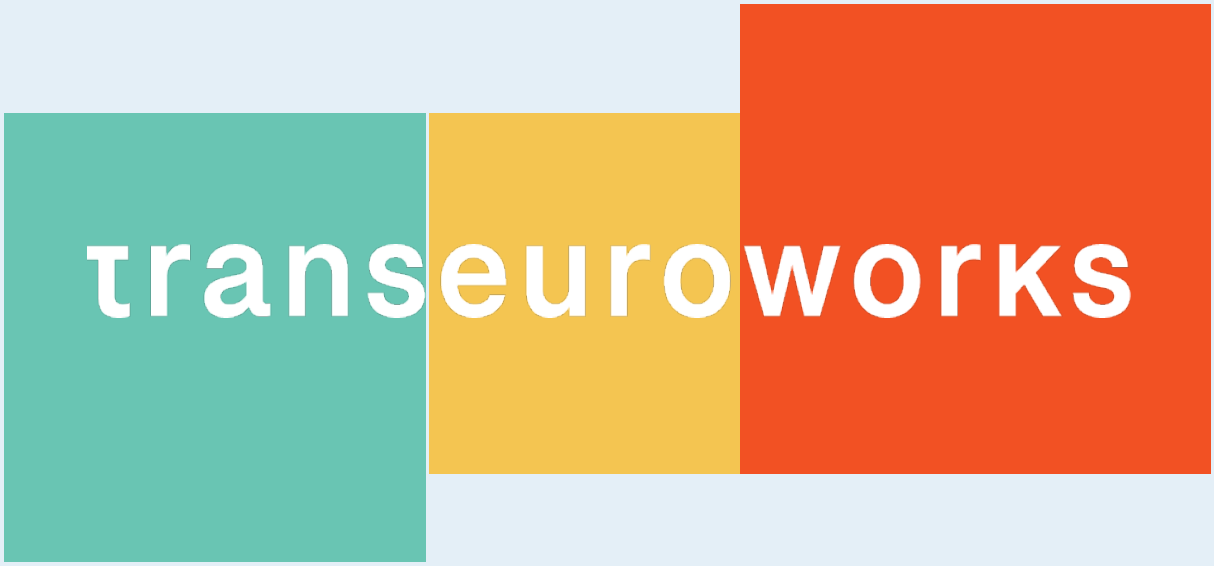

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Unemployment, Labour-Market Regulations, and the Growth of Non-Standard Employment Among Low- and Mid-Skilled Workers

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Abstract

In recent decades, the rise of non-standard employment (NSE) has raised concerns about labour market inequality across Europe. Low- and mid-skilled workers face larger exposure to NSE than high-skilled workers. While much of the literature emphasizes micro-level and macro-level dynamics, this study shifts attention to how unemployment levels and their short-term changes - interact with institutions (i.e. employment protection and unemployment benefit generosity) to shape NSE growth among low- and mid-skilled workers. We include these institutions as they regulate or mediate employers' hiring decisions and workers' risks and focus on NSE changes across 24 European countries from 1998 to 2019. Leveraging on NSE literature and power resource theory in combination with EU-Labour Force Survey data and fixed effects models, we examine within-country changes in dependent NSE among low and mid-skilled occupations, controlling for structural factors such as lagged NSE, female labour force participation, migrant share, low-end service employment, and union density. We define dependent NSE as fixed-term contracts, agency work, marginal part-time employment (less than 15 weekly working hours), and involuntary part-time work. Our findings show that both higher past unemployment levels and rising year-to-year unemployment are associated with NSE growth. However, this effect is significantly moderated by institutional configurations. The relationship between unemployment and NSE is strongest when employment protection legislation is weaker, unemployment benefits are less generous, and restrictions on using

temporary contracts less stringent. Therefore, in the presence of stronger protective institutions, the impact of rising unemployment on non-standard employment growth is reduced. These findings contribute to recent debates on the role of macro-economic drivers in shaping NSE, including the role of institutions, by illustrating how regulatory institutions shape the extent to which unemployment drives NSE change.

1. Introduction

The rise of non-standard forms of employment (NSE) in advanced capitalist (post-industrial) economies has attracted the attention of many sociologists, political scientists, labour economists and industrial-relations scholars over the last thirty years. In its broadest meaning, "non-standard employment" (henceforth NSE) refers to any and all employment forms that deviate from the post-war norm of full-time employment on an indefinite contract (Bosch, 2004). The literature on this topic often focus on the consequences of NSE for individual earnings, exposure to unemployment and access to social protection (and, by extension, its consequences for earnings inequality and the redistributive effects of welfare states) (Berglund et al., 2021; Rubery et al., 2018). While many scholars identify collective bargaining and employment regulation as institutional constraints or facilitators of NSE (Meardi et al., 2021; Palier & Thelen, 2010), much of the existing literature posits that NSE expansion is a common secular trend, to be explained in terms of structural developments such as the growing importance of employment in private services, female labour force participation, international competition, immigration and technological changes that allow for new ways to organize work (Emmenegger et al., 2012; Warren, 2015; Been & Beer, 2022).

This paper seeks to shed new light on NSE expansion as a macro-level (country-level) outcome by analysing cross-national differences and, crucially, temporal dynamics. With European Union Labour Force Survey (EU-LFS) data for twenty-four countries, we generate annual estimates of the relative size of three broad categories of employed persons in low and middle-

skilled occupations: (1) *self-employed* (with or without employees); (2) *standard dependent employees*, defined as employees on indefinite contracts, working full-time or voluntarily part-time for at least 15 hours per week; and (3) *non-standard dependent employees*, defined as all employees on fixed-term contracts, all employees who work less than 15 hours per week in their main job (marginal part-timers), involuntary part-time employees working more than 15 hours per week, and temporary agency workers. We present separate estimates of the incidence of each of these employment forms for high-skilled occupations, but our analysis focuses on the incidence of NSE in low- and middle-skilled occupations. As we will document in what follows, the incidence of NSE has always been higher and has increased more in low- and mid-skilled occupations than in high-skill occupations. Moreover, there are good reasons to suppose that the drivers of NSE expansion in low- and mid-skilled occupations are different from the drivers of NSE expansion in high-skill occupations. In low- and mid-skilled occupations, NSE is likely tied to weaker worker bargaining power and employer-driven flexibility, whereas workers in high-skilled occupations are qua their specialised knowledge and skill levels assumed to have stronger bargaining powers. However, elements of willingness to sacrifice some levels of job and income security for greater flexibility can also be seen across different occupational groups, especially in sectors or countries offering limited flexibility options to accommodate for example disability, caring responsibilities or other commitments (Larsen et al., 2022; Latner, 2022; Lietzmann & Hohmeyer, 2025).

Our descriptive analysis shows that the incidence of NSE in low- and mid-skilled occupations increased rapidly from the late 1990s to 2012 in all but three countries while NSE growth slowed or even declined in many countries from 2013 and onwards. We argue that the deceleration in NSE expansion since 2012 can be seen as invitation to pay more attention to the role of macroeconomic conditions and, more specifically, aggregated labour demand as an important determinant of the incidence of NSE among low- and mid-skilled workers as this appears to

shape worker and employer behaviour regarding their employment practices. Building on Baccaro et al. (2016), we develop a theoretical framework based on the premise that these workers typically prefer a standard employment contract while employers typically prefer to offer them more flexible (non-standard) contracts.[1] As the bargaining power of workers weakens, economic downturns - characterised by rising unemployment or sustained periods of high unemployment - provide employers with an opportunity to shift to non-standard employment forms. We further assume that policy variables identified in previous literature on dualization (see below) condition the impact of levels and changes in unemployment. While regulations protecting standard workers against dismissal and legal restrictions on temporary employment disincentivise employers from switching to NSE, generous unemployment benefits allow workers, especially those in low-skilled and mid-skilled occupations, to await a better job offer. In due course, we will present regression results that support these propositions.

The paper is organized as follows. Section 2 presents our operationalization of NSE and motivates our ambition to explain cross-national and temporal variation in the incidence of NSE among low- and mid-skilled workers. Section 3 briefly reviews existing literature on drivers of NSE expansion and develops our theoretical framework, centred on the impact of unemployment. Section 4 introduces the data and methods used to test the hypotheses generated by our theoretical framework. Section 5 presents our estimates on levels and change in the incidence NSE across 24 European countries, while section 6 presents our regression results. Section 7 discuss our key findings before main conclusions are drawn.

[1] We use the term "worker" as interchangeable with "employee" or "wage-earner," i.e., it refers to all individuals in "dependent employment" (all individuals who are employed by some entity or by another individual).

2. What is NSE and why do (should) we care about it?

As already noted, it is commonplace in existing literature to conceive "non-standard employment" as a residual category, encompassing any and all employment relationships, formal or informal, that do not involve full-time work and an indefinite contract (Bosch, 2004; Carver & Doellgast, 2021; Kalleberg, 2011; Wolf, 2025). At the other end of the spectrum, there are many studies that focus on specific forms of NSE, notably fixed-term employment, but also agency and platform work (Polavieja, 2006; Berglund et al., 2021; Been & Beer, 2022; Vandaele & Rainone, 2025) as well as studies of workers in marginal part-time employment and/or multiple part-time jobs (e.g. Conen & Schulze Buschoff, 2021; Larsen & Ilsøe, 2024).

