From Risks to Public Opinion

*How Structural Economic Changes*
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## How Structural Economic Changes Shape Political Attitudes and Policy Preferences

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# List of Abbreviations

| | |
|---|---|
| AfD | Alternative for Germany |
| ALMP | Active Labour Market Policies |
| CAWI | Computer-Assisted Web Interviews |
| EPL | Employment Protection Legislation |
| EU | European Union |
| EU-LFS | European Union Labour Force Survey |
| FvD | Forum for Democracy |
| GDP | Gross Domestic Product |
| GLES | German Londitudinal Election Study |
| STEM | Science, Technology, Engineering, and Mathematics |
| ISCO | International Standard Classification of Occupations |
| ISSP | International Social Survey Programme |
| JA21 | Right Answer 21 |
| MIP | Most Important Problem |
| OECD | Organisation for Economic Cooperation and Development |
| OLS | Ordinary Least Squares |
| PIAAC | Programme for International Assessment of Adult Competencies |
| LISS | Longitudinal Internet Studies for Social Science |
| PLMP | Passive Labour Market Policies |
| PvdA | Labour Party |
| PVV | Party for Freedom |
| RTI | Routine Task Intensity |
| SOC | Standard Occupational Classification |
| SP | Socialist Party |
| TD | Triple Difference |
| ToN | Pround of the Netherlands |
| TWFE | Two-Way Fixed Effects |
| VET | Vocational Education and Training |
| VVD | Party for Freedom and Democracy |

# 1 | Introduction

## 1.1    Understanding the Relevance of Risks

Across many Western countries, structural economic changes have had a substantial impact on labour markets over recent decades (Van Vliet et al. 2021). Whereas the overall employment effects of these changes tend to be positive or neutral, they also have distributive consequences within countries. For example, take the shift in the employment structure due to globalisation. Lowering trade barriers has boosted demand for high-skilled workers in sectors that export knowledge-intensive products, whereas demand has plummeted in sectors producing labour-intense products due to competition with low-wage countries, lowering demand for low-skilled workers (Acemoglu et al. 2016; Autor et al. 2013; Bloom et al. 2016; Thewissen and Van Vliet 2017). Moreover, the adverse effects of globalisation are typically regionally concentrated, translating into long-lasting economic hardship (Autor et al. 2021). Like globalisation, technological change yields distributional effects that vary both between workers and across regions. Computers and robotics have proven to be especially suited to performing manual and repetitive tasks that do not require interpersonal interaction (Autor et al. 2003; Autor and Handel 2013). As a result, demand for workers in occupations with a high number of routine-intense tasks has squeezed (Gregory et al. 2022; Goos et al. 2014; Michaels et al. 2014), leaving workers unemployed or pushing them into low-skill service occupations.

In parallel, governments have imposed austerity measures and increased labour market flexibility through deregulation, thereby failing to protect workers affected by these structural economic changes (Baccini and Sattler 2023; Eichhorst and Marx 2012; Fetzer 2019; Swank and Betz 2003; Vlandas and Halikiopoulou 2022). Instead, governments introduced so-called "social investment policies" designed to promote labour market participation through activation and investment in human capital (Bonoli and Natali 2012; Clasen et al. 2016; Hemerijck 2013; Nelson 2013). Yet, whereas public spending has shifted from passive to active labour market policies, workers' appetite for such policies is typically low as they prefer the short-term benefits of policies that bring immediate compensation (Bremer and Bürgisser 2023; Busemeyer and Tober 2023). Such findings align with the concept of "embedded liberalism", firstly articulated by Ruggie (1982). Accordingly, public support for the liberal international order depends on governments' ability to buffer the adverse labour market effects of globalisation

(Burgoon 2013; Hays 2009; Mansfield and Rudra 2021). As individuals are less protected from the adverse labour market effects of structural economic changes in general, public opposition to these economic changes and related policies amongst those affected may well arise.

Against this backdrop, this dissertation examines to what extent the labour market effects stemming from structural economic changes drive political attitudes and policy preferences. Whereas scholars have examined political attitudes and policy preferences in the context of globalisation and technological change (Gallego et al. 2022; Pardos-Prado and Xena 2019; Scheve and Slaughter 2001a, b; Wu 2022), I add to this strand of literature by focusing on public opinion about the green transition. Only recently, studies have begun to examine whether unemployment risks associated with the transition to a carbon-neutral economy can explain public opposition to climate change mitigation policies. These studies show that the distributional effects of this transition are analogous to those of the economic changes previously discussed. Policies like carbon taxes or performance standards have a neutral or even positive effect on overall employment (Hafstead and Williams III 2018; Shapiro and Metcalf 2023) but have chipped away at employment in carbon-intensive sectors. Whereas demand for workers in these sectors has been squeezed, this squeeze will be offset by positive employment effects in the whole economy. However, this requires a substantial number of workers to shift from carbon-intensive to green sectors. Such shifts are typically associated with a substantial drop in income due to unemployment spells and lower earnings in future employment (Walker 2013). In this dissertation, I test how such dynamics shape public opinion on the green transition and related policies. Therefore, this dissertation aims to provide insights into how previous structural economic changes have shaped labour market outcomes. Building on these insights, I examine how such economic changes drive political attitudes towards the green transition.

## 1.2     Research Questions

This dissertation is a collection of four chapters aiming to provide insights into whether and how structural economic changes drive labour market outcomes and public opinion. Although my dissertation is based on papers and the chapters can therefore be read independently, the empirical analysis of the risks associated with these economic changes is the common thread running through this dissertation. More specifically, my dissertation seeks to help better understand the relevance of these risks in contemporary labour markets and politics. Specifically, my research question is as follows:

> Research Question: *What factors can explain how structural economic changes drive labour market outcomes and political attitudes towards the related policies?*

To provide a comprehensive answer to this question, each chapter of this dissertation examines a distinct dimension of these economic changes, shedding light on the underlying links at play. Chapter 2 of this dissertation examines whether structural economic changes have affected the labour market position of workers at the lower end of the labour market, extending beyond the conventional focus on employment. Thereby, this chapter aims to provide insights into the mechanisms that explain the rapid flexibilization of labour markets across Western countries (Van Vliet and Van Doorn 2021). Whereas technological change has squeezed demand for routine-intense occupations, the effects of technological change may not only affect the employment prospects of individuals who typically occupied these jobs but those working at the lower segments of the labour market as well. For that reason, this chapter focuses on the effect of technological change on the prevalence of involuntary part-time employment in low-paying occupations, addressing the following sub-question:

> Sub-Question 1: *Does the squeeze in the demand for routine-intense occupations increase the prevalence of involuntary part-time employment at the lower end of the labour market?*

The next two chapters of this dissertation shift focus to the importance of unemployment risk in understanding attitudinal formation. Employing different datasets on individuals' political attitudes and policy preferences, these chapters examine how such risks interact with employment prospects. First, chapter 3 aims to provide insight into how occupational mobility drives public opinion towards the green transition. Individuals whose skill profile allows them to switch to occupations relatively easy have generally less to fear from unemployment risks related to their occupations. In contrast, individuals with skills specifically relevant to their current occupation face relatively poor employment prospects when they lose their job, including long spells of unemployment or a substantial drop in income if they accept reemployment in a job in which their skills are less relevant. For this reason, individuals with specific skills should hold less favourable attitudes towards structural economic changes affecting their occupational unemployment risk. This chapter examines this argument in the context of the green transition, examining whether attitudes towards this transition differ between individuals in carbon-intensive occupations holding specific or transferable skills across 11 OECD countries. In sum, chapter 3 aims to answer the following sub-question:

> Sub-Question 2: *To what extent does occupational mobility drive individual-level support for the transition towards a carbon-neutral economy?*

Whereas chapter 3 focuses on how unemployment risks drive political attitudes and policy preferences, chapter 4 examines the effect of such risks once materialised, focusing on individuals who actually have lost their jobs.

Individuals who feel they have lost their job due to structural economic changes, like globalisation or the green transition, are more likely to oppose the policies underpinning these changes. Opposition to these policies may translate into support for parties running on a platform that taps into discontent with the established parties who have been supporting these policies. Specifically, I examine whether job losses drive support for radical left and radical right parties, employing Dutch panel data tracking voters for up to fifteen years. Contrary to prior panel studies that find little evidence that individuals who lose their jobs shift their support to radical parties, I take anticipation effects of job losses into account. When voters who eventually lose their job become aware of their unemployment risks and subsequently become more supportive of radical parties, the identified effect of job losses will be dampened. By distinguishing between expected and unexpected job losses using individuals' self-assessed unemployment risk, I test whether job losses affect radical party support. Hence, this chapter addresses the following sub-question:

> Sub-Question 3: *Do individuals who are personally experiencing economic hardship turn to radical parties?*

In the final chapter of this dissertation, I focus on how individuals change their political attitudes and policy preferences when the risks of policy inertia become salient. This chapter examines the extent to which individuals who have witnessed weather extremes or natural disasters change their opinions towards climate change. Yet, in contrast to recent studies examining the effect of climate extremes, I propose that partisanship shapes the effect of such events on attitudes and preferences. By comparing how supporters of Die Grüne and other partisans changed their attitudes, this chapter tests whether the floods affected concern about climate change and to what extent they led to an increase in support for climate change mitigation policies. This chapter's sub-question reads as follows:

> Sub-Question 4: *To what extent does partisanship shape the effect of climate extremes on public opinion about climate change?*

## 1.3   Theoretical Background and Contributions

To provide insights into the way structural economic changes drive labour market outcomes and public opinion, this dissertation predominantly builds on the comparative political economy literature. Recent studies in this literature incorporate individuals' expectations about their future income in explaining attitudinal formation. Thus, individuals take such expectations into account when forming their attitudes towards a certain policy. There are roughly two strands of literature that depart from this assumption. The first strand emphasises an insurance logic in explaining

policy preferences (Häusermann et al. 2016; Iversen and Soskice 2001, 2009; Thewissen and Rueda 2019; Rehm 2009, 2011; Walter 2010, 2017). According to this logic, individuals exposed to unemployment risks, which potentially endanger their future income, exhibit similar levels of support for an encompassing welfare state that cushions income losses, as do those who have already lost their job and subsequently experienced a drop in income.

Whereas most studies in the comparative political economy literature focus on redistribution preferences and relatedly support for social policies, studies in the second strand of literature have assessed how unemployment risks translate into support for other types of policies as well. In this regard, support is determined by individuals' expectations of how a policy affects (future) income (Gallego et al. 2022; Pardos-Prado and Xena 2019; Scheve and Slaughter 2001a, b; Wu 2022). For example, individuals who expect that competition with low-wage countries will negatively affect their employment prospects are inclined to oppose the liberal trade policies that underpin globalisation. My dissertation largely follows studies in the latter tradition, focusing on how structural economic changes affect policy preferences and support for political parties. In this dissertation, I add to the comparative political economy literature by providing a more nuanced picture of how these mechanisms operate, building on three different literatures: labour economics, radical party support and motivated reasoning.

First, the next two chapters begin with theoretical models put forward in the labour economics literature emphasising the importance of tasks and related skills associated with different types of occupations to understand how structural economic changes increase occupational unemployment risks. This allows for a more nuanced understanding of how individuals are exposed to unemployment risks. For one, prior studies have shown that the new technologies that have been introduced in the past couple of decades are especially suited for performing routine tasks (Acemoglu and Autor 2011; Autor et al. 2003; Spitz-Oener 2006). This implies that individuals who typically performed such tasks have been gradually substituted by computers or robotics. As a result, the share of routine-intense occupations, like machine operators or office clerks, has sharply declined during recent decades (Goos et al. 2009; 2014).

The above argument is consistent with the comparative political economy literature on the expansion of the service sector, which provided the foundation for the transition to the knowledge economy (Hope and Martelli 2019; Iversen and Wren 1998; Wren 2013). On this reading, individuals employed in traditional sectors, like manufacturing, shifted into low-end service sectors in which the diffusion of new technologies is relatively limited. Chapter 2 explicitly links these two literatures and proposes that individuals at the lower end of the labour market also feel the squeeze in demand for routine-intense occupations. As the skills needed to perform the tasks

associated with occupations at the lower segments of the labour market require relatively little investment in education or training, individuals who were traditionally employed in routine-intense occupations can shift into the these low-end occupations rather easily (Acemoglu and Restrepo 2020; Cortes 2016; Dauth et al. 2017; Murphy 2014). However, the increased competition in these occupations has been corrosive to individuals' bargaining power and may well push them to accept part-time jobs with fewer hours than desired.

Relatedly, Chapter 3 builds on the labour economics literature to examine to what extent individuals can switch between occupations. The combination of tasks that are typically performed in each occupation differs substantively (Gathmann and Schonberg 2010; Lazear 2009). As a result, individuals who switch between occupations lose productivity. However, this loss in productivity is smaller for switches between occupations that require a similar set of skills, allowing individuals to switch occupations relatively easily. This implies that occupational mobility is higher for individuals who can potentially switch between a greater number of occupations, translating into shorter unemployment spells, higher wages and more occupational switches (Baley et al. 2022; Diris et al. 2022; Eggenberger et al. 2018; Fedorets et al. 2019).

Looking at individuals who may lose their jobs due to the transition to a carbon-neutral economy, Chapter 3 proposes that attitudes towards this transition are shaped by an individual's occupational mobility. Policies, like carbon taxes or performance standards, will lower demand for these occupations, potentially forcing individuals in carbon-intensive occupations to switch jobs. Following the comparative political economy literature (Gallego et al. 2022; Pardos-Prado and Xena 2019; Scheve and Slaughter 2001a; Wu 2022), individuals in carbon-intensive occupations should oppose such policies as they may well translate into lower future income. However, building on the above-described logic in the labour economics literature this chapter puts forward a more nuanced argument: individuals in carbon-intensive occupations whose skill profile allows them to switch between occupations more easily may be more supportive of the transition to a carbon-neutral economy compared to those who have a rather occupation-specific skill profile.

Second, Chapter 4 builds on the literature on radical party support to explain how experiencing materialised economic hardship affects attitudes towards radical parties. Prior studies have put forward roughly two categories of mechanisms related to radical parties' programmatic positions that explain why affected individuals turn to radical parties (Van der Brug et al. 2000), both of which are loosely linked to the either of the two strands in the comparative economy literature. The first category of explanations emphasises social policy preferences linking economic hardship and radical

party support. Aligning with studies in the first tradition of the comparative political economy literature (Iversen and Soskice 2001, 2009; Thewissen and Rueda 2019; Rehm 2009, 2011; Walter 2010, 2017), experiencing economic hardship should increase demand for social policies. This demand naturally translates into support for left parties, which are traditionally associated with providing a strong safety net. However, radical left parties have accused mainstream left parties of supporting neoliberal policies that have stripped down social policies and employment protection legislation (Bowyer and Vail 2011; March 2011; Visser et al. 2014). As a result, economic hardship should drive support for radical left rather than mainstream left parties. A second category of explanations relates to radical parties' programmatic positions more broadly. Radical parties mobilise voters who feel that mainstream parties have neglected their concerns (Hooghe and Marks 2018). For example, both radical left and radical right parties position themselves as nationalist (Burgoon 2013) and Eurosceptic (De Vries and Edwards 2008; Hooghe et al. 2002). Such programmatic positions may especially appeal to individuals who blame their economic hardship on globalisation or intra-EU mobility. Although radical parties typically employ a populist discourse expressing their policy positions (Rooduijn et al. 2017; Rooduijn 2018), this programmatic explanation largely aligns with studies in the second tradition of the comparative political economy literature (Gallego et al. 2022; Pardos-Prado and Xena 2019; Scheve and Slaughter 2001a, b; Wu 2022).

Third and finally, Chapter 5 provides a nuanced picture of the way in which individuals change their political attitudes and policy preferences, building on theories of motivated reasoning. Prior studies have argued that individuals have conflicting motives when processing policy relevant information (Kunda 1990; Redlawsk 2002; Taber and Lodge 2006). On the one hand, individuals are motivated to reach a 'correct' conclusion that enables them to rationally update their policy preferences and process information accordingly. On the other hand, individuals are often motivated by directional goals. They process information in a way that aligns with their standing attitudes (Druckman and Bolsen 2011). When provided with new information, individuals of different partisan stripes may well draw different conclusions and change their policy preferences. In particular, individuals are motivated by directional goals when it comes to politically salient issues (Chong and Druckman 2007; Druckman et al. 2013; Leeper and Slothuus 2014; Slothuus and De Vreese 2010) that individuals consider personally important (Barber and Pope 2023; Leeper 2014; Vidigal and Jerit 2022). Indeed, studies building on theories of motivated reasoning have demonstrated that partisanship shapes individuals' interpretation of policy-relevant information and subsequent conclusions (Bisgaard 2015; 2019; Gaines et al. 2007; Malhorta and Kuo 2008; Tilley and Hobolt 2011).

1.4     EMPIRICAL AND METHODOLOGICAL APPROACH

To examine the theoretical mechanisms outlined above, the chapters in this dissertation draw on different types of data and employ different analyses to test these mechanisms.

Chapter 2 draws on cross-sectional data from the European Union Labour Force Survey (EU-LFS). This chapter uses aggregated individual-level data to create time-series cross-sectional data. Such data enables an examination of how technological change has affected the dynamics at the lower end of the labour market. The resulting dataset spans 16 countries over an 11-year period (1999-2010) and enables an analysis of both the direct and structural long-term effects of the squeezed demand for routine-intense occupations on the prevalence of involuntary part-time employment. Moreover, this dataset can easily be merged with data on labour market institutions, such as active labour markets policies (ALMPs) and employment protection legislation (EPL), as well as other institutional and economic factors that may impact labour market dynamics.

The other theoretical mechanisms examined in this dissertation relate to political attitudes and policy preferences at an individual level. Chapter 3 focuses on how occupational unemployment risks and mobility shape individual attitudes towards the green transition. To measure individual attitudes and preferences, the chapter draws on international public opinion data from the International Social Survey Programme (ISSP). This survey has the advantage that it includes respondents from 11 OECD countries in 2000 and 2010, allowing for an examination of the differences in opinions towards the green transition using pooled time-series cross-sectional data. In addition, the ISSP includes information on respondents' occupations and, therefore, can be merged with the OECD's Programme for International Assessment of Adult Competencies (PIAAC) dataset. This dataset includes detailed information on the type of skills individuals use in their occupation. In this chapter, this dataset will be used to introduce a new measure in the comparative political economy literature to measure occupational mobility.

Datasets on public opinion, as used in chapter 3, have the important advantage that the inclusion of multiple countries in different points in time increases the generalisability of my findings. On the contrary, time-series cross-sectional data are typically less suited for causal inferences. For example, unobserved time-invariant heterogeneity, selection effects and reverse causality may plague findings based on these types of data. Whereas panel datasets enable scholars to deal with such issues, this typically comes at the cost of external validity. Hence, for a better understanding of the mechanisms that explain how risks drive labour market outcomes, political attitudes and policy preferences studies employing both types of data

are needed. That being said, the mechanism put to test in Chapters 4 and 5 of this dissertation relates to changes in attitudes and preferences. Such mechanisms can only be put to test in studies employing panel data.

In Chapter 4 of this dissertation, I examine whether personally experiencing economic hardship changes attitudes towards radical parties. In recent studies drawing on panel data, scholars find little evidence that job losses push individuals to radical parties (Gidron and Mijs 2019; Kurer 2020; Wiertz and Rodon 2021). In this study, I contribute to the literature by proposing that these findings may stem from anticipation effects. The identified effect of job losses on radical party support will be damped in panel studies when voters who eventually lose their jobs have already shifted their attitudes towards these parties. To employ an empirical strategy that accounts for anticipation effects (Been et al. 2023; Dickerson and Green 2012; Marcus 2013; Paiella and Pistaferri 2016; Siflinger 2017; Stephens Jr. 2004), I need panel data on individuals' attitudes towards political parties, changes in employment status, and self-assessed unemployment risk (ideally measured in the preceding wave). The Dutch 'Longitudinal Internet Studies for Social Sciences' (LISS) panel meets all these criteria. Drawing on this panel's dataset, I seek to estimate the true effect of job losses on radical party support by distinguishing between expected and unexpected job losses using an individual's self-assessed unemployment risk.

Chapter 5 examines whether individuals from different partisan stripes change their policy preferences differently after having witnessed the consequences of climate change. Specifically, I test the effect of the 2021 German floods on support for climate change mitigation policies, exploiting the coincidence of the floods with the fieldwork of the German Longitudinal Election Study (GLES) panel. This coincidence enables me to test the extent to which individuals who completed the questionnaire before and after the floods changed their opinions on climate change. Another advantage of the GLES panel is that it includes pre-treatment variables on party identification, preventing post-treatment bias (Montgomery et al. 2018). This enables me to examine whether supporters of Die Grünen change their political attitudes and policy preferences differently compared to all other partisans.

## 1.5 OUTLINE AND MAIN FINDINGS

In the second chapter of this dissertation, *Wishing for More: Technological Change, the Rise of Involuntary Part-Time Employment and the Role of Active Labour Market Policies*, co-authored by Olaf van Vliet, we show that the squeeze in demand for routine-intense occupations is associated with an increase in the prevalence of involuntary part-time employment at the lower end of the labour market. This finding implies that the automation of routine-intense labour worsens employment opportunities in this

segment of the labour market. However, we show that training and job creation schemes mitigate this effect. These programmes cushion labour market competition either by providing medium-educated workers with the necessary skills to shift into high-skill jobs or by increasing employment possibilities.

The next three chapters focus on the individual-level determinants of political attitudes and policy preferences. In chapter 3, *Labour Market Risks, Skill Transferability and Public Opinion on the Green Transition,* co-authored by Olaf van Vliet as well, we show that the extent to which individuals can switch between occupations drives political attitudes towards the transition to a carbon-neutral economy. Individuals in carbon-intensive occupations with occupation-specific skills are more likely to oppose this transition and underlying policies compared to those with skills that are transferable between occupations.

Subsequently, chapter 4, *Caught by Surprise: The Effect of Job Loss on Attitudes towards Radical Parties,* provides evidence that the effect of job losses on support for the radical left depends on whether the loss was anticipated by voters. Voters who lose their jobs unexpectedly become more supportive of the radical left. On the contrary, neither expected nor unexpected job losses increase support for the radical right. In this chapter, I also discuss the implications of these findings and suggest that understanding the roots of the electoral fortunes of radical left and right parties differs.

In chapter 5, *After the Floods: The Effects of Natural Disasters on Public Opinion on Climate Change*, I provide quasi-experimental evidence of the effect of the German 2021 floods. Comparing how partisans who were interviewed just before and after the floods changed their attitudes towards climate change and related policies, I show that the floods increased concern about climate change among partisans of all stripes. However, the increased salience of climate change does not necessarily translate into support for climate change mitigation policies. Only among those who identify with Die Grünen did support for implementing such policies increase.

# 2 | Wishing for More: Technological Change, the Rise of Involuntary Part-Time Employment and the Role of Active Labour Market Policies[1]

ABSTRACT

Technological change has squeezed the demand for middle-skill jobs, which typically involve routine-intense tasks. This squeeze has coincided with an increase in the number of part-time working individuals who wish to work more hours. We argue that these two trends are linked. Due to the decline of middle-skill employment, medium-educated workers shift into low-skill employment, increasing the supply of labour for jobs in this segment of the labour market. This pushes those dependent on these jobs to accept part-time jobs, even if these involve fewer hours than they prefer. To empirically assess this claim, we analyse involuntary part-time employment across 16 European countries between 1999 and 2010. Our analysis confirms that a decline in middle-skill employment is associated with an increase in involuntary part-time employment at the bottom end of the labour market. This finding implies that the automation of routine-intense labour worsens employment possibilities in this segment of the labour market. However, we show that training and job creation schemes mitigate this effect. These programmes cushion competition either by providing medium-educated workers with the necessary skills to shift into high-skill jobs or by increasing employment possibilities. Thus, governments have the tools to support workers facing challenges in the knowledge economy.

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## 2.1    Introduction

Technological change is one of the main drivers of the transition to the knowledge economy. The consequences of this transition for the labour market feature prominently on the political agendas in many Western countries. Amongst the numerous policy reports which have been published about this topic, one of the publications that triggered the policy debate the most is arguably the OECD's (2019) 'Under Pressure: The Squeezed Middle Class'. The report depicts the unequal distributional effects of new technologies: the number of jobs involving routine-intense tasks, typically occupied by medium-educated workers, declined due to the increased applicability of computers and robotics. At the same time, non-standard employment is on the rise, in particular at the bottom of the labour market. For instance, recent studies report a growing number of part-time working individuals who wish to work more hours (Greve 2017). This has raised concerns as these jobs exhibit higher risks of in-work poverty (Brülle et al. 2019; Gardiner and Mialler 2006; Marx et al. 2012;).

We contribute to the comparative political economy literature by providing a novel theoretical explanation that ties the declined demand for routine-intense labour and involuntary part-time employment together. Building on previous studies showing that replacement risks are a key determinant in explaining labour market outcomes (Bellani and Bosio 2019; Eichhorst and Marx 2015; Mattijssen et al. 2020; Reichelt 2015; Weisstanner 2021;), we argue that those in low-skill employment also feel the squeeze in demand for routine-intense labour. Workers in this segment of the labour market have a relatively high replacement risk, even though their jobs involve tasks that cannot easily be performed by computers or robotics (Acemoglu and Autor 2011; Autor et al. 2003;). However, the skills needed to perform these tasks typically require little investments in education or training (Emmenegger 2009; Goldthorpe 2000). Hence, these workers have a relatively high replacement risk; they can easily be replaced by someone else. This makes them relatively vulnerable to shifts in supply of labour (Eichhorst and Marx 2015). Hence, the increased supply for low-skill jobs, resulting from a substantial number of medium-educated workers that shifted into low-skill employment (Acemoglu and Restrepo, 2020; Cortes 2016; Dauth et al. 2017; Kurer and Gallego 2019; Murphy 2014), has been corrosive to the bargaining power of these workers. That in turn pushes them to accept part-time jobs that involve fewer than the desired number of hours.

This study empirically assesses the link between the size of middle-skill employment and the incidence of involuntary part-time employment across 16 European countries for the period 1999-2010. Our empirical analysis also examines the role of ALMPs. In particular, social investment-oriented ALMPs – policies aimed at stimulating labour market participation – might

cushion competition for low-skill employment as they aim to prevent new social risks that are associated with the transition to the knowledge economy from materialising (Bonoli 2013; Taylor-Gooby 2004). So far, the effectiveness of ALMPs is mainly examined in relation to labour market participation, either measured using the employment rate or the unemployment rate (Abrassart 2015; Bakker and Van Vliet 2021; Benda et al. 2019). However, an empirical assessment of whether these programmes have actually protected workers against new social risks, like possessing obsolete skills due to the automation of routine-intense labour, is lacking. Our analysis provides insights into the effectiveness of ALMPs in protecting workers from these risks. These insights are also relevant for governments' employment policies.

## 2.2 Theory

### *The Dwindling Shares of Middle-Skill Employment*

Recently, studies in the field of labour economics have shaken up the consensus that technological change mainly erodes low-skill employment (Acemoglu and Autor 2011; Autor et al. 2003; Goos et al. 2014; Spitz-Oener 2006).[2] Focusing on a job's task content rather than its skill level, these studies show that technological change is routine-biased. New technologies are especially suited to perform routine tasks, that can be characterised as repetitive, procedural and rule-based. As jobs involving these routine tasks typically lie in the middle of the skills distribution, medium-educated workers have been gradually substituted by computers and robotics. This has resulted in a squeezed demand for routine-intense labour, attested by dwin-dling shares of middle-skill employment in Western economies (Gregory 2019; Micheals et al. 2014).

In contrast, both the shares of low- and high-skill employment have grown during the same period. Again, the explanation for this trend is rooted in the task content of these jobs (Acemoglu and Autor 2011; Autor et al. 2003). On the higher end of the skills distribution, digital capital has complemented workers performing non-routine cognitive tasks. Accordingly, the demand for high-educated workers increased, fuelling the transition to the knowledge economy. On the other end of the skills distribution, jobs involve non-routine manual tasks that cannot easily be substituted by computers or robotics, like cleaning, renovating, or serving. This implies that these workers are relatively sheltered from automation risks. Besides, the demand for

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2    In the broader literature, this squeeze in demand for routine-intense labour is mainly linked to rising income inequality (Kristal and Cohen 2017; Parolin 2021) and political and policy preferences (Thewissen and Rueda 2019; Kurer 2020).

low-skill labour increased, predominately due to the growing demand for low-skill services (Autor and Dorn 2013; Goos and Manning 2007).[3]

These findings resonate with the comparative political economy literature analysing the service sector expansion that underpinned the transition to the knowledge economy (Hope and Martelli 2019; Iversen and Wren 1998; Wren 2013). On this reading, the adoption of new technologies in high-end service sectors increased the demand for high-educated workers, given their complementary skills. As a corollary, high-educated workers concentrated in sectors, like finance, business services and communication.[4] Meanwhile, low-educated workers shifted from shrinking traditional sectors, like agriculture and manufacturing, into low-end service sectors in which the diffusion of new technologies is relatively limited.

Our argument builds on these insights but departs from the automation of routine-intense labour and its effect on employment possibilities for medium-educated workers. Note that jobs involving routine tasks were both prevalent in the manufacturing sector and high-end service sectors. Not only the number of blue-collar jobs, like machine operators and assemblers, but also white-collar jobs, like customer service employees and office clerks, have sharply declined during the last decades (Goos et al. 2009; 2014). This study therefore focuses on jobs instead of sectors in analysing the widespread effects of technological change.

The squeezed demand for routine-intense labour has affected medium-educated workers' employment possibilities: they have become more likely to work in low-skill employment over the past decades (OECD 2020; Van Vliet et al. 2021). This shift stems from the nature of these workers' skills which are typically less suited to the tasks involved in high-skill jobs compared to those in low-skill jobs. This explains why a substantial number of displaced medium-educated workers shifted into low-skill employment, albeit some medium-educated workers managed to retain their job (Acemoglu and Restrepo 2020; Cortes 2016; Kurer and Gallego 2019; Murphy 2014). Furthermore, young labour market entrants who completed medium-education are more likely to start working in low-skill jobs (Dauth et al. 2017). At this point, it is important to note that there might be variation in this regard between countries as ALMPs, in particular training, and vocational education and training (VET) systems might provide workers with the necessary skills to

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3    Note that Oesch and Rodriquez-Menes (2011) show that there are large cross-country differences in the growth of low-skill employment.

4    Interestingly, Germany is an important exception in this regard (Diessner et al. 2021). Here, high-educated workers, particularly in science, technology, engineering, and mathematics (STEM), concentrated in the manufacturing sector, whereas reforms across industrial relations and social protection have benefited high-end exporting firms in this sector.

shift into high-skill jobs (Busemeyer and Trampusch 2012; Wang 2020). Nevertheless, the overall picture shows that medium-educated workers shifted into low-skill jobs, increasing the competitive pool for low-skill jobs.

The above-described trends are confirmed by Figure 1, which shows employment data of 16 European countries in the period between 1999 and 2010. First, low-skill employment as a share of total employment indeed increased. The United Kingdom is leading the pack, just ahead of Finland, Norway, and Spain, with an increase in the share of low-skill employment of eight percentage points. The only exceptions are Italy and Luxembourg, in these countries the share of low-skill employment declined, respectively with four and one percentage points. More importantly, the figure confirms the expected shift of medium-educated workers into low-skill employment. In fact, the shares of these workers in low-skill jobs increased by at least 10 percentage points in the majority of the countries. The largest increases can be found in Belgium, Greece and Finland, where their share increased by approximately 18 percentage points. Interestingly, Denmark, Norway and Sweden – the other three Scandinavian countries – are the only countries debunking this trend.

*Figure 1. Medium-educated workers' dependence on low-skill employment, 1999 and 2010*
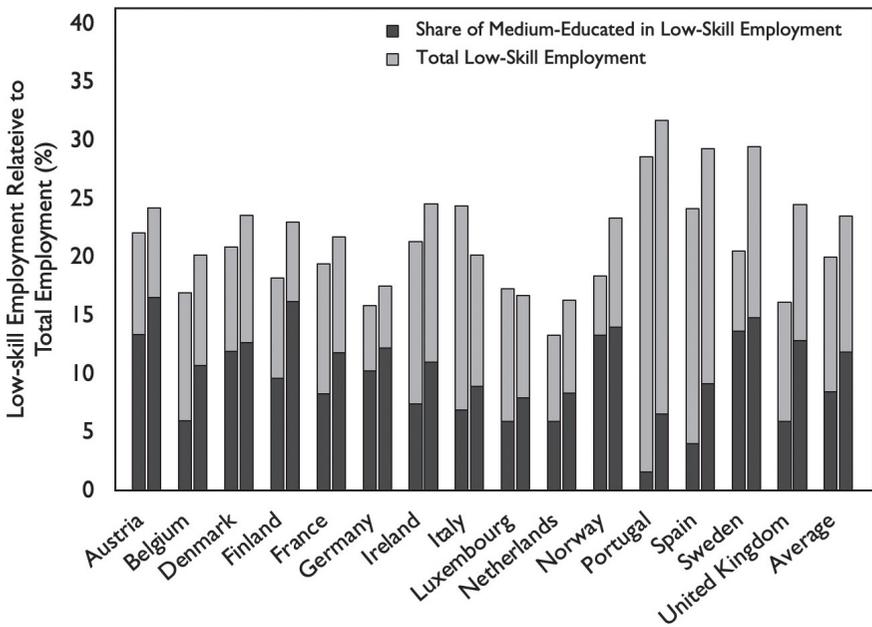


*Source: European Union Labour Force Survey (Eurostat, 2019).*
*Notes: Job categorisation based on ISCO-88. Educational attainment coded according to ISCED.*

*Replacement Risks and Shifting Supply*

Although sheltered from automation risks, the squeezed demand for routine-intense labour also worsens the employment possibilities for workers in low-skill employment. The skills needed to perform tasks associated with low-skill jobs typically require little investment in training or education. Due to this skill profile, workers at the bottom end of the labour market have a relatively high replacement risk: employers can replace these workers relatively easily (Eichhorst and Marx 2015; Emmenegger 2009; Goldthorpe 2000). As replacement is lurking, the bargaining power of these workers is relatively limited. In the same vein, as the burden of finding a replacement is relatively low, employers face few incentives to bind workers to the firm through favourable working conditions, like permanent full-time contracts. This mechanism explains differences in workers' job trajectories (Eichhorst and Marx 2015; Mattijssen et al. 2020; Reichelt 2015), and relative wage risks resulting from labour market flexibilisation (Bellani and Bosio 2019; Weisstanner 2021).

The skill profile of workers in low-skill employment makes them relatively vulnerable to the shifts in labour supply stemming from the automation of routine-intense labour. The described inflow of medium-educated workers in the competitive pool for low-skill jobs implies a growing number of potential substitutes for workers depending on this type of employment (Acemoglu and Restrepo 2020). This in turn has a corrosive effect on these workers already limited bargaining power, pushing them to accept part-time jobs that involve few hours to exit unemployment. Moreover, recall that the growing shares of low-skill employment are mainly driven by the increased demand for low-skill services, which includes a lot of jobs that require flexible working times to meet customers' needs (Hipp et al. 2015). The increased supply of labour for low-skill jobs gives employers greater leverage to achieve this flexibility through the use of part-time contracts.

This dynamic implies a macro-level increase in the number of part-time employed workers who wish to work more hours, in particular at the bottom end of the labour market. Studies presenting descriptive evidence show that their numbers are indeed rising in Europe (Greve 2017). Besides, the share of involuntary part-time employment is highest amongst low-skilled service workers (Peugny 2019). The labour market data presented in Figure 2 tell the same tale. Whereas the share of involuntary part-time employment is relatively stable in middle- and high-skill employment, the share has increased in low-skill employment. Hence, we expect that a decline in the size of middle-skill employment is associated with an increase in the incidence of involuntary part-time employment at the bottom end of the labour market.

