

IBS WORKING PAPER 03/2026  
JUNE 2026

THE LONG-TERM EFFECTS OF  
UNDEREMPLOYMENT SHOCKS ON  
VOLUNTARY PART-TIME EMPLOYMENT

Maciej Albinowski  
Agata Rozszczypała



# The long-term effects of underemployment shocks on voluntary part-time employment<sup>♦</sup>

Maciej Albinowski<sup>♦</sup>

Agata Rozszczypała<sup>♣</sup>

## Abstract

This paper examines the long-term effects of underemployment shocks on part-time employment, with a particular focus on voluntary part-time work. We use regional datasets for the European Union and the United States covering the period 2006-2019. Our empirical strategy combines a difference-in-differences framework with a shift-share instrument for underemployment shocks. In the EU, underemployment shocks are driven not only by an increase in part-time employment, but also by a decrease in the share of part-time employees who are satisfied with their working hours. Underemployment shocks have persistent effects, including a lasting negative impact on voluntary part-time employment. A one percentage point increase in the underemployment rate leads to a voluntary part-time employment rate that is 0.28 percentage points lower five years later. These effects are particularly pronounced among non-tertiary-educated women and in Western Europe. In Central and Eastern Europe, as well as in the US, we do not find statistically significant negative long-term effects of underemployment shocks on voluntary part-time employment.

Keywords: Underemployment, Involuntary part-time employment, Voluntary part-time employment

JEL: J22, J21, C26

---

<sup>♦</sup> We thank Piotr Lewandowski and Iga Magda for their helpful comments. This paper uses Eurostat data. Eurostat bears no responsibility for the results and the conclusions, which are those of the authors. The usual disclaimers apply. This research was funded in whole by the National Science Centre, Poland (grant No. 2024/53/B/HS4/03007).

<sup>♦</sup> Institute for Structural Research (IBS), Warsaw. E-mail: maciej.albinowski@ibs.org.pl

<sup>♣</sup> Institute for Structural Research (IBS), and SGH Warsaw School of Economics. E-mail: agata.rozszczypala@ibs.org.pl

## 1. Introduction

Following the global financial crisis, many developed countries experienced a substantial rise in involuntary part-time employment. This increase may reflect not only cyclical factors, but also structural ones, as the expansion of certain sectors appears to account for a substantial part of the rise in underemployment among part-time workers (MacDonald, 2019; Valletta et al., 2020). An increase in underemployment may enable employers to adjust working hours more flexibly to changes in labour demand, in particular by absorbing negative demand shocks without terminating employment contracts. At the same time, rising underemployment has adverse consequences for affected part-time workers and may also reduce wage growth among full-time employees (Bell and Blanchflower, 2021). Underemployment shocks may also influence preferences for part-time employment in the long run, yet this channel remains unexplored in the literature.

Previous research shows that the nature of underemployment shocks may differ across institutional settings. Evidence from the US and the UK points to an adjustment pattern in which involuntary part-time employment is largely driven by transitions between full-time and part-time work within the same employer (Borowczyk-Martins and Lalé, 2019). Evidence for Germany, a country with relatively strong employment protection, suggests that underemployment may be driven by mechanisms other than within-firm cuts in working hours (Markefke and Müller-Rehm, 2024). In particular, already employed part-time workers become more likely to prefer full-time work in downturns, an “added hours effect”. Furthermore, job seekers become more willing to accept part-time jobs despite preferring full-time positions, a “reservation hours effect”.

The existing evidence on the relationship between underemployment and voluntary part-time employment is limited across three dimensions. First, there has been no research on the effects of increased underemployment on voluntary part-time employment over the long run. Second, the in-depth analyses of underemployment shocks have focused on a small group of countries. Third, little is known about the heterogeneity across socio-demographic groups. For the German case, women are found to exhibit stronger added hours effects than men (Markefke and Müller-Rehm, 2024). In a multi-country setting, MacDonald (2019) documents differences in the incidence of underemployment across detailed socio-demographic groups.

In this paper, we examine the long-term impact of underemployment shocks on the prevalence of part-time employment and voluntary part-time employment. On the one hand, underemployment shocks may decrease preferences for part-time employment as full-time positions become relatively more attractive. In particular, an increased difficulty of switching from part-time employment to full-time employment may motivate employees to secure a full-time position. On the other hand, a higher prevalence of part-time employment could change social norms regarding working hours. Some workers may reconsider part-time employment as less inconsistent with prevailing norms. The limited existing evidence suggests that working hours of peers affect one’s own working-hour preferences (Collewet et al., 2017; Grodner and Kniesner, 2008). The actual direction and size of the impact of underemployment on preferences for part-time employment remain open empirical questions.

Our analysis draws on a rich regional dataset covering 184 regions from 27 EU countries over the period 2006-2019. We also conduct a parallel analysis for the US, though differences in data availability prevent full comparability of the results. We exploit considerable variation in underemployment shocks across regions within countries. Our difference-in-differences approach utilises a shift-share instrument based on regional sectoral employment structures. Our preferred specification examines the impact of a one-year change in underemployment on the six-year change in the prevalence of part-time employment and voluntary part-time employment.

We find that underemployment shocks in the EU are quite persistent, with around 58% of an increase in the underemployment rate still visible five years after the shock. However, in line with evidence from Germany (Markefke and Müller-Rehm, 2024), an increase in underemployment is only partially reflected in higher part-time employment. Around 48% of the increase in underemployment is associated with a decline in voluntary part-time employment, that is, part-time employment among workers who do not wish to work more hours. Moreover, the negative effect of underemployment shocks on voluntary part-time employment is long-lasting. A one percentage point increase in the underemployment rate is associated with a voluntary part-time employment rate that remains 0.28 percentage points lower five years later.

Heterogeneity in the effects of underemployment shocks is pronounced both across socio-demographic groups and across institutional settings. Within the EU, the negative effects on voluntary part-time employment are concentrated mainly among women without tertiary education. This pattern is found in both Southern Europe and Western and Northern Europe. In these regions, the prevalence of voluntary part-time employment is high, and underemployment shocks are, to a larger extent, driven by the changes in working-hour preferences among part-time workers. In Central and Eastern Europe, by contrast, underemployment shocks are more fully reflected in higher part-time employment, while long-term negative effects on voluntary part-time employment are weak and statistically insignificant. The US exhibits a pattern similar to that of Central and Eastern Europe, although the more restrictive definition of underemployment in US data may understate the role of changing working-hour preferences.

In the next section, we outline our empirical strategy. In Section 3, we introduce our data and present descriptive evidence on the incidence of underemployment. In Section 4, we report our econometric results, together with the results of the robustness analysis. In Section 5, we conclude.

## 2. Empirical strategy

We conduct a difference-in-differences analysis to examine the long-term effects of underemployment shocks. Our identification strategy exploits variation in underemployment across regions. Formally, we estimate the following 2SLS model:

$$\Delta y_{r,d,t+k,t} = \beta_1 \widehat{\Delta UR}_{r,d,t+1,t} + \beta_2 \Delta GDP_{r,d,t+1,t} + \rho_{c,d,t} + \epsilon_{r,d,t+k,t} \quad (1)$$

where  $y_{r,d,t}$  is either the underemployment rate, the part-time employment rate, the voluntary part-time employment rate, or average hours worked among part-time employees. All rates are defined as shares of total employment in region  $r$ , demographic group  $d$ , and year  $t$ .  $UR$  stands for the underemployment rate,  $GDP$  is the logarithm of real regional GDP, and  $\rho$  represents country-demographic group-year fixed effects.

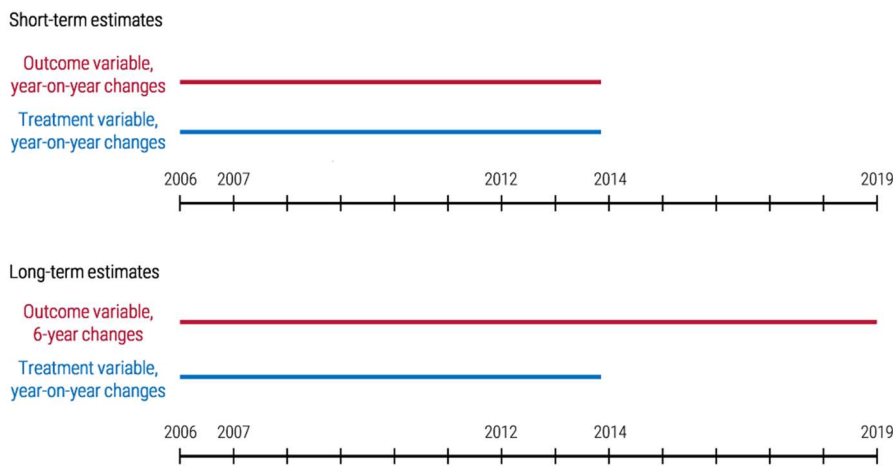
While part-time and voluntary part-time employment rates are our main outcome variables, we also examine average hours worked among part-time employees to better understand the nature of underemployment shocks. If higher underemployment is associated with lower average hours among part-time employees, this may indicate that some workers who were previously employed on a voluntary part-time basis had their hours reduced below their preferred level and consequently became underemployed.

