that previous research has yet failed to do.

The dissertation is structured as follows: The following chapter 2 provides an overview of the area of research to place the three studies of the dissertation into a common

framework. To this end, the connections between the central concepts of the dissertation are presented, and it is shown how the three studies of the dissertation fit into this context. Subsequently, the central concepts within the research project will be discussed to provide an overview. Following this introduction to the central constructs, in Chapter 3, the three studies, their relation to the general research framework and the results are summarized. Chapter 4 contains the conclusion. After that, the three studies will follow in the published form (Study 1 and 2) or the submitted form (Study 3).

2. Overview of the Research Program and the Link between the Studies

In my dissertation, I focus on the *perceived job insecurity* as the key construct, in other words, the subjective assessment of the probability of losing the current job involuntary (Anderson and Pontusson, 2007: 4). This subjective assessment of job security is influenced by various factors at the individual, company and macro-level (e.g. Anderson and Pontusson, 2007; Erlinghagen, 2008; Esser and Olsen, 2012). In this context, I focus on *fixed-term employment* as a key factor determining perceived job insecurity at the individual level (Anderson and Pontusson, 2007; Erlinghagen, 2008; Esser and Olsen, 2012). The most important factor on the macro level is e*mployment protection legislation* (EPL), which indicates the legal framework for the dismissal of permanent employees and also the framework for the use of temporary contracts (OECD, 2014b). EPL, therefore, affects both the temporary employment risk and the perceived job insecurity. Moreover, protection against dismissal is also expected to moderate the effect of temporary employment on perceived job security (Chung and van Oorschot, 2011; Chung, 2016). However, empirical evidence is inconclusive.

As one example of the consequences of perceived job insecurity, I study *turnover intentions*, which are the intention to leave the current employer (Berntson et al., 2010).

Within this framework, there are several gaps in the literature, which the studies of this dissertation close.

Figure 1 presents an overview of the frame of reference of the dissertation. Within this framework, it becomes clear how the articles and the central constructs are connected. Furthermore, the context of the dissertation is presented.

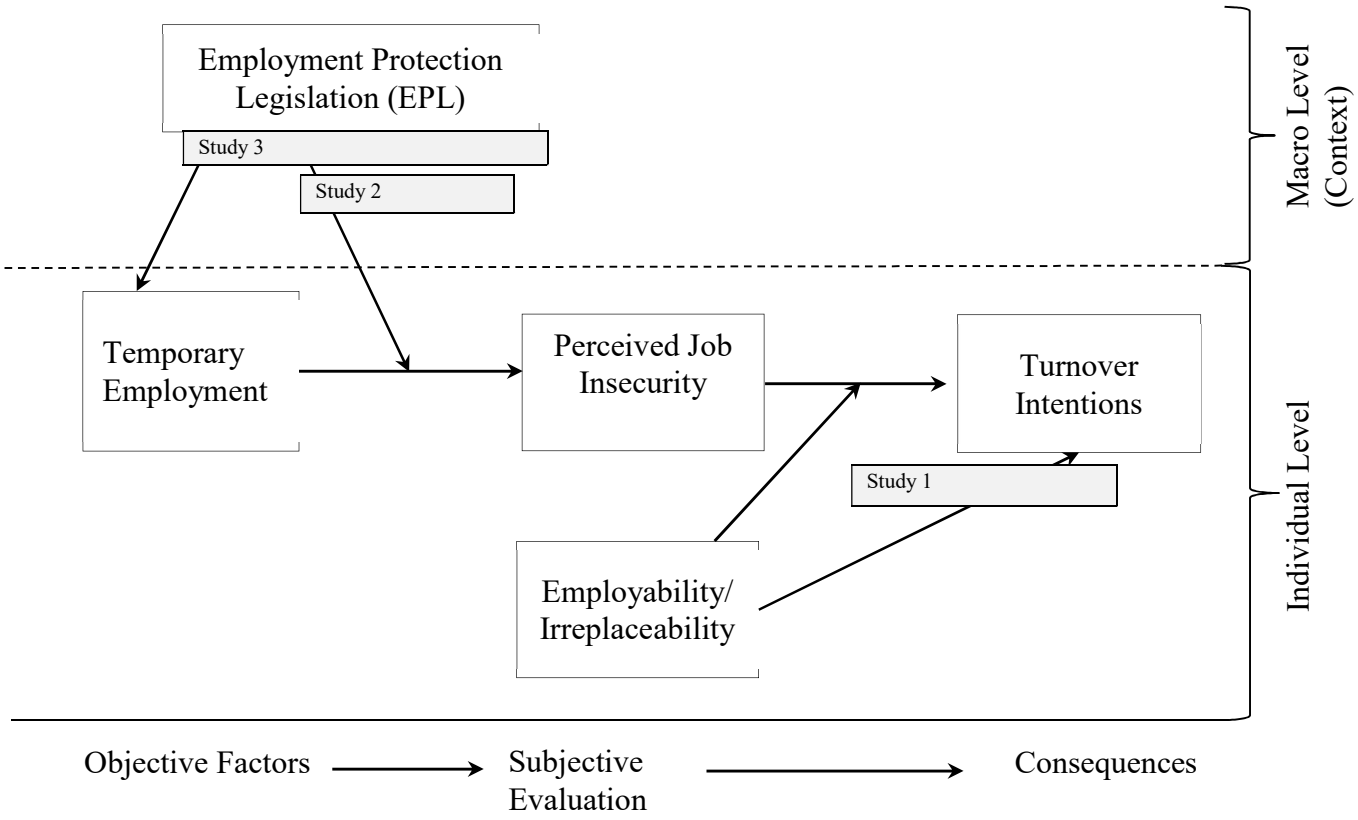

Figure 1. Framework of the dissertation and connection of the studies to the framework

Figure 1 illustrates how the key constructs of the dissertation are connected to each other. The horizontal axis represents the position of the concepts within the process. The vertical axis is used to indicate on which level the constructs are located – either on the individual level or the macro-level (context). Additionally, the figure displays which constructs and connections are studied within the studies and where the studies can be found in the framework.

Perceived job insecurity is at the center of the figure and my research. This perceived job insecurity is the evaluation of objective factors on the individual level (influenced, e.g. by *temporary employment*) as well as on the context level (e.g. *EPL*). Due to this subjective evaluation, the objective aspects have consequences for individuals. In my work, I look at *turnover intentions* as one example.

The three studies examine different aspects within this research framework: The first study focuses strictly on the micro-level, examining the consequences of perceived job insecurity. In this context, the consequences of job insecurity on turnover intentions and the

influence of employability and irreplaceability - the perceived company-specific human capital - are analyzed (Study 1). This study closes a research gap by analysing the interaction effects between job insecurity and employability and irreplaceability. Additionally, the methodological approach - that is, the estimation of separate models for each country in comparison to previous studies, which were limited to individual countries - allows an assessment of the robustness of the results.

Study 2 and 3 focus on the influence of EPL in a comparative cross-country perspective. First, the influence of protection against dismissal on the temporary employment risk of new hires is examined in cross-country comparisons. In other words, the role of EPL on the distribution of objective job insecurity (Study 3). Secondly, the role of EPL regarding its moderating effect on the link between objective insecurity (temporary employment) and perceived job insecurity (Study 2) is examined.

Thirdly, the operationalization of EPL - one key construct of this dissertation and also in labor market research in general, is not only critically examined (Study 2 and Study 3) but also a theory-driven improved measurement is developed and validated (Study 3).

In the following, the key concepts within the frame of reference are presented in order to integrate the studies into previous research and to define the gaps in the literature. The first three sections deal with the individual level, namely with (1) perceived job insecurity, (2) turnover intentions, (3) fixed-term employment. Subsequently, section (4) presents EPL as a key context variable.

2.1. Subjective evaluation: Perceived job insecurity

Perceived job insecurity is the central concept of the dissertation – it is examined as a central independent variable in study 1 and as the dependent variable in studies 2 and 3.

According to previous research, not objective job insecurity itself (such as fixed-term employment for example), but rather the subjective evaluation in the form of perceived job insecurity causes the detrimental effects on the individual (e.g. Golsch, 2003). Therefore, this subjective assessment is so crucial. In the following, the different facets of job insecurity will be discussed and where the evaluation comes from.

There are different types of subjective insecurity in relation to the labor market. These can be distinguished by (1) whether they refer to job loss or its consequences and (2) whether they represent a cognitive or affective assessment.

Perceived job insecurity is the estimated probability of losing one' s job (Anderson and Pontusson, 2007: 4). This cognitive assessment related to job loss is the focus of this

dissertation. Labour market security or employability, on the other hand, is crucial for the estimated consequences of job loss. Employability refers to the perceived chances of re-employment in the event of job loss (see Berntson et al., 2010: 225). This cognitive evaluation referring to the consequences is explored in study 1 as an independent variable.

For the affective evaluation - which is measured by the intensity of anxiety or worry caused by this potential job loss (Anderson and Pontusson, 2007: 4) - both the probability of job loss and its consequences are taken into account. This evaluation is, therefore, much broader and is not the focus of the dissertation.

Perceived job security is a subjective assessment by the individual, in which individual attributes, the characteristics of the company and also factors in the national context have an influence (e.g. Green et al., 2000; Erlinghagen, 2008; Esser and Olsen, 2012). In my dissertation, I am assuming that both sides presume that the other side is acting rationally by maximizing the expected utility, i.e. the perceived job insecurity is based on the employee's assessment of what the employer will do to maximize profit - given the individual characteristics of the employee, the characteristics of the company and the particular national context. In previous research, this assumption is rarely explicitly stated, but it is in line with previous findings:

On the individual level, firm-specific human capital, for example, is a factor that reduces perceived job insecurity (Erlinghagen, 2008; Green et al., 2000). This can be explained by the fact that employees with firm-specific human capital – knowledge that can only be acquired in the company (Becker, 1975) – are difficult and expensive to replace. One of the most significant factors increasing perceived job insecurity is having a fixed-term contract (Anderson and Pontusson, 2007; Green et al., 2000; Erlinghagen, 2008; Esser and Olsen, 2012). This is in line with rational cost-benefit assessments, as the dismissal costs of permanent employees are higher than those of temporary employees, whose contract automatically ends.

The framework of rational choice also explains the effects on perceived job insecurity connected to the firm and country attributes. These factors also influence the cost-benefit assessment of companies in relation to possible dismissals. Perceived job insecurity is, for example, higher in smaller firms, in certain industries and when the companies have financial difficulties (e.g. Erlinghagen, 2008). On the country level, especially a high unemployment rate is increases perceived job insecurity (e.g. Erlinghagen, 2008). These factors make it more likely that companies will lean towards dismissals, which seems to be reflected in the subjective assessments of the employees.

Even though perceived job insecurity is subjective, also influenced by personality and past experiences, and seemingly somewhat exaggerated - studies found that even among those who were absolutely sure to lose their job only 40% actually did (Dickerson and Green, 2012) - the assessment still mirrors the real situation and has considerable negative consequences. Research clearly shows that perceived job insecurity has a significant impact on both the employee himself and on his social environment. The negative impact of job insecurity is not limited to work-related outcomes such as job satisfaction (Cuyper and De Witte, 2007; Zeytinoglu et al., 2013). Through spillover-effects, which are the across-domain transmission of strain from one area of life to another (Bakker and Demerouti, 2013: 3), the negative consequences of job insecurity affect a number of areas of the person's life. Job insecurity reduces psychological health (Buffel et al., 2015; Chirumbolo and Areni, 2010; De Witte, 1999), and psychological well-being (Dawson et al., 2017), life satisfaction (De Cuyper and De Witte, 2007) as well as marital satisfaction (Cheng et al., 2014). Additionally, job insecurity does also shape life decisions: especially long-term commitments such as marriage, having children, or purchasing residential property are often delayed (Lozza et al., 2013).

With people living together in households, the negative consequences of job insecurity spread to other family members via crossover effects (Bakker and Demerouti, 2013). In studies, negative effects on the mental health of children and partners, for instance, have been shown (e.g. Bubonya et al., 2017).

2.2. Turnover intentions

As can be seen in figure 1, subjective evaluations have consequences. "If men define situations as real, they are real in their consequences" (Thomas and Thomas, 1928). This also applies to perceived job insecurity. As discussed in the previous section, perceived job insecurity has many negative consequences. Turnover intentions can be understood as a problem-focused coping strategy when faced with job insecurity: Turnover intentions are the intention of employees to leave their current employer. This strategy is aimed at changing or eliminating the source of stress (Lazarus and Folkman, 1984). In my dissertation, the relationship between job insecurity and turnover intentions is discussed in Study 1.

The expectation or even fear of losing one’s job is devastating and therefore, people want to escape that situation. There are different coping strategies to do so: they can either change the situation or change their feeling about it (Lazarus and Folkman, 1984). As a reaction to job insecurity, often used coping strategies are voice, exit and neglect (Berntson

et al., 2010). If employees have enough workplace bargaining power, in the form of valuable knowledge and skills (Wright, 2000), they may choose "voice", speak up and ask for a more secure job within the current company. However, often the most promising option is often "exit", to leave and find a more secure job somewhere else. Consequently, job insecurity has been shown consistently to increase turnover intentions (Berntson et al., 2010; Furaker and Berglund, 2014; Sverke and Goslinga, 2003), which is a strong predictor of actual turnover (Allen et al., 2005).

The third possible coping strategy "neglect", - emotionally disengage from one's job (Berntson et al., 2010), is empirically also an often used strategy, and job insecurity, therefore, leads to a decrease in work attitudes, such as commitment to and trust in the company and a regression in work-related behavior like performance (for an overview, see Cheng and Chan, 2008; Sverke et al., 2002). One main function of temporary employment is its use as an effort-eliciting-tool (Güell, 2000; Polavieja, 2003). However, the notion that that perceived job insecurity causes people to fight and work harder does not hold, when looking at the empirical finding concerning the three coping strategies.

Even though flexibility makes companies more competitive, it also has negative consequences for companies: Job insecurity increases turnover, which is costly due to the expensive search for and training of replacements (who need to acquire company-specific skills and knowledge). This is one reason why turnover rates have been shown to negatively affect productivity and the financial performance of companies (Hancock et al., 2013).

Usually, one way to relieve the negative consequences of job insecurity is to increase the general employability level (Flexicurity). However, not only job insecurity but also employability increases turnover intentions (Berntson et al., 2010), which might be quite damaging when thinking about the firm-specific human capital, which is lost. This turnover seems damaging for both sides and ultimately should reduce productivity at the macro level.

2.3. Temporary employment

Temporary employment refers to an employment contract that automatically ends after a fixed term, without requiring termination by the employee or employer. This fixed-term employment is one of the most influential attributes in terms of perceived job security (e.g. Green et al., 2000; Erlinghagen, 2008; Esser and Olsen, 2012) and one of the main causes for inequality concerning actual and perceived job security.

In my dissertation, fixed-term employment is examined in Study 2 and Study 3.

For a broader understanding, in the following, I will address, which functions fixed-term contracts have for companies, which consequences fixed-term employment has for employees and how the fixed-term employment risk is distributed between different groups.

Since fixed-term contracts expire automatically and the decision as to whether the employee should remain with the company can be made over and over again, it is one possibility for companies to manage their labor demand in a flexible way.

In this context, according to previous research, fixed-term contracts have three main functions: (1) they allow for numerical flexibility, i.e. they allow companies to react flexibly to fluctuations in demand and adapt the size of their workforce accordingly (Giesecke and Schindler, 2008: 284). (2) fixed-term contracts are used by companies as an extended probationary period to assess the productivity of employees (Korpi and Levin, 2001) to minimize the risk of hiring inefficient employees on a permanent contract. (3) Similarly, for project work, it is attractive for enterprises to use fixed-term contracts (Giesecke and Schindler, 2008: 284) because their need for manpower is limited in time (both in terms of the number and skills of the employee).

While for companies fixed-term contracts offer clear advantages, in scientific research, their impact on employees is controversial.

The effects on employees' careers are still to be determined. It is not clear whether fixed-term contracts tend to be “traps” or “stepping stones”. Some findings suggest that fixed-term employment increase the likelihood of continuous fixed-term contracts and unstable employment patterns (Giesecke and Groß, 2003) and can, therefore, be considered a trap. On the other hand, most temporary employees find their way into permanent employment (Gash, 2008) and the probability of transitioning into permanent employment within is higher for temporary employees than for unemployed (OECD, 2014a) which supports the notion of "stepping stone" empirically.

Despite the above-mentioned advantages of accepting fixed-term contracts (as opposed to staying in unemployment), they are clearly disadvantageous (compared to permanent employment). Most importantly, fixed-term contracts increase the likelihood of losing one's job (e.g., OECD, 2006), even when other possible factors are controlled (Giesecke and Groß, 2003; Gash and McGinnity, 2007). The most common reason for accepting a temporary job is that a permanent job could not be found (OECD, 2014a:151), which indicates that for employees, they are clearly inferior.

Fixed-term employees are also less likely to undergo training than permanent employees (e.g. OECD, 2014a). It is rational for companies to invest preferentially in

employees who are likely to stay longer with the company. Additionally, it might also seem unprofitable for employees to invest in training. In addition to lower training opportunities, wages and career advancement opportunities for fixed-term employees are generally lower and empirical evidence suggests, that accepting a temporary contract may lead to permanent wage penalties (Booth et al., 2002).

Previous research most likely does not come to a consensus, since the effects of temporary employment are not homogeneous and therefore very difficult to quantify. The effects on career prospects and wage vary by the successive number of FTC, by gender, age and education and also between countries (for an overview see OECD, 2014a).

The risk of receiving a fixed-term contract varies considerably between different groups of the population. There are studies on education groups, gender and migrant status; however, results are mixed. In some countries, high education groups have the highest FTC-risk, while in other countries, the lowest education groups have the highest FTC-risk (e.g. Gebel and Giesecke, 2011). Gender differences are neither uniform nor pronounced (e.g. OECD, 2014a).

However, one finding seems to be consensus: Especially, labor market entrants have an immensely increased risk of entering temporary employment, in Spain – as the most extreme case - the probability was almost 90% in 2012 (OECD, 2014a). For an overview (also of the country variation) see also figure 7 in study 3.

Because of the differences in the national context, however, (1) the fixed-term employment risk varies considerably from one country to another, due to different incentives and regulations; (2) the consequences of fixed-term employment are significantly different; and (3) the composition of temporary employees across different population groups differ considerably. Particularly EPL plays an essential role, which will be discussed in the following section.

2.4. Employment protection legislation

For both actual and perceived job security, *employment protection legislation* (EPL) is one of the most important factors on the context level. By (1) setting the regulatory framework under which dismissals are permitted and (2) defining the legal basis for fixed-term employment, governments have a major impact on job allocation and the distribution of job security.

EPL is examined in study 2 and 3: First, the comparative studies 2 and 3 deal with the operationalization of this construct. Secondly, the effects of EPL on the temporary

employment risk of new hires are studied and, thirdly, the influence of EPL on the perceived job insecurity of permanent and temporary employees are examined.

The effect of EPL on both actual and perceived job security is quite complex and has many different facets. Therefore, it is not surprising that it is highly debated and so far, between countries, there are huge differences in the way EPL is defined. To provide a broader understanding, the following section, therefore, examines what the key construct of EPL is, which EPL regimes exist, and how EPL affects the distribution of job security across countries - both objectively and subjectively.

The construct EPL is multidimensional and includes a variety of regulations that can be separated into three independent theoretical sub-dimensions: (1) Protection of regular workers against individual dismissal, (2) specific requirements for collective dismissals, and (3) regulations on temporary employment (OECD, 2014b: 1). Research usually focuses on the EPL for permanent employees (EPR or EPLreg) and the EPL for temporary employees (EPT or EPLtemp). While EPLreg refers to the protection of permanent employees against dismissal, EPLtemp refers to the regulations on fixed-term contracts.
The connection between the two dimensions is shown in figure 2.

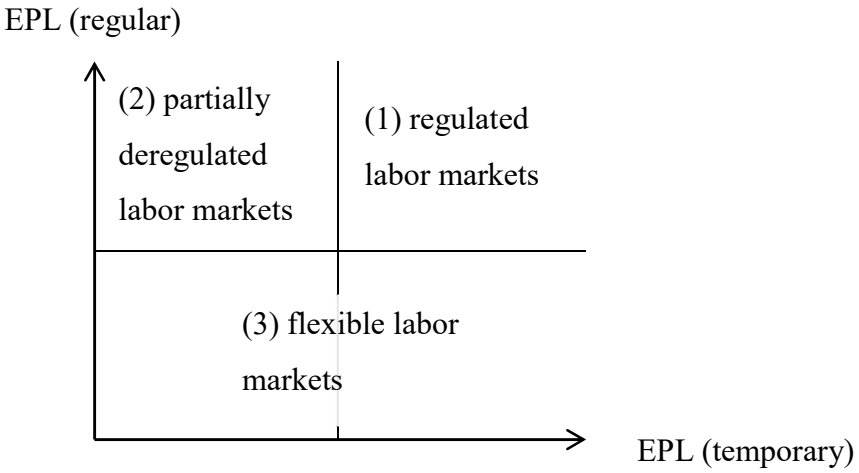

Figure 2. Employment protection regimes

The two dimensions, EPLreg and EPLtemp, are orthogonal to each other and thus form a two-dimensional policy spectrum. By dichotomizing EPLreg and EPLtemp in high and low, three EPL-regimes can be identified:
(1) regulated labor markets, with both strict regulations regarding the dismissal of permanent workers and strict regulations regarding the use of fixed-term contracts.

(2) partially deregulated labor markets, with strict regulations preventing the dismissal of permanent workers but weak regulation of the use of fixed-term contracts and
(3) flexible labor markets with relatively little protection of permanent workers against dismissal. In this case, the strictness of the regulations on fixed-term employment is of little importance (cf. Study 2, Online Appendix). Therefore, no additional distinction is made as to whether or not fixed-term employment is regulated.

The measurement of institutional regulations is challenging. They are often complex, multidimensional, and in addition often not clearly defined and therefore difficult to operationalize. This is also true for the measurement of EPL. To this point, the only existing comparative measurement for EPL are the three Indices by the OECD. These Indices were combined to an EPL-Index and published under the name "Overall strictness of protection against dismissals" in the June 1999 Employment Outlook (OECD, 2004). The OECD-EPL-Index consists of weighted additive indices, including different aspects related to regulations of the dismissal process (EPLreg) and weighted additive indices related to the use of fixed-term contracts (EPLtemp). This operationalization, however, was never discussed in detail, which I will do in study 2 and 3. Additionally, no validation studies exist, a gap, that will also be closed in study 3.

In the following, the effects of EPL on unemployment rates and on temporary employment rate will be discussed. Secondly, the gaps or permeability between the three labor market states - temporary - permanent - and unemployed will be discussed. For this, knowledge about the transition probabilities between the three states will be looked at. Third, I discuss the influence of EPL for different population groups, based on the current state of research. This shows, firstly, how complex the impact of protection against dismissal is and, secondly, also how many gaps still exist in this field.

With regard to the effect of EPL on the unemployment rate, theory predicts two opposite effects: on the one hand, EPLreg prevents dismissals and, on the other hand, it can also prevent further hiring (Bentolila and Bertola, 1990). As a result, both the expected effect of EPLreg on the unemployment rate and the empirical findings are ambiguous. While some studies find that strict EPLreg increases the unemployment rate (Holt et al., 2017; Lazear, 1990), other studies find no such effect (Addison and Grosso, 1996; Addison, Teixeira, and Grosso, 2000; OECD, 2004; Nickell, 1997; Blanchard and Portugal, 2001, for an overview see: Addison and Teixeira 2003). A decrease, however, seems unlikely. Additionally, low EPLreg causes economic fluctuations to affect the employment rate more directly (Sala et al., 2012), since firms are able to respond more flexibly and adjust their labor demand more

quickly. There are two sides to this: on the one hand, the entrepreneurial risk in these labor markets is passed on to the employees unfiltered. On the other hand, the opportunities for economic growth will have a direct impact on workers in the form of more employment.

When it comes to the effect of EPLreg on the temporary employment rate, expectations are relatively consistent: EPLreg increases the incentive for companies to employ on a fixed-term contract in order to build a buffer stock (Polavieja, 2003), allowing them to adjust their labor demand to the economic situation without laying off permanent employees. Strict regulations on fixed-term employment (EPLtemp), on the other hand, reduce the fixed-term employment rate (Gebel and Giesecke, 2011). Additionally, an interaction effect is likely - temporary employment risk should increase particularly when permanent employees are strongly protected, and regulations on temporary employment are less strict. In this case, there is a possibility and also the incentive to use temporary contracts. To summarize, while EPL has little influence on the unemployment rate, strict EPLreg does increases the share of fixed-term employees, while strict EPLtemp indeed decreases the share.

In addition to the impact of EPL on the group size of the unemployed, temporary and permanent employed, the question also arises as to how EPL influences the transition probabilities between those groups and to what extent EPL has an impact on the consequences associated these three states. These two aspects provide insights into how EPL affects inequality and labor market segregation. Looking at the theoretical expectations and the current state of research on the impact of employment protection legislation on the probability to make the transition between the three labour market states - fixed-term employment, permanent employment and unemployment - the following becomes clear: EPLreg has a particularly strong influence on the chance of changing from temporary to permanent employment: The evidence for the effect of strict EPLreg on the difficulty to transition from a temporary job to a permanent job however are rather convincing (Centeno and Novo, 2012). If EPLreg is strict and a successive temporary contract with the current employee is not possible (strict EPLtemp), employers will rather hire a new temporary employee, replacing the old one than turning the temporary contract into a permanent one (Centeno and Novo, 2012). In other words, strict EPLreg increases the unemployment risk of fixed-term employees (Blachard and Landier, 2002) and at the same time reduces their likelihood of moving into permanent employment.

As described above, EPL is a crucial determinant of the probabilities for the transition between states. Depending on the starting conditions, the effects of EPL on

individuals are therefore fundamentally different. EPLreg lowers the threshold below which an employee's productivity must drop in order to make it profitable for the company to replace him with a new employee. In other words, EPLreg is biasing competition in favor of insiders. Therefore, labor market insiders, i.e. those in permanent employment, benefit greatly from a high level of protection against dismissal and only experience disadvantages when trying to change jobs, labor market outsiders, i.e. unemployed individuals, temporary employees and labor market newcomers, are mainly confronted with disadvantages.

These theoretical expectations of the negative effects of EPLreg on labour market outsiders (e.g. Breen, 2005; Gebel and Giesecke., 2016; Noelke, 2016) are confirmed by empirical findings on the impact of EPLreg on labour market entrants as it increases both youth unemployment (Esping-Andersen, 2000; Heckman and Page´s-Serra, 2000; Cahuc and Zylberberg, 2004; OECD, 2004, 2006; Breen, 2005; Boeri and van Ours, 2013) and temporary employment risk (Lange et al., 2014, Gebel and Giesecke, 2016).

These findings can be summarized as follows: Firstly, the size of the group (unemployed, and the proportion of employees with limited or unlimited term contracts) is influenced by employment protection legislation. Second, the "gaps" or probabilities of transition between the three states - unemployed, temporary and permanent employed - are strongly influenced by employment protection legislation. Third, also the composition of the groups within the three states is influenced by EPL. This is shown in figure 3.

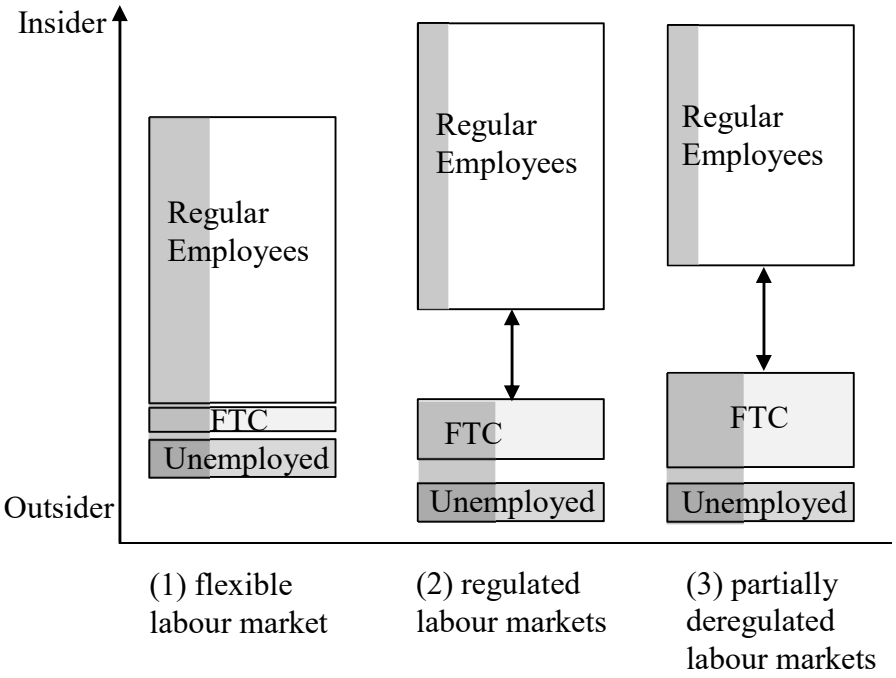

Figure 3. EPL regimes, size of the groups and distances between them.
Source: own representation

The figure illustrates the different groups: permanent employees, fixed-term employees and unemployed. The size of the boxes symbolizes the size of the group; the distance between the boxes represents the distance between the groups with regard to the probability of transition between the states. The vertical grey shadowed area within the boxes symbolizes the proportion of labor market entrants within the groups.

According to previous research, the number of unemployed is independent of the EPL regime. The share of temporary workers is lowest in flexible labor markets (as companies have little incentive to use fixed-term contracts) and the share of permanent workers is highest. Typical representatives of this type are, for example, the United Kingdom or the USA. The gap between permanent and temporary employees is highest in countries with partially deregulated labor markets and lowest in flexible labor markets. Additionally, youth temporary employment and youth unemployment is expected to be higher in partially deregulated and regulated labor markets compared to flexible labor markets.

As already indicated in the introduction, there are different questions within the previously presented research frame that previous research has neglected so far and that this dissertation contributes to. After the overview of the key concepts within the research agenda, in the following, I will provide an overview of the three studies, their connection to the research agenda of the dissertation and their results and contribution to previous research.

3. Methods, Results and Contribution to the Literature of the three Studies

In this section, I will provide a summary of the studies, including their research questions, hypotheses and results.

3.1. Study 1: Always looking for something better? The impact of job insecurity on turnover intentions[1]

The first study of this dissertation deals with one of the consequences of job insecurity – turnover intentions. It additionally examines the consequences of further aspects of insecurity – employability and irreplaceability.

This study contributes to the current research on the effect of job insecurity on turnover intentions by examining how employees react in terms of turnover intentions when job security is replaced with employment security. For this, the study analyzes whether perceived *employability* and *irreplaceability* (a) increase or decrease turnover intentions and also looks at the interaction effects to study, whether *employability* and *irreplaceability* (b) buffer or intensify the negative effects of job insecurity on turnover intentions. For this, hypotheses are derived using rational choice considerations and equity theory.

The hypotheses are empirically tested using international data from the International Social Survey Programme (ISSP). The substantive focus is on a connection at the micro-level. However, the use of the cross-national-data allows assessing the generalizability of the results, since separate regression models were run for each of the countries datasets.

The findings show that perceived job insecurity increases turnover intentions in all countries. In addition, perceived employability increases turnover intentions in most countries, whereas weak evidence suggests that employees who feel irreplaceable are less likely to have turnover intentions.

The results on the question about whether employees who feel employable or irreplaceable react differently to job insecurity – with respect to turnover intentions – vary widely between countries, and so a general conclusion about buffering effects cannot be drawn.

[1] Balz, A. and Schuller, K. (2018). Always looking for something better? The impact of job insecurity on turnover intentions: Do employables and irreplaceables react differently? *Economic and Industrial Democracy,* Online first. 1–18. doi: 10.1177/0143831X18757058.

In this context, it is particularly noteworthy the frequently recommended flexibilization strategy - flexicurity instead of partial deregulation (European Commission, 2007) – has unintended consequences as well. This strategy promotes the decrease of individual job security to be counteracted by an increase in individual employability. However, both job insecurity and employability increase turnover intentions. At the macro level, this leads may lead to an 'excess turnover' (Centeno and Novo, 2012) in a flexicure labor market. In other words, this flexibilization strategy also has negative consequences.

3.2. Study 2: Cross-national variations in the security gap: Perceived job insecurity among temporary and permanent employees and employment protection legislation[2]

Substantially, the second study focuses on temporary employment as the most important cause of job insecurity on the individual level, and on the influence of the context factor employment protection legislation in the assessment of perceived job insecurity.

In previous research, it is often shown that temporary employees generally perceive their job insecurity to be higher than permanent employees (Anderson and Pontusson, 2007; Erlinghagen, 2008; Esser and Olsen, 2012). However, substantial variations in this perceived job security gap exist between countries. This article engages with this knowledge and adds to it by focusing on these country variations and asking what role the strength of employment protection legislation (EPL) has both on the size of the job security gap and in explaining country differences.

As discussed in Chapter 2, EPL consists of two orthogonal dimensions – employment protection legislation for regular employees (EPLreg) or *job security provisions* and *regulations on the use of temporary contracts* (EPLtemp). While EPLreg limits employers' possibilities to dismiss employees, EPLtemp limit the number and duration of successive temporary contracts.

Drawing from rational choice considerations of the employers, I derive two hypotheses, suggest that the two components of EPL will increase the gap between permanent and temporary employees: (H1) EPLreg or *job security provisions*, indicating the 'protection gap' between permanent and temporary employees will increase the difference in perceived job insecurity between permanent and temporary employees, since high

[2] Balz, A. (2017). Cross-National Variations in the Security Gap. Perceived Job Insecurity among Temporary and Permanent Employees and Employment Protection Legislation. *European Sociological Review,* **33,** 675–692.

dismissal costs will lead employers to choose not renewing temporary contracts instead of dismissing permanent employees if the need to adapt the size of the workforce emerges. (H2) Also, strict EPLtemp or *regulations on the use of temporary contracts* will increase the job security gap, since if these regulations are strict, employers face the decision to either turn the temporary contract into a permanent one or let the temporary employee go. Since this decision also often ends in job loss, strict regulations should also make temporary employees feel more insecure compared to permanent ones.

These two hypotheses are tested using micro-data from the European Social Survey for 2004 and 2010 and country-level-data on employment regulations from the Organisation for Economic Co-operation and Development (OECD). I used a multilevel model with a random slope and random intercept due to the hierarchical structure of the data and the focus on the cross-level interaction.

Compared to existing studies, this article offers a more detailed look at the operationalization of EPLreg (*job security provisions)* and EPLtemp (regulations on *temporary employment)*—proposing an alternative measurement which is more closely related to the theoretical arguments. By using this more elaborate operationalization, we can confirm our hypotheses, which previous studies failed to find: The multilevel model shows that the gap in perceived job security between temporary and permanent employees systematically increases with respect to the EPLreg and EPLtemp.

In other words, the study shows that employment protection legislation moderates the influence of temporary employment on perceived job insecurity. The difference in subjective uncertainty between temporary and permanent employees is all the more pronounced, the stronger the employment protection is.