*ALMPs: Cushioning Competition*

Active labour market policies might cushion the competition that stems from the increased supply of labour for low-skill jobs. These policies took off in the 1990s when many governments transformed their welfare states against a backdrop of growing concerns regarding its carrying capacity, and the emergence of new social risks stemming from the transition to the knowledge economy (Hemerijck 2013; Nelson 2013; Clasen et al. 2016).[5] Accordingly, the rationale underlying labour market policies became the promotion of labour market participation through activation and invest-ment in human capital policy (Bonoli and Natali 2012:9).

*Figure 2. Rise of involuntary part-time employment at the bottom end of labour market*
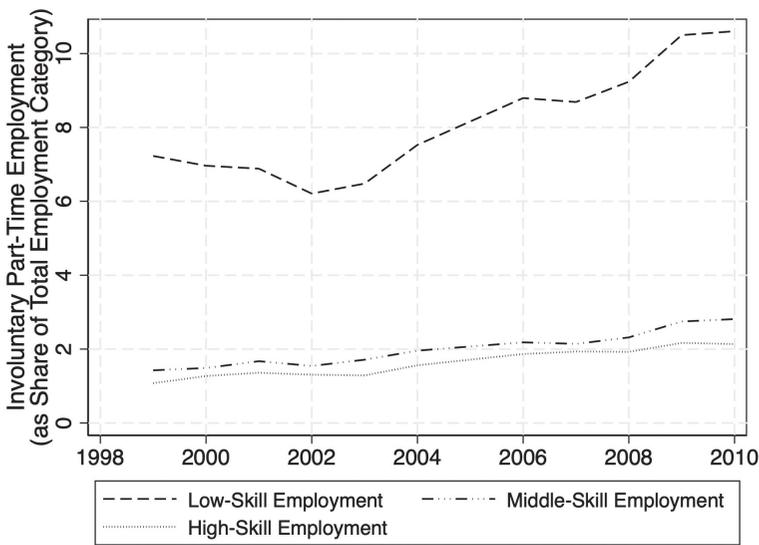
Following Bonoli (2013), we distinguish two types of ALMPs. On the one hand, there are so-called social investment-oriented ALMPs, which invest in human capital and have a pro-market employment orientation. These poli-cies are designed to increase the quantity and quality of the labour force. In particular, two policies are relevant in this regard: training and employment incentives. First, training increases an individual's employability by human capital enhancement, which has been associated with an increase in labour market participation (Card et al. 2018; Kluve 2010). Training can also help

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5     Moreover, European integration (Van Vliet and Koster 2011) and the financial crisis in
      2008 (Bengtsson et al. 2017) have fueled this transformation.

workers who found themselves possessing obsolete skills due to the auto-
mation of routine-intense labour, acquiring the necessary skills to shift into
high-skill jobs (Rodrik and Stantcheva 2021). This might limit the inflow of
redundant workers in the competitive pool for low-skill employment. As a
result, we expect that high levels of effort on training attenuate the rise in
involuntary part-time employment by cushioning competition.

Second, employment incentives also aim to stimulate labour market partici-
pation (Graversen and Van Ours 2011). However, we expect that the effect
differs regarding the prevalence of involuntary part-time employment. The
bulk of spending in this category includes making-work-pay-policies, like
income maintenance and support payments, and back-to-work bonuses.
This entails payments to formerly unemployed individuals who have taken
up part-time or full-time employment and as a result experience an income
loss relative to unemployment benefits. Therefore, they are encouraged to
accept (part-time) jobs even though earnings might be lower than the level
of benefits due to a lower wage or fewer hours (Haapanala 2021). Thus,
we expect that effort on employment incentives increases the incidence of
involuntary part-time employment.

On the other hand, there are demand-side ALMPs that stimulate labour
market participation by increasing employment possibilities, like public job
creation schemes. The creation of these jobs offers workers dependent on
low-skill employment an alternative to exit unemployment. This reduces
the need to accept a part-time job in the private sector to exit unemploy-
ment. However, the effectiveness of these schemes in relation to labour
market participation is inconclusive (Card et al. 2018; Kluve 2010). This
might call the attractiveness of these public jobs as a realistic alternative into
question. Nevertheless, we expect that effort on direct job creation mitigates
competition and is thus associated with a decrease in the incidence of invol-
untary part-time employment.

## 2.3   Method, Measures and Data

Using a *partial* adjustment model, we regress the share of involuntary
part-time employed workers in a country on indicators measuring the
automation of routine-intense labour, active labour market policies, and
institutional and economic factors (see section A of the supplementary
material for a technical explanation of our model). As this model captures
both transitory and permanent effects (De Boef and Keele 2008; Williams
and Whitten 2012), we are able to analyse not only the immediate impact
of the decline of middle-skill jobs but also the way this contributes to the
structural change in the dynamics at the bottom end of the labour market.
Note that our model controls for serial correlation, panel-heteroscedasticity
and contemporaneous spatial correlation (Beck and Katz 2011).

We define our dependent variable as the number of part-time employed workers who wish to work more than the current number of hours as a share of the total number of workers in low-skill employment (see online appendix for the operationalisation of all variables and sources). To define low-skill employment, we follow Goos et al. (2014) and categorise jobs based on their mean wage rank using two-digit International Standard Classification for Occupations (ISCO) codes.[6] The jobs that are included in this category are typically low-paying and involve few routine tasks, meaning that they are not easy to automate.

Focusing on low-skill employment is relevant for two reasons. First, the automation of routine-intense labour intensifies competition at the bottom end of the labour market (Acemoglu and Restrepo 2020). Workers in these jobs are especially vulnerable to competitive pressures as they have a relatively high replacement risk. Second, our measure is relevant in the context of the growing number of working poor in Europe, as insufficient working hours, especially in low-skill employment, are one of the main determinants of in-work poverty (Brülle et al. 2019; Gardiner and Millar 2006; Marx et al. 2012).

For our measure of the size of middle-skill employment, the main independent variable, we again use two-digit ISCO codes to categorise jobs based on the ranking provided by Goos et al. (2014).[7] Subsequently, we use the relative number of hours worked in this category to measure the size of middle-skill employment: this measure is frequently used to analyse the labour market structure (Maarek and Moliteaux 2021; Verdugo and Allègre 2020). In this way, we are able to capture the decrease in demand for routine-intense labour, which is associated with an increase in the competi-tive pool for low-skill jobs.

The data underlying our dependent variable and main independent variable come from the EU-LFS (Eurostat 2019). We aggregated micro-level data to create time-series cross-sectional data for 16 countries between 1999 and 2010.[8] Due to a break in the occupational classification in 2011 (from

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6    Based on this categorisation, low-skill employment includes labourers in mining construction, manufacturing and transport; personal and protective service workers; models, salespersons, and demonstrators; and sales and service elementary occupations.

7    The complete list of occupations in middle-skill employment includes: stationary plant and related operators; metal machinery and related trade workers; drivers and mobile plant operators; office clerks; precision, handicraft, craft printing and related trade workers; extraction and building trades workers; customer service clerks; machine operators and assemblers; other craft and related workers.

8    We focus on the countries that made up the European Union previous to the 2004 enlargement (Austria, Belgium, Denmark, Germany, Greece, Finland, France, Luxembourg, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden and the United Kingdom) plus Norway.

ISCO88 to ISCO08), our analysis focuses on the longest consistent time series available (1999-2010). This could be a potential limitation of our analysis. However, a sensitivity analysis shows that our results also hold if we extend the period to 2018 by applying a crosswalk to link both classifications (see the robustness tests). Furthermore, we restricted our sample to individuals of working-age (15-64), excluding full-time students, unpaid family workers and the agricultural sector. Note that the results of our analysis are not sensitive to the exclusion of these categories.

To analyse the effect of ALMPs, we focus on the three previously described policies: two social investment-oriented ALMPs, training and employment incentives, and public job creation schemes. Effort on each policy is operationalised as expenditures corrected by the number of unemployed relative to Gross Domestic Product (GDP) per capita. In this regard, the unemployed serve as a proxy for the number of recipients (Kuitto 2016; Van Vliet and Koster 2011). The data underlying our measure are from the OECD's Labour Market Programmes, and the National Accounts databases.

In our analysis, we also control for a number of institutions and economic explanations of involuntary part-time employment. First, passive labour market policies (PLMPs) are associated with a shrinkage of the labour supply (Bassanini and Duval 2009). Hence, we include a measure of PLMPs, which comprises unemployment benefits and early retirement programmes, to control for this. Second, the strictness of EPL might impact hiring decisions of employers (Kalleberg 2003). We control for this by including the OECD's EPL indicator for regular contracts. Third, the degree of firm involvement in the provision of VET determines the development and quality of medium-educated worker's skills (Busemeyer and Trampusch 2012). The theoretical skills that are important for (high-end) service sector jobs are less provided if firms are heavily involved in the provision of VET, compared to a school-based setting or on-the-job-learning (Anderson and Hassel 2013). To account for these differences in the skill formation process, we follow Busemeyer and Iversen (2012) and control for the share of students in vocational training schemes that combine school- and workplace-based VET. Fourth, the effect of automation on labour market outcomes is conditional on the strength of organised labour, reflected by trade union membership and wage-setting institutions (Parolin 2021). Automation has, however, also chipped away at organised labour's power (Meyer 2019a), and trade unions typically have difficulties gaining ground in the service sector (Brady 2007; Palier and Thelen 2010). We control for the strength of organised labour by adding trade union density and the centralisation of wage bargaining. Fifth, we use government partisanship to control for the impact of left-wing governments. Left-wing parties express more criticism regarding various forms of non-standard employment (Picot and Menendez 2017). Finally, we account for economic conditions by including GDP growth and the unemployment rate. Economic downturns are typically associated with an increase in involuntary part-time employment (Valletta et al. 2020).

## 2.4    Results

*Regression Results*

Table 1a shows the estimation results from our partial adjustment model. The coefficients of the size of middle-skill employment show a negative and statically significant relationship with the incidence of involuntary part-time employment at the bottom end of the labour market. In other words, a decline in the size of middle-skill employment is associated with an increase in the incidence of involuntary part-time employment. This implies that the automation of routine-intense labour indeed intensifies competition. Moreover, the long-run multiplier shows that a percentage point decrease in middle-skill employment is associated with a permanent increase in involuntary part-time employment of approximately 0.8 percentage points (see Table 1b).[9] These results confirm our hypothesis that technological change pushes workers to accept part-time jobs that have fewer than the desired number of hours.

Turning to the social investment-oriented ALMPs (see Table 1a), effort on training is associated with a decrease in the incidence of involuntary part-time employment. The coefficient is significant, indicating that a one-unit increase in effort on training per unemployed as a share of GDP tends to decrease the incidence of involuntary part-time employment by 0.06 percentage points. This finding is in line with previous studies reporting positive effects regarding effort on training (Card et al. 2018; Kluve 2010). In contrast, effort on employment incentives is associated with an increase in involuntary part-time employment. This is in line with our expectation that employment incentives encourage unemployed individuals to accept jobs that involve few hours. Finally, effort on direct job creation is associated with a decrease in the incidence of involuntary part-time employment, confirming our expectation. This might provide support for the importance of the cushioning role of demand-side policies, like the "Melkertbanen" in the Netherlands, and "Nouveaux Services Emplois Jeunes" in France (Daguerre 2007; Huo 2009; Vlandas 2013).

With regard to the results of the institutional and economic factors, the coefficients of effort on PLMP and EPL are insignificant. Firm involvement in training seems to increase involuntary part-time employment, providing support for the argument that dual training systems limits a countries' ability to adjust to the knowledge economy (Anderson and Hassel 2013). Furthermore, trade union density is associated with a decrease in the incidence of involuntary part-time employment, which is in line with previous studies (Parolin 2021). The coefficients of bargaining centralisation and left-wing gov-

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9       Recall that this coefficient captures the total cumulative effect of competition in the long run.

ernments have the expected sign but are insignificant. Finally, GDP growth is associated with a decrease in the incidence of involuntary part-time employment, whereas the coefficient for unemployment is not significant.

Our second hypothesis pertains the potential cushioning role of ALMPs regarding the competition stemming from the squeezed demand for routine-intense labour. Figure 3 graphically plots the result of the interaction with effort on training (see Table 1a for the coefficients). The figure shows that the decline of middle-skill employment does not have a significant effect in countries with relatively high levels of effort on training. However, the average effort on training exceeds 16 per cent per unemployed as a share of GDP per capita only in Denmark for the entire period. Besides, for some periods in Austria (between 2008 and 2010), Norway (between 1999 and 2004, and in 2007) and Sweden (between 1999 and 2002) the yearly level of effort on training exceeds the threshold. Overall, these findings provide support for our hypothesis that effort on training cushions competition and is thus associated with a decrease in involuntary part-time employment at the bottom end of the labour market. In this regard, this policy seems to live up to expectations.

*Table 1a. Partial adjustment models of involuntary part-time employment*

| | Δ Involuntary Part-Time Employment | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Competitive pressure* | | | | |
| Size middle-skill employment | -0.094*** | -0.208*** | -0.096*** | -0.154*** |
| | (0.028) | (0.062) | (0.034) | (0.038) |
| *Active labour market policies* | | | | |
| Training | -0.056*** | -0.369*** | -0.056*** | -0.087*** |
| | (0.020) | (0.142) | (0.020) | (0.021) |
| Middle-skill empl. * Training | | 0.009** | | |
| | | (0.004) | | |
| Employment incentives | 0.068*** | 0.051** | 0.056 | 0.067*** |
| | (0.026) | (0.023) | (0.144) | (0.026) |
| Middle-skill empl. * Employment incentives | | | 0.000 | |
| | | | (0.004) | |
| Direct job creation | -0.074* | -0.059 | -0.075* | -0.688** |
| | (0.038) | (0.037) | (0.039) | (0.323) |
| Middle-skill empl. * Direct job creation | | | | 0.015* |
| | | | | (0.008) |

| | Δ Involuntary Part-Time Employment | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Institutional and economic factors* | | | | |
| PLMPs | 0.001 | -0.006 | 0.001 | 0.011 |
| | (0.006) | (0.007) | (0.006) | (0.008) |
| EPL | -0.124 | -0.156 | -0.126 | 0.070 |
| | (0.191) | (0.205) | (0.190) | (0.215) |
| Firm involvement in training | 0.014** | 0.009 | 0.014** | 0.016** |
| | (0.007) | (0.008) | (0.007) | (0.007) |
| Trade union density | -0.026*** | -0.026*** | -0.027*** | -0.031*** |
| | (0.008) | (0.008) | (0.008) | (0.008) |
| Bargaining centralisation | -0.009 | 0.097 | -0.008 | 0.022 |
| | (0.160) | (0.143) | (0.161) | (0.166) |
| Partisanship government (left) | -0.003 | -0.002 | -0.003 | -0.002 |
| | (0.002) | (0.002) | (0.002) | (0.002) |
| GDP growth | -0.084*** | -0.074*** | -0.084*** | -0.078*** |
| | (0.029) | (0.027) | (0.028) | (0.029) |
| Unemployment | -0.009 | 0.028 | -0.009 | -0.018 |
| | (0.042) | (0.045) | (0.041) | (0.045) |
| Involuntary part-time employment (t-1) | -0.123*** | -0.152*** | -0.123*** | -0.158*** |
| | (0.026) | (0.029) | (0.026) | (0.033) |
| Observations | 148 | 148 | 148 | 148 |
| Adjusted $R^2$ | 0.260 | 0.272 | 0.258 | 0.268 |

*Note:* Panel corrected standard errors (in parentheses) and panel specific AR1 structure (estimated through Prais-Winsten transformation). Constant and trend not shown. * $p<0.1$, ** $p<0.05$, *** $p<0.01$

*Table 1b. Partial adjustment models of involuntary part-time employment*

| | Δ Involuntary Part-Time Employment | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Long-run multiplier* | | | | |
| Middle-skill employment | -0.767*** | -1.369*** | -0.780*** | -0.975*** |
| | (0.167) | (0.282) | (0.212) | (0.145) |
| Observations | 148 | 148 | 148 | 148 |
| Adjusted $R^2$ | 0.260 | 0.272 | 0.258 | 0.268 |

*Note:* Panel corrected standard errors (in parentheses) and panel specific AR1 structure (estimated through Prais-Winsten transformation). * $p<0.1$, ** $p<0.05$, *** $p<0.01$

Figure 4, which plots the interaction with effort on employment incentives, does not show a significant effect. Hence, employment incentives do not exacerbate competition for low-skill employment. Finally, Figure 5 plots the results of the interaction with effort on direct job creation. The plot reveals a similar pattern as described for effort on training. In countries with higher levels of effort on direct job creation, a decline in the size of middle-skill employment does not have a significant effect. The Netherlands is the only country in which effort on job creation exceeds the threshold of 10 per cent per unemployed as a share of GDP per capita between 1999 and 2010. Furthermore, effort in Belgium (in 2000 and 2001), France (between 2000 and 2004, and in 2007), Ireland (between 1999-2008), and Luxembourg (in 2010) also exceeds the threshold during some periods. Although the coefficient of the interaction with job creation is only significant at the 10 per cent level (also reflected in the confidence intervals), this finding underlines the previously suggested success of demand-side policies in cushioning competition stemming from the automation of routine-intense labour.

*Figure 3. Interaction effect of middle-skill employment and effort on training*
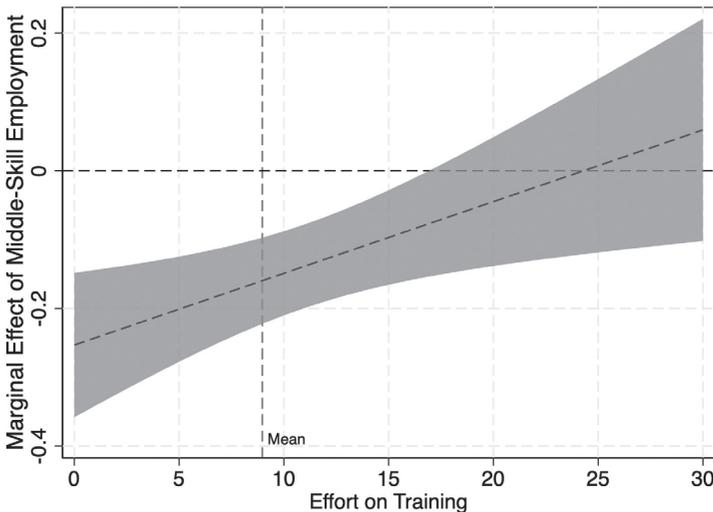
*Figure 4. Interaction effect of middle-skill employment and effort on employment incentives*
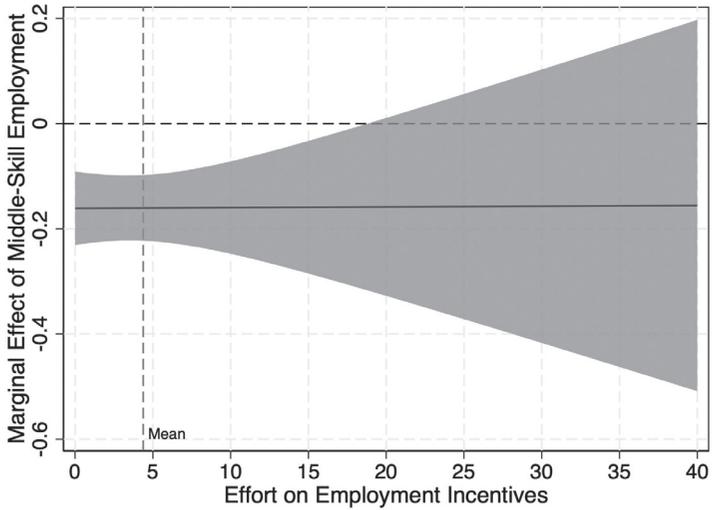


*Figure 5. Interaction effect of middle-skill employment and effort on direct job creation*
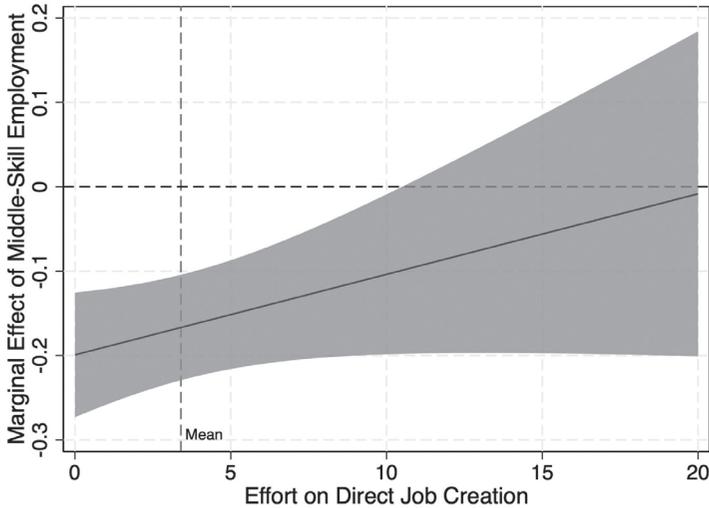


*Sensitivity Analysis*

In a number of additional estimations, we examine the robustness of our results (see online appendix). The first row in this table presents the standardised beta coefficient and LRM of our baseline estimation of the association between the size of middle-skill employment and the incidence of involuntary part-time employment (see Table 1, first column). First, the findings hold if we extend the period to 2018 by applying a crosswalk to

link the ISCO-88 and ISCO-08 classifications. Second, our findings are robust if we extend our analysis to the total employment by including all jobs (low-, middle- and high-skill). Note that the magnitude of the coefficients is relatively small compared to the original results. This seems to confirm that the competitive pressures mainly affect those at the bottom end of the labour market. Next, we limit our sample to individuals of prime working age (between 25-64). In this way, we rule out the possibility that our findings are mainly driven by workers just entering the labour market or approaching retirement. Indeed, the presented coefficients are fairly similar. Third, we restrict our sample to either men or women. There are various studies showing that (involuntary) part-time employment is especially relevant regarding women's labour market position (Insarauto 2010). Although our results confirm that women are more affected by the changing labour market structure, the coefficient for the estimation only including men is also highly significant.

Subsequently, we test the robustness of our results for different methodological specifications. First, we include the initial share of low-skill employment to control for differences between countries to the extent they already relied on low-skill jobs. Second, our preferred specification does not include country or/and year fixed effects as this might introduce bias into the model (Nickell 1981) or amplify bias (Plümper and Troeger 2019). Nevertheless, our results are largely unaltered by the introduction of country fixed effects or a combination of country and year fixed effects. Finally, we test whether our results hold up using a general error correction model.[10] Again, the coefficients remain highly significant and comparable in magnitude.

## 2.5    Conclusion

Technological change has transformed Western economies' labour markets substantially since the early 1990s. As artificial intelligence, computers, and robotics proved to be a low-cost substitute for routine-intense labour, medium-educated workers suffered a fall in demand. As a result, a sizeable proportion of medium-educated workers is forced to shift into low-skill employment. We argue that the inflow of these workers in the competitive pool for low-skill employment worsens the employment possibilities of those dependent on this type of employment. Workers in low-skill employment have a high replacement risk: they typically perform tasks that require little investment in training. Their bargaining position corroded as the automation of routine-intense labour increased their potential number of substitutes. This pushed these individuals to accept part-time jobs that involve fewer than the desired number of hours.

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10    The inclusion of lagged independent variables makes this model more flexible. However, this asks a lot more from the data. To illustrate, such a model would include ten differenced independent variables and four interactions instead of one.

Our empirical analysis provides support for the argument that the automation of routine-intense labour is associated with an increase in involuntary part-time employment at the bottom end of the labour market. Analysing 16 European countries between 1999 and 2010, we show that involuntary part-time employment in this segment of the labour market increased at the macro-level. Accounting for the cross-country variation in (labour market) institutions, we show that the decrease in the size of middle-skill employment is associated with an increase in the incidence of involuntary part-time employment, both in the short and the long run. This finding fits within previous studies that showed how high replacement risks impact job trajectories (Mattijssen et al. 2020; Reichelt 2015), translate into wage pressure in the context of flexibilisation (Bellani and Bosio 2019; Weisstanner 2021), and affects job quality (Eichhorst and Marx 2015). Moreover, the results add to the descriptive evidence that the transition to the knowledge economy and the squeezed demand for routine-intense labour are linked to a rise in non-standard employment (Green and Livanos 2017; Greve 2017; Peugny 2019).

Furthermore, the results confirm that effort on training cushions competition for low-skill employment. Previous studies have already shown that training is associated with an increase in the employment rate (Card et al. 2018; Kluve 2010). We add to this that training helps individuals, whose skills have become obsolete due to automation, acquiring the skills necessary to shift into high-skill jobs. As a result, these programmes relieve pressure on the bottom end of the labour market. We also presented evidence that effort on direct job creation has a similar effect. Encompassing job creation schemes mitigate the adverse effect of the automation of routine-intense labour at the bottom end of the labour market. However, note that our analysis of the effectiveness of ALMPs comes with two limitations. First, our measure does not include benefit conditions and eligibility rules (Knotz 2020). Besides, ALMPs can complement each other: the success of an individual policy might hinge on such complementarities (Bakker and Van Vliet 2021; Benda et al. 2019).

To conclude, the transition to the knowledge economy goes hand in hand with increased competition at the bottom end of the labour market, increasing involuntary part-time employment. However, training and direct job creation can cushion this competition. These findings are relevant considering predications that more jobs will disappear in the next 15 to 20 years (Frey and Osborne 2013). In this regard, they provide support for the prominence of skills in the European Pillar of Social Rights; an initiative of the European Commission to reform European labour markets. Even so, governments face obstacles in expanding such policies, as recent studies show that these policies have not found their way to workers' hearts yet (Bremer and Bürgisser 2023; Busemeyer and Sham 2021).

*Section A – Technical background estimation method*

For our analysis, we use a partial adjustment model. This model captures both transitory and permanent effects (De Boef and Keele 2008; Williams and Whitten 2012), which enables us to analyse both the direct effect of the decline of middle-skill jobs but also the way this contributes to the structural change in the dynamics at the bottom end of the labour market. We estimate the following equation:

$$\Delta Y_{i,t} = \alpha + \beta_0 Y_{i,t-1} + \beta_1 X_{i,t} + \tau t + \varepsilon_{i,t}$$

Here, $\Delta y_{it}$ represents the first difference in the share of involuntary part-time employment in country $i$ at time t, whilst $Y_{i,t-1}$ refers to its lagged level. $\alpha$ represents the intercept, $\varepsilon$ denotes the error term, and $\tau$ parametrises a linear time trend. The latter is included as unit root tests provide evidence that our main dependent variable, the share of middle-skill employment, is trend-stationary. The direct effect of $X$, a vector of independent variables, is captured by $\beta_1$, which is the contemporaneous value of the covariate. This effect, also known as the short-term or transitory effect, captures the impact of a one-unit change in $X$ on $Y$ at time t (De Boef and Keele 2008). We also analyse the permanent effect of $X$ on $Y$ at time t distributed in the long run; steady-state or long-run equilibrium of the model. This is captured by the long-run multiplier, which is given by $\left(\widehat{\beta_1} / -\widehat{\beta_0}\right)$. Moreover, we calculate its standard errors using the delta method (Papke and Wooldridge 2005).

Finally, we control for remaining autocorrelation by specifying our error term to follow a country-specific AR(1) process, estimated with Prais-Winsten transformation. Additionally, panel-corrected standard errors are used to correct for panel-heteroscedasticity and contemporaneous spatial correlation (Beck and Katz 2011).

# 3 | Labour Market Risks, Skill Transferability and Public Opinion on the Green Transition[1]

ABSTRACT

The transition towards a green economy has distributive consequences; existing carbon- intense jobs will disappear, whereas new jobs in green sectors will be created. Individuals with specific skills who risk losing their job due to these policies face unfavourable labour market prospects. This translates into a potentially long spell of unemployment or a substantial drop in income if they accept reemployment in jobs in which their skills are less relevant. In contrast, those individuals with transferable skills are more likely to reap the benefits of this transition. Hence, we argue that an individual's labour market risk is essential for understanding the roots of public opposition to climate policies. More specifically, the transferability of an individual's skill profile shapes preferences towards climate policies. To test our theory, we create a new measure that captures the transferability of skills by linking them to occupations. Our cross-sectional and longitudinal models based on comparative survey data confirm the importance of skill transferability in the context of support for the green transition. This also provides valuable insights in understanding why it has been so difficult to introduce the climate policies underpinning this transition.

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## 3.1    Introduction

Climate change is one of the most pressing challenges that humanity faces today, with the potential to cause severe economic, social and environmental consequences in the coming years. As such, it has become an issue of great concern among policymakers, academics, and the public. Yet, whereas many governments have committed themselves to limiting the average temperature increase to less than two degrees Celsius above pre-industrial levels, implementing the policies to achieve this goal remains difficult. This difficulty stems partly from the public opposition to these policies (Schaffer et al. 2022). Understanding the roots of this opposition is fundamental for the implementation of future climate policies.

The policies underpinning the transition towards a green economy have distributive consequences; existing carbon-intensive jobs will disappear, whereas new jobs in green sectors will arise. This will be associated with concerns regarding an individual's labour market prospects (Vona 2019; Weber 2020). Literature on earlier structural economic changes such as globalisation and technological change has demonstrated how labour market risks associated with such changes have shaped policy preferences (Pardos-Prado and Xena 2019; Scheve and Slaughter 2001b; Walter 2017). However, most literature on the adoption of climate policies, so far, has largely ignored the important role of occupational mobility.

In this paper, we focus on an individual's economic risks and provide a novel explanation for understanding environmental support and attitudes towards climate policies. Whether individuals will be sheltered from the potential adverse employment effects of the green transition or be able to reap its benefits is largely dependent on their skill profile. Individuals with skills that are transferable to a broad group of occupations should feel relatively safe in the face of the green transition. In contrast, those individuals with specific skills face unfavourable labour market prospects should they lose their job. Since their skills are only relevant for a small number of occupations, the event of job loss is likely to result in a long spell of unemployment or a substantial drop in income if they accept reemployment in jobs in which their skills are less relevant. This difference in risk exposure explains why we expect opposition amongst the latter group to climate policies, which have insecure, potentially adverse labour market effects.

We provide empirical evidence for the link between labour market risks and environmental support and corresponding climate policy preferences. In this regard, we rely on two waves of the ISSP on the environment. To assess the importance of perceived labour market risks, we introduce a new measure of skill transferability in the comparative political economy literature. This measure is rooted in Lazear's (2009) skill weight approach and is

frequently used in the labour economics literature. To do so, we use detailed individual-level survey data from the OECD's PIAAC. This dataset contains information on how individuals use their skills at work. As far as we know, we are the first to use this measure in relation to policy preferences.

In addition, we examine the mechanism through which the transferability of an individual's skills operates in shaping individuals' policy preferences. In the comparative political economy literature, it is often assumed that individuals are aware of how labour market shifts affect their jobs and increase the risk of becoming unemployed (Gallego and Kurer 2022; Rehm 2009; Thewissen and Rueda 2019; Walter 2010). In contrast, Ahrens (2024) recently contended that these assumptions might be too strong. Our study contributes to this literature by actually testing these assumptions explicitly. The results show that skill transferability is positively related to the perceived relevance of skills and negatively related to subjective labour market risk.

Overall, we show that individuals with transferable skills have a lower probability of prioritising the economy over the environment. This finding is robust across sub-samples, to the inclusion of additional control variables, and to alternative model specifications. More generally, our findings show the relevance of labour market risks, measured with our refined concept of skill transferability, for understanding climate policies. Thereby, our results contribute to a growing literature on public support for climate policies (Beiser-McGrath and Busemeyer 2023; Gaikwad et al. 2022; Mildenberger and Tingley 2019; Umit and Schaffer 2020). In showing the importance of labour market prospects, we provide valuable insights into why it has been so difficult to introduce climate policies.

## 3.2    The Argument – Climate Policies and Skill Transferability

*Structural Economic Change and Labour Market Risks*

In explaining attitudes towards environmental policies, we build on the comparative political economy literature by focusing on people's expectations about the economic impact of these policies. Scholars have shown how worries regarding the anticipated effect on market income, either in the present or the future, of structural economic changes, such as globalisation, and technological change, shaped preferences (Gallego and Kurer 2022; Pardos-Prado and Xena 2019; Rehm 2009; Walter 2017). As a substantial part of market income depends on an individual's labour market status, labour market risks are at the heart of this body of literature. The causal mechanism in this regard is that workers perceive economic risks because they can only transfer part of their skills from one occupation to a new occupation, which typically translates into lower market income. Hence, risks that affect

people's occupation – either because the occupation can easily be offshored
or automated, or because of increased competition from immigrant workers
– translate into higher demand for social protection (Thewissen and Rueda
2019; Walter 2010, 2017) or opposition towards related policies (Gallego et
al. 2022; Scheve and Slaughter 2001a, b; Wu 2022).

Yet, climate change and policies which are aimed at mitigating the effects of
climate change have not been considered as major drivers of structural eco-
nomic change in the comparative political economy literature yet. However,
based on insights from the economic literature which indicate that the green
transition will have substantial employment effects, it can be expected that
labour market risks are a relevant factor in the politics of the green transition.

*The Employment Effects of Climate Policies*

Recent macro-economic studies predict that the overall employment effects
of the green transition tend to be positive or neutral (Hafstead and Williams
III 2018; Shapiro and Metcalf 2023). Using general-equilibrium models, they
show that the job losses in affected sectors arising from the climate policies
underpinning the green transition, such as carbon taxes or performance
standards, will be offset by positive employment effects in the whole econ-
omy. While the validity of these models typically hinges on assumptions,
like perfect labour mobility (Heutel and Zhang 2021), the evidence on the
impact of existing carbon taxes confirms that carbon taxes have not affected
overall employment in Europe (Martin et al. 2014; Metcalf and Stock 2023).
At the same time, the predicted overall employment effect will be associated
with a shift in the employment structure, requiring a substantial number of
workers to reallocate to less carbon-intensive sectors.

Indeed, numerous studies which examined the employment effects of cli-
mate policies that have already been implemented echo the need for work-
ers to reallocate (Becker and Henderson 2000; Curtis 2018; Curtis et al. 2024;
Greenstone 2002; Kahn and Mansur 2013; Millimet and Roy 2016; Popp et
al. 2024; but also see Berman and Bui 2001; Morgenstern et al. 2002). As
climate policies have chipped away at employment in affected sectors, job
prospects for workers employed in these sectors changed dramatically. For
example, after the 1990 Clean Air Act Amendment was implemented, work-
ers in regulated sectors experienced a substantial drop in income of 20 per
cent compared to their pre-regulatory earnings, stemming from unemploy-
ment and lower earnings in future employment (Walker 2013). Moreover, it
took up to five years for incomes to recover. This adds to previous studies
showing that the adverse effects of job losses are relatively persistent (Davis
and Von Wachter 2011; Jacobson et al. 1993).

However, the short-term adverse employment effects might also spill-over
into the broader economy. Analysing how regions that initially prospered
during the coal boom in the 1970s experienced a dramatic drop in employ-

ment in the mining sector, Black et al. (2005) show that employment also contracted in other sectors. Furthermore, these effects tend to be relatively persistent as well (Autor et al. 2021). Thus, we can conclude that the literature shows that climate policies do not result in massive employment losses. However, these policies have the potential to shift employment structures, which potentially increases economic concerns in the broader economy.

This picture also emerges in the literature analysing attitudes towards climate policies and environmental support. Various studies show that individuals worry that climate policies have adverse effects for the broader economy. In fact, when it comes to voting for climate policies many voters considered this as one of the most important determinants for their voting decision (Shwom et al. 2010). Concerns about the broader impact of climate policies also contributed to the rejection of carbon taxes in Switzerland in two separate occasions (Carattini et al. 2017; Thalmann 2004). These findings confirm that feelings of economic insecurity are not limited to those directly impacted by climate policies (Gaikwad et al. 2022). Instead, the worries regarding these policies are also shared amongst a broader public.

