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Non-standard employment and the redistributive effects of unemployment compensation

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Abstract

By examining how different forms of non-standard employment affect the redistributive impact of unemployment compensation, this paper speaks to the large literature on the politics of inequality and welfare state retrenchment as well as to the growing literature on the rise of non-standard employment forms. Drawing on the European Union Statistics on Income and Living Conditions, we generate estimates of the share of fixed-term, solo self-employed and permanent part-time workers among the employed in the bottom third of the income distribution across 29 countries from 2003 to 2023. We then use error-correction models (ECMs) to estimate the responsiveness of unemployment-related redistribution to changes in the rate of unemployment in the bottom of the income distribution, and then focus on how this relationship is conditioned by the incidence of different categories of non-standard employment. Most importantly, we find that the incidence of fixed-term employment strongly determines the strength of the redistributive response to unemployment, and that this is especially true when the rules governing eligibility requirements for unemployment benefits recipiency are more restrictive. By documenting the role of non-standard employment (and fixed-term employment in particular) in shaping the unemployment-redistribution link, this paper contributes to the literature on the politics of welfare state retrenchments, in particular as it highlights how structural conditions interact with policy variables to generate retrenchment. By conducting an analysis of the indirect impact of non-standard employment forms on macro-level redistributive outcomes, it also contributes to the broader literature on non-standard employment, where the dominant focus has been on individual-level studies.

Introduction

Drawing on the European Union Statistics on Income and Living Conditions, this paper pools data for twenty-nine European countries from 2003 to 2023 to explore how and why the redistributive effects of unemployment compensation change over time. Studies of redistribution commonly take a bird's-eyes view, identifying the effects of taxes and income transfers on the overall distribution of household income, with redistribution measured as the difference between a 'pre-fisc' and a 'post-fisc' inequality measure (more often than not, the Gini coefficient). By contrast, we focus here on the redistributive effects of a specific form of income transfers and measure redistribution as the difference between the income share of the bottom third of the household income distribution before and after transfers to unemployed individuals.

Existing literature teaches us that income transfers account for the lion's share of total redistribution in most OECD countries and that the importance of income transfers, relative to taxes, rises with total redistribution. The dominant role of income transfers is most pronounced when pensions are part of the picture, but it also holds for redistribution among working-age households (Pontusson, 2005, 155). As argued most forcefully by Steinmo (1993), the approach to redistribution adopted by successful social democratic parties in the postwar era prioritized social spending growth over tax progressivity.

It is also well established that unemployment insurance has played a key role in redistribution via income transfers among working-age households since the onset of mass unemployment in the 1970s. In most OECD countries, unemployment insurance provides for income replacement proportional to prior earnings but benefit floors and ceilings generate redistributive effects. Most importantly, the fact that unemployment is concentrated among the less skilled, who consistently earn less, means that unemployment insurance would be redistributive even if benefits were strictly proportional (Korpi and Palme, 1998).[1]

While unemployment compensation is inherently redistributive, on account of the correlation between income and unemployment risk, there is significant temporal as well as cross-national variation in the redistributive impact of unemployment benefits. As we shall see, the countries included in our analysis fall into three groups: one characterized by a more or less continuous decline in the redistributive impact of unemployment benefits from the early 2000s to the early 2020s, another group (the smallest) characterized by stable or increasing redistributive impact over the same period, and a third group (the biggest) characterized by a cyclical pattern of rising redistributive impact from the early 2000s through the economic crisis of 2008-12 and then decline.

So long as unemployment is higher among workers earning less than the average wage than among workers earning more than the average wage, the redistributive impact of unemployment benefits is bound to increase with the rate of unemployment. However, the link between unemployment and redistribution appears to have become weaker over time. Analyzing 1990-2013 data for eleven

[1] Averaging across 26 of the 29 countries included in our analysis, the 2020 rate of unemployment for labor-force participants with less than upper secondary education was 1.92 times higher than the rate for upper-secondary-school graduates and 2.87 times higher than the rate for university graduates (OECD, 2022, 333).

OECD countries (from the Luxembourg Income Study), Pontusson and Weisstanner (2018) find that redistribution via income transfers responded strongly to rising unemployment in the first half of the 1990s but not in 2008-13. In a similar vein, Huber and Stephens' more comprehensive analysis of LIS data for OECD countries shows that the rate of unemployment consistently predicts market-income inequality among working-age households, but it only predicts disposable-income inequality in the post-2000 period (Huber and Stephens, 2024, 67).

Political decisions that have reduced the generosity of unemployment benefits and/or restricted access to unemployment benefits provide a very plausible explanation of the decline in the responsiveness of redistribution to unemployment. In what follows, we argue that the expansion of new forms of employment that do not conform to the standard model of 'full-time work with an indefinite contract' should also be taken into account. Many recent studies observe that non-standard workers earn less and are more exposed to unemployment risk than standard workers. Assuming that all workers have equal access to unemployment benefits that are proportional to prior earnings, we should expect the redistributive effects of unemployment benefits to decline as the non-standard share of employment in the bottom third of the income distribution increases. First, because the benefits that the unemployed receive decline with the prior earnings of the average unemployed person. Second, because non-standard workers tend to have less access to unemployment benefits than standard workers.

Estimating error-correction models (ECMs) with change in the redistributive effect of unemployment benefits as the dependent variable, our empirical analysis explores how non-standard employment moderates the effects of unemployment. We seek to advance the literature on non-standard employment and access to social protection by distinguishing between three different forms of non-standard employment: fixed-term employment, part-time employment and solo self-employment. To anticipate, we find that a higher prevalence of fixed-term employment weakens the relationship between unemployment and redistribution while that of solo self-employment and part-time employment does not have any moderating effect.

In parallel, we seek to contribute to the literature on the redistributive effects of social policy provisions by exploring how net replacement rates in unemployment insurance and access restrictions to unemployment insurance moderate the effects of unemployment on redistribution via unemployment benefits. Unsurprisingly, we find that in higher generosity settings, the long-run association between unemployment and redistribution is reinforced. As per restrictions, we find that they weakly impact the long-run association, but that lower restrictions boost the short-term redistributive response to changes in unemployment. In a final step, we estimate models that interact unemployment with combinations of non-standard employment incidence and eligibility restrictions. The results of this last exercise suggest that the negative moderating effect of fixed-term employment increases with restrictions. It further shows that low restrictions settings result in part-time incidence boosting the redistributive response to unemployment, presumably as benefit floors lead to eligible part-time workers benefiting from higher effective replacement rates.

The rest of the paper is organized as follows. While the first section briefly indicates how our paper

contributes to recent literature on the politics of inequality and redistribution, the second section provides an overview of European unemployment compensation systems and sets out hypotheses about the consequences of different forms of non-standard employment for the relationship between unemployment and redistribution via unemployment benefits. The third section explains how we operationalize the variables included in our regression analysis and the fourth section presents descriptives based on these operationalizations. The fifth section elaborates on our modelling strategy, and the sixth section presents the empirical results (briefly anticipated above).

1 Contributions to the politics-of-inequality literature

The politics of income inequality and redistribution has become a topic of debate among political scientists (and other social scientists) in recent years (Lupu and Pontusson, 2024b). The debate centers on the question of why it is that democratically elected governments across the advanced capitalist world have done so little effort to compensate low- and middle-income citizens for the rise of income inequality (especially the rise of top income shares). One side in this debate emphasizes that rising inequality has not generated support for redistribution among low- and middle-income citizens, suggesting that citizens do not accurately perceive what has happened to the income distribution or consider inequality to be fair and/or conducive to economic growth. The other side argues that the lack of compensatory redistribution reflects the fact that policymaking is biased in favor of affluent citizens, again for any number of reasons (social background of policymakers, lobbying, campaign donations and/or unequal turnout in elections).

Without engaging directly with the substantive issues involved in this debate, we seek to advance the literature on the politics of inequality and redistribution in two ways. First, we want to suggest that the literature ought to pay more attention to 'automatic equalizers' built into existing tax-transfer systems, and to illustrate how this can be done. Assuming that taxation and income transfers have some redistributive effect, the size of that effect will automatically increase with income inequality before taxes and transfers. Studies from both sides of the aforementioned debate posit (without much systematic analysis) that the distribution of market income has become steadily more unequal in most, if not all, OECD countries and proceed on the assumption that redistribution would have increased had it not been for political decisions that allowed market-income inequality to 'pass through' to disposable-income inequality. As documented by Lupu and Pontusson (2024a, 4-10), pre-fisc income inequality rose uniformly, and often quite sharply, in the 10-15 years preceding the global financial crisis of 2007-08, but this trend did not continue in the 2010s. While the top 1% continued to gain relative to the rest of the population, top 10% income shares as well as pre-fisc Gini coefficients have held steady or declined in most OECD countries in the post-crisis period. Most relevant for present purposes, unemployment rates have fallen sharply across the entire OECD area since the mid-2010s. These developments and their implications for redistribution must be taken into account as we seek to assess the role of political choices in the apparent retreat from redistribution.

Secondly, we want to suggest that the literature on the politics of inequality and redistribution

would benefit from more attention to variation across policy domains and to the mechanisms through which specific policies – or programmatic 'policy packages' – affect the distribution of income. While much of the literature on demand for redistribution relies on a single survey question soliciting support for (or opposition to) redistribution in general, studies of unequal responsiveness typically pool survey questions pertaining to the entire policy spectrum. Rosset et al. (2025) present evidence suggesting that citizens' preferences for specific policies are more responsive to rising (and falling) inequality and that income bias in policy responsiveness varies across policy domains. It seems equally plausible to suppose that the importance of automatic equalizers and the role of policy choices differ across policy domains.

Conceiving of inequality and redistribution in terms of the income share(s) of a specific segment (or segments) of the income distribution, as opposed to a comprehensive index such as the Gini coefficient, represents a natural complement to focusing on specific redistributive mechanisms. Under the influence of Piketty (2013), the 'income-share approach' has come to be associated with a focus on top-end inequality, but it is more broadly applicable (Milanovic, 2000; Elkjær and Iversen, 2023). We focus on the bottom of the income distribution because we know that the risk of unemployment falls with (relative) income. That said, it is important to keep in mind that income shares are relative: the income share of the bottom third declines if incomes in the top third (and/or middle third) rise while incomes in the bottom remain unchanged.

2 Non-standard employment and unemployment compensation

It is a commonplace that forms of employment that diverge from the post-war standard of full-time employment on an indefinite contract have expanded across advanced capitalist ('post-industrial') economies over the last two or three decades. Consistent with existing literature on this topic, we use the term 'non-standard employment' to refer to fixed-term employment, part-time employment and self-employment.[2] The literature teaches us that these are heterogeneous categories. While some studies distinguish between marginal part-time workers and 'regular' part-time workers (with fifteen hours of work per week as the conventional cut-off), others rely on surveys to distinguish between voluntary and involuntary part-time workers (the latter being part-time workers who say that they would like to work more hours). Berglund et al. (2023) highlight the importance of distinguishing between the conditions of labor-market entrants for whom fixed-term employment represents a (probationary) step to a permanent job with the same employers and older workers who cycle through a succession of fixed-term contracts with different employers. The category 'self-employed' is even more heterogeneous, encompassing individuals who work for an enterprise that they own, lawyers, doctors and consultants as well as farmers, domestic workers (childminders and house cleaners), temp agency workers and platform workers.[3] Employment contracts without

[2] We cannot possibly do justice to the vast literature on non-standard employment here. See Girardi et al. (2025) for further discussion and references.

[3] Eurofound (2017) presents estimates indicating that 'vulnerable workers' account for 17% of the self-employed across the European Union, with employers, shopkeepers-plus-farmers and stable 'own-account workers' each accounting for roughly 25% (the remainder being 'concealed dependent employees').

guaranteed hours and 'multi-jobbing' add further complexity to the meaning of 'non-standard employment.'