To address potential endogeneity concerns, we use a shift-share instrument for underemployment shocks. The instrument combines predetermined local sectoral exposure with sector-specific changes in underemployment in other regions. For each economic sector, we compute the leave-one-out average change in underemployment of a given socio-demographic group among all other regions in the same country. We then weight these sector-specific shocks by the sector's pre-period employment share in the demographic group and region of interest, measured as the average share over 2004-2005, and sum them across sectors. This yields an instrument that

reflects the region's predetermined sectoral exposure, while the shocks themselves are measured outside the region of interest. For EU countries consisting of only one NUTS 2 region, we construct an instrument using underemployment changes in all other EU countries.

We consider two dynamic specifications. In the first one, parameter  $k$  is set to 1, so we estimate the relationship between a one-year change in underemployment and the contemporaneous change in an outcome variable. This specification does not have a causal interpretation, but it helps characterise the contemporaneous relationship between underemployment and the outcome variable in a given sample. In our main specification,  $k$  is set to 6, which allows us to examine the longer-term impact of a one-year underemployment shock on part-time employment and its voluntary component. The basic comparison between the two dynamic specifications is depicted in Figure 1. In each specification, we control for a one-year change in real GDP, measured over the same period as the change in underemployment. Note that later changes in real GDP would be endogenous as these would reflect potential changes in voluntary part-time employment induced by underemployment shocks.

**Figure 1. Structure of the short-term and long-term specifications**



A crucial identifying assumption is that trends in the outcome variables would be similar in regions exposed to higher and lower underemployment shocks if these shocks had not occurred. To assess this parallel trends assumption, we estimate an additional specification in which instrumented lead values of underemployment changes are included as regressors (Angrist and Pischke, 2009). For the specification with  $k = 1$ , we add  $\widehat{\Delta UR}_{r,d,t+3,t+2}$ , while for  $k = 6$ , we add  $\widehat{\Delta UR}_{r,d,t+8,t+7}$ . If these lead values were statistically significant predictors of the outcomes measured earlier in time, this would point to pre-existing differential trends invalidating our empirical strategy.

### 3. Data and descriptive evidence

#### 3.1. Data

The analysis uses European Union Labour Force Survey (EU-LFS) microdata for the EU and Basic Monthly Current Population Survey (CPS) microdata for the US, covering the period 2006–2022. The two datasets are processed in parallel but are not pooled; all analyses are conducted separately for the EU and the US. Data for the years 2020–2022 are used only in a robustness check utilising lead values of underemployment changes.

We focus on employed individuals aged 25-54. Employment is defined consistently across datasets to include both individuals at work and those with a job but temporarily absent during the reference week. We distinguish four socio-demographic groups defined by gender and completion of tertiary education.

For the EU, the data are aggregated at the NUTS 2 regional level (184 regions<sup>1</sup>), with regional definitions harmonised over time to ensure consistency despite changes in coding and boundaries. For the US, a comparable panel is constructed at the state level. All variables are aggregated to the region (NUTS2/state) × demographic group × year level using survey weights. The weights for region × demographic group cells reflect employment levels, measured as the average number of employed individuals in a given socio-demographic group across all years.

Industry classifications are harmonised across time and between the two datasets. For the EU, economic activity is mapped to a common set of broad sectors consistent across the NACE Rev. 1 and Rev. 2 transition. For the US, Census industry codes (NAICS-based) are collapsed into equivalent broad classifications. These classifications are collapsed into a common set of 13 broad sectors, from which agriculture is excluded, yielding 12 harmonised industry groups used in the analysis. In both datasets, individuals employed in teaching occupations are also excluded to improve the comparability of working-time measures.

Working time is measured using hours worked in all jobs. In the EU-LFS, total weekly hours are constructed by combining usual hours worked in the main job with hours worked in a second job, when applicable. We primarily rely on usual hours worked, which provide a more stable measure of working time, and supplement them with actual hours worked in the reference week when usual hours are missing. In the CPS, usual hours worked at all jobs are used as the primary measure, supplemented by actual hours for individuals reporting variable hours.

Part-time employment is defined as working fewer than 35 hours per week across all jobs. This threshold is applied consistently in both datasets. In the EU-LFS, when total hours cannot be directly constructed, self-reported full-time/part-time status is used to refine classification. Observations with unresolved part-time status are excluded. Similarly, in the CPS, additional information on labour force status is used to refine classification: individuals who report working part-time but indicate that their full-time work week is below 35 hours are reclassified as full-time.

Underemployment is defined using measures that are adapted to the information available in each dataset. The EU-LFS allows for different definitions of this variable, based either on the declared number of preferred working hours or on the reason for part-time employment. In our preferred approach, underemployed individuals are those part-time employees who would like to increase their working time (similarly to Lewandowski and Szymczak, 2024 and Van Doorn and Van Vliet, 2024). Conversely, voluntary part-time workers are those who do not report such a desire. For the robustness analysis, we also consider two alternative definitions. First, we use the Eurostat definition by adding a condition that an individual must be available to work more hours within two weeks. Second, we define underemployed individuals using the Eurostat definition of involuntary part-time employment, namely as those who report working part-time because they could not find a full-time job.

In the CPS data, underemployment corresponds to involuntary part-time employment as defined by the U.S. Bureau of Labor Statistics, based on reported economic reasons for working part-time, specifically “slack work or business conditions” or “could only find part-time work.” This definition is broader than the involuntary part-time employment in the EU-LFS data, where respondents cannot choose the option “slack work or business

---

<sup>1</sup> For the EU, we exclude from the sample the 10 regions where the number of employed individuals in any year is fewer than 20 for any of the four socio-demographic groups. Furthermore, we assess the consistency of year-to-year changes in part-time employment and underemployment. In all cases, large year-to-year divergences in part-time employment or underemployment are associated with sharp contractions in overall employment.

conditions". Instead, such cases may be partly captured by the sizable residual "other" category, which includes respondents who do not select any of the listed personal reasons for part-time work. Importantly, the US definition of underemployment is unlikely to capture part-time employees who would prefer to work more hours but have not been actively looking for a full-time position. Furthermore, our preferred measure for the EU captures a broader notion of hours constraints, including individuals who would prefer to work moderately longer hours (e.g. from 20 to 30 hours per week). These differences should be kept in mind when comparing the results for the US and the EU.

The analysis also considers average hours worked among part-time employees as an outcome variable, which can only be calculated when a region-year-demographic group cell contains a sufficient number of part-time workers. Consequently, a small number of observations are excluded from the estimation sample because average hours among part-time workers cannot be reliably computed. Such cases are concentrated in groups and countries where part-time employment is virtually absent, most notably among tertiary-educated men in Bulgaria and, to a lesser extent, in Czechia, Romania, Slovakia, and Germany. To ensure a common estimation sample across specifications, observations with missing values for any variable included in the regressions are excluded. This explains the modest differences in the number of observations across socio-demographic groups reported in the regression tables.

Finally, to account for macroeconomic conditions, we control for real GDP at the regional level. For the EU, regional GDP data are obtained from Eurostat, while for the US, they come from the Bureau of Economic Analysis. GDP is indexed and enters the regressions in logarithmic form.

### **3.2. Descriptive statistics**

Underemployment in the EU is non-negligible and exhibits substantial heterogeneity across socio-demographic groups (Table 1). On average, it accounts for around 4.6% of total employment, but reaches 8.5% among non-tertiary-educated women, compared to 1.9% among tertiary-educated men. This pattern mirrors the distribution of part-time work, which is strongly concentrated among women, especially those without tertiary education. Voluntary part-time employment constitutes the majority of part-time work, particularly among women (around 75% for both tertiary- and non-tertiary-educated), while it is less prevalent among men. Regional dispersion is also substantial, particularly among women. For non-tertiary-educated women, the interquartile range of regional underemployment rates extends from approximately 3.8% to over 12%. This cross-regional dispersion is even wider for part-time employment and its voluntary component.