*Skill Transferability*

We argue that the employment concerns associated with the introduction of climate policies resonate with a broader public and that the degree to which individuals would be affected by job losses differs. Displaced workers typically lose productivity when they move to the next job because they can only transfer part of their skills. This, in turn, translates into lower earnings or unemployment spells. However, there are differences in the degree to which workers can transfer their skills across occupations. This implies that some workers will have higher levels of occupational mobility, and that the transition from one occupation into the next will be relatively smooth. In contrast, exiting unemployment might be more challenging for other workers, as their skills have lost relevance.

This idea has also been put forward in the comparative political economy literature by Iversen and Soskice (2001) in the context of redistribution. They argued that workers with specific skills will demand higher levels of redistribution as job loss would result in potentially long unemployment spells or a substantial drop in earnings. The opposite is true for workers with transferable skills. Their skill profile allows them to move across occupations without losing much productivity. In a similar vein, Pardos-Prado and Xena (2019) show that the economic risks associated with specific skill profiles explain anti-immigrant attitudes. We build on these insights and argue that individuals with transferable skills face relatively lower economic risks in the event of job loss. Therefore, they are more likely to support policies that have uncertain economic impacts, in this case climate policies.

## 3.3    Empirical Approach and Data

*Measuring Skill Transferability*

In the above, we have emphasised the importance of people's occupational mobility for attitudes towards environmental policies. To capture the ease with which workers can move from one occupation to another, we take a skill-weight approach (Lazear 2009). Occupations bundle different combinations of skills, each skill with a different weight attached. These weights reflect the relevance of the skill. For instance, occupations that rely heavily on physical skills attach a higher weight to this type of skill. The transferability of a skill between two occupations is determined by the difference in the attached weights. If these weights are similar, workers can transfer this skill without losing productivity. This implies that workers can move relatively easily between occupations to which the same bundle of skills is relevant.

To ascertain skills' relevance within occupations, we rely on the PIAAC survey, which is conducted by the OECD, and which contains individual-level information on workers' use of skills. For each ISCO two-digit level occupation, we create skill weights using the frequency with which a skill is typically used. First, we recode all answers into a work-time scale. To create comparable individual-level weights, we use this scale and divide the time spent on each individual skill by the sum of time spent on all skills. Second, we take the average time spent on each skill by occupation and country. This leaves us with country-specific occupations skill weights, which relax the assumption that skill-use in occupations is identical across countries.

Next, we need a measure that empirically captures the transferability of skills between occupations. Gathmann and Schönberg (2010) have used the angular distance to calculate the difference in skill-use between occupations.[2] They think of the bundle of skills of each occupation as a vector. Doing so allows them to position occupations relative to another. Figure 1 illustrates the logic of this measure for a teaching professional and an assembler, which is visualised on the left-hand panel of the figure. For simplicity, we suppose that there are only two types of skills: communication skills, and physical skills. We use information from the PIAAC survey to position both occupations, following the above-described procedure. If we

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2    The angular distance (sometimes referred to as the uncentered correlation) is calculated using the following formula:

$$\mathrm{AngDis} = \frac{\Sigma_{j=1}^{J}\left(q_{jo} \times q_{jo'}\right)}{\left[\Sigma_{j=1}^{J}\left(q_{jo}^{2}\right) \times \Sigma_{k=1}^{J}\left(q_{jko'}^{2}\right)\right]^{\frac{1}{2}}}$$

Here, $o$ and $o'$ denote two occupations, and $q_{jo}$ is the weight of skill $i$ in occupation $o$. This measure has also been used for analysing the length of unemployment spells, differences in wages, and the likelihood of occupational switches (Baley et al. 2022; Eggenberger et al. 2018; Fedorets et al. 2019)

consider physical skills (shown on the y-axis), there is a sizeable difference between the two occupations. Not surprisingly, these types of skills are more relevant to assemblers. Turning to communication skills (shown on the x-axis), the difference is smaller. Whereas teaching professionals rely heavily on these types of skills, they are relevant to assemblers as well.[3]

*Figure 1. The angular distance based on only two skills (physical and communication skills) for three occupations; teaching professionals (23); assemblers (81); and stationary plant and machine operators (82). The numbers in the figure and the parentheses correspond to their ISCO08 two-digit code.*
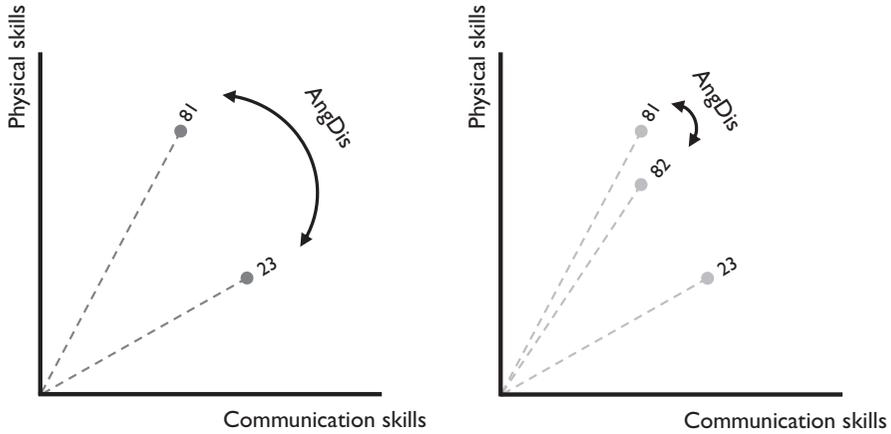


Based on the position of both occupations in the two-dimensional vector space, we can calculate the angular distance between the two positions.[4] Moreover, we can also compare the transferability of skills between occupations. The right-hand panel of Figure 1 shows that the angular distance is much smaller between assemblers on the one hand and stationary plant and machine operators on the other. A priori, we would indeed expect that the skill profiles of stationary plant and machine operators and assemblers are more alike than the profiles of teaching professionals and assemblers.[5]

We address two issues to ensure that our measure actually reflects the ease with which workers switch occupations. First, we take differences in educational requirements and income between occupations into account.[6] The ISCO occupation scheme distinguishes four different skill levels. These levels reflect the formal and informal education requirements. As skill weights

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3    Assemblers also need these skills to exchange information and communicate with their co-workers.
4    Note that the angular distance is equal to the cosine angle between the position of both occupations.
5    See table A3 for the five closest and most distant possible occupational moves.
6    Note that our main results also hold without correcting for these differences.

do not reflect these requirements, it might be that skills are less transferable between occupations than our measure would suggest. Therefore, we weight the difference between each pair of occupations that entails a step up in skill requirements by the difference in ISCO skill levels. A similar argument holds for income: whereas two occupations can be relatively similar regarding their skill bundle, their average wage might differ substantially. Occupational moves that entail a drop in wages are less attractive and limit workers' mobility. Hence, we create four occupational income quartiles and weight the difference of each pair which entails a step down in income by the distance between the associated quartiles.

Second, we weight occupation moves by the relative size of the exit-occupation across countries and time, using the share of the occupation in the labour force. Doing so, ensures that we do not inflate our measure by including matches that are theoretically close, but are not realistic given the current labour market structure. For example, a move between two occupations should increase potential occupational mobility more if there is actually demand for the occupation, compared to a match in which this is not the case.

Finally, we take the weighted average angular distance between an occupation and all other occupations to define people's occupational mobility. This reflects how many skills of their current occupation workers can transfer to other occupations without losing productivity.[7] To ease interpretation, we normalise our measure to a 0-1 scale, in which higher values indicate greater skill transferability.

*Brown Occupations*

We argue that environmental policies bring about labour market risks for individuals in brown occupations. In identifying these jobs, we follow the work by Vona et al. (2018). First, they define sectors in the 95th percentile of polluting intensity for at least three pollutants as pollution-intensive.[8] Second, occupations that are overrepresented in pollution-intensive sectors are categorised as a brown job, which is the case if an occupation's relative share of employees is at least seven times larger than the share of employees for all occupations in pollution-intensive sectors. In other words, only those occupations whose probability is seven times higher than any other occupation to be apparent in a pollution-intensive sector are categorised as a brown. As occupations are coded at the six-digit SOC-2010, we use the

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7    Table A4 reports the skill transferability for each occupation. Whereas agricultural, forestry and fishery labourers have the lowest skill transferability, electrical and electronic trade workers rank highest.

8    These are $CO_2$ and seven other pollutants (CO, VOC, $NO_x$, $SO_2$, $PM_{10}$, $PM_{2.5}$ and lead), which are all regulated by the United States' Environmental Protection Agency.

United States Bureau of Labor Statistics crosswalk to four-digit ISCO-08 occupations. This procedure yields a list of 64 occupations which are categorised as a brown job.

*Data and Method*

We draw on public opinion data from the ISSP to measure attitudes towards climate policies. To capture people's appetite for these policies, we use the following statement: "We worry too much about the environment and not enough about prices/jobs today." Respondents are asked to indicate whether they (1) Strongly disagree, (2) Disagree, (3) Neither agree or disagree, (4) Agree, and (5) Strongly agree with this statement. To ease interpretation of our results, we construct this variable by recoding these answers into three categories: (strongly) disagree, neither agree or disagree and (strongly) agree.[9] As this question reveals respondents feelings about the environment vis-à-vis the economy, we interpret our results as concerns about the economy as a consequence of protecting the environment, typically accomplished by policies that demand labour markets to adjust. Hence, respondents who prioritise the economy over the environment are assumed to oppose environmental policies.

The statement above is included in ISSP waves on the environment (2000 and 2010). Importantly, these waves also include information regarding a respondent's ISCO08 two-digit occupation. This enables us to link respondents to our measure of skill transferability.[10] As our measure of skill transferability is country-specific, our sample of countries is limited to those that are included in both the PIAAC survey and the ISSP. This leaves us with a sample of 11 advanced industrialised democracies.[11]

Because our dependent variable is a constructed ordered measure, we assess the proposed relationship between skill transferability and attitudes towards climate policies with ordered logistic regression models.[12] All our models include country and wave fixed effects, to control for unobserved heterogeneity between countries and common contemporary shocks affecting all countries and individuals respectively. Our models include a vector of individual-level control variables, including gender, age, age squared, living with child(ren), education, income in quintiles, and labour market

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9　Also, we discard *Don't knows* and nonresponses in our analyses.

10　We include all working-age individuals of working-age (25-65) in our sample. As the ISSP asked unemployed respondents about their previous occupation, we are able to link unemployed respondents to our measure as well. Our results also hold if we use a sample of only prime-aged (25-55) individuals in the labour force.

11　The countries included in our sample are Belgium, Denmark, France, Germany, Netherlands, New Zealand, Norway, Spain, Sweden, the United Kingdom and the United States.

12　We use robust standard errors and include weights supplied by the ISSP.

status. Including these variables, we ensure that our results are not driven by confounding factors. Previous research has shown that higher levels of both education and income are associated with support for climate policies (Bechtel et al. 2019; Franzen and Meyer 2010; Hornsey et al. 2016, but also see Mildenberger and Leiserowitz 2017).[13] Similar results are found among females, students, and people with (young) children (Bush and Clayton 2023; Dechezlepretre et al. 2022). In contrast, opposition towards climate policies is found amongst older people and the unemployed (Hartmann and Preisendorfer 2023).

## 3.4    Results

*Prioritising the Economy over the Environment*

Table 2 shows our results for the relationship between skill transferability and the probability that an individual prioritises the economy over the environment. The first model (M1) includes only our main variable of interest; the second model (M2) adds the individual-level controls, and the third model (M3) adds country and wave fixed effects. Most importantly, the estimates for skill transferability are highly significant in both models. In line with our expectations, individuals with transferable skills have a lower probability of prioritising the economy over the environment.

Besides, the findings for the individual-level control variables are in line with previous findings. Higher levels of education and income are associated with a decrease in the likelihood that an individual prioritises the economy. While this is also true for females, younger individuals believe that the economy should be given priority. The estimate of capturing whether respondents live with children is in the expected direction, but not significant. Surprisingly, both the unemployed and non-employed respondents are less likely to prioritise the economy over the environment. Most importantly, the results presented in Table 2 provide support for our argument that individuals who can transfer their skills with relative ease between occupations worry less about the economy and, therefore, oppose environmental policies less.

Moreover, Figure 3 shows that the effect of having transferable skills is substantively meaningful: a standard deviation increase from the average level of skill transferability in our sample decreases the probability that an individual agrees or strongly agrees with the statement that we worry too much about the environment and not enough about the economy by 2 per cent (the left-hand panel). As an illustration, this equals the difference

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13    In Table A5, we show the correlations between our measure of skill transferability and education and income.

in skill transferability between Danish labourers in mining, construction, manufacturing and transport on the one hand, and science and engineering associate professionals on the other hand. If we compare individuals at the extremes, those with specific skills to those with highly transferable skills, the probability of prioritising the economy reduces with 20 percent. Comparing this magnitude to the effects of education and income to flesh out its broader meaning (respectively, the middle and right-hand panel of Figure 3), confirms the substantive meaning of the effect. Overall, this indicates that skill transferability explains a substantial range of variation in our dependent variable. Indeed, such a pattern suggests that the possibility to transfer one's skills across occupations does a good job in explaining whether an individual feels at risk in the labour market, and thus, worries less about the economic effects of the green transition.[14] This is a finding that ties in well with previous literature showing the importance of transferable skills in other contexts (Iversen and Soskice 2001; Pardos-Prado and Xena 2019; Rehm 2009).

*Table 2. Prioritising the Economy over the Environment*

|  | M1 | M2 | M3 |
|---|---|---|---|
| Skill transferability | -1.698*** | -0.846*** | -0.859*** |
|  | (0.077) | (0.099) | (0.103) |
| Brown occupation | 0.381*** | 0.161* | 0.215** |
|  | (0.057) | (0.065) | (0.066) |
| Female |  | -0.228*** | -0.252*** |
|  |  | (0.036) | (0.037) |
| Age |  | -0.209 | -0.267 |
|  |  | (0.166) | (0.169) |
| Age squared |  | 0.033 | 0.041* |
|  |  | (0.018) | (0.019) |
| Living with child(ren) |  | -0.030 | -0.037 |
|  |  | (0.040) | (0.042) |
| Less than secondary completed |  | Ref. | Ref. |
| Secondary completed |  | -0.303*** | -0.431*** |
|  |  | (0.042) | (0.046) |
| At least tertiary completed |  | -0.755*** | -0.875*** |
|  |  | (0.055) | (0.059) |

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14    Note that the differences in effect size should be interpreted cautiously due to the different scaling of the three variables.

| | M1 | M2 | M3 |
|---|---|---|---|
| Below 20<sup>th</sup> income quintile | | Ref. | Ref. |
| Between 20<sup>th</sup> and 40<sup>th</sup> income quintile | | -0.192** | -0.154* |
| | | (0.063) | (0.064) |
| Between 40<sup>th</sup> and 60<sup>th</sup> income quintile | | -0.270*** | -0.222*** |
| | | (0.063) | (0.064) |
| Between 40<sup>th</sup> and 60<sup>th</sup> income quintile | | -0.427*** | -0.373*** |
| | | (0.063) | (0.065) |
| Above 80<sup>th</sup> income quintile | | -0.192** | -0.154* |
| | | (0.063) | (0.064) |
| Unemployed | | -0.270*** | -0.222*** |
| | | (0.063) | (0.064) |
| Non-employed | | -0.427*** | -0.373*** |
| | | (0.063) | (0.065) |
| Student | | -0.566*** | -0.502*** |
| | | (0.069) | (0.070) |
| Retired | | 0.221** | 0.100 |
| | | (0.082) | (0.083) |
| Cut 1 | -1.015*** | -1.465*** | -1.678*** |
| | (0.048) | (0.370) | (0.382) |
| Cut 2 | -0.206*** | -0.616 | -0.805* |
| | (0.047) | (0.370) | (0.382) |
| Country and wave FE | No | No | Yes |
| Observations | 17,189 | 14,537 | 14,537 |

*Note:* Ordered logistic models. Standard errors in parentheses.
* p<0.05 ** p<0.01 *** p<0.001

*Figure 2. The predicted probability of prioritising the economy over the environment conditional on skill transferability, education or income.*
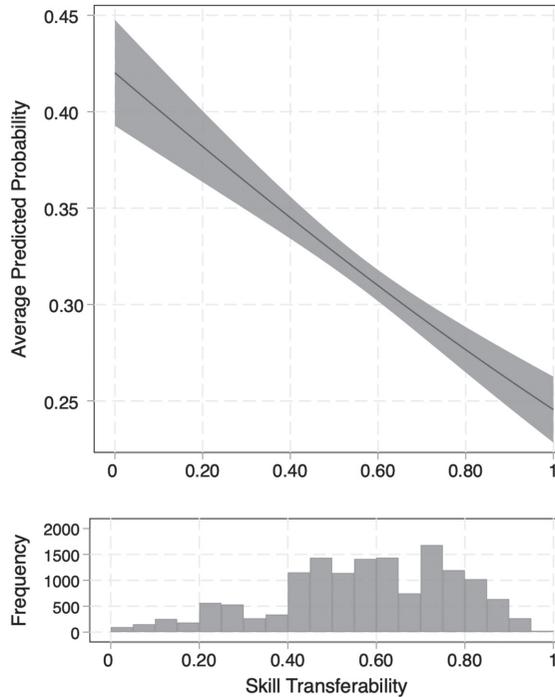


Note: the bluegrey area represents the 95% confidence intervals.

Are people in brown occupations with transferable skills also less likely to prioritise the economy over the environment? To test this relationship, we estimate the interaction effect of skill transferability and brown occupations on our dependent variable. Figure 4 shows the average predicted probabilities conditional on skill transferability for people in brown occupations and all other occupations. The results show that for both categories of occupations, transferable skills decrease the probability that people's economic concerns prevail over the environment. Moreover, Figure 4 shows that at low levels of skill transferability people in brown occupations are more likely to prioritise the economy over the environment than people in other occupations, but this difference turns insignificant at higher levels of skill transferability This provides support for our argument that transferable skills mitigate the occupational risks: people who can easily move from a brown occupation to another occupation have little to fear from adverse employment effects stemming from environmental policies.

*Figure 3. The predicted probability of prioritising the economy over the environment conditional on job type and skill transferability.*
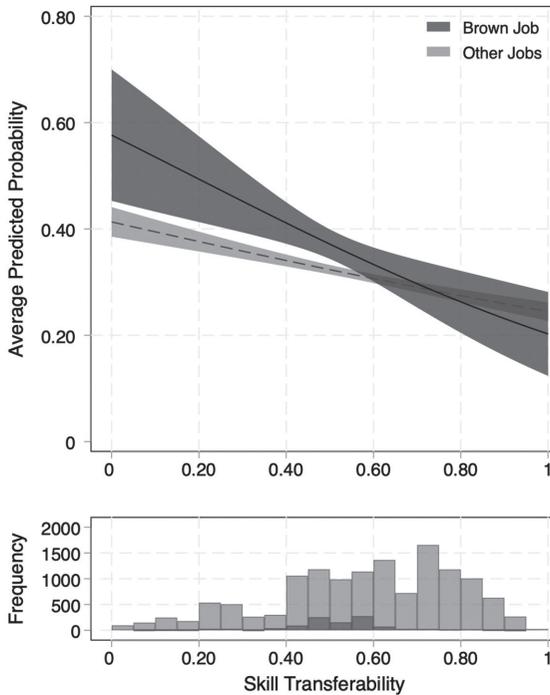


*Note: the areas represent the 95% confidence intervals.*

*Robustness Tests*

Next, we assess the robustness of our results for the relationship between skill transferability and attitudes towards environmental policies. Table 3 shows the results of these robustness tests. First, we include a battery of additional control variables to address alternative explanations for attitudes towards climate policies put forward in the literature. This ensures that our results are not driven by the exclusion of potential confounders. For instance, Franzen and Meyer (2010) show that an individual's perceived environmental burden determines their environmental concern, and thus, should also affect the way the economic-environment scales tip. We address this by including people's perceived environmental burden indexing six items that capture how dangerous an individual perceives five environmental risks.[15] Our results remain the same after including this variable.

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15    These risks include; air pollution caused by cars; air pollution caused by industry; pesticides and chemicals used in farming; pollution of the country's rivers, lakes and streams; and a rise in the world's temperature caused by the greenhouse effect.

Furthermore, we control for people's ideology by including three different variables: left-right self-placement, union membership and a number of dummy variables capturing the family of the party supported. These variables are not included in our main models as we consider people's ideology as endogenous to our dependent variables. However, including these variables does not change our results. In addition, it is shown that class divides are still relevant in the politics of the knowledge economy (Häusermann et al. 2022), especially when it comes to issues that do not immediately serve their material self-interest (Oesch and Rennwald 2018; Iversen and Soskice 2019). Indeed, Parth and Vlandas (2022) find that the working class is less likely to support environmental action. We examine the sensitivity of our results to this issue by testing whether our results hold for including class categories.[16] Again, the results remain the same, which confirms the robustness of our results.

Then, we proceed testing the robustness of our results by controlling for labour market risks stemming from globalisation and technological progress. First, we include Walter's (2010; 2017) measure of an occupation's offshoring potential. She measures the potential of an occupation to be offshored based on two criteria in Blinder's (2009) offshorable index: the need for an individual to be physically close to their work, and the necessity of a work unit to be in the same country. The inclusion of this variable does not affect our results. Next, we include the routine task intensity (RTI) index from Goos et al. (2014), which is frequently used in the comparative political economy literature (Dermont and Weisstanner 2020; Milner 2021; Thewissen and Rueda 2018; Wu 2022). By distinguishing routine, manual and abstract tasks, the index measures the relative importance of routine tasks compared to the other two. Subsequently, occupations which are relatively routine-intense are defined as prone to automation. Our main results do not change. The same holds when we include three variables that capture job security: part-time employment, solo self-employment and public-sector employment.

Subsequently, we test the sensitivity of our results to different model specifications, alternative operationalisations of our dependent variable, or sample definitions. We start by including occupational-country fixed effects. This implies that we no longer compare individuals relative to individuals in other countries, but to other individuals in other occupations and countries. Doing so, eliminates potentially unobserved heterogeneity between occupations. The results of the sensitivity analysis show that our original results are robust to the inclusion of this type of fixed effects. Similarly, it might be that our results are driven by outliers: people in 'elementary occupations'

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16  We include eight class groups following Oesch (2006). The groups include self-employed professionals and large employers; small business owners; (associate) managers and administrators; office clerks; technical professionals and technicians; production workers; sociocultural (semi-) professionals; and service workers.

have substantially less transferable skills compared to people in all other occupations. To ensure that our results are not driven by this specific occupational group, we exclude them. Again, our results do not change.

Next, we operationalise our dependent variable differently. Recall that we use the following statement that is included in the ISSP: "We worry too much about the environment and not enough about prices/jobs today" and that we recode the answers into three categories. To assess the robustness of our analyses to the operationalisation of the dependent variable, we create two binary dependent variables to assess the robustness of our analyses to the operationalisation of the dependent variable. The first indicator is coded 1 if a respondent either agrees or strongly agrees with the statement, the second indicator is coded 1 if a respondent strongly agrees with the statement. The estimates remain significant in both tests.

*Table 3. Robustness Tests for Main Results*

|  | Skill transferability estimate | Standard error |
|---|---|---|
| Original result | -0.855*** | (0.103) |
| Adding control variables |  |  |
| R1 Environmental burden | -0.859*** | (0.103) |
| R2 Left-right placement | -0.873*** | (0.114) |
| R3 Union membership | -0.910*** | (0.106) |
| R4 Party family support | -0.862*** | (0.123) |
| R5 Class | -0.479*** | (0.149) |
| R6 RTI | -0.869*** | (0.113) |
| R7 Offshorable occupation | -0.841*** | (0.105) |
| R8 Public-sector employment | -0.843*** | (0.104) |
| R9 Part-time employment | -0.856*** | (0.103) |
| R10 Solo self-employment | -0.838*** | (0.104) |
| Alternative models, operationalisation and samples |  |  |
| R11 Occupation-country FE | -0.455** | (0.217) |
| R12 Excluding 'elementary occupations' | -0.901*** | (0.134) |
| R13 Binary | -0.908*** | (0.117) |
| R14 Binary – Strongly agree | -1.171*** | (0.218) |
| R15 Higher taxes to protect the environment | 0.218** | (0.100) |
| R16 Employed respondents only | -0.762*** | (0.086) |
| R17 All OECD countries | -0.908*** | (0.117) |

*Note:* The original support corresponds to M3 in Table 2. Standard errors in parentheses.
* $p<0.05$ ** $p<0.01$ *** $p<0.001$

*Table 4. Robustness Tests for Interaction Results*

| | Brown occupations versus all other occupations | |
| --- | --- | --- |
| | $\chi^2$ *Specific Skills* | $\chi^2$ *Transferable Skills* |
| Original result | 9.04*** | 0.23 |
| Adding control variables | | |
| R1 Environmental burden | 8.80*** | 0.27 |
| R2 Left-right placement | 6.49*** | 0.00 |
| R3 Union membership | 10.05*** | 0.68 |
| R4 Party family support | 7.04*** | 0.37 |
| R5 Class | 4.97** | 1.98 |
| R6 RTI | 8.82*** | 0.35 |
| R7 Offshorable occupation | 9.42*** | 0.21 |
| R8 Public-sector employment | 9.09*** | 0.20 |
| R9 Part-time employment | 8.97*** | 0.21 |
| R10 Solo self-employment | 9.39*** | 0.16 |
| Alternative models, operationalisation and samples | | |
| R11 Occupation-country FE | 3.73** | 2.60 |
| R12 Excluding 'elementary occupations' | 9.67*** | 1.23 |
| R13 Binary | 4.47** | 0.07 |
| R14 Binary – Strongly agree | 2.84* | 0.30 |
| R15 Higher taxes to protect the environment | 4.34** | 1.46 |
| R16 Employed respondents only | 9.16*** | 0.13 |
| R17 All OECD countries | 6.95*** | 0.47 |

*Note:* Standard errors in parentheses.
* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Our argument implies that people who have transferable skills are more likely to support environmental policies. To test the robustness of our results we also use an alternative question that is included in the ISSP waves on the environment, namely: "How willing are you to pay much higher taxes in order to protect the environment?". Respondents' answers range from (1) Very unwilling to (5) Very willing. The introduction of policies which increase the price of carbon are considered essential to limit global warming. However, higher tax burdens are generally also associated with negative consequences for employment. Even though workers may not be fully aware of the broader employment effects of such taxes, those who have skills that are relevant for a variety of occupations have relatively little to worry about when it comes to their job prospects. The opposite is

true for individuals with relatively specific skills. If they lose their job due to the broader employment effects of climate policies, they risk a substantial drop in income. When we use this dependent variable on the willingness to pay higher taxes, our results are largely replicated.

Finally, we use two different samples. In the first sample, we only include employed individuals. Our results are unaffected to using this smaller sample. The second sample includes all OECD countries that are both included in the PIAAC survey and the ISSP. Whereas we build on literature that focuses on Western advanced post-industrial economies, our results do not change if we include all OECD members.

To test the robustness of our interaction results, we calculate the average predicted probabilities of prioritising the economy for people in brown occupations and people in all other occupations with either specific or transferable skills, defined as the 10th or 90th percentile of the sample's skill transferability respectively. Subsequently, we use chi-square tests to examine whether people in brown occupations differ in their predicted probability from people in all other occupations. If transferable skills indeed mitigate the labour market risks associated with holding a brown job, there should be a difference in the predicted probabilities between occupations in case of specific skills, but not when people have transferable skills. The results of these robustness tests are presented in Table 4. We would expect that the difference between people in brown occupations and all other occupations is only significant with specific skills. This is indeed the case for all tests. Together with the above, this leaves little doubt about the robustness of our results

## 3.5    Mechanisms and Underlying Assumptions

In this section, we briefly test the two main assumptions underlying our theory using the two most recent ISSP waves on Work Orientations (2005 and 2015). First, we assume that individuals with transferable skills should experience that the skills they used in their previous jobs still matter in their current job. To test this assumption, we use the following questions: "How much of your past work experience and/or job skills can you make use of in your present job?" and "If you were to look for a new job, how helpful would your present work experience and/or job skills be?" (the latter is only included in the 2005 wave). Respondents answer on a four-point scale, ranging from (1) Almost none/Not helpful at all to (4) Almost all/Very helpful. Table 5 presents the results for our ordered logistic models and provides evidence for our first assumption that individuals with transferable skills perceive the skills deemed relevant in their previous job also as more relevant in their current job or a potential new job (M4 and M5).

Our second assumption is that individuals with transferable skills worry less about losing their job as their skill profile allows them to move relatively easyily from one job to the next. Here, we rely on a question that is tapping into respondents' subjective labour market risk, which states: "To what extent, if at all, do you worry about the possibility of losing your job? "Again, respondents answer on a four-point scale, which ranges from (1) I don't worry at all to (4) I worry a great deal. The results of M6 in Table 5 support our argument that individuals with transferable skills worry less about losing their job. Together, these results show that our measure of skill transferability is indeed an important determinant in explaining the way individuals perceive their potential occupational mobility and labour market risks.

*Table 5. Perceived Relevance of Skills (M4 and M5) and Subjective Labour Market Risk (M6)*

|  | *M4* | *M5* | *M6* |
|---|---|---|---|
| Skill transferability | 1.292*** | 1.491*** | -0.702*** |
|  | (0.180) | (0.304) | (0.178) |
| Female | 0.008 | -0.097* | -0.050 |
|  | (0.034) | (0.048) | (0.034) |
| Age | 0.483* | 0.293 | 0.134 |
|  | (0.199) | (0.285) | (0.205) |
| Age squared | -0.041 | -0.054 | -0.006 |
|  | (0.024) | (0.035) | (0.025) |
| Less than secondary completed | Ref. | Ref. | Ref. |
| Secondary completed | 0.251*** | 0.171*** | 0.196** |
|  | (0.045) | (0.063) | (0.044) |
| At least tertiary completed | 0.412*** | 0.389*** | -0.224*** |
|  | (0.052) | (0.075) | (0.053) |
| Below 20th income quintile | Ref. | Ref. | Ref. |
| Between 20th and 40th income quintile | 0.109 | 0.110 | -0.243*** |
|  | (0.065) | (0.098) | (0.068) |
| Between 40th and 60th income quintile | 0.256*** | 0.177 | -0.366*** |
|  | (0.063) | (0.092) | (0.065) |
| Between 40th and 60th income quintile | 0.337*** | 0.414*** | -0.540*** |
|  | (0.063) | (0.093) | (0.064) |
| Above 80th income quintile | 0.596*** | 0.642*** | -0.611*** |
|  | (0.065) | (0.095) | (0.067) |
| Cut 1 | 1.044* | -1.622* | -0.727 |
|  | (0.427) | (0.630) | (0.442) |
| Cut 2 | 2.553*** | 0.060 | 0.813 |
|  | (0.427) | (0.628) | (0.442) |
| Cut 3 | 4.037*** | 2.209*** | 2.257*** |
|  | (0.428) | (0.628) | (0.443) |
| Country and wave FE | Yes | Yes | Yes |
| Observationˢ | 12,031 | 6,725 | 12,359 |

*Note:* Ordered logistic models. Standard errors in parentheses.
* p<0.05 ** p<0.01 *** p<0.001

## 3.6    CONCLUSION

Over the past few decades, the literature on the relationship between economic risks and public opinion has made considerable progress. Research has shown how several structural economic changes impose risks for individuals and how these risks shape preferences regarding different types of public policy. In particular, shifts on the labour market are associated with an increased risk of unemployment and loss of income when workers have to change occupations. In the existing comparative political economy literature, it has been highlighted that the limited transferability of skills between occupations is the main factor underlying this risk. To assess the role of the transferability of skills in the analysis of public opinion empirically, we have introduced a new measure which captures the relative weight of the skills which are needed for an occupation.

The empirical results of our study show how labour market risk is related to attitudes regarding the green transition. When people have transferable skills, it is less likely that they prioritise the economy over the environment. The magnitude of the association shows that skill transferability plays a substantively meaningful role, and a range of sensitivity analyses has shown that it is a robust finding. In addition, we find similar results for people who work in brown occupations. This suggests that even people who have jobs which might be negatively affected by environmental policies have more positive attitudes towards environmental policies when they have transferable skills.

Our findings provide further and more fine-graded empirical support for the theoretical notion that skill transferability constitutes an essential part of occupational risk (Iversen and Soskice 2001; Rehm 2009; Pardos-Prado and Xena 2019). When the skills which were useful in one occupation are less relevant in other occupations, an individual's occupational mobility is restricted. This implies a higher chance of income loss as a result of unemployment or a less productive job and hence a higher perceived economic risk.

In addition, we have examined the mechanism through which skill transferability is assumed to be linked to attitudes towards environmental policies. Our results show that people with transferable skills perceive the skills from their previous job as valuable in their next job and that they worry less about losing their job. This result provides additional insight into the relationship at the heart of this study and, additionally, contributes to the labour market risk literature by testing an essential assumption on people's awareness of their potential occupational mobility and subjective labour market risks and how they are linked to preference formation.

To the best of our knowledge, this study is the first empirical analysis of the linkages between occupational risk and attitudes regarding the green transition. This does not only introduce a novel and increasingly important source of risk into the study of labour market risks and public opinion, but it also adds a factor to take into account to the literature on the politics of climate policies (Beiser-McGrath and Busemeyer 2023; Gaikwad et al. 2022; Mildenberger and Tingley 2019; Umit and Schaffer 2020). The implementation of climate policies faces significant obstacles due to public opposition, and understanding the reasons for this opposition is crucial for the development of effective policies. Our analysis shows that individuals with transferable skills have a lower probability of opposing climate policies that prioritise the environment over the economy. In contrast, individuals with specific skills which are less transferable face higher labour market risks and are more likely to oppose such policies.

Our findings suggest that it is important for policymakers to take the labour market risks of individuals into account when designing the policies underpinning the green transition. Against this backdrop, it may also be worthwhile for future research to investigate how labour market institutions shape public opinion on the green transition. As the number of countries included in this study does not allow us to test the interplay between such institutions and workers' labour market risks, we test whether the latter drives public opinion about the green transition. However, future research may shed light on the question whether institutions like employment protection legislation or active labour market policies mitigate the labour market risks associated with the green transition for workers with specific skills and, subsequently, related attitudes.