Our objective in this paper is to provide a broad overview of cross-national and temporal variation in the extent of NSE and then to analyse the determinants of the variation that we identify. For this purpose, we need a broad operationalization of "NSE," but the operationalization that we have settled on (specified above) is not quite as broad as "everything but indefinite full-time employment." Specifically, we assign part-time workers on indefinite contracts, who state that they would like to work more hours to the NSE category while treating those who say that they are content with their current amount of work as belonging to the labour force in standard employment. It should also be noted that the EU-LFS data at our disposal do not allow us to distinguish between self-employed individuals with and without employees. The estimates of self-employment that we will present thus include workers that other studies quite rightly conceive as members of the non-standard labour force.[2]

It is important to keep in mind that our analyses ignore cross-national and temporal variation in the composition of the NSE labour force. To capture the full complexity of NSE on the scale of twenty-four countries is simply impossible, at least in a stand-alone article, but we reduce

[2] To clarify further, our operationalization of "self-employment" encompasses farmers (with or with employees) and traditional forms of solo self-employment (domestic workers, craftsmen and professionals) as well as new forms of solo self-employment (platform workers and consultants).

some of this complexity by distinguishing between the incidence of NSE in low- and mid-skilled occupations and the incidence of NSE in high-skill occupations. While this distinction does not feature very prominently, the main findings of the literature on the individual and societal consequences of NSE expansion would seem to apply primarily to the NSE expansion in low- and mid-skill occupations.

Many studies document that individuals in non-standard forms of employment have more irregular work histories, characterised by more frequent spells of unemployment, and that that they earn significantly less on an annual basis than individuals in standard employment (e.g. (Kalleberg, 2011; Warren, 2015; Rubery et al., 2018; Lietzmann & Hohmeyer, 2025). The existing literature also demonstrates that NSE tends to be concentrated in workplaces without shop stewards or works councils and that non-standard workers have fewer training opportunities than standard workers (Doellgast et al., 2018; Larsen & Mailand, 2018; Keune & Pedaci, 2020). Finally, it is well established that non-standard workers often struggle to qualify for unemployment and sick pay insurance due to patchy employment records, leaving them reliant on means-tested social assistance when unemployed or for the self-employed when their business close (Leschke, 2008; Immervoll et al., 2022; Spasova & Regazzoni, 2022; Girardi et al., 2024; Bekker et al., 2025).

For these reasons, NSE is strongly associated with lower job satisfaction and well-being (Kalleberg, 2011; Li & Wu, 2022; Kvart et al., 2025). The negative consequences of NSE seem to affect low-skill individuals more than other groups when controlling for educational attainment (Li & Wu, 2022; Wolf, 2025). More important for our present purposes, the negative societal consequences of NSE expansion identified by existing literature—rising earnings inequality as well as dualization of social protection systems (Grimshaw et al., 2017; Eichhorst & Marx, 2020)—often hinge on the concentration of NSE among less skilled and less well-remunerated workers. Consistent with the country-level estimates of NSE incidence presented below,

Baccaro et al. (2016) show that across 21 European countries workers with manual skills are the least likely to hold indefinite contracts, followed by clerical workers, with managerial workers being most likely hold such contracts. Baccaro et al. (2016) also find that women, immigrant and younger workers are less likely to have indefinite contracts than men, country nationals and older workers. Perhaps most importantly, other studies indicate that less skilled workers and immigrants commonly get stuck in non-standard trajectories while temporary employment contracts can also serve as a stepping stone for labour-market entrants, especially for those struggling to gain foothold on the labour market but important cross-country variations exist (Ojala et al., 2017; McVicar et al., 2019; Berglund et al., 2021; Lietzmann & Hohmeyer, 2025). In what follows, we argue that the concentration of NSE among less skilled workers is closely related to the fact that these workers are particularly exposed to unemployment.

3. Explaining the incidence of NSE

Turning now to our main objective, to explain variation in NSE across countries and over time, we can distinguish between two different theoretical perspectives on the rise of new, more flexible employment forms within the literature. One perspective, embraced by many economists, focuses on the preferences of buyers and sellers of labour power for different kinds of employment contracts and conceives the rise of NSE as the result of long-term developments that affect the supply-side as well as the demand-side of labour markets (Lindbeck & Snower, 1986). Favoured by sociologists and political scientists, the other perspective emphasizes institutional reforms and policy changes that have strengthened the marketplace power of firms (buyers of labour power) relative to workers (sellers of labour power) (Rubery et al., 2018; Palier & Thelen, 2010; Eichhorst & Marx, 2020). In what follows, we will briefly elaborate on how these perspectives differ and propose a theoretical framework that

integrates insights from each by linking market transactions (bargaining between firms and individual workers) to institutions and policies determined by the collective exercise of power.[3] For the demand side of the labour market, the "contemporary mainstream economist perspective" (henceforth the "economist view" in quotation marks but without qualifiers) holds that intensified competition and increased macroeconomic volatility have incentivised firms not only to cut labour costs, but also, perhaps more importantly, to tighten the linkage between labour costs and consumer demand or, in other words, to reduce their reliance on full-time workers with indefinite contracts. This perspective also stresses the role of technological changes that have generated more fragmented work tasks and new forms of surveillance of workers, making firms less dependent on worker commitment and initiative, and suggests that the rise of NSE is closely related to the growth of private services (internet shopping in particular) as a source of new employment (Eurofound, 2018; Peng, 2024).

In the "economist view," firms are the main architects of the increase in new forms of employment contracts, but their success in this endeavour depends on the existence of a pool of workers willing to accept new terms of employment. Setting unemployment aside for the time being, the expansion of part-time employment is closely linked to the entry of women with childcare responsibilities into the labour force (Warren, 2015; Maestripieri, 2023). In a similar vein, it seems plausible that the expansion of tertiary education has boosted the share of the labour force willing to sacrifice job security in return for greater autonomy at work and control over working hours, although similar trade-offs are also seen among low and medium skilled occupational groups, but often with more severe negative implications for their earnings, employment trajectories and living standards more broadly (Larsen et al., 2022; Latner & Saks, 2022; Lietzmann & Hohmeyer, 2025).

[3] The term "economist view" is here used as a shorthand for the view that the incidence of NSE (as well as the wage level) corresponds to the intersection of supply and demand. We recognize that many labour economists take collective action and the structure of collective bargaining into account and that "class power" is a central feature of "classical political economy."

Importantly, the "economist view" recognizes that long-term commitments serve as means to recruit skilled employees and that firms have an incentive to retain skilled workers during economic downturns (Atkinson, 1987; Kallas, 2025). From the firm's perspective, then, the ideal scenario is where high-skill employees are employed on indefinite contracts while more readily replaceable workers are employed on a more casual basis (cf. Piore & Berger, 1980; Atkinson, 1987; Kallas, 2025). By implication, the expansion of NSE in high-skill occupations might be regarded as more of a supply-side development (driven by the preferences of sellers of labour power) than the expansion of NSE in low- and mid-skill occupations.

In contrast to the "economist view", many sociologists and political scientists emphasize the role of institutional frameworks—collective bargaining systems, social insurance systems and government regulation of employment contracts—in structuring employment relationships, employers' recruitment and dismissal practices as well as worker behaviour (e.g., Rubery, 1978; Pulignano et al., 2015; Grimshaw et al., 2017; Doerflinger et al., 2019; Garnero, 2021; Berglund et al., 2021). Proponents of this perspective commonly invoke power resource theory (Arnholtz & Refslund, 2024) to explain why employment regulation as well as welfare-state provisions vary across countries and over time. As documented by Emmenegger (2014) among others, trade unions have historically relied on collective bargaining to advance the wage claims of workers and to curtail the capacity of employers to dismiss workers at will. In countries in which unions were too fragmented or otherwise too weak to regulate employment practices via collective bargaining, coalitions of Left and Christian Democratic parties introduced legislation to restrict the use of fixed-term employment contracts, to protect workers against unfair dismissals, and to impose notification and compensation requirements for collective layoffs in the aftermath of the Second World War (Emmenegger, 2014). With unemployment rising and employers becoming more intransigent in defending managerial prerogatives, even Swedish unions, previously committed to "voluntary regulation," turned to employment regulation by legislative

means in the 1970s. In short, Emmenegger (2014) argues compellingly that the dominance of employment forms that we now designate as "standard" resulted from a combination of strong unions and "pro-worker" legislation.

As measured by the OECD, legislative provisions protecting employees on indefinite contracts against dismissals and layoffs have only slightly declined since the 1980s. However, many European governments significantly lowered restrictions on the ability of employers to hire workers on temporary contracts in the 10-15 years prior to the Great Recession of 2008-09 (King & Rueda, 2008; Eichhorst & Marx, 2015). Left- and right-wing leaning Governments often conceived such reforms as means to stimulate employment growth and to reduce spending on unemployment compensation. While organized business strongly supported the reforms, unions reluctantly went along, justifying more "flexible" rules governing temporary employment as a concession necessary to preserve the protection of standard employment (Palier & Thelen, 2010; Emmenegger, 2014; Eichhorst & Marx, 2015, 2020).[4]

The decline of union influence over the formal rules governing the kinds of contracts firms can offer employees might be attributed to loosening ties between unions and Left parties as well as declining rates of unionisation across Europe. Arguably, union membership decline and other changes in the industrial relations landscape (see Baccaro & Howell, 2017; Doellgast et al., 2018) have also reduced the capacity of unions to act as enforcers of legislative or collective bargaining provisions at the firm level.[5]

In a related vein, Rubery et al. (2018) suggest that the expansion of NSE can be seen as a consequence of re-commodifying welfare reforms undertaken in the 1990s and 2000s. Esping-Andersen (1990) argues famously that generous welfare provisions in general, and generous

[4] Rueda, (2007) provides a less sanguine view of the role of unions in this story. On the politics of dualization, see also (Emmenegger et al., 2012).
[5] See Rubery et al. (2024) for a comparative analysis of the interdependence of regulatory provisions and trade-union practices.

unemployment benefits, serve to de-commodify labour power by allowing jobseekers to be choosier, i.e., allowing them to hold out for a more attractive job offer. The story of unemployment insurance reforms in the pre-crisis period is - similar to the story of employment protection reforms - in that benefits have not necessarily been cut, but the requirements to qualify for benefits (pertaining to prior work history as well as willingness to accept jobs on offer) have been significantly increased and the duration of benefits has been reduced (Leschke, 2008; Bekker et al., 2025). Arguably, the upshot of such reforms is to render unemployed workers more willing to accept NSE.