**Table 1. Descriptive statistics**

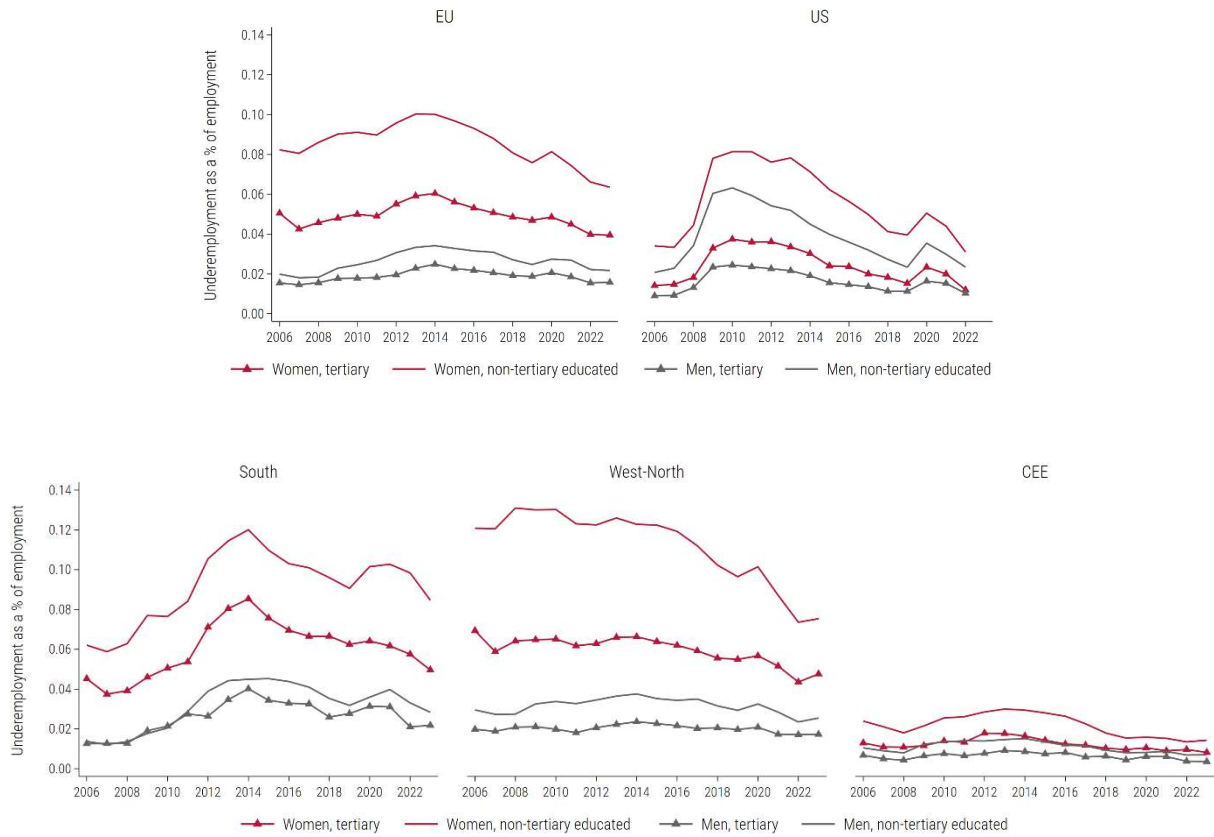
	Women		Men		All
	Tertiary	Non-tertiary	Tertiary	Non-tertiary	
<b>EU</b>					
Share of part-time employment	0.225	0.334	0.059	0.066	0.169
p25 of part-time employment	0.111	0.120	0.036	0.036	0.050
p75 of part-time employment	0.304	0.500	0.074	0.086	0.272
Share of voluntary part-time employment	0.175	0.249	0.040	0.039	0.123
p25 of voluntary part-time employment	0.075	0.076	0.020	0.017	0.028
p75 of voluntary part-time employment	0.254	0.407	0.052	0.053	0.172
Share of underemployment	0.049	0.085	0.019	0.026	0.046
p25 of underemployment	0.024	0.038	0.009	0.012	0.015
p75 of underemployment	0.069	0.124	0.027	0.035	0.061
Observations			3 278		13 112

*Notes: The table reports descriptive statistics for EU regions aggregated at the region × demographic group × year level, with weights reflecting employment levels, measured as the average number of employed individuals in a given socio-demographic group across all years.*

Underemployment in the EU shows a clear and persistent gender gradient over time, with underemployment levels being systematically higher for women than for men (Figure 2). Differences by education are also apparent, but within gender groups. Underemployment evolves relatively smoothly in the EU, peaking in 2013 and 2014 in the aftermath of the European debt crisis across all socio-demographic groups, but most notably among non-tertiary-educated women. However, these aggregate EU trends mask a stark geographic divide: both Southern and Western and Northern European countries exhibit substantially higher levels of underemployment than their counterparts in Central and Eastern Europe.

The patterns across socio-demographic groups remain broadly consistent in general in the EU: non-tertiary-educated women experience the highest levels of underemployment, while tertiary-educated men experience the lowest. However, in CEE, tertiary-educated women and non-tertiary-educated men exhibit very similar levels for most of the sample period, with a divergence emerging only at the peak of underemployment, when women's rates temporarily exceed those of men. In the South, differences between non-tertiary- and tertiary-educated men only began to appear after 2012, when underemployment rose rapidly, and this gap has persisted ever since. The dynamics also differ between regions: in Western and Northern Europe, non-tertiary-educated women show the most pronounced trend with a peak of around 13%, followed by a substantial decline after 2014, while in Southern Europe, underemployment increased across all groups during the debt crisis and rose again for non-tertiary-educated women during the COVID-19 crisis.

Figure 2. Underemployment as a share of total employment in the EU (Southern, Western and Northern, and CEE) and the US, by socio-demographic group



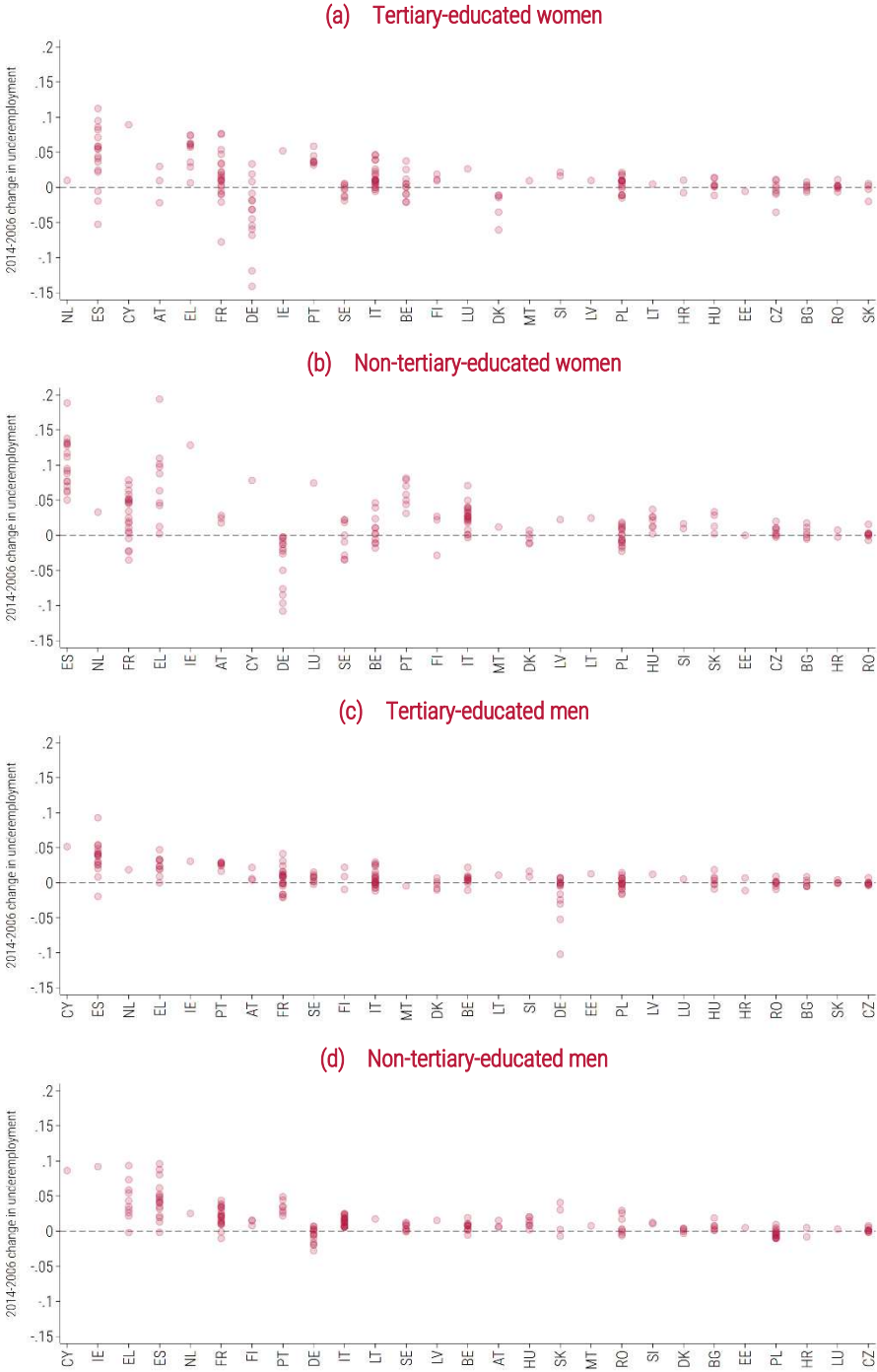
Note: The data are aggregated using weights reflecting average employment levels. Source: EU-LFS and CPS data.

Compared with the EU, the United States has lower underemployment on average over time (Figure 2). In the US, underemployment varies primarily by education: non-tertiary-educated workers show higher underemployment than their tertiary-educated counterparts, in contrast to the more gendered patterns in the EU. Time patterns are also more cyclical in the US, with underemployment rising sharply during the Great Recession, declining during the subsequent expansion, and increasing again during the COVID-19 pandemic.