Notwithstanding the diversity of non-standard employment, the literature identifies a number of features that many non-standard workers have in common. Setting consultants, professionals and self-employed individuals with employees aside, individuals in non-standard employment tend to earn less than full-time workers with indefinite contracts on an hourly basis and especially on an annual basis. Multiple studies show that they are also less likely to be covered by collective bargaining agreements and that their working conditions as well as advancement prospects are worse than those of standard workers. Most importantly for our present purposes, the literature teaches us that dependent non-standard workers are more vulnerable to labor-markets risks, especially unemployment risk (Fervers and Schwander, 2015), and that they are less well protected by social insurance programs that cover income losses due to disability, sickness and unemployment (Immervoll et al., 2022; Girardi et al., 2024; Bekker et al., 2025).[4]

As indicated at the outset, we seek to contribute to the literature on unequal access to social protection by exploring how the incidence of different forms of non-standard employment moderate the effects of unemployment on redistribution via unemployment benefits. By targeting individuals belonging to households in the bottom third of the market income distribution among those aged 25-60 and excluding individuals with employees from our operationalization of self-employment, we sidestep some of the aforementioned diversity within the categories of fixed-term employment, part-time employment and self-employment.

With the possible exception of the UK, unemployment insurance is the principal source of unemployment benefits in all the countries included in our analysis.[5] In most countries, dependent employees and their employers are required to contribute to unemployment insurance schemes that are administered either jointly by employer and employee representatives or by the state, with some of the costs involved covered by general government revenues. The main exception to this generalization is the so-called 'Ghent system' of Belgium, Denmark, Finland and Sweden, where unemployment insurance is voluntary, administered by trade unions, yet regulated and subsidized by the government.[6]

As noted at the outset, unemployment insurance schemes provide cash benefits proportional to earnings in prior employment, typically with a floor (a minimum received by all who qualify for benefits) and a ceiling (the maximum earnings loss insured). As we will document below, there is a great of deal cross-national and temporal variation in the level of earnings replacement provided by unemployment insurance. For present purposes, the question of access to insurance benefits is

[4]The implications of non-standard employment for pensions (inequality among retired households) has yet to receive much attention by scholars working in this domain, but it is bound to become a major public policy issue in the future.

[5]The following overview draws on Clasen and Clegg (2011) as well as sources cited in the main text.

[6]Note also that unemployment insurance is entirely financed by payroll taxes on the insured and their employers in Bulgaria, Estonia, France, Hungary, the Netherlands and Portugal, is financed solely by employer contributions and general taxation in the Czech Republic and Lithuania, and solely workers and general taxation in Denmark (Esser et al., 2013).

equally, if not more, relevant.

There are two dimensions to access: first, who is covered by (included in) unemployment insurance and, second, what it takes for such a person to receive benefits if she becomes unemployed. The first dimension is primarily relevant for the employment compensation available to self-employed individuals. In seven of our twenty-nine countries (the Czech Republic, Croatia, Hungary, Luxembourg, Poland, Slovakia and Slovenia), the self-employed are required to contribute the public unemployment insurance system and entitled to benefits on the same basis as other contributors. The self-employed have the option to join the state-administered insurance system or a state-subsidized insurance fund in another six countries (Austria, Denmark, Finland, Romania, Spain and Sweden), but they are formally excluded in the remaining (sixteen) countries (Spasova and Wilkens, 2018, 105).

The second dimension pertains to country-specific (often very complicated) rules regarding the amount of paid work someone who is covered by unemployment insurance must have performed and/or the amount of contributions that she must have made in order to qualify for benefits (Clasen et al., 2001). These rules commonly exclude individuals with prior spells of unemployment as well as recent labor-market entrants (including older individuals re-entering the labor force). When minimum prior-work-history requirements are specified in terms of earnings or hours per week or month (rather than weeks or months), they may also pose an obstacle to benefits access for part-time workers.

A large number of countries have separate unemployment assistance schemes for individuals who do not qualify for insurance benefits. In a handful of countries, such schemes provide flat-rate benefits solely conditional on seeking work, but the benefits are typically means-tested. In countries without unemployment assistance schemes, unemployed individuals without access to unemployment insurance must fall back on means-tested social assistance (or income support provided by other family members). Crucially for our purposes, the income replacement provided by unemployment assistance and social assistance is invariably much lower than the income replacement provided by unemployment insurance (Esser et al., 2013).

In light of the above, it is tempting to suppose that the extent to which unemployment compensation offsets the inegalitarian effects of unemployment diminishes with levels of fixed-term employment, part-time employment and solo self-employment among individuals in the bottom third of the income distribution. However, this expectation presupposes that non-standard workers are more likely than standard workers to lose their jobs when unemployment rises (or, at the very least, as likely). While this surely holds for fixed-term workers, it is less obvious that it holds for other non-standard workers. In particular, the self-employed can be expected to adapt their working hours to demand for their services and this behavior should be most pronounced if they do not have access to unemployment insurance benefits (or can avoid costs by not joining). To the extent that part-time employment is concentrated in public services (childcare, elderly care, healthcare and education), it may also be case that permanent part-time workers are less exposed to unemployment risk than permanent full-time workers.

Yet another caveat concerns the effects of benefit floors and the fact that quite a few countries provide supplementary benefits to unemployed individuals with dependent children. Benefit floors are likely to translate into higher income replacement rates for non-standard workers who qualify for unemployment insurance benefits, at least partly offsetting the negative effects of access restrictions. In addition, it seems plausible that part-time employment is concentrated among households with dependent children and it is thereby associated with higher income replacement (especially if the household member who loses their job is a permanent full-time worker). Taking into account variation in access restrictions and benefits generosity as well, Table 1 summarizes the expectations that we derive from the preceding discussion.[7]

Table 1: Expectations for the impact of redistribution via unemployment benefits

	Direct effects	Conditioning the effect of unemployment
unemployment	++	
benefits generosity	+	+
access restrictions	-	-
fixed-term employment share		-
part-time employment share		-/0
solo-self-employment share		-/0
restrictions+fixed-term		–
restrictions+part-time		-

3 Data and variables

Provided directly by Eurostat, micro data from the European Union Statistics on Income and Living Conditions (hereafter SILC) constitutes the core of the dataset that we analyze in this paper. Relative to the European Labour Force Survey (LFS), the SILC database leaves something to be desired when it comes to estimating the rate of unemployment and the incidence of non-standard employment forms, but it is the obvious choice for our purposes because it includes extensive information on the composition of households and their income.[8]

We begin by computing the income distribution of individuals aged 25 to 60 before identifying households belonging to the lower third of that distribution. This constitutes our target population,

[7] It is commonplace in studies of unemployment insurance to include benefits duration as a third source of cross-national and temporal dimension (in addition to generosity and access). We have chosen not to do so for three reasons: (1) data on benefits duration fail to take account of reductions in benefits levels over the time that one can receive benefits; (2) averaging across the 29 countries included in our analysis, the percent of the unemployed that had been unemployed for more one year fell from 39.8% in 2003 to 32.3% 2023 (OECD Statistics); and (3) the long-term unemployed tend to be low-skilled individuals above the age of 50 (most of whom were presumably 'permanent workers' before they became unemployed).

[8] For documentation on the EU-SILC database, see `https://www.gesis.org/en/missy/metadata/EU-SILC`. Note that income is entirely missing from the LFS. A secondary advantage relative the LFS is that the SILC database allows us to distinguish between self-employed individuals with and without employees.

to which our measures of redistribution, unemployment and non-standard employment among the employed refer. The income concept we use to rank households is equivalized market income, i.e. income from employment and assets divided by the square root of all household members. To identify households belonging to the bottom third, we construct household weights by multiplying SILC-provided household cross-sectional weights by the number of household members aged 25 to 60.[9] While it is commonplace to operationalize the working-age population as individuals aged 15-64, we opt for a narrower age range to exclude early retirees and labor-market entrants with fixed-term contracts as their first (probationary) step to contracts of indefinite duration (a common arrangement for university graduates as well as less skilled wage-earners, often predating the 'rise of non-standard employment').

3.1 The redistributive impact of unemployment compensation

The dependent variable in the regression models that we estimate is the year-on-year change in the redistributive impact of unemployment benefits. SILC micro data allow us not only to estimate the share of total market income that is received by the bottom third of working-age households but also to estimate how the income share of this population changes when we take into account income transfers to working-age households. The SILC database also enables us to isolate transfers to unemployed individuals from other income transfers to working-age households (such as child allowances, sick pay and social assistance). As defined by SILC, 'unemployment benefits' include contribution-based unemployment insurance benefits but also other cash benefits specifically targeted to the unemployed (including unemployment assistance, early retirement schemes and severance/redundancy payments that employers are legally required to pay).

We operationalize 'redistribution' as the difference in the income share of the bottom third of working-age households between two income concepts: (1) market income plus income transfers other that unemployment benefits and (2) market income plus all income transfers. As noted at the outset, this operationalization differs from the standard approach of political scientists and sociologists in that it focuses on how a particular type of income transfers affects the relative standing of a particular segment of the income distribution. In addition, our approach is distinctive in that we operationalize redistribution as the absolute difference between the two measures of income share rather than the percentage change from the 'pre' to the 'post' measure. In this respect, we follow Kenworthy and Pontusson (2005), who argue that redistribution measured as a percentage change in the Gini coefficient or some other inequality indicator is misleading in that countries with a more equal pre-fisc distribution end up with more redistributive tax-transfer systems at any given level of tax progressivity or benefits generosity. With the income share of the bottom third as the basis for our measure of redistribution, this logic applies in reverse: the same amount of income transfers translates into more redistribution in the more inegalitarian country (or

[9] This means that households consisting of two members aged 62 and 64 end up with a weight of zero and are not ranked as part of this process. By contrast, a household with two members aged 58 and 61 is treated like a single-member household, with the relevant household member being assigned the household's equivalized market income. We also systematically exclude pension income from our measurement of disposable income.

year), i.e., where (or when) the pre-transfer income share is lower. Operationalizing redistribution as the absolute difference between 'pre' and 'post' measures of the income share serves to correct for this apparent bias.[10]

3.2 Low-end unemployment

Our analysis starts from the premise that the rate of unemployment among working-age individuals in the bottom third of the income distribution is the key determinant of the redistributive impact of unemployment and that other variables matter primarily by conditioning the effects of unemployment. Estimating the rate of unemployment for a specific income group based on SILC data is complicated by the fact that the reference year for the solicited information about household income is the completed calendar year prior to the survey while the question about current employment status refers to a specific moment in the calendar year when the survey fieldwork was carried out. However, the database includes a 'calendar activity' variable, identifying respondents' main activity status in each month of the income reference year. Using data for all active respondents who are part of the bottom third of the income distribution, we first compute monthly unemployment rates and then average those to obtain the average low-end unemployment rate for the income reference year.[11] Unfortunately, the calendar activity variable is missing for several countries in early SILC waves, restricting the size of our sample.

3.3 Non-standard employment forms

We seek to assess how the incidence of fixed-term, part-time and solo self-employment among employed individuals in the bottom third of the income distribution affect the relationship between unemployment and redistribution via unemployment benefits. To estimate the share of fixed-term workers in our target population, we rely on a variable that identifies whether the respondent is employed on a permanent or temporary contract. Because this variable sometimes contains missing values, we first compute the proportion of fixed-term workers among respondents who answered the question and multiply this proportion by the share of respondents who identify themselves as (dependent) employees. To estimate the share of solo self-employed workers, we rely on two separate variables, one that identifies the respondent as self-employed and one that indicates whether or not self-employed respondents have employees. Again, we first compute the proportion of solo self-employed workers among those who answer the second question and then multiply this proportion by the proportion of respondents who identify themselves as self-employed.

[10] In a regression framework, the bias can also be addressed by controlling for the pre-fisc income share (while measuring redistribution as a percentage change from the pre-fisc to post-fisc income share). As reported in Appendix 9, our main results replicate with this setup.

[11] For this purpose, we rank households based on disposable rather than market income as the latter approach runs the risk of assigning individuals to the bottom-third of the income distribution simply as a result of an unemployment spell that they experienced in the reference year ('market income' typically being zero during unemployment). As shown in Appendix 2, our estimates of unemployment rates based on the SILC calendar variable correspond closely to LFS-based estimates of unemployment for a comparable population. Note also that results presented below are robust to substituting a market-income-based measure of low-end unemployment (see Appendix 9).

As we define these categories, 'fixed-term workers' and 'solo self-employed' do not take into account hours worked. For present purposes, 'part-time workers' refer to individuals with indefinite contracts, working 30 hours or less per week in their main job. Thus, the three non-standard employment categories are mutually exclusive. Having identified respondents as belonging to one of these categories (or as unemployed or out of the labor force), we compute the share of employed respondents in each category.