In sum, the power resources perspective leads us to expect a negative association between the NSE share of the employed labour force and the generosity of unemployment compensation as well as a negative association between the NSE share and legal restrictions on temporary employment. It is less obvious what to expect regarding the effects of restrictions on the ability of employers to dismiss workers on standard employment contracts. While standard employment protection leads firms to prefer non-standard employment forms, it also restricts their ability to substitute non-standard employees for standard employees. What seems clear is that the combination of high standard employment protection and low restrictions on temporary employment is particularly conducive to NSE expansion (cf. Berglund et al., 2021). Finally, it is tempting to suppose, based on existing literature, that the NSE share tends to fall with union density, but two reservations with respect to this conjecture deserve to be noted. First, the arguments advanced by scholars working in the power resources tradition suggest that union strength operates primarily through legislative measures pertaining to employment protection and unemployment compensation. Secondly, any additional effects of union membership, not captured by legislative measures, are likely to be conditioned by collective bargaining institutions and industrial relations at the firm level.

From the perspective of power resources theory (cf. Korpi, 2002) and labour economics alike, the unemployment rate would seem to be highly relevant. It has typically been used as an important proxy to explain the insecurities associated with NSE forms (Leschke, 2008; Berglund et al., 2021), yet has received little attention in previous efforts to explain NSE expansion. In our review of the literature, Baccaro et al. (2016) and Zielinski (2020) stand out as some of the few studies explicitly theorising and empirically identifying unemployment as a driver of NSE expansion.[6] Building on these studies, we posit that employers would always prefer to hire workers who can be replaced without occurring excessive costs on flexible (non-standard) contracts and that such workers would always prefer the security of indefinite contracts. We further assume that the rate of unemployment is a key determinant of the relative bargaining power (or marketplace power) of buyers and sellers of readily replaceable labour. As demand for labour increases, and the aggregated rate of unemployment declines, employers need to offer better terms of employment—more secure job and higher wages—to recruit and retain low- and mid-skilled workers. Conversely, persistently high unemployment forces low- and middle-skilled workers to accept fixed-term contracts and other forms of NSE. In the long-term, we would then expect the NSE share of the employed low- and mid-skilled labour force to rise with the level of unemployment.

It is less straightforward to predict how the NSE share will respond to changes in unemployment in the short-term. If it is costly for employers to shed workers on standard

[6] In addition to aforementioned results, Baccaro et al. (2016) show that the national rate of unemployment has a significant negative effect on the incidence of indefinite contracts in all skill categories other than professionals and that the effect is biggest for manual workers. Based on the European Working Conditions Survey of 2010, their analysis pools individual-level data for a single year. Based on data from the European Labour Force Surveys for 2004-17, Zielinsky estimates correlation coefficients between national rates of unemployment and three forms of NSE for the EU as a whole (28 countries) and for each of the four Visegrad countries (Czechia, Hungary, Poland and Slovakia). For the EU as a whole, he finds a statistically significant negative correlation between levels of unemployment and temporary employment, a statistically significant positive correlation between levels of unemployment and part-time employment, and no significant correlation between levels of unemployment and self-employment.

contracts, they can be expected to respond to economic downturns by shedding non-standard workers, at least in the first instance. On the other hand, employers might respond to economic downturns by shifting to greater reliance on non-standard employment, if the costs of shedding standard workers are lower. If the former scenario prevails, increases in unemployment is assumed to be associated with decreases in the NSE share of the employed labour force; if the latter scenario prevails, we expect instead to observe a positive association between increases in unemployment and increases in the NSE share.

The regression analysis presented in section 5 goes beyond Zielinski (2020) and Baccaro et al., (2016) by distinguishing between the short-term and long-term effects of unemployment and by exploring how the policy variables identified by institutionalists and scholars working in the power resources tradition condition the effects of unemployment and changes in the rate of unemployment. We posit that costs of shedding standard workers are determined, to a significant extent, by employment protection legislation (EPL). By the logic articulated above, we expect high (rising) unemployment to be associated with a rising NSE share when legal restrictions on the ability of employers to discuss workers and compensatory requirements are low. Similarly, we expect high (rising) unemployment to be associated with a rising NSE share when legal restrictions on employers' ability to recruit workers on fixed-term contracts are low. We further expect high (rising) unemployment to be associated with a rising NSE share when unemployment access to unemployment benefits is more restricted and (or) the benefits levels are low.

4. Data, variables and methods specifications

As indicated at the outset, the descriptive analysis in section 5 and the regression analysis in section 6 are both based on harmonised micro data from the European Union Labour Force

Survey (EU-LFS) and encompasses twenty-four countries.[7] For a subset of these countries, the EU-LFS dates back to the 1980s, but the survey question that enables us to distinguish between voluntary and involuntary part-time employment was not asked until 1998 and then only in some countries until 2005. As reported in Appendix 1, countries enter our dataset between 1998 and 2005. For all countries but the UK, which drops out of the EU-LFS in 2019, the descriptive analysis reports on changes in the incidence of the different employment forms among employed survey respondents from the initial year until 2022. For lack of more recent data on policy variables, the regression analysis is based on annual data for 1998-2019.

We mobilize the EU-LFS to generate annual measures of the unemployment rate in the economically active population aged 15-64 as well as the incidence of different employment forms among employed individuals aged 15-64. As noted at the outset, we operationalize the incidence of NSE as the share of employed individuals with at least one of the following characteristics: (1) a fixed-term contract, (2) working less than 15 hours per week, (3) working 15-30 hours per week but wanting to work more hours, and (4) working for a temporary employment agency (including on an indefinite contract without guaranteed hours of work). Treating the self-employed as a separate category (cf. above), our measure of the incidence of standard employment encompasses all individuals with indefinite contracts who either work more than 30 hours per week or who work 15-30 hours per week and do not wish to work more.

While the descriptive analysis reports separate measures of the incidence of different employment forms in low-/mid-skill and high-skill occupations, the regression analysis pertains exclusively to the incidence of NSE in low- and mid-skill occupations, for reasons articulated above. We rely on ISCO major groups to distinguish these occupations, treating

[7] The LFS includes seven countries that do not feature in the analyses presented here. We have dropped Cyprus, Iceland, Luxemburg and Malta on account of their small size (populations below 1 million) and Bulgaria, Croatia and Romania for lack of data on independent variables of theoretical interest (employment protection measures). See Appendix 1 for estimates of different employment forms in all LFS countries (including the seven countries that are not included in our analyses).

occupations from ISCO major groups 1 through 3 as high-skilled and occupations from ISCO major groups 4 through 9 as low-/mid-skilled occupations.[8]

The dependent variable of the regression analysis is year-on-year change in the incidence NSE (in low- and mid-skill occupations). We estimate OLS models that include country fixed effects and panel-corrected standard errors. The use of country fixed effects ensures that the analysis captures within-country variation over time by centring yearly values of each variable on the mean for the country to which they pertain. This specification allows us to assess how changes in unemployment rates and institutional configurations influence changes in NSE within countries, net of time-invariant national characteristics. To account for spurious correlations arising from common trends, we include a linear time trend in all models. To capture persistence in employment patterns over time and to account for potential ceiling effects (a finite number of jobs that lend themselves to NSE), the models also include the lagged share of NSE (NSE t-1) as an independent variable.

Our regression models include two measures of unemployment, both derived from the EU-LFS: the national unemployment rate lagged by one year (unemployment t-1) and the year-on-year change in the national unemployment rate (Δ unemployment). Thus, we estimate the (long-term) effects of levels of unemployment as well as the (short-term) effects of changes in unemployment.

Motivated by the theoretical framework set out above, the regression models include three policy variables, all lagged by one year. Based on OECD (2018), two of these variables pertain to national legislation regulating employment practices: first, the OECD index of legislation protecting workers on indefinite contracts against individual layoffs, including both procedural requirements and mandatory financial compensation (standard EPL t-1); and, secondly, the

[8] Armed forces occupations (ISCO 0) have been excluded from our dataset.

OECD index of restrictions in temporary employment (temp empl restrictions t-1). For coverage over the entire period 1998-2019, we rely on "version 1" of these indicators.[9] Based on a new dataset presented by Bakker et al. (2024), the third policy variable is the net income replacement provided by unemployment insurance for someone earning the average wage (UI net replacement t-1).[10]

We estimate direct effects of standard employment protection, restrictions on temporary employment and unemployment compensation and, in a second step, interact these variables with levels and change in the rate of unemployment. To facilitate interpretation and minimise potential multicollinearity, the interaction models are based on dichotomizing the policy variables at the sample median. This specification allows for a straightforward comparison of the effects of unemployment across more and less protective policy settings.

In addition to the independent variables and interaction terms of theoretical interest, our regression models include several control variables to account for change structural and demographic factors known to influence variation in NSE, all lagged by one year. Calculated based on EU-LFS micro data, we control for the share of foreign-born individuals in the labour force (foreign-born LF share) and the share of total employment in low-skill private services (low-skill services empl share).[11] We also control the percentage of women aged 15-64 in the

[9] See OECD (2020) for data based on more recent versions of these indicators and discussion of how they differ from version 1.

[10] The Net Replacement Rates (NRRs) estimated by Bakker et al. (2024) is the ratio of the net earnings of an individual in unemployment to her net earnings in employment, taking into account not only unemployment benefits but also child allowances and income taxes. Here we report results for the average NRR for two workers earning the average wage, one being a single individual and the other with a non-working spouse and two young children (aged 10 and 12). The underlying data were made available to us by Vincent Bakker (Leiden University).