Our identification strategy exploits the substantial within-country regional variation in underemployment shocks across EU NUTS 2 regions (Figure 3). Focusing on changes between 2006 and 2014, non-tertiary-educated women (Panel b) exhibit the largest dispersion in underemployment. In Spain, for example, changes in their underemployment between regions range from just above 5 to nearly 19 percentage points, with similarly wide within-country ranges in France and Greece. Tertiary-educated women (Panel a) display a broadly similar pattern, though with smaller variation overall, except for an even more pronounced variation in Spain and Germany.

For men, both tertiary-educated (Panel c) and non-tertiary-educated (Panel d), regional variation is more moderate, but remains meaningful, with ranges exceeding 5 percentage points in several countries. As across all groups, their underemployment variation is larger in Southern and Western and Northern European countries than in Central and Eastern Europe.

Figure 3. Within-country regional variation in changes in underemployment between 2006 and 2014, by socio-demographic group, EU sample

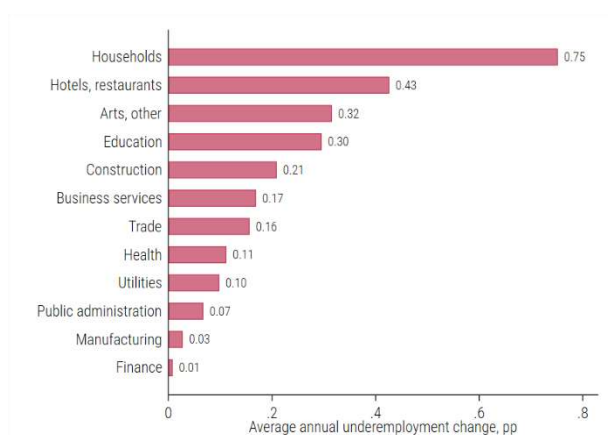


Notes: Each point represents a NUTS 2 region. Countries are ordered by underemployment levels in 2014. For Denmark and Croatia, the baseline year is 2007, and for Malta, it is 2009, due to data availability. Source: own elaboration based on EU-LFS.

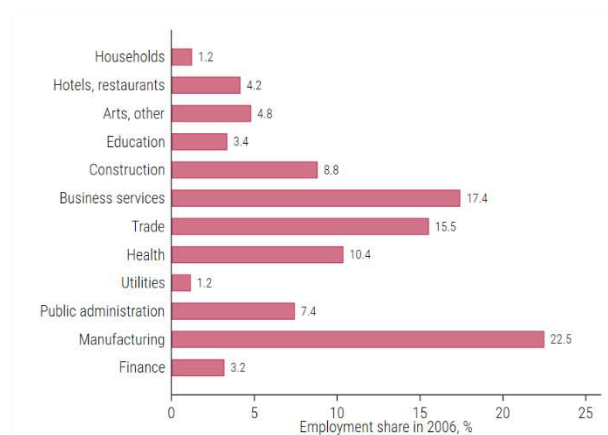
We observe clear sectoral patterns in increases in underemployment, which we exploit in constructing our instrument for underemployment shocks. Over the period 2006-2014, the increase in the underemployment rate was negligible in manufacturing and in the financial sector (Figure 4). By contrast, large increases were observed in hotels and restaurants (0.43 pp annually) and in arts and other services (0.32 pp). The largest

increase in the underemployment rate was recorded in the sector of households acting as employers. However, its share in total employment was very low, amounting to 1.2% in 2006 (Figure 5).

**Figure 4. Average annual change in underemployment rate, 2006–2014, EU sample**



**Figure 5. Sectoral shares in total employment in 2006, EU sample**



Source: own elaboration based on EU-LFS.

## 4. Results

In this section, we report our econometric results. Subsection 4.1 focuses on the main results for the EU sample. Subsection 4.2 compares the effects of underemployment shocks across three institutional settings: Western Europe, Central and Eastern Europe, and the US. Subsection 4.3 reports the results of robustness checks.

### 4.1. Main results

We begin by documenting the persistence of underemployment. More than half of the one-year underemployment shock, identified with our shift-share instrument, remains after five years (0.58 in the preferred specification, Table 2, Panel A, column 4). This suggests that the identified shocks capture sustained changes in labour market conditions rather than short-lived cyclical fluctuations. Importantly, the regional persistence of underemployment is much lower than it might be concluded without controlling for country-year-demographic group fixed effects (column 3).

Underemployment shocks are only partially reflected in higher part-time employment rate. In the short run, around 52% of a one-year increase in underemployment translates into a higher part-time employment rate (Table 2, Panel B, column 2). This effect is persistent: even five years after the initial shock, about 0.29 of the initial 0.52 increase remains (column 4), implying that over half of the initial rise in part-time employment rate persists over five years within a given region and demographic group.

Underemployment shocks are consistently associated with declines in voluntary part-time employment, both in the short and in the long run. The short-run coefficient is  $-0.48$  (Table 2, Panel C, column 2) and remains negative and statistically significant at  $-0.28$  even five years after the shock (column 4). Overall, the long-term effect on voluntary part-time employment is more persistent than the effect on the part-time employment rate. These results suggest a long-lasting compositional shift within part-time employment, resulting in a lower share of part-time workers satisfied with their working hours.

An increase in underemployment accompanied by a decline in voluntary part-time employment may reflect several mechanisms. Markefke and Müller-Rehm (2024) emphasise that part-time employees who were

previously satisfied with their hours may become more likely to prefer longer working hours. Another possibility is that some previously satisfied part-time employees experience reductions in working hours, which may move them into underemployment. To assess the potential importance of this adjustment channel, we examine the log of average hours worked among part-time employees as an additional dependent variable.

**Table 2. Main results for the EU sample**

	(1)	(2)	(3)	(4)
	$\Delta Y(t+1, t)$		$\Delta Y(t+6, t)$	
<b>Panel A: Underemployment share</b>				
$\Delta$ Underempl share (t+1, t)			1.945** (0.708)	0.575*** (0.064)
<b>Panel B: Part-time employment share</b>				
$\Delta$ Underempl share (t+1, t)	0.524* (0.226)	0.516*** (0.070)	1.308** (0.444)	0.292*** (0.079)
<b>Panel C: Voluntary part-time employment share</b>				
$\Delta$ Underempl share (t+1, t)	-0.476* (0.226)	-0.484*** (0.070)	-0.637 (0.409)	-0.283*** (0.078)
<b>Panel D: Log of average hours worked among part-time workers</b>				
$\Delta$ Underempl share (t+1, t)	-0.676 (0.362)	-0.658*** (0.181)	-1.553 (0.925)	-0.225 (0.164)
Country×Year×Group FE?	NO	YES	NO	YES
$\Delta$ GDP (t+1, t)	NO	YES	NO	YES
Kleibergen–Paap F-stat.	24.7	177.4	24.7	177.4
No. of observations	5664		5664	

*Note:* This table reports 2SLS estimates of the effects of underemployment shocks on different employment outcomes. Panel A reports results for the underemployment rate, panel B for the part-time employment rate, panel C for the voluntary part-time employment rate (all representing shares in total employment), and panel D for the logarithm of average hours worked among part-time employees. The main explanatory variable is the one-year change in the underemployment rate, instrumented using the regional sectoral employment structure, while all dependent variables are expressed either as first differences over one year (columns 1-2) or over six years (columns 3-4). Columns 2 and 4 include country × year × socio-demographic group fixed effects, and additionally control for changes in log real GDP. Standard errors clustered at the country-year level are reported in parentheses. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

*Source:* Own estimations based on EU-LFS and Eurostat data.

However, we find limited evidence of economically meaningful adjustments along the intensive margin. Average hours worked among part-time workers decline in the short run, with the coefficient at  $-0.66$  (Table 2, Panel D, column 2). Interpreted in percentage terms, this corresponds to a reduction of roughly 0.66% in hours for a 1-percentage-point increase in underemployment. For a baseline of around 22.3 weekly hours, this implies a decrease of around 0.15 hours, i.e. only 9 minutes per week. Even these minor effects become statistically insignificant in the long-term (Table 2, Panel D, column 4). This suggests that changes in hours worked among part-time workers are not the primary margin of adjustment following underemployment shocks.

Heterogeneity across socio-demographic groups is pronounced, with the strongest differences running along educational lines and, within the non-tertiary educated population, along gender lines. The negative relationship between underemployment shocks and voluntary part-time employment is concentrated among non-tertiary-educated individuals, while the effect is statistically insignificant for both tertiary-educated women and men in the long run (Table 3, Panel C, columns 2 and 6). Within the non-tertiary-educated population, the effect is substantially stronger for women: a one-percentage-point increase in underemployment is associated with a 0.58 pp decline in voluntary part-time employment in the short run (Panel C, column 3), compared to 0.31 pp for non-tertiary-educated men (Panel C, column 7). For non-tertiary-educated women, this effect remains large

in the long run at -0.41 pp (Panel C, column 4), while for men it is reduced to a third and becomes statistically insignificant.