The mismatch between the reference year for information about household income and the moment to which the information about current employment refers again poses a problem and the calendar activity variable does not contain the information needed to implement the solution we employ with respect to the rate of unemployment. Comparing mean-centered SILC-based measures of the share of fixed-term, part-time and self-employment for the entire labor force with similar measures based on LFS data, we find that the series are very well matched for most countries (see Appendices 3-5).

3.4 Unemployment compensation provisions

The final set of variables included in our regression models pertain to the generosity of unemployment benefits and access restrictions. Again, we expect these variables to moderate the relationship between low-end unemployment and the redistributive impact of unemployment benefits. For generosity, we rely on the updated database on Net Replacement Rates (NRRs) of Unemployment Benefits recently constructed by scholars at University of Leiden (Bakker et al., 2022).[12] Specifically, our generosity variable is the average net income replacement over six months for two unemployed individuals earning the average production wage prior to becoming unemployed, one being a single person and the other being the only wage-earner in a household with two children. In contrast to our SILC-based measure of the amount of unemployment benefits received by unemployed individuals in the bottom third of the income distribution, this measure of benefit generosity pertains specifically to unemployment insurance benefits and also takes taxation of benefits into account. Focusing narrowly on income replacement by unemployment insurance arguably overstates the overall generosity of unemployment benefits. By the same token, however, insurance benefits account for the lion's share of cash transfers to unemployed workers.

For access restrictions, we rely on data on legislative provisions that we have compiled in collaboration with scholars at the University of Leiden. Again, these data pertain specifically to unemployment insurance benefits. Building on Clasen et al. (2001), the indicator of eligibility restrictions that we employ here combines two variables: the minimum amount of work, measured in time or earnings, that a worker must complete to qualify for benefits and the timeframe ('reference period') within which that minimum must be recorded. If the minimum amount of work is specified in terms of earnings, access for low-part-time workers disimproves as the minimum increase, but

[12] Data provided to us by Vincent Bakker. An earlier version of this dataset is available at `https://www.universiteitleiden.nl/binaries/content/assets/rechtsgeleerdheid/fiscaal-en-economische-vakken/economie/neujobs-vanvliet--caminada-24-01-2012.pdf`.

minima defined in terms of the duration of prior work should not affect access for part-time workers. Shorter reference periods also represent an obstacle for workers with irregular histories (prior spells of unemployment or transitions in and out the labor force). Converting minima specified in earnings into full-time weeks worked at the average production wage, our indicator of eligibility restrictions multiplies the minimum amount of work by the ratio of the minimum amount of work to the reference period ($m * \frac{m}{p}$).[13] It is important to keep mind that this measure pertains to the second dimension of access, i.e., access for individuals who would be entitled to unemployment benefits if they had worked more. With the data at hand, we must leave aside the question of how solo self-employment and the first dimension of access restrictions jointly affect the redistributive impact of unemployment benefits.

4 Descriptives

To contextualize our regression analysis and to facilitate interpretation of the results, the figures presented in this section display over-time changes in the variables introduced above by country.[14] To begin with, the plots in Figure 1 pertain to the redistributive effect of unemployment benefits and the rate of unemployment in the bottom third of the income distribution, with smoothed (LOESS) curves added. They are constructed so that the first jointly available set of observations for a given country is set to 100 for both variables, allowing us to track how the two variables evolve relative to one another.

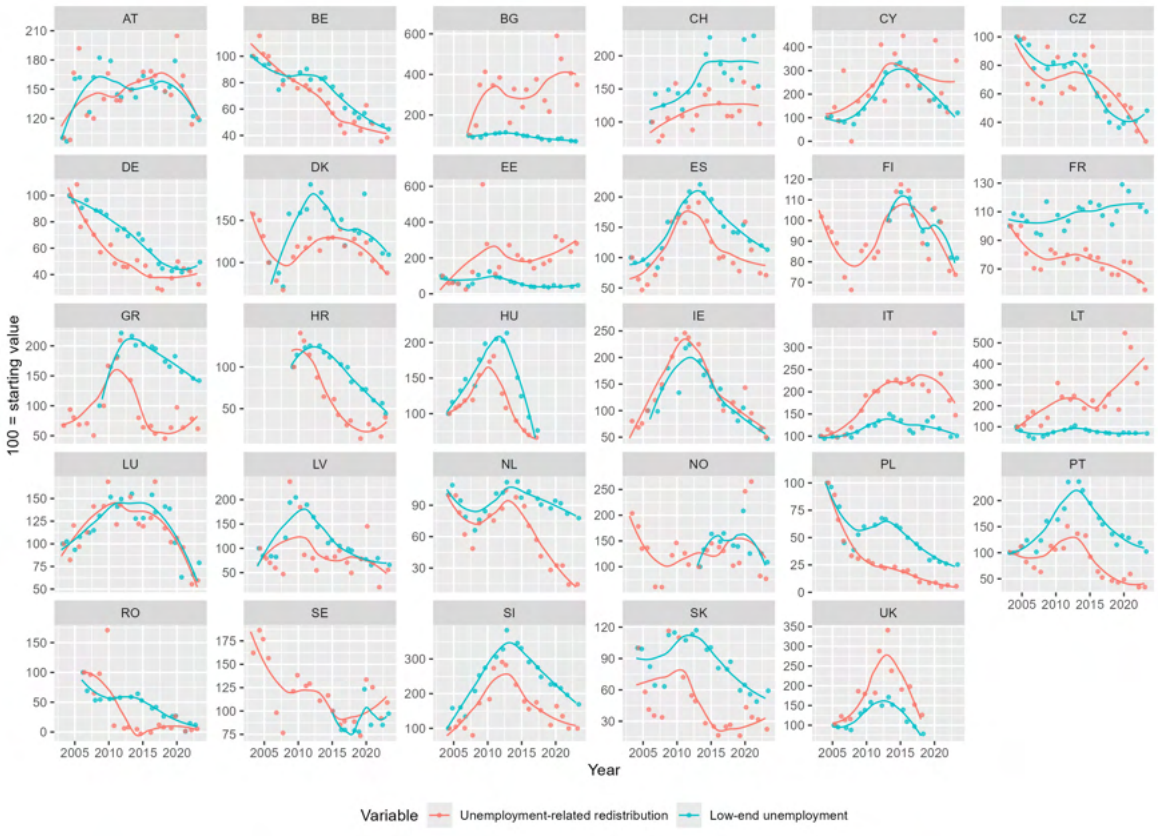
Setting the co-variation with unemployment aside for a moment, the modal pattern in Figure 1 is one in which the redistributive impact of unemployment increased from the early 2000s through the recessions triggered by the financial crisis of 2007-08 and subsequently declined. This characterization holds for Austria, Finland, Greece, Hungary, Ireland, Italy, Luxembourg, Portugal, Slovenia, Slovakia and the UK. With the qualification that there was some decline in the redistributive impact of unemployment benefits prior to the onset of recessions, the same basic pattern also holds for Denmark, Finland and the Netherlands (for a total of fourteen countries). By contrast, we observe a decline in the redistributive impact of unemployment benefits over the entire period covered by our data in eight countries (Belgium, the Czech Republic, Germany, France, Croatia, Poland, Romania and Sweden) and a secular increase in five other countries (Bulgaria, Cyprus, Estonia, Lithuania and Switzerland). Characterized by little change in the redistributive impact of unemployment benefits, Latvia and Norway do not readily fit in any one of these groups.

The most obvious take-away from Figure 1 is that the redistributive impact of unemployment benefits rises and falls with the rate of unemployment. Keeping in mind the shorter time series

[13] As this indicator includes a squared term, we take the natural logarithm of the resulting quantities (adding 1 so that it cannot take a negative value) to approximate a normal distribution. The dataset that we have constructed with Leiden colleagues includes a more comprehensive indicator, taking into account delays, additional work intensity requirements and entrance barriers as well. Setting aside entrance barriers (which apply primarily to workers below the age of 25), the narrower indicator used here accounts for 89% of the temporal (within-country) variation in the more comprehensive indicator.

[14] See Appendix 1 for the standard descriptive-statistics table.

Figure 1: Redistribution via unemployment benefits and the rate of unemployment in the bottom third of the income distribution 2003-2023 (first joint observation equals 100)



for a handful of (mostly Nordic) countries, the rate of unemployment would appear to be a near-perfect predictor of redistribution in ten countries, drawn from all three of the aforementioned groups (Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Finland, Hungary, Ireland, Luxembourg, Norway and Sweden). However, there is considerable divergence between the two series in the other nineteen countries. Over sustained periods, redistribution has risen less or fallen more than unemployment in fourteen countries (again drawn from all three of the aforementioned groups: Croatia, Denmark, France, Germany, Greece, Latvia, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Switzerland). In the case of the UK, by contrast, redistribution rose more than unemployment from 2005 to 2013 and fell less than unemployment thereafter. Estonia, Lithuania and, less obviously, Italy stand out as the only cases in which we observe sustained increases in the redistributive effect of unemployment in the absence of rising unemployment. It is noteworthy that these are countries with very low starting values on the redistribution variable.

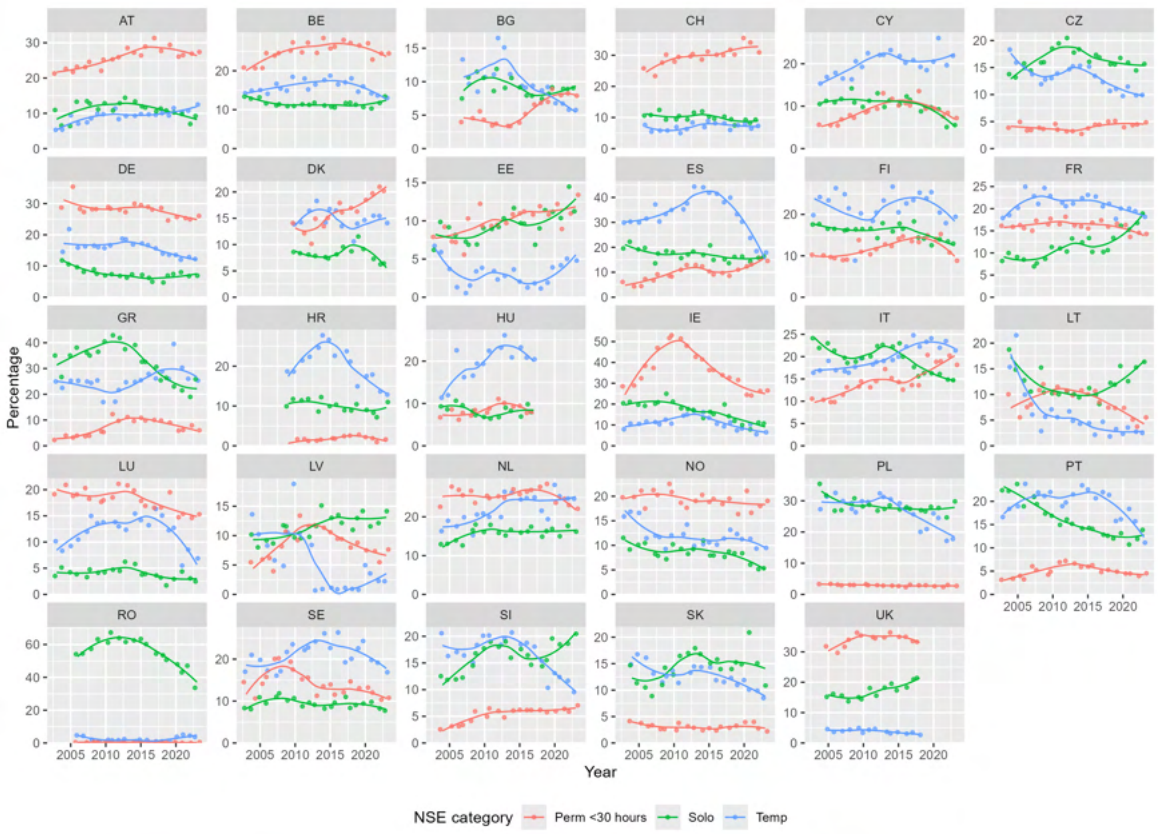
Figure 2 in turn plots the evolution of fixed-term, part-time and solo self-employment (in percent of total employment) by country, again with smoothed (LOESS) curves as well as actual observations. As there is no obvious reason to think that the variables co-evolve, we do not standardize their values in this case. (Note that the range of the y axes varies by country). Starting with fixed-term employment, we do not see the broad-based and continuous rise that much of the existing literature would lead us to expect. Over the period covered by our SILC-based estimates, fixed-term employment increased steadily in four countries (Austria, Cyprus, Italy and the Netherlands) and declined steadily in six countries (the Czech Republic, Germany, Lithuania, Norway, Poland and Slovakia). The most common pattern that we observe is the same as the pattern for unemployment (and the inverse of the pattern for redistribution via unemployment benefits), viz., rising fixed-term employment through the early 2010s followed by a clear trend reversal. This pattern holds for at least eleven countries (Belgium, Bulgaria, Croatia, France, Hungary, Ireland, Latvia, Luxembourg, Portugal, Slovenia, Spain and Sweden), possibly also Hungary.[15]