[11] "Low-skill private services are defined based on the NACE classification of economic sectors. In LFS country-years where NACE 1.1 applies, it includes categories G (wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods), H (hotels and restaurants) and O (other community, social and personal service activities). In LFS country-years where NACE 2 applies, it includes G (wholesale and retail trade; repair of motor vehicles and motorcycles), I (accommodation and food service activities), R (arts, entertainment and recreation) and S (other service activities).

labour force (female LF participation) as reported by Eurostat (2024).[12] Finally, we control for the percentage of wage-earners who are union members (union density) based on the OECD database created by Visser (OECD, 2024).

5. Descriptive analysis

Complemented by more detailed information in Appendix 1, Table 1 reports our estimates of the incidence of standard employment, non-standard employment and self-employment in 2022 and provides a broad-brushed overview of how the distribution of total employment across theses three categories changed from 1998 to 2022. To allow for accurate comparisons between countries that enter the dataset in different years (and, in a second step, for comparisons across sub-periods of different duration) the figures for change over time presented in Table 1 are annual averages, i.e., the difference between the first and the last observations divided by the number of intervening years. At a persistent annual increase (decrease) of .10, the incidence of a particular employment form would increase (decrease) by 1 percentage point over ten years.

For heuristic purposes, we sort the countries in our dataset into five groups, based on geography, language and/or historical commonalities: (1) Nordic countries; (2) Continental countries (or "the EU core," including France); (3) Anglophone countries; (4) Mediterranean countries; and (5) East European countries. Broadly speaking, this sorting of countries corresponds to conventional typologies in the comparative welfare-state literature (e.g., Huber & Stephens, 2024) and the typology of industrial relations regimes proposed by Visser (2009). With figures for the full set of 24 countries presented in Appendix 1, Table 1 shows figures for a selection of countries, alongside averages for each of the five groups of countries. For each

[12] For Switzerland, we instead use figures from Swiss Federal Statistical Office (on account of the short time period covered by Eurostat data).

group, Table 1 includes the two countries at opposite ends of the within-group variation in NSE expansion and the most populous country not included by that criterion.

[*insert Table 1 here*]

The main take-aways from Appendix 1 and Table 1 are as follows. To begin with, we observe a common tendency for standard employment in low- and mid-skill occupations to decline in the Nordic, Continental and Anglophone countries (i.e., the more "post-industrial" in countries in our dataset) from the late 1990s to the early 2020s. Among these twelve countries, Germany and Switzerland are the only two cases in which the incidence of standard employment in low- and mid-skill occupations increased over this period.[13] There does not appear to be any consistent pattern in the evolutions of standard employment in low- and mid-skill occupations for the Mediterranean and Eastern European countries. Over the time-period covered by these data, standard employment in low- and middle-skill occupations declined in Italy but increased in Spain and Portugal and remained essentially unchanged in Greece. Similarly, it declined in Czechia, Estonia, Slovakia and Slovenia but increased in Hungary, Lithuania, Latvia and Poland.

By contrast, standard employment in high-skill occupations held steady or increased in nineteen out the twenty-four countries included in dataset from the late 1990s to the early 2020s. Among the Nordic, Continental and Anglophone countries, the Netherlands stands out as the only country in which standard employment in high-skill occupations declined. By the end of the period covered by our analysis, standard employment was higher in high-skill occupations than in low- and middle-skill occupations in all but four countries (Italy, Portugal, Latvia and Slovakia). The difference between these occupational categories exceeded 10 percentage points in one third of the country considered. Averaging across all countries in our

[13] Note that Germany only enters our dataset in 2005 as the EU-LFS does not allow us to distinguish between voluntary and involuntary part-time employment in earlier years (when NSE in low- and middle-income occupations increased sharply in many of these countries).

dataset, standard employment among high-skilled workers stood at 74.9% in 2022 compared to 68.7% for low- and middle-skilled workers.

Over the same period, the incidence of NSE in low- and middle-skilled occupations increased significantly in seventeen countries, held steady in two countries (Belgium and Switzerland) and declined noticeably in five countries (Germany, Lithuania, Latvia, Spain and the UK). We also observe a broad tendency for NSE to increase among high-skill workers (eight exceptions). However, increases in NSE among high-skill workers have consistently been lower than increases in NSE among low- and middle-skilled workers (on average, .06 compared to .09 per year). As a result, and in line with expectations, the shift from standard to non-standard employment is a phenomenon that pertains primarily to lower segments of the skill distribution.

Declines in self-employment explain why several Mediterranean and Eastern European countries exhibit increases in standard and non-standard dependent employment. It is also noteworthy that self-employment in low- and middle-skill occupations, but not high-skill occupations, has increased in Belgium, Ireland, the Netherlands and the UK.[14]

Focusing on the incidence of non-standard employment in low- and middle-skill occupations, the Nordic countries constitute the most coherent of the five groups of countries. Along with the Netherlands, all four Nordic countries are characterized by high levels and large increases in low/middle-skill NSE. By comparison, other country groups are characterized by a great deal of within-group variation with respect to levels and trajectories. This observation motivates the analysis of determinants of NSE in the next section, exploring the relevance of discrete policy variables rather than that of complex clusters of institutions and policies.

[14] Self-employment in high-skill occupations increased in the Netherlands (.03 per year), but very much less than self-employment in low- and middle-skill occupations (.38).

Turning to temporal dynamics, Table 2 displays average annual changes in NSE among low- and middle-skill workers over four sub-periods: from 1998 to 2007, from 2007 to 2012, from 2012 to 2019 and from 2019 to 2022. This particular periodisation is justified by the intuition that the economic crisis of 2007-12 and the COVID crisis of 2020-21 represent key moments of rupture. As the regression analysis presented in the next section is limited to 1998-2019, we focus here on differences between the first three periods. Rather than sorting the countries as before, we now rank them based on how changes in the period after the economic crisis compare to changes in the pre-crisis period. There are two groups of countries. In the first group, NSE increased in at least one of the two periods; in the second (much smaller) group, NSE declined in post-crisis and the pre-crisis period (but increased during the economic crisis). For the first group, the "pre/post-crisis difference" reported in the fourth column is derived by subtracting post-crisis from pre-crisis change, so that positive values signify either that NSE expanded in the post-crisis period but not in the pre-crisis period or that NSE expanded more in the post-crisis period than in the pre-crisis period. For the second group, positive values signify a deceleration of the shift away from NSE.

[*insert Table 2 here*]

Table 2 yields two observations that are critically important for the purposes of this paper. The first is that we observe a broad, nearly universal, tendency for the incidence of NSE to increase among low- and mid-skilled workers during the economic crisis. This finding would seem to contradict the common assumption that non-standard workers (fixed-term workers in particular) are typically the first to be dismissed during economic downturns (when employers need fewer workers). Our data are more consistent with the notion that crisis conditions (weak demand for labour) provide an opportunity for employers to switch from standard to NSE forms by weakening the marketplace power of workers. That said, it also deserves to be noted that

NSE, averaged across the twenty-four countries, grew faster in the pre-crisis period than during the crisis itself. [15]

The second point has to do with developments in the 2010s. Relative to the pre-crisis period, the expansion of NSE accelerated in seven countries, but it was reversed in an equal number of countries and decelerated in two additional countries (Italy and the Netherlands). Averaging across the twenty-four countries, the incidence of NSE increased by .31 per year in the pre-crisis period (.30 during the crisis) but declined from 2012 to 2019 (-.05). We also observe significant declines in incidence of NSE in most countries and an all-country average decline of -.28 from 2019 to 2022.

The apparent deceleration, if not reversal, of NSE expansion since the early 2010s poses a challenge not only to explanations of NSE expansion that emphasise long-term structural changes, but also to explanations couched in terms of power resources and government policies. The incidence of NSE in low- and mid-skill occupations held steady or even declined in many European countries over the decade of the 2010s despite the continued decline of union density and the persistence of deregulatory reforms introduced prior to the economic crisis.

Figure 1 tracks unemployment rates (measured as the unemployed persons as percentage of the total labour force aged 15-64) by country over the time period covered by Table 2. The timing varies by country, but the general trend is clearly one of sharply rising unemployment during the crisis and sharply declining unemployment rates since the crisis (or, in some cases, since the mid-2010s). Descriptively, NSE trajectories would appear to be closely associated with cyclical labour-markets dynamics captured by the rate of unemployment. Against this

[15] Note also that our data (and regression results) do not contradict the observation that NSE workers are, on average, more likely to become unemployed than standard workers. They do imply that the unemployment gap between standard and non-standard workers diminishes as the aggregate rate of unemployment increases.

background, the following analysis explores the effects of unemployment on the incidence of NSE and, in a second step, explores how employment protection and unemployment compensation mediate the effects of unemployment

[*insert Figure 1 here*]

6. Regression analysis

We now proceed to test the claims set out in section 3. Table 3 presents the results of estimating OLS models without any interaction terms. Consistent with the idea of ceiling effects, we observe a significant negative coefficient for the lagged dependent variable. More importantly, higher levels of unemployment are associated with NSE expansion, and so is rising unemployment, confirming that employers tend to substitute non-standard for standard employees during economic downturns.

[*insert Table 3 here*]

Turning to the control variables introduced in Models 2 and 3, the results presented in Table 3 indicate that the employment share of low-end private services is consistently associated with rising NSE and contrary to expectations, the female labour force participation is consistently associated with declining NSE. The coefficient for the foreign-born share is consistently positive but only clears the 95% threshold of statistical significance in the full model (Model 4). There appears to be no association whatsoever between union density and NSE expansion. We do not have any ready explanation for the result for female labour force participation, but it may be that its effects are non-linear, i.e., it may be that women entering the labour force initially boosts the NSE share but the effects of female labour force participation turn negative

above some threshold.[16] It is also important to keep in mind that our operationalization of "NSE" excludes voluntary part-time workers and research documents that women often voluntarily reduce working time during periods of childrearing (Maestripieri, 2023) and thus fall within the remit of standard work according to the definition used here.

