



Incidence and Distribution of Earnings Shocks: Southern Europe in Comparative Perspective

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Abstract

Large earnings losses are likely to cause financial hardship, lower consumption, and trigger poverty and material deprivation. While the phenomenon has received significant attention in the US, it remains relatively under-researched in Europe. Our study aims to fill this gap. We examine the incidence and the distribution of earnings shocks, defined as year-on-year losses of at least 20% of gross individual earnings, in four South European countries (Greece, Italy, Spain, and Portugal) and in four comparator countries (France, Germany, the Netherlands, and Denmark), in 2006–2017, using longitudinal EU-SILC data. The paper proceeds to identifying the relative weight of economic conditions (proxied by GDP growth), and labour market characteristics (employment status, occupational class, and earnings quintile prior to the shock), and goes some way towards clarifying the nature of the effect of each explanatory variable on the incidence of earnings shocks in the eight countries, *ceteris paribus*. Our results confirm the hypothesis that the reason Southern Europe was more susceptible to earnings shocks during the Great Recession and the Euro crisis was the interplay of more unfavourable economic conditions with higher share of non-standard work (especially self-employment and fixed-term contracts), which left a higher share of the workforce exposed.

Keywords Earnings losses · Economic insecurity · Employment instability · Southern Europe

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1 Introduction

Income losses have become a significant phenomenon in contemporary Western societies, affecting a large share of the population across income groups and occupational classes. In a context of increased income volatility, due to greater macroeconomic and labour market instability, such ‘adverse shocks’ (Bossert & D’Ambrosio, 2013) compromise the financial security of families. The resulting economic insecurity is distinct from poverty, although may contribute to it (Western et al., 2012; Hacker et al., 2014; Gioachin et al., 2023), and may capture short-term situations rather than chronic hardship.

Large income losses have important consequences: they cause financial hardship, anxiety and discontent (Hacker et al., 2014). Some of these have long-term effects: those suffering large income losses may force to readjust their consumption patterns downward; this is what Hacker (2006) has termed ‘the Great Risk Shift’. Under Friedman’s permanent income hypothesis (1957), large income losses, even when short-lived, lower households’ perceptions of their lifetime income and induce them to readjust downwards their consumption patterns. Income losses have also been associated to economic insecurity (Western et al., 2012; Hacker et al., 2014) as one of the main effects of macroeconomic instability, and the growth of non-standard (especially temporary) work. All in all, the phenomenon of large income losses deserves to be studied separately (Stiglitz et al., 2009).

While the empirical investigation of income losses has flourished in the US, this has not been the case in Europe (see Venn, 2011 for an exception). Studies in Europe have instead mainly focused on income volatility (Van Kerm & Alperin, 2013), which fails to capture the clear asymmetry between income gains and losses (Western et al., 2012). Furthermore, there is little comparative research examining cross-country differences in the incidence and determinants of earning shocks. We aim to fill these gaps by focusing on a specific case of large income losses: earnings shocks, defined as year-on-year reductions of gross labour income by at least 20%.

We test the hypothesis that earnings shocks are more common in Southern Europe than elsewhere in the EU due to the interplay of two factors. The first is contingent: the effects of the Great Recession and the Euro crisis were deeper and lasted longer in the Southern periphery (Gutiérrez, 2014; Matsaganis & Leventi, 2014). The second factor is structural: non-standard employment in its various forms (fixed-term or temporary work, and self-employment) is more prevalent in Southern Europe (Latner, 2022; Van Lancker, 2012), and so is labour market segregation (“dualization”) (Barbieri & Cutuli, 2015).

We aim to disentangle the two factors, and to establish the relative weight of each in causing earnings shocks. Specifically, we estimate the extent to which non-standard employment and labour market dualization drive large earnings losses over and above the effect of economic downturns. To do so, we analyse the incidence and distribution of earnings shocks in Southern Europe (Greece, Italy, Spain, and Portugal), compared to four countries in the rest of Europe (France, Germany, the Netherlands, and Denmark), over a 12-year period from 2006 to 2017, using longitudinal EU-SILC data.

To identify the determinants of earning shocks in our eight countries we consider both individual-level variables (such as occupational class and employment status) and one country-level variable (GDP growth).

Our analytical strategy consists of three main steps. First, we examine how the incidence of earnings shocks by country and by year varies with changes in economic conditions as

measured by the annual rate of GDP growth. We then analyse the distribution of earning shocks within each country's labour force varies by occupational class, employment status, and earnings level. Finally, we apply Blinder–Oaxaca decomposition to identify the relative weight of each of the factors mentioned here.

The paper is structured as follows. Section 2 reviews the literature on earnings losses. Section 3 describes the data and our methodology. Section 4 presents our results. Section 5 summarises our main findings and draws implications for further research.

2 State of the Art

Research on earnings losses has grown significantly over the last two decades, especially in the US. Earnings losses have been seen as a sign of greater economic insecurity (Gosselin & Zimmerman, 2008; Venn, 2011; Western et al., 2012; Helgason, 2016; Chauvel et al., 2019). According to Hacker (2006), the significant labour income losses of a large set of the US population have produced a 'drop zone', a section of the population characterised by high risk of poverty and insecurity, which includes segments of the middle-class traditionally protected against such threats.

Earnings losses have been found to weaken households' capacity to keep up with day-to-day spending on food, housing, or transport, and to cause arrears and debt (Gottschalk & Moffitt, 2009). They also undermine the stability and predictability of life (Rohde et al., 2014; Nichols & Rehm, 2014) they increase anxiety (D'Ambrosio & Rohde, 2014; Bossert & D'Ambrosio, 2013), discontent (Gunther & Maier, 2014), and under-investment in housing and education (Carneiro & Ginja, 2016).

Of the various measures proposed to identify earnings drops (Gottschalk & Moffitt, 1994; Dynan et al., 2012), the share of workers suffering large declines in labour income year-on-year is probably the most intuitive, and has been used extensively in empirical investigations. The limitations concern its short-term nature, which fails to capture the evolution of earnings shocks over time, even though clearly whether such shocks are temporary (with earnings trajectories soon returning to trend) or permanent (with more severe scarring effects) makes a lot of difference.

Research on earnings losses has mainly focused on *large* ones, expected significantly to lower the living standards of workers and their families. Various thresholds have been used to define 'large'. Venn (2011) has proposed 20%; Orszag (2007), Gosselin and Zimmerman (2008), Hacker et al. (2014), and Helgason (2016) have opted for 25%. As Hacker et al. (2014) have suggested, a 20–25% decline in earnings implies a significant fall in living standards, unlikely to be promptly buffered (see also Helgason, 2016). Others have looked at earnings losses of 50% or more (Orszag, 2007; Hacker & Jacobs, 2008; Helgason, 2016), usually linked to job loss and other 'destabilizing events' (Gosselin & Zimmerman, 2008).