## Supplementary Information

*Table A1. Skill categories and skills*

| Skill category | Skills |
| --- | --- |
| Communication skills | Exchanging information; teaching others; presenting; selling; consulting |
| Planning skills | Planning own activities; planning activities of others; organising own schedule |
| Persuasion skills | Influencing; negotiating |
| Creative skills | Solving simple problems; solving complex problems |
| Physical skills | Working physically for long hours; using fingers or hands |
| Literacy skills | Reading instructions; reading newspapers and magazines; reading professional publications; reading books; reading manuals; reading financial statements; read diagrams, maps, or schematics; writing letters, memos, or mails; writing articles; writing reports; filling in forms |
| Numeracy skills | Calculating costs or budgets; calculating shares or percentages; using calculator; preparing charts, graphs, or tables; using simple algebra or formula's; using math or statistics |
| ICT skills | Using email; using internet for work-related information; using internet to conduct transactions; using spreadsheets; using Word; using programming language; using communication software |

*Table A2. Skill categories by occupation at the ISCO08 two-digit level*

| Occupation (ISCO08) | Com. skills | Plan. skills | Pers. skills | Creative skills | Phys. skills | Literacy skills | Num. skills | ICT skills |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | 0.137 | 0.128 | 0.068 | 0.058 | 0.042 | 0.276 | 0.118 | 0.175 |
| 12 | 0.121 | 0.115 | 0.058 | 0.058 | 0.031 | 0.289 | 0.133 | 0.196 |
| 13 | 0.125 | 0.118 | 0.059 | 0.062 | 0.042 | 0.291 | 0.126 | 0.176 |
| 14 | 0.151 | 0.128 | 0.070 | 0.054 | 0.075 | 0.252 | 0.139 | 0.131 |
| 21 | 0.094 | 0.110 | 0.038 | 0.064 | 0.043 | 0.306 | 0.145 | 0.199 |
| 22 | 0.148 | 0.119 | 0.057 | 0.070 | 0.089 | 0.313 | 0.089 | 0.116 |
| 23 | 0.163 | 0.132 | 0.060 | 0.062 | 0.054 | 0.307 | 0.080 | 0.142 |
| 24 | 0.112 | 0.106 | 0.052 | 0.057 | 0.030 | 0.298 | 0.136 | 0.209 |
| 25 | 0.098 | 0.102 | 0.033 | 0.075 | 0.034 | 0.299 | 0.102 | 0.257 |
| 26 | 0.125 | 0.128 | 0.063 | 0.071 | 0.055 | 0.311 | 0.068 | 0.180 |
| 31 | 0.129 | 0.120 | 0.042 | 0.065 | 0.083 | 0.295 | 0.137 | 0.129 |
| 32 | 0.152 | 0.109 | 0.053 | 0.066 | 0.110 | 0.312 | 0.091 | 0.105 |
| 33 | 0.119 | 0.106 | 0.057 | 0.058 | 0.043 | 0.303 | 0.130 | 0.184 |
| 34 | 0.159 | 0.137 | 0.061 | 0.075 | 0.098 | 0.270 | 0.073 | 0.127 |
| 35 | 0.106 | 0.093 | 0.036 | 0.073 | 0.061 | 0.312 | 0.091 | 0.228 |
| 41 | 0.106 | 0.109 | 0.030 | 0.053 | 0.050 | 0.320 | 0.123 | 0.208 |

| Occupation (ISCO08) | Com. skills | Plan. skills | Pers. skills | Creative skills | Phys. skills | Literacy skills | Num. skills | ICT skills |
|---|---|---|---|---|---|---|---|---|
| 42 | 0.153 | 0.081 | 0.060 | 0.064 | 0.059 | 0.311 | 0.114 | 0.157 |
| 43 | 0.110 | 0.109 | 0.036 | 0.057 | 0.080 | 0.290 | 0.151 | 0.166 |
| 44 | 0.133 | 0.120 | 0.039 | 0.067 | 0.112 | 0.292 | 0.085 | 0.151 |
| 51 | 0.194 | 0.132 | 0.056 | 0.066 | 0.172 | 0.220 | 0.114 | 0.045 |
| 52 | 0.217 | 0.095 | 0.064 | 0.059 | 0.119 | 0.226 | 0.148 | 0.072 |
| 53 | 0.153 | 0.157 | 0.067 | 0.083 | 0.158 | 0.290 | 0.043 | 0.049 |
| 54 | 0.165 | 0.095 | 0.063 | 0.077 | 0.101 | 0.359 | 0.036 | 0.106 |
| 61 | 0.134 | 0.194 | 0.032 | 0.064 | 0.233 | 0.210 | 0.090 | 0.043 |
| 62 | 0.203 | 0.147 | 0.024 | 0.081 | 0.293 | 0.162 | 0.060 | 0.029 |
| 71 | 0.151 | 0.141 | 0.045 | 0.078 | 0.237 | 0.214 | 0.102 | 0.032 |
| 72 | 0.142 | 0.118 | 0.038 | 0.079 | 0.181 | 0.275 | 0.111 | 0.056 |
| 73 | 0.149 | 0.124 | 0.029 | 0.065 | 0.166 | 0.254 | 0.132 | 0.082 |
| 74 | 0.129 | 0.132 | 0.042 | 0.076 | 0.134 | 0.297 | 0.083 | 0.107 |
| 75 | 0.160 | 0.132 | 0.036 | 0.062 | 0.211 | 0.231 | 0.113 | 0.055 |
| 81 | 0.158 | 0.105 | 0.026 | 0.075 | 0.251 | 0.243 | 0.106 | 0.036 |
| 82 | 0.158 | 0.091 | 0.029 | 0.072 | 0.271 | 0.240 | 0.108 | 0.033 |
| 83 | 0.143 | 0.118 | 0.037 | 0.075 | 0.193 | 0.317 | 0.087 | 0.030 |
| 91 | 0.120 | 0.227 | 0.024 | 0.057 | 0.358 | 0.164 | 0.033 | 0.015 |
| 92 | 0.139 | 0.159 | 0.034 | 0.068 | 0.371 | 0.134 | 0.086 | 0.009 |
| 93 | 0.190 | 0.108 | 0.031 | 0.082 | 0.292 | 0.193 | 0.073 | 0.031 |
| 94 | 0.246 | 0.109 | 0.039 | 0.076 | 0.317 | 0.139 | 0.062 | 0.012 |
| 95 | 0.130 | 0.189 | 0.130 | 0.044 | 0.221 | 0.186 | 0.093 | 0.006 |
| 96 | 0.167 | 0.161 | 0.036 | 0.065 | 0.239 | 0.225 | 0.073 | 0.034 |
| Mean | 0.146 | 0.126 | 0.048 | 0.067 | 0.146 | 0.262 | 0.100 | 0.106 |

*Note:* the angular distances presented here are sample averages. In the analysis, we use country-specific distances.

*Table A3. The top and bottom 5 of potential occupational changes in our sample*

| Closest occupations | | | Most distant occupations | | |
|---|---|---|---|---|---|
| Change from (…) | Change to (…) | AngDis | Change from (…) | Change to (…) | AngDis |
| (13) Production and Specialised Services Managers | (33) Business and Administration Associate Professionals | 0.999 | (95) Street and Related Sales and Services Workers | (25) Information and Communications Technology Professional | 0.493 |
| (12) Administrative and Commercial Managers | (24) Business and Administration Professionals | 0.999 | (91) Cleaners and Helpers | (25) Information and Communications Technology Professional | 0.519 |
| (81) Stationary Plant and Machine Operators | (82) Assemblers | 0.998 | (24) Business and Administration Professionals | (94) Food Preparation Assistants | 0.522 |
| (11) Chief Executives, Senior Officials and Legislators | (13) Production and Specialized Services Managers | 0.998 | (94) Food Preparation Assistants | (25) Information and Communications Technology Professional | 0.525 |
| (22) Health Professionals | (32) Health Associate Professionals | 0.998 | (12) Administrative and Commercial Managers | (92) Agricultural, Forestry and Fishery Labourers | 0.541 |

*Note:* the angular distances presented here are sample averages. In the analysis, we use country-specific distances. All angular distances are calculated using the 18 skill categories in the PIAAC dataset. The number in the parentheses correspond to the ISCO08 two-digit code of each occupation.

*Table A4. Skill categories by occupation at the ISCO08 two-digit level*

| Occupation (ISCO08) | Skill transferability (Average angular distance) | Occupation (ISCO08) | Skill transferability (Average angular distance) |
|---|---|---|---|
| 11 | 0.890 | 61 | 0.881 |
| 12 | 0.871 | 62 | 0.818 |
| 13 | 0.888 | 71 | 0.889 |
| 14 | 0.914 | 72 | 0.927 |
| 21 | 0.868 | 73 | 0.932 |
| 22 | 0.922 | 74 | 0.934 |
| 23 | 0.905 | 75 | 0.913 |
| 24 | 0.861 | 81 | 0.890 |
| 25 | 0.835 | 82 | 0.875 |
| 26 | 0.890 | 83 | 0.911 |
| 31 | 0.918 | 91 | 0.752 |

| Occupation (ISCO08) | Skill transferability (Average angular distance) | Occupation (ISCO08) | Skill transferability (Average angular distance) |
|---|---|---|---|
| 32 | 0.928 | 92 | 0.743 |
| 33 | 0.882 | 93 | 0.841 |
| 34 | 0.927 | 94 | 0.770 |
| 35 | 0.866 | 95 | 0.839 |
| 41 | 0.872 | 96 | 0.888 |
| 42 | 0.898 | | |
| 43 | 0.901 | Mean | 0.882 |
| 44 | 0.926 | | |
| 51 | 0.912 | | |
| 52 | 0.903 | | |
| 53 | 0.914 | | |
| 54 | 0.899 | | |

*Note:* the angular distances presented here are sample averages. In the analysis, we use country-specific distances.

*Table A5. Correlation Matrix Skill Transferability, Education, and Income*

| | Skill transferability | Education |
|---|---|---|
| Skill transferability | | |
| Education | 0.232*** | |
| Income (percentiles) | 0.100*** | 0.331*** |

# 4 | Caught by Surprise: The Effect of Job Losses on Attitudes towards Radical Parties[1]

ABSTRACT

This study examines whether job losses drive support for radical parties in the Netherlands. Whereas recent panel studies find little evidence that the voters who lose their job turn to radical parties, I propose that these null findings may stem from anticipation effects. Specifically, when voters who eventually lose their job become aware of their unemployment risk and subsequently shift their political attitudes, the identified effect of job losses will be damped. Drawing on Dutch panel data that tracks voters up to fifteen years, my analysis reveals that job losses drive support for the radical left. Among voters who did not anticipate losing their jobs, support for radical left parties increased. On the contrary, job losses do not increase support for the radical right. Taken together, this suggests that job losses predominantly bolster support for parties with socio-economically left-leaning programmatic positions. When it comes to radical right parties, my results are consistent with studies emphasising broader economic and cultural changes in explaining support for these parties. Thereby, this study sheds light on the way that job losses drive radical parties' electoral fortunes.

## 4.1    Introduction

About one-third of the European voters cast their ballots for radical parties on either the left or right of the political spectrum in 2021, marking a pronounced shift from the early 1990s when radical parties secured roughly 12 per cent of the vote (Rooduijn et al. 2023). While radical parties gained a foothold across Europe, the Brexit referendum and the election of Donald Trump in 2016 further underscored the appeal of the anti-establishment vote. Against this backdrop, the electoral fortunes of radical parties have sparked debate among public pundits and academics alike.

In this debate, the narrative that economic grievances electorally benefit radical parties features prominently. Macro-level studies have examined whether regional variation in exposure to adverse economic shocks like the financial crisis and globalisation, or structural economic changes driven by automation, drive support for radical parties (Algan et al. 2017; Anelli et al. 2021; Barone and Kreuter 2021; Broz et al. 2021; Colantone and Stanig 2018a; Dal Bó et al. 2023; Dehdari 2022; Dippel et al. 2022; Guiso et al. 2019; Scheiring et al. 2024; Patana 2022). Most of these studies demonstrate that radical parties have performed well in those regions that have been adversely affected by these changes. Such regional differences in electoral outcomes align with initial studies that identified absolute deprivation as a driver of individual-level support for both radical left (Bowyer and Vail 2011; Gomez et al. 2016; Visser et al. 2014) and radical right parties (Ford and Goodwin 2010; Golder 2016; Lubbers et al. 2002; Rink et al. 2009; Werts et al. 2012). Accordingly, the electoral success of radical parties in adversely affected regions is the result of the prevalence of voters who lost their job and experienced a subsequent drop in income. Moreover, many governments have imposed austerity measures over the past decades, largely failing to provide a safety net to protect those voters exposed to these structural economic changes (Baccini and Sattler 2023; Fetzer 2019; Swank and Betz 2003; Vlandas and Halikiopoulou 2022).

Yet in recent studies drawing upon panel data, scholars provide mixed evidence that voters who personally experienced absolute deprivation turn to radical parties (Gidron and Mijs 2019; Kurer 2020; Wiertz and Rodon 2021). In this study, I test whether the null effects presented in some of these studies stem from the anticipation of job losses – that is, voters who change their political attitudes before they actually lose their jobs. For example, voters who learn from their social network about job losses among individuals in the same sector or occupation not only perceive higher unemployment risks but also change their political attitudes and policy preferences (Alt et al. 2021). As labour market risks are typically concentrated in specific sectors and occupations (Iversen and Soskice 2001; Rehm 2009, 2011; Thewissen and Rueda 2019: Walter 2010, 2017), voters who eventually lose their job are also amongst those most likely to learn about job losses amongst economically similar individuals

and, thus, already shift their political attitudes. Therefore, the identified effect of job losses in panel studies that do not take such anticipation into account may be dampened, underestimating this effect on political attitudes.

In this study, I show that the effect of job losses on radical party support in the Netherlands depends on whether voters anticipated this loss. To distinguish between expected and unexpected job losses, I use voters' subjective employment risk. Drawing on Dutch panel data, I provide evidence that voters who are surprised by their job loss become more supportive of radical left parties, but not of radical right parties. An unanticipated job loss increases support for the Socialist Party (SP), the Dutch radical left party, by 0.67 points (measured on a 11-point scale). When it comes to support for radical right parties, I do not find evidence that either personal experiences of material economic hardship or increases in voters' subjective employment risks result in higher support for the radical right. If anything, my results suggest that voters who unexpectedly lost their job become less supportive of radical right parties. Taken together, my results highlight the various ways in which subjective employment risks shape political attitudes in the Netherlands.

The remainder of this paper is structured as follows. In the first section, I provide a review of the literature on the different mechanisms underlying support for radical left and radical right parties. Next, I introduce the data and my strategy to distinguish between expected and unexpected job losses. I then discuss the results and present additional analyses to underline the robustness of my main results. Finally, I conclude this paper by discussing the implications and limitations of my findings.

## 4.2    Theoretical Background

Many studies have demonstrated that macro-economic changes spur electoral support for radical parties. Leveraging variation across regions, these studies show that both radical left (Algan et al. 2017; Anelli et al. 2021; Backes and Müller 2024; Barone and Kreuter 2021; Guiso et al. 2019) and radical right parties (Algan et al. 2017; Anelli et al. 2021; Barone and Kreuter 2021; Broz et al. 2021; Colantone and Stanig 2018a; Dal Bó et al. 2023; Dehdari 2022; Dippel et al. 2022; Guiso et al. 2019; Hays et al. 2019; Scheiring et al. 2024; Patana 2022) have indeed performed well in those regions adversely affected by economic shocks stemming from the financial crisis, globalisation and technological change.[2] Accordingly, scholars have assumed that such changes foster resentment among voters, defecting

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2    Studies have also examined the effect of adverse economic shocks on political attitudes in the context of the Brexit referendum (Carreras et al. 2019; Colantone and Stanig 2019b) and party support in the United States (Autor et al. 2020; Baccini and Weymouth 2021; Frey et al. 201; Margalit 2011).

them from mainstream parties towards radical parties running on an anti-establishment platform.

However, there is ongoing debate regarding how adverse economic shocks can explain the success of radical parties at the ballot box and precisely who supports these parties. Roughly two strands of economic explanations emerged from the body of studies exploring the individual-level mechanisms behind the electoral success of radical parties. Building on the correlational evidence between measure of absolute deprivation and support for radical left (Bowyer and Vail 2011; Gomez et al. 2016; Visser et al 2014) and radical right parties (Ford and Goodwin 2010; Golder 2016; Lubbers et al. 2002; Rink et al. 2009; Werts et al. 2012) provided by initial studies, the first strand of explanations emphasises the material causes stemming from these economic shocks. Accordingly, those voters who have lost their job and subsequently experienced a drop in income become more likely to turn to radical parties. In affected regions, the prevalence of these voters is typically higher, strengthening the radical parties' electoral success in these regions.

Yet in the few studies that focus on the effect of changes in voters' economic situation, scholars found mixed evidence that personal experiences of economic hardship shift voters' attitudes towards radical parties.[3] Drawing upon panel data from the LISS survey in the Netherlands, Gidron and Mijs (2019) find that voters who experienced negative changes in income become more supportive of the radical left but not of the radical right. However, they do not find an effect of job losses on support for either of these parties. Wiertz and Rodon (2021), who draw on the same data, corroborate this finding by showing that job losses cause a leftward ideological shift but do not increase support for (radical) left parties. In contrast, Kurer (2020) provides evidence that job losses shift support towards radical parties examining panel data from Germany, Switzerland and the United Kingdom.[4] Focusing on lower middle-class voters employed in jobs susceptible to automation, he finds that job losses increase support for radical left parties, whereas they lead to a decline in the probability of voting for radical right parties.

Studies from the second strand of explanations argue that the effects of macro-economic changes should be interpreted in relation to voters' (subjective) social status. Not those voters who are objectively worst-off but those

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3    Similar studies that assessed how experiencing changes in economic conditions affects voters policy preferences, particularly about labour market policies and redistribution, provide mixed results as well (Ahrens 2022, 2023; Margalit 2013; O'Grady 2017; Owens and Pedulla 2014; Stegmueller 2013; Wehl 2020).

4    More precisely, Kurer (2020) shows that among voters who lose their job support for left parties increases in Germany and the United Kingdom but not in Switzerland. This effect is more pronounced regarding radical left parties. When it comes to radical right parties, Germany's radical right party, the Alternative for Germany (AfD) was not included in the analyses for reasons related to the study's estimation strategy

who experience threats to their social status are most likely to support radical left (Bolet 2023; Burgoon et al. 2019; Gidron and Hall 2020; Kurer and Van Staalduinen 2022; Rooduijn and Burgoon 2018; Van Elsas 2017) and, particularly, radical right parties (Bolet 2023; Burgoon et al. 2019; Engler and Weisstanner 2020; Hartmann et al. 2022; Gidron and Hall 2017, 2020; Kurer and Van Staalduinen 2022; Rooduijn and Burgoon 2018; Van Elsas 2017). In this light, studies have also focussed on voters' concerns regarding their future employment prospects. As it is well established that jobs are an important feature in determining voters' relative social status (Brand 2015; Darity and Goldsmith 1996; Jahoda 1982; Newman 1988), studies have argued that voters working in occupations that lost relative importance during the past decades experience feelings of status anxiety (Gidron and Hall 2017; Häusermann et al. 2023; Kurer 2020). These voters may be more likely to fall for the anti-establishment appeals of radical parties. This interpretation is supported by the robust correlations between various occupational-based indicators and support for radical parties (Abou-Chadi and Kurer 2021; Baccini and Sattler 2023; Gingrich 2019; Häusermann 2020; Im et al. 2019; Meyer 2019b; Milner 2021; Rovny and Rovny 2017).

*Anticipation Effects and Unexpected Job Losses*

I build on these insights but propose a different mechanism that explains the limited empirical support for the effect of realised economic hardship on support for radical parties in studies employing panel data. More specifically, I argue that economic changes give rise to anticipation effects. Such effects typically present a challenge in detecting the effect of job losses.[5] When voters expect to lose their job, they may already change their political attitudes. That, in turn, dampens the identified effect of the actual job loss on support towards radical parties.

Why would economic changes lead to anticipation effects? Prior studies have shown that information from voters' social network shape their evaluations of the economy and incumbent government as well as voting behaviour (Ansolabehere et al. 2014; Bisgaard et al. 2016; Newman et al. 2015). Hence, economic changes may well have an effect beyond voters' direct economic situation. For example, voters may shift their political attitudes because they empathise with those who lose their job as a result of businesses closing permanently due to competition from low-wage countries or factories replacing workers with robots (Colantone and Stanig 2018a, b; Hays et al. 2009; Mansfield and Mutz 2009). However, Alt et al. (2021) recently showed that only job losses among individuals who work in the same industry or occupation increases voters' self-assessed probability to become unemployed and additionally result in an increased demand

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5　　Formally, this implies that the strict exogeneity assumption does not hold.

for more generous unemployment benefits and support for left parties, which are traditionally the political champions of such policies.[6] Voters, thus, primarily change their political attitudes in an egotropic rather than sociotropic manner.

Moreover, labour market risks are typically concentrated in specific sectors or occupations (Iversen and Soskice 2001; Rehm 2009, 2011; Thewissen and Rueda 2019: Walter 2010, 2017). As a result, voters who eventually lose their job are also among those most likely to learn about job losses among economically similar individuals and, thus, shift their political attitudes more easily. Therefore, I argue that it is likely that anticipation effects present a challenge to identify the effect of job losses for studies employing panel designs. When voters expect to lose their job, they will already change their political attitudes (partly) dampening the identified effect of becoming unemployed. Put differently, not distinguishing between expected and unexpected job losses results in underestimating the effect of job losses on support for radical parties. Hence, I expect that in panel studies only the effect of job losses that caught voters by surprise will be identified.

Finally, note that Wiertz and Rodon (2021) put forward a related argument when testing how different types of job losses affect political ideology, measured as voters' self-placement on a left-right scale. They argue that voters who do not have time to prepare for job losses will be hit relatively harder by their effect. Thus, unexpected job losses should have a larger effect on political attitudes compared to expected ones. Indeed, they find suggestive evidence that unexpected job losses affect voters' political ideology but do not test whether such losses affect party support. However, Rooduijn (2018) demonstrates that voters' self-placement on the left-right scale is necessarily related to support for radical parties suggesting that job losses may well have an effect on party support that will not be captured by voters' self-placement on a left-right scale.

*Mechanisms Linking Job Losses to Support for Radical Parties*

There are two categories of mechanisms that explain why unexpected job losses increase support for radical parties. The first category relates to radical parties' programmatic positions (Van der Burg et al. 2000). For example, radical left and radical right parties alike position themselves as nationalist (Burgoon 2013) and Eurosceptic (De Vries and Edwards, 2008; Hooghe et al. 2002). This programmatic position may especially appeal to those who are harmed by trade or intra-EU migration. Thus, radical parties mobilise voters who feel that mainstream parties have neglected their concerns by being

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6    Occupational-based indicators may also serve as a heuristic informing voters about their probability to become unemployed, such as their occupational employment risks (Helgason and Mérola 2017).

largely supportive of the liberal trade policies that underpin globalisation and further EU integration (Hooghe and Marks 2018).

Additionally, job losses and a subsequent drop in income increase demands for a generous and encompassing welfare state to relieve economic hardship. This translates into higher support for radical left parties. Although mainstream left parties are traditionally associated with providing a strong safety net as well, radical left parties have accused these parties of supporting neoliberal policies, questioning their credibility (Bowyer and Vail 2011; March 2011; Visser et al. 2014). In contrast, radical right parties' socioeconomic policy positions are still a topic of scholarly debate (Enggist and Pinggera 2022; Mudde 2007: Rathgeb and Busemeyer 2022; Röth et al. 2018; Rovny 2013; Rovny and Polk 2019). Instead, these parties appeal to voters who fear benefit competition between natives and immigrants or non-natives (Cavaillé and Ferwerda 2023; Hooijer 2021).

A second category of explanations linking economic hardship and radical party support runs via the rhetoric adopted by radical parties. This rhetoric may appeal to those voters experiencing economic hardship. First, radical parties typically employ a populist discourse. More specifically, they argue that the political mainstream has neglected the interest of 'ordinary citizens' with their policy positions (Rooduijn et al. 2017; Rooduijn 2018). Indeed, support for radical parties correlates with trust in political institutions (Foster and Frieden 2017; Guiso et al. 2019; Lechler 2019; Rooduijn et al. 2016; Vasilopoulou and Halikiopoulou 2023; Zhirkov 2014). Second, radical parties provide scapegoats for voters' absolute deprivation. Radical left parties typically target economic elites, while radical right parties offer a political outlet for those who blame immigration (Guiso et al. 2019; Hopkins et al. 2023; Lubbers et al. 2002; Lucassen and Lubbers 2021; March 2011; Semyonov et al. 2006; Visser et al. 2014). Furthermore, both types of parties often scapegoat the EU or other international organisations that foster globalisation (Burgoon et al. 2019; Chueri 2021; Mughan et al. 2003; Van der Waal and De Koster 2017).

## 4.3    Data and Empirical Strategy

This study draws on data from the Dutch LISS panel. The LISS is based on a probability sample of almost 5,000 Dutch households drawn from the population register provided by Statistics Netherlands, which limits problems regarding self-selection (Van der Laan 2009).[7] To enhance representativeness, respondents are paid for each completed questionnaire (€10) and are provided with loan equipment and free internet access if necessary

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7    See https://www.lissdata.nl and Scherpenzeel (2011) for further information.

(Scherpenzeel 2011). Overall, this yields a sample of 9,448 observations from 2,771 individuals (see Table 1 for the summary statistics).

The LISS panel is especially well-suited to test this paper's hypotheses for three reasons. First, the panel structure allows me to capture the impact of job losses instead of the rather static employment status as is common in cross-sectional data. Relatedly, focusing on changes in a respondents' employment status allows me to control for selection bias. For example, job losses are also correlated with people's socioeconomic background, which in turn is associated with distinct political socialisation experiences determining political attitudes and party preferences (Jennings et al. 2009; O'Grady 2017; Rekker el. 2017; Rico and Jennings 2016; Siedler 2011; Wehl 2019) or personality traits (Bakker et al. 2016, 2021). Second, the LISS Core study comprises monthly updated socio-economic and demographic information, along with yearly fielded questionnaires about income and political attitudes, starting from 2007.[8] Importantly, the questionnaire on income includes a question about respondents' subjective employment risks. Below, I explain how I use this question to make a distinction between expected and unexpected job losses.

Finally, both radical right and radical left parties have gained electoral traction in the Netherlands during the past decades, which allows me to assess changes in support for both parties over fifteen years (2007-2022). In recent years, the Dutch radical left party, the Socialist Party (SP), has been in electoral decline. Following its peak in 2016, where the party won 16.6 per cent of the votes, it has suffered consecutive losses in subsequent elections. In the most recent elections, the SP received only 3.15 per cent of the votes, marking its worst result since entering the parliament in 1994. In contrast to the SP, the Dutch biggest radical right party, the Party for Freedom (PVV), has been doing well electorally in recent elections. The party first participated during the 2006 national elections, clinching 5.9% of the votes. Since its inception, the party's electoral appeal has steadily grown, attested by consistently gaining a minimum of 10% of the votes in subsequent elections. In the recent 2023 elections, the PVV achieved its best results to date, capturing 23.5 of the votes and emerging as the largest party. Although the Dutch electoral institutions have been particularly open to new parties, the Netherlands is far from an outlier; other European countries have witnessed a surge in support for radical parties as well (Kriesi and Pappas 2015).

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8    There was no data collected for the questionnaire on political attitudes in 2014.

*Table 1. Summary statistics*

|  | Mean | Standard Deviation |
|---|---|---|
| Support SP | 4.998 | 2.191 |
| Support PVV | 2.969 | 2.719 |
| Lost Job | 0.010 | 0.097 |
| Subjective Employment Risk $_{t-1}$ | 0.174 | 0.243 |
| 18 – 34 years old | 0.160 | 0.366 |
| 35 – 44 years old | 0.249 | 0.433 |
| 45 – 54 years old | 0.306 | 0.461 |
| 55 – 67 years old | 0.286 | 0.452 |
| Children | 0.492 | 0.500 |
| High Education | 0.436 | 0.496 |
| Income (log) | 1.129 | 0.306 |
| Own House | 0.804 | 0.397 |
| Married | 0.609 | 0.488 |
| Sep./Div./Wid. | 0.123 | 0.328 |
| Never Married | 0.268 | 0.443 |
| Retired | 0.004 | 0.064 |
| Disabled | 0.002 | 0.048 |
| Observations | 25644 | |

## Support for Radical Parties

My dependent variables are either support for the SP or the PVV. The categorisation of these two parties is based on existing code schemes (March 2011; Rooduijn et al. 2023) and has been widely used in the recent broad political science literature (Burgoon et al. 2019; Colantone and Stanig 2018a, b; Im et al. 2019; Krause 2020; March and Rommerskirchen 2015; Oesch and Rennwald 2018; Polacko 2023; Rooduijn and Burgoon 2018; Rooduijn and Akkerman 2017).[9] Following previous studies drawing on the LISS panel (Gidron and Mijs 2019; Hooijer 2021; Solodoch 2021; Versteegen 2024), I measure support for these parties using an item that measures a respondent's sympathy on an 11-point scale, ranging from 0 (very unsympathetic) to 10 (very sympathetic). Compared to voting intentions, which are rela-

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9    Party manifesto data measuring the relative importance of parties' policy positions show that the SP scores high on policy dimensions like 'welfare state expansion' and 'market regulation,' whereas the PVV particularly scores high on the dimension 'national way of life' (Lehmann et al. 2024). This aligns with the described mechanisms linking job losses and support for radical parties.

tively stable over time, this indicator allows more variation over time and is arguably less vulnerable to social desirability bias (Gidron and Mijs 2019; Hooijer 2021).[10] Figure S1 of the supplementary material shows the average score of this measure over time.

*Subjective Employment Risks and Job Losses*

Distinguishing job losses by respondents' subjective employment risks presents an empirical challenge. Naturally, these two are never observed simultaneously; only individuals who currently have a job are at risk losing it. To circumvent this empirical challenge, I build on the strategies put forward in previous studies that employed panel data (Been et al. 2023; Dickerson and Green 2012; Marcus 2013; Paiella and Pistaferri 2016; Siflinger 2017; Stephens Jr. 2004). More specifically, these studies use questions that ask respondents about their expectations on future outcomes. Accordingly, future outcomes that were not expected by respondents are identified as exogenous: respondents do not change their behaviour in anticipation of the outcome they do not expect.

To facilitate such an empirical strategy, I proceed in two steps. First, I use the monthly updated socio-economic and demographic information of each respondent that can be linked to each questionnaire. I construct the binary indicator that captures whether a respondent loses their job between consecutive waves based on information about respondents' main activity.[11] Although job losses are typically rare, this is not an artifact of the LISS panel's sample. In Figure S2 of the supplementary material, I compare the unemployment rate from Statistics Netherlands with the unemployment rate based on the LISS panel.[12] The figure corroborates the representativeness of the LISS panel showing that both unemployment rates show a similar trend.

Next, I complement the data above with the questionnaire on income to measure a respondents subjective employment risk. This questionnaire includes the following question: "Do you think that there is any chance that you might lose your job in the coming 12 months?" Respondents are asked to indicate this in terms of a percentage where 0% implies that they are sure that they will not lose their job and 100% implies that they are sure that they will lose their job. I provide two tests to verify the validity of this indicator to measure employment risks. First, Panel A of Figure 1 shows the overall distribution of this indicator. The skew to the right indicates

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10    In the robustness section, I show that my main results also hold using voting intention.
11    Out of all employed respondents who are observed in at least two consecutive waves, 0.92 per cent lost their job between wave *t* and *t+1*.
12    Note that I include all unemployed respondents to calculate the unemployment rate instead of only those who lost their job between consecutive waves.

that most respondents do not expect to lose their job in the coming year. Although most respondents do not expect to lose their job, panel B of Figure 1 provides descriptive evidence that subjective unemployment risks are informative for actual employment outcomes. Here, I split the sample between respondents who did not lose their job in wave *t+1* (the dark grey bars) and those who did (the light grey bars). Respondents who did lose their job generally believed that their probability of doing so was 67.3 per cent, compared to 16.9 per cent among respondents who did not end up losing their job. Also, most respondents in the former group anticipated their job loss (42.9 per cent), whereas only 6.5 per cent was completely surprised that they lost their job.

*Figure 1. Distribution of respondents' subjective employment risk in the LISS, by outcome in the subsequent wave.*
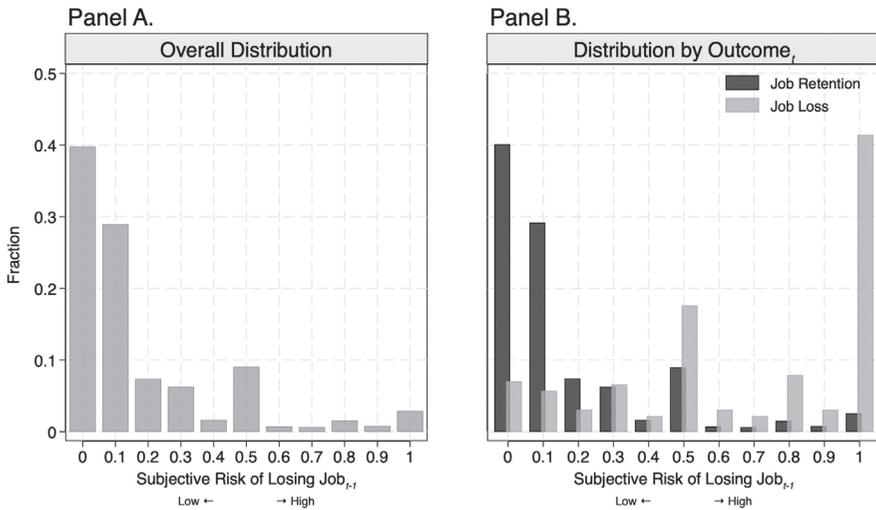


Second, I estimate the relationship between subjective employment risks and job losses to provide a more rigorous test of this indicator's validity. Table 2 presents the results of the associated logit regressions. Consistent with prior studies (Dickerson and Green 2012; Stephens Jr. 2004), the models confirm that respondents' subjective employment risks in the previous wave predicts the probability of job losses in the subsequent wave ($\rho < 0.01$). Importantly, this underscores the plausibility that respondents may already update their political attitudes before experiencing job losses, thereby dampening the identified effect of job losses on support for radical parties.

*Table 2. Subjective Employment Risks and Job Losses*

|  | Lost Job | |
|---|---|---|
|  | *M1* | *M2* |
| Subjective Employment Risk $_{t-1}$ | 0.081*** | 0.081*** |
|  | 0.008 | 0.008 |
| Observations | 21183 | 21151 |
| Unique Respondents | 4025 | 4021 |
| Individual FE | Yes | Yes |
| Wave FE | Yes | Yes |
| Controls | No | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
* $\rho < 0.10$
** $\rho < 0.05$
*** $\rho < 0.01$

*Method*

Like previous studies that draw on panel data, I identify the effect of subjective employment risks and job losses using ordinary least squared (OLS) to estimate two-way fixed effects (TWFE) models (Ahrens 2023; Gidron and Mijs 2019; Hopkins et al. 2023; Mutz 2018; Naumann et al. 2016; O'Grady 2019; Wiertz and Rodon 2021).[13] My main model takes the following form:

$$y_{it} = \beta_0 + \beta_1 Job\ Loss_{it} + \beta_2 Sub.\ Emp.Risk_{it-1} + \beta_3 Job\ Loss_{it} \times Sub.Emp.\ Risk_{it-1}$$
$$+ \beta_4 X_{it} + \alpha_i + \mu_t + \epsilon_{it}\ ,$$

where $y_{it}$ denotes the support for radical parties for respondent $i$ in wave $t$. Furthermore, $Job\ Loss_{it}$ is a binary indicator that takes on the value 1 if a respondent lost their job and zero otherwise. Next, $Sub.\ Risk_{it-1}$ is an indicator that captures a respondent's subjective employment risks assessed in the previous wave. $Job\ Loss_{it} \times Sub.\ Risk_{it-1}$ represents the interaction between the previous two indicators which enables me to distinguish between expected and unexpected job losses. $X_{it}$ is a vector of controls including age, income, education level, marital status, house ownership and current labour market status. Finally, $\alpha_i$ and $\mu_t$ denote the individual and year FE and $\varepsilon_{it}$ is the error term. Using TWFE enables me to control for unobserved time-invariant confounders. For example, an individual's personality traits or social background may correlate with both subjective employment risks

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13     Recently, a number of studies have argued that under certain conditions TWFE estimators can amplify bias (Imai and Kim 2020; Plümper and Troeger 2019). To account for this, I show that the results are robust using different model specifications.

and political attitudes (Bakker et a. 2016; 2021; Jennings et al. 2009; O'Grady 2017; Rekker el. 2017; Rico and Jennings 2016; Siedler 2011). Thus, without including individual FE, my estimates would be biased. Besides, TWFE accounts for common temporary shocks, like the financial crisis or Covid-19 pandemic.

