

How does self-employment affect pension income? A comparative analysis of European welfare states

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Abstract

The characteristics of self-employment in Europe have changed profoundly in the last decades. The share of solo self-employment has grown and individuals combine more frequently dependent employment with self-employment at the same time, or more often switch between dependent employment and self-employment. These developments heavily affect the pensions of the self-employed and therefore present a challenge for the old-age security systems of European welfare states. So far, there has been little comparative research on how periods of self-employment in the working career affect pension income in different European welfare states and how this is linked to the institutional design of pension systems. The paper contributes to filling this research gap by investigating the effect of self-employment in the working career on individuals' pension income in 11 European countries. The findings show that self-employment has a negative effect on total pensions of men and women. However, country differences are not significant in men, while in women only in the case of Poland and Belgium are there significant but contradictory effects of the share of self-employment in the working career on total pensions. These effects are due to pension regulations concerning the contribution and benefit calculation rules for self-employed persons.

KEYWORDS

gender, pension income, pensions and retirement, self-employed persons, SHARE data

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1 | INTRODUCTION

In the last decades, the character of self-employment in Europe has changed profoundly. Not only has the share of women among the self-employed increased who also often work in part-time employment, there are also more solo-self-employed, more frequent transitions into and out of self-employment, and more persons combining self-employment and dependent employment (Spasova, Bouget, Ghailani, & Vanhercke, 2017). The described changes on the labour market present a challenge to old-age security systems in Europe because these groups face the risk of poverty more often than other parts of the workforce. However, self-employed are a rather heterogeneous group and the share of “vulnerable” self-employed differs between sectors and countries. It is especially high among farmers and in eastern European countries as well as in France, Italy, and Austria. It is also more common among women compared to men. In contrast, in the Netherlands, the Nordic countries and in Germany self-employed persons are more often in a stable position (Eurofound, 2017). Despite these clear country differences, comparative welfare state research has so far paid only little attention to the old-age security of the self-employed. While there are some studies that deal with old-age security institutions of the self-employed, there is little comparative knowledge on how periods of self-employment in the working career affect pension income. This paper aims at closing this research gap by studying the effect of the duration of self-employment in the working career on individuals' pension income in 11 European welfare states. To explain country differences in the effect of the duration of self-employment on pension income, old-age security institutions for the self-employed are studied. The analysis of pension income is based on the third and fourth wave of the Survey of Health, Ageing and Retirement in Europe (SHARE) and makes use of detailed data on the respondents' working biographies, focusing on respondents in old-age retirement. The investigation of pension income is carried out separately for women and men, as it can be expected that the duration and kind of labour market activity have gender-specific effects on the pension income (Frericks & Maier, 2008).

The paper is organised as follows: In the next section, the literature on old-age security with regard to the self-employed and pension income is discussed. Section 3 deals with the institutional design of old-age security systems for the self-employed, comparing the 11 countries of this study. Section 4 presents the data and method of the analysis; while in Section 5, the empirical findings are described. The paper closes with a discussion of the findings and a conclusion.

2 | LITERATURE REVIEW

In comparative welfare state research, the average production worker (APW) has rather often been at the centre of interest. Prominent examples are the path-breaking study of Esping-Andersen (1990) and the datasets of the Social Policy Indicator database or the Comparative Welfare Entitlements Dataset used in many comparative analyses. More than a quarter-century ago, the focus on the APW was criticised by feminist researchers who argued that this perspective ignores citizens who are not in regular employment, for example, women who do unpaid care work (Lewis, 1992). Another consequence of the focus on the APW is that the self-employed are often not considered in the theoretical concepts of comparative welfare state research. We find this for example in the most popular approach to cluster pension systems—the Bismarck/Beveridge dichotomy—that only implicitly refers to the old-age security of the self-employed. This becomes evident if we look at the features of the two types of pension systems: Bismarckian pension systems are characterised by public social insurance schemes that are based on payroll contributions by employers and employees, providing earnings-related benefits, and that aim at status maintenance; Beveridgean pension systems in contrast cover universal flat-rate pensions that are often tax-financed and provide basic protection (Anderson, 2019; Bonoli & Shinkawa, 2005; Hinrichs, 2016). While universal basic pensions of Beveridgean countries cover inter alia self-employed persons, the characteristics of Bismarckian pension systems only refer to the institutional design of employees' old-age security. One can argue that putting employees at the

centre of interest is valid and pragmatic because it is the goal of the Bismarck/Beveridge dichotomy to capture the basic principles of old-age security systems, and employees represent the majority of the labour force in the Western welfare states. How the old-age security of the self-employed is designed in different welfare states is, however, not explicitly considered in the Bismarck/Beveridge dichotomy. This is also the case for more nuanced approaches, which pay attention to the development of the mix of public, occupational and private pensions in European welfare states (e.g., Ebbinghaus & Gronwald, 2011).