In the US, empirical research on earnings losses has shown them to be on the rise. There is broad consensus that the share of workers suffering large earnings losses started to rise in the 1970s and again in the early 2000s (Carr & Wiemers, 2018, Moffitt & Gottschalk, 2012; Dynan et al., 2012), especially during an economic downturn (Moffitt et al., 2022). The picture is less clear for the 1980s and 1990s, with some researchers finding a continuous moderate increase, but others pointing towards a plateau (Dynan et al. 2012). Earnings losses were particularly high again in the early 2000s: Winship (2009) noted that earnings

shocks (of 25% or more) increased from 12% in 1998 to 17% in 2003, approaching the peak of the early 1980s (20% in 1982). Hacker and Jacobs (2008), confirming similar findings by Orszag (2007), found that 15% of workers in the US lost 50% or more of their earnings in 2004 relative to the year before.

Outside the US, research on earnings shocks has been more sporadic, and has produced mixed results. An important exception is Venn (2011), who analysed earnings shocks in 22 OECD countries in 2004–2007. She found notable cross-country variation in their incidence. Spain (25%) ranked higher than Germany (20%), the US (19%), and Italy (19%), followed by the UK (17%) and France (16%), while earnings shocks were least common in the Nordic countries (12–13%). No specific factors were put forward to explain such variation. Venn also analysed long-term trends in earnings (upward and downward) volatility in Germany, Korea, the UK, and the US. She found no clear cross-country trends over time, but a close correlation with the business cycle and the unemployment rate. She argued that the effect of economic downturns was mediated by institutional factors, such as employment protection legislation, unemployment benefits, taxation, collective bargaining, and union density (Venn, 2011; Sologon & O'Donoghue, 2012). Other research, focusing on economic insecurity more broadly, has also addressed downward volatility, in total income rather than earnings per se (Romaguera-de-la-Cruz, 2020; Cantò et al., 2020). The authors found that in countries like Spain the incidence of income drops varied with the economic cycle, while in countries like Sweden it was relatively stable.

Research has mostly focused on individual-level drivers of earnings shocks, with scholars examining the triggering role of destabilizing events, such as job loss, decline in working hours, and illness or disability (Gosselin & Zimmerman, 2008). While earnings losses have been often studied as a result of job losses (Ehlert, 2016), research has shown that earnings volatility of those moving from one job to another, or even within the same job, is also significant (Venn, 2011). In this case, earnings losses are driven by a reduction in working hours, in overtime pay, or in bonus payments. The incidence of earnings shocks has been found to be higher among women (Hacker & Jacobs, 2008), although this effect has lost importance over time (Orszag, 2007). Low-skilled and younger workers were found to be more vulnerable to earnings shocks (Orszag, 2007; Venn, 2011; Hacker et al., 2014; Hur, 2018). Venn (2011) found that in many OECD countries earnings shocks were highest among temporary employees, the self-employed, and part-time workers. Jensen and Shore (2015) found that the 'volatility gap' between employees and the self-employed in the US had widened since the 1960s.

Finally, while some studies observed that volatility was highest at the bottom of the earnings distribution (Guvenen et al., 2014; Jensen & Shore, 2015), others found a U-shaped pattern with greatest stability in the middle (Hardy & Ziliak, 2014; Moffitt & Zhang, 2018; Carr & Wiemers, 2021). However, since the onset of the global financial crisis, the risk of suffering an earnings loss in the US has risen for middle-income families to the level of lower-income ones (Nau & Soener, 2017).

Beyond these important advances, there are limitations to be addressed. Firstly, while the size and distribution of earnings shocks have become better known in the US, research in Europe has lagged behind. In particular, cross-country differences in the incidence of earnings losses have not been fully explained. While economic crises are obviously expected to increase the share of workers suffering earnings losses, research has not so far investigated

how the impact of a crisis might differ across countries, nor has clarified what the main explanatory factors related to the structure of labour market might be.

Our study aims precisely to fill these gaps. We consider how the incidence of earnings losses across Europe may be determined by the interaction of structural features of national labour markets with the severity of an economic downturn. The focus on Southern Europe results from this perspective, as the economic crisis of the early 2010s was more severe, and labour markets less stable, than elsewhere in Europe.

3 Data and Methods

We explore the longitudinal data of the *European Union Statistics on Income and Living Conditions* (EU-SILC), and of the *German Socio-Economic Panel* (SOEP), to analyse earnings shocks in eight EU countries (Greece, Italy, Spain, Portugal, France, Germany, the Netherlands, and Denmark). We use data from 2006 (2007 in Greece, Italy, and Portugal) to 2017, to cover the period before, during and after the Great Recession and the Euro crisis. Four-year rotations were pooled, and weights adjusted, as suggested by Borst (2018).

We focus on individuals' yearly gross income from work. We define earnings shocks as a loss of 20% or more of gross earnings in year t_1 relative to year t_0 , adjusted for inflation using Eurostat's Harmonised Indices of Consumer Prices (HICP). Earnings shocks have been analysed either at aggregate level, as changes in average earnings or incomes (Western, 2015), or by identifying individual cases of significant earnings shocks and estimating their incidence (Venn, 2011). We opted for the latter, as we are interested in differences in the incidence and distribution of earnings shocks across countries. (Incidentally, changes in average earnings or incomes offset gains and losses, if calculated on the whole population, or fail to take into account the size of the relevant sub-group, if calculated only on those experiencing losses. Also, they are more sensitive to outliers).

As for the threshold to identify earning shocks, we opted for 20%: on the one hand, because it allows to consider a larger group of those affected; on the other hand, because the respective earnings loss is still significant enough to affect living standards (Venn, 2011).

Our sample is working-age individuals (aged 16–64) with positive earnings in the start year (t_0), excluding those retiring over the period. We discarded cases with extremely low labour income (below 10% of median, not considering zero earnings, by country by year).

We analyse earnings shocks by *country*, by *year*, by *earnings quintile*, by *employment status* (employees vs. self-employed; permanent vs. fixed-term employees), and by *occupational class* (managers; professionals; technicians and associate professionals; small entrepreneurs; clerical and professional service workers; industrial professionals; low-skilled workers). We use the European Socio-Economic Group (ESeG) classification of Eurostat to define occupational class (Eurostat, 2014). We assign earners to the appropriate socio-economic group by translating ISCO-88 categories into ISCO-08 ones, based on the modal value of their cross distribution, calculated in EU-SILC for the years 2010 and 2011, when both classification codes were made available, as suggested by Rose and Harrison (2007). With respect to variables related to labour market participation, we align income and survey years, as in most countries information on incomes in EU-SILC refers to the year prior to the survey.