## 4.4    RESULTS

*Support of the Dutch Radical Left*

Table 3 presents the results for the effect of job losses on support for the SP. In model 1, I do not distinguish between expected and unexpected job losses showing the overall effect of a job loss on attitudes towards the SP. Respondents who lose their job became more supportive of the SP, but the associated estimate is statistically insignificant ($\rho > 0.10$) and relatively small: job losses are generally associated with an increase in support for the SP of only 0.12 (measured on a 11-point scale). To rule out meaningful effects in a more rigours manner, I use equivalence tests and a benchmark of 0.36 of a standard deviation as suggested by Hartman and Hidalgo (2018). The confidence intervals of the estimate range from -0.05 to 0.16 of a standard deviation, falling comfortably within the range of negligible effects.

*Table 3. Effect of Job Losses on Support for the SP*

|  | Support SP | | |
|---|---|---|---|
|  | *M1* | *M2* | *M3* |
| Lost Job | 0.123 | 0.606*** | 0.569** |
|  | 0.121 | 0.221 | 0.222 |
| Subjective Employment Risk $_{t-1}$ | 0.117** | 0.135** | 0.126** |
|  | 0.053 | 0.053 | 0.056 |
| Lost Job × Subjective Employment Risk $_{t-1}$ |  | -0.721** | -0.672** |
|  |  | 0.307 | 0.313 |
| Observations | 21371 | 21371 | 19851 |
| Unique Respondents | 4053 | 4053 | 3858 |
| Individual FE | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes |
| Controls | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
\* $\rho < 0.10$
\*\* $\rho < 0.05$
\*\*\* $\rho < 0.01$

However, the null effect of job losses on support towards the SP may be attributed to those respondents who had already anticipated their job loss and subsequently shifted their support towards the SP. Indeed, model 1 provides tentative evidence of anticipation effects, showing that support for the SP increased among respondents who became more concerned that they would lose their job. Although this effect is statistically significant ($\rho < 0.1$), the estimate is also substantially small as the confidence intervals lie within the null effect range (CI: [$0.01\sigma$, $0.10\sigma$]).

In models 2 and 3 of Table 3, I provide evidence that corroborates that job losses have a positive effect on respondents' attitudes towards the SP. The estimates are very similar across both specifications. Plot A in Figure 2 presents the effect of job losses on support for the SP conditional on respondents' subjective employment risks in the previous wave. Among respondents who were not concerned that they would be able to keep their job, job losses have a statically significant effect.[14] For example, a respondent who was completely surprised by their job loss became about 0.30 of a standard deviation more supportive of the SP ($\rho < 0.05$). As the associated confidence intervals range from 0.03 to 0.58 of a standard deviation, the effect of an unexpected job loss is also substantively meaningful.[15] In contrast, I do not find evidence of an effect of job losses among respondents who expected to lose their job. The effect of job losses is statically insignificant and close to zero ($\rho > 0.10$, CI: [$-0.18\sigma$, $0.13\sigma$]) for respondents who completely anticipated that they would lose their job in the subsequent wave.

*Figure 2. The effect of job losses on support for the SP conditional on respondents' subjective employment risk.*
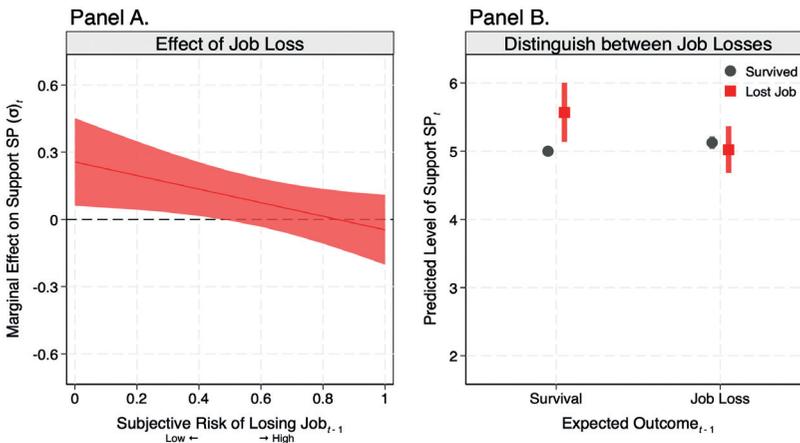


*Note: Based on Table 3 M3. 95% confidence interval shown.*

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14    The effect of job losses is significant at the 0.01, 0.05 and 0.10 level for subjective employment risks of up to respectively 30, 49 and 55 percent.
15    To provide further context, this effect is similar to the effect of a change in monthly household income of about €11.500.

Plot B of Figure 2 provides another illustration of the same model by showing the predicted level of support for the SP. Most importantly, the plot shows that the level of support for the SP among respondents who were surprised by their job loss is 5.6 (measured on a 11-point scale). This corresponds to a difference of 0.67 points compared to respondents who anticipated losing their jobs. The predicted level of support among respondents who anticipated they would lose their job is roughly similar regardless of their employment status in the subsequent wave.

*Support for the Dutch Radical Right*

Turning to the PVV, Table 4 demonstrates that job losses are not associated with increased support for the PVV. Although a respondent who lost their job became less supportive of the PVV, the associated estimate is statically insignificant and indicates a negligible effect size ($\rho > 0.10$, CI: [-0.06$\sigma$, 0.11$\sigma$]). Changes in respondents' subjective employment risk does not seem to drive their support for the PVV either. Although the associated estimate is positive, implying that support for the PVV increased among those respondents who became more concerned they would not be able to keep their job, the estimate does not reach conventional levels of statistical significance and negligible in size ($\rho = 0.128$, CI: [-0.01$\sigma$, 0.06$\sigma$]).

*Table 4. Effect of Job Losses on Support for the PVV*

|  | Support PPV | | |
|---|---|---|---|
|  | *M1* | *M2* | *M3* |
| Lost Job | 0.075 | 0.219 | -0.022 |
|  | 0.117 | 0.283 | 0.292 |
| Subjective Employment Risk $_{t-1}$ | 0.071 | 0.076 | 0.084 |
|  | 0.054 | 0.054 | 0.055 |
| Lost Job × Subjective Employment Risk $_{t-1}$ |  | -0.216 | -0.041 |
|  |  | 0.354 | 0.360 |
| Observations | 22003 | 22003 | 20431 |
| Unique Respondents | 4151 | 4151 | 3947 |
| Individual FE | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes |
| Controls | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $\rho < 0.10$
** $\rho < 0.05$
*** $\rho < 0.01$

Moreover, models 2 and 3 in Table 4 show that this null effect does not stem from anticipation effects. The interaction effect between respondents' subjective employment risks and job losses is neither statistically significant nor meaningful in both model 2 ($\rho > 0.10$, CI: [-0.25$\sigma$, 0.27$\sigma$]) and model 3 ($\rho > 0.10$, CI: [-0.27$\sigma$, 0.24$\sigma$]). Panels A and B of Figure 3 illustrate that respondents who lost their job did not shift their support towards the PVV. The first panel shows that the slope of job losses across different levels of respondents' preceding subjective employment risk is close to zero. This indicates that regardless of whether respondents completely anticipated that they would lose their job or that they were caught by surprise, they did not become more supportive of the PVV. The second panel, panel B, shows that the predicted level of support for the PVV is roughly similar among respondents experiencing either type of job loss: the difference between these two types is a mere 0.041 points (on a 11-point scale).

*Figure 3. The effect of job losses on support for the PVV conditional on respondents' subjective employment risk.*
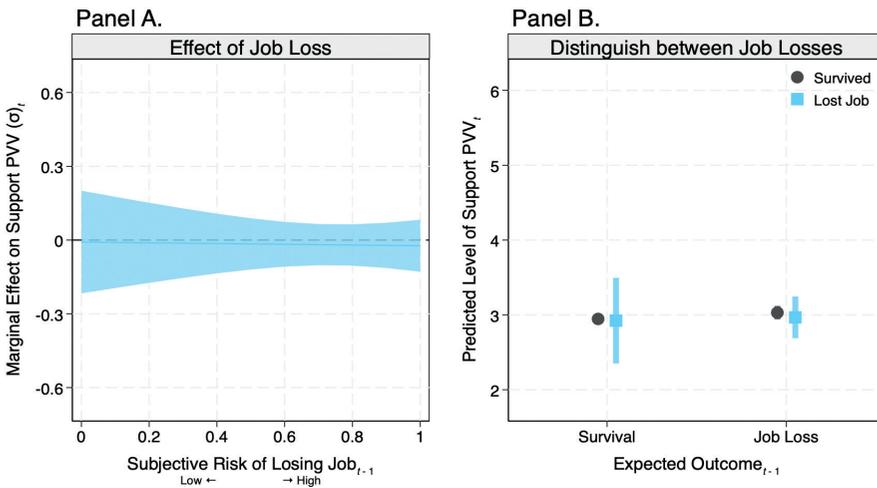


*Note: Based on Table 4 M3. 95% confidence interval shown.*

## 4.5    ROBUSTNESS CHECKS

Next, I conduct several additional analyses to show the robustness of my results. Taken together, these analyses corroborate my main results. Job losses matter to attitudes towards the SP, whereas they do not affect support for the radical right. In fact, I present some tentative evidence that unexpected job losses may have an opposite effect: those who experienced an unexpected job loss became less supportive of the radical right.

*Different Measures of Party Support*

First, I show that the results are not sensitive to using an alternative item to measure support for both parties: respondents' vote intention. The item asks respondents for which party they would vote if parliamentary elections were held today.[16] The available answering categories consist of the largest parties of the Netherlands, including the PVV and SP for all waves.[17] Although previous studies also employed similar items to measure party support (Janssen et al. 2019; Lindner et al. 2024; Versteegen 2024; Voeten 2024), voting intentions are relatively stable yielding less variation over time, making it harder to capture changes in electoral preferences that might also shift mainstream parties' policy position (Abou-Chadi and Krause 2020; Gidron and Mijs 2019). Furthermore, roughly a third of the respondents are asked to indicate the probability that they would vote for each party from 2016 onwards. For these respondents, I recode these answers into a measure that is coded 1 for the party with the highest probability and 0 for all other parties (see also Voeten 2024).

Figure 4 shows the interaction effect of job losses and subjective employment risks for both parties (see Tables S4 of the supplementary information for the corresponding regression results). First, the estimates presented in plots A and B corroborate that unexpected job losses are a meaningful driver of radical left support. Among respondents who unexpectedly lost their job, the likelihood of voting SP increased with 0.41 of a standard deviation ($\rho < 0.05$, CI: [-0.02, 0.80]), whereas the anticipated job losses do not affect respondents' intention to vote SP ($\rho > 0.10$, CI: [-0.10, 0.04]). Note that the difference between these two types of job losses is statistically significant at the 5 per cent level.

*Figure 4. The effect of job losses on respondents' intention to vote for either the SP (Panel A and B) or the PVV (Panel C and D) conditional on their subjective employment risk.*
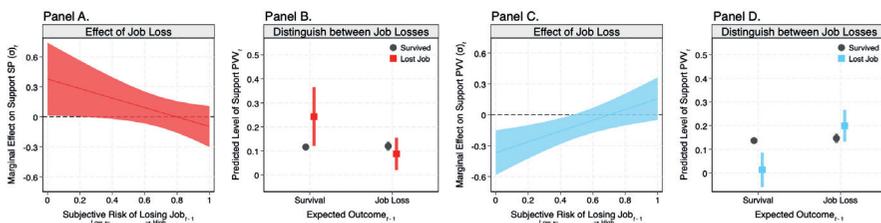


*Note: Based on Table S4 M3 and M6 respectively. 95% confidence interval shown.*

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16    The exact wording is: "*If parliamentary elections were held today, for which party would you vote?*"

17    I exclude respondents who do not intend to vote. Besides, I recode the answering category "Other Party" if respondents refer to either the PVV and SP. This is especially relevant during early waves as some respondents indicate that they would vote for "*Groep Wilders*" instead of the PVV, although the former refers to the PVV's party leader.

Second, plot C and D of Figure 4 show that unexpected job losses are associated with a decrease in the likelihood that a respondent would vote for the PVV. Respondents who did not anticipate a job loss in the subsequent wave became about 10 percentage points less likely to support the PVV at the ballot box ($\rho$ < 0.01). This corresponds to a substantive decrease of 0.33 of a standard deviation (CI: [-0.58, -0.09]), constituting a change in the predicted voting probability from 0.12 per cent to 0.01 percent. The effect of expected job losses is statically insignificant and substantially small ($\rho$ > 0.10, CI: [-0.04, 0.36]). Note, however, that confidence intervals fall just within the standard equivalence range for negligible effects. Finally, the significant interaction effect indicates that the difference between these types of job losses is statistically significant as well ($\rho$ < 0.01).

Next, I take into account that the Netherlands host multiple radical right parties (Rooduijn et al. 2023), including Forum for Democracy (FvD) and Right Answer 21 (JA21). Besides, some studies also consider Proud of the Netherlands (ToN) a radical right party (De Blok en Van der Meer 2018; Daenekindt et al. 2017). Hence, I test the effect of job losses on support for radical parties in general, using both the sympathy measures and vote intention. Table S5 of the supplementary information shows that this does not affect my results.

*PVV as an Incumbent Party, the Political Horse Race of 2012 and the Covid-19 Pandemic*

Third, I exclude waves that may drive my results given the specific electoral dynamics at the time of fieldwork. First, the PVV has backed the government in a confidence-and-supply deal between 2010-2012 (Cabinet Rutte I). As a result, the lack of support for the PVV after unexpected job losses might stem (at least partly) from anti-cumbent voting (Helgason and Mérola 2017; Mughan and Lacy 2002). In addition, I test whether the results of support for the SP are driven by the party's popularity ahead of the 2012 elections (see also Figure S1). The party's popularity peaked before the election with polls indicating the SP were in competition with the People's Party for Freedom and Democracy (VVD) to become the largest party and, consequently, obtain the initiative of forming a new government (Van Holsteyn 2014). To make sure that my results are not driven by this dynamic, I exclude the fourth wave of the LISS, which was in field only five months before the election. Finally, I exclude the waves for which the fieldwork took placing during the Covid-19 pandemic as recent contributions show that this may induce rally effects (Bol et al. 2021; Kritzinger et al. 2021; Louwerse et al. 2021; Van der Meer et al. 2023). Furthermore, this may affect my results if job losses during this period did not result in support for either the SP or the PVV but incumbent parties instead. Tables S6-S8 of the supplementary information show that my results remain largely unchanged.

*Additional and Differently Operationalised Controls*

Finally, I test the sensitivity of my results to the inclusion of additional controls and different operationalisations of the controls variables. Tables S9 – S12 of the supplementary information show that the results are not affected when I (i) include a dummy indicator that captures whether a respondent has been unemployed before, (ii) include a dummy indicator that turns to 1 when a respondent has experienced a drop of 25% in household income between two subsequent waves (Hopkins et al. 2023; Margalit 2013; Wiertz and Rodon 2021), (iii) include personal income instead of household income as a control variable, (iv) employ random effects to account for some of the recent criticism regarding fixed effects (Imai and Kim 2021; Plümper and Troeger 2019) and (v) test whether respondents also change their attitudes towards radical parties following an (unexpected) shift into retirement, disability or other types of non-employment (see also Figure S3 and S4 of the supplementary information).

## 4.6    Conclusion

Leveraging variation across regions, studies have demonstrated that adverse economic shocks and economic changes have contributed to the electoral success of both radical left and radical right parties. In this context, studies have identified voters who were directly harmed by these changes as typical supporters of radical parties. However, scholars have questioned this interpretation as panel studies examining whether voters who lose their job become more supportive of radical parties yield mixed evidence (Gidron and Mijs 2019; Kurer 2020; Wiertz and Rodon 2021).

In this study, I present evidence relating to the Netherlands, suggesting that the identified effect of job losses in panel studies depends on whether this loss was anticipated. Voters who expect to lose their job may well shift their attitudes before the actual job loss. Such anticipation effects dampen the identified effect of job losses in panel studies. Drawing on Dutch panel data, my analyses reveal that voters who lose their job unexpectedly become more supportive of the radical left but not of the radical right. Compared to respondents who anticipated their job loss, those who were caught by surprise became 0.67 to 0.72 points (measured on a 11-point scale) more supportive of the SP. In a series of robustness checks, I show that these results also hold for using a different item to capture support for the SP, excluding waves with a particular electoral dynamic, different operationalisation of the independent variables and different model specifications. In contrast, I do not find evidence that either expected or unexpected job losses drives support towards the PVV. The estimates associated with the interaction term capturing these different types of job losses are not only statistically insignificant but also negligible in size. Furthermore, robustness

tests show that this null effect persists when using alternative measures to capture support for the PVV or radical right parties in general as well as across the aforementioned robustness tests. If anything, I find evidence that respondents who did not anticipate their job loss even became less supportive of radical right parties.

Taken together, my results show that ignoring anticipation in panel models may well result in an underestimation of the effect of job losses on political attitudes. Prior studies drawing on the LISS panel but ignoring anticipation effects do not find evidence that job losses affect support for radical parties (Gidron and Mijs 2019; Wiertz and Rodon 2021). By distinguishing between expected and unexpected job losses, my analyses show that models incorporating anticipation effects yield significant and substantial effects of job losses on radical left parties. Thus, panel studies examining the true effects of personal experiences of absolute deprivation should take anticipation effects into account. Although my findings differ from prior studies when it comes to the null effect of job losses specifically, the results align with prior studies showing that personal experiences of absolute deprivation primarily result in a shift towards the (radical) left, translating into demands for a generous welfare state (Margalit 2013; Naumann et al. 2016; Owens and Pedalla 2014) or support for (radical) left parties (Gidron and Mijs 2019; Kurer 2020).

When it comes to radical right parties, my results are consistent with studies that emphasise how broader economic and social changes foster support for radical parties. For one, radical right parties appeal to voters who feel threatened by such changes (Gidron and Hall 2017, 2019; Häusermann et al. 2023; Kurer and Van Staalduinen 2022; Versteegen 2024). In addition, recent studies have demonstrated that the local conditions shape voters' attitudes towards radical parties (Arzheimer et al 2024; Bolet 2021; Harteveld et al. 2022). While I do not test these arguments directly in this study, my results suggest that it may be worthwhile to examine such boarder changes rather than absolute deprivation for understanding the electoral fortunes of radical right parties.

In addition, several limitations apply to my study and may be fruitful avenues for future research. First, the advantages for causal inferences of using panel data come at the prices of external validity. Hence, future research should explore whether these results are generalisable beyond the Netherlands, particularly given that the Labour Party (PvdA) was in government during seven out of the fifteen waves included in this study. From 2012-2017, the PvdA formed a coalition together with the VVD, implementing several retrenchment measures. This allowed the SP to blame the PvdA of pushing neoliberal policies. Additionally, the incidence of part-time and temporary employment is relatively high in the Netherlands. Since this type of employment is typically associated with insecure labour market

prospects, anticipation effects may be more prevalent in the Dutch context. Second, the prevalence of job losses in the overall population is typically small. My results therefore should be interpreted as evidence on how job losses drive political attitudes, but not as evidence that job losses will shape election outcomes (Margalit 2019a, b). In fact, Krause (2020) shows that radical left parties may electorally benefit from adopting more moder-ate economic policy positions to appeal to a broader share of the elector-ate. Third, my empirical strategy together with the fact that job losses are statistically rare does not allow me to take shifts in the SP's party leadership into account. Although the effects of shifts in leadership are at least par-tially captured by the year fixed effects, studies have also suggested that these shifts have been accompanied by periods during which the party was less populist (Akkerman et al. 2014). Future research should shed light on whether the SP, and radical left parties in general, electorally benefit from populist programmes.

Supplementary Information

*Figure S1. Average support for the SP and PVV over time. 95% confidence intervals shown.*
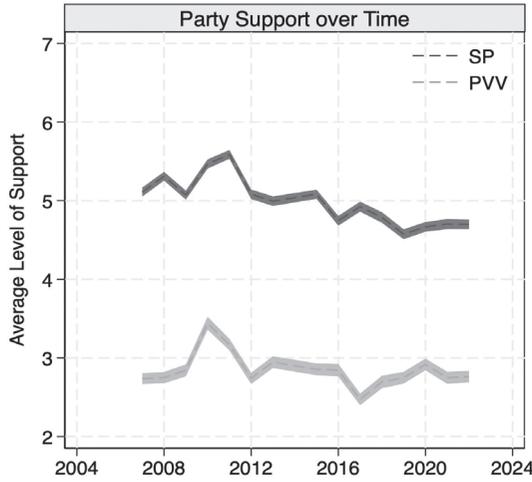


*Figure S2. Unemployment rate in the Netherlands, official statics (retrieved from Statistics Netherlands) and the LISS panel. The blue region indicates the 95% confidence intervals.*
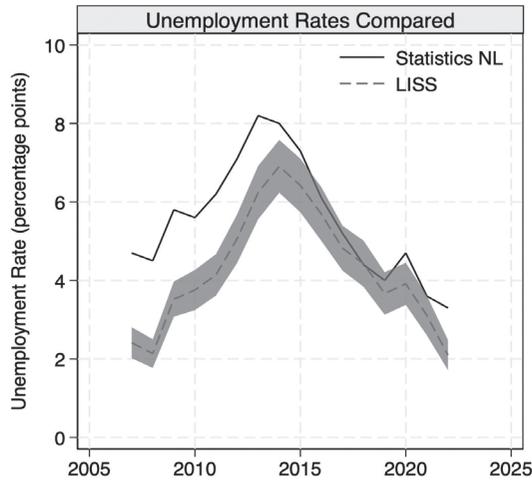
*Table S1. The Effect of Subjective Employment Risks and Job Losses*

|  | Lost Job | |
| --- | --- | --- |
|  | *M1* | *M2* |
| Subjective Employment Risk $_{t-1}$ | 0.081*** | 0.081*** |
|  | 0.008 | 0.008 |
| 18 – 34 years old |  | *Ref.* |
| 35 – 44 years old |  | -0.002 |
|  |  | 0.004 |
| 45 – 54 years old |  | -0.005 |
|  |  | 0.006 |
| 55 – 67 years old |  | -0.007 |
|  |  | 0.008 |
| High Education |  | -0.013 |
|  |  | 0.010 |
| Children |  | -0.002 |
|  |  | 0.004 |
| Married |  | *Ref.* |
| Sep./Div./Wid. |  | 0.003 |
|  |  | 0.007 |
| Never Married |  | 0.010 |
|  |  | 0.007 |
| Observations | 21183 | 21151 |
| Unique Respondents | 4025 | 4021 |
| Individual FE | Yes | Yes |
| Wave FE | Yes | Yes |
| Controls | No | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
* $\rho < 0.10$
** $\rho < 0.05$
*** $\rho < 0.01$

*Table S2. Effect of Job Losses on Support for the SP*

|  | Support SP | | |
|---|---|---|---|
|  | *M1* | *M2* | *M3* |
| Lost Job | 0.123 | 0.606*** | 0.569** |
|  | 0.121 | 0.221 | 0.222 |
| Subjective Employment Risk $_{t-1}$ | 0.117** | 0.135** | 0.126** |
|  | 0.053 | 0.053 | 0.056 |
| Lost Job × Subjective Employment Risk $_{t-1}$ |  | -0.721** | -0.672** |
|  |  | 0.307 | 0.313 |
| 18 – 34 years old |  |  | *Ref.* |
| 35 – 44 years old |  |  | 0.097 |
|  |  |  | 0.064 |
| 45 – 54 years old |  |  | 0.090 |
|  |  |  | 0.093 |
| 55 – 67 years old |  |  | 0.058 |
|  |  |  | 0.118 |
| Child(ren) |  |  | -0.169*** |
|  |  |  | 0.062 |
| High Education |  |  | 0.142 |
|  |  |  | 0.161 |
| Income (log) |  |  | -0.172 |
|  |  |  | 0.105 |
| House owner |  |  | -0.033 |
|  |  |  | 0.075 |
| Married |  |  | *Ref.* |
| Sep./Div./Wid. |  |  | 0.015 |
|  |  |  | 0.097 |
| Never Married |  |  | -0.186** |
|  |  |  | 0.093 |
| Retired |  |  | -0.029 |
|  |  |  | 0.174 |
| Disabled |  |  | -0.202 |
|  |  |  | 0.291 |
| Other |  |  | 0.051 |
|  |  |  | 0.208 |
| Observations | 21371 | 21371 | 19851 |
| Unique Respondents | 4053 | 4053 | 3858 |
| Individual FE | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes |
| Controls | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $\rho < 0.10$
** $\rho < 0.05$
*** $\rho < 0.01$

*Table S3. Effect of Job Losses on Support for the PVV*

| | Support PVV | | |
|---|---|---|---|
| | *M1* | *M2* | *M3* |
| Lost Job | 0.075 | 0.219 | -0.022 |
| | 0.117 | 0.283 | 0.292 |
| Subjective Employment Risk $_{t-1}$ | 0.071 | 0.076 | 0.084 |
| | 0.054 | 0.054 | 0.055 |
| Lost Job × Subjective Employment Risk $_{t-1}$ | | -0.216 | -0.041 |
| | | 0.354 | 0.360 |
| 18 – 34 years old | | | *Ref.* |
| 35 – 44 years old | | | -0.036 |
| | | | 0.073 |
| 45 – 54 years old | | | -0.084 |
| | | | 0.102 |
| 55 – 67 years old | | | -0.091 |
| | | | 0.123 |
| Child(ren) | | | -0.027 |
| | | | 0.065 |
| High Education | | | -0.114 |
| | | | 0.124 |
| Income (log) | | | -0.310*** |
| | | | 0.107 |
| House owner | | | 0.069 |
| | | | 0.091 |
| Married | | | *Ref.* |
| Sep./Div./Wid. | | | 0.163 |
| | | | 0.123 |
| Never Married | | | -0.040 |
| | | | 0.095 |
| Retired | | | -0.017 |
| | | | 0.138 |
| Disabled | | | 0.010 |
| | | | 0.310 |
| Other | | | 0.055 |
| | | | 0.202 |
| Observations | 22003 | 22003 | 20431 |
| Unique Respondents | 4151 | 4151 | 3947 |
| Individual FE | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes |
| Controls | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $\rho < 0.10$
** $\rho < 0.05$
*** $\rho < 0.01$

*Table S4. Effect of Job Losses on SP and PVV Vote Intentions*

| | Would Vote SP | | | Would Vote PVV | | |
|---|---|---|---|---|---|---|
| | M1 | M2 | M3 | M4 | M5 | M6 |
| Lost Job | 0.015 | 0.119** | 0.134** | -0.003 | -0.106*** | -0.123*** |
| | 0.026 | 0.060 | 0.066 | 0.020 | 0.033 | 0.037 |
| Sub.Emp.Risk $_{t-1}$ | -0.000 | 0.004 | 0.004 | 0.013 | 0.010 | 0.010 |
| | 0.011 | 0.011 | 0.012 | 0.011 | 0.011 | 0.012 |
| Lost Job × Sub.Emp.Risk $_{t-1}$ | | -0.156** | -0.167** | | 0.155*** | 0.176*** |
| | | 0.078 | 0.084 | | 0.055 | 0.060 |
| 18 – 34 years old | | | *Ref.* | | | *Ref.* |
| 35 – 44 years old | | | -0.004 | | | -0.003 |
| | | | 0.012 | | | 0.016 |
| 45 – 54 years old | | | -0.013 | | | 0.012 |
| | | | 0.019 | | | 0.021 |
| 55 – 67 years old | | | -0.040* | | | 0.018 |
| | | | 0.024 | | | 0.025 |
| Child(ren) | | | 0.011 | | | 0.002 |
| | | | 0.011 | | | 0.011 |
| High Education | | | -0.020 | | | 0.063* |
| | | | 0.024 | | | 0.036 |
| Income (log) | | | -0.007 | | | -0.015 |
| | | | 0.020 | | | 0.021 |
| House owner | | | -0.025 | | | 0.011 |
| | | | 0.018 | | | 0.018 |
| Married | | | *Ref.* | | | Ref. |
| Sep./Div./Wid. | | | 0.054** | | | -0.042 |
| | | | 0.023 | | | 0.033 |
| Never Married | | | -0.006 | | | -0.028* |
| | | | 0.020 | | | 0.016 |
| Retired | | | -0.030* | | | 0.008 |
| | | | 0.017 | | | 0.019 |
| Disabled | | | -0.039 | | | 0.037 |
| | | | 0.055 | | | 0.045 |
| Other | | | -0.024 | | | 0.046 |
| | | | 0.053 | | | 0.039 |
| Observations | 14518 | 14518 | 13564 | 14968 | 14968 | 13919 |
| Unique Respondents | 3763 | 3763 | 3566 | 3394 | 3394 | 3226 |
| Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | No | No | Yes | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $\rho < 0.10$
** $\rho < 0.05$
*** $\rho < 0.01$

*Table S5. Effect of Job Losses on Support for the Radical Right and Radical Right Vote Intentions*

| | Support Radical Right Party | | | Would Vote Radical Right Party | | |
|---|---|---|---|---|---|---|
| | M1 | M2 | M3 | M4 | M5 | M6 |
| Lost Job | 0.034 | 0.052 | 0.092 | -0.022 | -0.173*** | -0.194*** |
| | 0.081 | 0.193 | 0.209 | 0.027 | 0.045 | 0.050 |
| Sub.Emp.Risk $_{t-1}$ | -0.016 | -0.016 | -0.011 | 0.008 | 0.003 | 0.005 |
| | 0.038 | 0.038 | 0.040 | 0.013 | 0.013 | 0.014 |
| Lost Job × Sub.Emp.Risk $_{t-1}$ | | -0.028 | -0.134 | | 0.229*** | 0.256*** |
| | | 0.249 | 0.267 | | 0.070 | 0.077 |
| 18 – 34 years old | | | Ref. | | | Ref. |
| 35 – 44 years old | | | 0.079* | | | -0.019 |
| | | | 0.045 | | | 0.019 |
| 45 – 54 years old | | | 0.092 | | | 0.013 |
| | | | 0.065 | | | 0.025 |
| 55 – 67 years old | | | 0.109 | | | 0.016 |
| | | | 0.081 | | | 0.029 |
| Child(ren) | | | -0.095** | | | -0.001 |
| | | | 0.043 | | | 0.014 |
| High Education | | | 0.077 | | | 0.054 |
| | | | 0.089 | | | 0.045 |
| Income (log) | | | 0.007 | | | 0.034 |
| | | | 0.072 | | | 0.027 |
| House owner | | | -0.010 | | | -0.004 |
| | | | 0.061 | | | 0.020 |
| Married | | | Ref. | | | Ref. |
| Sep./Div./Wid. | | | 0.050 | | | -0.051 |
| | | | 0.078 | | | 0.033 |
| Never Married | | | -0.058 | | | -0.034 |
| | | | 0.061 | | | 0.024 |
| Retired | | | -0.068 | | | -0.011 |
| | | | 0.098 | | | 0.029 |
| Disabled | | | 0.118 | | | -0.015 |
| | | | 0.199 | | | 0.037 |
| Other | | | -0.066 | | | 0.076* |
| | | | 0.173 | | | 0.041 |
| Observations | 22309 | 22309 | 20696 | 15702 | 15702 | 14615 |
| Unique Respondents | 4181 | 4181 | 3976 | 3511 | 3511 | 3339 |
| Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | No | No | Yes | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $\rho < 0.10$
** $\rho < 0.05$
*** $\rho < 0.01$

*Table S6. Effect of Job Losses on Support for the PVV and PVV Vote Intentions (Waves During which the Cabinet had Confidence and Supply Agreement with the PVV)*

| | Support PVV | | | Would Vote PVV | | |
|---|---|---|---|---|---|---|
| | *M1* | *M2* | *M3* | *M4* | *M5* | *M6* |
| Lost Job | 0.083 | 0.420* | 0.435* | 0.002 | -0.089** | -0.105** |
| | 0.131 | 0.250 | 0.245 | 0.024 | 0.036 | 0.041 |
| Sub.Emp.Risk $_{t-1}$ | 0.078 | 0.089 | 0.079 | 0.022 | 0.019 | 0.018 |
| | 0.061 | 0.061 | 0.064 | 0.013 | 0.013 | 0.015 |
| Lost Job × Sub.Emp.Risk $_{t-1}$ | | -0.493 | -0.516 | | 0.136** | 0.155** |
| | | 0.330 | 0.329 | | 0.062 | 0.069 |
| 18 – 34 years old | | | *Ref.* | | | *Ref.* |
| 35 – 44 years old | | | 0.126* | | | -0.011 |
| | | | 0.071 | | | 0.019 |
| 45 – 54 years old | | | 0.128 | | | 0.008 |
| | | | 0.101 | | | 0.025 |
| 55 – 67 years old | | | 0.139 | | | 0.012 |
| | | | 0.128 | | | 0.029 |
| Child(ren) | | | -0.182*** | | | -0.004 |
| | | | 0.066 | | | 0.012 |
| High Education | | | 0.150 | | | 0.053 |
| | | | 0.174 | | | 0.043 |
| Income (log) | | | -0.209* | | | -0.019 |
| | | | 0.117 | | | 0.026 |
| House owner | | | -0.077 | | | 0.017 |
| | | | 0.082 | | | 0.022 |
| Married | | | *Ref.* | | | *Ref.* |
| Sep./Div./Wid. | | | -0.002 | | | -0.035 |
| | | | 0.102 | | | 0.038 |
| Never Married | | | -0.210** | | | -0.044** |
| | | | 0.102 | | | 0.018 |
| Retired | | | 0.068 | | | -0.008 |
| | | | 0.227 | | | 0.046 |
| Disabled | | | -0.133 | | | 0.049 |
| | | | 0.321 | | | 0.064 |
| Other | | | -0.070 | | | 0.071 |
| | | | 0.235 | | | 0.056 |
| Observations | 17584 | 17584 | 16326 | 11932 | 11932 | 11048 |
| Unique Respondents | 3673 | 3673 | 3496 | 3030 | 3030 | 2880 |
| Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | No | No | Yes | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $p < 0.10$
** $p < 0.05$
*** $p < 0.01$

*Table S7. Effect of Job Losses on Support for the SP and SP Vote Intentions (Fourth Wave Dropped)*

|  | Support PVV | | | Would Vote PVV | | |
|---|---|---|---|---|---|---|
|  | *M1* | *M2* | *M3* | *M4* | *M5* | *M6* |
| Lost Job | 0.137 | 0.672*** | 0.688*** | -0.004 | 0.075 | 0.124* |
|  | 0.127 | 0.242 | 0.247 | 0.027 | 0.063 | 0.069 |
| Sub.Emp.Risk $_{t-1}$ | 0.101* | 0.119** | 0.118** | 0.002 | 0.005 | 0.005 |
|  | 0.056 | 0.057 | 0.060 | 0.010 | 0.010 | 0.010 |
| Lost Job × Sub.Emp.Risk $_{t-1}$ |  | -0.794** | -0.830** |  | -0.120 | -0.165* |
|  |  | 0.328 | 0.338 |  | 0.079 | 0.087 |
| 18 – 34 years old |  |  | *Ref.* |  |  | *Ref.* |
| 35 – 44 years old |  |  | 0.108 |  |  | 0.002 |
|  |  |  | 0.066 |  |  | 0.011 |
| 45 – 54 years old |  |  | 0.117 |  |  | 0.001 |
|  |  |  | 0.096 |  |  | 0.016 |
| 55 – 67 years old |  |  | 0.114 |  |  | -0.032 |
|  |  |  | 0.122 |  |  | 0.021 |
| Child(ren) |  |  | -0.176*** |  |  | 0.017* |
|  |  |  | 0.064 |  |  | 0.009 |
| High Education |  |  | 0.163 |  |  | -0.002 |
|  |  |  | 0.165 |  |  | 0.019 |
| Income (log) |  |  | -0.156 |  |  | -0.000 |
|  |  |  | 0.111 |  |  | 0.017 |
| House owner |  |  | -0.059 |  |  | -0.017 |
|  |  |  | 0.076 |  |  | 0.013 |
| Married |  |  | *Ref.* |  |  | *Ref.* |
| Sep./Div./Wid. |  |  | 0.017 |  |  | 0.047** |
|  |  |  | 0.099 |  |  | 0.018 |
| Never Married |  |  | -0.204** |  |  | -0.014 |
|  |  |  | 0.095 |  |  | 0.013 |
| Retired |  |  | 0.003 |  |  | -0.029 |
|  |  |  | 0.193 |  |  | 0.024 |
| Disabled |  |  | 0.009 |  |  | -0.022 |
|  |  |  | 0.303 |  |  | 0.043 |
| Other |  |  | -0.105 |  |  | 0.007 |
|  |  |  | 0.226 |  |  | 0.052 |
| Observations | 19512 | 19512 | 18131 | 13525 | 13525 | 12554 |
| Unique Respondents | 3921 | 3921 | 3736 | 3273 | 3273 | 3111 |
| Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | No | No | Yes | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $\rho < 0.10$
** $\rho < 0.05$
*** $\rho < 0.01$