**Table 3. Results for the EU sample across socio-demographic groups, EU sample**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Women				Men			
	Tertiary-educated		Non-tertiary-educated		Tertiary-educated		Non-tertiary-educated	
	$\Delta Y(t+1, t)$	$\Delta Y(t+6, t)$	$\Delta Y(t+1, t)$	$\Delta Y(t+6, t)$	$\Delta Y(t+1, t)$	$\Delta Y(t+6, t)$	$\Delta Y(t+1, t)$	$\Delta Y(t+6, t)$
<b>Panel A: Underemployment</b>								
$\Delta$ Underempl share (t+1, t)		0.578*** (0.116)		0.587*** (0.092)		0.495*** (0.100)		0.546*** (0.126)
<b>Panel B: Part-time employment share</b>								
$\Delta$ Underempl share (t+1, t)	0.558*** (0.128)	0.424** (0.132)	0.419*** (0.114)	0.175 (0.112)	0.828*** (0.173)	0.346 (0.212)	0.689*** (0.095)	0.438* (0.172)
<b>Panel C: Voluntary part-time employment share</b>								
$\Delta$ Underempl share (t+1, t)	-0.442*** (0.128)	-0.154 (0.133)	-0.581*** (0.114)	-0.412*** (0.123)	-0.172 (0.173)	-0.149 (0.169)	-0.311** (0.095)	-0.108 (0.129)
<b>Panel D: Log of average hours worked among part-time workers</b>								
$\Delta$ Underempl share (t+1, t)	-1.095*** (0.296)	-0.085 (0.236)	-0.369* (0.148)	-0.357* (0.155)	-1.218 (1.812)	-0.411 (1.597)	-0.599 (0.798)	0.173 (0.775)
Kleibergen–Paap F-stat.	84.6		100.7		46.3		56.8	
No. of observations	1420		1438		1368		1438	

*Note: This table reports 2SLS estimates of the effects of underemployment shocks on different employment outcomes, estimated separately for four socio-demographic groups defined by gender and educational attainment. Panel A reports results for the underemployment rate, panel B for the part-time employment rate, panel C for the voluntary part-time employment rate (all representing shares in total employment), and panel D for the logarithm of average hours worked among part-time employees. The main explanatory variable is the one-year change in the underemployment rate, instrumented using the regional sectoral employment structure, while all dependent variables are expressed either as first differences over one year (columns 1, 3, 5, 7) or over six years (columns 2, 4, 6, 8). All specifications include country  $\times$  year fixed effects and regional GDP growth, as specified in equation (1). Standard errors clustered at the country-year level are reported in parentheses. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ . Source: Own estimations based on EU-LFS and Eurostat data.*

To shed light on the long-term negative effects on voluntary part-time employment among non-tertiary educated women, we examine whether they can be explained by negative income shocks associated with underemployment shocks. First, we compare our main specification (columns 2 and 5, Table 4) with a specification that does not include the regional change in GDP growth (columns 1 and 4). The inclusion of GDP growth has virtually no effect on the coefficients of interest, suggesting that the relationship between underemployment shocks and voluntary part-time employment is not driven by changes in overall economic activity in the region.

Next, we consider the possibility that underemployment shocks among non-tertiary-educated women may coincide with a decrease in the employment of their partners, resulting in a negative income shock at the household level that might induce a long-lasting decrease in voluntary part-time employment. To verify this channel, we additionally control for the change in the share of non-tertiary-educated men in the population who are in full-time employment. This change is calculated for the same period as the change in the outcome variable. Adding this control variable does not change the coefficient for the one-year change in voluntary part-time employment and has minimal impact on the coefficient for the six-year change, reducing it from -0.41 to -0.40 (column 6). For symmetry, we conduct an analogous exercise to investigate changes in voluntary part-

time employment of non-tertiary-educated men (Table 4, Panel B), and we find no evidence to support the hypothesis that a decrease in voluntary part-time employment can be explained by income effects.

**Table 4. The role of income effects in explaining the long-term effects of underemployment shocks on voluntary part-time employment, EU sample**

	(1)	(2)	(3)	(4)	(5)	(6)
		$\Delta Y(t+1, t)$			$\Delta Y(t+6, t)$	
<b>Panel A: Non-tertiary-educated women</b>						
$\Delta$ Underempr share (t+1, t)	-0.582*** (0.115)	-0.581*** (0.114)	-0.582*** (0.110)	-0.412*** (0.123)	-0.412*** (0.123)	-0.400*** (0.118)
<b>Panel B: Non-tertiary-educated men</b>						
$\Delta$ Underempr share (t+1, t)	-0.311** (0.095)	-0.311** (0.095)	-0.312*** (0.095)	-0.108 (0.128)	-0.108 (0.129)	-0.106 (0.128)
$\Delta$ GDP (t+1, t)	NO	YES	YES	NO	YES	YES
$\Delta$ Full-time employment rate, opposite gender (t+1, t)	NO	NO	YES	NO	NO	NO
$\Delta$ Full-time employment rate, opposite gender (t+6, t)	NO	NO	NO	NO	NO	YES
No. of observations		1438			1438	

*Note: This table reports 2SLS estimates of the effects of underemployment shocks on voluntary part-time employment, estimated separately for non-tertiary-educated women (Panel A) and non-tertiary-educated men (Panel B). The main explanatory variable is the one-year change in the underemployment rate, instrumented using the regional sectoral employment structure. Regressions reported in columns 1 and 4 do not include GDP growth as a control variable. Regressions in columns 3 and 6 include the change in the full-time employment rate calculated for non-tertiary-educated people of the opposite gender. All specifications include country  $\times$  year fixed effects. Standard errors clustered at the country-year level are reported in parentheses. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ . Source: Own estimations based on EU-LFS and Eurostat data*

## 4.2. Heterogeneities across institutional settings

In this subsection, we compare the characteristics and effects of underemployment shocks across four distinct institutional settings: Southern Europe, Western and Northern Europe, Central and Eastern Europe, and the US. Western and Northern Europe is characterised by the highest prevalence of voluntary part-time employment, particularly among women, alongside comparatively high levels of unionisation and employment protection. Southern Europe also exhibits relatively high rates of voluntary part-time employment, although these coexist with stronger labour-market segmentation, including a sharper divide between stable employment and less secure temporary or seasonal work. Central and Eastern Europe, in turn, is characterised by a low prevalence of voluntary part-time employment and low union density. The US features the most flexible labour market institutions among the four regions and moderate levels of voluntary part-time employment.

The characteristics of underemployment shocks display similarities between Southern Europe and Western and Northern Europe, as well as between Central and Eastern Europe and the US. In Southern Europe, only 43% of an underemployment increase translates into a higher part-time employment rate (Table 5, Panel B, column 1), and in Western and Northern Europe, it is 54% (column 2). These results contrast with much higher coefficients for Central and Eastern Europe (84%, column 3) and for the US (90%, column 4). These differences can be linked to institutional features. High levels of voluntary part-time employment in Western and Northern Europe and Southern Europe mean that changes in working-hour preferences among part-time employees (an added hours effect) may account for a large part of changes in underemployment. Furthermore, greater labour market flexibility in the US allows employers to adjust working hours to market conditions to a greater extent than in Europe. Importantly, the added hours effect might be larger in the US if underemployment were defined, in line

with the European measure, by whether workers wish to work more hours rather than by economic reasons for part-time employment.

**Table 5. Main results across different institutional settings**

	(1) Southern Europe	(2) Western and Northern Europe	(3) Central and Eastern Europe	(4) United States	(5) Southern Europe	(6) Western and Northern Europe	(7) Central and Eastern Europe	(8) United States
<b>Panel A: Underemployment</b>								
Δ Underempl share (t+1, t)					0.553*** (0.162)	0.581*** (0.057)	0.541*** (0.088)	0.601** (0.204)
<b>Panel B: Part-time employment share</b>								
Δ Underempl share (t+1, t)	0.434*** (0.127)	0.535*** (0.087)	0.835*** (0.101)	0.901*** (0.096)	0.241 (0.153)	0.287** (0.096)	0.681*** (0.179)	0.543* (0.241)
<b>Panel C: Voluntary part-time employment share</b>								
Δ Underempl share (t+1, t)	-0.566*** (0.127)	-0.465*** (0.087)	-0.165 (0.101)	-0.099 (0.096)	-0.312** (0.111)	-0.294** (0.108)	0.060 (0.147)	-0.058 (0.134)
<b>Panel D: Log of average hours worked among part-time workers</b>								
Δ Underempl share (t+1, t)	-0.848** (0.301)	-0.625** (0.214)	-0.079 (1.224)	0.640 (0.652)	0.073 (0.167)	-0.484** (0.158)	0.491 (1.043)	0.302 (0.679)
K-P F-stat.	91	179.7	103	28.1	91	179.7	103	28.1
No. of observations	1811	2152	1701	1632	1811	2152	1701	1632

*Note: This table reports 2SLS estimates of the effects of underemployment shocks on different employment outcomes, estimated separately for four institutional settings. All dependent variables are expressed either as first differences over one year (columns 1–4) or over six years (columns 5–8). All specifications include country × year fixed effects and regional GDP growth, as specified in equation (1). Standard errors clustered at the country-year level are reported in parentheses. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .*

*Source: Own estimations based on EU-LFS and Eurostat data.*

The long-term effects of underemployment shocks are similarly clustered across institutional settings. The increase in the part-time employment rate following an underemployment shock is very persistent in Central and Eastern Europe and also remains substantial in the US, in contrast to Southern Europe and Western and Northern Europe (Table 5, Panel B). In Central and Eastern Europe, a one percentage point increase in underemployment is associated with a part-time employment rate that remains 0.68 pp higher five years later, compared with only 0.29 pp in Western and Northern Europe, and 0.24 pp in Southern Europe. For voluntary part-time employment, long-term negative effects are very similar in Southern Europe and in Western and Northern Europe, while the coefficients for Central and Eastern Europe and the US are close to zero (Panel C, columns 5-8). Northern and Western Europe is the only economic area with negative effects on average hours worked among part-time employees, although these effects are not economically significant.