We consider the persistence of earnings shocks in order to assess the chances of recovery. Given data limitations, we test persistence in the year after the earning shock (t_2).

We estimate the contribution of driving factors to earnings shocks by applying a Blinder–Oaxaca decomposition (Blinder, 1973; Oaxaca, 1973; see also Kitagawa, 1955). Originally applied to the analysis of wage differentials, this technique is now commonly applied in studies of a wide range of topics, from food poverty and multidimensional poverty (Diaz et al., 2023; Yilmaz & Kilic, 2021; Bidisha et al., 2021) to health and health care (O'Donnell et al., 2008), including binary outcomes (Yun, 2005; Fairlie, 2005). We apply Blinder–Oaxaca decomposition in order to apportion the difference in the incidence of earning shocks between South European and comparator countries to differences in the influence of determinants (i.e. their coefficients) versus differences in their prevalence (composition effects).

The technique decomposes the difference in the mean of the dependent variable between two groups (in our case: South European and comparator countries¹) into an *endowment* and a *coefficient* effect of a set of explanatory and control variables. In our analysis, the decomposition is estimated through a logistic regression with earning shocks at individual level as the dependent variable. Our model allows explanatory and control variables to be categorical, as in Jann (2008) and Yun (2005). To avoid results driven by countries with larger samples and/or populations, weights were adjusted to make each country count equally irrespective of size.

4 Results

4.1 Incidence of Earnings Shocks

We first consider the incidence of earnings shocks in South European vs. comparator countries in 2006–2017. Over the twelve years considered, earnings shocks were consistently higher in Southern Europe than in comparator countries. Specifically, in Spain the average risk of suffering an earnings shock over the period concerned nearly a quarter of all earners (24.6%). In Greece (21.5%), Portugal (20.9%), and Italy (19.2%), it involved around a fifth of all earners. The corresponding figure was significantly lower in Germany (16.8%), Denmark (15.3%), France (14.2%), and the Netherlands (10.4%). This is shown in Fig. 1.

Our data suggest that the size of the average loss was large: those experiencing earnings shocks lost on average around 58% of their previous earnings. Average losses ranged from 54.5% in Germany to 63.2% in Spain.

What caused such earnings shocks? Table 1 shows that, in a surprising number of cases, the workers who lost over 20% of their earnings did so while working as much as before. The relevant share, averaged over all twelve years and all eight countries, was 44%, ranging from about a quarter of all cases in the Netherlands to over half in Italy. Earnings losses at invariable working time were caused by moving to a lower-paid job, by earning less overtime or bonus payments while at the same job, or by providing fewer labour services if in self-employment. Another significant cause of earnings shocks (a close second, with 42% of all cases overall) was job loss, specifically an increase in unemployment spells over the

¹ The two groups seem to be quite robust: Table A.1 in the Appendix suggests that within-group variation in both the dependent variable and in key explanatory variables is small, and certainly a lot smaller than between-group variation.

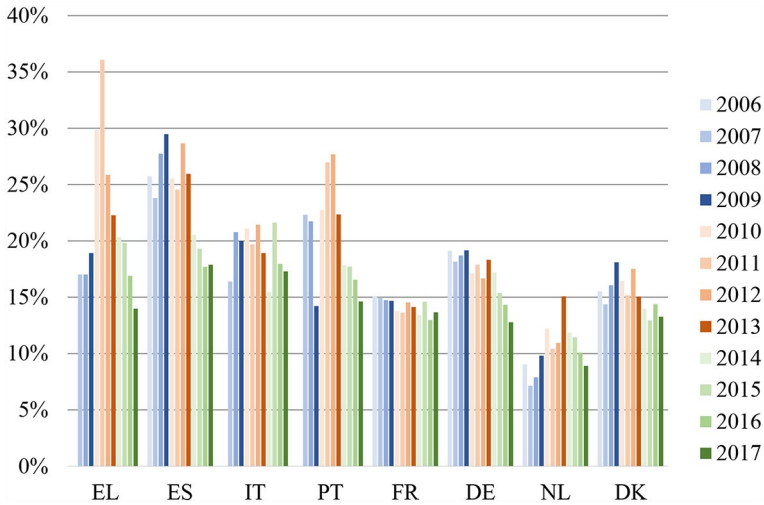


Fig. 1 Incidence of earnings shocks (2006–2017). Notes: Sample includes only individuals experiencing an earning shock for which full information on employment status was available in t_0 and t_1 ($n=138,118$). Source: EU-SILC longitudinal data (for Germany: SOEP).

Table 1 Earnings shocks by changes in working time (2006–2017)

	EL	ES	IT	PT	FR	DE	NL	DK	all
Unemployment spells	42	54	31	39	50	33	60	51	42
Inactivity spells	9	7	10	6	6	16	8	14	10
Switch to part-time	5	4	4	3	4	4	5	3	4
No change in working time	43	36	54	52	41	46	26	33	44
Total	100	100	100	100	100	100	100	100	100

Notes: Sample includes only individuals experiencing an earning shock for which full information on employment status was available in t_0 and t_1 (total number of cases: 138,118). Source: EU-SILC longitudinal data (for Germany: SOEP)

year. That was particularly important – over half of all cases – in the Netherlands, Spain, Denmark, and France. An increase in inactivity spells explained another 10% of all earnings shocks, more in Germany and Denmark. The remaining 4% of cases was due to a switch from full-time to part-time work.

The time profile of earnings shocks varied by country. As shown in Fig. 1, in 2006 the share of earnings shocks was high in Spain (25.7%), followed by Portugal (22.3%), but below 20% in the remaining six countries. As expected, when the economy slows down, the number of workers facing a large earnings loss goes up. Indeed, the onset of the Great Recession exposed more workers to earnings shocks in all countries, in some more than others: for instance, the incidence of earnings shocks in Greece rose dramatically from 17.0% in 2007–2008 to 36.1% in 2011. The share of earners suffering an earnings shock also went up in Spain and Portugal, though not as much, peaking at 29.5% (in 2009) and 27.7% (in 2012) respectively. In Italy, the incidence of earnings shocks fluctuated within a relatively narrow band throughout the period. In the other four countries, the share of earnings shocks

peaked at 19.2% in Germany, 18.1% in Denmark (both in 2009), and 15.1% in France and the Netherlands (in 2006 and 2013 respectively).