Within the research framework, the study has two functions: (1) It examines the relationship between objective and perceived job insecurity and shows that strict EPLreg and EPLtemp increases the difference between fixed-term and permanent employees and thus leads to greater subjective inequality in job security. (2) In addition, this study takes a critical look at the central variable within the research framework - Employment Protection Legislation. Thereby, several operationalizations are discussed and used in the substantive analysis: The main model uses the item "definition of unfair dismissal" to measure EPLreg. Two other plausible alternatives are discussed and tested as robustness checks in the appendix: First, an index that combines "definition of unfair dismissal" with the consequences of unfair dismissal, since I assume, that legal restrictions on dismissal will only lead to better protection if violations lead to consequences. Furthermore, the Online

Appendix implements an institutional approach by constructing an indicator that combines both orthogonal dimensions of employment protection Legislation for Regular Employees (EPLreg) or *job security provisions* and *regulations on the use of temporary contracts* (EPLtemp) to three employment protection regimes-regulated labor markets, partially deregulated labor markets and flexible labor markets. Substantive results confirm the results from the main model: the temporary contract penalty is largest in regulated labor markets and smallest in flexible labor markets; in partially deregulated labor markets the size is in between. Moreover, these findings are in line with the transition probabilities from figure 2.

3.3. Study 3: Operationalization of employment protection legislation and implications for substantive results: Example of perceived job insecurity and temporary employment risk[3]

In study 2, it was already pointed out that the commonly used measurement for EPL and especially for EPLreg (protection against dismissal for regular employees) is problematic. However, in study 2, the focus was on the substantive question of the subjective dualization of the labor market and the measurement issue was addressed, but not explored in depth. This is the objective of study 3.

The aim of this study is (1) to point out which aspects of the commonly used OECD-Indicator to measure EPLreg are problematic in terms of the principles of formative index construction, (2) to develop a measurement that follows these principles and (3) to demonstrate that the choice of measurement has far-reaching consequences for substantive results.

Study 3 shows that the OECD index that measures the employment protection legislation of regular employees (EPLreg) is deficient with respect to a theoretical point of view (content validity) and to its predicted effects (criterion validity) and that this choice of operationalization has important implications for substantive results. We suggest a new EPLreg-Index that measures permanent employees' protection against dismissal, which implements a theory-driven choice of items, normalization rules, and aggregation procedure. Subsequently, we empirically compare this new index with the OECD index by testing relationships with outcome variables indicated in the literature. First, we used a multi-level

[3] Balz, A. and Pforr, K. Operationalization of Employment Protection Legislation and Implications for Substantive Results: Example of Perceived Job Insecurity and Temporary Employment Risk. Unpublished Manuscript.

model to predict the perceived job insecurity of temporary and permanent employees that depends on the level of EPLreg with cross-national data from the European Social Survey, the European Working Condition Survey, and the European Quality of Life Survey. Second, we examine the effect of EPLreg on the temporary employment risk of new hires using data from the European Labour Force Survey. Whereas the predicted results based on the OECD-EPLreg-Index significantly contradict the hypotheses in the literature, the predicted results using the new EPR-Index confirm the hypotheses in the literature. The new EPLreg-Index also reveals the expected effects of related variables that are concealed when using the OECD-EPLreg-Index.

Within the research framework of this dissertation study 3 serves the purpose to look closely at the central country-level variable within the framework – EPLreg. Although it is a central independent variable in social and economic sciences, and the impact of EPLreg is highly debated, the validity of the measurement has not been questioned. However, without a valid measurement, substantive research cannot come to valid conclusions. This article, therefore, provides a new groundwork for labor market research by identifying a method for validly measuring employment protection.

This improves the empirical basis of the entire research on flexicurity, segmentation and insider-outsider labor markets. The article clearly shows that the commonly used measurement is deficient, which may have far-reaching implications for previous findings. In addition, the substantive results of study 2 can be confirmed with a broader empirical basis: strict EPLreg, as well as EPLtemp, leads to a greater gap between temporary and permanent employees regarding subjective job insecurity. This can be demonstrated using two additional datasets. Thus, the cause of the contradictions in previous empirical research can almost certainly be found in the measurement of EPLreg.

Furthermore, the study indicates that strict EPLreg increases the temporary employment risk for new hires. Thus, the study demonstrates that EPL makes it not only more likely for outsiders to receive a fixed-term contract, but also that, subjectively the distance between fixed-term and permanent employment is larger with strict EPLreg.

4. Discussion and Conclusion

To conclude - my dissertation project contributes to previous research by showing that job insecurity increases turnover initiated by employees, and this tendency seems to be rather increased than decreased by employability (Study 1). Additionally, this dissertation demonstrates, that the level of EPLreg or protection against dismissal plays a crucial role in

shaping the distribution of job insecurity, both factual as well as perceived, within a society (Study 2 and 3): it can be shown, that both EPLreg and EPLtemp increase the difference in perceived job insecurity between temporary employees, indicating that inequality is largest in partially deregulated labor markets and lowest in flexible labor markets. Additionally, temporary employment risk for new contracts increases when EPLreg is strong and the legal trial period for new contracts is short. For EPLtemp, no effect could be found.

Regarding the methodological aspect (Study 2 and 3), my dissertation project can clearly demonstrate that (1) the existing and commonly used measure for EPLreg by the OECD (OECD, 2014b) is problematic from a theoretical point of view and (2) the choice of measurement influences the substantive results to a large degree. Therefore, it is essential to measure the independent variable EPLreg (protection against unfair dismissal) correctly.

For sociological research, the implications, especially regarding previous research on the effects of EPL, are significant: replication of previous results seems necessary to ensure, that these results are not caused by the measurement. Especially null-findings can possibly be rectified with the improved measurement of EPL.

For society, the implications of the substantive findings seem of special interest. This dissertation could show that strict EPLreg would lead to an increase in temporary employment risk for new employees. This implies that EPLreg causes generational inequality in terms of security. This finding is troubling, considering that temporary employment may lead to unstable careers, and it is yet unknown, how long this unstable career path will prevail. Additionally, it is noteworthy that the negative consequences of temporary employment are more pronounced in countries with strict EPLreg with regards to perceived job insecurity. This indicates that not only causes EPLreg a deeper inequality between generations in terms of the occurrence, but also regarding the hardship that is connected with temporary employment.

The most obvious limitation of the three studies is the difficulty to establish causality when using cross-sectional data. Even though this objection has a true core to it and has to be taken seriously, however, there are conditions under which it is possible to establish causality with cross-sectional data reasonably; therefore, I argue that a causal conclusion is nevertheless justified. In order to estimate the true and unbiased causal effect with these models, strong and by nature, not empirically testable assumptions must be met. However, in my studies, I argue that these assumptions are met and causality can be established with reasonable certainty. The most important concerns are confounding variables and reverse causality. These two are unlikely for theoretical reasons: there is no theoretical argument in

previous literature that would call for further control variables on the country level. Randomly including control variables without theoretical arguments will just as likely lead to biased results.

Additionally, there are research questions that can only be studied using cross-national data, and I argue that questions about the effect of EPLreg are such a case. A longitudinal design is only possible with variability in the independent variable. With EPL, unfortunately, this is not the case, which can be seen in Study 3 (Appendix A2), which automatically rules out all endeavors to implement country-fixed effects. Results would be unreliable due to the missing variation in the independent variable.

For further research, the most crucial issue arising from my work stems from the introduction of a new and improved measurement for EPLreg. The OECD-operationalization is used in all comparative studies about the effect of EPLreg, so almost the entire body of knowledge (with the exception of some comparative case studies and quasi-experiments) rests on this operationalization that I argue to be invalid. Therefore, it is essential to study the effects of EPL, especially regarding the sometimes inconclusive findings on the youth labor market with the new and improved measure. In this dissertation, the focus of study 3 was to develop a valid measurement. Therefore, the substantial dimension was only a means to an end. So temporary employment risk of new hires was used to validate the measurement because the increasing effect of EPLreg on temporary employment risk is well expected. However, the effect of EPLreg on overall unemployment and employment rates and on youth unemployment rates is still debated, and further research should take a closer look here.

References

Addison, J. T. and Grosso, J.-L. (1996). Job Security Provisions and Employment. Revised Estimates. *Industrial Relations,* **35,** 585–603.

Addison, J. T. and Teixeira, P. (2003). The Economics of Employment Protection. *Journal of Labor Research,* **24,** 85–128.

Addison, J. T., Teixeira, P. and Grosso, J.-L. (2000). The Effect of Dismissals Protection on Employment: More on a Vexed Theme. *Southern Economic Journal,* **67,** 105–122.

Allen D. G., Weeks K. P., and Moffitt K. R. (2005). Turnover intentions and voluntary turnover: the moderating roles of self-monitoring, locus of control, proactive personality, and risk aversion. *The Journal of applied psychology,* **90,** 980–990.

Anderson, C. J. and Pontusson, J. (2007). Workers, worries and welfare states. Social protection and job insecurity in 15 OECD countries. *European Journal of Political Research,* **46,** 211–235.

Bakker, A. B. and Demerouti, E. (2013). The spillover-crossover model. In *New frontiers in work and family research*, *Current issues in work and organizational psychology.* New York, NY: Psychology Press, 55–70.

Balz, A. (2017). Cross-National Variations in the Security Gap. Perceived Job Insecurity among Temporary and Permanent Employees and Employment Protection Legislation. *European Sociological Review,* **33,** 675–692.

Balz, A. and Schuller, K. (2018). Always looking for something better? The impact of job insecurity on turnover intentions: Do employables and irreplaceables react differently? *Economic and Industrial Democracy,* Online first. 1–18. doi: 10.1177/0143831X18757058.

Balz, A. and Pforr, K. Operationalization of Employment Protection Legislation and Implications for Substantive Results: Example of Perceived Job Insecurity and Temporary Employment Risk. Unpublished Manuscript.

Becker, G. S. (1975). *Human Capital*, Chicago, IL: University of Chicago Press.

Berglund, T. (2015). Flexicurity, Job Insecurity, and Well-Being in European Labor Markets. In Vuori, J., Blonk, R. and Price, R. H. (Eds.), *Sustainable working lives. Managing work transitions and health throughout the life course.* Dordrecht: Springer (Aligning perspectives on health, safety and well-being), 145–167.

Berntson, E., Näswall, K. and Sverke, M. (2010). The moderating role of employability in the association between job insecurity and exit, voice, loyalty and neglect. *Economic and Industrial Democracy,* **31,** 215–230.

Blanchard, O. and Landier, A. (2002). The Perverse Effects of Partial Labour Market Reform: fixed-Term Contracts in France. *The Economic Journal,* **112,** 214–244.

Blanchard, O. and Portugal, P. (2001). What Hides Behind an Unemployment Rate: Comparing Portuguese and U.S. Labor Markets. *American Economic Review,* **91**, 187–207.

Boeri, T. and van Ours, J. C. (2013). *The economics of imperfect labor markets.* Princeton: Princeton Univ. Press.

Booth, A., Francesconi, M., & Frank, J. (2002). Temporary Jobs: Stepping Stones or Dead Ends? *The Economic Journal,* **112,** F189-F213.

Breen, R. (2005). Explaining Cross-national Variation in Youth Unemployment. *European Sociological Review,* **21,** 125–134.

Bubonya, M., Cobb-Clark, D. A. and Wooden, M. (2017). Job loss and the mental health of spouses and adolescent children. *IZA Journal of Labor Economics*, **6**, 1–27.

Buffel, V., Dereuddre, R. and Bracke, P. (2015). Medicalization of the Uncertainty? An Empirical Study of the Relationships between Unemployment or Job Insecurity, Professional Care Seeking, and the Consumption of Antidepressants. *European Sociological Review,* **31,** 446–459.

Cahuc, P. and Zylberberg, A. (2004). *Labor Economics.* Cambridge and London: MIT Press.

Centeno, M. and Novo, Á. A. (2012). Excess worker turnover and fixed-term contracts. Causal evidence in a two-tier system. *Labour Economics,* **19,** 320–328.

Cheng, G. H.-L. and Chan, D. K.-S. (2008). Who Suffers More from Job Insecurity? A Meta-Analytic Review. *Applied Psychology,* **57,** 272–303.

Cheng, T., Mauno, S. and Lee, C. (2014). The buffering effect of coping strategies in the relationship between job insecurity and employee well-being. *Economic and Industrial Democracy,* **35,** 71–94.

Chirumbolo, A. and Areni, A. (2010). Job insecurity influence on job performance and mental health. Testing the moderating effect of the need for closure. *Economic and Industrial Democracy,* **31,** 195–214.

Chung, H. (2016). Dualization and subjective employment insecurity: Explaining the subjective employment insecurity divide between permanent and temporary workers across 23 European countries. *Economic and Industrial Democracy.* Online first.

Chung, H. and Mau, S. (2014). Subjective insecurity and the role of institutions. *Journal of European Social Policy,* **24,** 303–318.

Chung, H. and van Oorschot, W. (2011). Institutions versus market forces: Explaining the employment insecurity of European individuals during (the beginning of) the financial crisis. *Journal of European Social Policy,* **21,** 287–301.

Cuyper, N. de and Witte, H. de (2007). Job insecurity in temporary versus permanent workers. Associations with attitudes, well-being, and behaviour. *Work & Stress,* **21,** 65–84.

Dawson, C., Veliziotis, M. and Hopkins, B. (2017). Temporary employment, job satisfaction and subjective well-being. *Economic and Industrial Democracy,* **38,** 69–98.

De Witte, H. (1999). Job Insecurity and Psychological Well-being: Review of the Literature and Exploration of Some Unresolved Issues. *European Journal of Work and Organizational Psychology,* **8,** 155–177.

Dickerson A, Green F, (2012). Fears and realisations of employment insecurity. *Labour Economics,* **19,** 198–210.

Emmenegger, P. (2011). Job security regulations in Western democracies: A fuzzy set analysis. *European Journal of Political Research*, **50,** 336–364. doi:10.1111/j.1475-6765.2010.01933.x

Erlinghagen, M. (2008). Self-Perceived Job Insecurity and Social Context: A Multi-Level Analysis of 17 European Countries. *European Sociological Review,* **24,** 183–197.

Esping-Andersen, G. (2000). Who Is Harmed by Labour Market Regulations? Quantitative Evidence. In Esping-Andersen, G. and Regini, M. (Eds.). *Why Deregulate Labour Markets?:* Oxford University Press, pp. 66–98.

Esser, I. and Olsen, K. M. (2012). Perceived Job Quality: Autonomy and Job Security within a Multi-Level Framework. *European Sociological Review,* **28,** 443–454.

European Commission (2007). *Towards Common Principles of Flexicurity: More and Better Jobs Through Flexibility and Security.* Luxembourg: Office for Official Publications of the European Communities.

Furaker, B. and Berglund, T. (2014). Job Insecurity and Organizational Commitment. *Revista Internacional de Organizaciones,* 163–186.

Gash, V. (2008). Bridge or Trap? Temporary Workers' Transitions to Unemployment and to the Standard Employment Contract. *European Sociological Review,* **24,** 651–668.

Gash, V., and McGinnity, F. (2007). Fixed-Term Contracts – the New European Inequality? Comparing Men and Women in West Germany and France. *Socio-Economic Review* **5,** 467-96.

Gebel, M. and Giesecke, J. (2011). Labor Market Flexibility and Inequality: The Changing Skill-Based Temporary Employment and Unemployment Risks in Europe. *Social Forces,* **90,** 17–40.

Gebel, M. and Giesecke, J. (2016). Does Deregulation Help? The Impact of Employment Protection Reforms on Youths' Unemployment and Temporary Employment Risks in Europe. *European Sociological Review,* **32,** 486–500.

Giesecke, Johannes, and Groß, M. (2003). Temporary Employment: Chance or Risk? *European Sociological Review,* **19**, 161-77.

Giesecke, J. and Schindler, S. (2008). Field of Study and Flexible Work. A Comparison between Germany and the UK. *International Journal of Comparative Sociology* **49**, 283-304.

Golsch, K. (2003). Employment Flexibility in Spain and its Impact on Transitions to Adulthood. *Work, Employment & Society,* **17,** 691–718.

Green, F., Felstead, A. and Burchell, B. J. (2000). Job insecurity and the difficulty of regaining employment. An empirical study of unemployment expectations. *Oxford Bulletin of Economics and Statistics,* **62,** 855–883.

Güell, M. (2000). Fixed-term Contracts and Unemployment: An Efficiency Wage Analysis, Working Paper, Princeton University, Department of Economics, Industrial Relations Section, Nr. 433.

Hancock, J. I., Allen, D. G., Bosco F. A., et al. (2013). Meta-Analytic Review of Employee Turnover as a Predictor of Firm Performance. *Journal of Management* **39**, 573–603.

Heckman, J. and Pagés-Serra, C. (2000). The cost of job security regulation: evidence from Latin American labor markets. *Economía,* **1,** 109–154.

Holt, H. and Hendrickson, J. R. (2017). Turning pink slips into red tape. The unintended effects of Employment Protection. *Contemporary Economic Policy,* **35,** 421–438.

Kalleberg, A. L. (2009). Precarious Work, Insecure Workers: Employment Relations in Transition. *American Sociological Review,* **74,** 1–22.

Korpi, T. and Levin, H. (2001). Precarious Footing: Temporary Employment as a Stepping Stone out of Unemployment in Sweden. *Work, Employment and Society,* **15,** 127–148.

Lange, M. de, Gesthuizen, M. and Wolbers, M. H. J. (2014). Youth Labour Market Integration Across Europe. The impact of cyclical, structural, and institutional characteristics. *European Societies,* **16,** 194–212.

Lazarus, R. S. and Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer.

Lazear, E. P. (1990). Job Security Provisions and Employment. *The Quarterly Journal of Economics,* **105,** 699–726.

Lozza, E., Libreri, C. and Bosio, A. C. (2013). Temporary employment, job insecurity and their extraorganizational outcomes. *Economic and Industrial Democracy,* **34,** 89–105.

Maurin, E. and Postel-Vinay, F. (2005). The European Job Security Gap. *Work and Occupations,* **32,** 229–252.

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review,* **50,** 370-396.

Nickell, S. (1997). Unemployment and Labor Market Rigidities: Europe versus North America. *The Journal of Economic Perspectives*, **11,** 55-74

Noelke, C. (2016). Employment Protection Legislation and the Youth Labour Market. *European Sociological Review,* **32,** 471–485.

OECD (2004). OECD Employment Outlook. Paris: OECD.

OECD (2006). OECD Employment Outlook. Paris: OECD.

OECD (2014a). Non-regular employment, job security and the labour market divide. In: OECD Employment Outlook. Paris: OECD, pp. 141–209.

OECD (2014b). Calculating Summary Indicators of EPL Strictness: Methodology. http://www.oecd.org/els/emp/EPL-Methodology.pdf [accessed 19 April 2019].

Polavieja, J. (2003). Temporary contracts and labour market segmentation in Spain: an employment-rent approach. *European Sociological Review,* **19,** 501–517.

Sala, H., Silva, J. I. and Toledo, M. (2012). Flexibility at the Margin and Labor Market Volatility in OECD Countries. *The Scandinavian Journal of Economics,* **114,** 991–1017.

Scherer, S. (2009). The Social Consequences of Insecure Jobs, *Social Indicators Research*, **93,** 527-547.

Sverke, M. and Goslinga, S. (2003). The Consequences of Job Insecurity for Employers and Unions: Exit, Voice and Loyalty. *Economic and Industrial Democracy,* **24,** 241–270.

Sverke, M., Hellgren, J. and Näswall, K. (2002). No security. A meta-analysis and review of job insecurity and its consequences. *Journal of Occupational Health Psychology,* **7,** 242–264.

Thomas, W. I. and Thomas, D. S. (1928). *The Child in America: Behavior Problems and Programs.* New York: A. A. Knopf.

Wright, E. O. (2000). Working-Class Power, Capitalist-Class Interests, and Class Compromise. *American Journal of Sociology,* **105,** 957–1002.

Zeytinoglu, I. U., Yılmaz, G., Keser, A., et al. (2013). Job satisfaction, flexible employment and job security among Turkish service sector workers. *Economic and Industrial Democracy,* **34,** 123–144.

STUDY I

Always Looking for Something Better? The Impact of Job Insecurity on Turnover Intentions: Do Employables and Irreplaceables React Differently? Evidence From the ISSP[4]

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Abstract

This study contributes to the current research on the effect of job insecurity on turnover intentions by examining what happens to employees when job security is replaced with employment security. It analyzes whether perceived employability and irreplaceability (a) increase or decrease turnover intentions, or (b) buffer or intensify the negative effects of job insecurity on turnover intentions. The study focuses on an international context by using International Social Survey Programme (ISSP) data to assess the generalizability of the results. The findings show that perceived job insecurity increases turnover intentions in all countries. In addition, perceived employability increases turnover intentions in most countries, whereas weak evidence suggests that employees who feel irreplaceable are less likely to have turnover intentions. The results on the question about whether employees who feel employable or irreplaceable react differently to job insecurity – with respect to turnover intentions – vary widely between countries, and so a general conclusion about buffering effects cannot be drawn.

1. Introduction

Globalization and global competition increasingly demand that organizations must be competitive and flexible to survive. This pressure is passed down to employees who are confronted by less secure and stable employment relations (e.g., Eichhorst and Marx, 2011; Kalleberg, 2000, 2003) and the need for the workforce as a whole to adapt to fluctuations in market demand. Consequently, employees are faced with increasing levels of subjective job insecurity that has received growing recognition in current research (Cheng and Chan, 2008; Sverke et al., 2002).

Job insecurity, the perception that one's current job is in danger (Greenhalgh and Rosenblatt, 1984; for an overview, see Anderson and Pontusson, 2007), has many adverse effects on employees. Numerous studies indicate that for employees, job insecurity has a negative effect on job satisfaction (De Cuyper and De Witte, 2007; Zeytinoglu et al., 2013) and also spills over into other domains of life. Job insecurity also impairs psychological well-being (Dawson et al., 2017) and psychological health (Buffel et al., 2015; Chirumbolo and Areni, 2010; De Witte, 1999), marital satisfaction (Cheng et al., 2014), and even life satisfaction (De Cuyper and De Witte, 2007). Additionally, job insecurity has a significant impact on life planning; especially long-term commitments such as marriage, having children, or purchasing residential property are often delayed (Lozza et al., 2013).

Even though flexibility may lead to companies being more competitive, the higher levels of job insecurity that accompany this increased competitiveness not only have negative effects on employees but may be problematic for companies as well. An empirical consensus exists that perceived job insecurity causes a decrease in work attitudes, such as commitment to and trust in the company and a regression in work-related behavior like performance (for an overview, see Cheng and Chan, 2008; Sverke et al., 2002). Additionally, job insecurity has been shown consistently to increase turnover intentions (Berntson et al., 2010; Furaker and Berglund, 2014; Sverke and Goslinga, 2003), which is problematic since turnover intentions are a strong predictor of actual turnover (Allen et al., 2005). Turnover can be very costly due to the expensive search for and training of replacements (who need to acquire company-specific skills and knowledge) which may be one reason why turnover rates have been shown to negatively affect productivity and the financial performance of companies (Hancock et al., 2013). Therefore, job insecurity can also be linked to negative outcomes for companies.

In light of the adverse effects of job insecurity, it seems obvious that one would wish to counteract or at least buffer them. In recent debates, some have argued that job security

could be replaced by employment security, which means instead of providing employees with the security of staying long-term with a company, they are provided with the security of staying employed (Wilthagen and Tros, 2003). From this perspective, *employability*—"the individual's perception of his or her possibilities to achieve a new job" (Berntson et al., 2010: 225)—is seen as a substitute for job security at the individual level. At the country level, this idea of contractual flexibility combined with employment and income security has been promoted under the catchphrase "flexicurity" by policy makers (e.g. European Commission, 2007).

Regarding the individual outcomes of employees, the strategy of replacing job security with employment security could work. People who feel employable suffer less from burnout (Aybas et al., 2015) and experience fewer negative effects on their well being (Silla et al., 2009) and life satisfaction (Green, 2011), which means that the main effects of employability and job insecurity pull in opposite directions. Therefore if—within the flexicurity framework—job security is reduced and employability is increased, these opposing forces could possibly cancel each other out. Additionally to the main effect, an interaction effect may occur—in other words, employability seems to buffer the negative effects of job insecurity with respect to various outcomes other than turnover intentions (Aybas et al., 2015; Green, 2011; Silla et al., 2009). In these instances, very employable employees react less strongly to a reduction in job security. However, when looking at the relationship between an employee and employer, especially regarding turnover intentions, it is unclear whether employability could replace job security or act as a buffer. Instead, employability seems to rather increase turnover intentions (e.g., Berntson et al., 2010). If this is the case, both job insecurity and employability will increase turnover intentions. Additionally, it has been suggested that employees who feel employable respond stronger to job insecurity through even higher turnover intentions, compared to employees who feel less employable (Berntson et al., 2010), so a buffering effect also seems rather unlikely. This phenomenon is problematic for organizations since turnover induces separation and replacement costs and additionally causes problems due to loss of knowledge and skills (Hancock et al., 2013: 576). With respect to employees, this phenomenon also may have adverse effects.

Even though a turnover intention can be seen as a conscious decision that an employee makes when trying to cope actively with an unpleasant situation, turnover intentions also inherently imply uncertainty about a future work situation, since the

characteristics of a new (not yet found) job are unknown, which makes it difficult to plan ahead.

In addition to *employability*, perceived *irreplaceability*, which we define as an employee's perception of having very specific skills that the current organization will have difficulty replacing, could also play a role in the framework of the characteristics of coping with job insecurity. Whereas *employability* can be interpreted as the perceived external marketability of an employee (in the labor market) (Spurk et al., 2016: 290), *irreplaceability* is the perceived internal marketability (within the organization) (Spurk et al., 2016: 290),

As far as we know, no empirical study has analyzed the impact of an employee's perceived irreplaceability on turnover intentions or whether this perception might counteract or buffer the effect of insecurity on turnover intentions. In addition, since both the main effect of employability on turnover intentions (e.g., Berntson et al., 2010; Acikgoz et al., 2016) and the moderating effect of employability on the connection between job insecurity and turnover intentions have been studied only in single countries (Sweden: Berntson et al., 2010; Turkey: Acikgoz et al., 2016), we do not know whether the specific characteristics of the institutional context and labor market cause this effect, or whether the effect also exists in other countries and institutional contexts.

Our study adds to the current knowledge in the literature first by analyzing these connections in an international context by asking whether they are generalizable, and second by extending the framework of buffering factors between job insecurity and turnover intentions with the new concept of *irreplaceability*.

The research questions of this study are the following:

- What is the impact of job insecurity on turnover intentions?
- What is the impact of employability on turnover intentions?
- Can employability buffer the effect of job insecurity on turnover intentions?
- What is the impact of irreplaceability on turnover intentions?
- Can irreplaceability buffer the effect of job insecurity on turnover intentions?

In the next section, we derive our hypotheses for our research questions from empirical findings and theoretical considerations.

2. Empirical Findings and Theoretical Considerations

2.1. Job insecurity and turnover intentions

A great deal of previous research has discussed how job insecurity affects job-related behavior and attitudes. So far, we know that an increase in job insecurity leads to a decrease in job attitudes, such as organizational commitment, trust, and job-related behavior like performance (for an overview, see Cheng and Chan, 2008; Sverke et al., 2002).

Job insecurity and *job-related behavior and attitudes* are multidimensional concepts operationalized in different ways in various studies. *Job insecurity* usually refers to the subjective perception that one's current job may be lost involuntarily (e.g., Greenhalgh and Rosenblatt, 1984: 438; for an overview, see Anderson and Pontusson, 2007: 214). This perception can be *cognitive* or *affective* (Anderson and Pontusson, 2007; Borg and Elizur, 1992; Näswall and De Witte, 2003). The cognitive aspect relates to the cognitive estimation of job loss (the perceived probability of job loss), whereas the affective aspect is the evaluation of this perception, which refers to the fear, worry, or anxiety associated with job loss (Anderson and Pontusson, 2007: 4). We focus on the impact of cognitive job insecurity since affective job insecurity includes both cognitive job insecurity, perceived employability, and various factors not related to the labor market, such as the income of a partner and family responsibilities (see Anderson and Pontusson, 2007).

Job-related behavior and attitudes are conceptualized as *organizational commitment*, which includes several dimensions (Hirschman, 1970; Porter et al., 1974). One central dimension is the "definite desire to maintain organizational membership" (Porter et al., 1974: 604). Previous research usually has studied the opposite of this desire to stay with the company—*turnover intentions* (Berntson et al., 2010; Furaker and Berglund, 2014; Sverke and Goslinga, 2003). Since high turnover rates are costly for an organization because replacements have to be found and trained, the present study focuses on *turnover intentions*, which are the reported intentions to look actively for another job.

Studies have consistently shown that employees' intentions to leave an organization increase with perceived job insecurity (Berntson et al., 2010; Furaker and Berglund, 2014; Sverke and Goslinga, 2003; and for meta-analysis results, see Cheng and Chan, 2008; Sverke et al., 2002). This phenomenon can be explained by rational choice considerations (for an overview, see Kroneberg and Kalter, 2012) and by psychological contract theory (Rousseau, 1995).

Rational choice theory argues that decisions are made by weighing the expected utility and probability of the outcome of an action and the expected costs (Kroneberg and Kalter, 2012). With high levels of job insecurity, the utility of a finding a new, more secure job is high, which explains the higher turnover intentions of employees who feel their job to be insecure. Other things being equal, the instant probability of finding an acceptable job typically declines by around 20% during the first half-year of a job-search during unemployment (Gaure et al., 2012). However, a longer job search period pays off in terms of higher expected earnings once a job is obtained (Gaure et al., 2012). Therefore, it seems rational to be proactive and try to avoid unemployment and also to prolong available search time.

Psychological contract theory (Rousseau, 1995) makes the same prediction but for different reasons. Psychological contract theory suggests that an informal contract exists between an employer and an employee. The employee offers high productivity, devotion, and effort, whereas the employer delivers an adequate wage and a secure job (Rousseau, 1995). With the perception of job insecurity, this informal psychological contract seems violated, and thus, employees react to this violation with an increased probability to actively search for a new job. This leads us to our first hypothesis:

Job insecurity increases turnover intentions (H1).

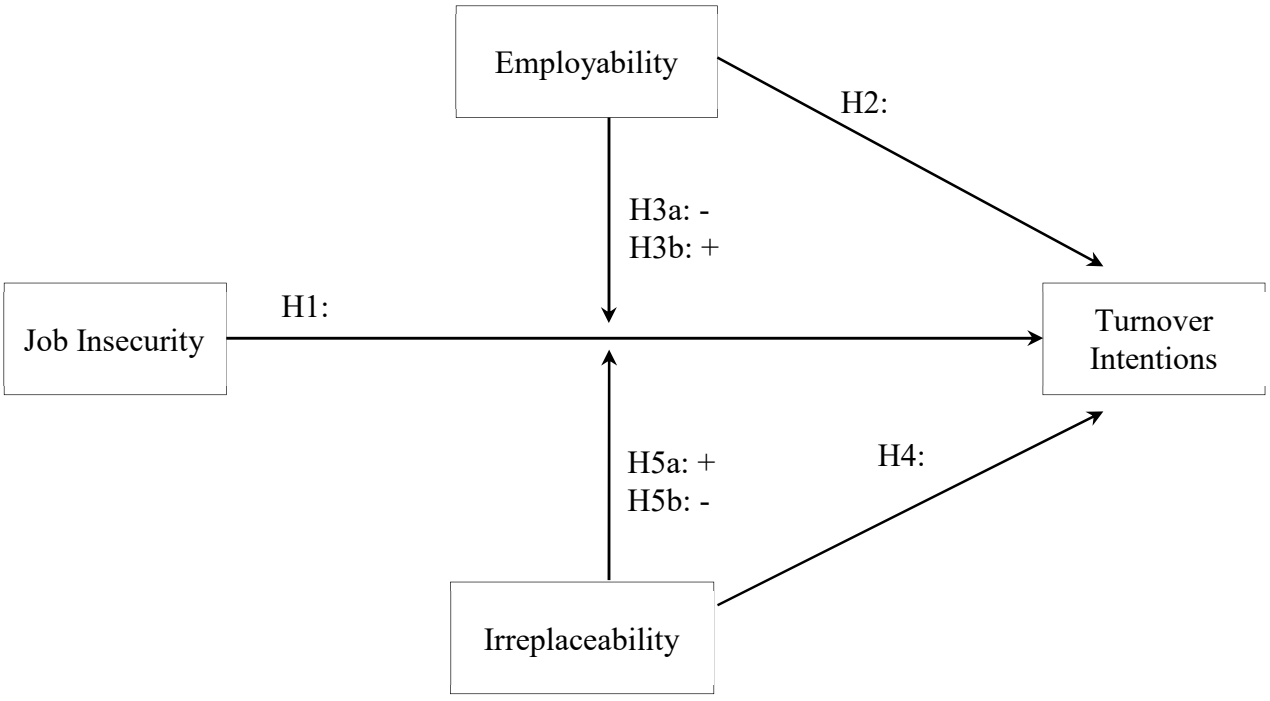

Figure 1. Overview of hypotheses.

Source: Author of the present study.

2.2. Employability and turnover intentions

A characteristic that is argued to be a substitute for job security, and which has been discussed recently in the literature in various contexts is *employability* (De Cuyper and De Witte, 2008; De Cuyper et al., 2008; Silla et al., 2009). Employability is affected by personal adaptability, career identity, and the assessment of personal resources, such as social and human capital (Fugate et al., 2004).

Employability has been shown to increase turnover intentions (e.g., Berntson et al., 2010). The main reason for this correlation is that employables have more opportunities outside their current company, which makes it more likely that they will encounter a more appealing offer. Within a rational choice framework (see Kroneberg and Kalter, 2012), this means that the costs for searching for a new job can be expected to be considerably lower, and the probability of actually getting a more attractive offer is higher. Considering these arguments, we assume the following:

Employable individuals are more likely to have turnover intentions (H2).

2.3. Buffer effect of employability

Empirical evidence has suggested that employability shapes reactions to job insecurity with respect to various outcomes. For example, employability buffers the negative effects of job insecurity on individual outcomes such as burnout (Aybas et al., 2015), well being (Silla et al., 2009), and life satisfaction (Green, 2011).

In addition, the Berntson et al. (2010) study also hypothesized that an employee's employability moderates the link between job insecurity and the probability of leaving an organization. In this study, the authors found that employability increases the effect of job insecurity on turnover intentions. Despite the finding of this study, when asking how employable individuals—compared to less employable individuals—would react to job insecurity with respect to their turnover intentions, two contradictory predictions seem plausible. Arguments for both outcomes can be derived from a rational choice perspective (see Kroneberg and Kalter, 2012) and psychological contract theory (Rousseau, 1995).

From a rational choice perspective, the costs for more employable individuals with respect to finding a suitable new job is lower than for less employable individuals. At the same time, the probability of finding a new job is higher for more employable individuals (see also H2). Therefore, employable individuals also perceive that they have more control over an insecure job situation and feel less threatened by it (Ganster and Murphy, 2000;

Lazarus and Folkman, 1984). Anderson and Pontusson (2007) have strengthened this argument by showing that individuals who think of themselves as employable are less concerned about losing their job. Since they are less concerned, they might also have fewer reasons to act when faced with job insecurity. Searching for a new job is costly, which explains, for example, why temporary employees make intense search efforts only 6 months before the end of their contracts (Kahn, 2012). Job searching demands temporal, psychological, and financial resources, even for employable individuals. Therefore, since job insecurity usually does not end in job loss, it might be more economical to wait. Even though employees' perceptions of job insecurity helps to predict actual job loss, respondents grossly overestimate the probability of job loss (Dickerson and Green, 2012). Even among those employees who were absolutely sure they would lose their job, only 40% of them actually lost their job (Dickerson and Green, 2012).