We observe a sharp separation between the core and the peripheries of the European Union with respect to levels of part-time employment. While the rate of part-time employment exceeded 15% in France and all but one country North-Northwest of France in the 2000s (the exception being Finland), it stood at less than 10% in the Mediterranean countries and the East European (former state-socialist) periphery, with Romania and to a lesser extent Croatia displaying especially low values. By comparison to fixed-term employment, trends in part-time employment appear to be less cyclical or, in other words, less closely tied to macroeconomic conditions. Setting aside the exceptional case of Ireland, we observe rising rates of part-time employment in eleven countries (Austria, Belgium, Bulgaria, Cyprus, Denmark, Estonia, Finland, Italy, Slovenia, Spain and Switzerland) and stable or declining rates in the other seventeen countries.

The absence of big changes is the main story as far as solo self-employment is concerned. In

[15] The remaining seven countries are characterized either by very little change (Romania, Switzerland and the UK) or by several trend reversals (Denmark, Estonia, Finland and Greece). The overall picture of evolution of fixed-term employment conveyed by Figure 2 resembles that for a broader, LFS-based measure of non-standard employment among low- and mid-skilled workers presented by Girardi et al. (2025).

Figure 2: NSE shares of employment in the bottom third of the income distribution 2003-2023



most countries, the decline of traditional forms of solo self-employment (domestic help, crafts and small shops) and the growth of new forms (platform work and agency work) would seem to have cancelled each other out. That said, we observe significant declines of solo self-employment in Greece, Ireland, Italy, Portugal and Romania, modest declines in Denmark, Germany, Norway and Poland, and some tendency for solo self-employment to increase in Estonia, France, Latvia, Slovenia and the UK.

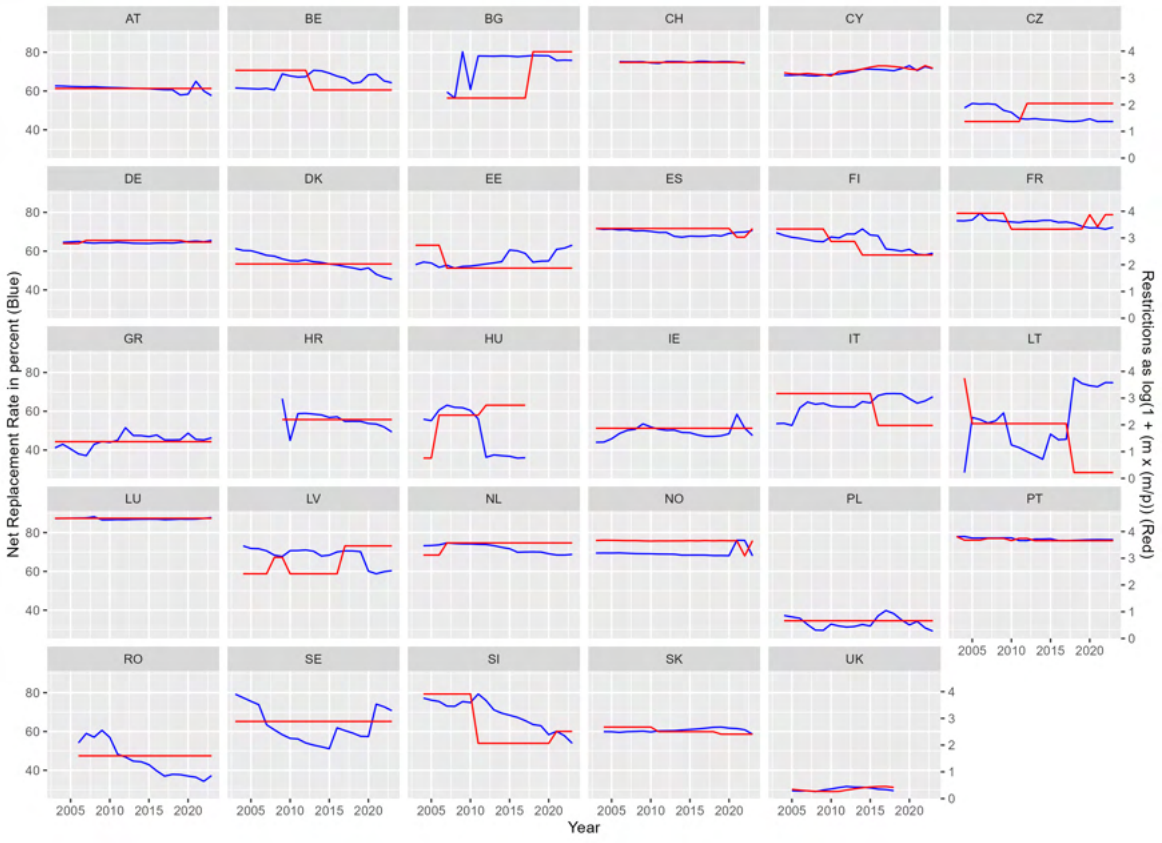
Most importantly for our purposes, Figures 1 and 2 suggest that trends in fixed-term employment are closely correlated with trends in unemployment while this is less the case for trends in part-time and solo self-employment. Related to this observation, Appendix 5 shows our estimates of SILC respondents in the bottom third of the disposable income distribution who report having been unemployed at some time in the previous year by current employment status (based on pooling all SILC waves for each country). Averaging across the nineteen countries, 31.1% of current fixed-term workers report that they were unemployed in the previous year, as compared to 10.7% of full-time workers with an indefinite contract, 6.4% of part-time workers with an indefinite contract and 5.9% of the solo self-employed.[16] It is important to note that the SILC database does not include information about employment status prior to unemployment. Fixed-term workers are more likely to lose their jobs than other workers, but the fact that fixed-term employment in percent of total employment tends to increase with unemployment suggests that the relationship between unemployment and fixed-term is more complicated than this observation implies. Arguably, the high percentage of current fixed-term workers who report having been unemployed reflects, in part, the fact that many standard workers who lose their jobs escape unemployment by accepting jobs with fixed-term contracts.

Finally, Figure 3 presents a country-by-country overview of changes in the generosity of unemployment insurances benefits and restrictions on unemployment benefits eligibility, with separate scales for the two variables (with net replacement on the left and restrictions on the right of each plot). Like Figures 1 and 2, Figure 3 conveys a complex picture without easily discernable patterns that distinguish 'welfare-state regimes' or 'varieties of capitalism' from each other, let any 'central tendency' that all (or most) countries have in common. In this case, the complexity is magnified by the fact that the indicators of generosity and restrictions change abruptly from one year to another, as a result of legislative decisions (or executive decisions by governments), and that such decisions are often reversed by new legislative majorities or by the same majority confronting new economic conditions. (The politics whereby the values of these indicators are determined is a topic that we intend to pursue in a future paper).

Setting temporary adjustments aside, we observe declines in benefits generosity in ten countries (Croatia, the Czech Republic, Denmark, France, Hungary, Latvia, the Netherlands, Romania and

[16] As with the measure of the rate of unemployment in the bottom third of the income distribution, these figures are based on ranking households by disposable income (cf. footnote 11). The ratio of self-reported unemployment experience among fixed-term workers to self-reported unemployment among permanent full-time workers exceeds 1.8 in 28 of our 29 countries (with Cyprus as an exceptional case, at 1.3). Strikingly, the number of months of self-reported unemployment hardly varies at all across categories of current employment status (ranging from a cross-country average of 5.7 for permanent full-time workers to 6.2 for the solo self-employed).

Figure 3: Net replacement rates (blue) and access restrictions (red) to unemployment benefits



Slovenia) and significant increases in six countries (Bulgaria, Estonia, Greece, Ireland, Italy and Lithuania). Sweden stands out as a case of early cutbacks of generosity followed by reversal in the 2010s. The remaining eleven countries are characterized either by stability or by several trajectory reversals. Rules governing eligibility for unemployment insurance benefits have changed less frequently than replacement rates, but when they have been changed the changes have been abrupt. Over the time period covered by our data, eligibility became noticeably stricter in four countries (Bulgaria, the Czech Republic, Hungary and Latvia) and less strict in five countries (Belgium, Finland, Italy, Lithuania and Slovenia). France reduced restrictions during the crisis of 2008-09 and introduced new restrictions in the late 2010s. In the other nineteen countries, we observe virtually no change (or only very minor changes) in eligibility restrictions.

5 Modelling strategy

The diversity of country trajectories documented in the previous section makes it very difficult (impossible) to generalize about causal relationships based on descriptives, but it represents an opportunity for the purposes of regression analysis (lots of leverage). As noted earlier, we estimate error-correction models (ECMs) with year-on-year changes in redistribution via unemployment benefits as the dependent variable, with levels of redistribution lagged by one year on the right-hand side of the equation. The independent variables are entered twice, as first differences and as lagged levels. As all models include country fixed effects, the analysis pertains to temporal variation within countries, minimizing the problem of missing confounders and allowing for a more 'causal' interpretation of the results.[17] In addition, the ECM setup allows us to distinguish between the long-term (structural) effects and the short-term (cyclical) effects of unemployment (De Boef and Keele, 2008; Keele et al., 2016).

All models use panel-corrected errors (Beck and Katz, 1995) and all variables have been standardized using the whole sample of country-years. To ensure that the coefficients are as comparable as possible within and across models, the scale of all variables is identical across all models and across variables expressed in levels and in first differences. A one-unit change in any variable always corresponds to the standard deviation of that variable in the full country-year sample (see Appendix 1).

The regression models are based on the following equation:

$$\begin{aligned}\Delta Redist_{it} = \alpha_i &+ \phi Redist_{it-1} + \beta_1 Unemp_{it-1} + \beta_2 NRR_{it-1} + \beta_3 Restrictions_{it-1} \\ &+ \beta_4 NSEshares_{it-1} + \beta_5 Unemp_{it-1} * Moderator_{it-1} + \gamma_1 \Delta Unemp_{it} + \gamma_2 \Delta NRR_{it} \\ &+ \gamma_3 \Delta Restrictions_{it} + \gamma_4 \Delta NSEshares_{it} + \gamma_5 \Delta Unemp_{it} * Moderator_{it-1} + \epsilon_{it}\end{aligned} \tag{1}$$

Note that the lagged levels of our moderator variables – non-standard employment shares, net replacement rates and the indicator of access restrictions – are interacted with the unemployment

[17] A high value on a given lagged variable is a value that is high relative to the other values that the variable takes for the same country across our sample. It does not necessarily mean that it is high with respect to the sample as a whole.

rate in lagged levels as well as first differences. Again, we seek to assess how pre-existing levels of these variables mediates the effects of changes in the unemployment rate, but also to capture to capture the long-run association between unemployment and the redistribution through unemployment benefits.