As economic conditions improved, the share of earnings shocks declined in all countries. A partial exception was Italy, where the incidence of earnings shocks, having fallen to 15.4% in 2014, rose again to 21.6% in 2015. In the same year, the share of earners suffering an earnings shock fell to around 14% in Greece and Portugal, and to 18% in Spain. In France, Denmark, the Netherlands and Germany, it was about 12–13%.

Overall, the incidence of earning shocks seems related to the economic cycle. In a recession, when the size of the economy shrinks, that incidence of earnings shock looms larger: the deeper the recession, the higher that incidence. However, it seems reasonable to assume that the relation between GDP growth and incidence of earnings shocks is non-linear. When the economy grows fast, it is likely to remain small, while as the recession deepens, the incidence of earnings shocks rises fast. We tentatively test this hypothesis in Fig. 2.

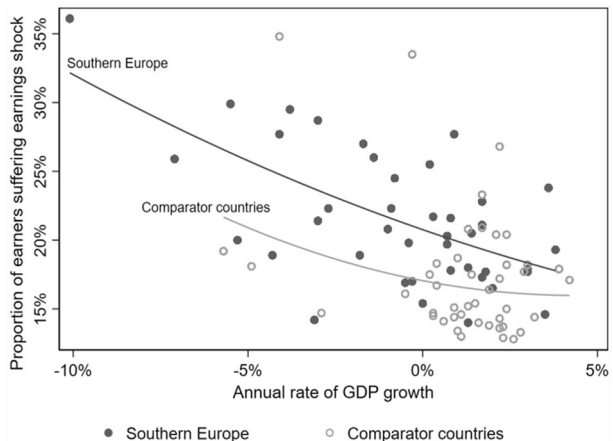
Two features clearly stand out. On the one hand, the line of best fit for the four South European countries lies well above the corresponding line for the four comparator countries. On the other hand, the two lines are close enough when the economy grows at a reasonably fast rate (4–5%), but they diverge further as we move from right to left, i.e. as the severity of the recession increases. In other words, the incidence of earnings shocks when the economy performs well is similar everywhere, while in a recession many more workers are exposed to the risk of earnings shocks in Southern Europe than elsewhere in the EU.

4.2 Persistence of Earnings Shocks

Not all earnings shocks are equally damaging. V-shaped episodes (with earnings soon bouncing back to pre-shock levels) are destabilizing but often manageable. L-shaped ones (with earnings remaining low long after the initial shock) may be more devastating: they deplete human capital and undermine the capacity to earn in the future, in a self-reinforcing pattern. In view of this, the question of whether earnings shocks are temporary or persistent is of great importance.

Figure 3 shows the distribution of earnings shocks in year t_1 relative to year t_0 , by whether earnings had recovered in full, in part, or not recovered at all in year t_2 .

Fig. 2 Incidence of earnings shocks by annual GDP growth (2006–2017). Notes: Dots show proportions of earners suffering earnings shock (defined as a loss of 20% or more of gross earnings in year t_1 relative to year t_0) by the annual rate of real GDP growth in that year. South European countries are Greece, Italy, Spain, and Portugal. Comparator countries are France, Germany, the Netherlands, and Denmark. The line of best fit is quadratic. Source: EU-SILC longitudinal data (for Germany: SOEP). GDP growth: Eurostat.



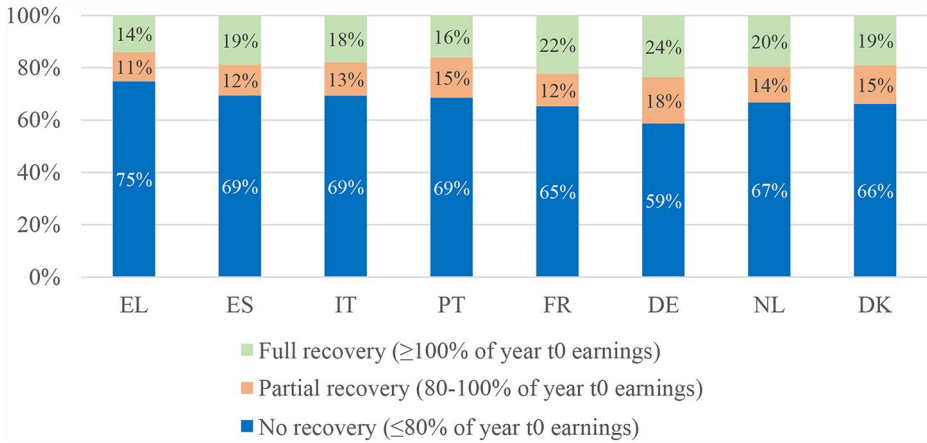


Fig. 3 Distribution of earnings shocks in t_1 by level of earnings in t_2 relative to t_0 (2006–2017). Notes: Figures are proportions of earners suffering an earnings shock (defined as a loss of 20% or more of gross earnings in year t_1 relative to year t_0) whose earnings had recovered in full, in part, or not at all one year later (year t_2), averaged over the period. Full recovery is when real gross earnings in year t_2 were 100% or above of real gross earnings in year t_0 . Partial recovery is when real gross earnings in year t_2 were between 80% and 100% of real gross earnings in year t_0 . No recovery is when real gross earnings in year t_2 were below 80% of real gross earnings in year t_0 . Sample includes individuals suffering an earnings shock with full information about earnings in t_0 , t_1 and t_2 ($n=69,140$). Source: EU-SILC longitudinal data (for Germany: SOEP).

Simple inspection immediately makes clear that the vast majority of earnings shocks persisted for at least a second year. In Southern Europe, the share of earners who, having suffered an earnings shock in year t_1 , continued to earn less than 80% in year t_2 of what they had earned in year t_0 ranged from 69% in Italy, Spain, and Portugal, to 75% in Greece. In the four comparator countries, that share was a bit lower, ranging from 59% in Germany to 65–67% in France, Denmark, and the Netherlands.

As regards variation in time, in Southern Europe the share of earners who one year later had not yet recovered from an earnings shock peaked during the Euro crisis, reaching 81% in Greece, 74% in Spain, 72% in Portugal, and 71% in Italy (in 2010–2013). In comparator countries, the corresponding rate also rose in France (to 67%) and the Netherlands (to 69%), though not in Denmark or Germany.

In contrast, the share of earners who had fully recovered from the earnings shock (i.e. earned at least as much one year after the shock as in the year prior to the shock, adjusted for inflation) was no more than 19% overall, ranging from 14% in Greece to 24% in Germany. As pointed out in Sect. 4.1, while the cut-off point in our definition of earnings shock is 20%, the average loss of those suffering an earnings shock was actually as large as 58% over all eight countries and all twelve years. This makes it difficult to write earnings shocks off as a relatively benign feature of volatility around a stable mean or along a gently-sloping trend².