Especially in times of skill shortages, an organization generally provides continuing work opportunities for employees with high employability (Spurk et al., 2016). However, possibly they don't communicate their intentions clearly and ahead of time, which leaves the employees with feelings of insecurity for an extended length of time. However, only employable employees can afford to wait, since they can expect their job loss to be followed by short job search periods.

On the other hand, employees who perceive themselves as less employable might not be able to afford to wait for an organization's decision about whether or not they have a continuing job with the organization. Since they anticipate longer job search periods in case of job loss, they may be better off to start searching immediately for a new job, when they are faced with job insecurity. This scenario implies that employable individuals who experience job insecurity are more likely to wait, and less likely to look actively for another job.

From a psychological contract perspective (Rousseau, 1995), an argument can be made that for employable employees, job security might not be that important because of the reasons previously outlined. Therefore, they may not perceive job insecurity as such a severe breach of the informal contract.

If this line of argument is true, we would expect to observe the following:

Employability decreases the effect of job insecurity on turnover intentions (H3a).

However, psychological contract theory (Rousseau, 1995) also can be used to predict the opposite outcome. Since employees who perceive their job to be insecure may perceive

this insecurity as a breach of the informal contract, they may not feel obligated to fulfill their end of the deal. Job insecurity may feel especially unfair to employees who perceive their labor market value to be high and thus experience an even stronger reaction to job insecurity than individuals who feel less employable.

In addition, a rational choice argument for this outcome can be made. All employees feel uncomfortable when faced with job insecurity. Even though people who are employable worry less when faced with job insecurity, they still worry to some degree and have to deal with the situation. Employees often use two coping strategies to deal with unsatisfactory situations. First, they simply may evaluate the situation in another way to avoid feelings of dissatisfaction towards an otherwise unchanged situation (Lazarus and Folkman, 1984). Since they are less worried about job insecurity, they can try to accept it. This would predict H3a to be true. Second, an individual who is dissatisfied with her/his employment situation could try to change it (Lazarus and Folkman, 1984). The second coping strategy would predict that employees who experience job insecurity will try to leave their organization. Since the costs to find a new job are lower for employable individuals, and at the same time, the probability of a positive job search outcome is higher, the second coping strategy seems more attractive to employable individuals than less employable individuals.

This argument leads to the following assumption:

Employability increases the effect of job insecurity on turnover intentions (H3b).

2.4. Irreplaceability and turnover intentions

In contrast to employees with high *employability*, who possess high "marketplace bargaining power" (Silver, 2003: 13), employees with high *irreplaceability* possess high "workplace bargaining power" (Silver, 2003: 13), and therefore high "perceived internal marketability [which] describes the self-assessed value and employability of individuals for their current organization" (Spurk et al., 2016: 290).

We assume that this employee perception of *irreplaceability* stems from a personal evaluation of one's "workplace bargaining power." Therefore, it depends on his/her skills and resources, the demand for these skills within the company, and the supply of these skills and knowledge on the labor market (Silver, 2003: 13). Since this assessment is a subjective evaluation, it probably also includes some feedback from the organization.

It can be assumed that the perception of being irreplaceable also provides employees with a sense of purpose and self-worth, and can be interpreted as an additional utility within a rational choice framework (Kroneberg and Kalter, 2012). Therefore, one can expect that

employees who feel irreplaceable will be less likely to look for another place to work. From a psychological contract theory perspective (Rousseau, 1995), we would predict that this perception of irreplaceability further strengthens the employee's felt obligation towards the employer.

This leads us to the following hypothesis:

The perception of irreplaceability decreases turnover intentions (H4).

2.5. Buffer effect of irreplaceability

But how do individuals who think of themselves as irreplaceable react when experiencing job insecurity? Generally, as described in the preceding sections, employees who have accumulated organization-specific skills can be expected to demand more job security as a return on their investments—compared to employees who can be replaced easily—since they have accumulated more firm-specific capital that they would lose if they changed employers. Therefore, according to psychological contract theory (Rousseau 1995), employees who have accumulated organization-specific skills, and thus feel irreplaceable, may perceive feelings of job insecurity as especially unfair. This perceived breach of the psychological contract can be expected to lead to even greater intentions to leave the company.

Thus, if this is true, we would expect to observe the following:

Irreplaceability increases the effect of job insecurity on turnover intentions (H5a).

However, the story may be quite different when the perception of job insecurity is not actively produced by the organization (e.g., by using fixed-term contracts or giving ambiguous signals to employees) but rather is due to an external threat for which the organization is not responsible for (e.g., a problematic financial situation, difficult economic circumstances, drop in demand, high unemployment rate). Based on psychological contract theory (Rousseau, 1995), it can be assumed that when an organization makes an employee feel valuable, she/he will be even more loyal to the organization as a way to fulfill the informal contract mentioned earlier. Moreover, "irreplaceable" employees will be less threatened by drops in demand since it can be assumed that they would be the last to be dismissed. In addition, individuals who feel irreplaceable usually are well integrated into intra-organizational networks and communications, which provide them with better access to further opportunities (Spurk et al., 2016). If this is true, we would expect to observe the following:

Irreplaceability decreases the effect of job insecurity on turnover intentions (H5b).

The following section is an overview of the data and methods used to analyze these hypotheses.

3. Data and Methods

The empirical analyses are based on the 2005 survey of the International Social Survey Programme (ISSP Research Group, 2013).[1] The ISSP includes 31 countries: Germany, Great Britain, Ireland, Norway, Sweden, Spain, France, Portugal, Denmark, Switzerland, Flanders, Finland, Hungary, Czech Republic, Slovenia, Bulgaria, Latvia, Cyprus, Russia, Philippines, Israel, Japan, Taiwan, South Korea, Mexico, Dominican Republic, United States, Canada, Australia, New Zealand, and South Africa. Our sample includes all employees between the ages of 18 and 69.

In total, our target population included 24,811employees. We used list-wise deletion since it is most robust to violations of the Missing at Random-Assumption on the independent variables (Allison, 2001: 6). Due to missing values on our dependent and independent variables, 19,357 cases were available for analyses. Our sample consisted of 350 to 1085 respondents in each country, with a mean of 628 respondents (for an overview of the sample, see Appendix A).

The dependent variable in our analysis was *turnover intentions*, which was measured on a four-point answering scale (see Table 1). The independent variables— *job insecurity, employability,* and *irreplaceability*—were measured on a five-point answering scale.[2]

Table 1. Description of Central Variables

	Mean (SD)	Percent
Turnover intentions	1.98 (1.01)	
(How likely is it you will try to find a job within the next 12 months?)		
1 Very unlikely		41.18
2 Unlikely		30.58
3 Likely		17.66
4 Very likely		10.57
Job insecurity	2.37 (1.13)	
(My job is secure.)		
1 Strongly agree		23.23
2 Agree		40.62
3 Neither agree nor disagree		16.5
4 Disagree		15.09
5 Strongly disagree		4.56
Employability	2.64 (1.18)	
(Easy or difficult to find a job as good as the current job?)		
1 Very difficult		18.24
2 Fairly difficult		32.66
3 Neither easy nor difficult		22.95
4 Fairly easy		19.2
5 Very easy		6.95
Irreplaceability	2.75 (1.21)	
(Easy or difficult for the firm to replace you?)		
1 Very easy		17.32
2 Fairly easy		28.17
3 Neither easy nor difficult		25.21
4 Fairly difficult		20.46
5 Very difficult		8.85

Source: ISSP 2005; author of present study's own calculations.
Note: N=19,357 respondents

We included two groups of control variables in our models (for an overview, see Appendix A). The first group measured structural variables, such as working time (part-time vs. full-time), sex, age, and formal education (no formal education, lowest formal education, above lowest qualification, higher secondary completed, above higher secondary level, university degree completed), which have been shown to affect job insecurity (Berntson et al., 2010; Näswall and De Witte, 2003) and turnover intentions (Clark, 2001; Sousa-Poza and Sousa-Poza, 2007).

The second group of control variables accounted for eight important job characteristics that can be expected to influence turnover intentions. We used five items to measure the valued aspects of a current job (perception that income is high, job is interesting, possibility to work independently, possibility to help others, job is useful for society) and

four items to measure strains (exhaustion after work, work is physically hard, work is stressful, work is dangerous).

To test our hypotheses, we used a linear OLS regression. Since our substantial interest is in interaction effects, we decided against ordinal models, since they make the interaction extremely difficult to present and interpret. In addition, since we wanted to see whether or not the effects were identical (or similar) across countries in the dataset, we ran a separate regression analysis for each country in the data set and examined the coefficients across countries. In ordinal models, coefficients are not comparable across samples due to heterogeneity on unobserved variables (Mood, 2010), which is the second reason for using a linear model.[3]

In addition, we calculated the coefficients for geographical regions (with robust standard errors) to obtain a larger sample. This strategy served as an additional check for cases in which a significant effect could not be found in the countries. Thus, we were able to determine whether the non-existence of an effect was due only to a small sample size, and the resulting large confidence intervals. However, pooled results were only interpreted this way when the effects within a region pointed in the same direction for all included countries.

4. Results

This section presents the results of the regression analyses. We show the effects of *job insecurity*, *employability*, and *irreplaceability* on turnover intentions in three steps. Model 1 considers the main effect of job insecurity on turnover intentions. Model 2 adds the main effects of *employability* and *irreplaceability* on turnover intentions. Model 3 adds the interaction effects between employability and *job insecurity*, and *irreplaceability* and *job insecurity*. All three models also include control variables. Instead of presenting tables, we plotted the predicted linear effects of our central variables on turnover intentions. We also included the confidence intervals. For all graphs, we separately plotted the coefficients for each country.

Since the effect of job insecurity on turnover intentions is basically identical when employability and irreplaceability are included—which is due to the very low correlations between the three concepts (correlations between -0.09 and -0.01)—we only present the results from Model 2 (Figure 2) and Model 3 (Figure 3). Figure 2 displays the main effects of job insecurity, employability, and irreplaceability on turnover intentions in each country and region so to analyze how these three factors separately affect turnover intentions. The

figures present the point estimates for the predicted linear effects and the 95 percent confidence intervals.

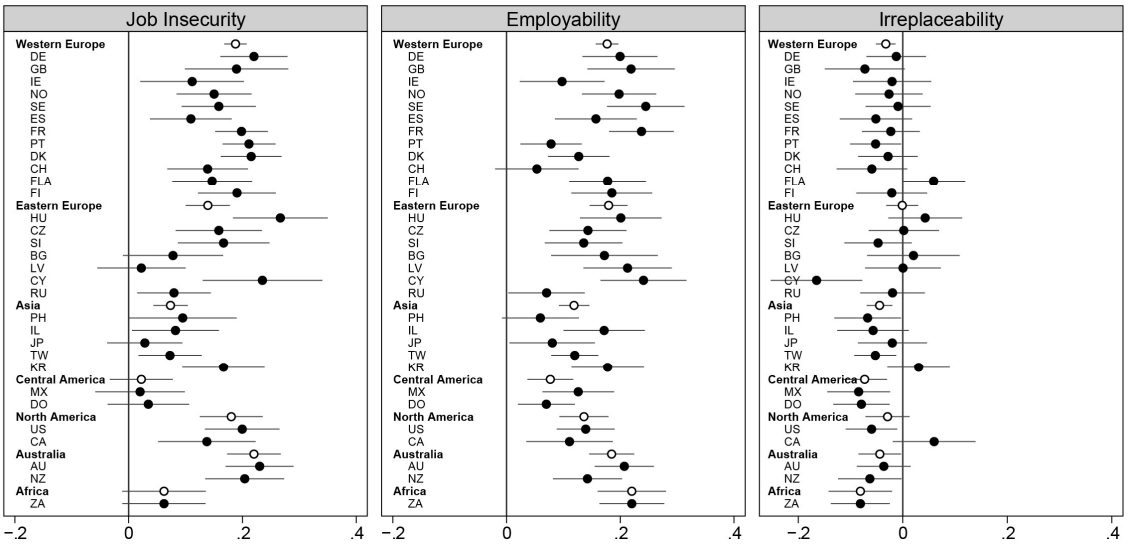

Figure 2. Effect of job insecurity, employability, and irreplaceability on turnover intentions.
Source: ISSP 2005; estimations from Model 2.
Note: Predicted linear effects on turnover intention and 95 percent confidence intervals.

In accordance with previous research, we found that in most countries, job insecurity significantly increases turnover intentions. We found very few exceptions (Bulgaria, Japan, Latvia, Taiwan, Dominican Republic, Mexico, South Africa) for which the effects were comparatively small and/or statistically not significant. Therefore, Hypothesis 1 can be confirmed—job insecurity increases turnover intentions—and this connection seems to be rather universal.

We also found that employability significantly increases turnover intentions in almost all countries. Very few exceptions exist for which the effect is not significant (Switzerland and Philippines). This finding supports Hypothesis 2. Feeling employable seems to make employees more inclined to look for another job.

With respect to irreplaceability, the effect differs strongly among countries. In many countries, although irreplaceability decreases turnover intentions, this effect is significant in only a few countries; moreover, in many countries, irreplaceability and turnover intentions seem unrelated; and in Canada, irreplaceability appears to rather increase turnover intentions (although not significantly). Since a lot of variation exists between countries and also a lot of uncertainty (indicated by the confidence intervals), larger samples would be necessary to achieve more certain conclusions. This goal can be achieved by pooling, although pooling

the data makes sense only when the effects in the various countries are similar. In Western Europe and Australia, this is the case, and we can see that in these two regions, feeling irreplaceable significantly reduces turnover intentions. However, the evidence for H4 is weak, since it could be confirmed only in some countries and two of the regions. Therefore, even though the perception of irreplaceability decreases turnover intentions in some countries, the effect does not seem to be universal, since it cannot be found in every country.

The results from Model 3 show the interaction effects of employability and irreplaceability and job insecurity on turnover intentions so to analyze whether employability and irreplaceability buffer the negative effect of job insecurity on turnover intentions (Figure 3). Again, the predicted linear effects and the 95 percent confidence intervals are displayed.

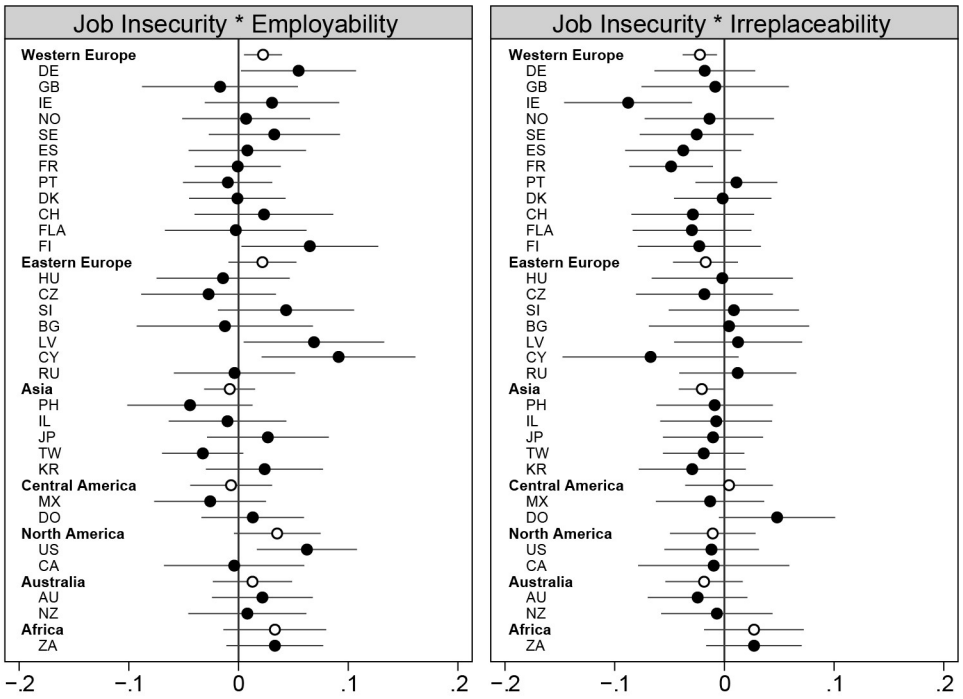

Figure 3. The moderating effects of employability and irreplaceability on turnover intentions.

Source: ISSP 2005; estimations from Model 3.
Note: Predicted linear effects on turnover intention and 95 percent confidence intervals.

We found a lot of variation among the included countries of our study with respect to the two moderators—employability and irreplaceability—and thus, we were not able to draw a general conclusion concerning our hypotheses. The interaction terms were not significant in most countries. We found some support for hypothesis H3b. The perception of employability significantly increased the effect of job insecurity on turnover intentions in

Germany, USA, Latvia, Cyprus, and Finland, which represent 5 of the 31 analyzed countries. The effects for all other countries were not significant in either direction.

Pooling the data in regions would not make sense in this case since the effects within the regions vary quite strongly and also point in opposite directions. However, no statistically significant evidence exists to support the hypothesis that the interaction effect could go in the other direction. Five countries were identified in which employability significantly increased the effects of job insecurity on turnover intentions, but not a single one was found in which employability significantly decreased the effects of job insecurity on turnover intentions. Therefore, it seems unlikely that H3a would be true. However, to answer our question—Does employability increase or decrease the effects of job insecurity?—we don't know for sure. In some countries, it seems to increase the effect, but that effect is neither strong nor universal.

The estimations for the interaction effect of job insecurity and the perception of irreplaceability also show a lot of variation and a lot of uncertainty (indicated by the large confidence intervals). For example, in Ireland and France, we found statistically significant support for hypothesis H5b. In these countries, the perception of irreplaceability decreases the effect of job insecurity on turnover intentions. However, a clear conclusion cannot be drawn.

Since the effects for the countries point in opposite directions in most regions, pooling the data in regions would not make much sense.

In summary, the moderating effects of employability and irreplaceability vary considerably across national contexts.

5. Discussion and Conclusion

The present study adds to current knowledge by investigating the effects of job insecurity, employability, and irreplaceability on turnover intentions. Additionally, we analyzed the impact of employability and irreplaceability on the relationship between job insecurity and turnover intentions. We examined whether these effects were universal or varied among the countries included in our study.

We can show that in most countries included in our study, job insecurity increases turnover intentions, which confirms the results from previous studies (Berntson et al., 2010; Furaker and Berglund, 2014; Sverke and Goslinga, 2003; and for meta-analysis results, see Cheng and Chan, 2008; Sverke et al., 2002) and shows that this connection is quite universal.

Since turnover intentions are a strong predictor for actual turnover (Allen et al., 2005), our results suggest that job insecurity induces "excess worker turnover" (Centeno and Novo, 2012: 321) initiated by employees, which means both sides change partner, but not labor market state – the employee keeps working, and the company maintains the same employment level. Since firm-specific human capital is lost when employees change their employer, this phenomenon seems damaging for both sides, and ultimately should reduce productivity at the macro level.

In most countries, employees who are employable are more inclined to look actively for another job, which suggests that this main effect of employability on turnover intentions—that has been found in previous studies (e.g., Berntson et al., 2010)—seems to be rather universal.

The implications of these findings are far-reaching since they raise questions about whether employability can be a replacement for job security. This argument, put forward and promoted by policymakers, suggests that job security and employability are substitutes: if job security is reduced and employability is increased, the outcome remains the same. In many contexts, this has been proven to be possible—at least to some degree. Increasing employability can counteract the negative effects of decreasing job security, for example, on mental health (Green, 2011), psychological distress (Silla et al., 2009), and burnout (Aybas et al., 2015), since the main effects of job insecurity and employability pull in opposite direction. However, with respect to turnover intentions, this is not the case. Both a reduction in job security and a rise in employability increase turnover intentions. This finding indicates that in a "flexicure" labor market—promoted by the European Commission (2007)—in which job security is low and employability is high, a considerable potential impact exists for companies who may experiencing especially high turnover rates.

The assumption concerning the interaction effect between employability and job insecurity—if employability is high enough, the effect of job insecurity is minimized or may disappear completely—is even stronger than the assumption about counteracting main effects. These buffer effects have been observed with respect to various outcomes other than turnover intentions (Aybas et al., 2015; Green, 2011; Silla et al., 2009).

Regarding turnover intention, a reinforcing interaction effect (rather than a buffer effect) has been observed by a previous study (Berntson et al., 2010). This study found that employability increased the effect of job insecurity on turnover intentions. In our study, however, the interaction effect varied greatly among the countries we included, which leads

us conclude that the interaction effect was not very strong or generalizable to all national contexts.

Feeling irreplaceable decreased turnover intentions in some countries, which indicates that companies may be able to increase stability by increasing their employees' company-specific human capital, although this main effect could not be established universally.

The results concerning the interaction effect were uncertain in our study. We did not find any strong evidence that irreplaceability increases or decreases the effect of insecurity on turnover intentions. Therefore, we do not know whether employees who feel irreplaceable have a stronger or weaker reaction to an increase in perceived job insecurity.

In our study, both interaction effects varied considerably. One possible explanation is that since we have identified two possible mechanisms that point in opposite directions (one predicting a positive and the other a negative interaction effect), both mechanisms might be true. Depending on which mechanism is stronger, the interaction effect could go either way.

A possible approach for further research to disentangle these effects would be to distinguish between different origins of perceived job insecurity. If these feelings are induced by the employer's use of fixed-term contracts or ambiguous signals, people who feel irreplaceable and have accumulated organization-specific skills or have high employability and feel very valuable might perceive the job insecurity resulting from these employers strategies as especially unfair, and thus would react with increased turnover intentions. However, if perceived job insecurity is caused by an external threat for which the organization is not responsible (e.g., a problematic financial situation, difficult economic circumstances, drop in demand, high unemployment rate), it can be assumed that when an organization helps an employee to feel valuable, she/he will be even more loyal to the organization as a way to fulfill the informal contract mentioned earlier. In this situation, employable employees might also react less strongly to an increase in perceived job insecurity, since their psychological contract was not violated, and they can afford to wait.

In addition, we found considerable country variations with respect to the effects of job insecurity, employability, and irreplaceability. Further research should investigate the causes of these differences across countries. It would be especially interesting to investigate the potential links between the effect sizes and employment protection legislation (EPL) and unemployment rates. Indications exist that EPL strongly influences the turnover intentions of employees who are not satisfied with their job (Gielen and Tatsiramos, 2012). Therefore,

EPL also may affect the turnover intentions of employees who are faced with job insecurity. The unemployment rate should make a difference since the effect of job insecurity on turnover intentions can be expected to differ, depending on whether job insecurity is induced by a company and attractive, more secure alternatives exist; or whether the job insecurity is related to an insecure labor market situation. Therefore it would be interesting to evaluate the influence of these macro variables on the effects of job insecurity, employability, and irreplaceability in further research.

Our study has some limitations. First, the effects we found cannot be interpreted as causal effects due to the methodological limitations of the cross-sectional design. Thus, it would be desirable to employ a longitudinal design. Second, unfortunately, we also were not able to use multi-item-measures for our independent and dependent variables, which would have made our measurements more exact. Although a more exact measurement might possibly help to uncover significant interaction effects, this seems rather unlikely considering the effects we found pointed in opposite directions.

Notes

1) For more information, see: http://www.issp.org/.

2) The correlations between the three variables were very low. For example, the correlation between *irreplaceability* and *job insecurity* was -0.09, and the correlation between *employability* and *job insecurity* was -0.04. The correlation between *employability* and *irreplaceability* was -0.01.

3) We decided against using a multilevel model with random slopes. Even though it offers the advantage of empirically testing whether coefficients vary across countries in our sample, the huge disadvantage is that information is very compressed, and the variation in coefficients is difficult to grasp (Bryan and Jenkins, 2016: 20; Bowers and Drake, 2005).

References

Acikgoz Y, Sumer HC and Sumer N (2016) Do employees leave just because they can? Examining the perceived employability–turnover intentions relationship. *The Journal of Psychology* 150(5): 666–683.

Allen DG, Weeks KP and Moffitt KR (2005) Turnover intentions and voluntary turnover: The moderating roles of self-monitoring, locus of control, proactive personality, and risk aversion. *The Journal of Applied Psychology* 90(5): 980–990.

Allison PD (2001) Missing Data. Thousand Oaks, CA: Sage. Anderson CJ and Pontusson J (2007) Workers, worries and welfare states: Social protection and job insecurity in 15 OECD countries. *European Journal of Political Research* 46(2): 211–235.

Aybas M, Elmas S and Dündar G (2015) Job insecurity and burnout: The moderating role of employability. *European Journal of Business and Management* 7(9): 195–202.

Berntson E, Näswall K and Sverke M (2010) The moderating role of employability in the association between job insecurity and exit, voice, loyalty and neglect. *Economic and Industrial Democracy* 31(2): 215–230.

Borg I and Elizur D (1992) Job insecurity: Correlates, moderators and measurement. *International Journal of Manpower* 13(2): 13–26.

Bowers J and Drake KW (2005) EDA for HLM: Visualization when probabilistic inference fails. *Political Analysis* 13(4): 301–326.

Bryan ML and Jenkins SP (2016) Multilevel modelling of country effects: A cautionary tale. *European Sociological Review* 32(1): 3–22.

Buffel V, Dereuddre R and Bracke P (2015) Medicalization of the uncertainty? An empirical study of the relationships between unemployment or job insecurity, professional care seeking, and the consumption of antidepressants. *European Sociological Review* 31(4): 446–459.

Centeno M and Novo ÁA (2012) Excess worker turnover and fixed-term contracts: Causal evidence in a two-tier system. *Labour Economics* 19(3): 320–328.

Cheng GH-L and Chan DK-S (2008) Who suffers more from job insecurity? A meta-analytic review. *Applied Psychology* 57(2): 272–303.

Cheng T, Mauno S and Lee C (2014) The buffering effect of coping strategies in the relationship between job insecurity and employee well-being. *Economic and Industrial Democracy* 35(1): 71–94.

Chirumbolo A and Areni A (2010) Job insecurity influence on job performance and mental health: Testing the moderating effect of the need for closure. *Economic and Industrial Democracy* 31(2): 195–214.

Clark AE (2001) What really matters in a job? Hedonic measurement using quit data. *Labour Economics* 8(2): 223–242.

Dawson C, Veliziotis M and Hopkins B (2017) Temporary employment, job satisfaction and subjective well-being. *Economic and Industrial Democracy* 38(1): 69–98.

De Cuyper N and De Witte H (2007) Job insecurity in temporary versus permanent workers: Associations with attitudes, well-being, and behaviour. *Work and Stress* 21(1): 65–84.

De Cuyper N and De Witte H (2008) Job insecurity and employability among temporary workers: A theoretical approach based on the psychological contract. In: Näswall K, Hellgren J and Sverke M (eds) *The Individual in the Changing Working Life.* Cambridge: Cambridge University Press, pp. 88–107.

De Cuyper N, Bernhard-Oettel C, Berntson E et al. (2008) Employability and employees' wellbeing: Mediation by job insecurity. *Applied Psychology* 57(3): 488–509.

De Witte H (1999) Job insecurity and psychological wellbeing: Review of the literature and exploration of some unresolved issues. *European Journal of Work and Organizational Psychology* 8(2): 155–177.

Dickerson A and Green F (2012) Fears and realisations of employment insecurity. Labour Economics 19(2): 198–210. Eichhorst W and Marx P (2011) Reforming German labour market institutions: A dual path to flexibility. *Journal of European Social Policy* 21(1): 73–87.

European Commission (2007) *Towards Common Principles of Flexicurity: More and Better Jobs Through Flexibility and Security.* Luxembourg: Office for Official Publications of the European Communities.

Fugate M, Kinicki AJ and Ashforth BE (2004) Employability: A psycho-social construct, its dimensions, and applications. *Journal of Vocational Behavior* 65(1): 14–38.

Furaker B and Berglund T (2014) Job insecurity and organizational commitment. *Revista Internacional de Organizaciones* 13: 163–186.

Ganster DC and Murphy LR (2000) Workplace interventions to prevent stress-related illness: Lessons from research and practice. In: Cooper CL and Locke EA (eds) *I/O Psychology: What We Know about Theory and Practice.* Oxford: Basil Blackwell, pp. 34–51.

Gaure S, Røed K and Westlie L (2012) Job search incentives and job match quality. *Labour Economics* 19(3): 438–450.

Gielen AC and Tatsiramos K (2012) Quit behavior and the role of job protection. *Labour Economics* 19(4): 624–632.

Green F (2011) Unpacking the misery multiplier: How employability modifies the impacts of unemployment and job insecurity on life satisfaction and mental health. *Journal of Health Economics* 30(2): 265–276.

Greenhalgh L and Rosenblatt Z (1984) Job insecurity: Toward conceptual clarity. *The Academy of Management Review* 9(3): 438–448.

Hancock JI, Allen DG, Bosco FA et al. (2013) Meta-analytic review of employee turnover as a predictor of firm performance. *Journal of Management* 39(3): 573–603.

Hirschman AO (1970) *Exit, Voice and Loyalty: Responses to Decline in Firms, Organizations and States.* Cambridge, MA: Harvard University Press.

ISSP (2013) *International Social Survey Programme: Work Orientation III – ISSP 2005.* GESIS Data Archive, Cologne. ZA4350 Data file Version 2.0.0, doi:10.4232/1.11648.

Kahn LM (2012) Temporary jobs and job search effort in Europe. *Labour Economics* 19(1): 113–128.

Kalleberg A (2000) Nonstandard employment relations: Part-time, temporary and contract work. *Annual Review of Sociology* 26: 341–365.

Kalleberg A (2003) Flexible firms and labor market segmentation: Effects of workplace restructuring on jobs and workers. *Work and Occupations* 30(2): 154–175.

Kroneberg C and Kalter F (2012) Rational choice theory and empirical research: Methodological and theoretical contributions in Europe. *Annual Review of Sociology* 38: 73–92.

Lazarus RS and Folkman S (1984) *Stress, Appraisal, and Coping.* New York: Springer.

Lozza E, Libreri C and Bosio AC (2013) Temporary employment, job insecurity and their extraorganizational outcomes. *Economic and Industrial Democracy* 34(1): 89–105.

Mood C (2010) Logistic regression: Why we cannot do what we think we can do, and what we can do about it. *European Sociological Review* 26(1): 67–82.

Näswall K and De Witte H (2003) Who feels insecure in Europe? Predicting job insecurity from background variables. *Economic and Industrial Democracy* 24(2): 189–215.

Porter LW, Steers RM, Mowday RT et al. (1974) Organizational commitment, job satisfaction, and turnover among psychiatric technicians. *Journal of Applied Psychology* 59(5): 603–609.

Rousseau D (1995) *Psychological Contracts in Organizations: Understanding Written and Unwritten Agreements.* Thousand Oaks, CA: Sage.

Silla I, De Cuyper N, Gracia FJ et al. (2009) Job insecurity and well-being: Moderation by employability. *Journal of Happiness Studies* 10(6): 739–751.

Silver BJ (2003) *Forces of Labor: Workers' Movements and Globalization since 1870.* New York: Cambridge University Press.

Sousa-Poza A and Sousa-Poza AA (2007) The effect of job satisfaction on labor turnover by gender: An analysis for Switzerland. *The Journal of Socio-Economics* 36(6): 895–913.

Spurk D, Kauffeld S, Meinecke AL et al. (2016) Why do adaptable people feel less insecure? Indirect effects of career adaptability on job and career insecurity via two types of perceived marketability. *Journal of Career Assessment* 24(2): 289–306.

Sverke M and Goslinga S (2003) The consequences of job insecurity for employers and unions: Exit, voice and loyalty. *Economic and Industrial Democracy* 24(2): 241–270.

Sverke M, Hellgren J and Näswall K (2002) No security: A meta-analysis and review of job insecurity and its consequences. *Journal of Occupational Health Psychology* 7(3): 242–264.

Wilthagen T and Tros F (2003) Dealing with the 'flexibility-security-nexus': Institutions, strategies, opportunities and barriers. *Working Paper 9*. Amsterdam Institute for Advanced Labour Studies, University of Amsterdam.

Zeytinoglu IU, Yılmaz G, Keser A et al. (2013) Job satisfaction, flexible employment and job security among Turkish service sector workers. *Economic and Industrial Democracy* 34(1): 123–144.

Appendix

Appendix A. Descriptive statistics of the variables within the sample.

	Included in the analyses	**Excluded due to missing on one or more variables**	**Min.**	**Max.**
	Mean (SD)	Mean (SD)		
Turnover Intentions	1.98 (1.01)	1.82 (1.00)	1	4
Job Insecurity	2.37 (1.13)	2.49 (1.17)	1	5
Employability	2.64 (1.18)	2.57 (1.20)	1	5
Irreplaceability	2.75 (1.21)	2.76 (1.24)	1	5
Part-time	17.11	19.93		
Female	48.01	48.54		
Education				
no formal education	8.70	12.22		
lowest formal education	10.42	15.10		
above lowest qualification	17.33	19.45		
higher secondary completed	21.91	21.66		
above higher secondary level	20.56	15.44		
university degree completed	21.07	16.13		
Age Groups				
18–29	20.60	21.42		
30–39	26.32	23.29		
40–49	27.71	26.84		
50–65	25.37	28.45		
Job Characteristics				
perception that income is high	2.76 (1.01)	2.61 (1.11)	1	5
job is interesting	3.81 (0.99)	3.72 (1.04)	1	5
possibility to work independently	3.75 (1.09)	3.82 (1.09)	1	5
possibility to help others	3.82 (1.00)	3.76 (1.02)	1	5
job is useful for society	3.86 (0.97)	3.83 (0.97)	1	5
exhaustion after work	3.34 (0.96)	3.27 (1.00)	1	5
work is physically hard	2.50 (1.29)	2.63 (1.30)	1	5
work is stressful	3.16 (1.06)	3.02 (1.09)	1	5
work is dangerous	2.08 (1.22)	2.04 (1.17)	1	5

Note: Standard deviations in brackets (not for dichotomous variables).
Source: ISSP 2005; unweighted results; N=19,357 (included in analysis).

STUDY II

Cross-National Variations in the Security Gap: Perceived Job Insecurity among Temporary and Permanent Employees and Employment Protection Legislation[5]

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Abstract

It is often shown that temporary employees generally perceive their job insecurity to be higher than permanent employees. However, substantial variations in this perceived job security gap exist between countries. This article engages with this knowledge and adds to it by focusing on these country variations and asking what role the strength of employment protection legislation (EPL) has both on the size of the job security gap and in explaining country differences.

The developed hypotheses suggest that the two components of EPL —job security provisions, indicating the 'protection gap' between permanent and temporary employees as well as specific regulations on the use of temporary contracts—will increase the job security gap. These hypotheses are tested using data from the European Social Survey for 2004 and 2010 and data on employment regulations from the OECD.

Compared to existing studies, this article offers a more detailed look at the operationalisation of job security provisions and regulations on temporary employment—proposing an alternative measurement which is more closely related to the theoretical arguments.

By using this more elaborate operationalisation, the multilevel model shows that the gap in perceived job security between temporary and permanent employees systematically increases with respect to the two components of EPL.

1. Introduction

Over the last decades, most European countries, faced with a growing demand for more flexibility, introduced so-called 'partial' or 'targeted reforms' that loosened regulations on the use of temporary contracts while still leaving job security provisions for permanent workers largely untouched (Maurin and Postel-Vinay, 2005). These reforms made it easier for employers to increase the flexibility of their workforce by using fixed-term contracts. This resulted in increasing numbers of temporary employees in Europe, which has created 'flexibility at the margin' (Sala et al., 2012).

This study evaluates the consequences of these temporary contracts on perceived job insecurity and the moderating role of the two different components of employment protection legislation (EPL): job security provisions and regulations on temporary contracts.