The coefficients for our three labour-market policy variables, introduced in Model 4, run counter to our theoretical expectations. While the direct effect of standard employment protection is not significant, it appears to be the case that restrictions on temporary employment contracts and unemployment benefits generosity are associated with NSE expansion. It deserves to be noted that these variables often move slowly, in some cases not all, over the period covered by our analysis. It may be that the average within-country effects that we find are due to restrictions on temporary employment and unemployment benefits generosity falling along with the incidence of NSE in a (relatively small) subset of countries.

Limited over-time variation on our measures of labour-market regulations also poses a problem for assessing whether (or how) such regulations condition the effects of unemployment. Interacting the unemployment variables with the policy variables as they are entered in Model 4 (Table 3), we do not observe any significant interaction effects. Table 4 shows the results that we obtain if we instead dichotomize country-year observations of the policy variables based on whether they fall above or below the median for all country-year observations in our sample. This setup is roughly equivalent to estimating separate models with country fixed effects for two sub-samples: one characterised by a high level and the other by a low level of

[16] Adding a squared term for female labour force participation to any one of models 2-4 in Table 3 lends some support to this conjecture in that coefficient for the LFPR turns negative while the coefficient for LFPR2 is positive, but neither coefficient comes close to conventional significance thresholds.

employment protection, temporary employment restrictions or unemployment benefits generosity.[17]

[*insert Table 4 here*]

Based on the models presented in Table 4, Figures 2-4 show our estimates of the effects of changes and levels of unemployment conditional on levels of labour-market regulation. These findings are unambiguous and consistent with our theoretical expectations. Figure 2 shows that the association between increases in unemployment and increases in the incidence of NSE only holds in the context of low standard employment protection or, in other words, that this association is conditional on the costs of shedding standard employees being relatively low. Over the long-term, however, high unemployment is associated with NSE expansion even in a high EPL context. Similarly, Figure 3 shows that the association between increases in unemployment and increases in the incidence of NSE only holds in the context of low restrictions on temporary employment. Persistently high unemployment is associated with NSE expansion in a context characterized by high restrictions on temporary employment as well, but the association is significantly stronger when restrictions are low. As shown in Figure 4, the same basic pattern also holds for unemployment benefits generosity.

[*insert Figures 2-4 here*]

Adding an additional layer of complexity, Figure 5 shows the conditional effects of unemployment that we obtain if we sort country-years into four categories, based on levels of

[17] As documented in Appendix 3, countries typically belong to one or the other sub-sample, but there is some over-time movement across the divide by the median for the entire sample. An alternative solution to the problem of limited over-time variation on our policy variables would be to centre continuous measures of these variables on their sample-wide mean. As this would involve mixing fixed-effects estimates for some variables with cross-sectional estimates of other variables, the results would be difficult to interpret (and quite also dubious). Available upon request, the interaction effects that we obtain with continuous indicators of labour-market are similar to the interaction effects reported in Table 4 and Figures 2-4.

standard employment protections *and* restrictions on temporary employment being above or below the median for the entire sample (see Appendix 3 for full regression results). The main take-away would seem to be that, in the short term, rising unemployment only promotes NSE expansion when standard employment protection and restrictions on temporary are both relatively low. Employment regulations also moderate the effect of high levels of unemployment, but the long-run effects of unemployment remain statistically different from zero (using 95% confidence intervals) even when both forms of employment regulation are high.

[*insert Figure 5 here*]

7. Discussion and conclusion

This paper contributes to the literature on non-standard employment (NSE) by leveraging on power resource theory and analysing the relationship between unemployment and the expansion of NSE among low- and middle-skilled workers in 24 European countries between 1998 and 2022. Using regression analysis of EU-LFS data, we show that both higher levels and increasing levels of unemployment are positively associated with growth in the share of NSE among those in employment. More importantly, our findings suggest that this relationship is mediated by labour market institutions. In particular, the effects of rising unemployment rates on NSE are amplified in institutional contexts with weak standard employment protection, low restrictions on temporary contracts, and low unemployment benefit levels. Where institutional protections are strong, these effects are reduced, though not eliminated.

In this study, we have used EU-LFS data for our analysis, which involves certain data limitations. As mentioned earlier, it is not possible to single out the solo self-employed in the EU-LFS data, which means we have omitted them from our analysis. Future studies might include additional data sources, where it is possible to capture the solo self-employed as it is

an increasingly important form of NSE among low- and mid-skilled workers for instance in food delivery and other forms of platform work (Vandaele & Rainone, 2025). This would also allow future studies to include high-skilled workers in the comparative analysis, as solo self-employment is one of the dominant forms of NSE among high-skilled workers (Conen & Reuter, 2024). For instance, we observe a high prevalence of solo self-employment in the creative industries, which several studies have documented lead to precarious working conditions for many of the workers (ibid).

From a theoretical perspective, these findings bridge the "economist view" and the power resources approach. The "economist view" expects that employers, particularly during downturns, will increase their reliance on flexible, cost-efficient forms of employment to maintain adaptability and reduce risks. Our findings echo this in that rising unemployment is associated with greater NSE, particularly when firms face limited regulatory constraints. At the same time, our results also support claims from the power resources literature: namely, that the institutional environment—crafted and maintained through political struggles over time—fundamentally conditions how macroeconomic pressures of labour market change (i.e. unemployment increase) translate into employment outcomes.

These findings provide empirical support to the understanding that labour market downturns, proxied by higher and increasing levels of unemployment, are a key driver of NSE for low- and mid-skill occupations. This is in line with the expectation that high unemployment weakens the bargaining power of workers in easily substitutable roles, making them more likely to accept insecure or temporary jobs.

Importantly, the analysis supports the argument that institutional regulations moderate the effects of unemployment on NSE, providing support to the power resources perspective. The positive relationship between unemployment and NSE is significantly stronger when

institutional protections are weaker that is, when employment protection for standard workers is lower, legal restrictions on fixed-term employment are smaller, and unemployment benefits are less generous.

The short-term effects of rising unemployment are worth to note. As expected, short-term increases in unemployment only translate into NSE growth in contexts of weak institutional protection. This supports the notion that in countries with high employment protection, employers appear constrained in substituting standard with non-standard labour to minimise short-term shocks (i.e. increasing unemployment). By contrast, in presence of weaker regulation, our findings suggest that employers can more rapidly adjust their workforce composition, leading to an expansion of NSE.

Our findings show that while economic conditions clearly matter, their impact is conditioned by the regulatory framework with weaker regulatory settings propelling their effects and are thereby, consistent with the decommodification logic articulated by Esping-Andersen, (1990) and the regulatory emphasis of Emmenegger (2014). Our findings also reinforce the idea that welfare retrenchment - e.g. erosion of EPL and hollowing out of benefit levels - exposes low- and mid-skill workers to larger employment insecurity in the face of economic downturns, reflecting the important role of policymakers in shaping and limiting labour market risks and segmentation through policy reforms.

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Tables and figures for the main text

Table 1: Average annual change in non-standard employment, self-employment and standard employment by occupational skill levels, 1999–2022

	NON-STANDARD				SELF				STANDARD			
	low/middle		high		low/middle		high		low/middle		high	
	Δ	2022 level	Δ	2022 level	Δ	2022 level	Δ	2022 level	Δ	2022 level	Δ	2022 level
overall mean	***0.09***	***19.5***	***0.06***	***11.6***	***-0.01***	***11.8***	***-0.20***	***12.5***	***-0.08***	***68.7***	***0.14***	***74.9***
Nordic												
group mean	***0.25***	***28.0***	***0.04***	***12.9***	***-0.02***	***8.1***	***-0.15***	***6.6***	***-0.23***	***64.0***	***0.11***	***80.5***
Denmark	0.33	30.6	0.09	11.4	0.07	6.6	-0.18	7.8	-0.40	62.8	0.09	80.8
Sweden	0.28	27.8	0.09	10.8	0.00	8.9	-0.23	8.1	-0.28	63.3	0.16	81.8
Finland	0.16	27.5	-0.04	19.3	0.04	12.1	-0.12	7.4	-0.20	60.5	0.13	72.6
Continental												
group mean	***0.13***	***25.5***	***0.10***	***15.7***	***0.10***	***9.8***	***-0.15***	***12.9***	***-0.23***	***64.7***	***0.05***	***71.4***
Netherlands	0.45	43.5	0.40	22.1	0.38	12.2	0.03	15.3	-0.83	44.3	-0.43	62.6
France	0.13	24.3	-0.02	12.7	0.09	10.4	-0.06	13.0	-0.23	65.3	0.07	74.2
Germany	-0.11	25.2	0.04	18.5	-0.09	4.8	-0.35	9.5	0.20	70.1	0.31	72.1
Anglophone												
group mean	***0.08***	***20.1***	***0.02***	***9.7***	***0.19***	***12.7***	***-0.44***	***11.8***	***-0.27***	***67.3***	***0.42***	***78.6***
Ireland	0.32	22.8	0.16	11.7	0.11	11.3	-0.83	11.1	-0.43	66.0	0.67	77.3
United Kingdom	-0.16	17.3	-0.12	7.6	0.26	14.1	-0.05	12.5	-0.10	68.6	0.16	79.9
Mediterranean												
group mean	***0.06***	***20.5***	***0.13***	***14.1***	***-0.20***	***16.6***	***-0.58***	***19.4***	***0.13***	***63.0***	***0.45***	***66.5***
Italy	0.53	21.0	0.17	11.4	-0.37	14.5	0.03	26.1	-0.16	64.5	-0.20	62.6
Portugal	0.08	19.1	0.15	14.6	-0.35	9.9	-0.88	14.4	0.27	71.0	0.73	71.0
Spain	-0.41	28.5	0.04	19.3	-0.02	12.8	-0.55	16.4	0.43	58.7	0.51	64.3
Formerly state-socialist												
group mean	***0.02***	***10.1***	***0.00***	***7.0***	***-0.05***	***12.6***	***0.00***	***12.0***	***0.03***	***77.3***	***0.00***	***81.0***
Poland	0.16	16.3	-0.02	9.2	-0.26	20.5	0.02	14.3	0.10	63.1	0.01	76.4
Hungary	0.02	8.0	-0.13	2.3	-0.18	11.6	-0.05	11.7	0.15	80.4	0.18	86.1
Lithuania	-0.26	5.6	-0.18	5.8	-0.41	12.7	0.04	8.3	0.66	81.7	0.14	85.9