Typically referred to as the error-correction rate (and represented by ϕ), a negative coefficient for the lagged dependent variable means that high (low) values of the dependent variable in levels are associated with more negative (positive) first-difference values. The standard assumption behind ECMs is that the dependent variables will sooner or later revert to its mean following a 'shock' of some kind, with the magnitude of the error-correction rate expressing the speed at which the mean-reverting process occurs, but the utility (appropriateness) of ECMs does not obviously depend on the existence of an 'equilibrium relationship.' The important point for our purposes is that it is necessary to take into account the error correction rate in order to appreciate the substantive meaning of short-term and long-term effects. For example, an error correction rate of -0.9 means that when the dependent variable undergoes a one-unit change from one year to the next, 90% of this deviation from the mean is 'corrected' by the end of the next year and 90% of the remaining deviation is 'corrected' by end of the following year. This corresponds to a fast-adjusting process, where short-term effects quickly become irrelevant. By contrast, an error correction rate of -0.33 means that around two thirds of any deviation is still felt in the following period, so that it takes 6.5 years for 90% of a deviation to dissipate.[18] Calculated by dividing the coefficient for the lagged level of an independent variable by the error correction rate ($\beta_1/abs(\phi)$), a statistically significant long-run effect indicates that a lasting change in the level of an independent variable is associated with a persistent change in the level of the dependent variable.

6 Results

Table 2 presents our main results, based on estimating error-correction models and variables operationalized as specified above. Model 1 already includes all variables of interest but does not yet include any interaction effects. In Models 2 through 6, we add interaction terms for each of the hypothesized moderators consecutively. Model 7 is the fully saturated model, with all interaction terms included. As it may seem dubious to report results for a model with ten interaction terms based on 492 country-year observations, it is important to note that the interaction effects identified by estimating Model 7 are very similar (almost identical) to the interaction effects we obtain with Models 2-6.

Across the models in Table 2, the coefficient for the lagged dependent variable (the error-correction rate) ranges between -.29 and -.30, which roughly corresponds to the terms to our slow-adjusting scenario mentioned above. In other words, the short-term effects that we identify cannot be dismissed as 'merely transitory.' The coefficient for changes in unemployment is positive and significant across all seven models. Averaging across 492 country-years, our measure of redistribution

[18] The formula $\frac{ln(1-\alpha)}{ln(1-abs(\phi))}$ enables us to compute the number of periods required in order for a fraction α – 90% in the example at hand – of a deviation to be corrected.

Table 2: Error correction models - Redist bottom Unemp - unemp - bot 33

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
L.redistribution	**−0.30*****	**−0.30*****	**−0.29*****	**−0.29*****	**−0.30*****	**−0.30*****	**−0.29*****
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)
L.Unemployment	0.06	0.07*	0.05	0.05	0.06*	0.07*	**0.07****
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
L.NetReplRate	**0.05****	**0.05****	**0.06****	**0.05****	**0.06****	**0.05****	**0.06*****
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
L.UB Restrictions	**0.07****	0.06*	**0.07****	**0.07****	**0.07****	**0.06****	0.05*
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Delta Unemployment	**0.41*****	**0.40*****	**0.41*****	**0.43*****	**0.41*****	**0.41*****	**0.42*****
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Delta NetReplRate	**0.09****	**0.09****	**0.10*****	**0.09****	**0.10*****	**0.10*****	**0.10*****
	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.03)
Delta UB Restrictions	0.01	0.00	0.01	0.01	0.01	0.02	0.03
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
L.Temp	0.00	−0.04	0.00	0.01	0.00	−0.01	−0.06
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Delta Temp	0.07	0.07*	0.06	0.07*	0.07*	0.06	0.06
	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)
L.Solo	0.02	0.01	0.02	0.02	0.01	0.01	−0.00
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Delta Solo	0.01	0.02	0.01	0.01	0.01	0.01	0.02
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)
L.Part-time	**0.26*****	**0.26*****	**0.27*****	**0.27*****	**0.26*****	**0.27*****	**0.27*****
	(0.07)	(0.07)	(0.06)	(0.07)	(0.07)	(0.07)	(0.06)
Delta Part-time	**0.19****	**0.19****	**0.19****	**0.19****	**0.19****	**0.20****	**0.19****
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
L.Unemployment x L.Temp		**−0.11****					**−0.13*****
		(0.05)					(0.04)
Delta Unemployment x L.Temp		**−0.28*****					**−0.31*****
		(0.08)					(0.08)
L.Unemployment x L.Solo			0.01				0.00
			(0.08)				(0.08)
Delta Unemployment x L.Solo			**−0.28****				**−0.26****
			(0.14)				(0.13)
L.Unemployment x L.Part-time				−0.03			0.01
				(0.08)			(0.08)
Delta Unemployment x L.Part-time				−0.16			−0.09
				(0.11)			(0.11)
L.Unemployment x L.NetReplRate					0.09*		**0.10****
					(0.05)		(0.05)
Delta Unemployment x L.NetReplRate					0.09		0.08
					(0.08)		(0.08)
L.Unemployment x L.UB Restrictions						−0.09	−0.06
						(0.07)	(0.07)
Delta Unemployment x L.UB Restrictions						**−0.20****	−0.19*
						(0.10)	(0.10)
Intercept	0.00	0.01	0.00	0.00	0.00	0.00	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PCSE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.38	0.40	0.39	0.39	0.39	0.39	0.43
Adj. R^2	0.37	0.38	0.37	0.37	0.37	0.37	0.40
Num. obs.	492	492	492	492	492	492	492

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

is highly responsive to changes in unemployment. Regarding the persistent effect of unemployment, things are less clear-cut. While the coefficient for lagged unemployment is positive across all models, it is non-significant in three models, significant at the $p < 0.1$ level in three models, and only significant at the $p < 0.05$ level in the fully saturated model.

Our results show a complete lack of direct effects of the shares of the employed members of bottom-third households that are employed on fixed-term contracts or self-employed (without employees). By contrast, we find that the indefinite-part-time share of total employment is consistently associated with more redistribution via unemployment benefits in both the short run and the long run. As for the direct effects of unemployment compensation provisions, we find, unsurprisingly, that the net income replacement rate provided by unemployment insurance has a positive effect on redistribution in the short run as well as the long run across all models. As our indicator of access restrictions is slow-moving, it is not so surprising that we do not find any effects of year-on-year changes in this variable. However, our results suggest that access restrictions are associated with more redistribution in the long run. As this association is only significant at the $p < 0.1$ level in model 7, we hesitate to speculate on why this is so. One possible explanation is that access restrictions tend to be associated with more generous unemployment benefits.

As indicated earlier, we are first and foremost interested in how non-standard employment and unemployment compensation provisions moderate the effects of unemployment on redistribution. Based on model 7 in Table 2, Figures 4 and 5 present simulation-based visualizations of the short-term and long-term effects of unemployment conditional on the values of the moderators. Specifically, these figures show the effects of unemployment when the moderators take on values corresponding to the 10^{th} and 90^{th} percentiles of observed values. To facilitate interpretation of the figures, Table 3 illustrates what the two values mean in terms of absolute distances to country-specific means.[19]

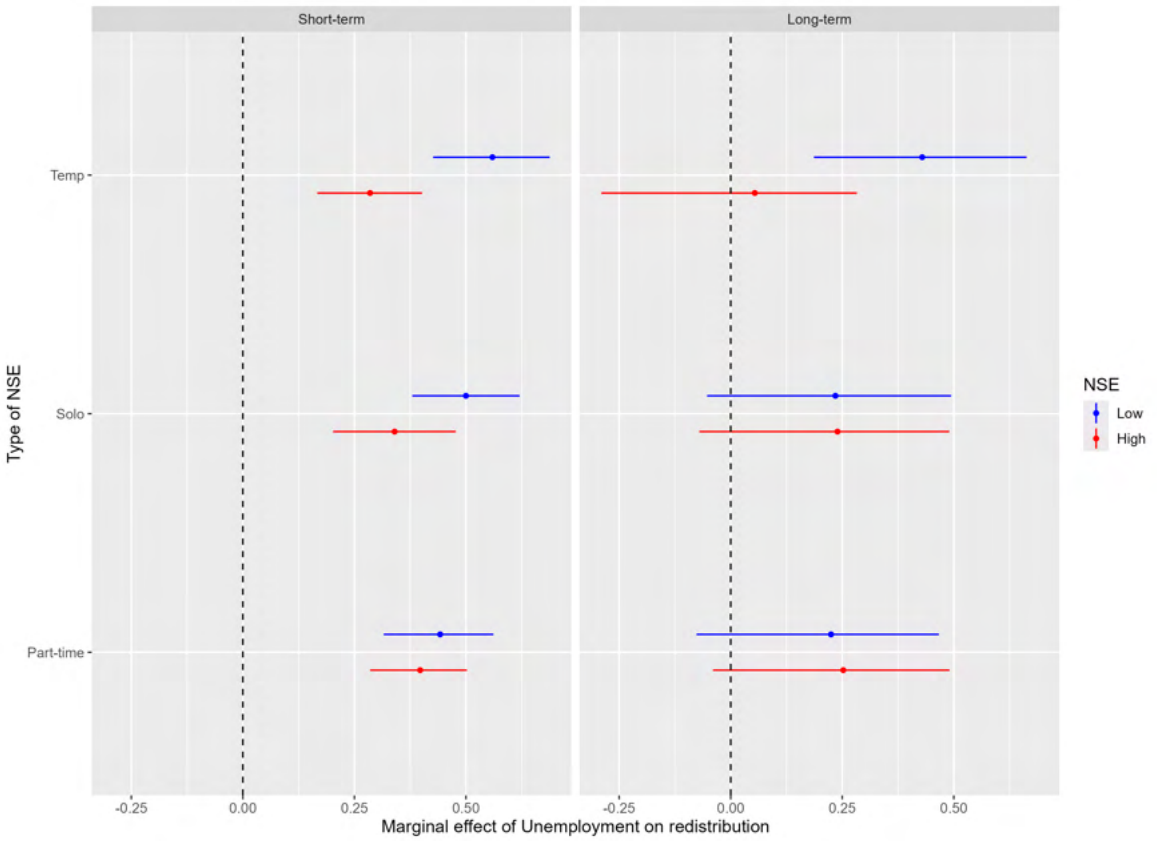
Table 3: 10^{th} and 90^{th} percentile value of conditioning variables, expressed as the absolute difference to the country mean (in percentage points, logged weeks for restrictions indicator)

	P10	P90
Fixed-term	-3.73	4.06
Solo self-employed	-3.06	3.05
Part-time	-3.11	2.88
NRR	-5.23	4.95
Restrictions	-0.27	0.27

Figure 4 shows our simulations of the conditioning effects of different forms of non-standard employment. As we would expect given the size of the coefficient for change in unemployment across all models in Table 2, we find that redistribution consistently increases (decreases) with

[19] This value is expressed as percentage points for the employment shares and net replacement rates variables and as logged weeks for the indicator of access restrictions. As m and p are both expressed in weeks, the unit of $m * \frac{m}{p}$ is weeks, to which we then apply a log transformation.

Figure 4: short and long-term effects of unemployment on redistribution conditional on NSE prevalence



increases (decreases) in unemployment. The effect of a change in unemployment on redistribution is most strongly conditioned by the prevalence of fixed-term workers among the employed in the bottom third. The redistributive response to a positive change in unemployment is visibly stronger when the prevalence of fixed-term workers is low. We see a similar pattern for the prevalence of solo self-employment, albeit less pronounced, and no indication that the prevalence of part-time employment conditions the effect of changes in unemployment. Fixed-term employment alone affects the long-term (equilibrium) relationship between unemployment and redistribution. Indeed, our results suggest that the positive association between levels of unemployment and redistribution disappears at high levels of fixed-term employment.