² To further test the possibility of reversion-to-the-mean thesis, we examined the sub-samples of workers with information on earnings also available one year after the shock (i.e. in t_2) and two years prior to the shock (i.e. in t_{-1}): as many as 80% of those who suffered an earnings shock in t_1 went on to earn less in t_2 than what they had earned in t_0 , while as many as 86% of those who suffered an earnings shock in t_1 ended up earning less in that year than what they had earned in t_{-1} .

4.3 Distribution of Earnings Shocks Within Countries

We then turn to the distribution of earnings shocks within countries. We look at the share of earners suffering large losses by earnings quintile, occupational class, and employment status. We also examine how the incidence of earnings shocks varied by the rate of GDP growth.

We first consider how the risk of earnings shock varies by the location of earners in the earnings distribution. This is shown in Fig. 4. We rank earners by their gross earnings in year t_0 (the starting year), and group them in quintiles. We pool observations into three periods: 2006–2009, 2010–2013, and 2014–2017. We then analyse the share of earnings shocks by quintile, per period, and per country.

We find that the distribution of earnings shocks by quintile of earnings prior to the shock resembled a reverse J-shaped relationship: the risk of earnings shock fell as earnings increased up to quintile 4 (the second highest), rising again somewhat in top quintile 5. In France, Germany, the Netherlands, and Denmark, the pattern was consistent throughout the period. In the four South Europe countries, the reverse J-shaped pattern was subject to

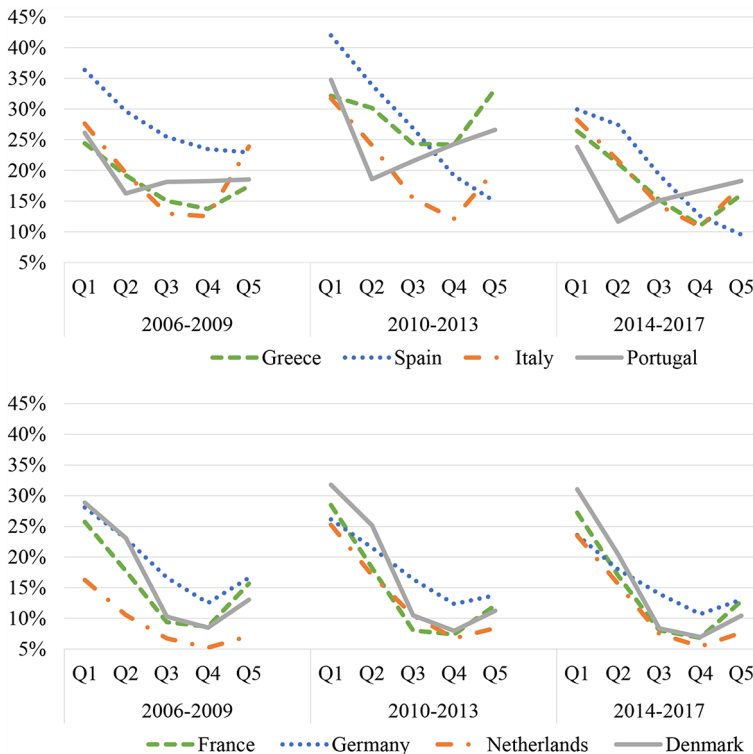


Fig. 4 Distribution of earnings shocks by earnings quintile (2006–2017). Notes: Figures are proportions of earners suffering an earnings shock (defined as a loss of 20% or more of gross earnings in year t_1 relative to year t_0) by earnings quintile (Q1: lowest 20% of the distribution of gross earnings in t_0 ; Q5: highest 20% of the distribution of gross earnings in t_0). Gross earnings were adjusted for inflation using the Harmonized Indices of Consumer Prices (HICP). Individuals with earnings below 10% of median per country per year in t_0 were excluded. Sample includes individuals with full information about earnings in t_0 and t_1 ($n = 741,082$). Source: EU-SILC longitudinal data (for Germany: SOEP).

variations: in Greece in 2010–2013, the risk of earnings shock at the top of the distribution was so high that the curve was U-shaped; in Italy in 2006–2009, that was nearly the case; in Portugal, the risk of earnings shock fell lowest in quintile 2 (the second lowest), and rose thereafter; in Spain, it fell steadily with the level of earnings. Our finding of a reverse J-shaped relationship contrasts with that of previous research (Venn, 2011), where the risk of earnings shock rose in line with earnings. Venn (2011) partly attributed that to reversion to the mean in a context of volatility³. Later work (Jensen & Shore, 2015) showed that volatility tends to be high at left tail of the earnings distribution.

We next turn to the distribution of earnings shocks by employment status, pooled over the whole period. This is shown in Fig. 5. A clear pattern emerges, according to which the share of earnings shocks rises as we move from permanent through fixed-term employees to the self-employed. In France, the risk of earnings shocks faced by the self-employed was a spectacular 27% points higher than that faced by permanent employees. In Spain, the risk differential was 23 points. In Italy and Portugal, but also in the Netherlands, the share of earnings shocks among the self-employed exceeded that among permanent employees by 17–18% points. In Germany and Denmark, it did so by 13–15% points. In Greece, the risk of earnings shocks varied less by employment status, and was higher for fixed-term employees than it was for the self-employed.

Let us now turn to the distribution of earnings shocks by occupational class, shown in Fig. 6. In all eight countries, small entrepreneurs were more at risk than any other group, as by definition all small entrepreneurs are self-employed. In all countries, the excess risk relative to the national average was large: in Italy, it was 10% points; in Spain, Portugal, Germany, Denmark, and the Netherlands, it was between 12 and 16% points; in France,

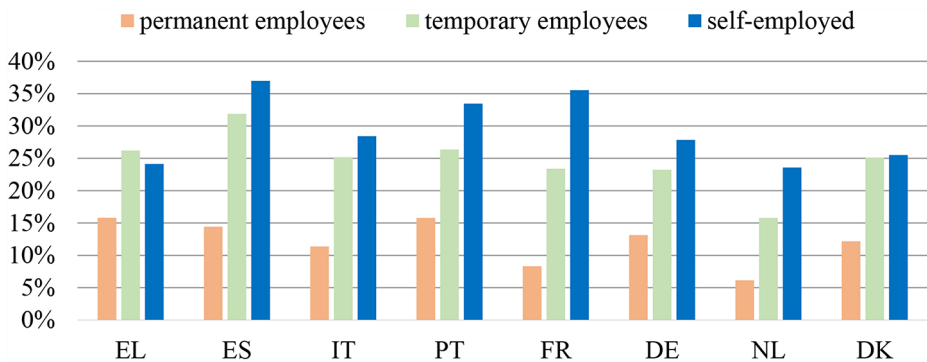


Fig. 5 Distribution of earnings shocks by employment status (2006–2017). Notes: Figures are proportions of earners suffering earnings shock (defined as a loss of 20% or more of gross earnings in year t_1 relative to year t_0) by employment status (i.e. either self-employed or dependent worker, and, among the latter, either permanent or fixed-term employee), averaged over the period. Sample includes individuals with full information about earnings in t_0 and t_1 , and information on variables related to labour market participation two years before the shock, to align it with information on incomes typically referring to the year prior to the survey ($n=422,279$).