*Table S8. Effect of Job Losses on Support for the SP and PVV (Waves During the Covid-19 Pandemic Dropped)*

| | Support SP | | | Support PVV | | |
|---|---|---|---|---|---|---|
| | *M1* | *M2* | *M3* | *M4* | *M5* | *M6* |
| Lost Job | 0.160 | 0.784*** | 0.621*** | 0.044 | 0.249 | 0.009 |
| | 0.130 | 0.234 | 0.232 | 0.130 | 0.328 | 0.326 |
| Sub.Emp.Risk $_{t-1}$ | 0.114** | 0.136** | 0.127** | 0.049 | 0.056 | 0.074 |
| | 0.055 | 0.056 | 0.058 | 0.058 | 0.059 | 0.060 |
| Lost Job × Sub.Emp.Risk $_{t-1}$ | | -0.918*** | -0.701** | | -0.303 | -0.110 |
| | | 0.323 | 0.327 | | 0.401 | 0.399 |
| 18 – 34 years old | | | *Ref.* | | | *Ref.* |
| 35 – 44 years old | | | 0.056 | | | -0.065 |
| | | | 0.068 | | | 0.077 |
| 45 – 54 years old | | | 0.048 | | | -0.119 |
| | | | 0.100 | | | 0.109 |
| 55 – 67 years old | | | 0.059 | | | -0.101 |
| | | | 0.127 | | | 0.133 |
| Child(ren) | | | -0.195*** | | | -0.014 |
| | | | 0.067 | | | 0.069 |
| High Education | | | 0.226 | | | -0.176 |
| | | | 0.162 | | | 0.141 |
| Income (log) | | | -0.073 | | | -0.294*** |
| | | | 0.110 | | | 0.110 |
| House owner | | | 0.028 | | | 0.154 |
| | | | 0.083 | | | 0.100 |
| Married | | | *Ref.* | | | *Ref.* |
| Sep./Div./Wid. | | | 0.039 | | | 0.129 |
| | | | 0.107 | | | 0.135 |
| Never Married | | | -0.201** | | | 0.009 |
| | | | 0.100 | | | 0.101 |
| Retired | | | 0.005 | | | -0.062 |
| | | | 0.189 | | | 0.145 |
| Disabled | | | -0.348 | | | 0.004 |
| | | | 0.300 | | | 0.325 |
| Other | | | 0.256 | | | 0.178 |
| | | | 0.231 | | | 0.233 |
| Observations | 17874 | 17874 | 16624 | 18379 | 18379 | 17079 |
| Unique Respondents | 3566 | 3566 | 3395 | 3656 | 3656 | 3472 |
| Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | No | No | Yes | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $\rho < 0.10$
** $\rho < 0.05$
*** $\rho < 0.01$

*Table S9. Effect of Job Losses on Support for the SP and PVV (Additional Controls)*

| | Support SP | | | Support PVV | | |
|---|---|---|---|---|---|---|
| | M1 | M2 | M3 | M4 | M5 | M6 |
| Lost Job | 0.571*** | 0.501** | 0.534** | -0.022 | -0.028 | 0.055 |
| | 0.221 | 0.236 | 0.213 | 0.292 | 0.304 | 0.283 |
| Sub.Emp.Risk $_{t-1}$ | 0.126** | 0.126** | 0.130** | 0.084 | 0.099* | 0.075 |
| | 0.056 | 0.058 | 0.054 | 0.055 | 0.057 | 0.055 |
| Lost Job × Sub.Emp.Risk $_{t-1}$ | -0.676** | -0.554* | -0.631** | -0.041 | 0.013 | -0.097 |
| | 0.312 | 0.336 | 0.301 | 0.360 | 0.375 | 0.350 |
| Unemployed Before | -0.130 | | | 0.024 | | |
| | 0.105 | | | 0.104 | | |
| Income Drop (25 percent) | | -0.118* | | | -0.133* | |
| | | 0.065 | | | 0.069 | |
| Personal Income (log) | | | -0.058 | | | -0.116 |
| | | | 0.106 | | | 0.110 |
| 18 – 34 years old | *Ref.* | *Ref.* | *Ref.* | *Ref.* | *Ref.* | *Ref.* |
| 35 – 44 years old | 0.097 | 0.112* | 0.104 | -0.036 | -0.031 | -0.035 |
| | 0.064 | 0.066 | 0.064 | 0.073 | 0.074 | 0.073 |
| 45 – 54 years old | 0.090 | 0.123 | 0.104 | -0.084 | -0.092 | -0.074 |
| | 0.093 | 0.096 | 0.092 | 0.102 | 0.104 | 0.101 |
| 55 – 67 years old | 0.060 | 0.094 | 0.065 | -0.091 | -0.080 | -0.089 |
| | 0.118 | 0.122 | 0.117 | 0.123 | 0.127 | 0.123 |
| Child(ren) | -0.170*** | -0.161** | -0.163*** | -0.027 | -0.025 | -0.020 |
| | 0.062 | 0.065 | 0.060 | 0.065 | 0.066 | 0.064 |
| High Education | 0.142 | 0.172 | *0.124* | -0.114 | -0.145 | -0.135 |
| | 0.161 | 0.184 | 0.159 | 0.124 | 0.133 | 0.122 |
| Income (log) | -0.172 | -0.187 | | -0.310*** | -0.347*** | |
| | 0.105 | 0.115 | | 0.107 | 0.112 | |
| House owner | -0.034 | -0.050 | -0.035 | 0.069 | 0.021 | 0.010 |
| | 0.075 | 0.078 | 0.075 | 0.091 | 0.093 | 0.089 |
| Married | *Ref.* | *Ref.* | *Ref.* | *Ref.* | *Ref.* | *Ref.* |
| Sep./Div./Wid. | 0.014 | 0.029 | 0.076 | 0.163 | 0.179 | 0.177 |
| | 0.097 | 0.104 | 0.100 | 0.123 | 0.125 | 0.119 |
| Never Married | -0.186** | -0.169* | -0.183** | -0.041 | -0.048 | -0.082 |
| | 0.093 | 0.097 | 0.091 | 0.095 | 0.098 | 0.097 |
| Retired | -0.028 | -0.079 | -0.081 | -0.018 | 0.000 | -0.052 |
| | 0.173 | 0.175 | 0.185 | 0.138 | 0.145 | 0.138 |
| Disabled | -0.200 | -0.176 | -0.195 | 0.010 | -0.089 | -0.021 |
| | 0.291 | 0.310 | 0.281 | 0.310 | 0.320 | 0.305 |
| Other | 0.048 | 0.053 | 0.165 | 0.056 | 0.066 | 0.081 |
| | 0.208 | 0.222 | 0.215 | 0.202 | 0.210 | 0.200 |
| Observations | 19851 | 18548 | 20356 | 20431 | 19119 | 20963 |
| Unique Respondents | 3858 | 3573 | 3867 | 3947 | 3663 | 3961 |
| Individual FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $\rho < 0.10$   ** $\rho < 0.05$   *** $\rho < 0.01$

*Table S10. Effect of Job Losses on Support for the SP and PVV (Random Effects)*

| | Support SP | | | Support PVV | | |
|---|---|---|---|---|---|---|
| | M1 | M2 | M3 | M4 | M5 | M6 |
| Lost Job | 0.175 | 0.688*** | 0.602*** | 0.083 | 0.272 | 0.007 |
| | 0.117 | 0.213 | 0.215 | 0.117 | 0.279 | 0.291 |
| Sub.Emp.Risk $_{t-1}$ | 0.129** | 0.147*** | 0.133** | 0.096* | 0.102* | 0.105* |
| | 0.051 | 0.051 | 0.053 | 0.052 | 0.052 | 0.054 |
| Lost Job × Sub.Emp.Risk $_{t-1}$ | | -0.766** | -0.690** | | -0.282 | -0.088 |
| | | 0.299 | 0.305 | | 0.351 | 0.362 |
| Woman | | | *0.339*** | | | *-0.528*** |
| | | | 0.059 | | | 0.074 |
| 18 – 34 years old | *Ref.* | *Ref.* | *Ref.* | *Ref.* | *Ref.* | *Ref.* |
| 35 – 44 years old | | | 0.100** | | | -0.156** |
| | | | 0.051 | | | 0.062 |
| 45 – 54 years old | | | 0.105* | | | -0.343*** |
| | | | 0.062 | | | 0.074 |
| 55 – 67 years old | | | 0.119* | | | -0.496*** |
| | | | 0.069 | | | 0.083 |
| Child(ren) | | | -0.121** | | | 0.016 |
| | | | 0.048 | | | 0.053 |
| High Education | | | 0.157*** | | | -1.071*** |
| | | | 0.060 | | | 0.072 |
| Income (log) | | | -0.398*** | | | -0.423*** |
| | | | 0.083 | | | 0.090 |
| House owner | | | *-0.197*** | | | 0.135* |
| | | | 0.057 | | | 0.070 |
| Married | *Ref.* | *Ref.* | *Ref.* | *Ref.* | *Ref.* | *Ref.* |
| Sep./Div./Wid. | | | 0.017 | | | 0.153* |
| | | | 0.072 | | | 0.093 |
| Never Married | | | 0.061 | | | -0.001 |
| | | | 0.061 | | | 0.068 |
| Retired | | | -0.050 | | | -0.111 |
| | | | 0.167 | | | 0.142 |
| Disabled | | | -0.159 | | | -0.017 |
| | | | 0.280 | | | 0.296 |
| Other | | | 0.033 | | | 0.080 |
| | | | 0.202 | | | 0.196 |
| Observations | 21371 | 21371 | 19851 | 22003 | 22003 | 20431 |
| Unique Respondents | 4053 | 4053 | 3858 | 4151 | 4151 | 3947 |
| Individual RE | Yes | Yes | Yes | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes | Yes | Yes | Yes |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* ρ < 0.10
** ρ < 0.05
*** ρ < 0.01

*Table S11. Effect of Job Losses on Support for the SP (All Types of Transitions)*

| | Support SP | | |
|---|---|---|---|
| | *M1* | *M2* | *M3* |
| Lost Job | 0.132 | 0.076 | 0.245 |
| | 0.120 | 0.116 | 0.277 |
| Retired | -0.066 | -0.075 | -0.005 |
| | 0.176 | 0.139 | 0.186 |
| Became Disabled | -0.225 | -0.013 | -0.337 |
| | 0.269 | 0.291 | 0.323 |
| Withdrew | 0.178 | 0.104 | *-0.162* |
| | 0.209 | 0.193 | 0.269 |
| Sub.Emp.Risk t-1 | 0.117** | 0.071 | 0.070 |
| | 0.053 | 0.053 | 0.054 |
| Lost Job × Sub.Emp.Risk t-1 | | -0.779** | -0.734** |
| | | 0.304 | 0.311 |
| Retired × Sub.Emp.Risk t-1 | | -0.362 | -0.379 |
| | | 0.355 | 0.348 |
| Became Disabled × Sub.Emp.Risk t-1 | | 0.139 | 0.193 |
| | | 0.608 | 0.627 |
| Withdrew × Sub.Emp.Risk t-1 | | 0.774 | 0.731 |
| | | 0.574 | 0.571 |
| 18 – 34 years old | | | *Ref.* |
| 35 – 44 years old | | | 0.097 |
| | | | 0.064 |
| 45 – 54 years old | | | 0.090 |
| | | | 0.093 |
| 55 – 67 years old | | | 0.057 |
| | | | 0.118 |
| Child(ren) | | | -0.170*** |
| | | | 0.062 |
| High Education | | | 0.143 |
| | | | 0.161 |
| Income (log) | | | -0.172 |
| | | | 0.106 |
| House owner | | | -0.034 |
| | | | 0.075 |
| Married | | | *Ref.* |
| Sep./Div./Wid. | | | 0.014 |
| | | | 0.097 |
| Never Married | | | -0.186** |
| | | | 0.093 |
| Observations | 21371 | 21371 | 19851 |
| Unique Respondents | 4053 | 4053 | 3858 |
| Individual FE | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes |
| Controls | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $p < 0.10$   ** $p < 0.05$   *** $p < 0.01$

*Figure S3. The effect of four different types of transitions out of employment on support for the SP conditional on respondents' subjective employment risk.*
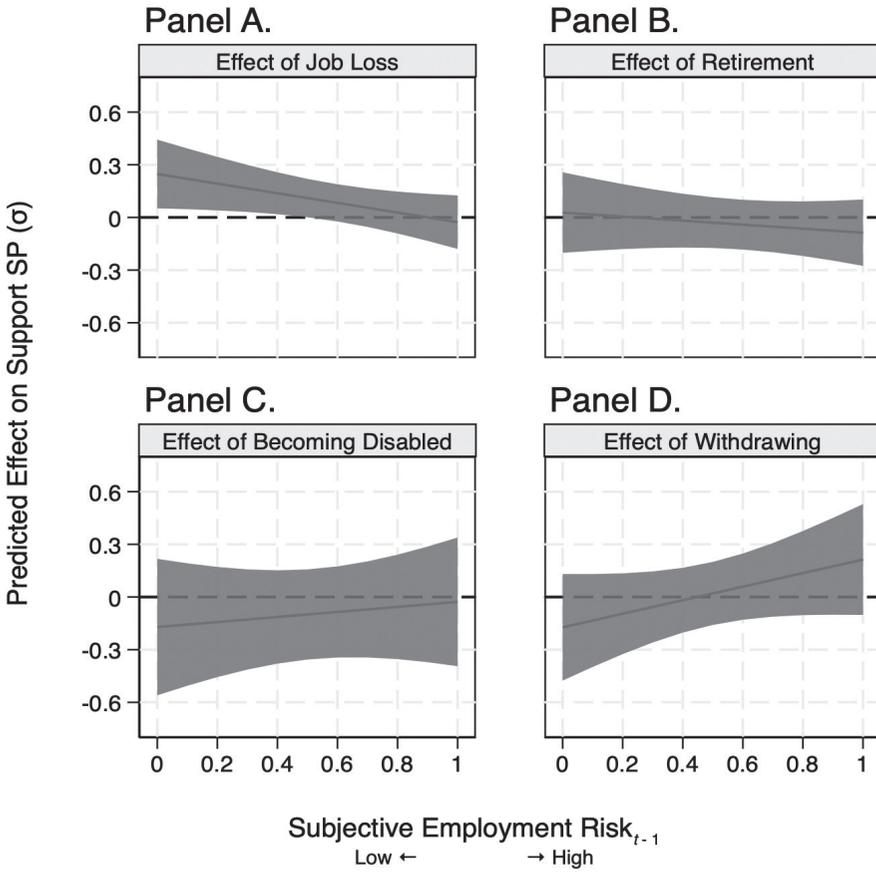


*Note: Based on Table S10 M3. 95% confidence interval shown.*

*Table S12. Effect of Job Losses on Support for the PVV (All Types of Transitions)*

|  | Support PVV | | |
|---|---|---|---|
|  | *M1* | *M2* | *M3* |
| Lost Job | 0.132 | 0.653*** | 0.620*** |
|  | 0.120 | 0.220 | 0.222 |
| Retired | -0.066 | 0.083 | 0.133 |
|  | 0.176 | 0.272 | 0.260 |
| Became Disabled | -0.225 | -0.307 | -0.308 |
|  | 0.269 | 0.430 | 0.440 |
| Withdrew | 0.178 | -0.204 | *-0.311* |
|  | 0.209 | 0.340 | 0.344 |
| Sub.Emp.Risk t-1 |  | -0.249 | -0.080 |
|  |  | 0.346 | 0.352 |
| Lost Job × Sub.Emp.Risk t-1 |  | -0.167 | -0.043 |
|  |  | 0.285 | 0.273 |
| Retired × Sub.Emp.Risk t-1 |  | 0.583 | 0.621 |
|  |  | 0.722 | 0.733 |
| Became Disabled × Sub.Emp.Risk t-1 |  | 0.546 | 0.492 |
|  |  | 0.527 | 0.529 |
| Withdrew × Sub.Emp.Risk t-1 |  | -0.249 | -0.080 |
|  |  | 0.346 | 0.352 |
| 18 – 34 years old |  |  | *Ref.* |
| 35 – 44 years old |  |  | -0.035 |
|  |  |  | 0.073 |
| 45 – 54 years old |  |  | -0.082 |
|  |  |  | 0.101 |
| 55 – 67 years old |  |  | -0.090 |
|  |  |  | 0.123 |
| Child(ren) |  |  | -0.028 |
|  |  |  | 0.065 |
| High Education |  |  | -0.114 |
|  |  |  | 0.124 |
| Income (log) |  |  | -0.310*** |
|  |  |  | 0.107 |
| House owner |  |  | 0.067 |
|  |  |  | 0.091 |
| Married |  |  | *Ref.* |
| Sep./Div./Wid. |  |  | 0.162 |
|  |  |  | 0.123 |
| Never Married |  |  | -0.040 |
|  |  |  | 0.095 |
| Observations | 22003 | 22003 | 20431 |
| Unique Respondents | 4151 | 4151 | 3947 |
| Individual FE | Yes | Yes | Yes |
| Wave FE | Yes | Yes | Yes |
| Controls | No | No | Yes |

*Note:* Standard errors are clustered at the respondent level and reported in parentheses.
* $p < 0.10$  ** $p < 0.05$  *** $p < 0.01$

*Figure S4. The effect of four different types of transitions out of employment on support for the PVV conditional on respondents' subjective employment risk.*



*Note: Based on Table S10 M3. 95% confidence interval shown.*

# 5 | After the Floods: The Effects of Natural Disasters on Public Opinion on Climate Change[1]
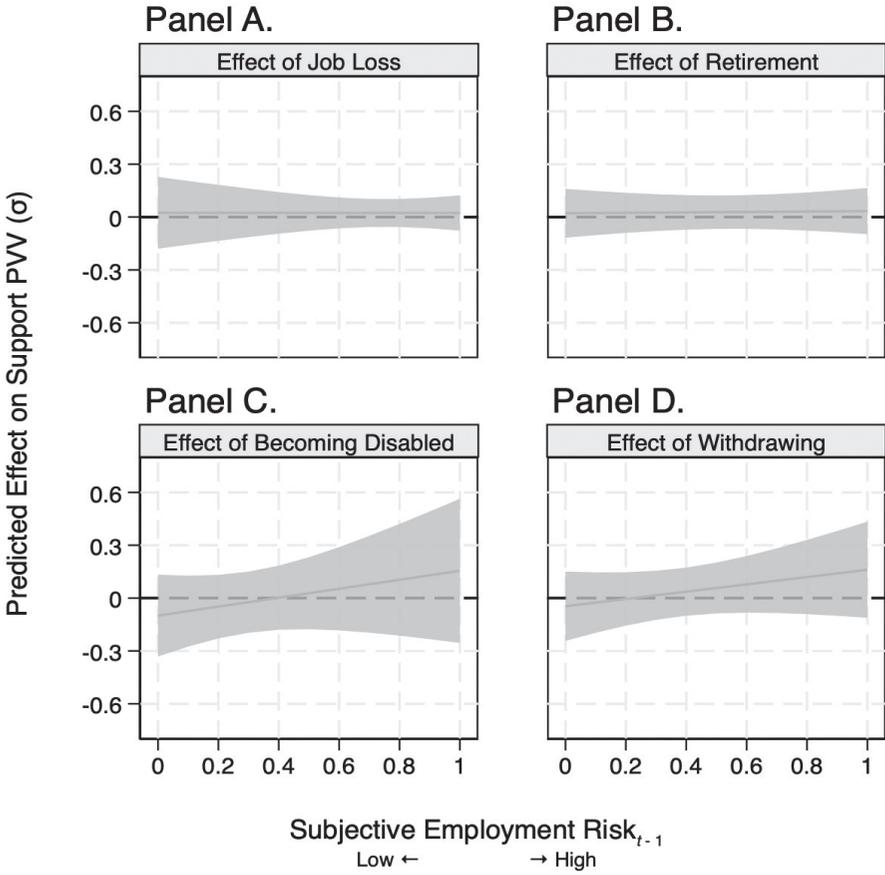
ABSTRACT

How does political ideology shape the impact of weather extremes and natural disasters on public opinion on climate change? In this study, I provide quasi-experimental evidence to address this question. Exploiting the coincidence of the German 2021 floods with the fieldwork of the German Longitudinal Election Study (GLES) panel, I test the extent to which partisans interviewed shortly before and after the floods changed their attitudes towards climate change. Using difference-in-difference models, I show that concern about climate change increased among partisans of all stripes. However, the increased salience of climate change does not necessarily translate into support for climate change mitigation policies. Only among those who identify with Die Grünen did support for implementing such policies increase. These nuanced findings contribute to the literature on attitude formation by suggesting that partisans may well differ in the way they change their policy preferences after learning new facts.

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### 5.1    Introduction

Over the past decades, the number of people who have witnessed weather extremes and natural disasters related to climate change has increased substantially (IPCC 2022; WMO 2021). The effects of such events on public opinion about climate change have increasingly garnered both public and scholarly attention. For example, prior studies have shown that climate extremes foster belief in climate change's anthropogenic causes and increase concern about climate change (Bergquist and Warshaw 2019; Egan and Mullin 2012, 2017; Howe et al. 2019; Kanlatzi Pantera et al. 2023; Kaufmann et al. 2017; Rüttenauer 2023; Visconti and Young 2024).

In light of this, studies have examined whether climate extremes also increase support for climate change mitigation policies and provide fertile ground for electoral success for green parties. So far, the evidence is mixed. Some studies show that regions exposed to climate extremes related to increased temperatures have 'turned green', either measured by the electoral support for pro-climate parties or ballot measures (Baccini and Leemann 2021; Hazlett and Mildenberger 2020; Hoffmann et al. 2022; Kornborg et al. 2024; McAllister and bin Oslan 2021; Vasilopoulos and Demertzis 2013). On the contrary, recent studies that examined how other types of climate extremes, like floods or storms, affect public opinion generally do not find evidence that people update their attitudes after being exposed to climate extremes (Cremaschi and Stanig 2023; Garside and Zhai 2022; Hilbig and Riaz 2024; Hofmann et al. 2022, Holub and Schündeln 2023). These studies suggest that subsequent effective disaster relief spending provided by (regional) incumbents has a greater electoral appeal than promises to deliver climate change mitigation policies.

The mechanisms described above assume that people update their attitudes rationally when they are confronted with natural disasters. However, studies drawing on theories of motivated reasoning have demonstrated that people have conflicting motives when interpreting new information. When partisans are exposed to new information about politically salient issues, they are motivated to process and interpret this information in a way that is consistent with their existing attitudes (Alesina et al. 2018, 2023; Barrera et al. 2020; Druckman and Bolsen 2011; Nyhan et al. 2020; Swire et al. 2017). Accordingly, partisans update their political attitudes and policy preferences differently depending on their party affiliation (Bisgaard 2015, 2019; Gaines et al. 2007; Malhotra and Kuo 2008; Tilley and Hobolt 2011). Building on this literature, I argue that climate extremes do not necessarily affect public support for climate change mitigation policies amongst partisans in a similar way. In particular, such events increase support for climate change mitigation policies amongst those who identify with green parties, as they are more likely to perceive climate extremes as an urgent reason to introduce ambitious climate change mitigation policies.

To examine my argument, I exploit the coincidence of the German 2021 floods and the fieldwork of the GLES panel. Whereas prior studies used within-country variation to identify the causal effect of the floods on voting for Die Grünen (Garside and Zhai 2022; Hilbig and Riaz 2024; Holub and Schündeln 2023), I examine whether the floods affected public opinion about climate change on a national level. More precisely, I use difference-in-differences models and compare how partisans who were interviewed just before and after the floods changed their attitudes towards climate change. My analyses show that the floods increased concern about climate change among partisans of all stripes. However, only among Die Grünen identifiers support to fight climate change increased in the direct aftermath of the floods. These result hold across a range of placebo and robustness checks.

My study contributes to the literature on climate-related weather extremes and disasters and, more broadly, to the formation of attitudes. First, my results shed light on the causal ties underlying the relationship between climate extremes and political attitudes. Although some studies have suggested that the effect of such events on attitudes is driven by regions in which the vote share of pro-climate voting was already high (Hazlett and Mildenberger 2020; Holub and Schündeln 2023; Marlon et al. 2022), the link between partisanship and climate extremes at an individual level has not been tested yet in the European context. My findings provide evidence that climate extremes do not necessarily increase support for ambitious climate mitigation policies. Second, my findings suggest that political attitudes towards issues over which partisan conflict is high may well be (partly) endogenous to party support. Thereby, this article fits within a growing body of studies that exploit real-world events using quasi-experimental designs to examine to what extent partisanship shapes political attitudes (Bisgaard 2015; Gaines et al. 2007; Gerber and Huber 2010; Slothuus and Bisgaard 2021; Solaz et al. 2021).

## 5.2     Theoretical Background

*Climate Extremes and Shifts in Political Attitudes*

A growing body of studies has demonstrated that weather extremes and natural disasters shape public opinion about climate change (see Howe et al. 2019 for a recent review). First-hand experiences, for one, provide people with directly accessible information about climate change (Brügger et al. 2015; Joireman et al. 2010; Larcom et al. 2019; Marx et al. 2007; Myers et al. 2013; Spence et al. 2011; Weber and Stern 2011; Zaval et al 2014). Such information changes people's perception of climate change as an abstract and

distant threat, thereby reducing its psychological distance.[2] Accordingly, climate extremes strengthen the belief in anthropogenic causes of climate change and increase concern about climate change (Bergquist and Warshaw 2019; Egan and Mullin 2012, 2014; Howe et al. 2013; Kaufmann et al. 2017; Rüttenauer 2023; Visconti and Young 2024). In addition, climate extremes shape public opinion indirectly through social networks and media coverage (Dalege and Van der Does 2022; Damsbo-Svendsen 2021; Carmichael and Brulle 2017; Goldberg et al. 2019; Tindal and Piggot 2015). For example, when a region is severely hit by a natural disaster this will receive nationwide media coverage.[3] Broad and prominent coverage of these events creates awareness (Bakaki and Bernauer 2017; Bakaki et al. 2020; Pianta and Sico 2020) and increases knowledge about relevant policies (Barabas and Jerit 2009).

Exposure to climate extremes can foster a pro-climate stance amongst the electorate as well. Voters who are more concerned about climate change have a larger appetite for climate change mitigation policies (Bergquist et al. 2022). Indeed, voters are more likely to support climate-related policies in regions affected by natural disasters (Arias and Blair 2023; Baccini and Leemann 2021; Hazlett and Mildenberger 2020). Yet when it comes to the electoral impact of climate extremes, the parties traditionally dedicated to ambitious climate change mitigation policies do not necessarily see their vote share increase in affected regions. Whereas climate extremes related to heat, like temperature anomalies, heatwaves or wildfires, boost the performance of green parties, the effect of other types of extremes is less clear (Hoffmann et al. 2022; Kronborg et al. 2024; McAllister and bin Oslan 2021; Vasilopoulos and Demertzis 2013).[4] In fact, green parties have lost ground in regions affected by floods in the year leading up to European Parliamentary elections (Hoffmann et al. 2020). Relatedly, recent studies that examined the effect of the devastating floods that hit Germany only two months before the 2021 election on the vote share of Die Grünen yielded mixed findings too (Garside and Zhai 2022; Hilbig and Riaz 2024; Holub and Schündeln 2023).

These mixed findings highlight another mechanism through which natural disasters shape public opinion: these events provide people with information about their government's competence. Accordingly, people reward their government's disaster preparedness and the provision of relief spending in the immediate aftermath of a disaster (Bechtel and Hainmueller 2011;

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2    As temperature anomalies become more frequent and normalise, however, its impact on public opinion reduces (Moore et al. 2019).
3    See Kanlatzi Pantera et al. 2023 for a related argument about media coverage in neighbouring countries.
4    Birch (2023) shows that party's programmatic positions on climate change mitigation drive electoral support in the United Kingdom.

Chen 2013; Gasper and Reeves 2011; Healy and Malhotra 2010).[5] Hence, green parties compete with (regional) incumbents for electoral support following climate-related disasters. Arguably, effective relief spending may have greater electoral appeal than promises to deliver policies that aim to prevent climate extremes from happening in the future (Cremaschi and Stanig 2023; Hilbig and Riaz 2024, but also see Birch 2023 and Holub and Schündeln 2023).

*Party Identity and Motivated Reasoning*

Regardless of whether natural disasters affect the electoral fortunes of green or incumbent parties, both mechanisms operate under the assumption that people update their attitudes rationally when provided with new information. However, scholars have demonstrated that partisanship and predistortions generally colour people's perception of the world (Altiparmakis et al. 2021; Bolsen et al. 2014; Goren et al. 2009; Kashner and Stalinksi 2024; Slothuus and Bisgaard 2021). These studies draw on theories of motivated reasoning. Accordingly, people have conflicting motives when processing new information: also referred to as accuracy and directional motives (Kunda 1990; Redlawsk 2002; Taber and Lodge 2006). Accuracy motives entail that people are motivated to process information in such a way that they reach a 'correct' conclusion and, thus, rationally update their attitudes. This way of processing information aligns with the assumption of rationally updating people.

On the contrary, people are often motivated by directional goals. They do not process information with an open mind but are motivated to process information in a way that aligns with their standing attitudes (Druckman and Bolsen 2011). Although some studies have shown that directional motives hamper people's willingness to acknowledge factual information (Bartels 2002; Evans and Andersen 2006; Jerit and Barabas 2012; Nyhan and Reifler 2010), scholars have recently quantified these findings (Bisbee and Lee 2022; Guess and Coppock 2020; Mehlhaff et al. 2024; Parker-Stephen 2013; Tappin et al. 2023). When provided with new information, partisans from all stripes change their factual perceptions similarly, but related attitudes remain largely unchanged (Alesina et al. 2023; Barrera et al. 2020; Nyhan et al. 2020; Porter et al. 2019; Swire et al. 2017). Such findings suggest that partisans mainly differ in their interpretation and the conclusions they draw from these facts (Bisgaard 2015; 2019; Gaines et al. 2007; Malhorta and Kuo 2008; Tilley and Hobolt 2011). For instance, pessimistic information about intergenerational mobility changes factual perceptions

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5     Note that voters also blame governments for events that are clearly beyond their control (Achen and Bartels 2017; Ashworth et al. 2018; Dynes and Holbein 2020; Fowler and Hall 2018). In contrast, disaster may also generate rally around the flag effects (Lazarev et al. 2014; Ramos and Sanz 2020).

of all partisans, whereas support for policies aimed to improve mobility increased only among respondents identifying as economically left (Alesina et al. 2018). Partisans may well agree on the facts of a problem but have different attitudes towards the policies that are designed to solve it. Therefore, I argue that the impact of natural disasters on attitudes towards climate change and related mitigation policies differs between different groups of partisans.

Why would partisans be motivated by directional goals in their interpretation of natural disasters? First, partisans are more likely to be motivated by directional goals when it comes to politically salient issues (Chong and Druckman 2007; Druckman et al. 2013; Leeper and Slothuus 2014; Slothuus and De Vreese 2010). Arguably, climate change is at the heart of partisan conflict in contemporary politics.[6] In the United States, those who identify as Democrats are typically more supportive of climate change mitigation policies compared to those identifying as Republican (Egan and Mullin 2012, 2017; Mayer and Smith 2020). Additionally, experimental studies show that Americans process new information about climate change and subsequently update their attitudes according to their partisan identities (Bayes et al. 2020; Constantino et al. 2022; Hai and Perlman 2022). Attitudes towards climate change differ between partisans in Europe's multi-party system as well (Fisher et al. 2022; Kenny and Langsæther 2022). In particular, those who support one of Europe's green parties stand out by holding strong pro-climate climate attitudes.

Second, directional motivates are more likely to be activated when the party's position aligns with partisans' prior attitudes, particularly for issues that partisans consider personally important (Barber and Pope 2023; Leeper 2014; Vidigal and Jerit 2022).[7] As a result, partisanship is more likely to colour perceptions about information related to traditional party positions (Mullinix 2016; Peterson 2019). In Europe's political landscape, green parties gained foothold by stressing the importance of climate change (Abou-Chadi 2016; Carter 2013; Grant and Tilley 2019; Spoon et al. 2014). Although mainstream parties are increasingly adopting a pro-climate stance too (Schwörer 2024), the issues of climate change and the environment lie at the heart of green parties.

Hence, I argue that directional motivated reasoning shapes attitudinal updating when partisans are exposed to natural disasters. In particular,

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6    Prior studies have consistently found a relationship between political ideology and public opinion about climate change in both Europe and the United States (Bergquist et al. 2022; Horsney et al. 2016; McCright et al. 2016; Myers et al. 2013).

7    Relatedly, Diamond (2020) shows that the priming of a partisan identity activates directional motives and consequently shapes the interpretation of news about climate change (see also Klar 2013).

those identifying with pro-climate parties are more likely to interpret natural disasters as evidence for the need to introduce (more) ambitious climate change mitigation policies. As climate change is a politically salient issue particularly associated with green parties, those who identify with these parties are more likely to update their policy preferences after witnessing the severe consequences of climate change. To test this mechanism, I examine differences in how partisans changed their attitudes towards climate change after the 2021 floods in Germany.

## 5.3    Emperical Strategy

*Setting*

Mid-July 2021, a lower pressure region dropped massive amounts of precipitation over Western Europe, with historically observed rainfall records broken by large margins in various places. On July 14 and 15, extreme rainfall caused rivers to burst their banks and dams to overflow, unleashing catastrophic floods. Germany bore the brunt of the devastation, with the flooding claiming at least 183 lives and inflicting over €33 billion in damages (Federal Ministry of the Interior and Finance Ministry 2021). This disaster stands as Germany's deadliest since the North Sea flood of 1962. Furthermore, the financial toll was significantly greater than that of the two major floods earlier this century, in 2002 and 2013.

With the 2021 federal election just over two months away, electoral campaigns were in full swing when the floods hit Germany. Climate change was already on the agenda during the campaign, but after the floods various media outlets portrayed it as a potentially decisive issue (Clauß 2021; Frey 2021; Thurau 2021; Von Drach 2021). Figure 1 confirms that the floods were a highly salient event. The figure shows the relative frequencies of Google searches for the terms: "floods", "severe weather" and "climate change".[8] There is a clear peak around the date of the floods for the first two search terms (see the right-hand and middle panels). The picture is a bit more nuanced regarding the term climate change (see the left-hand panel), which is more popular throughout the year. Notwithstanding its broader popularity throughout the year, searches for climate change also peaked around the date of the floods. This already provides some evidence that the floods were not only a salient event, but people also linked them to climate change.

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8    Respectively, "Hochwasser", "'Unwetter" and "Klimawandel" in German.