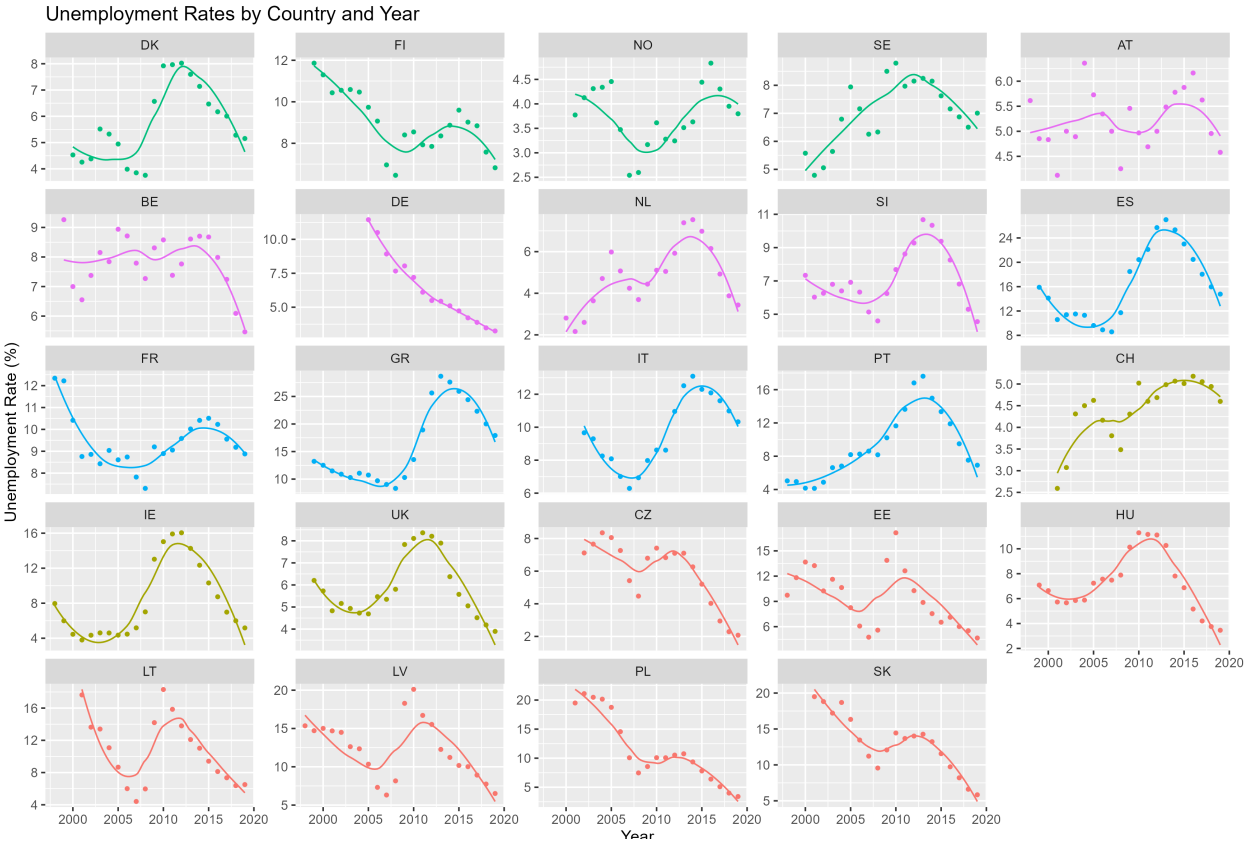
Increases in NSE and self-employment and decreases in standard employment are highlighted in red. Group means are based on all countries assigned to a particular group. Note that "2022 level" is actually "2019 level" for the UK. See Appendix 1 for country-specific initial years of observation, figures for all occupations combined as well as figures for countries that are included in the dataset but not in the table above. Source: European Labour Force Survey.

Table 2: Average annual change in the incidence of non-standard employment in low- and middle-skilled occupations (PNSE) by sub-periods

	1999-2007	2008-12	2013-19	pre-/post-crisis difference	*2020-22*	Visser regime
overall mean	***0.31***	***0.30***	***-0.05***	***-0.36***	***-0.28***	
Finland	-0.27	-0.16	0.45	0.72	1.12	OC
Spain	-0.21	-1.02	0.36	0.57	-1.56	PSC
Greece	-0.10	0.39	0.43	0.53	-0.96	PSC
Denmark	0.15	0.28	0.47	0.32	0.51	OC
Belgium	-0.06	0.07	0.23	0.29	-0.43	SP
Slovakia	0.07	0.46	0.28	0.21	-1.35	FSC
France	0.22	0.26	0.30	0.08	-0.76	PSC
Switzerland	0.17	0.09	0.05	-0.12	-0.71	LP
Sweden	0.53	-0.04	0.21	-0.32	0.40	OC
Norway	0.54	0.09	0.19	-0.35	-0.13	OC
Czechia	0.26	0.24	-0.11	-0.37	0.31	FSC
Ireland	0.02	1.97	-0.39	-0.41	0.11	LP
Italy	1.11	0.22	0.63	-0.48	-0.18	PSC
Netherlands	0.56	0.21	0.06	-0.50	1.53	SP
Portugal	0.54	0.58	-0.13	-0.67	-1.65	PSC
Austria	0.74	0.36	-0.17	-0.91	-0.12	AT
Hungary	0.30	0.92	-0.77	-1.07	-0.35	FSC
Germany	1.01	0.17	-0.43	-1.44	-0.56	SP
Slovenia	0.94	0.08	-0.58	-1.52	-0.37	SP
Poland	2.72	-0.20	-0.79	-3.51	-2.15	FSC
Lithuania	-0.70	0.35	-0.23	0.47	-0.44	FSC
Latvia	-0.67	0.74	-0.64	0.03	0.88	FSC
Estonia	-0.09	0.65	-0.09	0.00	0.37	FSC
UK	-0.24	0.40	-0.48	-0.24		LP

Increases in PNSE and acceleration of PNSE growth (or deceleration of PNSE decline) from the first to the third period are highlighted in red. See Appendix 1 for country-specific time periods covered by the data. Source: European Labour Force Survey.

Figure 1: Unemployment rates by country



Unemployed aged 15-64 in percent of total labour force (unemployed + employed) aged 15-64, based on self-reporting. Source: European Labour Force Survey.

Table 3: OLS models of change in the incidence of NSE

	Model 1	Model 2	Model 3	Model 4
NSE t-1	-.18***	-.20***	-.20***	-.21***
	(.04)	(.04)	(.04)	(.04)
unemployment t-1	**.12****	**.12*****	**.11*****	**.12*****
	(.02)	(.03)	(.03)	(.03)
Δ unemployment	**.18*****	**.16****	**.16****	**.13****
	(.04)	(.05)	(.05)	(.05)
foreign-born LF share t-1		.03	.03	.05*
		(.02)	(.02)	(.03)
low-skill services empl share t-1		.14*	.15*	.16*
		(.07)	(.07)	(.08)
female LF participation t-1		-.11***	-.10**	-.09***
		(.03)	(.03)	(.03)
union density t-1			-.02	-.04
			(.02)	(.03)
standard EPL t-1				-.45
				(.30)
temp empl restrictions t-1				**.51****
				(.16)
UI net replacement t-1				**.03***
				(.01)
time trend	.02	.06**	.05*	.03
	(.01)	(.02)	(.02)	(.02)
intercept	-.19	-.75**	-.63*	-.42
	(.15)	(.15)	(.28)	(.29)
country FEs	yes	yes	yes	yes
PCSEs	yes	yes	yes	yes
R^2	.22	.23	.22	.23
Adjusted R^2	.21	.22	.21	.21
N	460	442	434	397

*Legend: *** p < .001; ** p< .01, *p < .05*

Table 4: OLS interaction models of change in the incidence of NSE

	Model 5	Model 6	Model 7
NSE t-1	-.20***	-.24***	-.21***
	(.04)	(.04)	(.04)
unemployment t-1	**.19*** **	**.23*** **	**.15*** **
	(.04)	(.04)	(.03)
Δ unemployment	**.33*** **	**.41*** **	**.26** **
	(.07)	(.08)	(.06)
foreign-born LF share t-1	.02	.03	.06*
	(.03)	(.03)	(.03)
low-skill services empl share t-1	.16*	.12	.16*
	(.08)	(.07)	(.08)
female LF participation t-1	-.09**	-.08**	-.09***
	(.03)	(.03)	(.03)
union density t-1	-.04	-.03	.01
	(.03)	(.03)	(.02)
standard EPL t-1		-.44	-.43
		(.33)	(.30)
temp empl restrictions t-1	.29		.58***
	(.16)		(.16)
UI net replacement t-1	.03*	.03	
	(.01)	(.01)	
unemp t-1 * high EPL	**-.10** **		
	(.04)		
Δunemp * high EPL	**-.30*** **		
	(.08)		
unemp t-1 * high temp restrictions t-1		**-.17*** **	
		(.04)	
Δunemp * high temp restrictions t-1		**-.41*** **	
		(.09)	
unemp t-1 * high UI_NR t-1			**-.09***
			(.04)
Δunemp * high UI-NR t-1			**-.35*** **
			(.08)
high EPL t-1	-.10		
	(.09)		
high temp restrictions t-1		.08	
		(.08)	
high UI NR t-1			.03
			(.09)
time trend	.05	.05*	.03
	(.02)	(.02)	(.02)
intercept	-.52	-.62*	-.42
	(.29)	(.30)	(.29)
country FEs	yes	yes	yes
PCSEs	yes	yes	yes
R^2	.26	.28	.27
Adjusted R^2	.24	.25	.24
N	397	397	397