Source: EU-SILC longitudinal data (for Germany: SOEP).

³ “A control is also included for income quartile to control for the possibility that some earnings volatility reflects reversion to the mean. This appears to be the case for year-to-year changes: workers with lower earnings tend to have more earnings increases and those with higher earnings have more decreases” (Venn, 2011, p. 18).

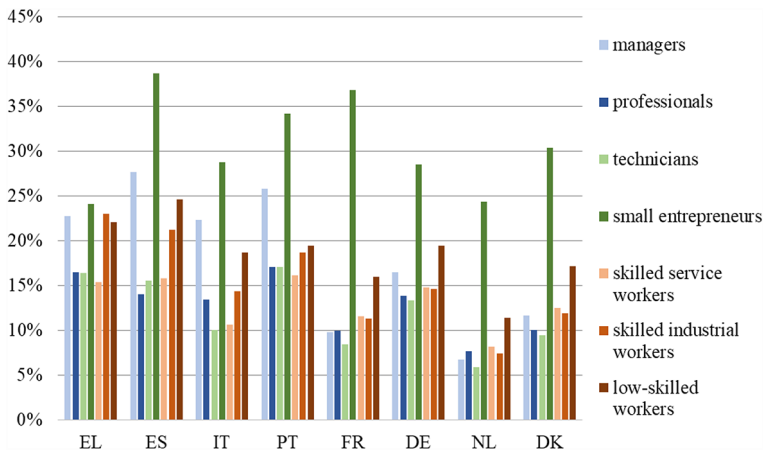


Fig. 6 Distribution of earnings shocks by occupational class (2006–2017). Notes: Figures are proportions of earners suffering earnings shock (defined as a loss of 20% or more of gross earnings in year t_1 relative to year t_0) by seven occupational groups (defined as in the ESeG classification and ranging from managers to low-skilled workers), averaged over the period. Gross earnings were adjusted for inflation using the Harmonized Indices of Consumer Prices (HICP). Individuals with earnings below 10% of median per country per year in t_0 were excluded. Sample includes individuals with full information about earnings in t_0 and t_1 , and information on variables related to labour market participation two years before the shock, to align it with information on incomes typically referring to the year prior to the survey year ($n=421,809$). Source: EU-SILC longitudinal data (for Germany: SOEP).

where the average incidence of earnings shocks in the entire population of earners was a low 14%, among small entrepreneurs it reached 37%.

Furthermore, in all four South European countries, managers emerged as the occupational group facing the second highest risk of suffering an earnings shock⁴, leaving low-skilled workers in third place, the underlying reason being that many managers were in fact self-employed: about two-thirds in Greece, Italy, and Spain, nearly half in Portugal. On the contrary, the share of managers who were self-employed was just over a quarter in Denmark, less than a fifth in Germany and the Netherlands, and only 3% in France. In those four countries, low-skilled workers, skilled service workers, and skilled industrial workers were more at risk of earnings shocks than were managers.

Interestingly, in Southern Europe the risk of earnings shock faced by skilled industrial workers was greater than skilled service workers, while the opposite was the case in the other four countries. In Greece, skilled industrial workers were more at risk of experiencing an earnings shock than were low-skilled workers; in Portugal, almost as much.

⁴ This finding seemingly partly contrasts with that of previous research (Gioachin et al., 2023), where the risk of poverty in Italy and Spain (and also in France and the UK) was found to be persistently stratified, remaining low for upper-class occupations while increasing further for working-class ones. Clearly, it is possible for both findings to hold at the same time, if the earnings losses suffered by managers, though large (>20%), are not sufficient to plunge their families into poverty.

4.4 Decomposing Differences in the Incidence of Earnings Shocks

The descriptive analysis presented above suggests that the share of earnings shocks is greatest at the bottom and at the top of the earnings distribution, among the self-employed (and, to a lesser extent, fixed-term workers), and among small entrepreneurs (and, to a lesser extent, low-skilled workers, and managers). Furthermore, the risk of earnings shock increases at an accelerating rate as GDP growth slows down and becomes negative (i.e. in a recession).

This makes it easier to understand why the incidence of earnings shocks in 2006–2017 was so high in Greece, Spain, Portugal, and even Italy. In no South European country was the share of permanent employees greater than in any of the four comparator countries. In terms of share of self-employment, Greece (33.5% in 2006–2017) and Italy (22.2%) far outperformed all other EU countries. The share of small entrepreneurs and low-skilled workers combined ranged from 42% (Greece) to 32–35% in Portugal, Italy, and Spain, compared to 20–22% in Germany and France, and 16–18% in Denmark and the Netherlands. As for GDP growth, it was consistently lower in Southern Europe than in the four comparator countries over the period considered here, especially during the Euro crisis when it was negative. Table 2 shows the average values of all variables by country, averaged over 2006–2017.

We shed more light on the differential in the incidence of earnings shocks between Southern Europe and the four comparator countries by resorting to a Blinder–Oaxaca decomposition. As explained in Sect. 3, this method consists in decomposing the earnings shocks differential between South European and comparator countries into three components: (i) an *endowment* effect, showing the change in the average share of earnings shocks in Southern Europe if explanatory and control variables in Greece, Italy, Spain and Portugal had the same average values as in France, Germany, the Netherlands, and Denmark; (ii) a *coefficient* effect, showing the change in the average share of earnings shocks in Southern Europe if

Table 2 Mean values of explanatory and control variables (2006–2017)