*Figure 1. Google trends for key search terms during 2020 (the panels above) and the month of the survey (the panels below).*

**2021**
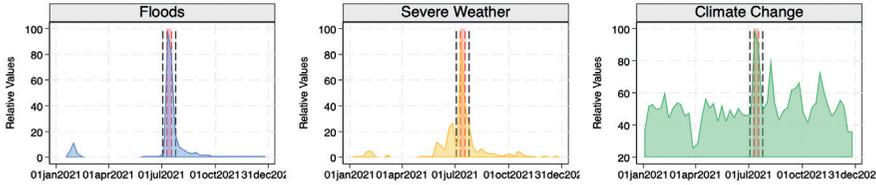


**July 2021**
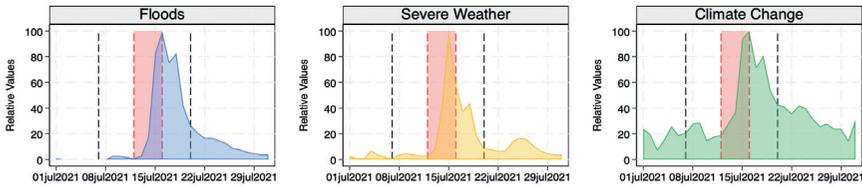


*Note: The dashed red lines denote dates of the floods. For the panels below, the dashed black lines denote the survey period. The values on the y-axis represent search interests relative to the highest point of the chart for Germany and the corresponding time. A value of 100 indicates the peak popularity of the search term; a value of 50 indicates the search term was half as popular; and so on.*

*Data and Outcomes*

To assess the impact of the 2021 floods on public opinion towards climate change, I rely on the GLES panel. The GLES panel consists of a non-probabilistic selection of participants from opt-in online panels provided by the polling companies *respondi* and *GapFish* (GLES 2019). Participants are selected using crossed quotas on gender, age and education. The panel includes two refreshment samples of which the latest was drawn in the run-up to the 2021 federal election. Participants in this final sample participated from Wave 15 onwards (see Table SI1 for an overview of the fieldwork of all waves).

I test the effect of the floods on the salience of climate change and support to fight climate change. To capture the salience of climate change, I rely on two open-ended questions that are included in each wave of the GLES panel. These questions ask respondents about Germany's most important problems: "In your opinion, what is the (second) most important problem facing Germany today?" These so-called most important problems (MIP) questions are frequently used to capture the salience of an issue and public priorities (Jennings and Wlezien 2015). Although most studies that use MIP questions to capture the saliency of climate change have relied on closed-ended questions, using open-ended questions instead has the advantage that respondents are not primed by the presented answer categories

and hence are more likely to provide less guided answers (Ferrario and Stantcheva 2022; Iyengar 1996; Roberts et al. 2014). In coding the answers, I rely on the coding scheme for open-ended questions provided by the GLES panel (GLES 2023) The scheme distinguishes 56 problems, including climate change and the environment. Accordingly, I create a binary indicator that turns to one when a respondent mentions climate change or the environment as an important issue.[9]

Next, I use a question that captures respondents' appetite for climate change mitigation policies. The question reads: "Some say that the fight against climate change should definitely take precedence, even if it impairs economic growth. Others say that economic growth should definitely take precedence, even if it impairs the fight against climate change." Political attitudes on this issue are measured on a 7-point scale, which are recoded such that higher values capture support to fight climate change. This type of trade-off questions is commonly employed in studies assessing attitudes with regard to climate change (Birch 2020; Böhmelt and Zhang 2023; Drews et al. 2018; Flanagan and Lee 2003; Neumayer 2004). Moreover, previous studies using survey experiments showed that when respondents are confronted with trade-off questions that force them to prioritise between potentially conflicting policy goals the moderating effect of partisanship increased (Armingeon and Bürgisser 2021; Harring and Sohlberg 2016).

*Party Identity*

I rely on a question that asks whether respondents lean towards a particular party to measure whether a respondent identifies with Die Grünen. Specifically, the question reads: "In Germany, many people lean towards a particular party for a long time, although they may occasionally vote for a different party. How about you, do you in general lean towards a particular party? If so, which one?" As respondents are asked about their party affiliation in each wave of the GLES panel, I use the answers to this question from Wave 15, which is the first wave to include participants from the latest refreshment sample. Importantly, these answers are not affected by the treatment as the floods hit Germany during the fieldwork of Wave 17, preventing post-treatment bias (Montgomery et al. 2018).

Recall that partisans are expected to be more likely to be motivated by directional goals in interpreting information if the party's policy position aligns with their prior attitudes. Descriptive evidence corroborates that this is indeed the case for Die Grünen supporters. First, I measure Die Grünen's policy positions on climate change over the last four elections using the Party Manifesto

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9    I build on this scheme but recode explicit negative answers. For example, the following answer "Klimahysterie" (climate hysteria) is coded as zero. The same applies for answers only referring to animal welfare.

Database (Lehmann et al. 2024). This dataset includes measures on the relative importance of each party's policy positions including environmental protection and anti-growth policies. Panel A of Figure 2 plots Germany's main parties along these two dimensions. In line with the idea that green parties are traditionally issue owners of climate change (Abou-Chadi 2016; Carter 2013; Grant and Tilley 2019; Spoon et al. 2014), Die Grünen has consistently been the most progressive party with regard to these two dimensions.

*Figure 2. Supply- and demand-side of Die Grünen and its supporters*
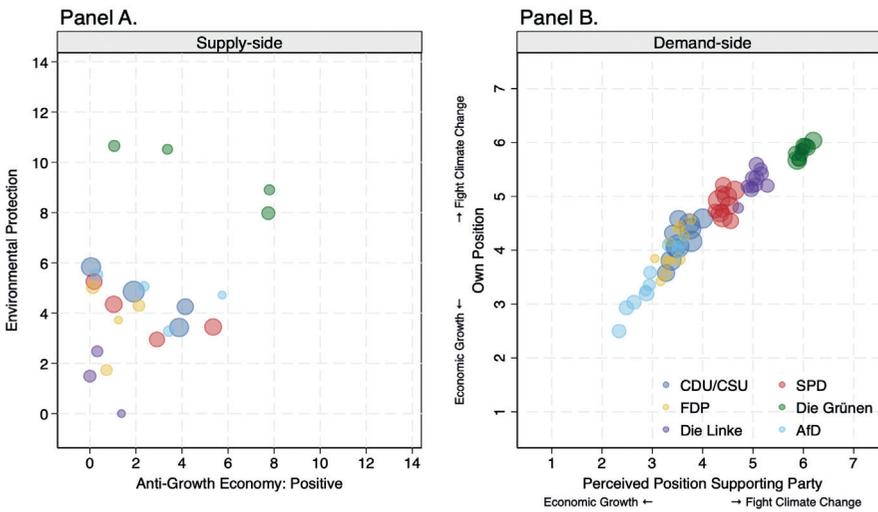


Second, I show that Die Grünen identifiers' policy position on climate change is consistent with the party's position. To measure partisans' policy position, I use the same question as described above asking respondents whether they prioritise fighting climate change over economic growth. In addition, the GLES includes a similar question that asks respondents about a party's position on this issue. This question enables me to measure how partisans perceive the policy position of the party they identify with. In panel B of Figure 2, I plot the policy position of partisans against the perceived policy position of their party. The figure shows that these two measures cluster for Die Grünen identifiers, confirming that their individual policy position closely aligns with the perceived party's position.

*Identification and Threats*

In this study, I exploit the coincidence of the 2021 floods with the fieldwork of Wave 17 of the GLES panel.[10] As respondents in this survey participate online in computer-assisted web interviews (CAWI), the exact date at which

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10    Specifically, the questionnaire was in field between 7 and 20 July 2021.

each respondent started and finished the questionnaire is known. This allows me to estimate the causal effect of the floods on attitudes towards climate change by comparing respondents who completed the survey before and after the floodings started. As floodings hit Germany on 14 and 15 July 2021, I assign those respondents who started the questionnaire after 15 July into the treatment group. In anticipation of storm system 'Bernd', weather services started warning for extreme precipitation on 12 July already. As these warnings may have already influenced respondents' attitudes, the control group consists only of respondents who finished the questionnaire before 12 July. Following this procedure, 760 observations (272 unique respondents) out of 23,545 observations (7,957 unique respondents) are assigned to the treatment group.

My identification strategy corresponds with the unexpected event during survey design as coined by Muńos et al. (2020). Such an identification strategy hinges on two assumptions: excludability and temporal ignorability. For the excludability assumption to hold, the timing at which respondents finished the questionnaire should only affect attitudes towards climate change through the floods. To the best of my knowledge, there is no evidence of simultaneous events that potentially confound this relationship during the second week of July 2021.[11] The temporal ignorability assumption entails that assigning respondents to either the treatment or control group should be independent of their outcomes. In other words, the probability of being interviewed before or after the floods should be equal for all respondents. This assumption might be violated because the design of the GLES survey panel allows respondents to self-select the date on which they fill in the questionnaire, should they choose to participate at all.

I provide two types of evidence that support the plausibility of the temporal ignorability assumption. First, Figure 3 shows the balance on pre-treatment covariates between the treatment and control groups using equivalence tests (see Table SI2 for the summary statistics). In contrast to traditional balance tests, equivalence tests are designed to provide evidence under a null hypothesis of differences (Hartman and Hidalgo 2018). The results below indicate that the null hypothesis of consequential differences can be rejected for all covariates but age.[12] Respondents in the treatment group are roughly four years younger compared to those in the treatment group. Other studies have confirmed that older respondents are more likely to participate early during the fieldwork of the survey (Munoz et al. 2020). As the prior attitudes towards climate change of younger respondents may be different, I use Hainmueller's (2012) entropy balancing to balance the mean,

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11    The relatively short sampling period also decreases the likelihood of simultaneous events. However, the reactions of the key political figures in the direct aftermath of the floods potentially drive changes in attitudes as well.

12    I follow Hartman and Hidalgo and use an equivalence range of 0.36 of a standard deviation.

variance and skewness of the covariates across the treatment and control group.[13] Second, I show that the floods did not affect individuals' likelihood to provide valid answers. Table SI2 presents the results of regression models assessing the impact of the floods on missingness. I do not find evidence of differences in missingness between the treatment and control group. Reassuringly, these results again provide evidence in favour of the temporal ignorability assumption, and thus, support my identification strategy.

*Figure 3. Equivalence tests*
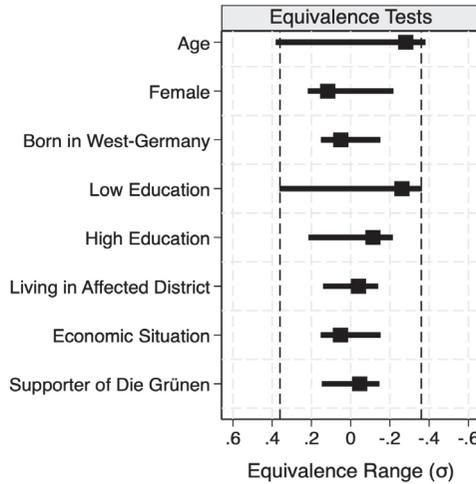


*Note: The black squares and lines represent the observed standardised difference between the variables and the associated standardised inverted equivalence range, respectively.*

*Estimation*

The GLES panel allows for a difference-in-differences strategy to estimate the effect of the floods on attitudes towards the environment. My baseline difference-in-differences estimation takes the following form, where subscripts $i$ and $t$ respectively index each respondent and survey wave:

$$Y_{it} = \beta_0 T_i + \tau(T_i \times P_{it}) + \beta_1 X_{it} + \mu_i + \lambda_i + \varepsilon_{it}.$$

Here, $Y_{it}$, is one of my outcomes capturing attitudes towards climate change of individual $i$ in wave $t$. In my model specification, the $\tau$ denotes the difference-in-differences estimate for the effect of the floods. Specifically, $\tau$ is an interaction between $T_i$, which takes the value of 1 for respondents that started Wave 17's questionnaire after the floods and $T_i$ takes the value of 0

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13    This matching technique is frequently used to adjust inequalities in the distribution of pre-treatment covariates (Hainmueller 2012). Specifically, the technique involves a reweighting scheme incorporating covariate balance.

otherwise, and $P_{it}$, which turns to 1 in Wave 17. Furthermore, $X_{it}$ vector of individual-level controls (gender, age, education, region of origin and perceived economic situation).[14] The terms $\mu_i$ and $\lambda_i$ denote the state and wave fixed effects, respectively. Note that the wave fixed effects capture the main effect of $P_{it}$. Finally, $\varepsilon_{it}$ refers to the error terms. The standard errors are clustered by respondents to account for serial correlation and heteroskedasticity.

In the main analysis, I focus on the three waves for which the fieldwork was conducted in 2021: Wave 15 (25 February to 12 March), Wave 16 (6 to 19 May) and Wave 17 (7 to 20 July). These three waves have the advantage to be regularly spaced in time with intervals of only two months between each wave. Moreover, when the parallel trend assumption holds, including pre-treatment periods can increase precision yielding more efficient estimators (Roth et al. 2023). Figure SI1 shows that both outcomes trended indeed similarly for the treatment and control group in pre-treatment waves. To provide a more robust test of the parallel trend assumption, I estimate leads-and-lags models of the following form:

$$Y_{it} = \sum_{k=-1}^{1} \beta_k \left( T_i \times 1_{t=k} \right) + \beta_1 X_{it} + \mu_i + \lambda_i + \varepsilon_{it}.$$

Here, $Y_{it}$ is the outcome variable for individual $i$ in wave $t$. Again, I include the terms $X_{it}$, $\mu_i$ and $\lambda_i$: a vector of the same individual-level controls, state and wave fixed effects respectively. Most importantly, $\beta_k$ captures the leads and lags of the treatment effect in each wave. In standard leads-and-lags models, the pre-treatment estimates serve as a placebo test for the parallel trends assumption. For this assumption to hold, the outcomes for respondents in the treatment and control group should trend similarly before the floods implying insignificant estimates in the pre-treatment.

To test whether the effect of the floods differs for respondents supporting Die Grünen, I rely on triple difference (TD) models. These models capture heterogeneity in treatment effects by taking the difference between two difference-in-differences estimates (Olden and Møen 2021), in this case between supporters of Die Grünen and all other partisans. The binary indicator that turns to one for respondents who support Die Grünen is included in the vector $X_{it}$, which also includes gender, age, education, and region of origin. Formally, the TD model takes the following form:

$$Y_{it} = \beta_0 T_i + \beta_1 X_{it} + \beta_2 \left( T_i \times X_{it} \right) + \tau \left( T_i \times P_{it} \right) + \beta_3 \left( P_{it} \times X_{it} \right) + \delta \left( T_i \times P_{it} \times X_{it} \right) + \mu_i + \lambda_i + \varepsilon_{it}$$

Here, $\delta$ denotes the TD estimates for each of the variables included in $X_{it}$. If Die Grünen supporters and all other partisans update their attitudes differently after the floods, this should be captured by the corresponding TD estimate.

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14     A respondent's perceived economic situation is measured in Wave 15.

My study's main identification strategy deviates from recent studies that assess the impact of the floods mentioned before (Garside and Zhai 2022; Hilbig and Riaz 2024; Holub and Schündeln 2023). These studies employ a difference-in-difference strategy to estimate the local effects of the floods whereas my study examines changes in attitudes at the national level. Prior studies have shown that big events have spillover effects: they shape attitudes well beyond regional or even national borders (Berger 2010; Finseraas et al. 2013; Malet 2022; Malet and Walter 2023). In the past, severe disasters related to climate change have also affected attitudes towards climate change in other countries (Böhmelt 2020; Kanlatzi Pantera et al. 2022). Indeed, Hilbig and Riaz (2024) show that the saliency of climate change and support for Die Grünen increased nationwide after the floods (see also McAllister and bin Oslan 2021).[15]

## 5.4    RESULTS

The first part of my analysis focuses on the effect of the 2021 German floods regardless of a respondent's party identification. I present the estimates of the difference-in-differences specifications in Table 1. Overall, the results provide some evidence that people update their attitudes after they have been exposed to climate-related natural disasters. Table 1 shows that concerns about climate change increased with as much as 12 percentage points after the floods. In contrast, the picture is less clear when it comes to the effect of the floods on support to fight climate change. The estimates shown in Table 1 indicate an increase in expressed levels of support of only 2 percentage points after the floods, but the estimates are not statistically significant. Thus, respondents became more concerned about climate change, but did not become more supportive to fight climate change.

*Table 1. Effect of the Floods on Concern about Climate Change (M1 and M2) and Support to Fight Climate change (M3 and M4)*

|  | Concern about climate change | | Support to fight climate change | |
|---|---|---|---|---|
|  | *(M1)* | *(M2)* | *(M3)* | *(M4)* |
| Difference-in-differences | 0.120*** | 0.119*** | 0.019 | 0.019 |
|  | (0.027) | (0.027) | (0.012) | (0.012) |
| Observations | 22,528 | 22,528 | 23,801 | 22,801 |
| $R^2$ | 0.127 | 0.141 | 0.103 | 0.118 |
| Controls | Yes | Yes | Yes | Yes |
| State FE | No | Yes | No | Yes |
| Wave FE | Yes | Yes | Yes | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
* p<0.1   ** p<0.05   *** p<0.01

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15    Figure SI3 in SI confirms that the floods had nationwide rather than local effects.

*Figure 4. After the Floods Concerns about Climate Change and Support to Fight Climate Change Increased*
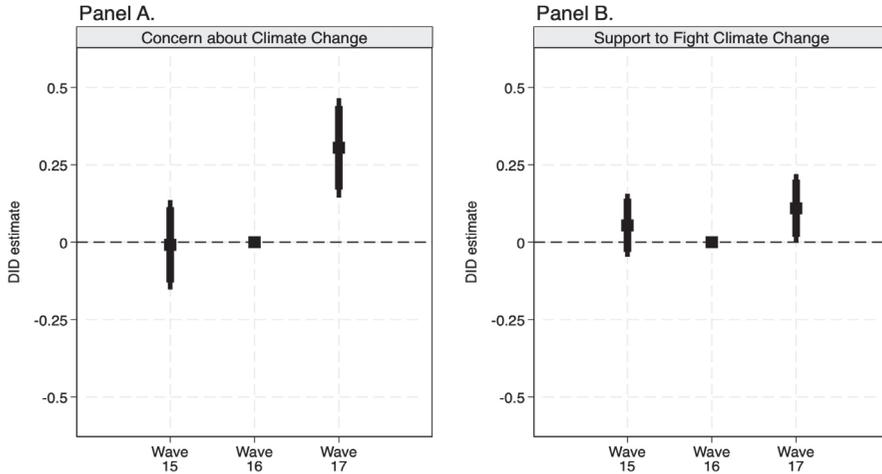


To corroborate these results, Figure 4 presents the estimates of the standard leads-and-lags specification in an event-study plot.[16] First, Panel A of Figure 4 shows that levels of concern about climate change trended similarly among respondents assigned to the treatment and control group before Wave 17. The estimate in the pre-treatment period is statistically insignificant and negligible in size. Once respondents in the treatment group are exposed to the floods, they become 0.32 of a standard deviation more concerned about climate change. Moreover, this effect is meaningful according to Hartman and Hidalgo's standard. Similarly, the estimates in Panel B of Figure 4 confirm the parallel trend in support for combating climate change. Again, the estimates are not only insignificant but also small in the pre-treatment periods. The effect of the floods is less obvious in this regard. Although support for fighting climate change increased among respondents in the treatment group in Wave 17, the associated estimate indicates a negligible effect size (CI: [-0.02σ, 0.24σ]).

Next, I examine whether party identity shapes the effect of the floods on attitudes. How did those identifying with Die Grünen update their attitudes compared to those who do with another party? Table 2 yields the results of my TD specifications capturing the difference in the effect of the floods

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16    Recall that the estimates in the pre-treatment period serve as a placebo test for the parallel trends assumption. When these estimates are insignificant the null hypothesis of parallel trends cannot be rejected. Note, such a strategy suffers from similar shortcomings as traditional balance tests described above. Therefore, I use Hartman and Hidalgo's (2018) standard and define effects below their proposed default value of 0.36 of standard deviation as small effects. This allows me to rule out not only statistically significant but also meaningful effects for the pre-treatment period.

between supporters of Die Grünen and all other partisans. When it comes to concerns about climate change, there is no difference between the two groups. The TD estimator is a negligible 2 percentage points and statically insignificant in both model specifications. However, support to fight climate change increases more among respondents identifying with Die Grünen compared to those identifying with another party after the floods. Supporters of Die Grünen become 8 percentage points more supportive of fighting climate change: a difference of 6 percentage points compared to other partisans. This finding resonates with regional-level analyses showing that the effect of natural disasters on support for climate change mitigation policies is more pronounced in regions in which the vote share of pro-climate voting was already high (Hazlett and Mildenberger 2020; Holub and Schündeln 2023; Marlon et al. 2022).

Figure 5 presents the estimates of the leads-and-lags specifications. Note that this event study plot is similar to the plot above but shows separate difference-in-differences estimates for supporters of Die Grünen and all other partisans. The difference between these two estimates constitutes the TD estimator. First, the findings largely confirm the parallel trend assumption for concern about climate change and support to fight it, shown in Panel A and B respectively. Although the estimates that capture the difference between Die Grünen supporters in the pre-treatment period are insignificant, the confidence intervals associated with the difference in concern about climate change overlap with benchmark of 0.36 of a standard deviation. Note that this might be explained by the relatively little variation in the outcome variable. Second, both panels support the results presented in Table 5. The estimates presented in Panel A show that concern about climate change trended similarly for respondents in the treatment and control group regardless of their party affiliation in the pre-treatment periods. After the floods, both supporters of Die Grünen and all other partisans alike exhibit higher concern about climate change.[17] Whereas the two groups become equally more concerned about climate change, support for climate change mitigation policies primarily increased among Die Grünen supporters.[18] Compared to all other partisans, the difference of the average treatment is 0.21 of a standard deviation between the two groups (CI: [-0.02σ, 0.45σ]).

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17    Moreover, the difference between the two groups is 0.1 of a standard deviation and statistically insignificant.

18    Among respondents identifying with Die Grünen support increases with 0.31 of a standard deviation (p < 0.01) after the floods. In contrast, the average treatment effect of the floods is insignificant (p > 0.1) and small in magnitude (0.09 of a standard deviation) for all other partisans.

*Table 2. Effect of the Floods on Concern about Climate Change (M1 and M2) and Support to Fight Climate Change (M3 and M4) by Party Identity*

| | Concern about climate change | | Support to fight climate change | |
|---|---|---|---|---|
| | *(M1)* | *(M2)* | *(M3)* | *(M4)* |
| Difference-in-differences × Die Grünen | -0.021 (0.084) | -0.021 (0.083) | 0.059** (0.026) | 0.060** (0.026) |
| Observations | 22,528 | 22,528 | 22, 801 | 22,801 |
| R$^2$ | 0.128 | 0.142 | 0.111 | 0.126 |
| Controls | Yes | Yes | Yes | Yes |
| State FE | No | Yes | No | Yes |
| Year FE | Yes | Yes | Yes | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
\* p<0.1   \*\* p<0.05   \*\*\* p<0.01

*Figure 5. Die Grünen Supporters Update Their Attitudes Differently Compared to All Other Partisans*
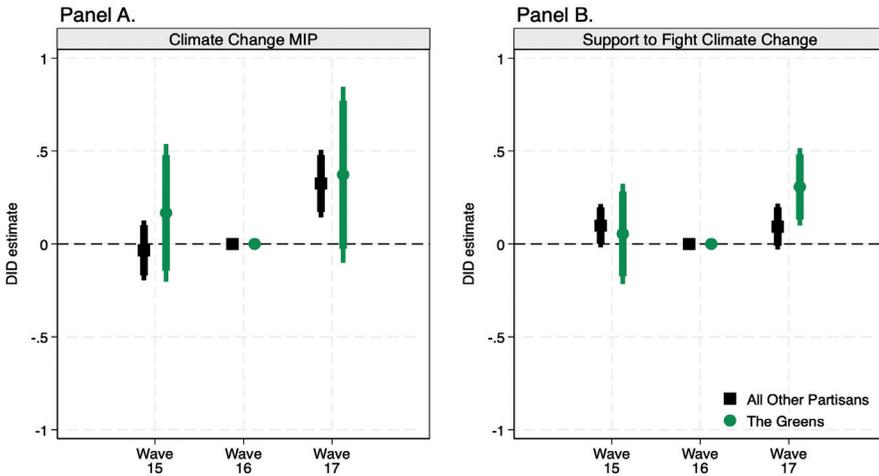


*Robustness*

To verify the robustness of my results, I run a series of robustness checks. First, I test whether the floods affected respondents' preferences towards a specific climate change mitigation policy: fossil fuel taxes. I use a question that asks how much respondents agree with the following statement: "Taxes on fossil fuels such as oil, gas and coal should be increased." To capture support, I recode answers creating a binary variable (1 = agree or strongly agree; 0 = neither agree nor disagree, disagree or strongly disagree). As this question is only included in the Wave 17 of the GLES, I cannot compare whether respondents who completed the survey before and after the floods

changed their preferences differently, but I can compare differences in the average levels of support between these two groups. Table SI4 presents the results of my probit models, showing that Die Grünen identifiers became more supportive to increase taxes on fossil fuels compared to all other partisans.

Second, I test the effect of the floods on two placebo outcomes: attitudes towards immigration and gender equality.[19] All waves of the GLES panel include a question that asks respondents whether they think it should be easier for foreigners to immigrate.[20] Although supporters of Die Grünen stand out by supporting less restrictive immigration policies compared to other partisans (see Figure SI4), the floods should not affect respondents' position. The results presented in Table SI5 confirm that this is the case: I do not find statistically significant nor meaningful treatment effects. Likewise, attitudes towards state measures for equality of women in society should be unrelated to the floods.[21] Again, respondents identifying with Die Grünen stand out compared to respondents who identify with a different party (see Figure SI4). Most importantly, however, I do not find evidence that the floods affected respondent's position in any of the difference-in-differences and triple-differences specifications (Table SI5).

Third, I use placebo treatments to check whether pre-existing time trends bias my results. To do so, I split the control group at the median date, in this case 8 July 2021 (Imbens and Lemieux 2008). The absence of an effect supports the assumption that my results are not driven due to a pre-existing trend before the floods, for example the increased saliency of climate change due to the election campaign. The results presented in Table SI6 confirm the absence of such an effect before the floods.

Finally, I show that my results are robust to including respondent fixed effects (see Table SI7). In such a model, differences between respondents that finished the questionnaire before and after the floods that threaten the temporal ignorability assumption are captured by the respondent fixed effects. In addition, I test the robustness of my result using a different operationalisation of party identification: the extent to which respondents feel positive or negative towards Die Grünen (see Table SI8). Again, my results are relatively similar to those presented above.

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19   Note that Munoz et al. (2020) suggest using placebo tests to support the plausibility of the exclusion restriction.

20   Specifically, the question reads: "Some want to make it easier for foreigners to immigrate, while others want to make it more difficult for foreigners to immigrate. What is your personal view on this issue?"

21   Respondents are asked the following question: "What is your opinion on state measures for the equality of women in society?"

## 5.5     Conclusion

Do climate extremes affect public support for climate change mitigation policies? Most recent studies looking at this question have focused on mechanisms that operate under the assumption that people interpret new information neutrally and update their attitudes accordingly (Baccini and Leemann 2021; Cremaschi and Stanig 2023; Hoffmann et al. 2022; Kornborg et al. 2024; McAllister and bin Oslan 2021; Vasilopoulos and Demertzis 2013). In this study, I argue instead that partisanship shapes how people interpret climate extremes and how this translates into attitudes towards climate change, building on the theory of motivated reasoning.

To test this argument, I compare respondents who were interviewed just before and after the 2021 floods in Germany, exploiting the coincidence of the event and the fieldwork of the Wave 17 of the GLES panel. Whereas prior studies used within-country variation to identify the causal effect of the floods on voting for Die Grünen (Garside and Zhai 2022; Hilbig and Riaz 2024; Holub and Schündeln 2023), I test whether Die Grünen supporters updated their attitudes differently in the aftermath of the floods. Using difference-in-differences models, I show that concern about climate change increased among partisans of all stripes in the direct aftermath of the floods. This finding aligns with prior studies that have shown that climate extremes increase the salience of climate change (Bergquist and Warshaw 2019; Egan and Mullin 2012, 2017; Howe et al. 2019; Kanlatzi Pantera et al. 2023; Kaufmann et al. 2017; Rüttenauer 2023; Visconti and Young 2024). However, this increase does not necessarily translate into support for ambitious climate change mitigation policies. Only among Die Grünen identifiers the appetite to fight climate change increased. This individual-level panel findings corroborate prior studies showing that the effect of climate extremes on attitudes is driven by more pro-climate voting regions (Hazlett and Mildenberger 2020; Holub and Schündeln 2023; Marlon et al. 2022). My findings suggest that climate extremes primarily increase support for climate change mitigation policies among those already inclined to support such measures. Hence, as climate extremes are expected to become more frequent in the future, support for ambitious climate mitigation policies will not necessarily increase.

Taken together, my study provides a nuanced perspective on the effect of climate extremes on attitudes towards climate change, making several contributions to the literature on attitudinal formation more broadly. First, my findings suggest that partisans are motivated by directional rather than accuracy goals when they process new information about climate change. Although my study focuses on the German floods, the findings suggests that political attitudes towards other issues over which partisan conflict is high may well be (partly) endogenous to party support. Second, I provide evidence that partisans acknowledge inconvenient truths but change their

related policy preferences differently. This finding resonates with studies showing that partisans acknowledge facts similarly but attribute responsibility for these events selectively (Bisgaard 2015; 2019; Gaines et al. 2007; Malhorta and Kuo 2008; Tilley and Hobolt 2011). A worthwhile avenue for future research may be to test the generalisability of my findings for other types of events related to politically salient issues that lie at the heart of partisan conflict.

Finally, certain caveats about the claims of my study are warranted. First, although this study's identification strategy enables me to examine the causal effect of the German floods on public opinion about climate change, such a strategy does not allow for a causal identification of whether the effect of such events persists over time. Only for the wave of which the fieldwork coincides with the floods, I can assign respondents to either the treatment or control group as all respondents are treated in subsequent waves. Hence, I cannot test whether the effect of the floods persists over time. Second, although my empirical strategy offers advantages for causal inferences, future research needs to establish the generalisability of my results beyond this specific context. For example, partisanship is particularly salient during the electoral campaigns (West and Iyengar 2022). As the floods hit Germany only a couple of months before the election, this increased the likelihood that partisans were motivated by directional goals in their interpretations of the floods. Third, I capture support for climate change mitigation policies relying on stated preferences instead of actual voting behaviour. Hence, I cannot fully rule out that differences in attitudes reflect partisan cheerleading implying that partisans distort their responses to survey questions to show support for their party's policy position (see Bullock and Lenz 2019 for a recent review).

## Supplementary Information

### Section A. – Descriptive Statistics

*Table SI1 – Information Waves Included in the GLES Panel*

| Wave | Date of Fieldwork | Months between Waves |
|------|-------------------|----------------------|
| 1 | 10/11-2016 | |
| 2 | 02/03-2017 | 4 |
| 3 | 05-2017 | 2 |
| 4 | 07-2017 | 2 |
| 5 | 08-2017 | 1 |
| 6 | 09-2017 | 1 |
| 7 | 09-2017 | 0 |
| 8 | 09/10-2017 | 1 |
| 9 | 03-2018 | 5 |
| 10 | 11-2018 | 8 |
| 11 | 05-2019 | 6 |
| 12 | 11-2019 | 6 |
| 13 | 04/05-2020 | 6 |
| 14 | 11-2020 | 6 |
| 15 | 02/03-2021 | 4 |
| 16 | 05-2021 | 2 |
| 17 | 07-2021 | 2 |
| 18 | 08-2021 | 1 |
| 19 | 09-2021 | 1 |
| 20 | 09/10-2021 | 1 |
| 21 | 12-2021 | 2 |

*Table SI2 – Summary Statistics*

| | Control Group | | Treatment Group | |
|---|---|---|---|---|
| | *Mean* | *Standard Deviation* | *Mean* | *Standard Deviation* |
| MIP Climate Change | 0.236 | 0.425 | 0.238 | 0.426 |
| Prioritise Fighting Climate Change | 4.441 | 1.719 | 4.401 | 1.680 |
| Gender | 1.445 | 0.497 | 1.489 | 0.500 |
| Age | 54.120 | 14.163 | 50.475 | 15.083 |
| Low Educated | 0.496 | 0.500 | 0.371 | 0.483 |
| High Education | 0.436 | 0.496 | 0.387 | 0.487 |
| Economic Situation | 0.777 | 0.416 | 0.791 | 0.407 |
| Supporter of Die Grünen | 0.190 | 0.392 | 0.172 | 0.378 |
| Observations | 757 | | 23,530 | |

## Section B. – Additional Evidence Assumptions

*Figure SI1 – Common Trend*
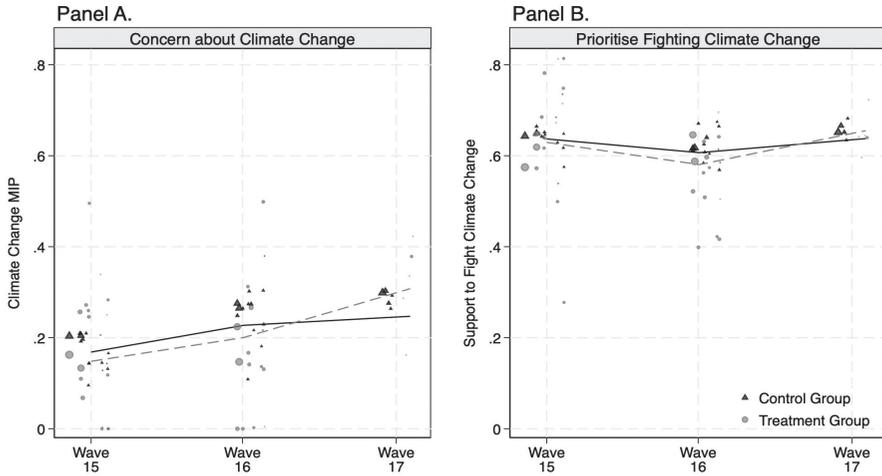
Panel A.



Panel B.

*Figure SI2 – Common Trend – Including Wave 18*
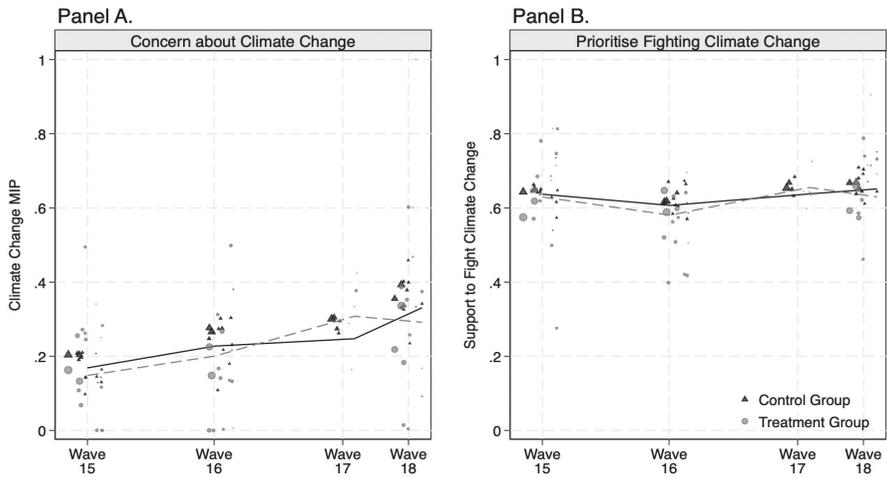
Panel A.



Panel B.