Employees with temporary contracts face a higher probability of becoming unemployed (e.g., OECD, 2006), even after taking a number of observable (Giesecke and Groß, 2003) and unobservable factors into account (Gash and McGinnity, 2007). Consequently, these employees report higher subjective job insecurity levels than permanent workers (Anderson and Pontusson, 2007; Erlinghagen, 2008; Esser and Olsen, 2012). In this study, subjective job insecurity refers to the cognitive evaluation that the current job will be lost involuntarily (for more details, see Anderson and Pontusson, 2007; Dixon et al., 2013).

This gap in subjective job insecurity is an essential dimension of social inequality since its negative effects extend far beyond work into various other domains of life. Employees who perceive their job to be insecure report lower job satisfaction (De Witte and Näswell, 2003; Sverke et al., 2002); suffer from decreased psychological and physical health (Buffel et al., 2015; De Witte et al., 2015) as well as lower well-being and life satisfaction (Carr and Chung, 2014; De Cuyper and De Witte, 2007); they also display differences in life planning, especially with respect to delaying long-term commitments, such as having children, getting married, or buying a house (Lozza et al., 2013). Since these negative consequences are not caused by objective job insecurity—such as temporary employment itself—but by perceived job insecurity (Golsch, 2003), knowledge about the perceptions of these fixed-term contracts on job insecurity is essential for understanding how strongly temporary employees are disadvantaged compared to permanent employees.

Although numerous studies have found a gap in perceived job insecurity between permanent and temporary employees (Anderson and Pontusson, 2007; Erlinghagen, 2008; Esser and Olsen, 2012), knowledge about differences across countries is sparse (Chung and Mau, 2014: 312). Since the implications of temporary employment on the risk of job loss vary

drastically across countries due to the strong variations in EPL (Blanchard and Landier, 2002; Centeno and Novo, 2012), the effect of temporary employment on perceived job insecurity cannot be expected to be constant across national contexts. In this case, the detrimental effect of temporary employment on various areas of life would also be expected to be much stronger in these countries.

The present study adds to current knowledge by analysing country differences in the size of the effect of temporary versus permanent employment, and by evaluating the role of *job security provisions* and *regulations on temporary contracts*.

The following sections develop hypotheses about how these two components of EPL influence the gap between temporary and permanent employees with respect to perceived job insecurity. The Methods section explains how these two components of EPL are operationalised, since this study argues that the standard approach of simply using the additive indices provided by the Organisation for Economic Co-operation and Development (OECD) is problematic and the items 'definition of unfair dismissals' and the regulations on temporary contracts (with respect to the maximum number of successive temporary contract and the maximum cumulative duration of temporary employment) are better suited for testing the hypotheses. Considerable country related variations are found in the perceived job insecurity of permanent and temporary employees. The multilevel model of the present study shows that both components of EPL—job security provisions and regulations on temporary contracts—increase the gap in perceived job insecurity of temporary and permanent employees. Lastly, the implications of these findings are discussed.

2. Empirical Findings and Theoretical Considerations

2.1. Perceived job insecurity: Its Causes and gaps in the literature

Subjective job insecurity is a multi-dimensional concept (Chung and Mau, 2014: 305; for an overview, see Anderson and Pontusson, 2007). Many scholars have pointed to the importance of distinguishing between the cognitive and affective aspects of job security (Anderson and Pontusson, 2007; Näswell and De Witte, 2003). The *cognitive aspect*—the perceived probability that the current job will be involuntarily lost—will be concentrated on here. This perceived job insecurity is an employee's subjective evaluation of his/her individual resources and the institutional context with respect to the likelihood of losing the current job. Factors influencing this assessment can be situated at the individual level, the level of the firm, or the country level.

At the individual level, a temporary (compared to permanent) contract is usually one of the factors that increases job insecurity the most (Anderson and Pontusson, 2007; Green et al., 2000; Erlinghagen, 2008; Esser and Olsen, 2012). Therefore, it is important to understand the conditions for which this is the case.

Previous research has argued that perceived job insecurity stems from a relative lack of power (Dixon et al., 2013: 1055). This approach matches with previous findings concerning the individual level. Employees who possess marketplace and workplace bargaining power (Wright, 2000), e.g. in the form of knowledge and skills that are valuable to the company, experience less job insecurity (Green et al., 2000). This finding also can be expressed as a simple rational choice argument: as long as a company expects the utility of keeping an employee to be higher than dismissing her/him, his/her job will be (and will be perceived to be) secure.

In addition to the individual characteristics of an employee, this rational choice calculation will also be influenced by country-level characteristics. In particular, the economic situation of a country and its labour legislation can be expected to influence decision making. The economic situation will impact the utility of keeping an employee. Consistent with this, a high unemployment rate has been found to increase perceived job insecurity (Berglund, 2015; Green et al., 2000; Erlinghagen, 2008; Esser and Olsen, 2012). On the other hand, EPL determines the possibilities and costs of keeping and dismissing employees. Since rules for dismissal differ immensely for permanent and temporary contracts, it seems evident that employees would be affected differently. However, studies looking in this direction have found only weak evidence. We know that a high unemployment rate and strict EPL reduce satisfaction

regarding job security only for temporary, not permanent, employees (Clark and Postel-Vinay, 2009). Studies that have identified significant effects on related questions (Berglund, 2015; Chung and van Oorschot, 2011) do not include a random slope for temporary employment in the multilevel models, which however leads to a severe underestimation of the confidence intervals. The results indicate that the effect of temporary employment on job insecurity is stronger in countries with strict EPL (Berglund, 2015) and stronger on employment security in countries with strict regulations on permanent employment (Chung and van Oorschot, 2011). If the random slope is included, however, (using the same dataset), employment regulations do not seem to explain differences in employment security between permanent and temporary employees (Chung, 2016). Additionally, these studies have a broader scope, concentrate more on the macro level and do not concentrate on EPL. This study looks at the connection more closely from a micro level perspective and asks: can EPL explain the effect heterogeneity of having a temporary contract? Additionally, it is also important to take a closer look at the measurement of EPL when studying this connection. EPL incorporates different dimensions. Recent research points to the importance of differentiating between regulations on the use of temporary contracts and job security provisions for permanent contracts (e.g., Noelke, 2016). Additionally, it is necessary to choose an operationalisation more closely related to the theoretical concepts than previous studies have done. In the next two sections, hypotheses are developed concerning how job security provisions for permanent contracts and regulations on the use of temporary contracts influence the gap between permanent and temporary employees.

2.2. EPL, job security provisions, and the protection gap

Generally, EPL is often expected to increase job security, since it limits companies' ability to hire and fire at will; however, in most studies, EPL is unrelated to perceived job insecurity (Dixon et al., 2013; Erlinghagen, 2008; Esser and Olsen, 2012); only one study has found that EPL decreases job insecurity (Anderson and Pontusson, 2007). However, these studies suffer from two shortcomings: first, they do not distinguish between the effects of EPL on permanent and temporary employees, and second, they use an index that includes both dimensions of EPL—job security provision and regulations on temporary contracts. The theoretical arguments, however, usually rely on the effect of job security provisions in decreasing job insecurity, and the role of regulations on the use of temporary contracts is neglected. Therefore, it is important to look at both dimensions separately.

Job security provisions reduce the permeability of the barrier between work and unemployment (Clark and Postel-Vinay, 2009). However, numerous labour market theories,

such as segmentation theory (Althausen and Kalleberg, 1981), differentiate between groups within the labour market, which could be affected differently. Typically, temporary contracts are seen as an attribute of the secondary labour market (Giesecke and Groß, 2003). The consensus among economists is that job security provisions deepen the gap between the unemployed and the employed. Additionally, these provisions also should widen the gap between temporary and permanent employees. In contrast to temporary contracts, which have an expiration date, permanent contracts are open ended. Therefore, if an employer wants to dissolve an employment relationship, permanent employees have to be actively dismissed while temporary contracts expire if no action is taken.

For permanent employees, job security provisions should increase perceived job security, since they increase dismissal costs (Gebel and Giesecke, 2011; OECD, 2013). The more difficult it is to dismiss employees, the less likely it is that they will lose their job because it would be complicated and costly for the firm. By increasing dismissal costs, job security provisions lower the threshold to which the utility of an employee can decline before she/he is dismissed (Cahuc and Zylberberg, 2004). These job security provisions for permanent employees can be interpreted as bargaining power on the part of employees. If perceived job insecurity stems from a lack of power (Dixon et al., 2013: 1055), job security provisions should decrease job insecurity for permanent workers. However, the situation is entirely different for temporary employees. Since, by definition, temporary contracts end automatically at a set date without any further employer obligations, job security provisions only protect temporary employees during the length of their contract. Once their contract ends, dismissal protection no longer applies and therefore can offer no protection. In contrast, if employers want flexibility on the number of people they employ and reduce their workforce, it is rational and the least costly to let the fixed-term employees go, since the expected costs of dismissing permanent employees are higher than not renewing the contracts of temporary employees. These predictions are based on the simple rational choice considerations of employers. If dismissal costs at the end of a temporary contract equal zero, the difference in dismissal costs between permanent and temporary employees equals the job security provisions for permanent employees. This difference constitutes the ‘protection gap’ between the two groups. Assuming, employees foresee these calculations made by the employer—this leads to the following hypothesis:

Hypothesis 1. The negative effect of temporary employment on perceived job security is stronger in countries with substantial differences in the dismissal costs between temporary and permanent employees (strong job security provisions).

2.3. Regulations on temporary contracts

Strict regulations on the use of temporary contracts are designed to prevent employers from the excessive use of these contracts that replace permanent jobs with temporary jobs. The regulations define which kind of work can be temporary and limit the number of successive temporary contracts and the cumulative duration of one employee with one employer. The last two aspects of these rules may be problematic for employees holding temporary contracts. If a successive temporary contract is not possible, employers face the decision of whether to transform the temporary contract into a permanent one or let the employee go. Especially when job security provisions are strong, transforming a temporary to a permanent contract increases dismissal costs steeply. Empirical evidence suggests that employers often prefer to hire on a temporary basis for the same position and replace the current temporary employee with a new one if a successive temporary contract is no longer possible (Blanchard and Landier, 2002; Centeno and Novo, 2012). Assuming that temporary employees recognise these considerations of their employer, either because it has been communicated to them or because they know about similar cases, this leads to the following hypothesis:

Hypothesis 2. The negative effect of temporary employment on perceived job security is stronger in countries with strict regulations on temporary contracts.

3. Data, Methods, Measurements

The analyses in the present study are based on individual-level data from Round 2 (2004) and 5 (2010) of the European Social Survey (ESS), both containing the rotating module 'Family, work and well-being' (ESS, 2010; for documentation of the data see: ESS, 2014). The ESS is a cross-national survey including 27 countries in 2010 and 25 countries in 2004.

These datasets are combined with country-level data. Countries, for which no comparable country-level data (for EPL) are available, are excluded from the analysis (for an overview see Appendix A3). The sample used here is restricted to employees between 15 and 67 years, and the target population includes 29,639 employees (2010: 17,370 in 22 countries;

2004: 12,269 employees in 17 countries). List-wise deletion is used, so due to missing data on the dependent and independent variables, 23,978 cases are available for analysis.

3.1. Outcome variable

The dependent variable *job insecurity* is measured by asking whether the statement 'My job is secure' is not at all, a little, quite, or very true. Of the study's sample, 14% feel very insecure, 21% a little insecure, 34% hardly insecure, and 31% not at all insecure. However, a considerable variation exists across countries. Figure 1 shows the proportion of permanent employees (solid bars) and the proportion of temporary employees (grey bars) who report that their job is very insecure. With only one exception, in all countries and both years, temporary employees feel more insecure than their permanent counterparts. However, the differences between the two groups vary considerably. The numbers to the right of the grey bars are the ratio of how many temporary employees feel insecure compared to their permanent counterparts.

In both 2004 and 2010, the largest ratio is found in Spain, where temporary employees are eight to nine times more likely than permanent employees to experience job insecurity.

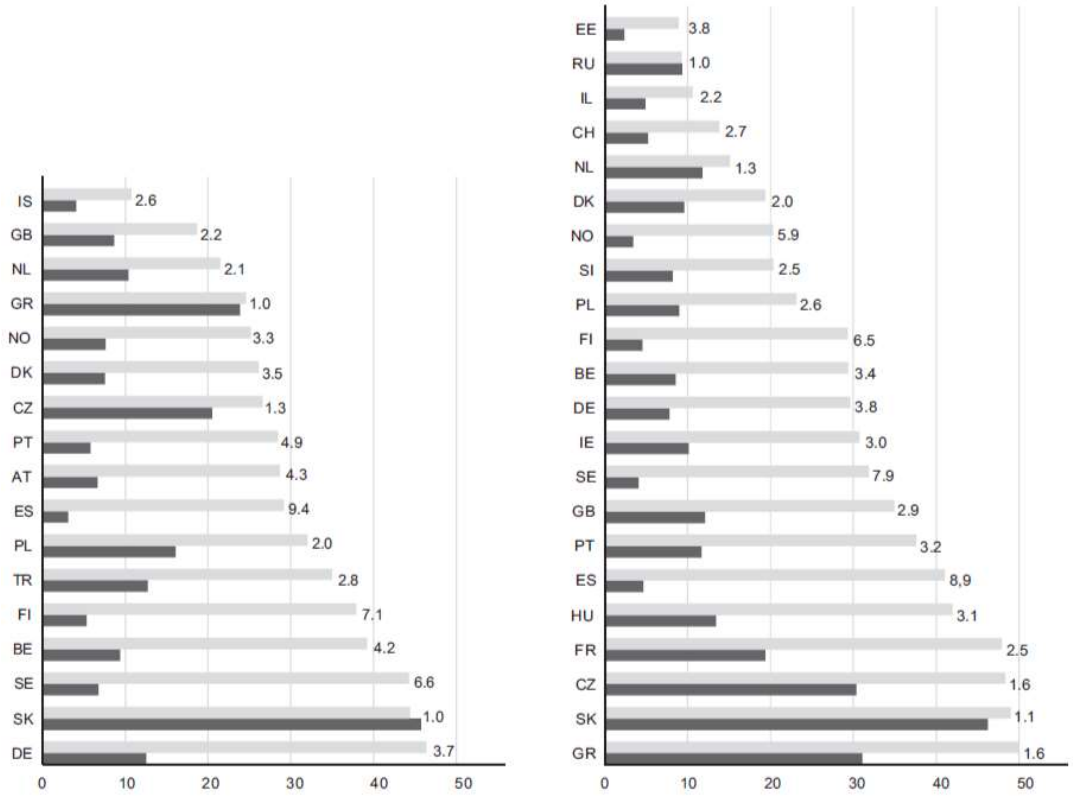


Figure 1. Distribution of perceived job insecurity

Note: Percentage of people in each country who judge their job to be very insecure.
Source: Weighted results ESS 2004 (left) and ESS 2010 (right).

3.2. Measurement of job security provisions and regulations on temporary contracts

The country-level data for *job security provisions* and *regulations on temporary contracts* measure the strictness of legislation in place on January 1, 2004, and 2010 respectively. This data is provided by the OECD (OECD, 2016; for details on the methodology, see OECD, 2013, 2014; Venn, 2009). The OECD provides 21 items, measuring different components of EPL that are combined into three additive indices on the strictness of EPL (for regular employment, temporary employment, and collective dismissals). These generalisations by construct indices have been used in previous studies on related questions (e.g. Berglund, 2015; Chung, 2016; Chung and van Oorschot, 2011). However, since they do not correspond very well to the theoretical argument set out here regarding the 'protection gap', the items are looked at to operationalise and test the hypotheses (see Appendix A1 for an overview of the items and indices).

Job security provisions

Of the nine items measuring EPL (for regular employment), the best-suited item for measuring job security provisions is *definition of unfair dismissal*, which is measured on a scale from 0 (no regulation) to 6 (strict regulation) and describes under which circumstances it is possible to dismiss employees. If a dismissal is just, it cannot be overturned by a court and therefore most accurately measures the legal protection gap. If worker capability or the redundancy of the job are adequate grounds for dismissal, all other factors should carry very little weight for dismissal costs. Within the index 'EPL regular' however this item only carries a very small weight. The other items (which constitute more than 90% of the index) measure various aspects of dismissal regulations but not protection against dismissal and are therefore disregarded.

Two items measure the consequences of an unfair dismissal. However, strong repercussions following unfair dismissal do not protect employees, if the threshold in court, to consider a dismissal unfair, is extremely high; in this case, *definition of unfair dismissal* assumes the value 0.[1] Another item—*duration of trial period*—measures the time when the protection gap does not exist but does not measure its size.

2/3 of the index 'EPL regular' consist of 'procedural inconveniences' and 'notice periods and severance pay'. Procedural inconveniences, such as notification and consultation requirements are inconvenient for the employer but do not protect employees from losing their

job if a dismissal is defined as just. Notice periods and severance pay (for just dismissals) impose dismissal costs, however, in some countries, temporary employees also are entitled to severance pay at the end of their contract, so severance pay does not cause a protection gap between permanent and temporary employees. Even though notice periods delay dismissals they do not prevent them. Additionally, this indicator assumes its maximum (coded with 6) at more than 3.5 months. This should not increase dismissal costs noticeably.

In the present study sample, almost half the countries are coded with 0, which means that regarding the *definition of unfair dismissal*, worker capability or the redundancy of the job are adequate and sufficient reasons for dismissal. In another large group, 'a transfer and/or retraining to adapt the worker to different work must be attempted prior to dismissal' is coded with 4 (see Appendix A2 for the coding scheme; see Appendix A3 for country characteristics).

Regulations on temporary contracts

The strictness of the regulations on temporary contracts is measured by an additive index, which combines two items (out of the 8 items measuring EPL for temporary employees)—the maximum number of successive contracts and the maximum cumulative duration (for more details, see OECD, 2013; Venn, 2009). The two are 'strategic substitutes'—independent strategies for countries to limit the use of temporary contracts of an employee with one company[2]. This independence also shows in the correlation of the two dimensions (-0.22), so countries use one of the two strategies. These two items make up only 25 per cent of the normally used index 'EPL temporary'. The other items measure various aspects of temporary work regulations that are not related to limitations of temporary contracts with one company. One item indicates regulations on what type of work is allowed to be temporary. This regulation prevents employers from replacing permanent jobs with temporary jobs and regulates entry into temporary employment, but it should not impact employees who hold a temporary contract. Other items measure regulations on temporary work agency employment, which is also not related to the present argument.

Within this study's sample, the strictness of the regulations on temporary contracts ranges between 0 and 4.

As an additional robustness check, the two dimensions of EPL regulations—job security provisions and regulations on temporary contracts—are also combined into three *employment protection types*, differentiating between *regulated labour markets*, *partially deregulated labour markets* and *flexible labour markets* (see Online Appendix for discussion and results).

3.3. Control Variables

This study relies on previous research to identify the variables to be included as controls in the multilevel model. On the individual level, previous research has found that company-specific human capital (Green et al., 2000) (measured by tenure or training period) reduces job insecurity, whereas general human capital (measured by years of education or educational degree) is unrelated to job security (Green et al., 2000; Erlinghagen, 2008; Esser and Olsen, 2012) as long as specific human capital is controlled for. Previous spells of unemployment increase perceived job insecurity (Chung and van Oorschot, 2011; Erlinghagen, 2008), which indicates that past experiences can sensitise individuals. The results concerning gender, age, having children, and part-time employment (Anderson and Pontusson, 2007; Green, 2000; Erlinghagen, 2008) are inconclusive—most likely no effects or only small effects are attributable to these characteristics. However, they are still included as controls. So, on the individual level, general human capital, specific human capital, age, part-time employment, sex, having a child, and unemployment experiences are all included as controls.

At the company-level, perceived job insecurity has been found to be lower in larger companies (Green et al., 2000). Differences also seem to exist across different industries (Erlinghagen, 2008). Therefore, company size and industry are included as controls.

To gain unbiased estimates of the security gap, all macro-level variables that 1) have a causal effect on the outcome variable (which is the size of the security gap) and 2) the independent variables of interest (job security provisions and regulations on temporary contracts) have to be controlled.

To identify factors that could influence the size of the security gap, theoretical arguments are considered. Additionally, factors that have so far been shown to influence perceived job insecurity are looked at more closely. At the country-level, previous research has found little evidence for strong predictors─except for the unemployment rate. It is possible that permanent and temporary employees might be affected differently as it is more difficult to terminate permanent employees, compared to not renewing fixed-term contracts. If an imbalance in labour demand and supply exists, temporary employees are especially at risk of not having their contract renewed. Therefore, both the main and the interaction effect of the *unemployment rate* (the percentage of the labour force aged 15–74 years who are currently unemployed but actively seeking work), provided by the International Labour Organisation (ILO 2015) are included as controls.

According to previous studies, factors such as *aggregated job stability*, *GDP growth*, *social security* (Erlinghagen, 2008), and *unemployment benefits* (Esser and Olsen, 2012) are

unrelated to perceived job insecurity. Although some indications exist that *union density* and *part-time rate* decrease perceived job insecurity (Dixon et al., 2013; Esser and Olsen, 2012), these results are quite sensitive to the other indicators included in the study. Even if they do not influence levels of job insecurity, they may still influence the gap between permanent and temporary employees with respect to job insecurity. However, a strong argument for any of these or other factors has not been made, or any evidence found. Therefore, they are not included as controls.

The most likely of these factors to influence the perceived security gap is *GDP growth*. It identifies the economic climate and might influence insecurity mainly by affecting unemployment. This factor however is already controlled for more directly by including the *unemployment rate*.

3.4. Methods

Since the data is clustered in countries, a multilevel model is estimated. To maximise the number of cases on the macro level, the samples for 2004 and 2010 are pooled, and country-years are used as the second level. To check for robustness, however, the models are also calculated separately for both years (see Online Appendix).

Although job insecurity is only measured on a four-point answering scale, a linear multilevel model is used, since the focus of the study is on interaction effects and ordinal models make interaction terms extremely difficult to present and interpret. In contrast to the commonly used binary model, this approach does not discard information. To check for robustness, results from the linear model were compared with the ordinal results (see Online Appendix). The latter pointed in the same direction and led to the same conclusions.

4. Results

At first, empty models are estimated without any covariates. 13.9 per cent of the total variance of job insecurity is due to country-year-level variability, which is a sizeable portion (Raudenbush and Sampson, 1999). In Model 1, only the individual and company level controls and the main effects of the country level variables─job security provisions, regulations on temporary employment and the unemployment rate─are included, replicating findings of previous research. Model 2 additionally includes the interaction terms to evaluate which factors can explain the variations in the gap in perceived job security between permanent and temporary employees. For both models, a random slope is included for the effect of temporary

employment, to see whether effect heterogeneity is present and needed explaining, and if so, what proportion can be explained by the cross-level-interactions that are introduced.

Table 1. Results of the multilevel analysis

	Model 1		Model 2	
Fixed-term contract (FTC)	0.524**	(0.048)	0.211	(0.137)
Country variables				
Job security provisions	-0.004	(0.024)	-0.037	(0.028)
Regulations on temporary employment	0.005	(0.051)	-0.059	(0.059)
Unemployment rate	0.023*	(0.012)	0.023+	(0.014)
Cross-level-interactions				
FTC*Job security provisions			0.050*	(0.021)
FTC*Regulations on temporary employment			0.096*	(0.045)
FTC*Unemployment rate			0.001	(0.010)
	individual and company level controls are included			
Constant	1.713**	(0.163)	1.917**	(0.184)
Variance components				
FTC (Random slope)	0.073	(0.020)	0.057	(0.017)
Country	0.127	(0.032)	0.120	(0.030)
Covariance (FTC, cons)	-0.057	(0.021)	-0.045	(0.020)
Individual	0.830	(0.008)	0.830	(0.008)
Explained variances				
Explained variance of random slope[a]	-		0.227	
R^2 (Individual)[b]	0.107		0.110	
R^2 (Country)[b]	0.229		0.230	
M	39		39	
N	23978		23978	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses.
All individual and company level controls are included. For complete results see Appendix A5.
a Reduction in variance = $(var(FTC)_{M1} - var(FTC)_{M1})/ var(FTC)_{M1}$
b R-squared as proposed by Snijders and Bosker (1994: 350-354), also see Snijders and Bosker (1999: 99-105).
Source: Estimations from the random intercept and random slope model (Restricted maximum likelihood); ESS 2004 and 2010.
2004: AT, BE, CZ, DE, DK, ES, FI, GB, GR, IS, NL, NO, PL, PT, SE, SK, TR;
2010: BE, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IL, NL, NO, PL, PT, RU, SE, SI, SK.

The Model 1 results (without cross-level interactions) showed that temporary employees feel considerably more insecure than permanent employees, which confirmes the results of previous research (Anderson and Pontusson, 2007; Erlinghagen, 2008; Esser and Olsen, 2012). The variance of the slope of temporary employment is significant, indicating that effect heterogeneity exists that needs to be explained. This model finds that the main effects of both components of EPL—job security provisions and regulations of temporary employment—do not significantly influence perceived job insecurity, which is also in line with previous findings (Dixon et al., 2013; Erlinghagen, 2008; Esser and Olsen, 2012). Also reflecting

previous findings (Berglund, 2015; Green et al., 2000; Erlinghagen, 2008; Esser and Olsen, 2012), the unemployment rate significantly increases perceived job insecurity. In Model 2 the interaction terms are included. The results show that the gap in the perceived job insecurity of temporary and permanent employees significantly increases with job security provisions and regulations on temporary contracts.

Evidently, temporary employees feel more insecure compared to permanent employees when job security provisions are strong, possibly because they perceive the difference in contractual power between themselves and permanent employees, which confirms Hypothesis 1. Temporary employees also experience more job insecurity compared to permanent employees when regulations on temporary contracts are strict, which confirms Hypothesis 2. One possible explanation is that temporary employees anticipate that employers would rather dismiss them than make their contract permanent when a successive temporary contract is no longer possible. 23 per cent of the variance of the random slope can be explained by the cross-level-interaction terms. These relationships (and especially their size) can best be shown by conditional effect plots (Figure 2). Job security provisions and regulations on the use of temporary contracts vary between their empirical minimum and maximum, respectively. The solid line indicates the predicted effect of temporary employment on perceived job insecurity, and the grey area the 95% confidence interval.

With respect to the strictness of job security provisions (which varies in the present study sample between 0 and 5), the gap increases from 0.42 to 0.67. With respect to the regulations on temporary contracts, the gap increases from 0.35 to 0.73.

These effects are quite strong, considering that the dependent variable is only scaled from 1 to 4.

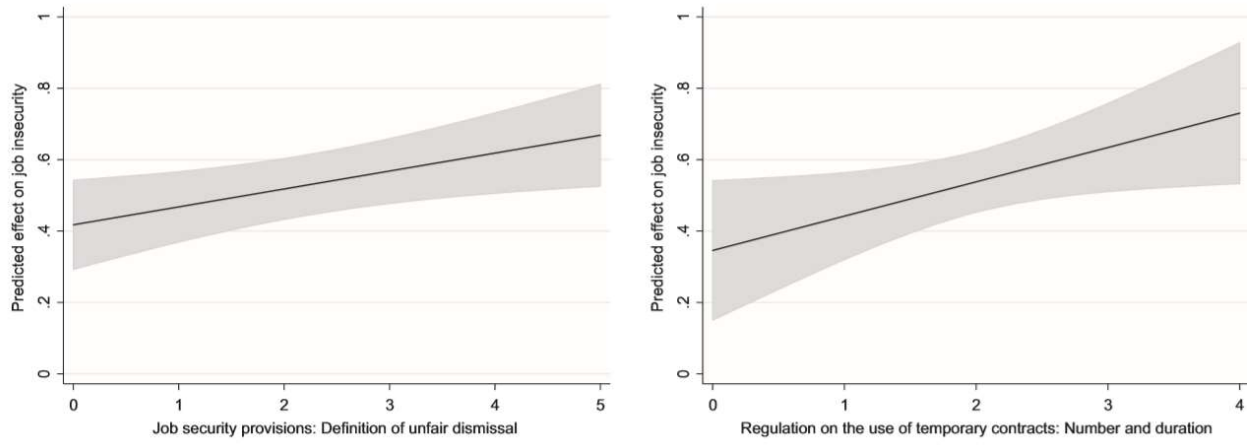


Figure 2. Effect of temporary contracts on perceived job insecurity

Source: ESS 2004 and ESS 2010, based on estimation from Table 1, Model 2.

The outcomes from the model using *employment protection regimes*, which are used as a robustness check (see Online Appendix), confirm the results. The temporary contract penalty is largest in regulated labour markets and smallest in flexible labour markets; in partially deregulated labour markets the size is in between (see Online Appendix for country characteristics, complete results and discussion).

When looking at the control variables, it is clear that the unemployment rate is not related to the job insecurity gap─it increases insecurity for both temporary and permanent employees. However, there might be a three-way interaction: the unemployment rate will increase the security gap only if job security provisions are strong. Unfortunately, there are not enough cases available at the macro level to test this.

Individual variables confirm the results from previous research. In particular, firm-specific human capital decreases perceived job insecurity, whereas previous unemployment experiences increase it (see Appendix A5 for a complete regression table).

Multilevel modelling is problematic with a data set including only 39 cases on the macro level, if one is interested in cross-level interactions. As a rule of thumb, usually 50 cases are required on level 2 if the interest is in interaction effects (Hox, 2010). Here a Restricted Maximum Likelihood Estimation is used, which is much more conservative and realistic than a Full Maximum Likelihood Estimation. Even though the results are unbiased, the estimates can be rather uncertain (Bryan and Jenkins 2016:7). The model pooling the two datasets (using 39 country-years), however, yields fairly stable results. When estimating the models separately for each year, the effects are still found but are very uncertain (see Online Appendix).

To check for robustness, the DFBETAs are calculated on the country-year level, for both interaction effects, by alternately dropping country-years and re-estimating the model (see Appendix A6). There are quite a few influential cases. The interaction effect of temporary employment and job security provisions varies between 0.043 (without Spain 2010) and 0.059 (without Belgium 2004). The interaction effect of temporary employment and regulation of temporary employment is estimated as between 0.074 (without the Czech Republic 2004) and 0.112 (without Denmark 2004). Since there is no random sample on the macro-level, this constitutes a rough estimation of the credible intervals using a different approach than the confidence intervals.

Additionally, a two-step model is estimated, fitting separate linear regressions on job insecurity in each country-year (including the individual and company level controls) and

plotting the effects of temporary employment from these 39 OLS-regressions against job security provisions and regulation on temporary employment respectively (Figure 3).

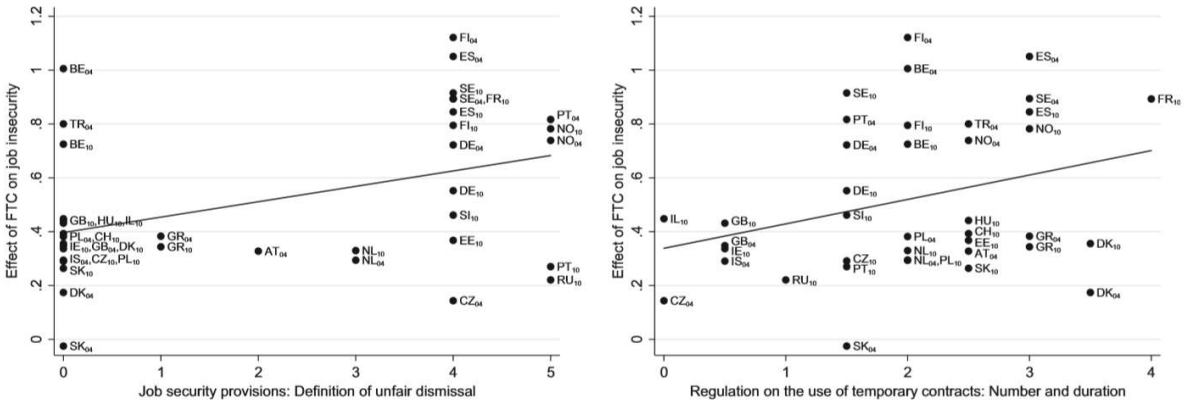


Figure 3. Effect of temporary contracts on perceived job insecurity plotted against both dimensions of EPL

Note: Separate OLS regression were estimated within each country-year including all individual and company-level controls
Source: ESS 2004 and ESS 2010, author's calculations

The graphs can identify influential countries and show the distributions of both the independent variables and the effect of temporary contracts in the different countries.

These diagnostics help to clarify the reliability of the findings. Even though the effects are quite robust, the size of the effects should be interpreted with caution. The sample of countries is not a random sample, and there are influential observations, which strongly influence the estimates. If these countries were excluded, the estimates would change noticeably. Even though pooling the two years helps increase the sample size, the confidence intervals and also the credible range of the interaction effects (as indicated by the estimates when dropping influential outliers) is quite large. Therefore, replication with other data would be desirable to further narrow the size of the effect (see Replication Package).

5. Summary, Discussion, and Conclusion

The results indicate that in relation to perceived job insecurity, temporary employees feel more insecure about their job than permanent employees, which is in line with numerous previous findings (e.g., Anderson and Pontusson, 2007; Erlinghagen, 2008; Esser and Olsen, 2012). Additionally, the study finds that this perceived job security gap varies strongly between countries. In contrast to previous studies that have only found weak or no evidence—either

because the model does not include the random slope or because no significant effects can be found— the study reveals that the gap between permanent and temporary employees regarding perceived job security significantly increases with strong job security provisions and strict regulations on temporary contracts. This is probably due to two advances made in this study compared to previous research. The operationalisation of job security provisions and regulations on temporary contracts, using only the items that are closely related to the theoretical arguments, measure the intended concepts more effectively. Additionally, increasing the number of cases on the macro level by analysing two datasets (ESS 2004 and ESS 2010) yields more exact estimates compared to studies that only use one (usually with fewer than 20 cases on the country level).

This means that the effect of temporary employment is much more pronounced when both components of EPL are strong. These results highlight the need to take country differences regarding the nature of temporary contracts into account when investigating the effects of these contracts on various outcomes (e.g., health, stress, fertility decisions, etc.), since for these outcomes the causal chain includes *perceived* job insecurity.

To evaluate the implications of this finding, one should keep in mind that the share of temporary workers is positively correlated with job security provisions, since these provisions increase the incentives to hire on a temporary basis, which, in turn, increases the percentage of temporary workers and the size of the 'buffer stock' (Polavieja, 2003). Therefore, it can be expected that EPL will lead to a higher segregation of the labour market, since both the detrimental effects of having a fixed-term contract and the share of employees affected increase with job security provisions.

Additionally, research has shown that temporary contracts are concentrated among young people (Gash and McGinnity, 2007), which might have severe consequences. Particularly at this stage of both entering the labour market and transitioning into adulthood, a significant number of important decisions—like having children, marriage, buying a house—will be made that will be influential for decades to come. Therefore, careful planning is of particular importance at this stage (Hellevik and Settersten, 2013) but job insecurity limits the capability to do so freely and effectively.

However, when looking at the distribution of risks associated with the labour market one should keep in mind that job insecurity is only one aspect. If an employee expects to find a similar or better job immediately, the perspective of losing a current job is less frightening (Berglund, 2015). These expectations are also distributed very unequally; older employees in particular anticipate great difficulties in this regard (e.g. Green et al., 2000). For this reason, an

equal distribution of job insecurity does not equate to an equal risk distribution concerning perceived labour market risks.

Considering the regulations on temporary contracts (with respect to the cumulative duration of temporary contracts and the number of temporary contracts), the findings of the present study suggest that temporary employees would benefit from deregulation. However, if these regulations were lifted the potential for temporary contracts becoming permanent seems even more unlikely, since employers are never forced to make a decision.