	EL	ES	IT	PT	FR	DE	NL	DK
GDP growth (%)	-3.0	0.1	-0.5	-0.1	0.9	1.5	1.3	0.5
Age (average)	42.5	42.0	43.2	43.2	43.3	44.4	41.9	44.0
Gender (% female)	40.4	43.8	42.2	48.6	49.1	48.4	46.3	49.2
Education (%)								
high (ISCED 5–8)	35.4	39.1	23.5	20.6	37.9	44.6	40.1	37.1
middle (ISCED 3–4)	40.6	24.2	43.7	21.3	46.3	47.6	43.3	46.5
low (ISCED 0–2)	24.0	36.7	32.8	58.1	15.8	7.8	16.6	16.4
Occupational class (%)								
managers	6.9	5.5	3.3	5.8	8.0	5.9	7.8	6.3
professionals	17.5	15.9	15.0	14.5	16.3	21.3	27.0	28.5
technicians	6.9	10.1	14.3	9.3	18.8	23.0	18.2	14.6
small entrepreneurs	21.2	8.9	15.6	7.2	5.0	4.4	6.2	3.8
skilled service workers	13.2	14.8	14.8	12.6	18.7	11.3	17.0	17.7
skilled industrial workers	13.8	18.3	18.8	25.6	15.9	18.1	11.9	16.0
low-skilled workers	20.7	26.6	18.2	25.1	17.4	16.0	11.9	13.1
Employment status (%)								
permanent employees	52.2	62.8	66.9	72.1	79.9	81.1	69.7	86.5
fixed-term employees	14.3	22.6	10.9	16.3	12.7	12.8	11.8	2.9
self-employed	33.5	14.6	22.2	11.6	7.4	6.2	18.6	10.7

Source: our elaborations on EU-SILC longitudinal data (for Germany: SOEP). GDP growth: Eurostat

explanatory and control variables there exerted the same influence as in the four comparator countries, and (iii) an *interaction* effect capturing how endowment and coefficient effects might interact.

The method consists in estimating two logistic regression models, one for each subset of countries, before proceeding to the decomposition analysis. The results of the logistic regressions, presented in Table A.2 in the Appendix, confirm that fixed-term employees and the self-employed (in terms of employment status), skilled industrial workers, and low-skilled workers, and small entrepreneurs (in terms of occupational class), were at higher risk of experiencing an earnings shock in both subsets of countries. Also, as regards our control variables, that risk tended to decrease with age, and with education attainment. The results of the logistic regressions suggest that the relationship between the risk of earnings shocks and the level of earnings was different when other effects were held constant than when they were not accounted for (as was the case in Fig. 4). In Southern Europe, the pattern became J-shaped in Table A.2: the bottom and the top quintiles both featured a higher risk of earnings shocks than the middle quintiles 2–4, with highest earners being more at risk than lowest earners, other things being equal. In the four comparator countries, the reverse J-shaped pattern held: the risk of suffering an earnings shock was highest among lowest earners, then fell as earnings rose, increasing again at the top quintile without reaching the level of risk faced by quintile 1 (or, for that matter, quintile 2). This divergence between what Table A.2 and Fig. 4 each suggest is due, of course, to the fact that the latter is the product of descriptive analysis, a simple cross-tabulation of share of earnings shocks by earnings quintile prior to the shock, while the former is the result of regression analysis, showing the effect of prior earnings on the risk of earnings shock over and above the effect of all other variables.

Composition effects are also important: if a certain characteristic (say, being self-employed) exerts a strong influence on an individual's risk of earnings shock, then the overall incidence of earnings shocks will tend to be higher in those countries where that characteristic is more common. As explained above, the very strength of Blinder-Oaxaca decomposition is precisely that it makes it possible to estimate the risk of earnings shock counterfactually, e.g. if self-employment had been as common in Southern Europe as it is in countries further north (*endowment* effect). The results of the decomposition are shown in Table 3.

Overall, the average incidence of earnings shocks in 2006–2017 was 19.1% in the four South European countries combined, compared to 13.0% in the four comparator countries combined (adjusting sample weights as if all countries had the same population size). The results reveal that the endowment effect accounted for over two thirds of the gap between the two sets of countries. Indeed, if the structure of South European labour markets, the socio-demographic composition of their labour force, and GDP growth had been the same as in the four comparator countries, the incidence of earnings shocks in the Southern Europe would have been 4.4% points lower. In terms of the contribution of each set of variables, employment status differences accounted for over half of the endowment effect (2.2% points). In other words, had the share of self-employment and temporary employment in Greece, Italy, Spain, and Portugal been the same as in France, Germany, the Netherlands, and Denmark, the average incidence of earnings shocks would have been 16.8% rather than 19.1% in 2006–2017. Differences in GDP growth and occupational classes exerted a smaller influence (both below 1% point).

Table 3 Blinder–Oaxaca decomposition of the differential in earnings shocks between Southern European and comparator countries (2006–2017)

			Contribution to total (%)	Standard error	$P > z$
Incidence of shocks (%)					
Comparator countries	13.0			0.001	0.000
Southern Europe	19.1			0.001	0.000
difference	-6.1			0.002	0.000
Decomposition of difference					
endowments	-4.4			0.001	0.000
coefficients	-2.5			0.003	0.000
interaction	0.8			0.002	0.000
Decomposition of effect of endowments					
age	-0.1	0.9		0.000	0.001
gender	0.1	-1.9		0.000	0.000
education	-0.7	11.1		0.001	0.000
occupational class	-0.7	11.2		0.001	0.000
employment status	-2.2	36.7		0.001	0.000
earnings quintile	0.0	0.6		0.000	0.027
GDP	-0.8	13.5		0.001	0.000
Decomposition of effect of coefficients					
age	-0.6	10.5		0.003	0.027
gender	-0.1	1.3		0.000	0.001
education	0.0	0.3		0.000	0.438
occupational class	0.2	-3.5		0.001	0.001
employment status	-0.2	3.1		0.001	0.093
earnings quintile	-0.4	7.0		0.000	0.000
GDP	-0.4	5.8		0.001	0.000
constant	-1.0	17.1		0.003	0.002
Decomposition of effect of interaction					
age	0.2	-2.7		0.000	0.000
gender	0.1	-2.2		0.000	0.003
education	0.7	-11.4		0.002	0.000
occupational class	0.0	-0.2		0.002	0.937
employment status	-0.8	13.1		0.002	0.001
earnings quintile	-0.4	7.2		0.001	0.000
GDP	1.1	-17.6		0.002	0.000

On the other hand, the coefficient effect was also significant, even though not as strong as the endowment effect. The difference in the sign and intensity of the selected regressors accounted for 2.5 points of the gap between the two sets of countries, meaning that the same factors produced more earning shocks in Southern Europe than in Northern and Western Europe. In particular, male, low-educated workers aged 25–50 were more exposed to the risk of suffering an earnings shock in Southern Europe than their counterparts in comparator countries. Furthermore, the same level of poor economic performance was likely to produce a higher incidence of earning shocks in Southern Europe than was the case elsewhere.