*Table SI3 – Results Missingness*

| | Completed Survey | Do not know MIP | Do not know Fight climate change | Speeder index |
|---|---|---|---|---|
| | (M1) | (M2) | (M3) | (M4) |
| *Panel A. DID estimations* | | | | |
| Difference-in-differences | 0.001 | 0.001 | 0.001 | 0.009 |
| | (0.004) | (0.007) | (0.001) | (0.013) |
| Observations | 24,191 | 23,251 | 23,254 | 23,190 |
| $R^2$ | 0.002 | 0.021 | 0.001 | 0.157 |
| *Panel B. TD estimations* | | | | |
| Difference-in-differences × Die Grünen | 0.002 | -0.001 | 0.002 | 0.018 |
| | (0.011) | (0.012) | (0.002) | (0.038) |
| Observations | 24,191 | 23,251 | 23,254 | 23,190 |
| $R^2$ | 0.003 | 0.029 | 0.002 | 0.162 |
| Controls | Yes | Yes | Yes | Yes |
| State FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
\* $p<0.1$
\*\* $p<0.05$
\*\*\* $p<0.01$

## Section C – The Nationwide Effects of the Floods

*Figure SI3 – Results of the leads-and-lags model*



Panel A. — Concern about climate change

Panel B. — Support to fight climate change
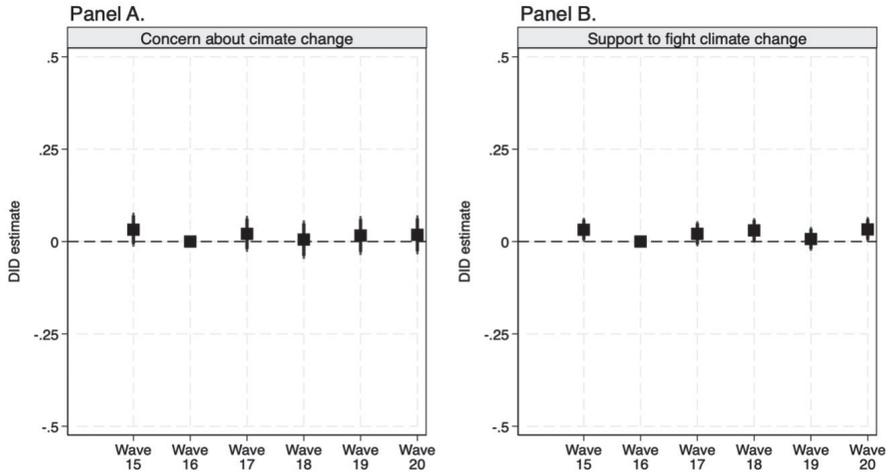
*Section D – Support to Increase Taxes on Fossil Fuels*

*Table SI4. Effect of the Floods on Support to Increase Taxes on Fossil Fuels in general (M1 and M2) and by Party Identity (M3 and M4)*

|  | *Increase Taxes on Fossil Fuels* | | | |
| --- | --- | --- | --- | --- |
|  | *(M1)* | *(M2)* | *(M3)* | *(M4)* |
| Post Floods | -0.142 | -0.129 | -0.397 | -0.303 |
|  | (0.094) | (0.094) | (0.606) | (0.623) |
| Post Floods × Die Grünen |  |  | 0.472** | 0.530** |
|  |  |  | (0.232) | (0.235) |
| Observations | 7676 | 7458 | 7676 | 7458 |
| Pseudo R$^2$ | 0.112 | 0.133 | 0.123 | 0.143 |
| State FE | No | Yes | No | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
\* p<0.1
\*\* p<0.05
\*\*\* p<0.01

## Section E – Placebo Tests

*Figure 4. Demand-side of immigration and gender equality. Notes: For both issues, the position of respondents support Die Grünen relatively closely aligns with the perceived party position on the corresponding issue.*
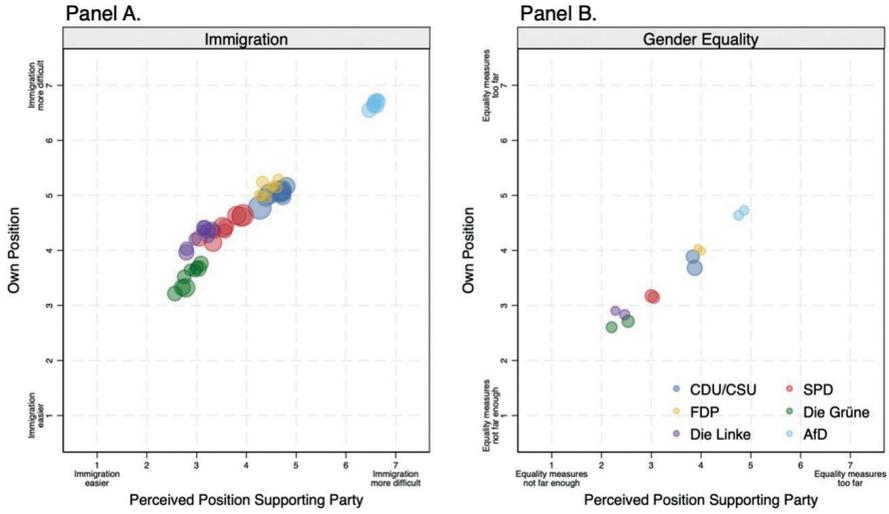


*Table SI5 – Results Placebo Outcomes*

|  | Immigration | | Gender equality | |
| --- | --- | --- | --- | --- |
|  | (M1) | (M2) | (M3) | (M4) |
| *Panel A. DID estimations* | | | | |
| Difference-in-differences | -0.002 | -0.003 | 0.037 | 0.037 |
|  | (0.042) | (0.042) | (0.049) | (0.049) |
| Observations | 23,023 | 23,023 | 23,023 | 23,023 |
| $R^2$ | 0.140 | 0.141 | 0.092 | 0.094 |
| *Panel B. TD estimations* | | | | |
| Difference-in-differences × Die Grünen | -0.121 | -0.119 | 0.016 | 0.018 |
|  | (0.102) | (0.102) | (0.097) | (0.097) |
| Observations | 23,023 | 23,023 | 22,787 | 22,787 |
| $R^2$ | 0.141 | 0.146 | 0.097 | 0. 097 |
| Controls | Yes | Yes | Yes | Yes |
| State FE | No | Yes | No | Yes |
| Wave FE | Yes | Yes | Yes | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
* p<0.1
** p<0.05
*** p<0.01

*Table SI6 – Results Placebo Treatment*

| | Concern about climate change | | Support to fight climate change | |
|---|:---:|:---:|:---:|:---:|
| | *(M1)* | *(M2)* | *(M3)* | *(M4)* |
| *Panel A. DID estimations* | | | | |
| Difference-in-differences | -0.004 | -0.004 | -0.002 | -0.002 |
| | (0.012) | (0.012) | (0.005) | (0.005) |
| Observations | 16,017 | 16,017 | 16,207 | 16,207 |
| R$^2$ | 0.105 | 0.108 | 0.143 | 0.147 |
| | | | | |
| *Panel B. TD estimations* | | | | |
| Difference-in-differences × Die Grünen | -0.047 | -0.047 | -0.011 | -0.011 |
| | (0.033) | (0.033) | (0.013) | (0.013) |
| Observations | 16,017 | 16,017 | 16,207 | 16,207 |
| R$^2$ | 0.109 | 0.111 | 0.147 | 0.151 |
| Controls | Yes | Yes | Yes | Yes |
| State FE | No | Yes | No | Yes |
| Year FE | Yes | Yes | Yes | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
* p<0.1
** p<0.05
*** p<0.01

## Section F – Alternative Model Specifications

### Table SI8 – Including Respondent Fixed Effects

|  | Concern about climate change | | Support to fight climate change | |
| --- | --- | --- | --- | --- |
|  | (M1) | (M2) | (M3) | (M4) |
| *Panel A. DID estimations* | | | | |
| Difference-in-differences | 0.120*** | 0.121*** | 0.019 | 0.019 |
|  | (0.027) | (0.028) | (0.012) | (0.012) |
| Observations | 23,058 | 22,464 | 22,801 | 22,784 |
| R² | 0.126 | 0.671 | 0.102 | 0.797 |
| *Panel B. TD estimations* | | | | |
| Difference-in-differences | -0.021 | -0.030 | 0.059** | 0.046* |
| × Die Grünen | (0.083) | (0.081) | (0.026) | (0.026) |
| Observations | 22,528 | 22,646 | 22,801 | 22,784 |
| R² | 0.131 | 0.674 | 0.111 | 0.799 |
| Controls | Yes | Yes | Yes | Yes |
| Respondent FE | No | Yes | No | Yes |
| Year FE | Yes | Yes | Yes | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
* p<0.1
** p<0.05
*** p<0.01

### Table SI9 – Different Operationalisation Party Identity: Scalometer Die Grünen

|  | Concern about climate change | | Support to fight climate change | |
| --- | --- | --- | --- | --- |
|  | (M1) | (M2) | (M3) | (M4) |
| Difference-in-differences × | 0.012* | 0.012* | 0.007* | 0.007* |
| Die Grünen | (0.007) | (0.007) | (0.003) | (0.003) |
| Observations | 29,9931 | 29,9931 | 30,412 | 30,412 |
| R² | 0.141 | 0.148 | 0.219 | 0.242 |
| State FE | No | Yes | No | Yes |

*Note:* Standard errors are clustered at the individual level and reported in parentheses.
* p<0.1
** p<0.05
*** p<0.01

# 6 | Conclusion

What factors can explain how structural economic changes drive labour market outcomes and political attitudes towards the related policies? This dissertation explores the underlying connections, particularly examining how past structural economic changes have influenced labour market outcomes and shaped political attitudes towards the green transition. This chapter summarises the key findings presented in the chapters included in this dissertation. In addition, I reflect on this dissertation's academic and societal implications, and discuss avenues for future research.

## 6.1  Main Findings

My dissertation consists of four chapters that aim to provide insights into whether and how structural economic changes affect labour market outcomes and public opinion by empirically analysing the risks associated with these changes and the effects on political attitudes and policy preferences.

Chapter 2 shows that the squeezed demand for routine-intense occupations is associated with an increase in the prevalence of involuntary part-time employment in low-skill occupations. Individuals traditionally employed in such routine-intense occupations can switch relatively easily to low-paying occupations that require little investment in education or training. The increased inflow of individuals in the competitive pool for the latter type of occupations changes the dynamics at the lower end of the labour market, chipping away at bargaining power of workers. Moreover, demand for low-skill service jobs that typically require flexible working hours to meet consumers' needs increased over the past decades. Drawing on aggregated labour force survey data from 16 EU countries between 1999 and 2010, this chapter provides evidence that such dynamics push individuals competing for low-skill employment to accept part-time jobs involving fewer than the desired number of hours. Technological change, thus, has not only affected employment prospects of individuals who are displaced but also of those working at lower segments of the labour market. However, labour market institutions that cushion competition, like training and job creation schemes, mitigate this effect as they provide individuals with the necessary skills to shift into high-skill jobs or increase employment possibilities at the lower end of the labour market.

Subsequently, Chapter 3 examines how the unemployment risks stemming from the transition towards a carbon-neutral economy shape public opinion. Although the employment effects of policies such as carbon taxes or performance standards tend to be neutral, they have distributional effects. As a result, a substantial number of workers are forced to switch occupations. This chapter provides support for this argument. Drawing on pooled time-series cross-sectional public opinion data from 11 OECD countries in 2000 and 2010, the analyses show that individuals in carbon-intensive occupations are generally less supportive of this transition and related policies. However, the costs of occupational switches differ between individuals. Whereas some individuals in carbon-intensive occupations have a skill profile that allows them to switch into a wide range of occupations, others have occupation-specific skills that make it more difficult to find re-employment if they lose their job. This chapter creates a new measure that captures the transferability of skills by linking skills to occupations, enabling an analysis of the differences in political attitudes between individuals who have specific and transferable skills. The findings suggest that opposition towards a carbon-neutral economy is typically lower amongst those individuals working in carbon-intensive occupations who have transferable skills, increasing their occupational mobility.

In Chapter 4, I examine the effect of job losses on attitudes towards radical parties. Ultimately, dissatisfaction with the policies underpinning structural economic changes should translate into support for parties with similarly critical policy positions. In particular, radical parties have run on electoral platforms that tap into feelings of dissatisfaction with such policies. However, examining the effect of job losses on support for radical parties is challenging due to anticipation effects. Such effects will dampen the identified effect of job losses in panel studies as voters expecting to lose their jobs already shift their attitudes. To take anticipation of job losses into account, this chapter draws on panel data from the Netherlands that allows differentiation between expected and unexpected job losses. This chapter finds that individuals who lose their jobs become more supportive of radical left but not towards radical right parties. These findings suggest that job losses primarily increase support for radical left parties that have traditionally championed a generous welfare state to relieve economic hardship. In contrast, support for radical right parties does not seem to be driven by personal experiences of economic hardship, corroborating studies that emphasise the broader economic and social changes in explaining the electoral fortunes of radical parties.

Finally, Chapter 5 provides evidence on how climate extremes shape public opinion towards climate change. In this chapter, I argue that individuals are likely to process information about politically salient issues in a way that is consistent with the position of the party they support. Using difference-in-differences models, I examine whether partisanship determines the extent to which individuals update their political attitudes towards climate

change in the aftermath of an extreme climate event. Specifically, I exploit the coincidence of the German 2021 floods with the fieldwork of the 17th Wave of the GLES. The analyses of this chapter show that individuals who support Die Grünen change their political attitudes towards climate change differently after the floods compared to all other partisans. Whereas concern about climate change increased amongst partisans of all stripes, only supporters of Die Grünen became more willing to fight climate change and supportive of necessary policies. Taken together, this chapter provides evidence that partisans may well differ in the way they change their policy preferences after learning new information.

## 6.2    ACADEMIC AND SOCIETAL IMPLICATIONS

Public opposition to the political mainstream, whether in terms of party or policy support, has generated considerable debate among pundits and academics alike. In this debate, considerable attention has been devoted to the (ir)relevance of economic hardship in sparking opposition towards structural economic changes, like globalisation, technological change and, increasingly, the transition towards a carbon neutral economy.

In this dissertation, I aim to contribute to this debate and the comparative political economy literature more broadly in at least two ways. First, this dissertation shifts focus beyond standard labour market outcomes but also takes non-standard employment into account. Prior studies examining the adverse effects of structural economic changes have predominantly focussed on whether individuals work – known in labour economics as the 'extensive margin – but less so on the type of contract or the number of hours worked. However, the latter is an important predictor of in-work poverty (Brülle et al., 2019; Gardiner and Millar, 2006; Marx et al., 2012). This dissertation examines how one of these structural trends, technological change, has affected the prevalence of involuntary part-time work at the lower end of the labour market. Doing so, provides insight into the various ways changing labour market dynamics may affect employment outcomes beyond employment per se.

Second, this dissertation examines the effects of labour market risks in a broader context by looking at the differences across occupations. Although the effects of structural economic changes on the demand for certain types of occupations, such as routine-intense or carbon-intensive occupations, may be relatively similar (Acemoglu et al. 2016; Autor et al. 2013; Bloom et al. 2016; Goos et al. 2014; Gregory et al. 2022; Hafstead and Williams III 2018; Michaels et al. 2014; Shapiro and Metcalf 2023; Walker 2013), their impact on the employment prospects of individuals in these occupations may well be very different. In this dissertation, the effects of how such differences shape labour market outcomes and public opinion features prominently.

The analyses presented in this dissertation acknowledge that the skills required for certain types of occupations determine the costs for workers to switch between occupations. Accordingly, workers with skills that are easily transferable between occupations are more mobile and lose less productivity when they switch occupations. As a result, the adverse labour market effects of structural economic changes differently affect bargaining power and, ultimately, political attitudes and policy preferences in different ways.

The findings presented in this dissertation are relevant for policymakers designing climate change mitigation policies deemed essential to limiting global warming. First, understanding whether and how such structural economic changes impact individuals is important for designing policy packages that aim to support individuals affected by the transition towards a carbon-neutral economy. This dissertation provides support for the argument that ALMPs, particularly (re)training programmes, have been effective in cushioning the adverse labour market effects of prior economic changes. Moreover, public opposition to climate change mitigation policies seems to be concentrated amongst individuals in carbon-intensive occupations who lack the skills that enable them to switch occupations without losing productivity. Taken together, this suggests that programmes aimed at providing individuals with the skills needed in the labour market of the future may help foster support for the transition towards a carbon-neutral economy.

Notwithstanding the potential of such policies for policymakers, prior studies have also shown an unyielding political reality. In particular, public support for social investment-oriented policies, like (re)training programmes, is typically low (Bremer and Bürgisser 2023; Busemeyer and Tober 2023). Indeed, the findings presented in this dissertation suggest that individuals who lose their jobs shift their support primarily to radical left parties, which traditionally advocate a strong safety net rather than the trampoline associated with social investment policies. In addition, other studies have also examined the distributional effects of social investment policies themselves. Specifically, these studies have questioned whether this type of policy protects all individuals equally (Bonoli et al. 2017).

The second finding that is relevant for policymakers relates to the public understanding of the need for climate change mitigation policies. Regardless of the way policy packages aim to support affected individuals, policymakers should not expect that scientific reports or media coverage highlighting the sometimes-devastating effects of climate change will be sufficient to garner broad public support for climate change mitigation policies. In fact, the findings of this dissertation suggest that such messages only increase support among those who are already in favour of implementing policies to combat climate change. Hence, both political parties and policymakers proposing ambitious climate change mitigation policies should better explain why such policies are needed.

## 6.3    AVENUES FOR FUTURE RESEARCH

Both the findings presented in this dissertation and the limitations associated with some of the analyses provide several fruitful avenues for future research. Here, I focus on three avenues particularly worthwhile given the broader implications of this dissertation, as individual chapters discuss the limitations of each study in more detail.

First, this dissertation does not look at individual employment trajectories to assess the effectiveness of ALMPs. This means that, strictly speaking, the analyses presented in this dissertation do not allow conclusions to be drawn about who ends up in involuntary part-time employment as a result of the squeeze in demand for routine-intense labour. For example, are individuals who used to work in routine-intensive occupations or those who were already working in low-skill occupations being pushed to accept part-time positions with fewer hours than they desire? Future research may look more closely into this type of questions and assess whether different types of ALMPs are equally effective for both types of individuals.

Second and relatedly, future research may focus on whether different types of job losses shift political attitudes and policy preferences differently. Prior research has examined whether individuals attribute blame rationally (Di Tella and Rodrik 2020; Gallego and Kurer 2022; Wu 2022). For example, individuals who are exposed to higher automation risks are more likely to support policies that aim to reduce immigration and oppose free trade. The analyses presented in this dissertation only capture employment risks using time-series cross-sectional data or job losses regardless of its causes using individual-level panel-data. Combining these two approaches may contribute to our understanding of the political effects of job losses.

Finally, this dissertation has explored how risks arising from structural economic changes have shaped labour market outcomes as well as political attitudes and preferences, taking a more contextualised perspective. Future research could follow and examine the adverse effects of such economic changes by looking into the effects on the regional and individuals' social networks (Alt et al. 2021; Ansolabehere et al. 2014; Bisgaard et al. 2016; Colantone and Stanig 2018a, 2018b; Hays et al. 2019; Mansfield and Mutz 2009; Newman et al. 2015). In addition, future research could explore differences in the ways in which the (perceived) economic and cultural threats associated with these economic changes drive political attitudes and preferences. This dissertation demonstrates that such avenues may be worth exploring in order to broaden our understanding of the ways in which structural economic changes shape contemporary labour markets and politics.

# Samenvatting (Dutch Summary)

Het Effect van Structurele Economische Veranderingen op Politieke en Beleidsvoorkeuren

Structurele economische veranderingen hebben de afgelopen decennia geleid tot substantiële arbeidsmarktverschuivingen in westerse economieën (Van Vliet et al. 2021). Hoewel het netto-effect van deze verschuivingen op de werkgelegenheid neutraal of zelfs positief is, zijn de nadelige arbeidsmarkteffecten ongelijk verdeeld (Acemoglu et al. 2016; Autor et al. 2013; Bloom et al. 2016; Thewissen en Van Vliet 2017).

Zo heeft het wegvallen van handelsbarrières door globalisering ertoe geleid dat de vraag vanuit het buitenland naar kennisintensieve producten is toegenomen. Dit heeft geleid tot een groei van de werkgelegenheid in sectoren waar dit type producten wordt geproduceerd en een hogere vraag naar hoogopgeleiden. Tegelijkertijd wordt het goedkoper om arbeidsintensieve producten te importeren uit lagelonenlanden, doordat handelsbarrières weggevallen zijn. Sectoren die in grote mate leunen op intensieve arbeid in het productieproces, krijgen hierdoor te maken met internationale concurrentie. Dit leidt to een afname in de vraag naar duurdere binnenlandse producten en minder vraag naar laagopgeleiden in arbeidsintensieve sectoren.

Technologische ontwikkelingen hebben eenzelfde soort asymmetrisch effect op de arbeidsmarkt. Tot dusver blijken nieuwe technologieën, zoals computers en robots, met name geschikt voor het uitvoeren van handmatige en repetitieve taken die geen persoonlijke interactie vergen (Autor et al. 2003; Autor en Handel 2013). Omdat dit type taken met name wordt uitgevoerd in beroepen in het middensegment van de arbeidsmarkt, heeft automatisering hier geleid tot een afname van het aantal banen (Gregory et al. 2022; Goos et al. 2014; Michaels et al. 2014). Hierdoor zijn middelbaaropgeleiden in toenemende mate aangewezen op beroepen in de dienstensector aan de onderkant van de arbeidsmarkt, waar zij concurreren met laagopgeleiden.

De arbeidsmarkteffecten van structurele economische veranderingen zijn niet enkel ongelijk verdeeld, maar sociale zekerheid en arbeidsmarktinstituties lijken er door hervormingen minder in te slagen werkenden te beschermen tegen deze nadelige effecten (Baccini en Sattler 2023; Eichhorst en Marx 2012; Fetzer 2019; Swank en Betz 2003; Vlandas en Halikiopoulou 2022). Westerse overheden hebben zogenoemd 'sociaal

investeringsbeleid' geïntroduceerd met als doel arbeidsmarktparticipatie te bevorderen door activering naar werk, de introductie van bijbehorende financiële prikkels en te investeren in menselijk kapitaal middels onderwijs en scholing (Bonoli en Natali 2012; Clasen et al. 2016; Hemerijck 2013; Nelson 2013). Dit type beleid blijkt echter weinig populair onder werkenden die worden geraakt door de nadelige gevolgen van arbeidsmarktverschuivingen (Bremer en Bürgisser 2023; Busemeyer en Tober 2023). Zij geven de voorkeur aan klassieke passieve uitkeringen die op de korte termijn directe compensatie bieden voor inkomensverlies gedurende perioden van werkloosheid. Daarnaast groeit de behoefte aan dit type bescherming doordat de flexibilisering van de arbeidsmarkt ertoe leidt dat banen minder zeker.

Hoewel zowel globalisering als technologische ontwikkeling de welvaart voor de samenleving als geheel verhogen, blijkt de steun voor het beleid dat ten grondslag ligt aan deze structurele economische veranderingen af te brokkelen wanneer overheden er niet in slagen werkenden tegen de nadelige arbeidsmarkteffecten ervan te beschermen (Burgoon 2013; Hays 2009; Mansfield en Rudra 2021). Publieke weerstand tegen globalisering in de vorm van onder andere vrijhandel en migratie lijkt dan ook toe te nemen in zowel omvang als hevigheid.

Tegen deze achtergrond worden in dit proefschrift zowel de arbeidsmarkteffecten die gepaard gaan met structurele economische veranderingen als de wijze waarop deze effecten politieke en beleidsvoorkeuren beïnvloeden onderzocht. De focus ligt hier enerzijds op de wijze waarop globalisering en technologische ontwikkelingen het arbeidsmarktperspectief van werkenden aan de onderkant van de arbeidsmarkt hebben veranderd. Anderzijds bouwt dit proefschrift voort op de inzichten uit eerder onderzoek naar de effecten van globalisering en technologische ontwikkelingen op politieke voorkeuren om dit soort voorkeuren ten aanzien van de groene transitie, een recente structurele economische verandering, te verklaren. Dit leidt tot de volgende centrale onderzoeksvraag:

> *Welke factoren verklaren hoe structurele economische veranderingen arbeidsmarktuitkomsten en politieke voorkeuren ten aanzien van hiermee samenhangend beleid beïnvloeden?*

Om deze vraag te beantwoorden, richt elk hoofdstuk van dit proefschrift zich op een afzonderlijk aspect van deze vraag en belicht het daarbij de verschillende onderliggende verbanden. Hoofdstuk 2 richt zich in dit kader op de arbeidsmarkteffecten van het afgenomen aandeel beroepen met een hoge mate van routinematige taken en op de flexibilisering van de arbeidsmarkt in het bijzonder. Individuen die van oudsher in dit type routine-intensieve beroepen werkzaam waren, kunnen relatief makkelijk werk vinden aan de onderkant van de arbeidsmarkt. In tegenstelling tot hoogbetaalde beroepen aan de bovenkant van de arbeidsmarkt vergen deze banen relatief weinig

investeringen van individuen ten aanzien van onderwijs en vaardigheden. Het gevolg hiervan is dat de concurrentie voor deze banen toeneemt en de onderhandelingspositie van individuen verslechtert. Tegelijkertijd is het aantal laagbetaalde banen in de dienstensector, die doorgaans flexibele werktijden vereisen om aan de behoeften van consumenten te voldoen, in de afgelopen decennia toegenomen. Aan de hand van geaggregeerde data van de European Labour Force Survey laten de analyses in dit hoofdstuk zien dat deze verschuivingen in de vraag naar arbeid hebben geleid tot een toename van het aantal werkenden in deeltijdbanen die minder uren omvatten dan gewenst. Deze toename suggereert dat de nadelige arbeids-markteffecten van technologische ontwikkelingen wijdverspreid zijn en niet enkel individuen treffen die traditioneel gezien werkzaam waren in banen die in toenemende mate zijn geautomatiseerd. Daarentegen laat dit hoofdstuk ook zien dat deze nadelige effecten worden gemitigeerd door arbeidsmarktinstituties die de concurrentie verlichten door individuen de relevante vaardigheden te verschaffen om over te stappen naar hoog-betaalde beroepen of juist extra banen creëren aan de onderkant van de arbeidsmarkt.

Hoofdstuk 3 bouwt verder op het inzicht dat relevante vaardigheden individuen minder kwetsbaar maken voor arbeidsmarktverschuivingen. De groene transitie en de daarmee samenhangende overgang naar een gro-tendeels $CO_2$-neutrale economie hebben, net als eerdere structurele econo-mische veranderingen, ongelijk verdeelde arbeidsmarkteffecten. Hierdoor zal een substantieel deel van de werkenden van beroep moeten wisselen. Zulke transities gaan veelal gepaard met perioden van werkloosheid of een terugval in salaris. Werkenden die door klimaatbeleid, zoals $CO_2$-heffingen of klimaatstandaarden, het risico lopen van beroep te moeten veranderen, zijn daarom doorgaans tegenstanders van dit type beleid. Dit hoofdstuk laat aan de hand van analyses op basis van cross-sectionele data uit 11 OESO-landen zien dat werkenden in $CO_2$-intensieve beroepen inderdaad minder positief staan tegenover de bestrijding van klimaatverandering. Uit deze analyses blijkt echter ook dat de mate van oppositie afhangt van het type vaardigheden dat werkenden bezitten. Door een nieuwe maatstaf te creëren die meet in hoeverre vaardigheden relevant zijn voor verschillende beroepen, laat dit hoofdstuk zien dat oppositie tegen klimaatbeleid in hoge mate afhangt van de vaardigheden van werkenden. Werkenden die over breed inzetbare vaardigheden beschikken, kunnen relatief gemakkelijk van beroep wisselen. Zij staan dan ook significant minder negatief tegenover klimaatbeleid dan werkenden die beroepsspecifieke vaardigheden bezitten en hierdoor geconfronteerd worden met hoge kosten bij een beroepswissel. Deze resultaten suggereren dat breed inzetbare vaardigheden een belang-rijke voorspeller zijn van publieke weerstand tegen de groene transitie.

Hoofdstuk 4 richt zich op het effect van baanverlies op de voorkeuren ten aanzien van politieke partijen aan de flanken van het politieke spectrum.

Onvrede ten aanzien van beleid dat ten grondslag ligt aan structurele economische veranderingen vertaalt zich vaak in steun voor dit type partijen. Het is echter moeilijk te analyseren in hoeverre de steun voor deze partijen toeneemt onder individuen die hun baan verliezen door zogeheten 'anticipatie-effecten'. Een dergelijk effect treedt op wanneer individuen verwachten hun baan op korte termijn te verliezen en daarop vooruitlopend hun politieke voorkeuren bijstellen, alvorens zij hun baan daadwerkelijk verliezen. Studies die de veranderingen van de politieke voorkeuren van werkenden door de tijd analyseren, maar geen rekening houden met dit soort verwachtingen, missen hierdoor mogelijk het effect van baanverlies op politieke voorkeuren. Om deze dynamiek te testen is gebruik gemaakt van Nederlandse paneldata waarin werkenden over een periode van een aantal jaar worden gevolgd. Daarbij wordt een onderscheid gemaakt tussen het effect van onverwacht en verwacht baanverlies op politieke voorkeuren op basis van de eerder gemeten verwachtingen van werkenden. Uit deze analyses blijkt dat onder individuen die hun baan onverwacht kwijtraken, de politieke steun voor radicaal linkse partijen toeneemt. Aangezien de resultaten geen vergelijkbaar effect van baanverlies ten aanzien van steun voor radicaal rechtse partijen tonen, lijkt onverwacht baanverlies met name te leiden tot steun voor radicale partijen die van oudsher pleiten voor een genereuze verzorgingsstaat. Steun voor radicaal rechtse partijen lijkt dan ook eerder te zijn geworteld in zorgen over bredere sociaal-economische veranderingen dan in individuele economische tegenspoed.

Het laatste hoofdstuk van dit proefschrift richt zich op de wijze waarop politieke voorkeuren bepalen hoe individuen nieuwe informatie tot zich nemen. Dit hoofdstuk onderzoekt in hoeverre de noodlottige overstromingen die Duitsland in de zomer van 2021 troffen een effect hebben op voorkeuren ten aanzien van klimaatbeleid. Door gebruik te maken van difference-in-difference modellen wordt vergeleken in hoeverre individuen hun voorkeur ten aanzien van dit type beleid na de overstroming hebben veranderd. Daarbij wordt er gebruik gemaakt van het samenvallen van de overstroming met het veldwerk van de 17de wave van de German Longitual Election Study. De resultaten laten zien dat onder individuen die zichzelf identificeren als aanhangers van Die Grünen, zowel de zorgen omtrent klimaatverandering als de steun voor klimaatbeleid toenemen, terwijl onder aanhangers van andere partijen enkel de zorgen over klimaatverandering toenemen. Uit deze resultaten blijkt dat politieke voorkeur een belangrijke voorspeller is in de wijze waarop nieuwe informatie leidt tot een verandering van beleidsvoorkeuren.

Bovenstaande bevindingen dragen bij aan een beter begrip van de gevolgen van structurele economische veranderingen op de arbeidsmarkt en de wijze waarop dit politieke voorkeuren beïnvloedt. Daarmee levert dit proefschrift ook relevante inzichten op voor beleidsmakers. Voor hen is het essentieel te begrijpen hoe structurele economische veranderingen individuen raken en

hoe beleid eventuele negatieve gevolgen kan verminderen. De bevindingen laten zien dat sociaal investeringsbeleid, zoals trainingsprogramma's, effectief is in het mitigeren van de negatieve arbeidsmarkteffecten van technologische ontwikkelingen. Allereerst helpt dit soort beleid de druk op de onderkant van de arbeidsmarkt te verlichten door individuen van de relevante vaardigheden voor hoogbetaalde banen in de kenniseconomie te voorzien. Daarnaast blijken individuen met breed inzetbare vaardigheden zich minder zorgen te maken over de mogelijk negatieve arbeidsmarkteffecten van beleid dat ten grondslag ligt aan structurele economische veranderingen. Aangezien deze veranderingen veelal welvaart verhogen voor de samenleving als geheel, is het belangrijk voor beleidsmakers oog te houden voor negatieve arbeidsmarkteffecten en individuen te ondersteunen die met deze effecten worden geconfronteerd. In deze context is het tevens belangrijk om aandacht te blijven schenken aan de behoefte aan directe compensatie voor individuen die te maken krijgen met economische tegenspoed.

Toekomstig onderzoek speelt een belangrijke rol om verdere inzichten te verkrijgen in de wijze waarop structurele economische veranderingen individuen raken en wat hiervan het effect is op hun politieke en beleidsvoorkeuren. Daarbij is het met name van belang nader te onderzoeken in welke mate baanverlies leidt tot weerstand tegen specifieke beleidsvoorkeuren of tot een breder gevoel van ongenoegen. In dit kader is het ook relevant te onderzoek in hoeverre sociale zekerheid en arbeidsmarktsituaties de zorgen van individuen ten aanzien van structurele economische veranderingen wegnemen. Onderzoek zou zich hierbij niet enkel moeten richten op de negatieve effecten voor individuen, maar ook het netwerk waarbinnen individuen geworteld zijn in ogenschouw moeten nemen.

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# Curriculum Vitae

Lars van Doorn was born on 7 July 1992 in Alphen aan den Rijn, the Netherlands. Following his bachelor's degree in Political Science from Leiden University, he obtained a master's degree in International Relations (University of Amsterdam) and Economics and Governance (Leiden University, cum laude). His thesis for the latter was nominated for the Daniel Heinsisusprijs (prize for best Master's thesis) by the Nederlandse Kring voor Wetenschap der Politiek (NKWP) and the Flemish Vereniging voor Politieke Wetenschap (VWP). During his master's studies, he was also an intern at the Dutch Central Bank for six months.

In 2018, Lars started working as a teaching/research staff member at the Department of Economics. Together with Olaf van Vliet, he was awarded a grant of 430,000 euros from Instituut Gak to analyse how structural economic changes affect labour markets and social security, enabling him to start as PhD Candidate in 2019. During his PhD, he completed (online) courses at KU Leuven, Tinbergen and the University of Michigan. His research has been presented at both academic (e.g. annual conferences of the American Political Science Association, Council of European Studies, and Midwest Political Science Association) and policy-oriented conferences (e.g. Nederlandse Arbeidsmarktdag and SZW Wetenschapsdag). In addition, Lars spent three months (from March to May 2023) as a visiting scholar at the University of Zurich after receiving grants from the Leids Universitair Fonds and Studiefonds Ketel1. His paper "Wishing for More: Technological Change, the Rise of Involuntary Part-Time Employment and the Role of Active Labour Market Policies", co-authored with Olaf van Vliet, won the Meijers Prize for the best published article from the research programme Reform of Social Legislation in 2024. In the same year, a larger consortium of researchers including Lars and his colleagues from the Department of Economics, Marion Collewet, Ron Diris, Olaf van Vliet, and Hendrik Vrijburg, received a 13 million euros grant from the National Growth Fund by the Dutch Research Council (NWO) to study the socio-economic aspects of the hydrogen transition.

While doing his PhD at Leiden Law School of Leiden University, Lars taught several courses and supervised BSc theses. From 2023 onwards, he is also a team member of the Horizon Europe research project TransEuro-WorkS. His research so far has been published in both Dutch and interna-tional journals as well as edited volumes. As of November 2024, Lars holds a position as Assistant Professor at the Department of Economics of Leiden University.

In the range of books published by the Meijers Research Institute and Graduate School of Leiden Law School, Leiden University, the following titles were published in 2024 and 2025

MI-414    E. Hutten, *Belastingprofessionals onder maatschappelijke druk: Een Nederlandse casestudie naar reacties op BEPS*, (diss. Leiden), Amsterdam: Ipskamp Printing 2024

MI-415    R. Stolk, *Procederende belangenorganisatie in de polder. Een interdisciplinair perspectief op de toegang tot de rechter*, (diss. Leiden), Zutphen: Uitgeverij Paris 2024

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