*Legend: *** p < .001; ** p< .01, *p < .05*

Figure 2: Short-term and long-term effects of unemployment conditional on standard employment protection (based on Model 1 in Table 3)

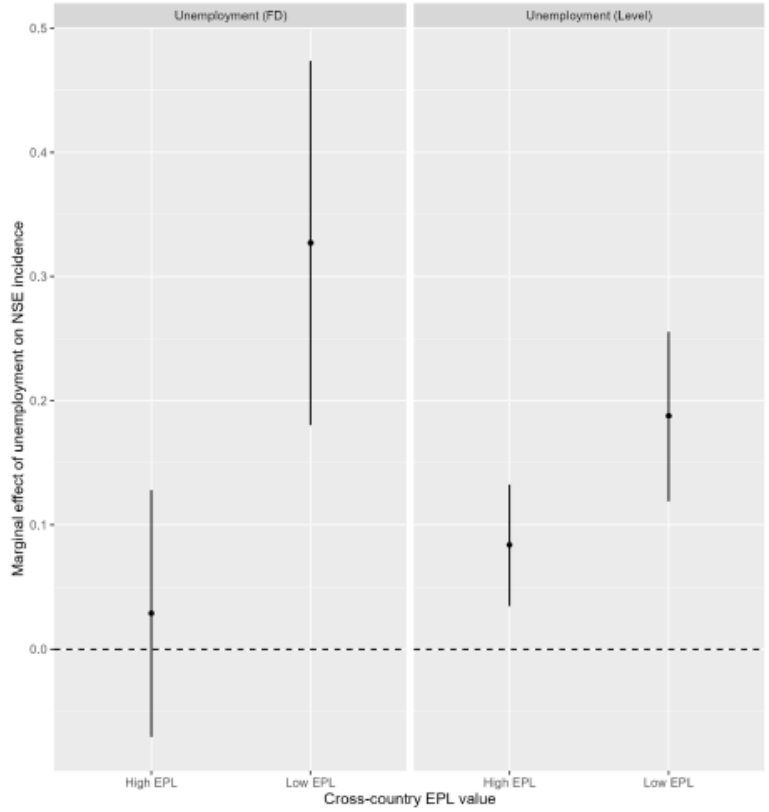


Figure 3: Short-term and long-term effects of unemployment conditional on temporary employment restrictions (based on Model 2 in Table 3)

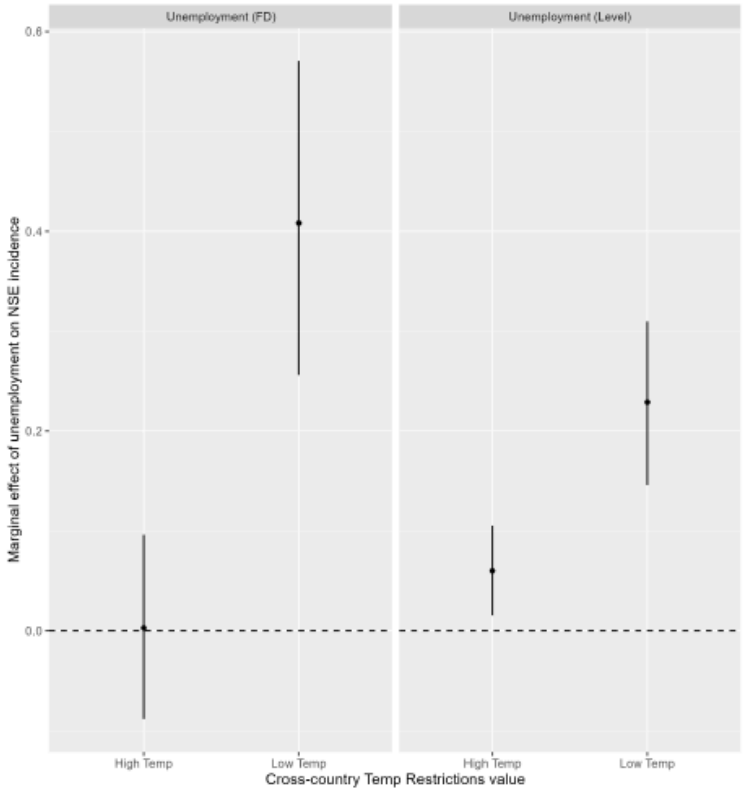


Figure 4: Short-term and long-term effects of unemployment conditional on generosity of unemployment insurance (based on Model 3 in Table 3)

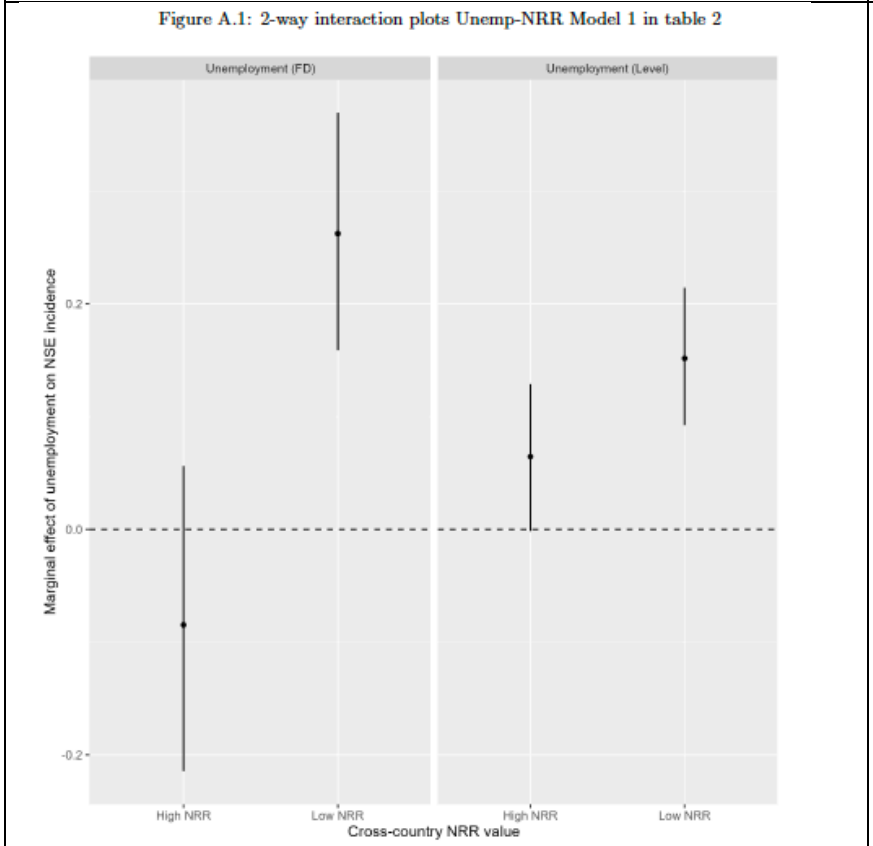
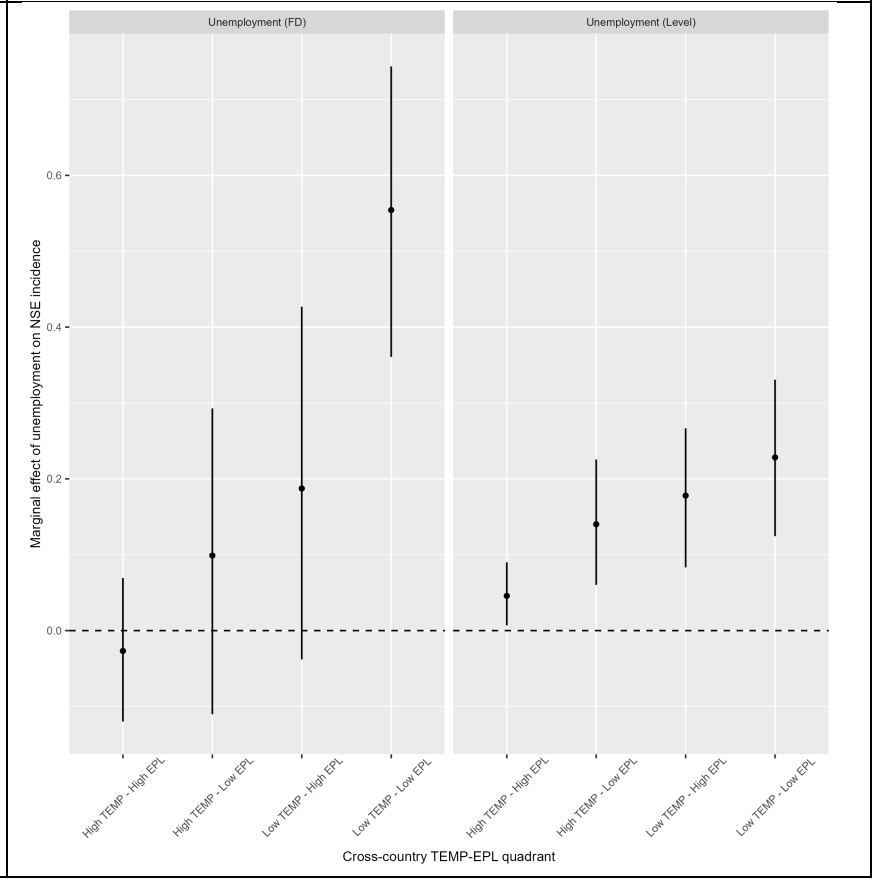