Figure 5: short and long-term effects of unemployment on redistribution conditional on NRR-Restrictions

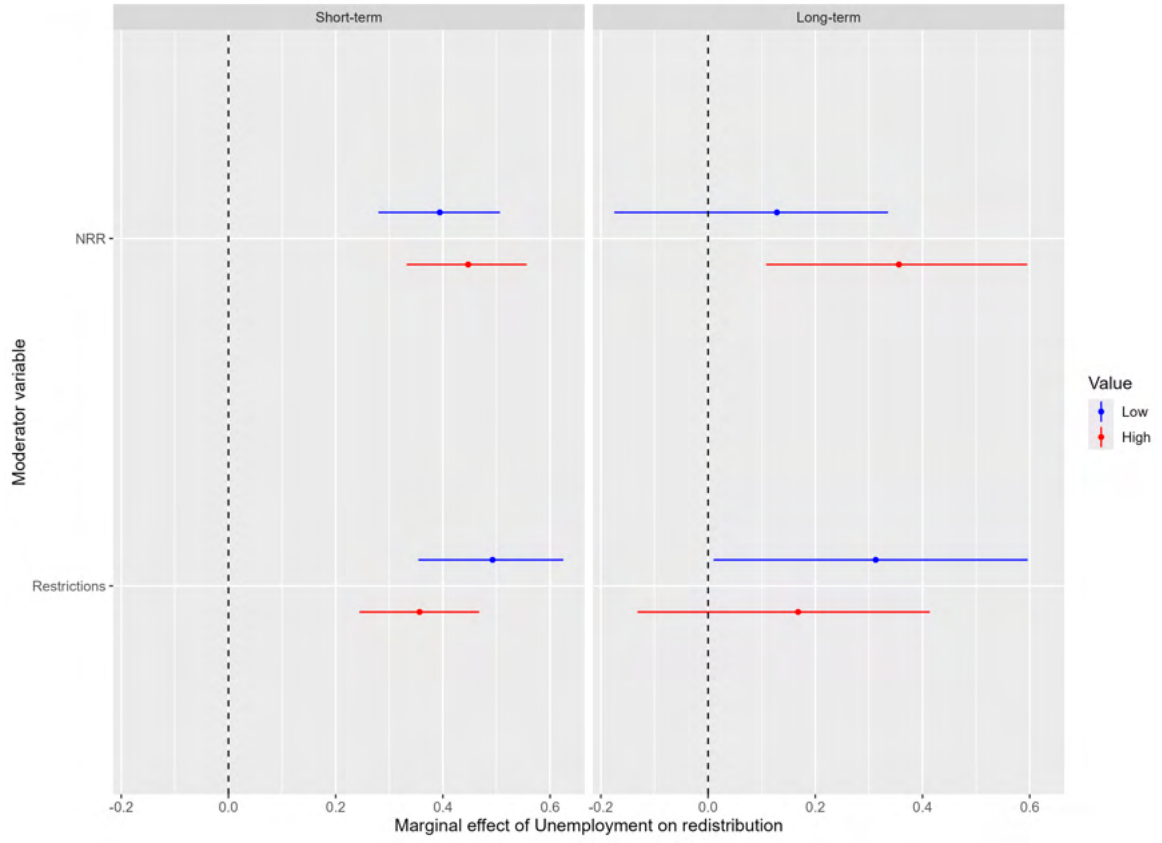
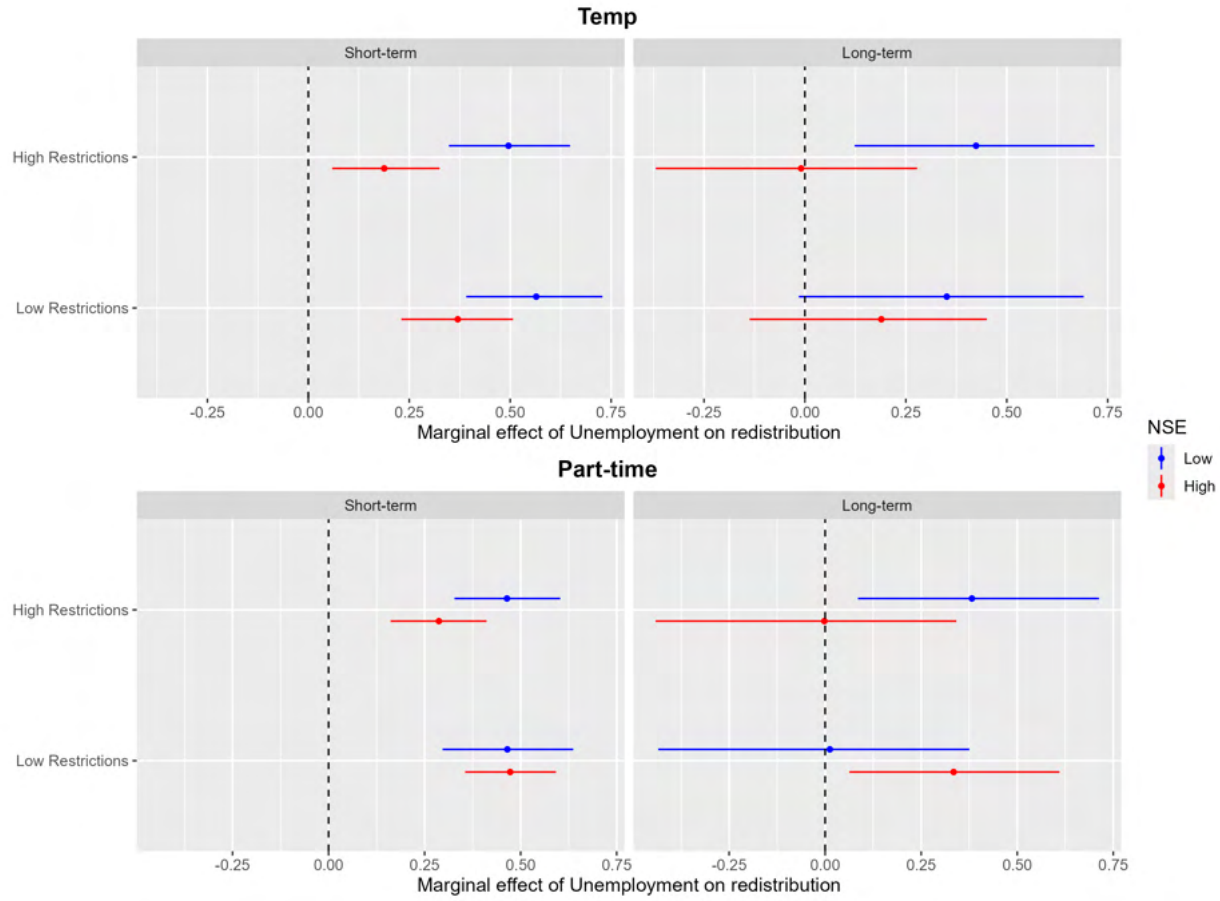


Figure 5 shows our estimates of the effects of unemployment when unemployment benefits generosity and access restrictions take on values at opposite ends of the spectrum. Our results suggest that the short-term redistributive response to changes in unemployment is not all affected the net income replacement rate. However, the net replacement rate appears to have a substantively meaningful conditioning effect on the long-run association between unemployment and redistribution. This association is clearly positive at high replacement rate, but not statistically different from zero at a low replacement rate. Although the confidence intervals for the long-term estimates overlap,

we take this finding as confirmation of the proposition that generous unemployment benefits generate more redistribution in response to unemployment. For access restrictions, the conditioning of the long-run equilibrium relationship between unemployment and redistribution is less clear-cut. Only the low-restrictions estimate is statistically different from zero, but there is a much larger overlap between the two estimates. By contrast, the conditioning is clearer with respect to the short-term effects of unemployment, suggesting that restrictions on access to unemployment insurance render redistribution less responsive to rising low-end unemployment.

Going beyond the results presented in Table 2, Figure 6 presents estimates of the short-term and long-term effects of unemployment conditional on different combinations of non-standard employment and restrictions on access to unemployment insurance. This figure is based on three-way interaction models (see Appendix 7 for regression results). Because our indicator of access restrictions pertains to work/earnings requirements necessary to receive benefits rather than formal 'membership' in the insurance scheme, we drop solo self-employment from this exercise.

Figure 6: Short and long-term effects of unemployment on redistribution, conditional on non-standard employment incidence and access restrictions to unemployment benefits (based on the models in Appendix 7



The most important take-away from Figure 6 is that the results for the conditioning of fixed-

term employment in Table 2 (and Figure 4) are driven primarily by cases (country-years) in which restrictions on access to unemployment insurance are high. When access restrictions are low, the difference in redistributive responses between the low and high prevalence of fixed-term employment is much more muted. This holds for the short run as well as the long run. Over the long run, we only observe a positive effect of unemployment when access restrictions are low. In addition, the panel that pertains to part-time employment reveals a pattern that diverges from the null results regarding the conditioning effects of part-time prevalence in Table 2. The three-way interaction shows that the conditioning effect of part-time prevalence on the unemployment-redistribution link depends crucially on access restrictions. When restrictions are high, the prevalence of part-time employment diminishes the redistributive response to unemployment. By contrast, a low-restrictions environment reverses the conditioning effect of part-time employment. In such a scenario, part-time workers who lose their job qualify for insurance benefits and, having qualified, are more likely than full-time workers to benefit from benefit floors. As suggested above, they may also benefit disproportionally from supplementary benefits conditional on having dependent children.

Appendix 9 reports results for replications of our core model (Model 7 in Table 2). First, we replicate the model with Gini-based measure of redistribution via unemployment benefits and, secondly, we do it with an alternative measure of low-end unemployment, with household ranked by market income rather than disposable income. In the third and fourth models in Appendix 9, we replicate the core model with relative rather than absolute measures of redistribution, for Gini coefficients as well as income shares of the bottom third, while controlling for corresponding measures of market-income inequality. Our core results are robust to these re-specifications. Note also that adding a three-way interaction with access restrictions to the models in Appendix 9 reproduces the findings reported in Figure 6 (results available upon request).

7 Conclusion

To summarize, the regression analyses in this paper show that the redistributive impact of unemployment compensation tends to respond to the rate of unemployment in the bottom third of the income distribution and that the effects of unemployment compensation are strongly influenced by the generosity of unemployment benefits and by the prevalence of fixed-term employment. In the short run, redistribution increases in response to rising low-end unemployment regardless of benefits generosity and the incidence of fixed-term unemployment, but this effect only persists when benefits are generous and fixed-term employment is low. Benefit cuts and the expansion of fixed-term employment would seem to be main reasons why redistribution in response to rising unemployment has declined in many countries since the early 2000s.

Our results do not support the hypothesis that stricter prior-work requirements render redistribution via unemployment benefits less responsive to rising unemployment, but they do suggest that the negative effect of fixed-term employment is contingent on strict prior-work requirements and that the prevalence of part-time employment has a positive effect on redistribution in response to rising low-end unemployment when such requirements are not very demanding. In the

absence of strict prior-work requirements, it would appear that unemployment compensation favors part-time workers relative to full-time works on indefinite contracts, which is not the case for fixed-term workers. We leave it as open question whether this holds for marginal part-time as well as part-time work in the range of 20-30 hours per week. In any case, our analysis shows that it is imperative to distinguish between different forms of non-standard employment in order to shed light on the dynamic relationship between low-end unemployment and redistribution via unemployment benefits.

The absence of any direct or moderating effects of solo self-employment is contrary to our prior expectations. As suggested earlier, this might partly be due to the fact that the self-employed adjust their hours to falling demand for their services and are less likely than dependent workers to become 'unemployed' in a legal-administrative sense. Exposure to unemployment risk as well as access to generous unemployment benefits distinguish different categories of non-standard employment from each other. It should also be noted (again) that our indicator of access restrictions only pertains to prior-work requirements and does not capture the fact that the self-employed are often excluded from unemployment insurance schemes. With a separate indicator of 'first-order access restrictions' we would perhaps find a pattern similar to the one we have found for fixed-term employment, viz. that solo self-employment has a negative effect on redistribution responsiveness when most self-employed are uninsured but not otherwise. Available from the Social Policy Indicators Database, unemployment insurance coverage rates constitute the most obvious indicator of first-order access restrictions.[20] As this indicator changes very little over the time period covered by SILC data, however, it is very unlikely that it would yield significant results in an ECM setup including country fixed effects.

Limited temporal variation within countries may also explain why we only obtain results for eligibility restrictions in the three-way interaction models. The role of access restrictions arguably needs to be explored with regression models that focus on cross-national variation, with all the problems that such models raise. In future work, we instead plan to explore the moderating effects of first- and second-order restrictions in a dynamic framework like the one in this paper but going further back in time for a smaller number of countries (based on data from the Luxembourg Income Study).