The design of the present study has some limitations, however. Concerning the validity of the effect—the study looked at country differences concerning the effects of temporary employment—depending on both components of EPL—in a cross-sectional way. Therefore, causal inferences are difficult to draw since these models rest on strong assumptions. Future research should, therefore, look at perceptions of job insecurity in a longitudinal study. Although some efforts have been made in this direction (Lübcke and Erlinghagen, 2014), a longitudinal research design presents serious challenges: since EPL is quite stable over time (OECD, 2004), there might not be enough variation in the independent variable. Therefore, a design that clearly identifies causal effects is quite difficult to operationalise due to the limitations of available data.

Notes

(1) Alternatively, it also would make sense to combine these consequences following unfair dismissal and the probability of unfair dismissal in a multiplicative index. When using this operationalisation, the results were very similar (see Online Appendix).

(2) To check this assumption, the two items are also separately included in the models. Both items influence job insecurity similarly and can, therefore, be combined (see Online Appendix).

References

Althausen, R. P. and Kalleberg, A. L. (1981). Firms, Occupations, and the Structure of Labour Markets: A Conceptual Analysis. In Berg, I. (Ed.), *Sociological Perspectives On Labour Markets.* New York: Academic Press, 119-149.

Anderson, C. J. and Pontusson, J. (2007). Workers, worries and welfare states: Social protection and job insecurity in 15 OECD countries. *European Journal of Political Research,* **46,** 211–235.

Berglund, T. (2015). Flexicurity, Job Insecurity, and Well-Being in European Labor Markets. In Vuori, J., Blonk, R. and Price, R. H. (Eds.), *Sustainable working lives. Managing work transitions and health throughout the life course.* Dordrecht: Springer (Aligning perspectives on health, safety and well-being), 145–167.

Blanchard, O. and Landier, A. (2002). The Perverse Effects of Partial Labour Market Reform: fixed-Term Contracts in France. *The Economic Journal,* **112,** 214–244.

Bryan, M. L. and Jenkins, S. P. (2016). Multilevel Modelling of Country Effects. A Cautionary Tale. *European Sociological Review,* **32,** 3–22.

Buffel, V., Dereuddre, R. and Bracke, P. (2015). Medicalization of the Uncertainty? An Empirical Study of the Relationships between Unemployment or Job Insecurity, Professional Care Seeking, and the Consumption of Antidepressants. *European Sociological Review,* **31,** 446–459.

Cahuc, P. and Zylberberg, A. (2004). *Labor Economics.* Cambridge and London: MIT Press.

Carr, E. and Chung, H. (2014). Employment Insecurity and Life Satisfaction: The Moderating Influence of Labour Market Policies across Europe. *Journal of European Social Policy,* **24,** 383–99.

Chung, H. (2016). Dualization and subjective employment insecurity: Explaining the subjective employment insecurity divide between permanent and temporary workers across 23 European countries. *Economic and Industrial Democracy.* Online first.

Chung, H. and Mau, S. (2014). Subjective insecurity and the role of institutions. *Journal of European Social Policy,* **24,** 303–318.

Chung, H. and van Oorschot, W. (2011). Institutions versus market forces: Explaining the employment insecurity of European individuals during (the beginning of) the financial crisis. *Journal of European Social Policy,* **21,** 287–301.

Centeno, M. and Novo, A. A. (2012). Excess worker turnover and fixed-term contracts: causal evidence in a two-tier system. *Labor Economics*, **19,** 320–328.

Clark, A. and Postel-Vinay, F. (2009). Job security and job protection. *Oxford Economic Papers,* **61,** 207–239.

De Cuyper, N. and De Witte, H. (2007). Job insecurity in temporary versus permanent workers: Associations with attitudes, well-being, and behaviour. *Work & Stress,* **21,** 65–84.

De Witte, H. and Näswall, K. (2003). `Objective' vs `Subjective' Job Insecurity: Consequences of Temporary Work for Job Satisfaction and Organizational Commitment in Four European Countries. *Economic and Industrial Democracy,* **24,** 149–188.

De Witte, H.; Vander Elst, T. and De Cuyper, N. (2015). Job Insecurity, Health and Well-Being. In Vuori, J., Blonk, R. and Price, R. H. (Eds.), *Sustainable working lives. Managing work transitions and health throughout the life course.* Dordrecht: Springer (Aligning perspectives on health, safety and well-being), 109–128.

Dixon, J. C., Fullerton, A. S. and Robertson, D. L. (2013). Cross-National Differences in Workers' Perceived Job, Labour Market, and Employment Insecurity in Europe. Empirical Tests and Theoretical Extensions. *European Sociological Review,* **29,** 1053–1067.

Erlinghagen, M. (2008). Self-Perceived Job Insecurity and Social Context: A Multi-Level Analysis of 17 European Countries. *European Sociological Review,* **24,** 183–197.

Esser, I. and Olsen, K. M. (2012). Perceived Job Quality: Autonomy and Job Security within a Multi-Level Framework. *European Sociological Review,* **28,** 443–454.

ESS (2004). *European Social Survey Round 2 Data 2004. Data file edition 3.4.* NSD – Norwegian Centre for Research Data, Norway – Data Archive and distributor of ESS data for ESS ERIC.

ESS (2010). *European Social Survey Round 5 Data 2010. Data file edition 3.2.* NSD – Norwegian Social Science Data Services, Norway – Data Archive and distributor of ESS data for ESS ERIC.

ESS (2014). *ESS-5 2010 Documentation Report. Edition 3.2.* Bergen, European Social Survey Data Archive, Norwegian Social Science Data Services for ESS ERIC.

Gash, V. and McGinnity, F. (2007). Fixed-term contracts-the new European inequality? Comparing men and women in West Germany and France. *Socio-Economic Review,* **5,** 467–496.

Gebel, M. and Giesecke, J. (2011). Labor market flexibility and inequality: the changing skill-based temporary employment and unemployment risks in Europe. *Social Forces,* **90,** 17–39.

Giesecke, J. and Groß, M. (2003). Temporary Employment. Chance or Risk? *European Sociological Review,* **19,** 161–177.

Golsch, K. (2003). Employment Flexibility in Spain and its Impact on Transitions to Adulthood. *Work, Employment & Society,* **17,** 691–718.

Green, F., Felstead A. and Burchell B. (2000). Job insecurity and the difficulty of regaining employment: an empirical study of unemployment expectations. *Oxford Bulletin of Economics and Statistics,* **65,** 857–885.

Hellevik, T. and Settersten, R. A. (2013). Life Planning among Young Adults in 23 European Countries. The Effects of Individual and Country Security. *European Sociological Review,* **29,** 923–938.

Hox, J. J. (2010). *Multilevel analysis. Techniques and applications*. New York, NY: Routledge.

International Labour Office (ILO) 2015: Key Indicators of the Labour Market (KILM) 2015. http://ilo.org/legacy/english/global-reports/kilm2015/kilm09.xlsx

Lozza, E., Libreri, C. and Bosio, A. C. (2013). Temporary employment, job insecurity and their extraorganizational outcomes. *Economic and Industrial Democracy,* **34,** 89–105.

Lübke, C. and Erlinghagen, M. (2014). Self-perceived job insecurity across Europe over time. Does changing context matter? *Journal of European Social Policy,* **24,** 319–336.

Maurin, E. and Postel-Vinay, F. (2005). The European Job Security Gap. *Work and Occupations,* **32,** 229–252.

Näswall, K. and De Witte, H. (2003). Who Feels Insecure in Europe? Predicting Job Insecurity from Background Variables. *Economic and Industrial Democracy,* **24,** 189–215.

Noelke, C. (2016). Employment Protection Legislation and the Youth Labour Market. *European Sociological Review*, **32,** 471–485.

OECD (2004). Employment Protection Regulation and Labour Market Performance. In: *OECD Employment Outlook*. Paris: OECD, pp. 61-125.

OECD (2006). *OECD employment outlook.* Paris: OECD.

OECD (2013). Protecting jobs, enhancing flexibility: A new look at employment protection legislation. In: *OECD employment outlook.* Paris: OECD, pp. 65–126.

OECD (2014). Calculating Summary Indicators of EPL Strictness: Methodology. http://www.oecd.org/els/emp/EPL-Methodology.pdf [accessed 21 April 2016].

OECD (2016). Employment Protection Database. Annual time series data. http://www.oecd.org/employment/emp/EPL-timeseries.xlsx [accessed on 21 April 2016].

Polavieja, J. (2003). Temporary contracts and labour market segmentation in Spain: an employment-rent approach. *European Sociological Review,* **19,** 501–517.

Raudenbush, S. and Sampson, R. J. (1999). 'Ecometrics': toward a science of assessing ecological settings, with application to the systematic social observation of neighborhoods. *Sociological Methodology,* **29,** 1–41.

Sala, H., Silva, J. I. and Toledo, M. (2012). Flexibility at the Margin and Labor Market Volatility in OECD Countries. *The Scandinavian Journal of Economics,* **114,** 991–1017.

Snijders, T. A. B.and Bosker, R. J. (1994). Modeled Variance in Two-Level Models. *Sociological Methods & Research*, **22,** 342–363.

Snijders, T. A. B. and Bosker, R. J. (1999). *Multilevel Analysis. An Introduction to Basic and Advanced Multilevel Modeling.* London: Sage.

Sverke, M., Hellgren, J. and Näswall, K. (2002). No security: A meta-analysis and review of job insecurity and its consequences. *Journal of Occupational Health Psychology,* **7,** 242–264.

Venn, D. (2009). Legislation, collective bargaining and enforcement: Updating the OECD employment protection indicators. *OECD Social, Employment and Migration Working Paper,* **89**. Paris: OECD.

Wright, E.O. (2000). Working-Class Power, Capitalist-Class Interests, and Class Compromise. *American Journal of Sociology,* **105,** 957–1002.

Appendix

Appendix A1. Strictness of EPL–items and summary indicator weights

Individual dismissals (regular workers)

Index (Level 2) Scale 0-6	**Sub-index** (Level 3) Scale 0-6	**Item** (Level 4) Scale 0-6	**Weights** Version 1 & 2	**Weights** Version 3
Individual dismissals – regular workers	Procedural inconveniences (1/3)	1. Notification procedures	(1/2)	(1/2)
		2. Delay to start a notice	(1/2)	(1/2)
	Notice and severance pay for no-fault individual dismissals (1/3)	3. Notice period after 9 months	(1/7)	(1/7)
		3. Notice period after 4 years	(1/7)	(1/7)
		3. Notice period after 20 years	(1/7)	(1/7)
		4. Severance pay after 9 months	(4/21)	(4/21)
		4. Severance pay after 4 years	(4/21)	(4/21)
		4. Severance pay after 20 years	(4/21)	(4/21)
	Difficulty of dismissal (1/3)	5. Definition of unfair dismissal	(1/4)	(1/5)
		6. Trial period	(1/4)	(1/5)
		7. Compensation	(1/4)	(1/5)
		8. Reinstatement	(1/4)	(1/5)
		9. Maximum time for claim	--	(1/5)

Temporary contracts

Temporary contracts	Fixed-term contracts (1/2)	10. Valid cases for use of fixed-term contracts	(1/2)	(1/2)
		11. Maximum number of successive contracts	(1/4)	(1/4)
		12. Maximum cumulated duration	(1/4)	(1/4)
	Temporary work agency employment (1/2)	13. Types of work for which is legal	(1/2)	(1/3)
		14. Restrictions on number of renewals	(1/4)	(1/6)
		15. Maximum cumulated duration	(1/4)	(1/6)
		16. Authorisation and reporting	--	(1/6)
		17. Equal treatment	--	(1/6)

Source: OECD, 2014.

Appendix A2. Coding scheme EPL

	Original unit and short description		**Assignment of numerical strictness scores**						
			Assigned scores						
			0	1	2	3	4	5	6
Definition of justified or unfair dismissal	Scale 0-3		Scale (0-3) × 2						
	0	when worker capability or redundancy of the job are adequate and sufficient ground for dismissal;							
	1	when social considerations, age or job tenure must when possible influence the choice of which worker(s) to dismiss;							
	2	when a transfer and/or a retraining to adapt the worker to different work must be attempted prior to dismissal;							
	3	when worker capability cannot be a ground for dismissal.							
Maximum number of successive FTC	Number		No limit	≥5	≥4	≥3	≥2	≥1.5	<1.5
Maximum cumulated duration of successive FTC	Months		No limit	≥36	≥30	≥24	≥18	≥12	<12

Source: OECD, 2014.

Appendix A3. Country characteristics

Country	Job security provisions[a]		Regulations on temporary employment[a]		Unemployment rate[b]	
	(2004)	(2010)	(2004)	(2010)	(2004)	(2010)
AT	2		2.5		5.8	
BE	0	0	2	2	8.5	8.3
BG		-		-		-
CH	-	0	-	2.5	-	4.5
CY		-		-		-
CZ	4	0	0	1.5	8.2	7.3
DE	4	4	1.5	1.5	10.7	7.1
DK	0	0	3.5	3.5	5.5	7.5
EE	-	4	-	2.5	-	16.7
ES	4	4	3	3	11.1	19.9
FI	4	4	2	2	10.4	8.4
FR		4		4		8.9
GB	0	0	0.5	0.5	4.6	7.8
GR	1	1	3	3	10.5	12.5
HR		-		-		-
HU	0	0	2.5	2.5	5.8	11.2
IE	-	0	-	0.5	-	13.9
IL		0		0	9.3	6.0
IS	0		0.5		4.0	
LT		-		-		-
LU	-		-		-	
NL	3	3	2	2	4.6	4.5
NO	5	5	2.5	3	4.3	3.5
PL	0	0	2	2	19.1	9.6
PT	5	5	1.5	1.5	6.3	10.8
RU		5		1		7.3
SE	4	4	3	1.5	6.7	8.6
SI	-	4	-	1.5	-	7.2
SK	0	0	1.5	2.5	18.6	14.4
TR	-		-		-	
UA	-	-	-	-	-	-

Note: - included in the ESS, but EPL not available.
Source: a based on OECD, 2014; *b* International Labour Office (ILO), 2015.

Appendix A4. Descriptive statistics of the variables

	Mean 2004	**Mean 2010**	**Min.**	**Max.**
Fixed-term contract	0.136	0.120	0	1
Education				
ISCED 0-2	0.189	0.121	0	1
ISCED 3-4	0.486	0.477	0	1
ISCED 5-6	0.325	0.402	0	1
'easy to replace' (1-10)	6.141 (2.651)	5.840 (2.683)	0	10
Training period				
<1day	0.033	0.034	0	1
2-6 days	0.087	0.087	0	1
1-4 weeks	0.172	0.160	0	1
1-3 months	0.228	0.221	0	1
3 months - 1 year	0.281	0.283	0	1
1- 2 years	0.118	0.128	0	1
2 - 5 years	0.064	0.067	0	1
More than 5 years	0.017	0.020	0	1
Age				
20-29	0.179	0.164	0	1
30-39	0.280	0.259	0	1
40-54	0.409	0.413	0	1
55-67	0.132	0.164	0	1
Part-time	0.149	0.164	0	1
Female	0.482	0.510	0	1
Child	0.516	0.515	0	1
Unemployed in last 5 years	0.122	0.111	0	1
Unemployed more than 12 month	0.093	0.090	0	1
Firm size				
<10	0.221	0.208	0	1
10-24	0.209	0.191	0	1
25-99	0.271	0.267	0	1
100-499	0.180	0.188	0	1
>500	0.120	0.146	0	1
Industry				
1 Agriculture	0.028	0.023	0	1
2 Manufacturing industry	0.183	0.172	0	1
3 Construction	0.062	0.060	0	1
4 Trade	0.115	0.111	0	1
5 Transport/Infrastructure	0.077	0.115	0	1
6 Finance	0.036	0.036	0	1
7 Public administration	0.077	0.073	0	1
8 Education	0.110	0.105	0	1
9 Health sector	0.139	0.125	0	1
10 Service	0.174	0.180	0	1

Note: Only for cases included in the analysis. Standard deviations in brackets (not for dichotomous variables).

Source: ESS 2004; unweighted results; N=10,029; ESS 2010; unweighted results; N=13,949.

Appendix A5. Complete results of the multilevel analysis

	Model 1		Model 2	
Fixed-term contract (FTC)	0.524**	(0.048)	0.211	(0.137)
Country variables				
Job security provisions	-0.004	(0.024)	-0.037	(0.028)
Regulations on temporary employment	0.005	(0.051)	-0.059	(0.059)
Unemployment rate	0.023*	(0.012)	0.023+	(0.014)
Cross-level-interactions				
FTC*Job security provisions			0.050*	(0.021)
FTC*Regulations on temporary employment			0.096*	(0.045)
FTC*Unemployment rate			0.001	(0.010)
Individual controls				
Education (Ref: ISCED 0-2)				
ISCED 3-4	0.016	(0.019)	0.016	(0.019)
ISCED 5-6	-0.044*	(0.021)	-0.044*	(0.021)
'easy to replace'	0.030**	(0.002)	0.030**	(0.002)
Training period (Ref: < 1 day)				
2-6 days	0.028	(0.038)	0.029	(0.038)
1-4 weeks	-0.010	(0.036)	-0.010	(0.036)
1-3 month	-0.024	(0.036)	-0.024	(0.036)
3 month-1 year	-0.094**	(0.036)	-0.094**	(0.036)
1-2 years	-0.118**	(0.038)	-0.117**	(0.038)
2-5 years	-0.149**	(0.041)	-0.148**	(0.041)
More than 5 years	-0.124*	(0.055)	-0.124*	(0.055)
Age (Ref: 20-29)				
30-39	0.129**	(0.019)	0.129**	(0.019)
40-54	0.143**	(0.019)	0.143**	(0.019)
55-67	0.043*	(0.022)	0.044*	(0.022)
Part-time	-0.064**	(0.018)	-0.065**	(0.018)
Female	0.032*	(0.013)	0.032*	(0.013)
Child	-0.030*	(0.013)	-0.030*	(0.013)
Unemployed in last 5 years	0.224**	(0.021)	0.223**	(0.021)
Unemployed more than 12 month	0.098**	(0.022)	0.098**	(0.022)
Company and industry controls				
Firm size (Ref: >10)				
10-24	0.031+	(0.019)	0.031+	(0.019)
25-99	0.020	(0.018)	0.020	(0.018)
100-499	0.000	(0.020)	0.000	(0.020)
>500	-0.021	(0.022)	-0.020	(0.022)
Industry (Ref: 10 Service)				
1 Agriculture	-0.033	(0.041)	-0.033	(0.041)
2 Manufacturing industry	0.096**	(0.021)	0.096**	(0.021)
3 Construction	0.046	(0.029)	0.046	(0.029)
4 Trade	0.030	(0.023)	0.030	(0.023)
5 Transport/Infrastructure	0.000	(0.024)	-0.000	(0.024)
6 Finance	0.044	(0.035)	0.044	(0.035)
7 Public administration	-0.256**	(0.026)	-0.255**	(0.026)
8 Education	-0.266**	(0.024)	-0.265**	(0.024)
9 Health sector	-0.217**	(0.022)	-0.217**	(0.022)
Constant	1.713**	(0.163)	1.917**	(0.184)

Variance components				
FTC (Random slope)	0.073	(0.020)	0.057	(0.017)
Country	0.127	(0.032)	0.120	(0.030)
Covariance (FTC, cons)	-0.057	(0.021)	-0.045	(0.020)
Individual	0.830	(0.008)	0.830	(0.008)
Explained variances				
Explained variance of random slope[a]	-		0.227	
R^2 (Individual)[b]	0.107		0.110	
R^2 (Country)[b]	0.229		0.230	
M	39		39	
N	23978		23978	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses.

a Reduction in variance = $(var(FTC)_{M1} - var(FTC)_{M1})/ var(FTC)_{M1}$

b R-squared as proposed by Snijders and Bosker (1994: 350-354), also see Snijders and Bosker (1999: 99-105).

Source. Estimations from the random intercept and random slope model (Restricted maximum likelihood); ESS 2004 and 2010.

2004: AT, BE, CZ, DE, DK, ES, FI, GB, GR, IS, NL, NO, PL, PT, SE, SK, TR;

2010: BE, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IL, NL, NO, PL, PT, RU, SE, SI, SK.

Appendix A6. Outlier analysis of the cross-level interaction effects

	$b_{FTC*Job\ security\ provisions}$	$b_{FTC*Regulation\ on\ temporary\ employment}$	$DFBETA_{FTC*Job\ security\ provisions}$	$DFBETA_{FTC*Regulation\ on\ temporary\ employment}$
all countries	0.050	0.096		
AT 2004	0.050	0.100	0.029	0.080
BE 2004	0.059	0.094	**0.396**	0.044
BE 2010	0.056	0.094	**0.281**	0.037
CH 2010	0.048	0.099	0.112	0.061
CZ 2004	0.055	0.074	**0.243**	**0.482**
CZ 2010	0.049	0.095	0.042	0.012
DE 2004	0.049	0.097	0.047	0.025
DE 2010	0.051	0.095	0.028	0.014
DK 2004	0.045	0.112	**0.254**	**0.344**
DK 2010	0.048	0.102	0.099	0.132
EE 2010	0.055	0.097	**0.200**	0.024
ES 2004	0.046	0.086	**0.197**	**0.218**
ES 2010	0.043	0.088	**0.346**	**0.169**
FI 2004	0.045	0.098	**0.256**	0.034
FI 2010	0.048	0.096	0.094	0.004
FR 2010	0.050	0.094	0.000	0.042
GB 2004	0.052	0.101	0.083	0.102
GB 2010	0.053	0.105	0.110	**0.182**
GR 2004	0.050	0.100	0.031	0.077
GR 2010	0.049	0.101	0.053	0.105
HU 2010	0.051	0.095	0.047	0.031
IE 2010	0.052	0.103	0.080	0.152
IL 2010	0.053	0.108	0.133	**0.244**
IS 2004	0.050	0.095	0.029	0.016
NL 2004	0.051	0.097	0.043	0.019
NL 2010	0.051	0.097	0.041	0.020
NO 2004	0.051	0.096	0.026	0.004
NO 2010	0.050	0.096	0.001	0.004
PL 2004	0.050	0.096	0.006	0.002
PL 2010	0.048	0.097	0.101	0.015
PT 2004	0.045	0.101	**0.232**	0.105
PT 2010	0.057	0.090	**0.304**	0.142
RU 2010	0.057	0.084	**0.322**	**0.267**
SE 2004	0.048	0.089	0.101	**0.165**
SE 2010	0.046	0.102	**0.206**	0.136
SI 2010	0.053	0.092	0.131	0.092
SK 2004	0.045	0.085	**0.235**	**0.253**
SK 2010	0.046	0.100	**0.191**	0.101
TR 2004	0.053	0.093	0.115	0.065

Note: DFBETA=(b1-b2)/s.e.(b2), where b1 is the original b (Table1, Model2) and b2 is the b without the listed country. Critical values above $1/\sqrt{n}$ (0.16) are bold.
Source: ESS 2010, ESS 2004, own calculations.

STUDY II – Online Appendix

Cross-National Variations in the Security Gap: Perceived Job Insecurity among Temporary and Permanent Employees and Employment Protection Legislation

1. Robustness Checks on the Measurement of Employment Protection Legislation

The first part of the Online Appendix inspects the measurement of employment protection legislation (EPL). Even though the study argues that the items used are a good method to measure EPL, at least two other ways are also plausible—1) assigning the countries to categories of EPL types and 2) using an index for measuring job security provisions that also considers the consequences of unfair dismissal alongside the definition of unfair dismissal. These alternatives are discussed and the results displayed as robustness checks. Both alternative operationalization confirm the results of the main study.

In addition, it is shown that the two items within the index 'regulations on the use of temporary contracts' used in the study similarly influence job insecurity and can be combined into an index.

1.1. Regulated labour markets/partial deregulation/flexible labour markets: Using categorized measure of both dimensions of EPL

The following is an institutional way to think about cross-country variations. Based on both dimensions of EPL—job security provisions and regulations on temporary employment—countries can fall into one of three categories. They can have either a) a regulated labour market along both dimensions which means strong job security provisions and strong regulations for temporary employment. They can have b) a regulated core workforce of permanent employees protected by strong job security provisions combined with a deregulated peripheral workforce made possible by weak regulations for temporary employment ('partial deregulation'), or they can have c) a flexible labour market in both dimensions, which means weak security provisions and weak regulations for temporary employment.

If the hypotheses put forward in section 2.2 and 2.3 in the main article are correct, one would expect to see larger temporary contract penalties in both regulated labour markets (a) and partially deregulated labour markets (b) relative to flexible labour markets (c), due to differences in job security provisions for permanent employees. In addition, there would be stronger temporary contract penalties in regulated labour markets (a) compared to partially deregulated labour markets (b) due to limitations on the maximum number and duration of successive temporary contracts with one company.

In order to check these assumptions, the countries are assigned to one of these three EPL categories, on the basis of their values on job security provisions and regulations for temporary employment. Table 1 (Online Appendix) shows the country characteristics.

Table 1 (Online Appendix). Categorization of countries into employment protection types

	Strong job security provisions (narrow definition of fair dismissal)[a]	Weak job security provisions (wide definition of fair dismissal)[a]
Strong regulations on temporary employment[b]	a) Regulated labour markets ES (2004 & 2010) FR (2004 & 2010) NO (2010) SE (2004)	c1) Flexible labour markets DK (2004 & 2010) GR (2004 & 2010) LU (2010)
Weak regulations on temporary employment[b]	b) Partially deregulated labour markets CZ (2004) DE (2004 & 2010) EE (2010) FI (2004 & 2010) NO(2004) PT (2004 & 2010) RU (2010) SE (2010) SI (2010)	c2) Flexible labour markets AT (2004 & 2010) BE (2004 & 2010) CH (2010) CZ (2010) GB (2004 & 2010) HU (2004 & 2010) IE (2010) IL (2010) IS (2004 & 2010) NL (2004 & 2010) PL (2004 & 2010) SK (2004 & 2010) TR (2004 & 2010)

Note: Categorization based on the OECD indicators 'definition of unfair dismissal' and 'maximum number of successive contracts'/'Maximum cumulated duration'.
a weak job security provisions (0 to 3.5); strong job security provisions (4 to 5)
b weak regulations on temporary employment (0 to 2.5); strong regulations on temporary employment (3 to 4)

Empirically there are countries that have weak employment protection for permanent employees and, nevertheless, strict regulations on the use of temporary contracts, even though this combination seems somewhat counterintuitive. However, if employment protection for permanent jobs is low (and therefore the core is deregulated), there are no clear lines between core and periphery. Thus, it should make no difference whether the regulations on temporary employment are strict or weak. Independent of whether the regulations on temporary employment are weak or strong, if job security provisions are weak, both cases can be categorized as flexible labour markets.

Considering these aspects, an additional model is estimated where c1 and c2 are included separately to check the previous assumption that the two can be combined.

Table 2 shows the estimates from the multilevel models, where both types of flexible labour markets are included separately (Model 1.1 and 2.1), and the ones where both types of flexible labour markets are combined (Model 1.2. and Model 2.2

Table 2 (Online Appendix). Models using employment protection types

	Flexible labour markets detailed (c1 and c2				Flexible labour markets combined (c)			
	Model 1.1		Model 2.1		Model 1.2		Model 2.2	
Fixed-term contract (FTC)	0.524**	(0.048)	0.953**	(0.144)	0.524**	(0.048)	0.954**	(0.142)
Country variables								
Employment protection regimes (Ref.: a. Regulated labour markets)								
b. Partial deregulation	-0.022	(0.161)	0.228	(0.183)	-0.021	(0.159)	0.228	(0.181)
c1. Flexible labour markets	0.072	(0.204)	0.427+	(0.231)				
c2. Flexible labour markets	0.005	(0.153)	0.365*	(0.174)				
c. Flexible labour markets					0.017	(0.148)	0.376*	(0.168)
Unemployment rate	0.024*	(0.012)	0.025+	(0.013)	0.024*	(0.012)	0.025+	(0.013)
Cross-level-interactions								
Employment protection regimes: (Ref.: a. Regulated labour markets)								
b. Partial Deregulation*FTC			-0.369**	(0.128)			-0.369**	(0.126)
c. Flexible labour markets*FTC							-0.539**	(0.118)
c1. Flexible labour markets*FTC			-0.534**	(0.165)				
c2. Flexible labour markets*FTC			-0.539**	(0.122)				
FTC*Unemployment rate			-0.002	(0.009)			-0.002	(0.009)

				individual and company level controls are included				
Constant	1.709**	(0.187)	1.419**	(0.208)	1.709**	(0.185)	1.420**	(0.205)
Variance components								
FTC (Random slope)	0.020	(0.046)	0.015	(0.073)	0.020	(0.044)	0.014	(0.014)
Country-year	0.034	(0.116)	0.029	(0.125)	0.033	(0.113)	0.027	(0.027)
Covariance (FTC, cons)	0.023	(-0.038)	0.016	(-0.056)	0.023	(-0.037)	0.015	(0.015)
Individual	0.008	(0.83)	0.008	(0.83)	0.008	(0.83)	0.008	(0.008)
Explained variances								
Explained variance of random slope[a]			0.373				0.396	
R^2 (Individual)[b]	0.109		0.112		0.111		0.115	
R^2 (Country-year)[b]	0.241		0.237		0.260		0.256	
M	39		39		39		39	
N	23978		23978		23978		23978	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses.
All individual and company level controls are included. Complete results upon request.
a Reduction in variance = $(var(FTC)_{M1} - var(FTC)_{M1})/ var(FTC)_{M1}$
b R-squared as proposed by Snijders and Bosker (1994: 350-354), also see Snijders and Bosker (1999: 99-105).
Source: Estimations from the random intercept and random slope model (Restricted maximum likelihood); ESS 2004 and 2010.
2004: AT, BE, CZ, DE, DK, ES, FI, GB, GR, IS, NL, NO, PL, PT, SE, SK, TR;
2010: BE, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IL, NL, NO, PL, PT, RU, SE, SI, SK.

The results (Table 2, Model 2.1) confirm the previous assumption: No difference can be found in the size of the effect of the two types of flexible labour markets (c1 and c2) on the security gap. The effects are almost identical (-0.534** and -0.539**), indicating that if job security provisions are weak, regulations on temporary employment do not make a difference. Therefore, they can be both classified as 'flexible labour markets' and coded into one category.

When looking at the results from the model with only three employment protection types (Model 2.2), the previously developed hypotheses can be confirmed: The temporary contract penalty is largest in regulated labour markets (a), which is the reference category and smallest in deregulated labour markets (c). The size of the temporary contract penalty in partially deregulated labour markets (b) is smaller than in regulated labour markets ($p<0.05$) and larger than in (c) flexible labour markets ($p<0.1$; equivalent to $p<0.05$ in the one-tailed test).

1.2. Check on the measurement of job security provisions: Including an index instead of single item measurement

When looking at the items for measuring the 'protection gap,' it is argued that the item 'definition of unfair dismissal' is the best for measuring this gap. However, the OECD also provides items that measure the repercussions following an unfair dismissal should it be declared unfair in court. The items measuring the consequences of unfair dismissal are 'compensation following unfair dismissal' and 'possibility of reinstatement'.

These items could also be combined in a multiplicative index measuring the difficulty of a court finding a dismissal to be unfair times the repercussions following an unfair dismissal. Here the square root is used, so as with the items and indices provided by the OECD, the index also ranges between 0 and 6.

The index is thus calculated as follows:

$$Index\ job\ security\ provisions = \sqrt{definition\ of\ unfair\ dismissal \times consequences\ of\ unfair\ dismissal} =$$

$$\sqrt{definition\ of\ unfair\ dismissal \times \frac{(compensation + possibility\ of\ reinstatement)}{2}}$$

Within this sample, the index for job security provisions ranges between 0 and 5. When using the index, two more cases on the macro level (GR 2004 and GR 2010) are lost due to missing information on the consequences of an unfair dismissal.

Since the results were similar, it was decided to report the easier measurement (also with more cases), but in addition, including the results of the index in the Online Appendix.

Table 3. Model including the index for job security provisions

	Model 1		Model 2	
Fixed-term contract (FTC)	0.533**	(0.050)	0.173	(0.147)
Country variables				
Job security provisions (index)	0.035	(0.028)	-0.005	(0.034)
Regulations on temporary employment	-0.004	(0.051)	-0.086	(0.061)
Unemployment rate	0.025*	(0.012)	0.022	(0.014)
Cross-level-interactions				
FTC*Job security provisions (index)			0.056*	(0.026)
FTC*Regulations on temporary employment			0.115*	(0.047)
FTC*Unemployment rate			0.004	(0.011)
	individual and company level controls are included			
Constant	1.614**	(0.169)	1.869**	(0.196)
Variance components				
FTC (Random slope)	0.078	(0.021)	0.060	(0.018)
Country-year	0.134	(0.035)	0.125	(0.031)
Covariance (FTC, cons)	-0.065	(0.023)	-0.052	(0.019)
Individual	0.823	(0.008)	0.823	(0.008)
Explained variances				
Explained variance of random slope[a]			0.227	
R^2 (Individual)[b]	0.100		0.103	
R^2 (Country-year)[b]	0.182		0.179	
M	37		37	
N	23,196		23,196	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses.
All individual and company level controls are included. Complete results upon request.
a Reduction in variance = $(var(FTC)_{M1} - var(FTC)_{M1}) / var(FTC)_{M1}$
b R-squared as proposed by Snijders and Bosker (1994: 350-354), also see Snijders and Bosker (1999: 99-105).
Source: Estimations from the random intercept and random slope model (Restricted maximum likelihood); ESS 2004 and 2010.
2004: AT, BE, CZ, DE, DK, ES, FI, GB, IS, NL, NO, PL, PT, SE, SK, TR;
2010: BE, CH, CZ, DE, DK, EE, ES, FI, FR, GB, HU, IE, IL, NL, NO, PL, PT, RU, SE, SI, SK.

The results are similar to those that are found in the main article when only the item 'definition of unfair dismissal' is used. The alternative measurement for job security provisions also significantly increases the gap between permanent and temporary employees. The results for 'regulations on the use of temporary contracts' on the job security gap are also fairly robust, and similar to the results reported in the main article.

1.3. Check on measurement of regulation on temporary employment (both items from the index included separately)

For the measurement of 'regulations on the use of temporary contracts', an additive index is used which combines two items: limitations on 1) the 'maximum number of successive fixed-term contracts (FTC)' and 2) on the 'maximum cumulated duration of successive FTC'. It is argued here that the two items are 'strategic substitutes', meaning two different ways for countries to limit the excessive use of temporary contracts, which is why these items can be combined even though the correlation is negative (-0.22). This assumption, however, can and should be checked. If the argument is correct, the two items should show the same effect on the gap between permanent and temporary contracts. Therefore, both items were included separately in this model.