5 Concluding Remarks

Our paper aimed to explore how the high incidence of earnings shocks in the 2010s in Southern Europe was caused by adverse economic conditions interacting with a labour market characterised by a high share of non-standard work. Our results confirm that the self-employed were more likely to suffer an earnings shock than those in dependent employment, while among the latter, fixed-term employees were more at risk than permanent ones. Also, in terms of occupational class, small entrepreneurs were more likely to suffer an earnings shock than any other group.

The logistic regression revealed that the distribution of earnings shocks by level of earnings prior to the shock, accounting for confounding factors, was J-shaped: middle earners were least likely to suffer an earnings shock. The pattern was not symmetrical: in Southern Europe, with those in the top 20% of the earnings distribution facing the highest risk of suffering an earnings shock, while in comparator countries it was reverse J-shaped, with workers in the bottom 20% being at greatest risk, other things being equal.

Furthermore, the share of workers who having suffered an earnings shock continued one year later to earn less than 80% of what they earned prior to the shock tended to be higher in Southern Europe, where it peaked during the worst years of the Euro crisis (2010–2013). Indeed, negative GDP growth was associated with a higher share of earnings shocks, especially in Southern Europe where in the 2010s not only did the economy perform worse, but at any given level of negative GDP growth, the share of earners suffering an earnings shock was higher than in the four comparator countries. What is more, the pattern seemed to be non-linear: as recessions became deeper, the share of workers suffering an earnings shock increased faster.

The latter observation seemed to suggest an intriguing possibility. Could it be that Southern Europe's predicament is that recessions expose vulnerabilities that already exist, but are less visible when times are good? In other words, could it be that structural features of the labour market (e.g. a high share of temporary work, or self-employment) render workers susceptible to the risk of experiencing a large earnings loss, which recessions then bring out to the open? (Let alone when such recessions happen to be deeper in Southern Europe, as they did in the period examined here, which covers the Great Recession and the Euro crisis).

We tested this hypothesis by applying a Blinder–Oaxaca decomposition. The question we asked was: What if the employment status and occupational class (and GDP growth, age, gender, and education characteristics) in South European countries had been as in the four comparator countries? Would the earnings shock differential have been eliminated as a result? We found that differences in employment status, followed at some distance by differences in economic performance measured by GDP growth, and by differences in occupational class, accounted for the largest part of the earnings shock differential between South European and comparator countries.

In other words, our results seem to imply that the main reason South European workers are so susceptible to large earnings losses is that they are more likely to be self-employed or in temporary jobs than their counterparts elsewhere in Europe. Differences in initial earnings, or occupational class, explained less of the variation in earnings shocks than employment status did. The underlying vulnerability of non-standard workers is exposed when economic prospects worsen. The fact that South European economies performed so poorly during the Euro crisis merely made things worse.

Our empirical findings shed light on two important issues. On the one hand, earnings losses exhibited a rather peculiar pattern. In terms of earnings distribution, middle earners were least affected. In terms of occupational class, those in the middle were internally divided into skilled employees and small entrepreneurs, with the latter being significantly more prone to earnings shocks than the former. Own-account workers (with no employees), and employers in small firms, were among the worst affected. While this was true in all countries, it was markedly so in countries like Greece or Italy, where the high share of small entrepreneurs enormously raised the overall incidence of earning losses.

The greater exposure of small entrepreneurs to economic insecurity in Southern Europe is typically associated with local, small-scale, low-margin economic activities that proved unable to adapt to an economic reality increasingly characterized by higher competition from cheaper imports. The Euro crisis of the 2010s only accelerated trends already at work for at least twenty years (since the fall of the Berlin Wall and China's admission to the World Trade Organization). In Southern Europe, the economic insecurity of small entrepreneurs contrasts with the relative security of salaried technicians and skilled service workers.

On the other hand, our Blinder–Oaxaca decomposition showed that, controlling for age, gender, education, earnings and occupational class, temporary employment also contributed to the higher incidence of earnings shock in Southern Europe. We think it is significant that temporary workers were found to be exposed to a higher risk of earnings shock even when controlling for occupation: it implies that fixed-term contracts greatly contribute to economic insecurity, and that this effect cuts across different occupational groups, affecting high-skilled as well as low-skilled workers.

What happens to those workers experiencing large earnings losses in the longer term, beyond the short term that we have been able to study with the data available, is largely unknown. Some are presumably able to recover, while others descend further to poverty and social exclusion. Moreover, the implications of insecurity for patterns of consumption and investment (including investment on human capital through education), and for the psychological well-being of the workers exposed to it, remain poorly understood. Lastly, the effects of economic insecurity on discontent, loss of trust in institutions and their capacity to protect, and support for political extremism, have only recently begun to attract the attention they deserve.

More research is needed to throw light on these and other related issues. We hope our paper will help stimulate such research.

Appendix

Table A.1 Decomposition of between-group vs. within-group variation

	variation (% of total)	
	between-group	within-group
Dependent variable		
% incidence of earnings shocks	94.2	5.8
Explanatory variables		
% high education (ISCED 5–8)	78.2	21.8
% managers or professionals (ESEG 1–2)	90.6	9.4

Table A.1 Decomposition of between-group vs. within-group variation

	variation (% of total)	
	between-group	within-group
% small entrepreneurs (ESEG 4)	86.7	13.3
% self-employed	75.7	24.3
% fixed-term workers	75.8	24.2

Note: The groups are Southern Europe and comparator countries, consisting of four countries each. Source: our elaborations on EU-SILC data

Table A.2 Logistic regression on risk of earning shock

	Southern Europe	Comparator countries
	Coefficient	
Age (reference group: <25)		
25–50	-0.198***	-0.387***
50+	-0.266***	-0.342***
Gender (reference group: <i>men</i>)		
<i>women</i>	0.138***	0.242***
Education (reference group: <i>ISCED 0–2</i>)		
ISCED 3–4	-0.184***	-0.017
ISCED 5–8	-0.209***	-0.128
Occupational class (reference group: <i>managers</i>)		
professionals	-0.300***	0.026
technicians	-0.163***	0.147***
small entrepreneurs	-0.003	0.322***
skilled service workers	-0.158***	0.163***
skilled industrial workers	0.138***	0.398***
low-skilled workers	0.136***	0.384***
Employment status (reference group: <i>permanent employees</i>)		
fixed-term employees	0.805***	0.663***
self-employed	0.877***	1.239***
Earnings (reference group: <i>Q1 i.e. lowest-paid 20%</i>)		
quintile 2	-0.122***	-0.226***
quintile 3	-0.179***	-0.663***
quintile 4	-0.155***	-0.808***
quintile 5	0.218***	-0.328***
GDP growth	-0.008***	-0.001
Constant	-1.515	-1.635

Note: *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

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