Figure 5: Short-term and long-term effects of unemployment conditional on standard EPL and temporary employment restrictions (based on model in Appendix 3)



Appendix

Appendix 1: Average annual change in dependent non-standard employment, self-employment and standard employment by and occupational skills levels

	Dependent Non-Standard Employment						Self Employment						Standard Employment					
	All occupations		Mid-Low skilled		High skilled		All occupations		Mid-Low skilled		High skilled		All occupations		Mid-Low skilled		High skilled	
	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022
Nordic																		
DK	0.15	20.9	0.33	30.6	0.09	11.4	-0.03	7.1	0.07	6.6	-0.18	7.8	-0.12	72.0	-0.40	62.8	0.09	80.8
FI	0.12	23.6	0.16	27.5	0.09	19.3	-0.08	10.2	0.04	12.1	-0.23	8.1	-0.04	66.2	-0.20	60.5	0.13	72.6
IS	0.13	17.9	0.23	23	0.14	13.3	-0.25	10.8	-0.29	10.3	-0.24	11.3	0.12	71.2	0.05	66.8	0.10	75.3
NO	0.08	18.2	0.22	26.2	0.01	10.2	-0.13	3.7	-0.18	4.6	-0.05	3.0	0.05	78.0	-0.04	69.2	0.04	86.8
SE	0.02	17.9	0.28	27.8	-0.04	10.8	-0.06	8.0	0.00	8.9	-0.12	7.4	0.04	74.0	-0.28	63.3	0.16	81.8
Continental																		
AT	0.27	17.6	0.29	19.6	0.29	15.2	-0.05	9.7	0.07	9.1	-0.31	10.4	-0.22	72.7	-0.36	71.3	0.01	74.4
BE	-0.04	12	0.01	14.8	-0.09	8.8	0.09	14.0	0.23	11.4	-0.13	17.0	-0.05	74.0	-0.24	73.8	0.22	74.2
CH	-0.03	21.6	-0.02	25.6	-0.01	17.1	-0.07	11.6	-0.06	10.8	-0.09	12.4	0.10	66.7	0.08	63.6	0.10	70.6
DE	-0.09	22	-0.11	25.2	0.04	18.5	-0.18	7.0	-0.09	4.8	-0.35	9.5	0.28	71.0	0.20	70.1	0.31	72.1
FR	0.02	18.6	0.13	24.3	-0.02	12.7	0.05	11.7	0.09	10.4	-0.06	13.0	-0.07	69.7	-0.23	65.3	0.07	74.2
LU	0.36	14.3	0.65	21.4	0.23	10.7	-0.03	7.6	0.06	6.0	-0.24	8.3	-0.33	78.1	-0.71	72.5	0.01	81.0
NL	0.34	31.9	0.45	43.5	0.40	22.1	0.22	13.9	0.38	12.2	0.03	15.3	-0.56	54.2	-0.83	44.3	-0.43	62.6
Anglophone																		
IE	0.20	17.2	0.32	22.8	0.16	11.7	-0.25	11.2	0.11	11.3	-0.83	11.1	0.05	71.6	-0.43	66.0	0.67	77.3
UK	-0.20	12.4	-0.16	17.3	-0.12	7.6	0.13	13.3	0.26	14.1	-0.05	12.5	0.07	74.3	-0.10	68.6	0.16	79.9
Mediterranean																		
ES	-0.30	25.3	-0.41	28.5	0.04	19.3	-0.17	14.1	-0.02	12.8	-0.55	16.4	0.46	60.7	0.43	58.7	0.51	64.3
CY	0.21	15.0	0.25	17.0	0.18	12.2	-0.53	8.0	-0.53	8.8	-0.50	6.9	0.33	76.9	0.28	74.2	0.32	80.9
GR	0.09	12.6	0.05	13.3	0.17	11.2	-0.35	26.1	-0.05	29.1	-0.93	20.6	0.26	61.3	-0.01	57.6	0.77	68.2
IT	0.39	17.5	0.53	21.0	0.17	11.4	-0.22	18.7	-0.37	14.5	0.03	26.1	-0.17	63.8	-0.16	64.5	-0.20	62.6
MT	0.26	10.7	0.39	13.5	0.13	7.5	0.08	14.1	0.18	16.5	-0.01	11.5	-0.33	75.1	-0.57	70.0	-0.11	80.9
PT	0.06	17.3	0.08	19.1	0.15	14.6	-0.44	11.7	-0.35	9.9	-0.88	14.4	0.38	71.0	0.27	71.0	0.73	71.0

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countries	Dependent Non-Standard Employment						Self Employment						Standard Employment					
	All occupations		Mid-Low skilled		High skilled		All occupations		Mid-Low skilled		High skilled		All occupations		Mid-Low skilled		High skilled	
	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022	Δ 99-22	level 2022
Formerly state-socialist																		
BG	-0.15	3.5	-0.19	4.5	-0.12	1.3	-0.22	7.1	-0.23	5.8	-0.18	9.8	0.37	89.4	0.41	89.7	0.30	88.9
CZ	0.10	8.9	0.14	10.4	0.05	6.6	0.01	15.3	0.13	15.1	-0.19	15.6	-0.11	75.8	-0.26	74.5	0.14	77.8
EE	0.07	6.8	0.12	8.3	0.02	5.1	0.04	8.5	0.07	7.9	-0.01	9.1	-0.11	84.8	-0.19	83.8	-0.01	85.8
HR	0.19	14.5	0.28	17.2	0.05	9.8	-0.17	11.3	-0.08	10.5	-0.37	12.7	-0.02	74.2	-0.19	72.4	0.31	77.4
HU	-0.04	5.7	0.02	8.0	-0.13	2.3	-0.14	11.6	-0.18	11.6	-0.05	11.7	0.18	82.6	0.15	80.4	0.18	86.1
LT	-0.23	5.7	-0.26	5.6	-0.18	5.8	-0.29	10.6	-0.41	12.7	0.04	8.3	0.52	83.7	0.66	81.7	0.14	85.9
LV	-0.11	9	-0.17	9.6	0.02	8.2	-0.08	8.8	-0.17	7.5	0.07	10.2	0.19	82.2	0.34	82.9	-0.09	81.6
PL	0.06	13.3	0.16	16.3	-0.02	9.2	-0.21	17.8	-0.26	20.5	0.02	14.3	0.14	68.8	0.10	63.1	0.01	76.4
RO	-0.02	2.3	0.00	3.0	-0.08	0.8	-0.47	11.7	-0.58	13.9	-0.01	6.4	0.50	86	0.58	83.1	0.08	92.8
SI	0.04	12.8	0.08	14.8	0.03	10.4	0.05	11.7	0.08	11.4	-0.03	12.1	-0.09	75.5	-0.16	73.8	0.00	77.5
SK	0.10	8.3	0.03	8.1	0.23	8.6	0.28	14.1	0.34	14	0.17	14.4	-0.38	77.6	-0.37	77.9	-0.40	77

Appendix 1 continued from previous page

Appendix 2: Coding of country-years for models in Table 3 and Appendix 3.

	total years in sample	years with values above sample median		
		standard EPL	temp empl restrictions	UI net replacement
organised corporatism				
Denmark	19	0	5	5
Finland	20	0	20	17
Norway	18	18	18	18
Sweden	19	19	0	6
social partnership				
Austria	21	5	0	0
Belgium	20	0	20	9
Germany	14	14	0	14
Netherlands	19	19	0	19
Slovenia	8	6	6	8
liberal pluralism				
Ireland	21	0	0	0
Switzerland	17	0	0	17
UK	20	0	0	0
polarised/state-centred				
France	21	21	21	21
Greece	18	18	18	0
Italy	15	15	15	12
Portugal	19	19	19	19
Spain	20	12	20	20
polarised/state-centred				
Czechia	17	17	0	0
Estonia	11	2	11	0
Hungary	18	0	0	0
Latvia	7	7	0	7
Lithuania	5	4	4	1
Poland	14	0	14	0
Slovakia	16	16	11	9

Note: The figures in this table are based on the sample for the full regression models Presented in Table 3 (N=397).

Appendix 3: Model with 3-way interactions between unemployment, standard employment protection and temporary employment restrictions

NSE t-1	-.22***
	(.04)
unemployment t-1	**.23*** **
	(.05)
Δ unemployment	**.55*** **
	(.10)
foreign-born LF share t-1	.01
	(.03)
low-skill services empl share t-1	.15*
	(.08)
female LF participation t-1	-.09**
	(.03)
union density t-1	-.02
	(.03)
UI net replacement t-1	.02
	(.01)
low EPL & high restrictions (ref: low & low)	-.10
	(.13)
high EPL &d low restrictions	**-.27***
	(.11)
high EPL & high restrictions	-.02
	(.11)
unemp t-1 * low&high	-.09
	(.07)
unemp t-1 * high&low	-.05
	(.06)
unemp t-1 * high&high	**-.18*** **
	(.05)
Δunemp * low&high	**-.45** **
	(.14)
Δunemp * high&low	**-.36** **
	(.14)
Δunemp * high&high	**-.58*** **
	(.10)
time trend	.05
	(.02)
intercept	-.52
	(.29)
country FEs	yes
PCSEs	yes
R^2	.30
Adjusted R^2	.27
N	397

*Legend: *** p < .001; ** p< .01, *p < .05*