The patterns of heterogeneity across socio-demographic groups are also setting-specific. Negative long-term effects on voluntary part-time employment are observed only among non-tertiary-educated women in Southern Europe and Western and Northern Europe, with respective coefficients of -0.53 pp and -0.40 pp (Figure 6). For Central and Eastern Europe, this coefficient is even positive, but not statistically significant (0.24 pp, p-value=0.26). In two regions, we also observe negative, albeit non-significant, long-term effects on voluntary part-time employment of non-tertiary-educated men: in Western and Northern Europe (-0.19 pp, p-value=0.17) and in the US (-0.22 pp, p-value=0.30). Overall, the difference between the effects of underemployment shocks among non-tertiary-educated men and women appears to be smaller in Western and Northern Europe than in Southern Europe.

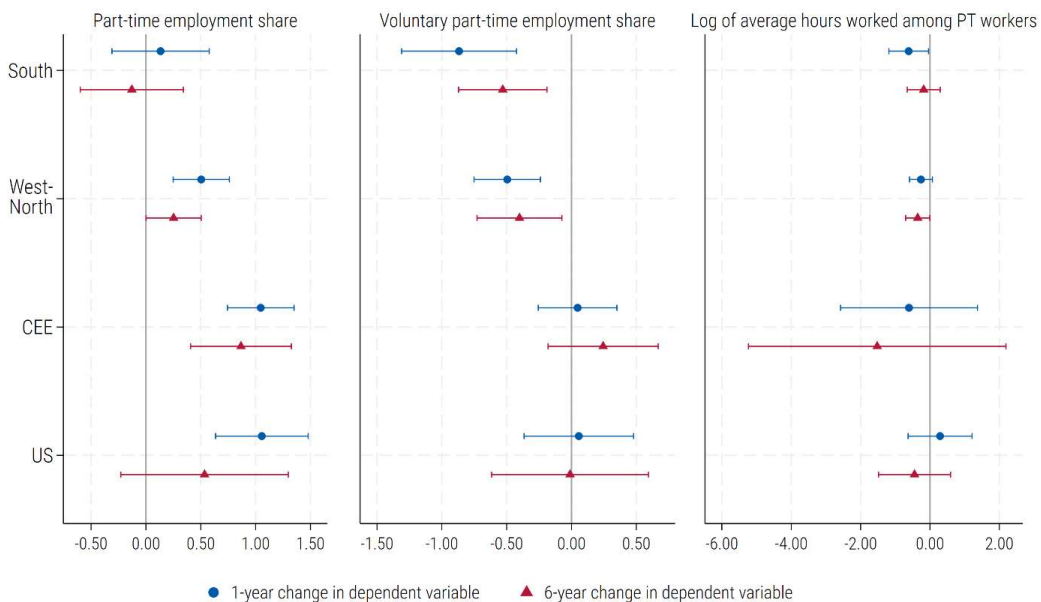
Tertiary-educated women are the only group for which underemployment shocks are associated with a statistically significant short-term decrease in voluntary part-time employment in all institutional settings. However, in contrast to non-tertiary-educated women, we do not observe any statistically significant long-term effects on voluntary part-time employment.

**Figure 6. Results across socio-demographic groups by institutional setting**

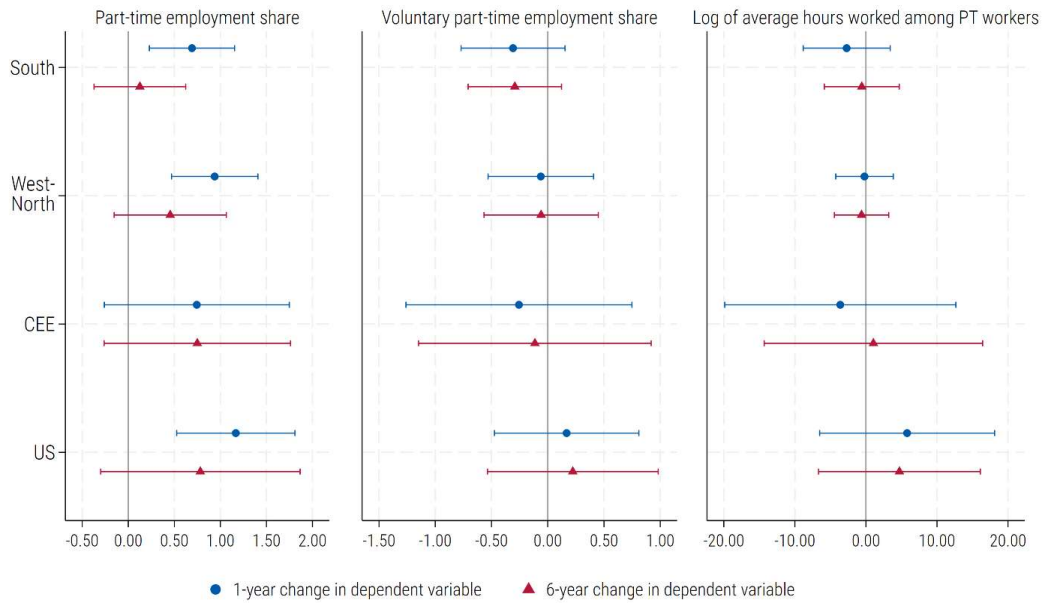
**(a) Tertiary-educated women**



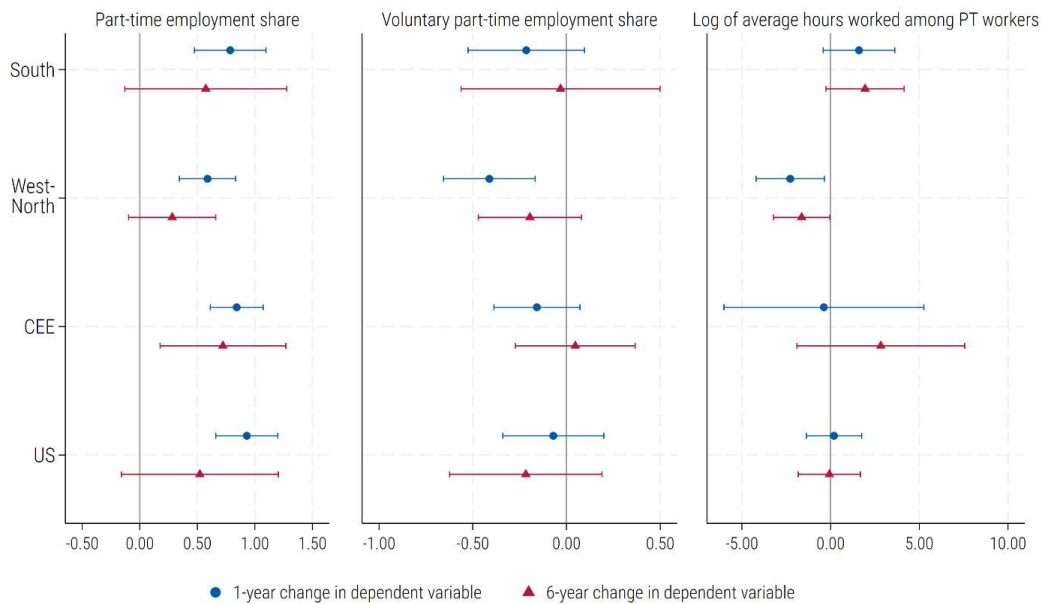
**(b) Non-tertiary-educated women**



### (c) Tertiary-educated men



### (d) Non-tertiary-educated men



Note: This figure reports 2SLS estimates with 95% confidence intervals of the effects of underemployment shocks on different employment outcomes, estimated separately across socio-demographic groups and for four institutional settings. Blue circles represent 1-year changes in the dependent variable, while red triangles represent 6-year changes. See notes to Table 3 for details on the specification.

Source: Own estimations based on EU-LFS, Eurostat, CPS, and BEA data.

### 4.3. Robustness analysis

We begin our robustness analysis by showing that the main results reported in Table 2 are not driven by linear regional trends in the variables of interest. In columns 1 and 5 of Table 6, we repeat the results from the baseline specification. The specifications reported in columns 2 and 6 add region fixed effects, which in the differenced specification are equivalent to allowing for linear trends in the levels of the outcome variable that are common

across demographic groups within a region. For the main outcome of interest, the long-term effect on voluntary part-time employment, the coefficient of interest decreases only slightly, from -0.28 to -0.25. A more restrictive test is reported in columns 3 and 7, where the levels of the outcome variables are purged of linear trends specific to each observation unit, that is, each demographic group within a region. Note that adding region  $\times$  demographic-group trends may absorb a substantial part of the increase in the underemployment rate over the period 2006-2014. Still, the main coefficient of interest is not significantly affected and remains at -0.24 (Panel C, column 7).