Table 4 (Online Appendix). Models with both items of regulations on temporary employment

	Model 1		Model 2	
Fixed-term contract (FTC)	0.524**	(0.048)	0.206	(0.136)
Country variables				
Job security provisions	-0.002	(0.023)	-0.038	(0.028)
Regulations on temporary employment (Item 1: Number)	-0.017	(0.028)	-0.041	(0.034)
Regulations on temporary employment (Item 2: Duration)	0.052	(0.037)	-0.005	(0.045)
Unemployment rate	0.024*	(0.011)	0.023+	(0.014)
Cross-level-interactions				
FTC*Job security provisions			0.050*	(0.021)
FTC*Regulations on temporary employment (Item 1: Number)			0.033	(0.026)
FTC*Regulations on temporary employment (Item 2: Duration)			0.077*	(0.033)
FTC*Unemployment rate			0.002	(0.010)
	individual and company level controls are included			
Constant	1.684**	(0.160)	1.911**	(0.185)
Variance components				
FTC (Random slope)	0.073	(0.02)	0.056	(0.017)
Country-year	0.130	(0.034)	0.121	(0.03)
Covariance (FTC, cons)	-0.062	(0.022)	-0.049	(0.018)
Individual	0.830	(0.008)	0.830	(0.008)
Explained variances				
Explained variance of random slope[a]			0.237	
R^2 (Individual)[b]	0.107		0.110	
R^2 (Country-year)[b]	0.225		0.224	
M	39		39	
N	23978		23978	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses.
All individual and company level controls are included. Complete results upon request.
a Reduction in variance = $(var(FTC)_{M1} - var(FTC)_{M1})/ var(FTC)_{M1}$
b R-squared as proposed by Snijders and Bosker (1994: 350-354), also see Snijders and Bosker (1999: 99-105).
Source: Estimations from the random intercept and random slope model (Restricted maximum likelihood); ESS 2004 and 2010.
2004: AT, BE, CZ, DE, DK, ES, FI, GB, GR, IS, NL, NO, PL, PT, SE, SK, TR;
2010: BE, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IL, NL, NO, PL, PT, RU, SE, SI, SK.

Both limitations on the 'maximum number of successive FTC' (Item 1: Number) as well as 'maximum cumulated duration of successive FTC' (Item 2: Duration) increase the gap between temporary and permanent employees (Table 4, Model 2). The effect of Item 1 is not significant, possibly because the measurement is not exact enough and the number of cases is too low, but since both effects go in the same direction, combining the two into an index seems justified.

2. Additional Robustness Checks

The additional robustness checks relate to the choice of the linear model (instead of the ordinal one), the pooling of the two datasets (ESS 2004 and ESS 2010) and the choice of macro-level control.

2.1. Ordinal model

Since the dependent variable is ordinal, there are reasons, why an ordinal model could be the obvious choice. Even though this model might be more appropriate for the scaling of the dependent variable (1-4), there are also two good reasons against it. First, it uses up more degrees of freedom, which is a disadvantage considering only 39 cases exist on the country level. Usually, 50 cases would be desirable for linear models and even more for ordinal or logistic models.

Second, effects are more difficult to present and interpret. Therefore, they were only used as a robustness check. The effects go in the same direction and are also significant.

Table 5 (Online Appendix). Ordinal model

	Model 1		Model 2	
Fixed-term contract (FTC)	1.038**	(0.096)	0.311	(0.259)
Country variables				
Job security provisions	-0.007	(0.049)	-0.074	(0.054)
Regulations on temporary employment	0.029	(0.106)	-0.132	(0.115)
Unemployment rate	0.047*	(0.023)	0.042	(0.027)
Cross-level-interactions				
FTC*Job security provisions			0.096*	(0.040)
FTC*Regulations on temporary employment			0.228**	(0.085)
FTC*Unemployment rate			0.007	(0.020)
	individual and company level controls are included			
Constant (cut1)	0.037	(0.342)	-0.465	(0.361)
Constant (cut2)	1.719**	(0.342)	1.217**	(0.361)
Constant (cut3)	3.118**	(0.342)	2.616**	(0.361)
Variance components				
FTC (Random slope)	0.291**	(0.078)	0.192**	(0.057)
Country-year (cons)	0.503**	(0.125)	0.454**	(0.105)
Covariance (FTC, cons)	-0.243**	(0.086)	-0.170**	(0.063)
M	39		39	
N	23978		23978	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses.
All individual and company level controls are included. Complete results upon request.
a Reduction in variance = $(var(FTC)_{M1} - var(FTC)_{M1})/ var(FTC)_{M1}$
b R-squared as proposed by Snijders and Bosker (1994: 350-354), also see Snijders and Bosker (1999: 99-105).
Source: Estimations from the random intercept and random slope model (Restricted maximum likelihood); ESS 2004 and 2010.
2004: AT, BE, CZ, DE, DK, ES, FI, GB, GR, IS, NL, NO, PL, PT, SE, SK, TR;
2010: BE, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IL, NL, NO, PL, PT, RU, SE, SI, SK.

2.2. ESS 2004 and ESS 2010 (separate)

For the main results, the data from the ESS 2004 and 2010 are pooled and country-years used as the macro level. There might be reasons to suspect that there is a difference between 2004 and 2010. Pooling the datasets might be incorrect if the estimated effects are very different within the two datasets. This can be checked by estimating the models separately in each case. Doing this also illustrates what happens when you are interested in interaction effects, but have only around 20 cases on the macro level.

The models are analogous to the main results in Table 1 (main paper). Model 1 only includes the main effects of the country level variables─job security provisions, regulations on temporary employment and the unemployment rate. Model 2 additionally includes the cross-level-interaction terms to evaluate which factors can explain the variations in the gap in perceived job security between permanent and temporary employees. Both models include the random slope for temporary employment.

In all models, the individual and country level controls mentioned in the main paper are included.

Table 6 (Online Appendix). Model with ESS 2004 and ESS 2010 separately

	Model 1		Model 2		Model 1		Model 2	
Fixed-term contract (FTC)	0.559**	(0.084)	0.172	(0.254)	0.493**	(0.055)	0.199	(0.161)
Country variables								
Job security provisions	0.062**	(0.023)	0.008	(0.037)	-0.039	(0.037)	-0.064	(0.041)
Regulations on temporary employment	0.016	(0.047)	-0.080	(0.075)	0.019	(0.081)	-0.031	(0.090)
Unemployment rate	0.034**	(0.010)	0.038*	(0.017)	0.020	(0.020)	0.012	(0.022)
Cross-level-interactions								
FTC*Job security provisions			0.075+	(0.039)			0.033	(0.025)
FTC*Regulations on temporary employment			0.133+	(0.078)			0.066	(0.055)
FTC*Unemployment rate			-0.004	(0.018)			0.010	(0.013)
			individual and company level controls are included					
Constant	1.406**	(0.177)	1.678**	(0.247)	1.824**	(0.250)	2.046**	(0.276)
Variance components								
FTC (Random slope)	0.106	(0.042)	0.079	(0.037)	0.051	(0.020)	0.045	(0.020)
Country	0.096	(0.039)	0.082	(0.033)	0.163	(0.056)	0.160	(0.054)
Covariance (FTC, cons)	-0.086	(0.037)	-0.067	(0.031)	-0.047	(0.027)	-0.042	(0.026)
Individual	0.823	(0.012)	0.823	(0.012)	0.834	(0.010)	0.834	(0.010)
Explained variances								
Explained variance of random slope[a]			0.251				0.127	
R^2 (Individual)[b]	0.133		0.138		0.088		0.089	
R^2 (Country)[b]	0.363		0.366		0.147		0.144	
M	17		17		22		22	
N	10029		10029		13949		13949	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses. All individual and company level controls are included. Complete results upon request.

a Reduction in variance = $(var(FTC)_{M1} - var(FTC)_{M1})/ var(FTC)_{M1}$

b R-squared as proposed by Snijders and Bosker (1994: 350-354), also see Snijders and Bosker (1999: 99-105).

Source: Estimations from the random intercept and random slope model (Restricted maximum likelihood); ESS 2004 and 2010. 2004: AT, BE, CZ, DE, DK, ES, FI, GB, GR, IS, NL, NO, PL, PT, SE, SK, TR; 2010: BE, CH, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IL, NL, NO, PL, PT, RU, SE, SI, SK.

The results go in the same direction as the main results (where both datasets were pooled)—the models indicate that job security provisions increase the gap between temporary and permanent employees, as do regulations on temporary employment. Since the effects go in the same direction, pooling seems justified and the main model is correctly specified.

However, compared to the pooled results the estimates were very uncertain and failed to reach significance using a standard two-tailed test ($p>0.05$). For 2004 the results were only significant at $p<0.1$, which is equivalent to $p<0.05$ when a one-tailed test is used. It can be argued that one-sided testing is justified since the hypotheses in this study are directed. However, in 2010 the results for job security provisions were only significant at $p<0.2$, which is equivalent to $p<0.1$ in a one-sided test, while for regulations on temporary employment, the coefficient fails to reach significance. The results for 2010 are more exact if the additional control variable 'financial difficulty of the company' is included. Consequently, the effect of regulations on temporary employment is a bit stronger (0.089) and significant at $p<0.1$, which equals $p<0.05$ in a one-sided test (see replication package). Additionally, the explained variance of the random slope increases considerably (0.25). However, it is not recommendable to include different controls in both years; therefore, the study refrains from doing this since the objective is only to check whether pooling is justified.

These models also clarify the problems with interaction effects in small samples—even though they are found, the confidence intervals are very large. Therefore, it is obviously preferable to try to increase the sample on the macro level, which will lead to more stable results.

3. Content of the Replication Package

A replication package is available upon request from the author including the macro-level-data and the Stata-do-files necessary to replicate the analysis.

Content

master_4.7.17.do
01_Recode_append_4.7.17.do
02_Recode_macro_variables_merge_4.7.17.do
03_Analysis_job_insecurity_4.7.17.do

ESS2e03_4.dta
(not included; please download here: http://www.europeansocialsurvey.org/data/)
ESS5e03_2.dta
(not included; please download here: http://www.europeansocialsurvey.org/data/)

Makroind_clean_long.dta
please cite original source:
OECD (2016). Employment Protection Database. Annual time series data. http://www.oecd.org/employment/emp/EPL-timeseries.xlsx
International Labour Office (ILO) 2015: Key Indicators of the Labour Market (KILM) 2015. http://ilo.org/legacy/english/global-reports/kilm2015/kilm09.xlsx

STUDY III

Operationalization of Employment Protection Legislation and Implications for Substantive Results: Example of Perceived Job Insecurity and Temporary Employment Risk[6]

[6] Balz, A. and Pforr, K: Operationalization of Employment Protection Legislation and Implications for Substantive Results: Example of Perceived Job Insecurity and Temporary Employment Risk. Unpublished Manuscript.

Abstract

This study shows that the OECD index that measures the employment protection legislation of regular employees (EPR) is deficient with respect to a theoretical point of view (content validity) and to its predicted effects (criterion validity) and that this choice of operationalization has important implications for substantive results. We suggest a new EPR-Index that measures permanent employees' protection against dismissal, which implements a theory-driven choice of items, normalization rules, and aggregation procedure. Subsequently, we empirically compare this new index with the OECD index by testing relationships with outcome variables indicated in the literature. First, we used a multi-level model to predict the perceived job insecurity of temporary and permanent employees that depends on the level of EPR with cross-national data from the European Social Survey, the European Working Condition Survey, and the European Quality of Life Survey. Second, we examine the effect of EPR on the temporary employment risk of new hires using data from the European Labour Force Survey. Whereas the predicted results based on the OECD-EPR-Index significantly contradict the hypotheses in the literature, the predicted results using the new EPR-Index confirm the hypotheses in the literature. The new EPR-Index also reveals the expected effects of related variables that are concealed when using the OECD-EPR-Index.

1. Introduction

Despite a large body of research, the effects of employment protection legislation of regular employees (EPR) are still highly debated. Although some studies have found an increasing effect of EPR on overall unemployment (Holt and Hendrickson 2017; Lazear 1990), others have not found this effect (Addison and Grosso 1996; Addison, Teixeira, and Grosso 2000; OECD 2004; Nickell 1997; Blanchard and Portugal 2001; for an overview, see Addison and Teixeira 2003). Also, the negative of effects of EPR on labor-market outsiders is inconsistent. While most studies have found that EPR increased youth unemployment rates (Breen 2005; Esping-Andersen 2000; Heckman and Pagés-Serra 2000; OECD 2004, 2006; Boeri and van Ours 2013), a thorough review and replication of previous findings has suggested that these results are unstable and may be an artifact (Noelke 2016).

Whereas most of the scientific discussion about better estimates of the causal effects of EPR has focused on better research designs and analytical methods (e.g., Checchi and Leonardi 2016; Noelke 2016), the operationalisation of the theoretical concept of EPR, which is the foundation of any empirical analyses, has been largely ignored. As we show in the present study, the empirical findings depend decisively on the choice of measurement of EPR, and the OECD-index—the most often used indicator for EPR—has multiple problems. General agreement exists that a valid measurement is of central importance to obtaining valid findings. The demand for validated instruments (Mustillo, Lizardo, and McVeigh 2018: 1282) cannot be met if such a validated instrument does not exist, which is precisely the case with respect to EPR. At this point, the only relevant cross-country measurement for the construct EPR is the "synthetic indicators of the strictness of regulation on dismissals and the use of temporary contracts" (OECD 2013) provided by the OECD for which only minimal theoretical documentation is available (Allard 2005; OECD 2014; Venn 2009) and validation studies are non-existent. Therefore, the research gap that our study closes is the development and validation of an index to measure EPR.

The OECD EPR-Index is used in most comparative research. Most recent studies (e.g., Baranowska and Gebel 2010; Gebel and Giesecke 2011, 2016; Noelke 2016) include it directly to measure "employment protection for regular employees." This operationalization is state of the art at this point (Checchi and Leonardi 2016:532). Other studies use the OECD EPR-Index in combination with the other two sub-indices of the OECD—regulations on temporary employment and protection against collective dismissals—either by using the OECD Overall Index[1] that calculates a weighted average between the EPR sub-index and the two other sub-indices (e.g., Breen 2005; Gangl 2003, 2008; Lange, Gesthuizen, and Wolbers 2014) or by

calculating the mathematical differences between the sub-indices (Barbieri and Cutuli 2016) or the ratio (Biegert 2017). However, all these variations are based on the EPR sub-index, which is very problematic, as we will show in this paper, since it suffers from several shortcomings.

The minimal documentation on the development of the OECD Index and its sub-indices (e.g., Allard 2005; Venn 2009) has significant gaps with respect to the theoretical foundation of the index, and the documentation also lacks validation studies. Although the sub-index OECD-EPR-Index includes a wide range of items related to the employment protection legislation of regular employees, it poorly reflects the theoretical construct *protection against dismissal* because two central steps in the index construction—1) the normalization strategy applied to the individual items and 2) the rule of aggregation—are not theoretically grounded. The empirical normalization strategy used by the OECD-EPR-Index implies that all items included differentiate over the entire range of the theoretical construct; however, this is not the case, since items which differentiate only on one end of the theoretical construct are artificially stretched and mask those items that differentiate strongly. In addition, the additive aggregation rule chosen for the OECD-EPR-Index assumes a perfect compensation between the various dimensions, which the theoretical construct does not allow. If, for example, a country does not impose any restrictions on the grounds for dismissal, and the dismissal of permanent employees is legally permitted for almost any reason—the consequences (i.e. penalties) of an unfair dismissal are irrelevant, since they will never occur. Due to the problems with the normalization rule and the aggregation, the measurement of the OECD-EPR-Index deviates substantially from the theoretical construct of *protection against dismissal*.

The present study is structured as follows. Based on the rules for formative index construction, we develop a theory-driven EPR-Index (New) to measure the latent construct *protection against dismissal*. Starting with a theoretical model, we have identified the relevant sub-dimensions that determine protection against dismissal. To measure these sub-dimensions, we identified the corresponding items and normalised them using theory to ensure that the range of the new instrument corresponds to the range of the theoretical dimension. In the last step, we discuss the theoretical compensation rules between the sub-dimensions, and derive the resulting rule of aggregation to construct the EPR-Index (New). The empirical section illustrates the substantial effects of the operationalization of EPR on the results by comparing the results of this theory-driven EPR-Index (New) and the traditional OECD-EPR-Index. For this comparison, we use the predicted causal relationships from the literature that are linked directly to protection against dismissal in the causal chain. This comparison also serves as a test of the criterion validity of the two EPR-Indices. The results of the comparison show that

the results differ to a substantial degree and that the results from the New EPR-Index correspond better to the predictions of the theory. We conclude our study with a summary of our results and implications for future research.

2. Operationalization of Employment Protection Legislation for Regular Employees (EPR)

Our study focusses on the measurement of the Employment Protection Legislation for Regular Employees (EPR)[2]. The only existing measurement for cross-country comparisons for EPR is the sub-index "Employment protection legislation: regular employees" by the OECD (OECD-EPR-Index). To maintain consistent terminology, we define *EPR* as the underlying theoretical construct of employment protection legislation of regular employees.

A wide consensus exists as to what the OECD-EPR-Index is supposed to measure: the protection of permanent employees against dismissal (e.g., Barbieri and Cutuli 2016:503), which is evident in the use of the OECD-EPR-Index in scientific research (e.g., Baranowska and Gebel 2010; Gebel and Giesecke 2011, 2016; Noelke 2016). However, so far, only a brief description of the development of the index exists (Allard 2005; Venn 2009), and a detailed discussion and assessment of its validity is missing. Although one study criticized the validity of the index, it did not offer a solution (Bertola, Boeri, and Cazes 2000).

The two types of index construction are reflexive index formation (effect indicators) and formative index formation (causal indicators) (Edwards 2011). With respect to indicators at the country level, the formative index construction logic almost always is used, which assumes that the sub-dimensions and their measurement are the cause of the latent construct to be measured (Bollen and Lennox 1991:306). Therefore, a correlation of the items with the latent construct is expected, but the correlation between items can be zero (Latcheva and Davidov 2014:750). In contrast, with respect to reflexive indicators, high correlations between the items are expected, and also can be empirically tested by a factor analysis (Latcheva and Davidov 2014:750). With respect to the OECD-EPR-Index, the correlation among items is low (see Appendix A1), which follows the condition for a formative index. The correlation structure alone, however, says nothing about the quality of the measurement, which must be determined on the basis of theory. To ensure that the index corresponds to the underlying theoretical construct, four steps are necessary to construct the formative index (see OECD 2008:21–22). The steps are as follows: 1) The latent construct must be defined, and the latent sub-dimensions that determine it must be identified; 2) with respect to these sub-dimensions, observable

indicators must be selected; 3) these indicators must be normalised; and 4) to construct the actual index, the aggregation-rule must be specified to combine the normalized items. In the following sub-sections, we show that the OECD-EPR-Index has deficiencies in all four steps: the theoretical construct and the sub-dimensions are not derived from theory; some items have no equivalent in the theoretical construct; and both the normalisation rule and the aggregation rule violate assumptions about the theoretical construct. In this section we discuss these problems and develop an alternative EPR-Index.

2.1. Definition of the latent construct EPR and derivation of the sub-dimensions

A consensus exists in the literature that the OECD-EPR-Index measures the protection of permanent employees against dismissal (e.g., Baranowska and Gebel 2010; Gebel and Giesecke 2011, 2016; Noelke 2016). To determine the sub-dimensions of this latent EPR construct, we used a theoretical model to understand the dismissal process.

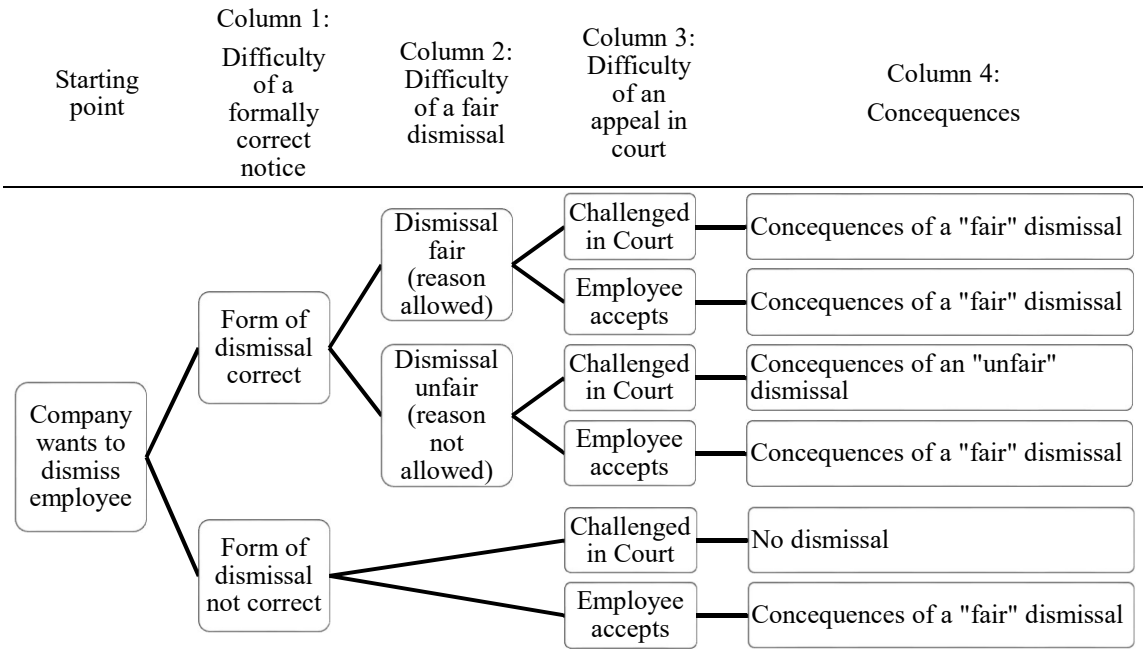


Figure 1. Dismissal procedure.

Source: Own presentation.

Figure 1 is a model of the dismissal process. If a company wants to dismiss an employee (Column 1), notice must be given. This notice can be valid in form or not (e.g., a verbal notice instead of a written notice as required). Therefore, the first factor is the difficulty of a formally correct notice. If the notice is valid in form, the next issue is whether the reason for dismissal is legally valid or not (Column 2), so the second decisive factor is the difficulty

of a fair dismissal. In either case, the employee can take legal action against the dismissal (Column 3). Therefore, the difficulty of an appeal is the third decisive factor. We assume that in the event of a challenge in court, the courts will rule according to the law[3]. At the end of the dismissal process, the outcomes or consequences are listed (Column 4). Costs for employers always correspond to the benefits for an employee and vice versa.

This dismissal procedure model implies that a formative EPR-indicator should include the following sub-dimensions: the difficulty of a formally correct notice, the difficulty of a fair dismissal, the difficulty of challenging a dismissal in court, and the consequences of a fair or unfair dismissal. To operationalize these sub-dimensions, one must determine the measurable factors that determine those difficulties.

2.2. Operationalization of the sub-dimensions of EPR

To operationalize these sub-dimensions, we use the legal situation as the starting point. Since this approach also was the OECD strategy, we can use the existing OECD coding, which offers two advantages: first, the OECD coding of country laws into items has been proven to be reliable (Noelke 2016:Online-Appendix 22f), and second, this strategy enables us to construct our index with existing data.

The first dimension (Column 1) is the "difficulty of a formally correct notice." The OECD offers two items that influence this dimension: "notification procedures" and "delay to start a notice"[4]. The OECD understands these items as "procedural inconveniences." Also, these two items capture the form that a valid notice of termination must take and how long employers must wait before notice of termination can be issued in a valid form. If these restrictions on the form of a notice of termination are not complied with, the notice is invalid. The "difficulty of fair dismissal" (Column 2: Reason) can be measured by the item "definition of unfair dismissal," which indicates the grounds on which dismissal is legally permissible. Column 3 refers to how difficult it is for employees to challenge a wrongful termination in court (Column 3: Difficulty of an appeal). With respect to the difficulty of challenging a wrongful termination in court, coding is not available within the EPR framework of the OECD, since this difficulty cannot be derived directly from the law. During the development of the OECD-indicators, a discussion was held as to whether some aspects of the legal system such as "burden of proof," "contested dismissal cases per 1,000 workers," or "average time for a decision in labour cases" should be included (Venn 2009:46–47). However, the role of courts was not included in the EPR-OECD-Index which has been criticized afterwards (Bertola, Boeri, and Cazes 2000:67-70). Nevertheless, since we want to account for the protection that a legal system provides

employees, we have chosen "collective bargaining coverage"[5] as a proxy. In other contexts, the degree of organization of trade unions has been used as a proxy for their influence in society, which also can serve as a proxy for the difficulty to challenge an employee's unfair dismissal in court. Thus, if employees have access to union support, legal advice or even legal support from union lawyers usually is available. Ensuring that employees are aware of their rights and helping them to enforce these rights reduces the difficulty to contest an unfair dismissal in court. The data on the coverage rate of trade unions also is provided by the OECD (2013). Column 4 "Consequences" distinguishes between the consequences of "fair" and "unfair" dismissals. "Notice period" and "severance pay" can be regarded as the consequences of a fair dismissal, and the two suitable items for the consequences of an unfair dismissal are "compensation following an unfair dismissal" and the "possibility of reinstatement following an unfair dismissal."

2.3. Normalization of items

Next, we normalize the items we derived from the theoretical model illustrated in Figure 1. In general, *normalization* means transformation to a common scale. Most normalization procedures are based on the empirical distribution of the items: e.g., Index of Social Progress (Estes 1997),and Index of Social Health (ISH) (Miringoff, Miringoff, and Opdycke 1999)). In rare cases, a theory-driven normalization strategy is chosen: e.g. "Level of Living Index" (Drewnowski 1974) and the "Human Development Index (HDI)" (Sen 1999). An important aspect of a theory-driven normalization are the "critical points of the indicator," i.e., the survival level and saturation point (Drewnowski 1974). Below the minimum or the survival level, a further deterioration is not to be expected, whereas above the saturation point a further increase is not to be expected. The difficulty, however, with respect to such standardization is that usually objective criteria or unanimous expert opinions are not available (Drewnowski 1974:22). Whereas empirical standardization usually can be described in one sentence, theoretical standardization requires a comprehensive theoretical explanation (e.g., Drewnowski 1974:52–68). However, such an approach is particularly important if the empirical distribution clusters at one end of the latent sub-dimension as is shown in Figure 2.

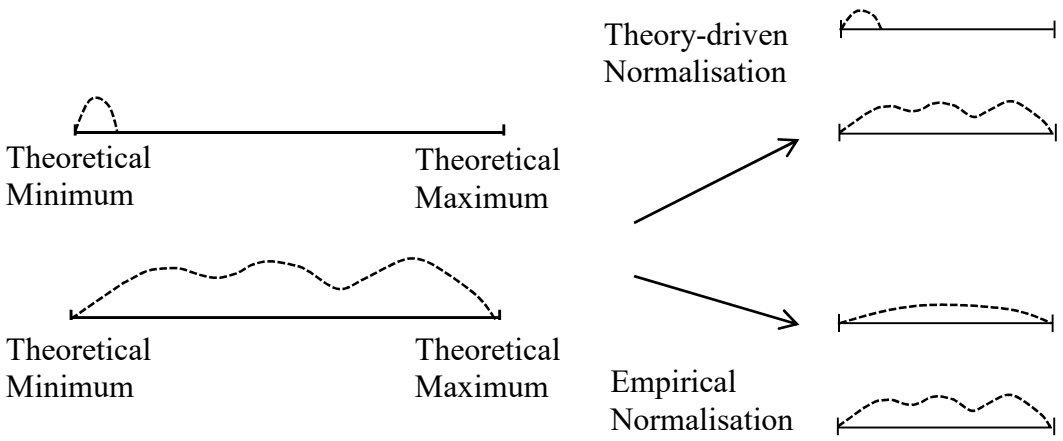


Figure 2. Theory-driven vs empirical normalization

Source: Own representation.

With respect to the upper item, the empirical distribution is restricted to the lower theoretical end of the sub-dimension, whereas the lower item is distributed over the entire range of the sub-dimension. The right side of Figure 2 shows the results of the two normalization strategies. Whereas the theory-driven normalization considers the distribution on the latent sub-dimension, the empirical normalization assumes that the empirical maximum equals the theoretical maximum. Therefore, if an empirical normalization is chosen, the resulting measurement misleadingly suggests a high variance or discrimination over the entire sub-dimension, although the measurement does not reflect the range across the construct. If the two items are aggregated, the variance of the upper item is artificially inflated relative to the lower item. Although a theory-based normalization is not empirically verifiable and can only be measured by the strength of the argumentation behind it, this approach improves the correspondence of the measurement with the underlying latent sub-dimension.

For each sub-dimension, the *theoretical minimum and maximum* must be defined on the basis of these general rules, and the coding adapted accordingly. The coding of each item for the EPR-Index (New) is explained below and summarized in Table 1. The column *theoretical dimension* shows the proposed theoretical normalization on the basis of the defined *theoretical minima and maxima*.

Table 1. EPR-Index (New): original coding scheme and theoretical normalization

Item, original unit, and short description of the assignment of numerical strictness scores[e]	**Theoretical dimension and theoretical range[g]**
Item 1: Notification Procedures 0 [an oral statement is enough] 2 [a written statement of the reasons for dismissal must be supplied to the employee] 4 [a third party (such as works council or the competent labour authority) must be notified] 6 [the employer cannot proceed to dismissal without authorisation from a third party]	Column 1: Difficulty of a formally correct notice of termination 0 ≡ Min, 6 ≈ Min ➔ Irrelevant
Item 2: Delay involved before notice can start[a] 0 [≤ 2 days], 1 [< 10 days], 2 [< 18 days], 3 [< 26 days], 4 [< 35 days], 5 [< 45 days], 6 [≥ 45 days]	Column 1: Difficulty of a formally correct notice of termination 0 ≡ Min, 6 ≈ Min ➔ Irrelevant
Item 5: Definition of justified or unfair dismissal 0 [when worker capability or redundancy of the job are adequate and sufficient ground for dismissal], 2 [when social considerations, age or job tenure must when possible influence the choice of which worker(s) to dismiss], 4 [when a transfer and/or a retraining to adapt the worker to different work must be attempted prior to dismissal], 6 [when worker capability cannot be a ground for dismissal]	Column 2: Difficulty of fair dismissal 0 ≡ Min, 6 ≡ Max
Item 9: Maximum time to make a claim of unfair dismissal[d] 0 [Before dismissal takes effect], 1[≤ 1 month], 2[≤ 3 months], 3[≤ 6 months], 4[≤ 9 months], 5[≤ 12 months], 6[> 12 months]	Column 3: Difficulty of an appeal 0 ≡ Min, 6 ≈ Min ➔ Irrelevant
Additional Item[f]: Collective bargaining coverage (in percentage) 0 [0], …, 6 [100]	Column 3: Difficulty of an appeal 0 ≡ Min, 6 ≡ Max
Item 3: Length of the notice period at... ...9 months tenure	Column 4: Consequences of a fair dismissal 0 ≡ Min, 6 ≈ Min ➔ Irrelevant

0 [0 months], 1 [≤ 0.4 months], 2 [≤ 0.8 months] 3 [≤ 1.2 months], 4 [< 1.6 months], 5 [< 2 months], 6 [≥ 2 months] ...4 years tenure 0 [0 months], 1 [≤ 0.75 months], 2 [≤ 1.25 months], 3 [< 2 months], 4 [< 2.5 months]5 [< 3.5 months], 6 [≥ 3.5 months] ...20 years tenure 0 [< 1 months], 1 [≤ 2.75 months], 2 [< 5 months], 3 [< 7 months], 4 [< 9 months], 5 [< 11 months], 6 [≥ 11 months]	
Item 4: Severance pay at... ...9 months tenure (in months pay) 0 [0], 1 [≤ 0.5], 2 [≤ 1], 3 [≤ 1.75], 4 [≤ 2.5], 5 [< 3], 6 [≥ 3] ...4 years tenure (in months pay) 0 [0], 1 [≤ 0.5], 2 [≤ 1], 3 [≤ 2], 4 [≤ 3], 5 [< 4], 6 [≥ 4] ...20 years tenure (in months pay) 0 [0], 1 [≤ 3], 2 [≤ 6], 3 [≤ 10], 4 [≤ 12], 5 [≤ 18], 6 [> 18]	Column 4: Consequences of a fair dismissal 0 ≡ Min, 6 ≈ Min ➔ Irrelevant
Item 7: Compensation following unfair dismissal[c] (in months pay) 0[≤ 3], 1[≤ 8], 2[≤ 12], 3[≤ 18], 4[≤ 24], 5[≤ 30], 6[> 30]	Column 4: Consequences of an unfair dismissal 0 ≡ Min, 6 ≡ Max
Item 8: Possibility of reinstatement following unfair dismissal 0 [no right or practice of reinstatement], 2[reinstatement rarely or sometimes made available], 4 [reinstatement fairly often made available], 6 [reinstatement (almost) always made available]	Column 4: Consequences of an unfair dismissal 0 ≡ Min, 6 ≡ Max

Note: **a** Estimated time includes, where relevant, the following assumptions: 6 days are counted in case of required warning procedure, 1 day when dismissal can be notified orally, or the notice can be directly handed to the employee, 2 days when a letter needs to be sent by mail and 3 days when this must be a registered letter.
b Period within which, regular contracts are not fully covered by employment protection provisions, and unfair dismissal claims can usually not be made.
c Typical compensation at 20 years of tenure, including back pay and other compensation (e.g. for future lost earnings in lieu of reinstatement or psychological injury), but excluding ordinary severance pay.
d Maximum time period after dismissal notification up to which an unfair dismissal claim can be made.
e Source: OECD 2014.
f Not included in the OECD-EPR. Source: OECD 2013 retrieved from https://stats.oecd.org/Index.aspx?DataSetCode=CBC.
g Source: authors consideration

Column 1: Difficulty of formally correct notice of termination

The measurement of the theoretical construct *difficulty of formally correct dismissal notice of termination* indicates the difficulty to give a formal notice of dismissal on a continuum from very easy to extremely difficult. The zero point represents *very easy*. The saturation threshold is reached when the legally required form of dismissal is so difficult to comply with that it represents a major obstacle for the employer. We consider the requirement of the consent of an employee-friendly third party—that has a high tendency of refusal of consent—to be a major obstacle for an employer to comply with the requirements of a formal notice of dismissal. If an employer can comply with the process relatively easily, the zero-point is reached. Looking at the original coding, it is clear that the empirical distribution only differentiates at the lower end of the scale. Code 0 means that an oral dismissal is sufficient, code 2 means that a written dismissal is necessary, code 4 means that a third party must be notified, and code 6 means that a third party must agree. Unfortunately, the coding of consent does not distinguish between employee-friendly and employer-friendly parties. However, in the 800 country years currently available, only Portugal in 1985–1989 and Venezuela in 2014 take the value 6. Thus considering that almost without exception, employers must only notify a third party, it can be assumed that this is not an obstacle to dismissal, which is the reason we do not consider this item. In terms of mapping the empirical dimension to the theoretical dimension, the theoretical minimum is the empirical minimum (zero), and the empirical maximum is close to the theoretical minimum.

The second item *delay involved before notice can start* would be an obstacle if it delayed the process to the degree that the dismissal would not be cost-effective. In this case, a theory-based normalization can be based on the average tenure. The value 6 represents a delay of 45 days, which the employer has to wait to give formally correct notice of termination. This is not an obstacle, since this period is negligibly short in relation to the average length of service and therefore similar to the theoretical minimum. Therefore, the measurement of *difficulty in giving formal notice* is not included as an indicator, i.e., we assume that the required form of notice does not play a role in the protection of employees against dismissal.

Column 2: Difficulty in finding a legally permissible ground for dismissal

The sub-dimension *difficulty in finding a legally permissible ground for dismissal* is captured using the item *definition of unfair dismissal,* which quantifies the reasons for dismissal that can be given, so the dismissal will not be overturned in court. The zero-point means that notice can be given for lack of performance, and the saturation point is reached if notice can

only be given if an employee cannot fill any other position in the company, even after extensive retraining. This corresponds to the theoretical sub-dimension, i.e., this indicator is included in the index without recoding, i.e., from 0 to 6.