In the 1990s and 2000s, Center-Left and Center-Right governments alike implemented reforms that encouraged the expansion of fixed-term employment (not only the removal of legal restrictions but also subcontracting of public services to private entities). The stated purpose of these reforms was to promote employment growth – in particular, to create jobs for less skilled workers – and to reduce public spending on unemployment compensation. From a progressive point of view, this approach would have made good sense had it been accompanied by the relaxation of prior-

[20] Based on 2020 data for the 29 countries included in our analysis, the cross-national correlation between the percentage of the labor force covered by unemployment insurance and self-employment in percent of total employment is -.297 (p=.118). With an extraordinarily high self-employment rate (31.9%) but an average coverage rate of (82%), Greece is a major outlier: dropping Greece, the correlation coefficient is -.397 (p=.037). Data sources: Social Policy Indicators Database (`https://www.su.se/social-policy-indicators-database/`) and World Development Indicators (`https://data.worldbank.org/indicator/SL.EMP.SELF.ZS`).

work requirements in unemployment schemes, but this complement did not materialize. Persistent restrictions of access to generous benefits have pushed unemployed workers into accepting fixed-term jobs and expansion of fixed-term employment has in turn reduced the redistributive effects of unemployment compensation.

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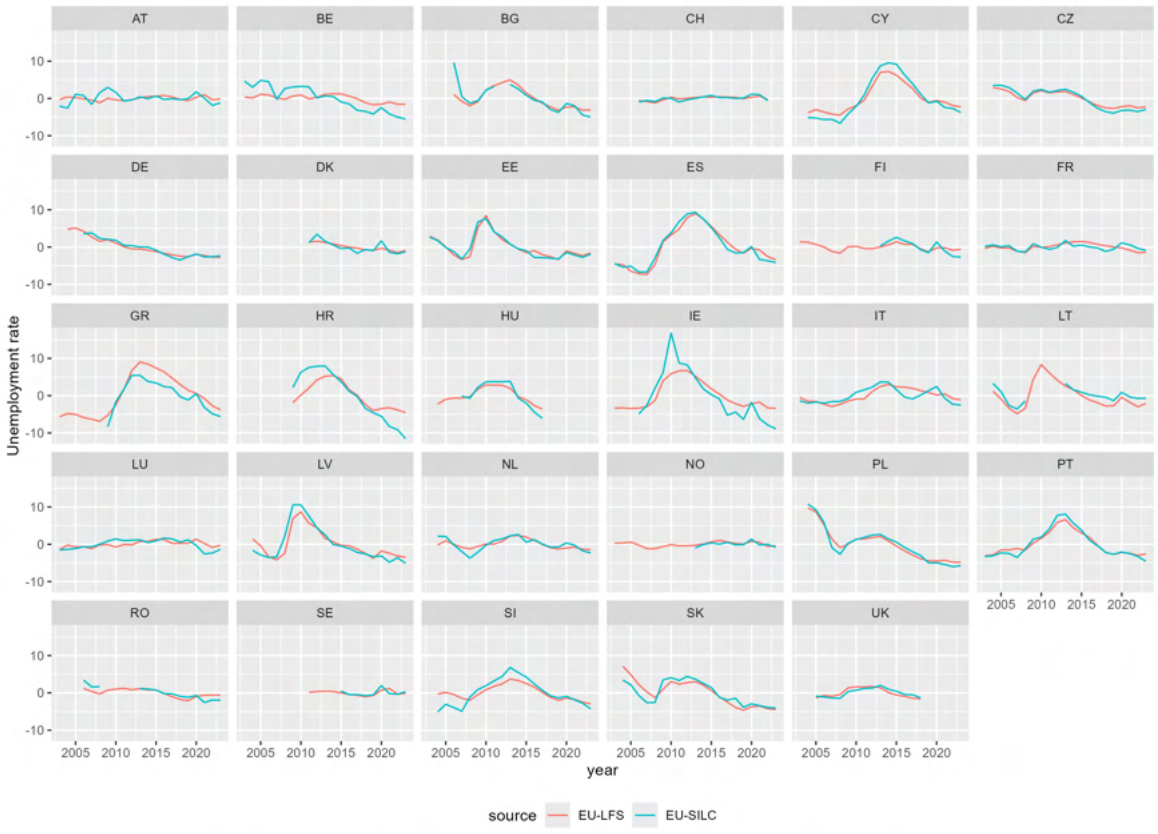
Appendices

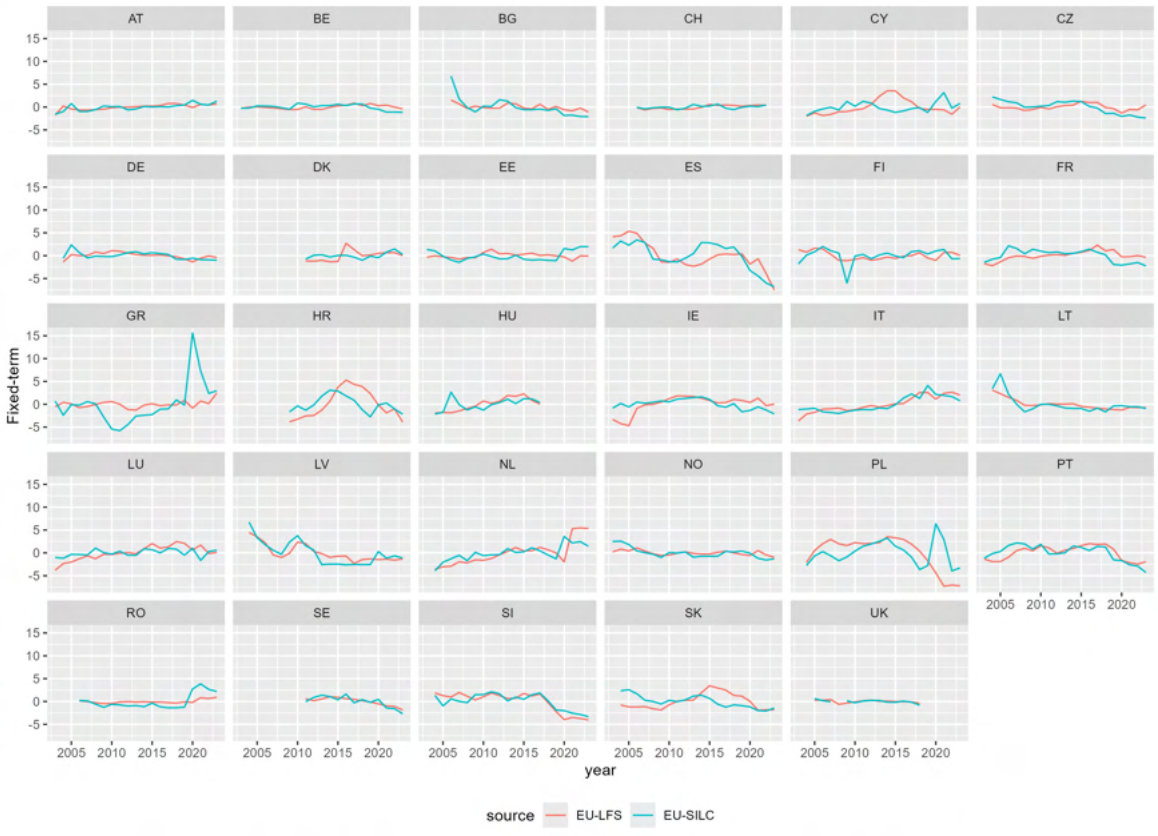
Appendix 1: Descriptives

Statistic	N	Mean	St. Dev.	Min	Max
Low-end unemployment	525	21.297	9.946	0.118	51.411
Abs Unemp-related redist (Bottom share)	569	0.803	0.741	−0.004	3.904
Rel Unemp-related redist (Bottom share)	569	5.281	4.873	−0.037	28.799
Market Inc share (Bottom)	569	10.858	1.820	3.595	15.234
Share FT workers (Bottom)	569	15.238	8.366	0.000	44.304
Share solo self-employed (Bottom)	569	14.954	9.896	1.711	67.325
Share part-timers (Bottom)	569	13.784	10.279	0.000	53.019
Net Rep Rate (APW)	569	61.481	13.609	28.391	88.197
Restrictions $log(1 + (m/(m/p)))$	569	2.874	0.844	0.000	4.771
Abs Unemp-related redist (Gini)	569	1.038	1.015	−1.571	5.727
Rel Unemp-related redist (Gini)	569	2.604	2.464	−3.922	11.317

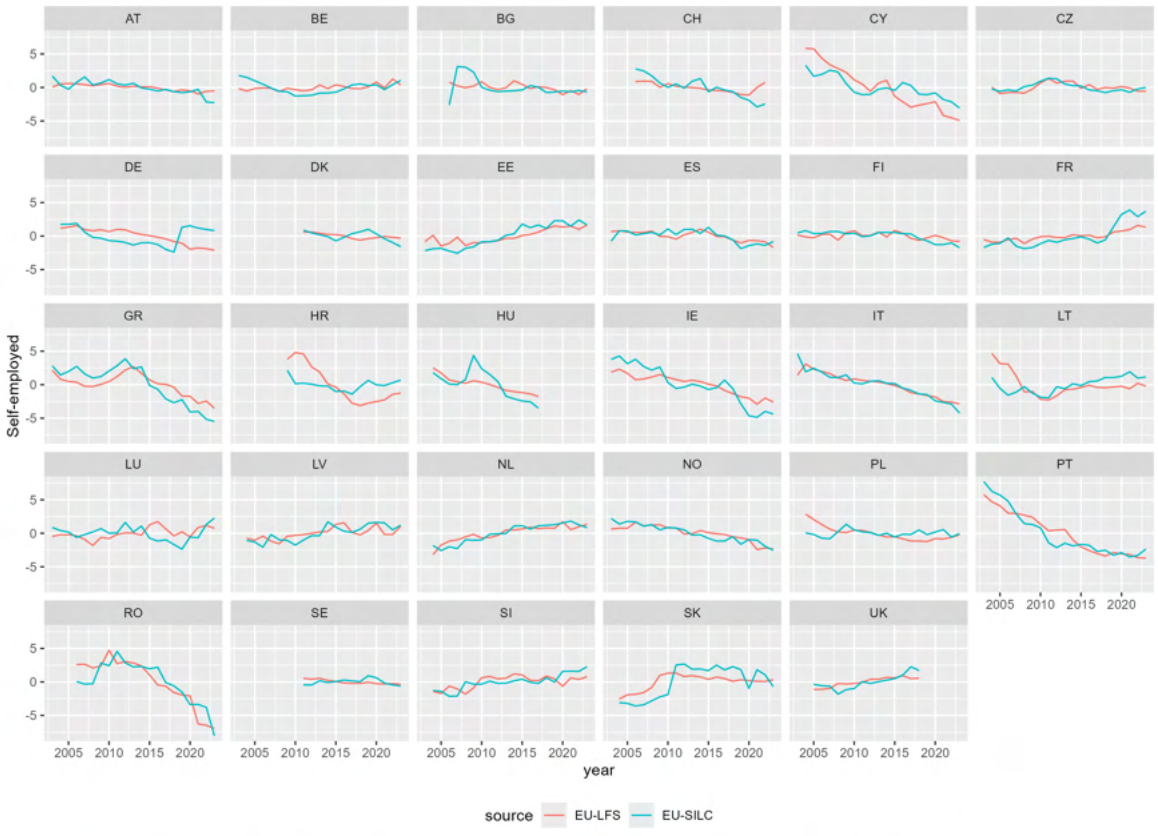
Appendix 2: Unemployment rate among aged 20-64 across EU-SILC and EU-LFS 2003-2023 (mean-centered)