**Table 6. The role of regional trends, EU sample**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$\Delta Y(t+1, t)$				$\Delta Y(t+6, t)$			
<b>Panel A: Underemployment</b>								
$\Delta$ Underempl share (t+1, t)					0.575*** (0.064)	0.546*** (0.055)	0.529*** (0.053)	0.574*** (0.064)
$\Delta$ Underempl share (t+8, t+7)								-0.019 (0.047)
<b>Panel B: Part-time employment share</b>								
$\Delta$ Underempl share (t+1, t)	0.516*** (0.070)	0.520*** (0.066)	0.520*** (0.067)	0.516*** (0.070)	0.292*** (0.079)	0.292*** (0.075)	0.290*** (0.061)	0.296*** (0.078)
$\Delta$ Underempl share (t+3, t+2)				-0.056 (0.065)				
$\Delta$ Underempl share (t+8, t+7)								0.066 (0.060)
<b>Panel C: Voluntary part-time employment share</b>								
$\Delta$ Underempl share (t+1, t)	-0.484*** (0.070)	-0.480*** (0.066)	-0.480*** (0.067)	-0.484*** (0.070)	-0.283*** (0.078)	-0.254*** (0.073)	-0.239*** (0.069)	-0.278*** (0.078)
$\Delta$ Underempl share (t+3, t+2)				-0.056 (0.065)				
$\Delta$ Underempl share (t+8, t+7)								0.085 (0.060)
<b>Panel D: Log of average hours worked among part-time workers</b>								
$\Delta$ Underempl share (t+1, t)	-0.658*** (0.181)	-0.668*** (0.190)	-0.663*** (0.171)	-0.657*** (0.181)	-0.225 (0.164)	-0.231 (0.145)	-0.237 (0.143)	-0.219 (0.167)
$\Delta$ Underempl share (t+3, t+2)				0.035 (0.207)				
$\Delta$ Underempl share (t+8, t+7)								0.098 (0.248)
Country $\times$ Year $\times$ Group FE?	YES	YES	YES	YES	YES	YES	YES	YES
NUTS region FE?	NO	YES	NO	NO	NO	YES	NO	NO
NUTS region $\times$ Group FE?	NO	NO	YES	NO	NO	NO	YES	NO
Kleibergen–Paap F-stat.	177.4	175.1	165.8	177.9	177.4	175.1	165.8	120.6
No. of observations	5664	5664	5664	5664	5664	5664	5664	5664

*Note:* This table reports 2SLS estimates of the effects of underemployment shocks on different employment outcomes. Columns 1 and 5 repeat the main results from Table 2. Specifications reported in columns 2 and 6 additionally include region fixed effects, and specifications reported in columns 3 and 7 use region  $\times$  demographic group fixed effects instead. Columns 4 and 8 add lead values of underemployment shocks to the baseline specification. The lead values are instrumented analogously to the change in the underemployment rate between period  $t$  and  $t+1$ . Standard errors clustered at the country-year level are reported in parentheses. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

*Source:* Own estimations based on EU-LFS and Eurostat data.

Next, we assess the parallel trends assumption by adding lead values of underemployment shocks to the baseline specification (Table 6, columns 4 and 8). The future values of the treatment variable, that is, one-year underemployment changes at t+3 or t+8, instrumented analogously to the main explanatory variable, are not statistically related to current outcomes, providing no evidence of pre-existing differential trends in the variables of interest.

The analogous analysis for the US is reported in Table B1 in the Appendix. It also confirms the robustness of the main findings to the inclusion of regional trends.

In the subsequent analysis, we verify whether our findings for the EU sample are sensitive to the choice of underemployment definition. Narrowing the definition of underemployment by excluding persons not available to work more hours within two weeks does not change the short-term composition of underemployment shocks (Table 7, column 2). However, the coefficient on the long-term effect on voluntary part-time employment is reduced from -0.283 to -0.235 (column 5). The analysis utilising the underemployment definition based on the declared inability to find a full-time job (columns 3 and 6) yields qualitatively similar findings to the baseline analysis. Although the short-term decrease in voluntary part-time employment is a bit larger than for the baseline definition, and the long-term effect on voluntary part-time employment is a bit lower (-0.24), the differences with respect to the baseline results are not statistically significant. It is important to note that with this definition of underemployment, our shift-share instrument is weaker than in the baseline analysis.

**Table 7. Alternative definitions of underemployment, EU sample**

	(1)	(2)	(3)	(4)	(5)	(6)
	Baseline definition of under- employment	$\Delta Y(t+1, t)$ Only persons available to work more hours	"Could not find a full- time job"	Baseline definition of under- employment	$\Delta Y(t+6, t)$ Only persons available to work more hours	"Could not find a full- time job"
<b>Panel A: Underemployment share</b>						
$\Delta$ Underempl share (t+1, t)				0.575*** (0.064)	0.505*** (0.078)	0.473*** (0.090)
<b>Panel B: Part-time employment share</b>						
$\Delta$ Underempl share (t+1, t)	0.516*** (0.070)	0.512*** (0.062)	0.452*** (0.087)	0.292*** (0.079)	0.270** (0.086)	0.231** (0.085)
<b>Panel C: Voluntary part-time employment share</b>						
$\Delta$ Underempl share (t+1, t)	-0.484*** (0.070)	-0.488*** (0.062)	-0.548*** (0.087)	-0.283*** (0.078)	-0.235** (0.077)	-0.242* (0.100)
<b>Panel D: Log of average hours worked among part-time workers</b>						
$\Delta$ Underempl share (t+1, t)	-0.658*** (0.181)	-0.560* (0.267)	-0.277 (0.293)	-0.225 (0.164)	-0.134 (0.222)	0.068 (0.272)
Kleibergen–Paap F-stat.	177.4	221.9	7.8	177.4	221.9	7.8
No. of observations	5664	5664	5543	5664	5664	5543

*Note: This table reports 2SLS estimates of the effects of underemployment shocks on different employment outcomes. Columns 1 and 4 repeat the main results from Table 2. Specifications reported in columns 2 and 5 use the Eurostat definition of underemployment, excluding from this category persons who are not available to work more hours within two weeks. Columns 3 and 6 define the underemployed as part-time employees who declare that they could not find a full-time job. Standard errors clustered at the country-year level are reported in parentheses. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ . Source: Own estimations based on EU-LFS and Eurostat data.*

Next, we consider the possibility that our findings might be influenced by employment changes accompanying underemployment shocks. To assess this, we redefine the outcome variables, which in the baseline specification were expressed as shares of employment. Specifically, we examine the impact of changes in the underemployment rate, defined as in the baseline specification, on the shares of part-time employees and

voluntary part-time employees in the total population aged 25-54 belonging to a given demographic group in a given region.

Our findings are robust to accounting for employment changes. The coefficients of interest are smaller, as the absolute values of changes in the dependent variables are now, by construction, lower (Table 8). However, we still observe a strong long-term effect of underemployment shocks on the prevalence of part-time employment, as well as a strong negative long-term effect on voluntary part-time employment. Furthermore, the relationship between the magnitudes of the short-term and long-term effects is very similar to that found in the main analysis (Table 2). The analysis across demographic groups also replicates the baseline findings (Table 9). Non-tertiary-educated women are the only group with statistically significant negative long-term effects on voluntary part-time employment.

**Table 8. Alternative definitions of outcome variables, EU sample**

	(1)	(2)
	$\Delta Y(t+1, t)$	$\Delta Y(t+6, t)$
<b>Panel A: Part-time employment, share in population</b>		
$\Delta$ Underempl share (t+1, t)	0.362*** (0.051)	0.222*** (0.056)
<b>Panel B: Voluntary part-time employment, share in population</b>		
$\Delta$ Underempl share (t+1, t)	-0.313*** (0.046)	-0.174** (0.059)
Kleibergen–Paap F-stat.	177.4	177.4
No of observations	5664	5664

Note: This table reports 2SLS estimates of the effects of underemployment shocks on changes in part-time employment (Panel A) and voluntary part-time employment (Panel B). Both outcome variables are expressed as shares of the total population in a given demographic group. The main explanatory variable is the one-year change in the underemployment rate, instrumented using the regional sectoral employment structure. All specifications include country  $\times$  year fixed effects and regional GDP growth, as specified in equation (1). Standard errors clustered at the country-year level are reported in parentheses. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Source: Own estimations based on EU-LFS and Eurostat data.