Column 3: Difficulty of appealing a dismissal in court

The OECD does not provide coding for the sub-dimension *difficulty of an appeal*, which should measure the difficulty of employees to challenge a formally incorrect or legally inadmissible notice in court. The desirability of measuring this dimension also was mentioned in the development of the OECD indicator (Venn 2009:27–37). "Burden of proof" or "contested dismissal cases per 1,000 workers" was discussed as a measurement (Venn 2009:46–47), but this data not provided by the OECD, and common data sources do not provide this information. Therefore, we use "coverage rate in %" as a proxy. In the minimum, which is also the survival level, 0% of employees have union protection, whereas in the maximum, i.e., the saturation threshold, 100% have protection. We rescale these values to 0 to 6.

Column 4: Consequences of fair dismissal

The sub-dimension *consequences of fair dismissals* is measured with *severance pay* and *notice period*. The saturation point is reached when the notice period is so long that the termination becomes unprofitable. A reference point is a comparison with tenure. The scale value 6 (maximum) means that if an employee has been with a company for 4 years, the notice period is more than 3.5 months. Although this delays the termination, it does not prevent it (which might be the case, for example, with a notice period of 10 years). Again, the empirical maximum is close to the theoretical minimum, i.e., so we do not include the notice period in our index.

The saturation point for *severance pay* is reached when the compensation payments are sufficiently high to make a dismissal uneconomical for an employer. This would be the case, for example, if severance pay corresponded to several annual salaries. The maximum code for 4 years' service is 4 months' salary, 20 years is 18 months, i.e., less than 10% of previous earnings. Again, the empirical maximum is close to the theoretical minimum, so we do not include this item.

Column 4: Consequences of unfair dismissal

The sub-dimension *consequences of unfair dismissal* consists of two items: *practice of reinstatement* and *compensation following unfair dismissal (excluding severance pay)*. The

measurement of *practice of reinstatement* corresponds exactly to the theoretical sub-dimension: reinstatement is offered almost never or never in the minimum, and always or almost always in the maximum, so we can include this item in the index without rescaling. The minimum of *compensation following unfair dismissal* is easy to determine: 0 or less than 3 months' salary is clearly a good survival level. The maximum seems rather arbitrary, but the OECD coding sets the threshold at greater than 2.5 annual salaries. In the absence of better alternatives, we follow this coding.

These findings reveal the second major problem with the OECD-EPR-Index. The majority of the included items differentiate only at the lower end of the theoretical dimension. However, since all items in the OECD-EPR-Index are empirically normalized, the variance of a few items that differentiate across the entire theoretical dimension is deflated by the artificially stretched items. Given these problems, the proposed indicators only include the dimensions *difficulty of fair dismissal, difficulty of an appeal* and *consequences of unfair dismissal*. The next step is to aggregate these dimensions.

2.4. Aggregation

The aggregation rules of the dimensions determine which substitution or compensation rules are assumed between the sub-dimensions (e.g., OECD 2008:33; Noll 2002; Scheuch and Zehnpfenning 1989:171). Therefore, an operationalization must clarify and discuss assumptions about substitution rules (Goertz 2006:46). Substitutability occurs when a decrease in one sub-dimension is offset by an increase in another sub-dimension.

Aggregation rules and underlying substitutability assumptions

The standard method for constructing indices, both in textbooks and in practice, is the additive aggregation rule (Goertz 2006:42), which is used, for example, in the Level of Living Index, the HDI, the Index of Social Progress, and the Index of Social Health. By using the arithmetic mean, full compensation of the dimensions is assumed (Goertz 2006) which poses a problem if the theory does not support linear compensation, i.e., if the effect of one sub-dimension depends on the height of another sub-dimension, or if certain conditions are defined as necessary prerequisites. If the aggregation rule violates the theoretical assumptions, the resulting index does not correspond to the theoretical construct. The underlying compensation assumptions of different aggregation rules are shown in Figure 3. The graphs show two sub-dimensions and the resulting index on the vertical axis when using different aggregation rules.

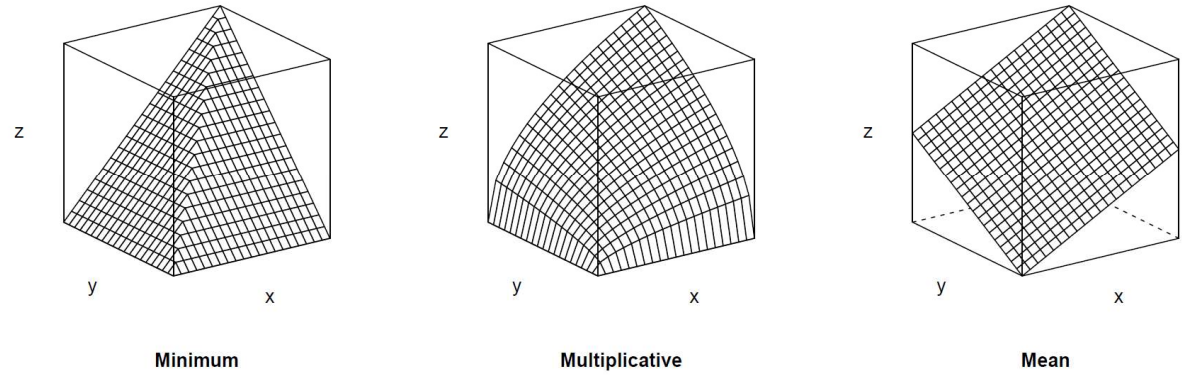


Figure 3. Compensation for different aggregation rules

Note: For Figure 3.1 and Figure 3.3, see also Goertz 2006:43, own presentation

If the theoretical model does not suggest compensation, the minimum aggregation rule is necessary[6]. In practice, however, the minimum aggregation rule is rarely used. A compromise between the arithmetic mean[7], which assumes full compensation, and the minimum, which completely excludes compensation, is the geometric mean (Goertz 2006:138). Such multiplicative indices[8] reflect that the effect of one factor depends on the level of another factor. In practice, these indices also are rarely used. One exception is the Joint Democracy index (Lemke and Reed 2001). In contrast to the arithmetic mean, the choice of the zero-point is central for the geometric mean. Zero on a sub-dimension of a multiplicative index is the point at which compensation is not possible. If a scale without a zero-point is used (e.g., Lemke and Reed 2001), compensation is possible at any point. A multiplicative index with zero represents a special case with characteristics of both the minimum and geometric mean.

Application to the EPR-Index

To determine the correct aggregation rule for sub-dimensions and corresponding items, assumptions must be made explicit concerning the substitutability between sub-dimensions. The OECD-EPR-Index uses the arithmetic mean, but the model of the dismissal process (Figure 1) illustrates that sub-dimensions are interdependent. A sub-dimension has a stronger effect on the latent construct, depending on the level of the other sub-dimensions. Additionally, compensation between the sub-dimensions is not possible at the zero-point of each dimension.

With respect to EPR, when a fair dismissal is legally possible for any reason, or if an unfair dismissal has no consequences or cannot be brought to court, protection against dismissal, regardless of the other dimensions, does not exist. Therefore, the overall indicator

should equal zero if one of the three dimensions equals zero. If, on the other hand, unfair dismissals always are overturned in court, the legislation concerning reasons for fair dismissals becomes very important, which implies a multiplicative combination of the dimensions (i.e., formation of the geometric mean) with previously defined zero-points. However, this substitution logic is violated by the aggregation rule of the OECD-EPR-Index, which constitutes the third major problem that the EPR-Index (New) addresses.

When constructing the EPR-Index (New), we use the geometric mean. Within the sub-dimensions, we assume that the items are perfect substitutes, which means that to measure the *consequences of unfair dismissal*, we use the arithmetic mean of items 7 and 8. This approach results in the following equation for the proposed indicator:

$$
\begin{aligned}
&\text{EPR (New)} = \\
&\quad = \text{Protection against dismissal} \\
&\quad = f(\text{Difficulty of fair dismissal , Difficulty of appeal, Consequences of unfair dismissal}) \\
&\quad = \Bigg(\text{Definition of justified or unfair dismissal} \times \text{Collective bargaining coverage} \times \\
&\qquad \frac{\text{Compensation following unfair dismissal} + \text{Possibility of reinstatement following unfair dismissal}}{2}\Bigg)^{\frac{1}{3}}
\end{aligned}
$$

3. Empirical Tests: Validity and Substantive Implications

The differences between the construction of the OECD-EPR-Index and our theory-driven EPR-Index (New) affect the distribution of the index itself and the empirical conclusions concerning the effects of the latent construct EPR. First, this section provides some descriptive results and examines the structure of the EPR-Index (New) by comparing it to the OECD-EPR-Index. Second, we test whether the predicted effects in the literature can be confirmed when using the OECD-EPR-Index or the EPR-Index (New).[9]

The empirical analysis fulfils two purposes: (1) it demonstrates how research findings about EPR depend substantially on the choice of operationalization, and (2) it show that our proposed EPR- Index (New) better matches the literature hypotheses, and therefore, has a higher criterion validity. With formative indices, it is not possible to test the assumptions underlying an index construction solely by analyzing the distribution and correlation of items. Therefore, we apply an indirect test that uses the effect of the index on a dependent variable that, according to the literature, is influenced by the latent construct (criterion validity).

3.1. Analytical approach and selection of the examples

To test criterion validity, it is necessary to analyze causal relationships, and so the research design should minimize any interfering factors that could damage the validity of the results.

The two criteria that are central to avoiding bias in the estimated causal effects are: 1) a close link between the latent construct and the effect in the causal chain and 2) a research design suitable for discovering causal connections. Thus, a fixed-effects approach would be an ideal research design. However, since both operationalizations of employment protection show minimal intra-country variation over time (see Appendix A2), country fixed-effect models cannot be used for the empirical tests. Therefore, empirical tests are restricted to cross-country comparisons, with all the associated causality problems including potentially omitting variables at the country level. To minimize causality problems, we investigate only those effects that are linked directly to the construct EPR, and control for all confounding variables.

We use two empirical questions to test the construct validity of the measurement: 1) How does protection against dismissal affect perceived job insecurity? and 2) How does protection against dismissal affect hiring strategies across countries?

In both cases, a direct connection between the two variables exists in the causal chain, which means that the effect is directly caused by EPR and not mediated by another variable. First, if permanent employees are well protected against dismissal, in cross-country comparisons they should feel more secure overall, and the difference in perceived security between permanent and temporary employees should increase. Second, for new hires, the risk of a temporary versus permanent contract is influenced directly by the level of protection against dismissal. Moreover, we have selected the second question because it can be answered with the European Labour Force Survey (EU-LFS), the most frequently used dataset for studies on employment protection (e.g., Baranowska and Gebel 2010; Biegert 2017; Gebel and Giesecke 2011, 2016; Noelke 2016).

3.2.Descriptive results: Comparison of proposed EPR-Index (New) vs OECD-EPR-Index

First, we look at the difference between our proposed EPR-Index (New) and the OECD-EPR-Index. If the differences in normalization and aggregation discussed in the previous section do not lead to differences in the final indices, there is no risk that previous findings are impacted considerably by the choice of indicator.

The distributions of the multiplicative EPR-Index (New) with theoretical normalization, and the additive OECD-EPR-Index with empirical normalization are shown in Figure 4.

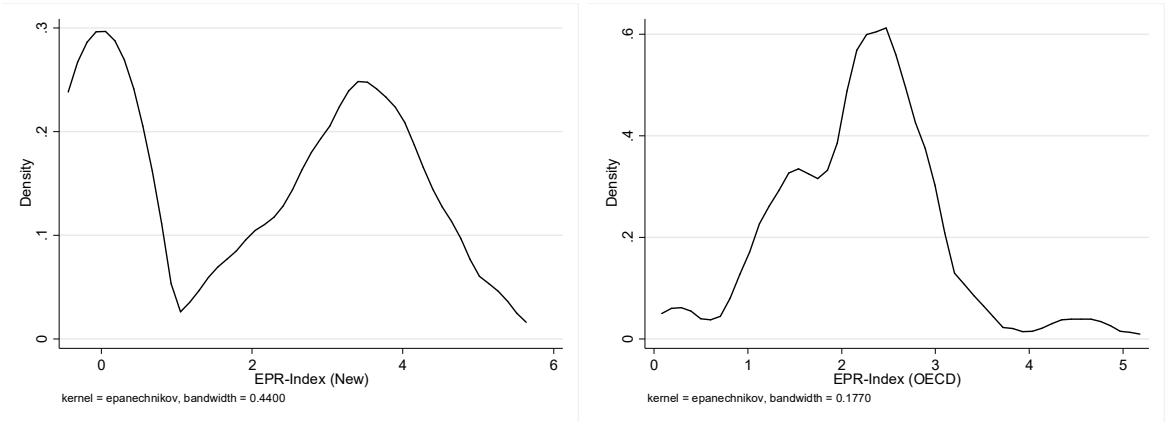


Figure 4. Distribution of EPR-Index (New) and OECD-EPR-Index

Source: OECD 2013, own presentation

The EPR-Index (New) on the left is bi-modally distributed, whereas the OECD-EPR-Index on the right is unimodal and approximately normally distributed. Consequently, the descriptive findings of the proposed distributions of the latent construct between countries differ considerably. The multiplicative EPR-Index (New) on the left indicates a polarization of the underlying theoretical dimension, which would be masked if the additive OECD-EPR-Index is used. The mean of the multiplicative EPR-Index (New) is 2 with a standard deviation of 1.8. The OECD-EPR-Index has a mean of 2.3 with a standard deviation of 0.7. A scatter plot between the additive OECD-EPR-Index and the multiplicative EPR-Index (New) (Figure 5) shows that most countries are located close to the diagonal, which means that the results of both EPR-Indices are similar in these cases. The correlation is 0.67.

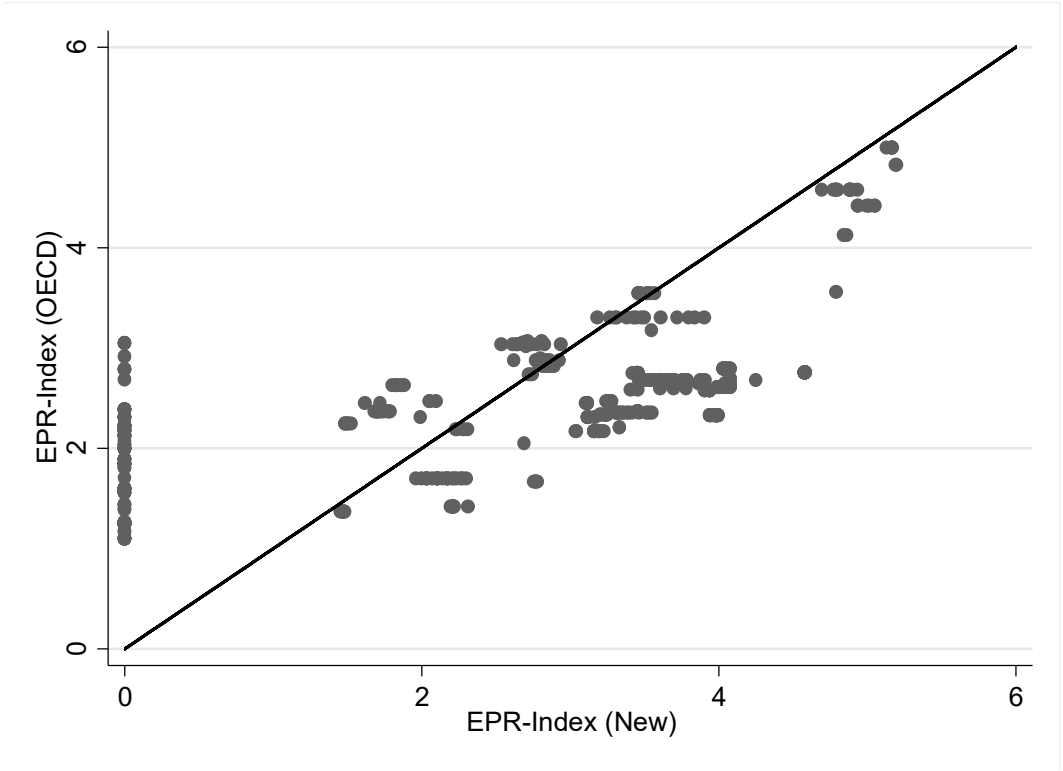


Figure 5. Correlations of new EPR- Index (New) against OECD-EPR-Index.
Source: OECD 2013, own representation.

However, the differences between the two indices are significant: With respect to the EPR-Index (New), almost half the countries are given the value 0. In all cases, this is because dismissal is permitted for all reasons. In contrast, these countries have values above 0 in the OECD-EPR-Index.

Since we have shown that our proposed theory-driven EPR-Index (New) and the OECD-EPR-Index are constructed differently and have different distributions, we also expect differences in the estimated causal effects when using the two indices.

3.3. Example 1: EPR and the effect on subjective job security

To understand the effects of the two indices on substantive results and to test the validity of these indices, we examine the effect of EPR on subjective job security.

Theory and hypotheses

EPR protects permanent employees against dismissal. The empirical test is based on the assumption that this protection also would be reflected in the perceived job security of permanent employees (for a detailed discussion, see Balz, 2017), which leads to the following hypotheses:

Hypothesis 1.1: Stricter EPR increases the subjective job security of permanent employees.
Hypothesis 1.2: Stricter EPR decreases the subjective job security of temporary employees.

Consequently:
Hypothesis 1.3: Stricter EPR increases the difference in subjective job security between permanent and temporary employees.

Although the hypotheses that are put forward in the literature are the same (Balz 2017; Berglund 2015; Chung and van Oorschot 2011; Chung 2016; Clark and Postel-Vinay 2009), the empirical evidence is mixed. Studies that use the OECD-EPR-Index find the expected effects described in the literature only if they fail to include a random slope, despite an interaction effect (cf. Bryan and Jenkins 2016). When the models are specified correctly, which means including a random slope (Chung 2016), the expected effects are no longer significant.

Data and methods

For the empirical test, we use the data from the European Social Survey (ESS) 2004 and 2010; European Working Condition Survey (EWCS) 2005, 2010, and 2015; and European Quality of Life Survey (EQLS) 2007, 2012, and 2016. Based on these three data sets, we estimate a linear multilevel regression model on subjective job security. The dependent variable *"subjective job security"* is scaled from 1 to 4 in the ESS, and 1 to 5 in the EWCS and the EQLS. The first level in the multilevel model is employees aged 20–67. The second level is country years.

At the country level, we control for regulations of temporary contracts and the unemployment rate. At the individual level, the included control variables differ slightly across the datasets. Depending on the variables available, we control for company size, industry sector, working hours, general and company-specific human capital, gender, and age. For summary statistics for the variables included in the models, see Appendix A3.

Results

Figure 6 shows the results for the multi-level models—the predicted levels of perceived job insecurity for permanent and temporary employees, depending on EPR. The line with the dark grey confidence interval indicates permanent employees; light grey corresponds to temporary employees. Additionally, the estimated coefficients are shown, i.e., the predicted effect of EPR on the subjective job security of permanent employees and the predicted

difference of the effect of EPR for permanent and temporary employees. For the complete results including control variables, see Appendix A4.

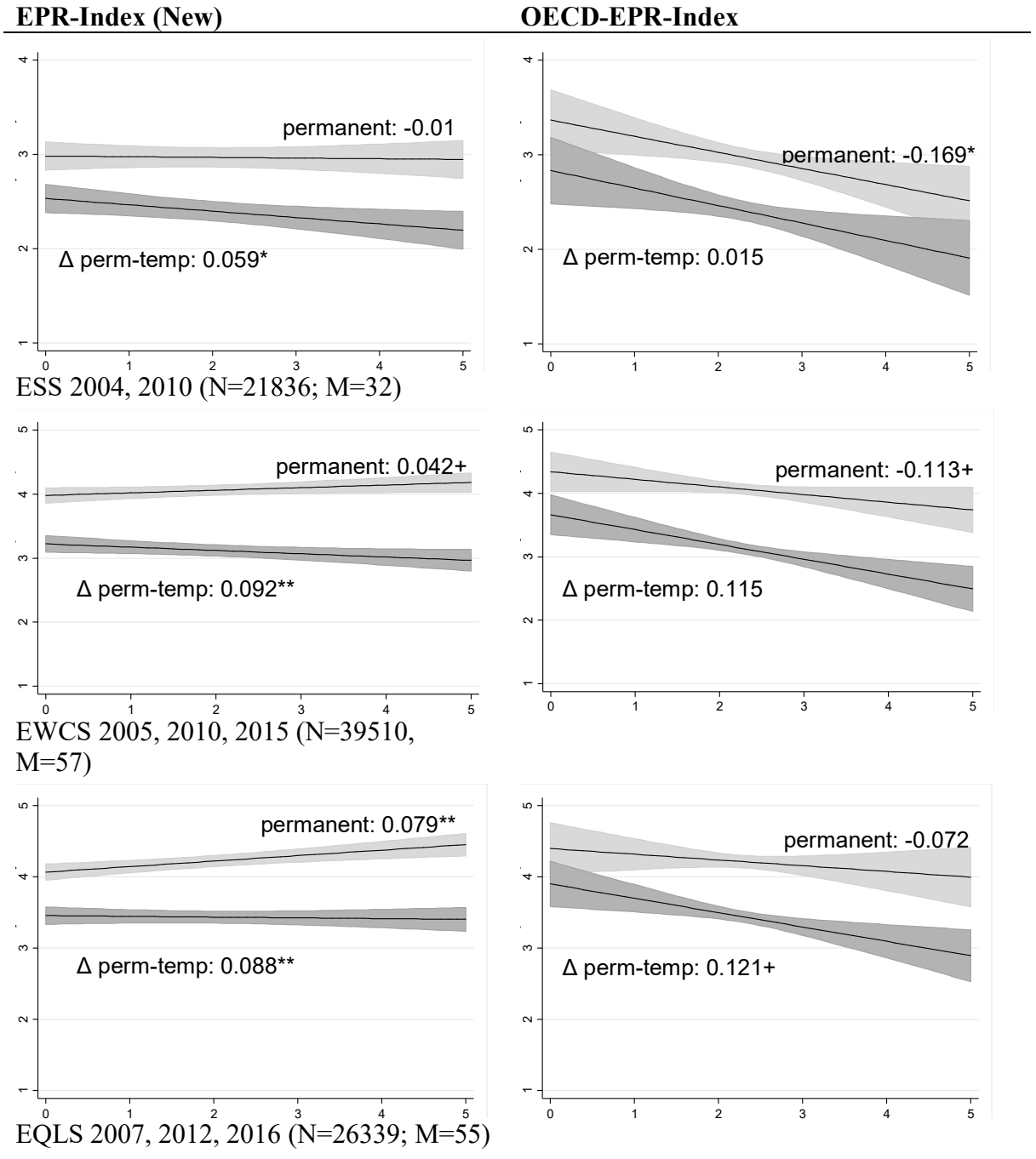


Figure 6. Predicted effects of EPR on job security.

Note: Predicted values of job insecurity of permanent and temporary employees, dependent on EPR estimated from the random slope multilevel models.

With the theory-driven EPR-Index (New), we mostly find the expected effects. Protection against dismissal increases the perceived job security of permanent employees (EWCS and EQLS). For all three data sets, the effect of protection against dismissal is stronger

for permanent employees than temporary employees. This interaction effect is significantly positive for all three data sets. In contrast, when using the OECD-EPR-Index, the empirical findings contradict the theoretical expectations. For all three datasets, we find that protection against dismissal measured with the OECD-EPR-Index reduces the perceived job security of permanent employees, and even significantly for the ESS dataset. Therefore, the OECD-EPR-Index does not capture the different effects of employment protection on temporary and permanent employees. When the OECD operationalization is used, the interaction effect is not significant in any of the three data sets.

However, the effect sizes of the two EPR indices are not comparable. Since the variance of the OECD-EPR-Index is smaller, the unstandardized regression coefficients tend to be larger. And, since the hypotheses only make statements about the direction of effects and not their sizes, an absolute interpretation of effect sizes is not necessary. Additionally, the differences in variance result from the different construction of the indices. When using the theory-based normalization and aggregation rules, which were implemented with the EPR-Index (New), the minima and maxima correspond to the theoretical equivalents. With the empirical approach, which is used in the EPR-OECD-Index, the distribution of the indicator is a result of the distribution of the items. Therefore, the effects are not comparable.

The results from this empirical test demonstrate that the findings of the two operationalizations differ considerably. Since the empirical findings correspond better to the predictions about the effect of the latent construct, and since no the findings contradict the theory when using our theory-driven EPR-Index, it has higher criterion validity. Therefore, in the first empirically example, our theory-based approach demonstrates significant advantages compared to an empirically-based approach.

3.4. Example 2: EPR and the temporary employment risk of new hires

The second part of the empirical analysis does not allow a simple replication of previous research. First, many of the effects studied in the literature are not directly caused by the latent construct protection against dismissal (e.g., youth unemployment rate, fixed-term employment rate for young people) but transmitted through other variables. It is not possible to control all the relevant confounding variables (e.g., the education system) and therefore these questions are not suitable as a test of criterion validity. Moreover, since the low variation of EPR across time rules out fixed-effect models that could control for many confounding variables, a close link in the causal chain is crucial. Therefore, in the second part of the analysis, we use the literature on the labor market participation of young adults; however, rather than

examining the unemployment rate or fixed-term employment rate, we examine the fixed-term employment risks of labour market outsiders.

Previous findings, theory, and hypotheses

The literature generally assumes that strict EPR has a negative impact on the labour market opportunities of young people (e.g., Breen 2005; Gebel and Giesecke 2016; Noelke 2016), since it increases unemployment risk (e.g., Breen 2005; Esping-Andersen 2000; Heckman and Pagés-Serra 2000; OECD 2004, 2006) and temporary employment risk of labor market entrants risks (Gebel and Giesecke 2016; Lange, Gesthuizen, and Wolbers 2014). However, the findings are ambiguous. Although most empirical findings have suggested that EPR increases youth unemployment (e.g. Breen 2005; Esping-Andersen 2000; Heckman and Pagés-Serra 2000; OECD 2004, 2006), a thorough review and replication of previous findings have found that these results are unstable and may be an artifact (Noelke 2016).

Nevertheless, some theoretical expectations are consistent. According to the literature (e.g., Gebel and Giesecke 2016:488), the effect of EPR or protection against dismissal on the youth unemployment and temporary employment rates is caused by the hiring strategies of companies. Thus, to reduce the influence of uncontrolled variables at the country level, we used the effect on hiring behavior to examine the construct validity of the two indices. By examining the hypothesis derivation of Gebel and Giesecke (2016:488), we identified hypotheses to use for the criterion validity test. According to Gebel and Giesecke (2016), high protection against dismissal leads to lower hiring and dismissal rates, and increases incentives to use fixed-term contracts. Thus, stricter EPR or job security provisions should not reduce the number of new hires in general, but rather the number of permanent hires. This expectation applies to both entrants to the labor market and labor market outsiders (the unemployed), which leads to the following hypothesis:

Hypothesis 2.1: Stricter EPR increases the risk for labor market new hires to receive a temporary (versus permanent) contract.

An advantage of this hypothesis is that it implicitly controls for current hiring rates in each country by comparing temporary to permanent contracts.

Data and methods

The analysis sample was restricted to new contracts for employees aged 18–68. *New contracts* are defined as all new employment contracts of employees who were not employed

in the previous year and were not on parental leave, i.e., were unemployed or still in the education system. The dependent variable is binary coded (temporary vs permanent contracts). We excluded fixed-term apprenticeship contracts from the sample. We used a linear multilevel model with new contracts as level 1 and country-years as level 2. We control for the duration of the trial period, unemployment rate, regulations on the use of temporary contracts, and years at the country level; and for age, gender, and level of education at the individual level. We use 304 country-years for our analysis.

Figure 7 shows the temporary employment rate for new hires across countries. Each dot represents one country-year. The mean temporary employment rate for new hires is 44%, with a standard deviation of 20, the minimum is 10%, and the maximum is 89%. Portugal, Slovenia, and Spain have particularly high values (greater than 80%), whereas Austria, Denmark, Estonia, Switzerland, and the United Kingdom have low values (less than 20%).

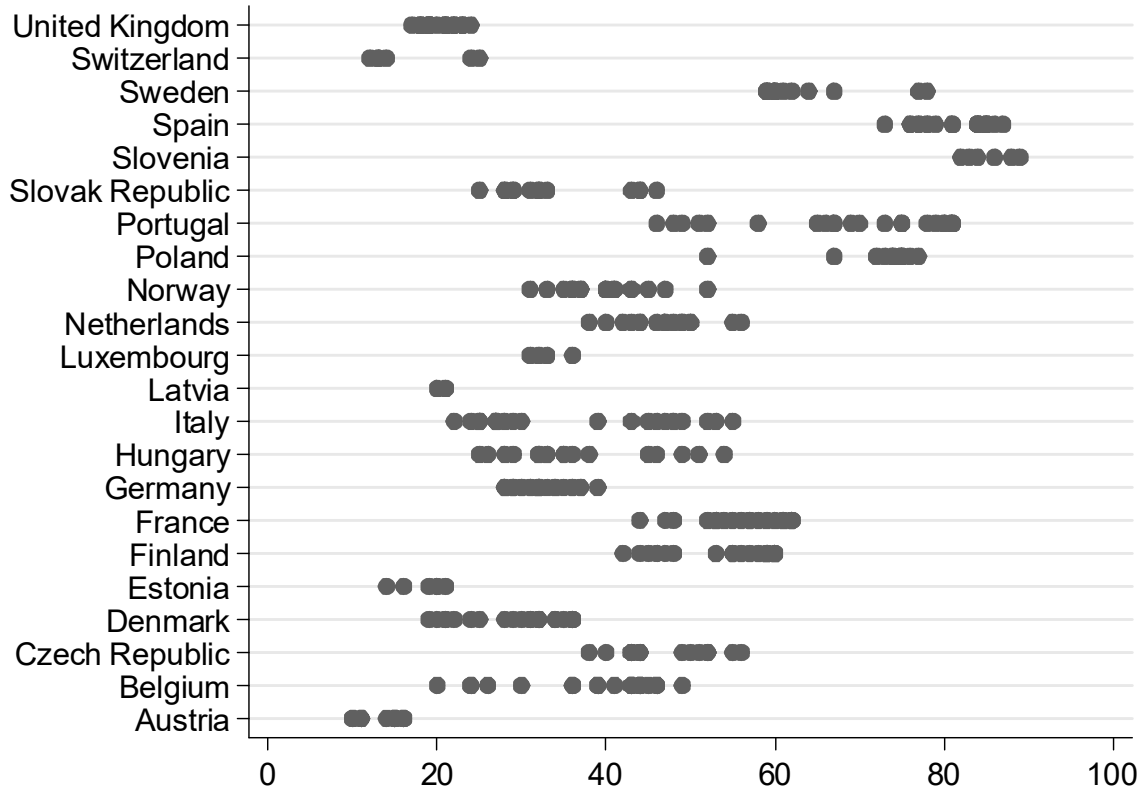


Figure 7. Proportion of fixed-term contracts for new hires

Source: EU-LFS. Own calculations; unweighted results.

Multivariate Results

The results of the multilevel regression presented in Table 2 show the effects of EPR and the duration of the trial period on temporary employment risk for new contracts. See Appendix A5 for a complete regression table including all control variables.

Table 2. Effect of EPR on temporary employment risk of new hires (EU-LFS)

	(1) OECD-EPR-Index		(2) EPR-Index (New)		(3) OECD-EPR-Index (z-stnd.)		(4) EPR-Index (New) (z-stnd.)	
OECD-EPR-Index	0.111**	(0.012)						
EPR-Index (New)			0.032**	(0.005)				
EPR-OECD-Index (z-standardized)					0.064**	(0.007)		
EPR-Index (New) (z-standardized)							0.057**	(0.009)
Duration of trial period (short)	0.026	(0.020)	0.074**	(0.020)	0.026	(0.020)	0.074**	(0.020)
Regulations on the use of temporary contracts	0.003	(0.005)	-0.007	(0.006)	0.003	(0.005)	-0.007	(0.006)
Unemployment rate	0.025**	(0.002)	0.022**	(0.002)	0.025**	(0.002)	0.022**	(0.002)
Variance components								
Individual	0.207	(0.000)	0.207	(0.000)	0.207	(0.000)	0.207	(0.000)
Country	0.020	(0.002)	0.023	(0.002)	0.020	(0.002)	0.023	(0.002)
Explained variance								
Individual	0.081		0.069		0.081		0.069	
Country	0.485		0.410		0.485		0.410	
M	304		304		304		304	
N	1242199		1242199		1242199		1242199	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses. R-squared as proposed by Snijders and Bosker (1994:350–354, 1999:99–105).
Source: Estimations from the random intercept model; Restricted Maximum Likelihood).

Both operationalizations of employment protection for regular employees support the hypothesis that the temporary employment risk of new hires increases with stronger protection

against dismissal. At first glance, this means that the theory-based EPR-Index (New) has no apparent advantage. The effect size when using the OECD-EPR-Index is even larger. However, as explained previously, the difference in the coefficients follows from the distribution differences between the two indices. If both EPR-Indices are z-standardized, the effects are similarly large (0.064 and 0.057; see Appendix 5). If the two EPR-Indices are standardized based ontheir empirical distribution, the estimated effect shows how much the temporary employment risk increases if the respective EPR-Index rises by 1 standard deviation on the empirical distribution. This standardization should not be confused with the empirical normalization discussed previously. With z-standardization of the Index, the coefficient of the valid index is adjusted to the empirical distribution, whereas an empirical standardization of items leads to an invalid index.

The key difference between the two models is, that in the model using the theory-based EPR-Index (New) a shorter legal trial period also significantly increases the temporary employment risk of new hires. This effect reflects the expectations in the literature (e.g. Gebel and Giesecke 2011), where fixed-term employment is expected to be used as an extended probationary period or screening device (Korpi and Levin 2001). The incentive to use fixed-term contracts as a prolonged trial period should increase if the legal trial period is short. This effect cannot be found by the model using the OECD-EPR-Index because the trial period-effect is partly confounded with the EPR-effect, since the item is part of the OECD-EPR-Index.

Therefore, even though the OECD-EPR-Index also found the expected effects of temporary employment risk for new hires, the advantage of the theory-based EPR-Index (New) is nevertheless evident. Only when using the EPR-Index (New) we can validly estimate the effects of the related concepts, since these effects are hidden when using the OECD-EPR-Index.

Thus, the analysis with the EU-LFS has shown that effects discussed in the literature so far may have been strongly influenced by the chosen operationalisation of EPR. Moreover, the results using the theory-driven EPR-Index (New) better align with the expectations in the literature, and therefore has a higher criterion validity.

4. Conclusion

Employment protection legislation of regular employees (EPR) is a key variable in labour market research (e.g., unemployment: Addison, Teixeira, and Grosso 2000; Addison and Teixeira 2003; Nickell 1997; Lazear 1990; youth unemployment: Breen 2005; Esping-Andersen 2000; Heckman and Pagés-Serra 2000; OECD 2004, 2006). In this study, we 1) argue that the standard OECD-operationalization violates several theoretical assumptions, 2) develop

an alternative EPR-index that solves these problems, 3) demonstrate with empirical analyses, that findings are crucially different when using the theory-driven EPR-Index (New), and 4) showed that the alternative EPR-Index (New) has higher criterion validity, since it better corresponds to the predictions of theory.