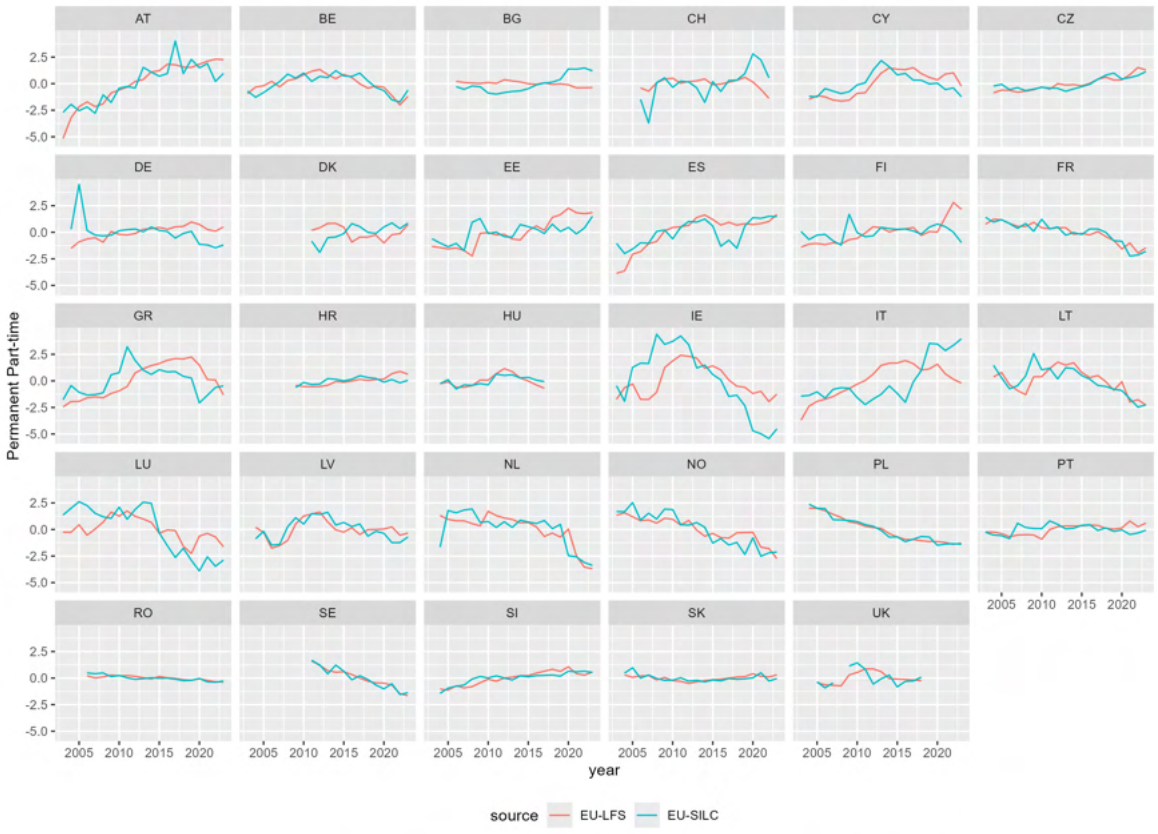
Appendix 3: Fixed-term workers among aged 20-64 across EU-SILC and EU-LFS 2003-2023 (mean-centered)



Appendix 4: Self-employed workers among aged 20-64 across EU-SILC and EU-LFS 2003-2023 (mean-centered)



Appendix 5: Permanent marginal part-timers among aged 20-64 across EU-SILC and EU-LFS 2003-2023 (mean-centered)



Appendix 6: Percentage of currently employed who experienced unemployment in the previous year, by current employment form (and averaged across all SILC surveys) – Bottom third – Disposable income ranking

country	Part-time	Full-time	Solo	Temp	Ratio Temp/Full-time
AT	8.4	23.1	6.7	40.5	1.8
BE	5.1	15.7	3.8	35.2	2.2
BG	17.8	16.1	19.3	52.9	3.3
CH	4.9	11.7	3.3	20.6	1.8
CY	18.7	24.2	24.6	31.9	1.3
CZ	6.5	6	5.4	32.5	5.4
DE	3	11.7	5.5	22.2	1.9
DK	7.1	14	2.3	36.6	2.6
EE	8.6	11.3	5.5	36.8	3.3
ES	7	13.5	7.3	40.7	3.0
FI	8.4	10.3	1.8	24.4	2.4
FR	6.4	10.7	7.7	34.1	3.2
GR	7.5	17.8	1.9	34.5	1.9
HR	7.9	8.7	9.5	56.4	6.5
HU	7.7	13.8	3.4	39.8	2.9
IE	7	14.4	8.1	26.7	1.9
IT	6.8	11	6	28.9	2.6
LT	4.8	8.3	5.5	29.3	3.5
LU	3.5	5.4	3.1	29.9	5.5
LV	10.4	15.4	6.6	39.8	2.6
NL	5.6	9.8	5.3	31	3.2
NO	0.9	1.9	1.4	7.2	3.8
PL	4.7	6	4.4	29.9	5.0
PT	3.1	4.4	6.3	37.1	8.4
RO	0	1.2	0.9	5.1	4.2
SE	1.5	2.8	1.1	8.8	3.1
SI	7.7	11.9	7.4	46.2	3.9
SK	5.5	6.3	6.1	34.2	5.4
UK	2.2	2.4	2.1	9.7	4.0
Mean	6.5	10.7	5.9	31.1	3.5

Appendix 7: Error correction models - Redist bottom Unemp - unemp - bot 33

	Model 1	Model 2
L.redistribution	**−0.30*****	**−0.29*****
	(0.06)	(0.06)
L.Unemployment	**0.07****	0.06
	(0.03)	(0.04)
L.NetReplRate	**0.05****	**0.05****
	(0.02)	(0.02)
L.Restrictions	**0.07****	**0.08*****
	(0.03)	(0.03)
Delta Unemployment	**0.40*****	**0.42*****
	(0.05)	(0.05)
Delta NetReplRate	**0.10*****	**0.11*****
	(0.04)	(0.04)
Delta Restrictions	0.02	0.06
	(0.05)	(0.05)
L.Temp	−0.05	−0.02
	(0.04)	(0.04)
Delta Temp	**0.08***	0.06
	(0.04)	(0.04)
L.Solo	0.01	0.01
	(0.04)	(0.04)
Delta Solo	0.03	0.00
	(0.05)	(0.05)
L.Marginal	**0.27*****	**0.28*****
	(0.07)	(0.07)
Delta Marginal	**0.19****	**0.20****
	(0.08)	(0.08)
L.Unemployment x L.Restrictions	−0.03	0.01
	(0.06)	(0.07)
Delta Unemployment x L.Restrictions	**−0.18***	−0.13
	(0.10)	(0.09)
L.Unemployment x L.Temp	**−0.11****	
	(0.04)	
Delta Unemployment x L.Temp	**−0.29*****	
	(0.08)	
L.Temp x L.Restrictions	**−0.12***	
	(0.07)	
L.Unemployment x L.Temp x L.Restrictions	−0.13	
	(0.12)	
Delta Unemployment x L.Temp x L.Restrictions	−0.19	
	(0.17)	
L.Unemployment x L.Marginal		−0.03
		(0.08)
Delta Unemployment x L.Marginal		−0.17
		(0.11)
L.Marginal x L.Restrictions		−0.09
		(0.07)
L.Unemployment x L.Marginal x L.Restrictions		**−0.57*****
		(0.19)
Delta Unemployment x L.Marginal x L.Restrictions		**−0.51***
		(0.26)
Intercept	0.01	0.01
	(0.02)	(0.02)
Country FE	Yes	Yes
PCSE	Yes	Yes
R^2	0.41	0.41
Adj. R^2	0.39	0.38
Num. obs.	492	492

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Appendix 8: Average number of children aged 0-17 in working households with and without part-time workers

Country	PT	Working excl. PT	Ratio
Increase			
AT	1.15	1.11	1.04
BG	1.68	1.04	1.62
CH	1.23	1.14	1.08
CY	1.13	1.01	1.12
EE	0.89	0.96	0.93
ES	0.87	0.90	0.97
IT	0.79	0.92	0.86
LT	0.86	0.97	0.88
SI	1.07	0.89	1.21
UK	1.25	1.13	1.10
Mean	1.09	1.01	1.08
Decline			
BE	1.12	1.14	0.98
CZ	0.90	0.97	0.93
DE	0.98	0.93	1.05
DK	0.80	1.05	0.76
FI	0.81	1.15	0.70
FR	1.15	1.18	0.97
GR	0.83	0.87	0.95
HR	1.18	1.10	1.07
HU	0.92	1.06	0.87
IE	1.30	1.29	1.01
LU	1.20	1.12	1.07
LV	0.78	0.90	0.87
NL	1.10	1.09	1.01
NO	1.06	1.12	0.95
PL	1.07	1.10	0.97
PT	0.86	0.85	1.01
RO	0.93	1.22	0.77
Mean	1.00	1.07	0.93

Appendix 9: Error correction models - robustness tests

	Model 1 Gini-based redist abs	Model 2 SILC MI unemp	Model 3 Gini-based redist rel	Model 4 SILC MI unemp rel redist
L.redistribution	**−0.34*****	**−0.29*****	**−0.37*****	**−0.28*****
	(0.06)	(0.06)	(0.06)	(0.05)
L.Unemployment	0.08*	**0.10****	0.08*	**0.11*****
	(0.04)	(0.04)	(0.04)	(0.04)
L.NetReplRate	**0.06****	**0.05****	0.05*	**0.05****
	(0.02)	(0.02)	(0.03)	(0.02)
L.UB Restrictions	0.04	0.05*	0.03	0.05*
	(0.03)	(0.03)	(0.03)	(0.03)
Delta Unemployment	**0.42*****	**0.44*****	**0.37*****	**0.34*****
	(0.06)	(0.05)	(0.05)	(0.05)
Delta NetReplRate	**0.11*****	**0.10*****	**0.09*****	**0.08****
	(0.04)	(0.03)	(0.03)	(0.03)
Delta UB Restrictions	0.03	0.02	0.01	0.01
	(0.05)	(0.05)	(0.05)	(0.05)
L.Temp	−0.06	−0.07*	−0.07	−0.07*
	(0.05)	(0.04)	(0.04)	(0.04)
Delta Temp	0.06	0.04	0.05	0.01
	(0.05)	(0.04)	(0.05)	(0.04)
L.Solo	0.01	−0.02	−0.01	−0.02
	(0.04)	(0.04)	(0.04)	(0.04)
Delta Solo	0.08	0.01	0.05	−0.00
	(0.06)	(0.05)	(0.06)	(0.05)
L.Part-time	**0.30*****	**0.24*****	**0.21*****	**0.27*****
	(0.07)	(0.06)	(0.06)	(0.06)
Delta Part-time	0.08	**0.16****	−0.01	0.11
	(0.08)	(0.07)	(0.08)	(0.07)
L.Unemployment x L.NetReplRate	**0.14****	0.10*	**0.14****	0.09*
	(0.06)	(0.05)	(0.05)	(0.05)
Delta Unemployment x L.NetReplRate	0.11	0.09	0.08	0.06
	(0.08)	(0.08)	(0.08)	(0.08)
L.Unemployment x L.UB Restrictions	−0.07	−0.08	−0.06	−0.05
	(0.08)	(0.07)	(0.07)	(0.07)
Delta Unemployment x L.UB Restrictions	**−0.23****	**−0.22****	−0.20*	**−0.21****
	(0.11)	(0.09)	(0.10)	(0.09)
L.Unemployment x L.Temp	**−0.12****	**−0.14*****	**−0.10****	**−0.16*****
	(0.05)	(0.04)	(0.04)	(0.04)
Delta Unemployment x L.Temp	**−0.32*****	**−0.32*****	**−0.31*****	**−0.34*****
	(0.09)	(0.08)	(0.09)	(0.08)
L.Unemployment x L.Solo	−0.05	0.02	−0.03	0.03
	(0.08)	(0.07)	(0.07)	(0.07)
Delta Unemployment x L.Solo	**−0.32****	**−0.26****	**−0.30****	−0.24*
	(0.15)	(0.12)	(0.14)	(0.13)
L.Unemployment x L.Part-time	0.04	0.02	0.01	0.06
	(0.09)	(0.07)	(0.08)	(0.07)
Delta Unemployment x L.Part-time	0.01	−0.12	−0.01	−0.03
	(0.12)	(0.08)	(0.10)	(0.08)
L.Market inc. Gini			0.01	
			(0.03)	
Delta Market inc. Gini			**0.08****	
			(0.04)	
L.Market inc. share				0.01
				(0.04)
Delta Market inc. share				**−0.26*****
				(0.04)
Intercept	0.01	0.01	0.01	0.01
	(0.02)	(0.02)	(0.02)	(0.02)
Country FE	Yes	Yes	Yes	Yes
PCSE	Yes	Yes	Yes	Yes
R^2	0.42	0.46	0.41	0.52
Adj. R^2	0.39	0.43	0.38	0.50
Num. obs.	492	492	492	492

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$