**Table 9. Results for the EU sample across socio-demographic groups, alternative definitions of outcome variables**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Women				Men			
	Tertiary-educated $\Delta Y(t+1, t)$	Non-tertiary-educated $\Delta Y(t+6, t)$	Non-tertiary-educated $\Delta Y(t+1, t)$	Non-tertiary-educated $\Delta Y(t+6, t)$	Tertiary-educated $\Delta Y(t+1, t)$	Non-tertiary-educated $\Delta Y(t+6, t)$	Non-tertiary-educated $\Delta Y(t+1, t)$	Non-tertiary-educated $\Delta Y(t+6, t)$
<b>Panel B: Part-time employment, share in population</b>								
$\Delta$ Underempl share (t+1, t)	0.399*** (0.081)	0.303*** (0.072)	0.274*** (0.075)	0.122 (0.092)	0.717*** (0.142)	0.334* (0.168)	0.484*** (0.067)	0.387** (0.123)
<b>Panel C: Voluntary part-time employment, share in population</b>								
$\Delta$ Underempl share (t+1, t)	-0.295*** (0.082)	-0.093 (0.089)	-0.366*** (0.071)	-0.257* (0.102)	-0.112 (0.138)	-0.101 (0.135)	-0.220*** (0.065)	-0.055 (0.095)
Kleibergen–Paap F-stat.	84.6		100.7		46.3		56.8	
No. of observations	1420		1438		1368		1438	

Note: This table reports 2SLS estimates of the effects of underemployment shocks on changes in part-time employment (Panel A) and voluntary part-time employment (Panel B), estimated separately for four socio-demographic groups defined by gender and educational attainment. Both outcome variables are expressed as shares of the total population in a given demographic group. All specifications include country  $\times$  year fixed effects and regional GDP growth, as specified in equation (1). Standard errors clustered at the country-year level are reported in parentheses. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ . Source: Own estimations based on EU-LFS and Eurostat data.

## 5. Concluding remarks

This paper examines the short- and long-term effects of underemployment shocks on the composition of employment, with a particular focus on voluntary part-time work. Using regional data for the European Union and the United States and a shift-share instrument within a difference-in-differences framework, we provide new evidence on how the effects of underemployment shocks vary across institutional settings and time horizons. The analysis addresses three gaps in the literature: the absence of evidence on the long-run effects of underemployment on voluntary part-time employment, the limited cross-country perspective, and scarce evidence on heterogeneity across socio-demographic groups. We examine the evolution of underemployment, part-time employment, its voluntary component, and hours worked among part-time workers to better understand the nature of adjustment margins following underemployment shocks.

Our results indicate that underemployment shocks in the EU are persistent and lead to significant reallocation within part-time employment. Around 52% of a one-year increase in underemployment is associated with higher part-time employment in the short run, and more than half of this effect persists over a five-year horizon. The remaining 48% of underemployment shocks in the EU can be attributed to lower voluntary part-time employment, which can be interpreted mainly as an increase in preferences for longer working hours among part-time workers. The negative effect on voluntary part-time employment is persistent: a 1 percentage point increase in underemployment reduces voluntary part-time employment by approximately 0.28 percentage points after five years.

The negative effects of underemployment on voluntary part-time employment are heterogeneous across socio-demographic groups and institutional settings, and are particularly pronounced among non-tertiary-educated women in Western Europe. It is remarkable that in Southern Europe and in Western and Northern Europe we find very similar aggregate effects. In Central and Eastern Europe and the US, by contrast, we do not find statistically significant negative long-term effects on voluntary part-time employment.

Our findings contribute to understanding what are the long-term effects of increases in underemployment that may arise due to both cyclical economic downturns and structural changes in the economy. In particular, they shed light on the potential effects on voluntary part-time employment. This is particularly relevant because the prevalence of part-time employment and its differences across socio-demographic groups have major consequences for economic development and gender inequalities.

## References

- Angrist, J.D., Pischke, J.-S., 2009. *Mostly Harmless Econometrics*. Princeton University Press.
- Bell, D.N.F., Blanchflower, D.G., 2021. Underemployment in the United States and Europe. *ILR Review* 74, 56–94.
- Borowczyk-Martins, D., Lalé, E., 2019. Employment Adjustment and Part-Time Work: Lessons from the United States and the United Kingdom. *American Economic Journal: Macroeconomics* 11, 389–435.
- Collewet, M., de Grip, A., de Koning, J., 2017. Conspicuous work: Peer working time, labour supply, and happiness. *Journal of Behavioral and Experimental Economics* 68, 79–90.
- Grodner, A., Kniesner, T.J., 2008. Labor supply with social interactions: econometric estimates and their tax policy implications. In: Polachek, S.W., Tatsiramos, K. (Eds.), *Work, Earnings and Other Aspects of the Employment Relation*, Research in Labor Economics. Emerald Group Publishing Limited, pp. 1–23.

Lewandowski, P., Szymczak, W., 2024. Automation, Trade Unions and Atypical Employment. *Industrial Relations: A Journal of Economy and Society*.

MacDonald, D., 2019. Under-employment: A crisis hangover, or something more? *OECD Social, Employment, and Migration Working Papers* 0\_1-48.

Markefke, T., Müller-Rehm, R., 2024. Labor market regulation and the cyclical nature of involuntary part-time work. *Journal for Labour Market Research* 58, 5.

Valletta, R.G., Bengali, L., van der List, C., 2020. Cyclical and Market Determinants of Involuntary Part-Time Employment. *Journal of Labor Economics* 38, 67–93.

Van Doorn, L., Van Vliet, O., 2024. Wishing for More: Technological Change, the Rise of Involuntary Part-Time Employment and the Role of Active Labour Market Policies. *Journal of Social Policy* 53, 751–771.

## Appendices

### Appendix A. Additional information on data

Table A1. Descriptive statistics for the US

	Women		Men		All
	Tertiary	Non-tertiary	Tertiary	Non-tertiary	
<b>USA</b>					
Share of part-time employment	0.144	0.190	0.041	0.076	0.108
p25 of part-time employment	0.119	0.163	0.032	0.061	0.054
p75 of part-time employment	0.165	0.216	0.049	0.089	0.157
Share of voluntary part-time employment	0.120	0.134	0.025	0.037	0.074
p25 of voluntary part-time employment	0.096	0.110	0.020	0.031	0.030
p75 of voluntary part-time employment	0.137	0.155	0.030	0.044	0.118
Share of underemployment	0.024	0.056	0.016	0.039	0.033
p25 of underemployment	0.015	0.038	0.010	0.025	0.017
p75 of underemployment	0.032	0.071	0.020	0.048	0.044
Observations		867			3468

Notes: The table reports descriptive statistics for the US aggregated at the state  $\times$  demographic group  $\times$  year level, with weights reflecting employment levels, measured as the average number of employed individuals in a given socio-demographic group across all years.

## Appendix B. Additional results

Table B1. Results for the US: the role of regional trends

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	$\Delta Y(t+1, t)$				$\Delta Y(t+6, t)$			
<b>Panel A: Underemployment</b>								
$\Delta$ Underempl share (t+1, t)					0.601** (0.204)	0.605** (0.185)	0.595*** (0.166)	0.601** (0.204)
$\Delta$ Underempl share (t+8, t+7)								0.076 (0.203)
<b>Panel B: Part-time employment share</b>								
$\Delta$ Underempl share (t+1, t)	0.901*** (0.096)	0.916*** (0.089)	0.913*** (0.091)	0.907*** (0.097)	0.543* (0.241)	0.613** (0.220)	0.550** (0.203)	0.543* (0.239)
$\Delta$ Underempl share (t+3, t+2)				0.057 (0.093)				
$\Delta$ Underempl share (t+8, t+7)								-0.119 (0.224)
<b>Panel C: Voluntary part-time employment share</b>								
$\Delta$ Underempl share (t+1, t)	-0.099 (0.096)	-0.084 (0.089)	-0.087 (0.091)	-0.093 (0.097)	-0.058 (0.134)	0.008 (0.121)	-0.045 (0.111)	-0.059 (0.133)
$\Delta$ Underempl share (t+3, t+2)				0.057 (0.093)				
$\Delta$ Underempl share (t+8, t+7)								-0.195 (0.163)
<b>Panel D: Log of average hours worked among part-time workers</b>								
$\Delta$ Underempl share (t+1, t)	0.640 (0.652)	0.618 (0.608)	0.668 (0.601)	0.621 (0.674)	0.302 (0.679)	0.346 (0.629)	0.387 (0.572)	0.301 (0.683)
$\Delta$ Underempl share (t+3, t+2)				-0.184 (0.581)				
$\Delta$ Underempl share (t+8, t+7)								-0.265 (0.622)
Year×Group FE?	YES	YES	YES	YES	YES	YES	YES	YES
State FE?	NO	YES	NO	NO	NO	YES	NO	NO
State x Group FE?	NO	NO	YES	NO	NO	NO	YES	NO
Kleibergen–Paap F-stat.	28.1	38.3	38	12.5	28.1	38.3	38	11.2
No. of observations		1632				1632		

Note: This table reports 2SLS estimates of the effects of underemployment shocks on different employment outcomes. Columns 1 and 5 repeat the main results from Table 5. Specifications reported in columns 2 and 6 additionally include state fixed effects, and specifications reported in columns 3 and 7 use state x demographic group fixed effects instead. Columns 4 and 8 add lead values of underemployment shocks to the baseline specification. The lead values are instrumented analogously to the change in the underemployment rate between period t and t+1. Standard errors clustered at the state-year level are reported in parentheses. \* p < .05; \*\* p < .01; \*\*\* p < .001.

Source: Own estimations based on CPS and BEA data.



[www.ibs.org.pl](http://www.ibs.org.pl)