So far, almost without exception, comparative research has used the OECD-EPR-Index for operationalizing employment protection for regular employees; however, this index has never been discussed and validated in detail. We close this gap by constructing and testing an alternative theory-driven EPR-Index. Starting with the latent theoretical construct of EPR, we develop an alternative measurement in accordance with the principles of index construction. Based on a broad empirical foundation using four cross-country datasets—ESS, EQLS, EWCS, and EU-LFS—we show that our theory-driven EPR-Index (New) does not only generate significantly different results than the OECD-EPR-Index, but also that it has a higher criterion validity. This conclusion refers to both the estimated effects of dismissal protection itself and to the effects of related constructs. For both the effects of EPR on perceived job security and on temporary employment risk for new hires, we find the effects predicted in the literature. In contrast, the results from the OECD-EPR-Index contradict the hypotheses in the literature. Most noteworthy is the finding that strict job security provisions measured with the OECD-EPR-Index reduce perceived job security for permanent employees, which contradicts theoretical expectations, and which is the opposite of the EPR-Index (New) findings. Moreover, the literature suggests that temporary contracts are used as extensions of probation periods (Gebel and Giesecke 2011; Korpi and Levin 2001). Therefore, in countries with a short probation period, the temporary employment risk for new hires should be higher. This effect has not been empirically verified so far, but it can be found with the theory-based EPR-Index (New), but not with the OECD-EPR-Index. Consequently, a valid measurement is crucial not only for producing unbiased estimates of the effects of EPR, but also for valid estimates of related constructs.

Besides the substantive implications for comparative labor market research, the second contribution of our study is methodological. Even though the call for a theory-driven index construction has existed for a long time in the index construction literature (e.g., Blalock 1983; Noll 2002), it has almost never been implemented consistently. The main problems with index construction revolve around normalization and aggregation. Particularly, theory-driven normalization is rarely applied, perhaps because it has been neglected in methodology textbooks. This study is a showcase example for a successful implementation of theory-driven index construction.

Our proposed EPR-Index (New) is based on a number of assumptions that can be refined and debated. For the normalization assumptions, it would be desirable to identify the saturation and survival levels with respect to items more precisely. The saturation levels are especially difficult to determine exactly, so refining and empirically testing the proposed threshold could improve the measurement. A starting point for this improvement could be the saturation level of severance payments as a consequence of unfair dismissal where a different level might better reflect the underlying theoretical sub-dimension. This concern also shows the difficulty of theory-driven normalization (cf. Drewnowski 1974:22) and that this normalization is only unambiguous when an external criterion or a consensus among experts exists, which usually is not the case. However, theory-driven normalization always is closer to the theoretical construct than empirical normalization. Another point of possible improvement could be the proxy chosen for the difficulty to challenge a dismissal in court. A detailed analysis of the procedural regulations of a country, the rules on court costs, and the degree to which legal expense insurances are spread might lead to better measurement. The advantage of our approach, however, is that all the coded indicators we use are readily available.

Considering that almost all previous research has been based on the EPR-index of the OECD, a replication of key research findings is imperative for a fact-based policy-debate about employment protection legislation. Moreover, in the social sciences, all indicators should be constructed with more theory-driven reflection in the normalization and aggregation steps.

Notes

1. Published under the name *overall strictness of protection against dismissals* in the June 1999 Employment Outlook (OECD 2004). The theoretical construct EPL includes a variety of regulations that can be separated into three independent theoretical sub-dimensions: 1) protection of regular workers against individual dismissal, 2) specific requirements for collective dismissals, and 3) regulations on temporary employment (OECD 2014:1).
2. In the literature, this also is called *job security provisions* (e.g., Balz 2017; Noelke 2016), *regulation of permanent work* (Baranowska and Gebel 2010), *employment protection for regular workers* (Barbieri and Cutuli 2016:503), *employment protection of regular contracts* (Gebel and Giesecke 2011), or *employment protection for regular jobs/of permanent contracts/of permanent work contracts* (Gebel and Giesecke 2016). However, commonly and a bit confusingly the term *EPL* is also often used as a synonym for *protection of regular employees against dismissal*, which also is reflected in the name of the original EPL-Index of the OECD, which included all three dimensions and was published under the name *overall strictness of protection against dismissals*.
3. This means we do not account for possible grey areas or a bias in favor of employees or employers in the legal system of countries.
4. Delay to start a notice: Estimated time includes, where relevant, the following assumptions: 6 days are counted in case of required warning procedure, 1 day when dismissal can be notified orally or the notice can be directly handed to the employee, 2 days when a letter needs to be sent by mail and 3 days when this must be a registered letter.
5. Collective bargaining coverage rate corresponds to the ratio of employees covered by collective agreements divided by all wage earners with a right to bargaining (see OECD.Stat at https://stats.oecd.org/Index.aspx?DataSetCode=CBC; and J. Visser, ICTWSS Data base, Amsterdam Institute for Advanced Labour Studies (AIAS), University of Amsterdam at http://www.uva-aias.net/en/ictwss/).
6. In economics, this is known as the Leontief production function, which indicates perfect complements. The marginal rate of substitution is equal to ∞.
7. In economics, this is known as perfect substitutes with a constant marginal rate of substitution and parallel indifference curves.
8. In economics, this is known as the Cobb-Douglas Production function. The marginal rate of substitution is decreasing.

9. Since the proxy “collective bargaining coverage” to measure “difficulty of an appeal” was unfortunately not as closely connected to the theoretical construct as we ideally hoped, we also ran the analyses with the multiplicative index without considering the legal system as a robustness check. The results using only the difficulty of fair dismissal and consequences of unfair dismissal were quite similar to the conclusions when we included collective bargaining coverage.

$$\text{EPR (New: robust)} = $$

$$= \left(\text{Definition of justified or unfair dismissal} \times \frac{\text{Compensation following unfair dismissal} + \text{Possibility of reinstatement following unfair dismissal}}{2}\right)^{\frac{1}{2}}$$

References

Addison, John T., and Jean-Luc Grosso. 1996. "Job Security Provisions and Employment: Revised Estimates". *Industrial Relations* 35 (4):585–603. doi: 10.1111/j.1468-232X.1996.tb00423.x.

Addison, John T., and Paulino Teixeira. 2003. "The Economics of Employment Protection". *Journal of Labor Research* 24 (1):85–128. doi: 10.1007/s12122-003-1031-0.

Addison, John T., Paulino Teixeira, and Jean-Luc Grosso. 2000. "The Effect of Dismissals Protection on Employment: More on a Vexed Theme". *Southern Economic Journal* 67:105–22.

Allard, Gayle. 2005. "Measuring Job Security over Time: In Search of a Historical Indicator for EPL (Employment Protection Legislation)". *IE Working Paper*.

Balz, Anne. 2017. "Cross-National Variations in the Security Gap: Perceived Job Insecurity among Temporary and Permanent Employees and Employment Protection Legislation". *European Sociological Review* 33 (5):675–92. doi: 10.1093/esr/jcx067.

Baranowska, Anna, and Michael Gebel. 2010. "The Determinants of Youth Temporary Employment in the Enlarged Europe". *European Societies* 12 (3):367–90. doi: 10.1080/14616690903165434.

Barbieri, Paolo, and Giorgio Cutuli. 2016. "Employment Protection Legislation, Labour Market Dualism, and Inequality in Europe". *European Sociological Review* 32 (4):501–16. doi: 10.1093/esr/jcv058.

Berglund, Tomas. 2015. "Flexicurity, Job Insecurity, and Well-Being in European Labor Markets" Pp. 145–67 in *Sustainable Working Lives: Managing Work Transitions and Health throughout the Life Course*, edited by Jukka Vuori, Roland Blonk, and Richard H. Price. Dordrecht: Springer.

Bertola, Giuseppe, Tito Boeri, and Sandrine Cazes. 2000. "Employment Protection in Industrialized Countries: The Case for New Indicators". *International Labour Review* 139 (1):57–72.

Biegert, Thomas. 2017. "Welfare Benefits and Unemployment in Affluent Democracies: The Moderating Role of the Institutional Insider/Outsider Divide". *American Sociological Review* 82 (5):1037–64. doi: 10.1177/0003122417727095.

Blalock, Hubert M. 1983. *Conceptualization and Measurement in the Social Sciences. From Verbal to Mathematical Formulations*, 2nd edn. Prentice-Hall methods of social science series. Beverly Hills, Calif.: Sage.

Blanchard, Olivier, and Pedro Portugal. 2001. "What Hides Behind an Unemployment Rate: Comparing Portuguese and U.S. Labor Markets". *American Economic Review* 91:187–207.

Boeri, Tito and Jan C. van Ours. 2013. *The economics of imperfect labor markets*, 2nd edn. Princeton: Princeton Univ. Press.

Bollen, Kenneth, and Richard Lennox. 1991. "Conventional Wisdom on Measurement: A Structural Equation Perspective". *Psychological Bulletin* 110 (2):305–14.

Breen, Richard. 2005. "Explaining Cross-national Variation in Youth Unemployment". *European Sociological Review* 21 (2):125–34. doi: 10.1093/esr/jci008.

Bryan, Mark L., and Stephen P. Jenkins. 2016. "Multilevel Modelling of Country Effects: A Cautionary Tale". *European Sociological Review* 32 (1):3–22. doi: 10.1093/esr/jcv059.

Checchi, Daniele, and Marco Leonardi. 2016. "An Economic Perspective on Employment Protection Legislation and Labour Market Prospects". *European Sociological Review* 32 (4):532–35. doi: 10.1093/esr/jcw038.

Chung, Heejung. 2016. "Dualization and subjective employment insecurity: Explaining the subjective employment insecurity divide between permanent and temporary workers across 23 European countries". *Economic and Industrial Democracy*:Online first. doi: 10.1177/0143831X16656411.

Chung, Heejung, and Wim van Oorschot. 2011. "Institutions versus Market Forces: Explaining the Employment Insecurity of European Individuals during (the Beginning of) the Financial Crisis". *Journal of European Social Policy* 21 (4):287–301. doi: 10.1177/0958928711412224.

Clark, A., and F. Postel-Vinay. 2009. "Job security and job protection". *Oxford Economic Papers* 61 (2):207–39. doi: 10.1093/oep/gpn017.

Drewnowski, Jan. 1974. *On Measuring and Planning the Quality of Life.* Mouton: The Hague.

Edwards, Jeffrey R. 2011. "The Fallacy of Formative Measurement". *Organizational Research Methods* 14 (2):370–88. doi: 10.1177/1094428110378369.

Esping-Andersen, Gøsta. 2000. "Who Is Harmed by Labour Market Regulations? Quantitative Evidence" Pp. 66–98 in *Why Deregulate Labour Markets?*, edited by Gøsta Esping-Andersen and Marino Regini. Oxford University Press.

Estes, Richard J. 1997. "Social Development Trends in Europe, 1970-1994: Development Prospects for the New Europe". *Social Indicators Research* 42:1–19.

Gangl, Markus. 2003. "The Only Way is up?: Employment Protection and Job Mobility among Recent Entrants to European Labour Markets". *European Sociological Review* 19 (5):429–49.

Gangl, Markus. 2008. "Unemployment and Worker Career Prospects: a Cross-national Comparison" in *Flexibility and Employment Security in Europe: Labour markets in Transition*, edited by R. J. A. Muffels. Cheltenham England, Northampton, Mass: Edward Elgar.

Gebel, Michael, and Johannes Giesecke. 2011. "Labor Market Flexibility and Inequality: The Changing Skill-Based Temporary Employment and Unemployment Risks in Europe". *Social Forces* 90 (1):17–40.

Gebel, Michael, and Johannes Giesecke. 2016. "Does Deregulation Help?: The Impact of Employment Protection Reforms on Youths' Unemployment and Temporary Employment Risks in Europe". *European Sociological Review* 32 (4):486–500. doi: 10.1093/esr/jcw022.

Goertz, Gary. 2006. *Social Science Concepts. A User's Guide.* New Jersey: Princeton University Press.

Heckman, James, and Carmen Pagés-Serra. 2000. "The cost of job security regulation: evidence from Latin American labor markets". *Economía* 1:109–54.

Holt, Harlan, and Joshua R. Hendrickson. 2017. "Turning pink slips into red tape: The unintended effects of Employment Protection". *Contemporary Economic Policy* 35 (3):421–38. doi: 10.1111/coep.12198.

Korpi, Tomas, and Henrik Levin. 2001. "Precarious Footing: Temporary Employment as a Stepping Stone out of Unemployment in Sweden". *Work, Employment and Society* 15 (1):127–48.

Lange, Marloes de, Maurice Gesthuizen, and Maarten H. J. Wolbers. 2014. "Youth Labour Market Integration Across Europe: The impact of cyclical, structural, and institutional characteristics". *European Societies* 16 (2):194–212. doi: 10.1080/14616696.2013.821621.

Latcheva, Rossalina, and Eldad Davidov. 2014. "Skalen und Indizes" Pp. 745–56 in *Handbuch Methoden der empirischen Sozialforschung*, edited by Nina Baur and Jörg Blasius. Wiesbaden: Springer VS.

Lazear, Edward P. 1990. "Job Security Provisions and Employment". *The Quarterly Journal of Economics* 105 (3):699–726. doi: 10.2307/2937895.

Lemke, Douglas, and William Reed. 2001. "The Relevance of Politically Relevant Dyads". *The Journal of Conflict Resolution* 45 (1):126–44.

Miringoff, Marc L., Marque-Luisa Miringoff, and Sandra Opdycke. 1999. *The social health of the nation. How America is really doing.* New York: Oxford University Press.

Mustillo, Sarah A., Omar A. Lizardo, and Rory M. McVeigh. 2018. "Editors' Comment: A Few Guidelines for Quantitative Submissions". *American Sociological Review* 83 (6):1281–83. doi: 10.1177/0003122418806282.

Nickell. 1997. "Unemployment and Labor Market Rigidities: Europe versus North America".

Noelke, Clemens. 2016. "Employment Protection Legislation and the Youth Labour Market". *European Sociological Review* 32 (4):471–85. doi: 10.1093/esr/jcv088.

Noll, Heinz-Herbert. 2002. "Globale Wohlfahrtsmaße als Instrumente der Wohlfahrtsmessung und Sozialberichterstattung: Funktionen, Ansätze und Probleme" Pp. 317–35 in *Sozialer Wandel und gesellschaftliche Dauerbeobachtung*, edited by Wolfgang Glatzer, Roland Habich, and Karl Ulrich Mayer. Wiesbaden: VS Verlag für Sozialwissenschaften.

OECD. 2004. "OECD Employment Outlook". Paris: OECD.

OECD. 2006. "OECD Employment Outlook". Paris: OECD.

OECD. 2008. *Handbook on Constructing Composite Indicators. Methodology and User Guide.* Paris: OECD.

OECD. 2013. "Strictness of Employment Protection Legislation: Regular Employment. OECD Employment and Labour Market Statistics (database)". Retrieved January 30, 2019 (https://doi.org/10.1787/data-00318-en).

OECD. 2014. "Calculating Summary Indicators of EPL Strictness: Methodology".

Scheuch, Erwin Kurt, and Helmut Zehnpfenning. 1989. "Skalierungsverfahren in der Sozialforschung" Pp. 97–203 in *Handbuch der Empirischen Sozialforschung: Band 3a. Grundlegende Methoden und Techniken der Sozialforschung. Zweiter Teil*, edited by René König. Stuttgart: Ferdinand Enke Verlag.

Sen, Amartya. 1999. *Human Development Report.* New York: Oxford Univ. Press.

Snijders, Tom A. B., and Roel J. Bosker. 1994. "Modeled variance in two-level models". *Sociological methods and research* 22 (3):342–63.

Snijders, Tom A. B. and Roel J. Bosker. 1999. *Multilevel Analysis. An Introduction to Basic and Advanced Multilevel Modeling.* London: Sage.

Venn, Danielle. 2009. "Legislation, Collective Bargaining and Enforcement: Updating the OECD Employment Protection Indicators". www.oecd.org/els/workingpapers.

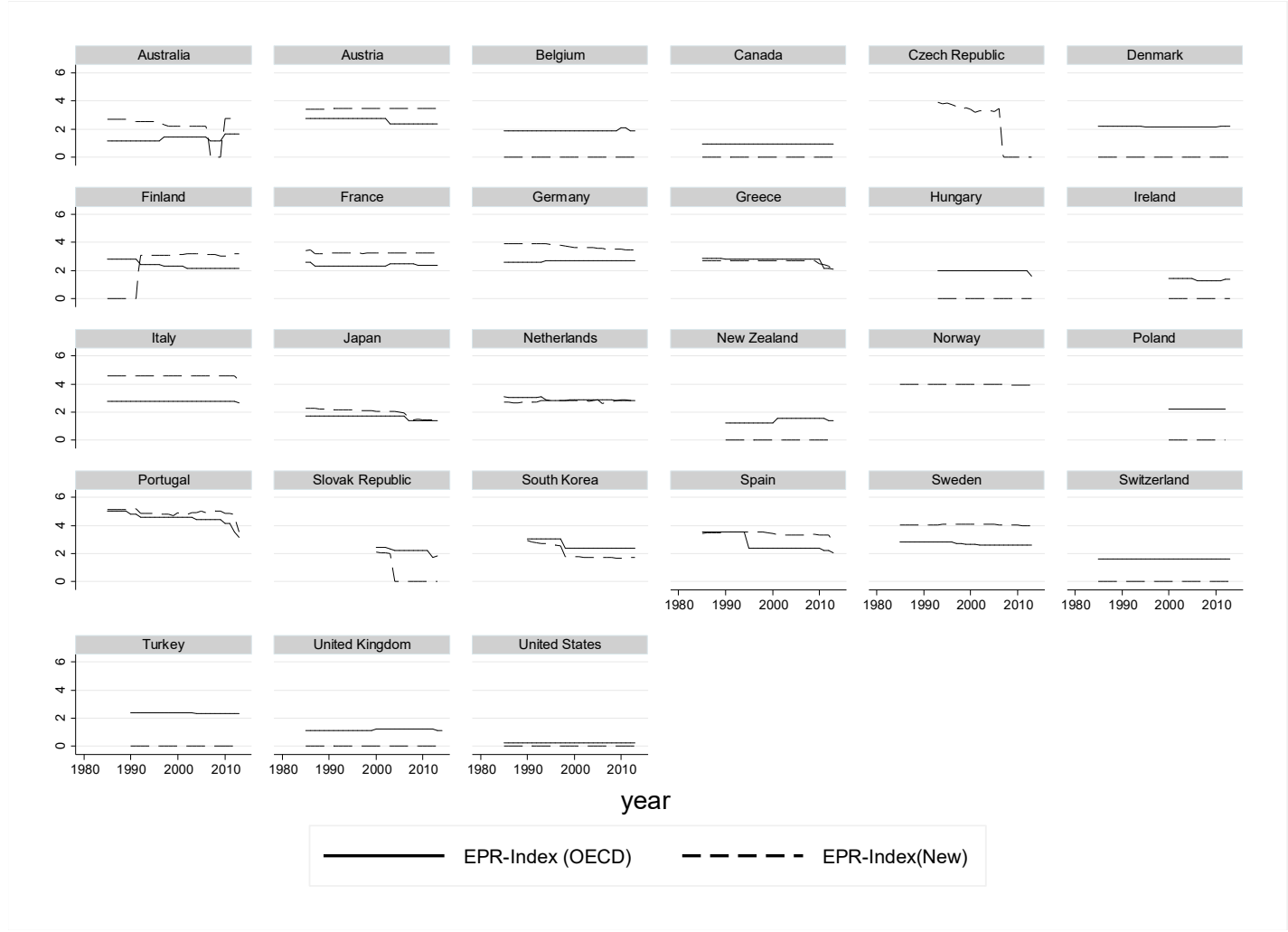
Appendix

Appendix A1. Correlation structure of the EPR-Items coded by the OECD

	Item 1	Item 2	Item 3a	Item 3b	Item 3c	Item 4a	Item 4b	Item 4c	Item 5	Item 6	Item 7	Item 8
Item 1	1.00											
Item 2	0.50	1.00										
Item 3a	0.14	0.30	1.00									
Item 3b	0.18	0.32	0.76	1.00								
Item 3c	0.06	0.24	0.47	0.51	1.00							
Item 4a	0.13	0.13	0.28	0.09	-0.26	1.00						
Item 4b	0.20	-0.11	-0.14	-0.13	-0.46	0.61	1.00					
Item 4c	0.31	-0.05	-0.08	-0.05	-0.34	0.48	0.90	1.00				
Item 5	0.38	0.26	0.01	-0.14	-0.13	0.30	0.14	0.05	1.00			
Item 6	0.01	0.08	0.13	-0.02	-0.31	0.30	0.29	0.14	0.19	1.00		
Item 7	0.18	0.13	0.13	0.13	0.12	0.16	0.08	0.09	0.53	-0.02	1.00	
Item 8	0.15	0.10	0.09	-0.22	-0.33	0.35	0.07	0.00	0.25	0.13	-0.07	1.00

Source: OECD 2013, own representation.
Note: N=767 observations. Item 9 is not included, since it would decrease the number of cases by 521 due to missing values.

Appendix A2. Change of EPR within countries over time



Source: OECD 2013, own representation.

Appendix A3a. Descriptive statistics ESS 2004, 2010

	Mean		Min	Max
Fixed-term contract (FTC)	0.124		0	1
Education				
ISCED 1-2	0.160		0	1
ISCED 3-4	0.475		0	1
ISCED 5-6	0.365		0	1
”easy to replace”	5.931	(2.657)	0	10
Learning Period				
<2 days	0.032			
2-6 days	0.085		0	1
1-4 weeks	0.164		0	1
1-3 month	0.224		0	1
3 month-1 year	0.287		0	1
1-2 years	0.125		0	1
2-5 years	0.065		0	1
More than 5 years	0.018		0	1
Age				
18-29	0.171		0	1
30-39	0.264		0	1
40-54	0.409		0	1
55-67	0.156		0	1
Part-time	0.169		0	1
Female	0.494		0	1
Child	0.498			
Unemployed in last 5 years	0.112		0	1
Unemployed more than 12 month	0.088		0	1
Company Size				
<10	0.215		0	1
10-24	0.193		0	1
25-99	0.267		0	1
100-499	0.188		0	1
>500	0.137		0	1
Industry				
1 Agriculture	0.023		0	1
2 Manufacturing Industry	0.176		0	1
3 Construction	0.062		0	1
4 Trade	0.112		0	1
5 Transport/ Infrastructure	0.092		0	1
6 Finance	0.037		0	1
7 Public Administration	0.078		0	1
8 Education	0.105		0	1
9 Health sector	0.142		0	1
10 Service	0.175		0	1

Appendix A3b. Descriptive statistics EWCS 2005, 2010, 2015

	Mean	Min	Max
Fixed-term contract (FTC)	0.113	0	1
Education			
ISCED 1-2	0.183	0	1
ISCED 3-4	0.463	0	1
ISCED 5-6	0.353	0	1
Age			
18-29	0.167	0	1
30-39	0.266	0	1
40-54	0.411	0	1
55-67	0.155	0	1
Part-time	0.151	0	1
Female	0.513	0	1
Company size			
<10	0.245	0	1
10-49	0.330	0	1
50-100	0.129	0	1
100-499	0.184	0	1
>500	0.113	0	1
Industry			
1. A-B Agriculture, hunting, forestry, fishing	0.014	0	1
2. C-D Mining, quarrying, manufacturing	0.154	0	1
3. E Electricity, gas, and water supply	0.014	0	1
4. F Construction	0.053	0	1
5. G Wholesale and retail trade; repair of motor vehicles and motorcycles	0.139	0	1
6. H Hotels and restaurants	0.033	0	1
7. I Transport, storage, and communication	0.069	0	1
8. J Financial intermediation	0.040	0	1
9. K Real estate activities	0.092	0	1
10. L Public administration and defense	0.082	0	1
11. M-N-O-P-Q Other services	0.309	0	1

Appendix A3c. Descriptive statistics EQLS 2007, 2012, 2016

	Mean	Min	Max
Fixed-Term-Contract (FTC)	0.124	0	1
Education			
ISCED 1-2	0.194	0	1
ISCED 3-4	0.460	0	1
ISCED 5-6	0.346	0	1
Age			
18-29	0.150	0	1
30-39	0.270	0	1
40-54	0.426	0	1
55-67	0.154	0	1
Part-time	0.138	0	1
Female	0.519	0	1

Appendix A4a. Effect of EPR on Job Security (ESS 2004, 2010)

	(1) Index (New)		(2) OECD Index	
Fixed-term contract (FTC)	-0.173	(0.142)	-0.249	(0.223)
EPR (New)	-0.006	(0.028)		
x FTC	-0.060*	(0.024)		
EPR (OECD)			-0.169*	(0.066)
x FTC			-0.015	(0.069)
Reg. on temp. employment (Number and Duration)	0.103+	(0.055)	0.102*	(0.050)
x FTC	-0.075	(0.047)	-0.088+	(0.052)
Unemployment rate	-0.001	(0.013)	-0.001	(0.011)
x FTC	-0.015	(0.011)	-0.013	(0.012)
Education (Ref: ISCED 1-2)				
ISCED 3-4	-0.005	(0.020)	-0.006	(0.020)
ISCED 5-6	0.033	(0.021)	0.032	(0.021)
"easy to replace"	-0.029**	(0.002)	-0.029**	(0.002)
Learning period (Ref: <2days)				
2-6 days	-0.016	(0.040)	-0.016	(0.040)
1-4 weeks	0.019	(0.038)	0.019	(0.038)
1-3 month	0.028	(0.037)	0.028	(0.037)
3 month-1 year	0.104**	(0.037)	0.104**	(0.037)
1-2 years	0.126**	(0.040)	0.125**	(0.040)
2-5 years	0.154**	(0.043)	0.153**	(0.043)
More than 5 years	0.136*	(0.058)	0.136*	(0.058)
Age (Ref.:18-29)				
30-39	-0.130**	(0.020)	-0.130**	(0.020)
40-54	-0.160**	(0.019)	-0.160**	(0.019)
55-67	-0.059**	(0.022)	-0.059**	(0.022)
Part-time	0.061**	(0.018)	0.059**	(0.018)
Female	-0.012	(0.014)	-0.011	(0.014)
Child	0.029*	(0.013)	0.030*	(0.013)
Unemployed in last 5 years	-0.255**	(0.022)	-0.256**	(0.022)
Unemployed more than 12 month	-0.094**	(0.023)	-0.094**	(0.023)
Company size (Ref.:<10)				
10-24	-0.028	(0.019)	-0.028	(0.019)
25-99	-0.016	(0.018)	-0.016	(0.018)
100-499	0.002	(0.020)	0.002	(0.020)
>500	0.024	(0.023)	0.024	(0.023)
Industry (Ref.: service)				
1 Agriculture	0.079+	(0.044)	0.079+	(0.044)
2 Manufacturing Industry	-0.089**	(0.022)	-0.089**	(0.022)
3 Construction	-0.042	(0.029)	-0.042	(0.029)
4 Trade	-0.013	(0.024)	-0.013	(0.024)
5 Transport/ Infrastructure	0.030	(0.025)	0.030	(0.025)
6 Finance	-0.027	(0.035)	-0.028	(0.035)
7 Public Administration	0.280**	(0.027)	0.281**	(0.027)
8 Education	0.296**	(0.025)	0.296**	(0.025)

9 Health sector	0.230**	(0.023)	0.230**	(0.023)
Constant	2.938**	(0.175)	3.323**	(0.218)
Variance components				
Random Slope (FTC)	0.050	(0.017)	0.064	(0.020)
Country	0.085	(0.023)	0.069	(0.019)
Individual	0.811	(0.008)	0.811	(0.008)
Covariance (FTC, cons)	-0.030	(0.015)	-0.031	(0.015)
Explained variance				
Random slope (FTC)	0.268		0.070	
R^2 (Individual)a	0.109		0.124	
R^2 (Country)a	0.199		0.368	
M	32		32	
N	21,836		21,836	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses. a R-squared as proposed by Snijders and Bosker (1994: 350–354); see also Snijders and Bosker (1999: 99–105)
Source: Estimations from the random intercept and random slope model (restricted maximum likelihood).

Appendix A4b. Effect of EPR on job security (EWCS 2005, 2010, 2015)

	(1) Index (New)		(2) OECD Index	
Fixed-term contract (FTC)	-0.259	(0.163)	-0.126	(0.248)
EPR (New)	0.041^{+}	(0.022)		
x FTC	-0.090**	(0.026)		
EPR (OECD)			-0.115^{+}	(0.064)
x FTC			-0.113	(0.082)
Regulation temp. employment	0.084^{+}	(0.045)	0.108*	(0.045)
x FTC	-0.165**	(0.053)	-0.188**	(0.058)
Unemployment rate	-0.034**	(0.009)	-0.034**	(0.009)
x FTC	-0.013	(0.011)	-0.013	(0.012)
Education	0.071**	(0.017)	0.070**	(0.017)
ISCED 3-4				
ISCED 5-6	0.170**	(0.018)	0.168**	(0.018)
Age (Ref.:18-29)	0.000	(0.018)	0.000	(0.018)
30-39				
40-54	0.010	(0.017)	0.010	(0.017)
55-67	0.121**	(0.021)	0.121**	(0.021)
Part-time	-0.014	(0.017)	-0.015	(0.017)
Female	0.004	(0.013)	0.005	(0.013)
Company size (Ref.: <10)				
10-49	0.078**	(0.015)	0.078**	(0.015)
50-100	0.090**	(0.020)	0.090**	(0.020)
100-499	0.096**	(0.018)	0.095**	(0.018)
>500	0.142**	(0.021)	0.141**	(0.021)
Industry (Ref.:10. L Public administration and defense)	-0.278**	(0.052)	-0.278**	(0.052)
1. A-B Agriculture, hunting, forestry, fishing				
2. C-D Mining, quarrying, manufacturing	-0.471**	(0.025)	-0.470**	(0.025)
3. E Electricity, gas, and water supply	-0.240**	(0.051)	-0.240**	(0.051)
4. F Construction	-0.437**	(0.032)	-0.437**	(0.032)
5. G Wholesale and retail trade; repair of motor vehicles and motorcycles	-0.382**	(0.026)	-0.382**	(0.026)
6. H Hotels and restaurants	-0.367**	(0.037)	-0.367**	(0.037)
7. I Transport, storage, and communication	-0.383**	(0.029)	-0.383**	(0.029)
8. J Financial intermediation	-0.295**	(0.035)	-0.294**	(0.035)
9. K Real estate activities	-0.356**	(0.027)	-0.356**	(0.027)
11. M-N-O-P-Q Other services	-0.083**	(0.023)	-0.083**	(0.023)

Constant	4.160**	(0.144)	4.455**	(0.197)
Variance components				
Random Slope (FTC)	0.097	(0.024)	0.119	(0.028)
Country	0.085	(0.017)	0.085	(0.017)
Individual	1.217	(0.009)	1.217	(0.009)
Covariance (FTC, cons)	-0.043	(0.015)	-0.062	(0.018)
Explained variance				
Random slope	0.359		0.212	
R^2 (Individual)a	0.129		0.131	
R^2 (Country)a	0.446		0.474	
M	57		57	
N	38426		38426	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses. a R-squared as proposed by Snijders and Bosker (1994: 350–354); see also Snijders and Bosker (1999: 99–105)
Source: Estimations from the random intercept and random slope model (restricted maximum likelihood).

Appendix A4c. Effect of EPR on job security (EQLS 2007, 2012, 2016)

	(1) Index (New)		(2) OECD Index	
Fixed-Term-Contract (FTC)	-0.370**	(0.109)	-0.190	(0.188)
EPR (New)	0.079**	(0.022)		
x FTC	-0.088**	(0.018)		
EPR (OECD)			-0.072	(0.077)
x FTC			-0.121+	(0.066)
Reg. temp. employment (Number & duration)	-0.046	(0.045)	-0.012	(0.051)
x FTC	-0.127**	(0.037)	-0.144**	(0.044)
Unemployment rate	-0.030**	(0.009)	-0.027**	(0.010)
x FTC	0.005	(0.007)	0.001	(0.009)
Education				
ISCED 3-4	0.073**	(0.018)	0.072**	(0.018)
ISCED 5-6	0.227**	(0.018)	0.225**	(0.018)
Age				
30-39	-0.014	(0.020)	-0.013	(0.020)
40-54	0.004	(0.019)	0.004	(0.019)
55-67	0.095**	(0.023)	0.095**	(0.023)
Part-time	0.003	(0.019)	0.003	(0.019)
Female	-0.006	(0.013)	-0.006	(0.013)
Constant	4.297**	(0.138)	4.514**	(0.221)
Variance components				
Random Slope (FTC)	0.039	(0.012)	0.061	(0.016)
Country	0.084	(0.017)	0.104	(0.021)
Individual	0.974	(0.009)	0.974	(0.009)
Covariance (FTC, cons)	-0.021	(0.011)	-0.049	(0.015)
Explained variance				
Random slope	0.536		0.267	
R^2 (Individual)[a]	0.106		0.094	
R^2 (Country)[a]	0.381		0.288	
M	55		55	
N	26339		26339	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses.
a R-squared as proposed by Snijders and Bosker (1994: 350–354); see also Snijders and Bosker (1999: 99–105).
Source: Estimations from the random intercept and random slope model (restricted maximum likelihood).

Appendix A5. Effect of EPR on temporary employment risk of new hires (EU-LFS)

	(1) OECD-EPR-Index		(2) EPR-Index (New)		(3) OECD-EPR-Index (z-stnd.)		(4) EPR-Index (New) (z-stnd.)	
OECD-EPR-Index	0.111**	(0.012)						
EPR-Index (New)			0.032**	(0.005)				
OECD-EPR-Index (z-stnd.)					0.064**	(0.007)		
EPR-Index (New) (z-stnd.)							0.057**	(0.009)
Duration of trial period (short)	0.026	(0.020)	0.074**	(0.020)	0.026	(0.020)	0.074**	(0.020)
Regulations on the use of temporary contracts	0.003	(0.005)	-0.007	(0.006)	0.003	(0.005)	-0.007	(0.006)
Unemployment rate	0.025**	(0.002)	0.022**	(0.002)	0.025**	(0.002)	0.022**	(0.002)
Age (Ref.:<20)								
20-29	-0.024**	(0.001)	-0.024**	(0.001)	-0.024**	(0.001)	-0.024**	(0.001)
30-39	-0.081**	(0.002)	-0.081**	(0.002)	-0.081**	(0.002)	-0.081**	(0.002)
40-49	-0.063**	(0.002)	-0.063**	(0.002)	-0.063**	(0.002)	-0.063**	(0.002)
50-59	-0.058**	(0.002)	-0.058**	(0.002)	-0.058**	(0.002)	-0.058**	(0.002)
60-69	0.013**	(0.002)	0.013**	(0.002)	0.013**	(0.002)	0.013**	(0.002)
>70	0.000	(0.005)	0.000	(0.005)	0.000	(0.005)	0.000	(0.005)
Education (Ref. low)								
middle	-0.018**	(0.001)	-0.018**	(0.001)	-0.018**	(0.001)	-0.018**	(0.001)
high	-0.014**	(0.001)	-0.014**	(0.001)	-0.014**	(0.001)	-0.014**	(0.001)
Female	-0.010**	(0.001)	-0.010**	(0.001)	-0.010**	(0.001)	-0.010**	(0.001)
Variance components								
Individual	0.207	(0.000)	0.207	(0.000)	0.207	(0.000)	0.207	(0.000)
Country	0.020	(0.002)	0.023	(0.002)	0.020	(0.002)	0.023	(0.002)
Explained variance								
Individual	0.081		0.069		0.081		0.069	
Country	0.485		0.410		0.485		0.410	
M	304		304		304		304	
N	1242199		1242199		1242199		1242199	

Note: + p < .1, * p < .05, ** p < .01; Standard errors in parentheses. R-squared as proposed by Snijders and Bosker (1994: 350–354, 1999: 99–105).
Source: Estimations from the random intercept model (restricted maximum likelihood).