In the literature on the old-age security of the self-employed, there are some detailed single country studies (e.g., Cantillon, 2004; Fachinger & Frankus, 2015), but there has so far been little comparative research. However, some authors have developed classifications of old-age security systems for the self-employed. For example, Fachinger (2003) differentiates between European welfare states (a) with a basic pension, (b) without a basic pension and with a mandatory insurance for all self-employed and (c) without a basic pension and only partial or no mandatory insurance at all for self-employed. Countries belonging to the first group are Denmark, Sweden and the Netherlands, while the second group consists of Belgium, France and Austria. Germany, Italy and Spain belong to the third group. Among the European welfare states, Choi (2009) differentiates between three types of pension systems with regard to the rules of pension coverage. First, there are countries with a basic pension based on the principle of national insurance. The Netherlands and Sweden are examples of this type. Secondly, there are earnings-related pensions that include employees and self-employed, for example, Switzerland and Austria. The third type are countries with separate schemes for self-employed like Germany, Belgium, France, Italy, Spain and Poland. Both classifications have in common that the first group corresponds to a large extent to the Beveridgean cluster, while the Bismarckian countries are divided into two groups, albeit based on different characteristics.

Although these studies provide important insights into the institutional design of old-age security for the self-employed, there are only few comparative investigations of pension outcomes for the self-employed and how these outcomes differ among European welfare states. Pettinicchi and Börsch-Supan (2019) find that formerly self-employed persons have on average lower pensions and a higher risk at poverty than former employees. However, the authors do not control for socio-economic parameters and occupational differences between self-employed and do not consider the influence of different pension systems. Other findings indicate that pension gaps between self-employed and employees are less pronounced in countries with basic pensions like Denmark or Switzerland (OECD, 2019:74f.). Nevertheless, there are no systematic analyses yet on the effect of self-employment on pension income and the moderating influence of different pension systems. In this context, it is likely that there are gender-specific differences in how old-age security institutions affect pension income because women's pensions are influenced by institutional differences while this is not the case in men (Möhring, 2015).

The paper goes beyond existing research with a twofold aim: It explicitly investigates differences between European welfare states in whether and in how far the duration of self-employment in the working career affects pension income while also considering differences between men and women. Furthermore, it analyses whether the findings are due to differences in the institutional characteristics of the study countries' pension systems. For this purpose, the next section discusses the institutional design of the pension systems for old-age security of the self-employed in Denmark, Sweden, Germany, France, Belgium, the Netherlands, Poland, Austria, Switzerland, Italy and Spain.

3 | OLD-AGE SECURITY OF THE SELF-EMPLOYED

Before the characteristics of the different old-age security systems for self-employed in the study countries are presented, some limitations have to be mentioned. First of all, the overview in this section refers exclusively to public old-age security schemes, leaving out voluntary occupational and private pension regulation, which belong to the second and third pension pillar. This is because public pensions constitute the most important part of the total pension (see Section 5.1) and for most self-employed in Europe, a second pillar occupational pension is not accessible,

although there are some exceptions like physicians in the Netherlands who have access to a special scheme (Damman & van Solinge, 2018). Characterising second and third pillar pensions for self-employed would go beyond the scope of this paper. Second, in many Bismarckian countries, there are several pension schemes for the self-employed in different occupations. Germany is an example of a welfare state with a very fragmented old-age security for the self-employed: While craftsmen, midwives, self-employed teachers and some other professions are included in same scheme as employees (GRV), the “liberal professions” (e.g., physicians, lawyers, architects) have their own mandatory pension schemes. Moreover, farmers are also organised in a separate mandatory scheme and there is a scheme for artists and writers. However, many self-employed in Germany do not have any mandatory old-age security (Fachinger & Frankus, 2015). In welfare states with several old-age security schemes for self-employed and varying regulations, the quantitatively most important pension scheme is considered here. Lastly, it is important to notice that the SHARE respondents analysed in this paper retired at different points in time while different pension regulations were in effect. Therefore, it is beyond the scope of this paper to identify all possible regulations in the 11 countries depending on the respondents' beginning of retirement. However, as the respondents studied in this paper were at least 65 years old in 2008 (see Section 4), pension regulations are not considered that came into effect shortly before 2008 and thereafter, or that do not concern this cohort.¹

According to the literature, there are five institutional characteristics that are relevant in comparing old-age security systems for the self-employed (Choi, 2009; Fachinger, 2003; Traub, 2013). First, an important characteristic of a pension system for self-employed is whether there is a universal basic pension with a flat-rate benefit.² Among the study countries, this is the case in Denmark, Sweden,³ the Netherlands and Switzerland. These countries are mainly attributed to the Beveridge type. Although the benefits of the Swiss AHV are earnings-related, the variation in the benefit level is rather low, so it is considered a quasi-flat-rate pension (Bonoli & Shinkawa, 2005).

Second, some countries provide a contribution-based pay-as-you-go (PAYG) public pension that might be combined with a basic pension (Sweden and Denmark) or not (Germany, France, Belgium, Austria, Poland, Italy and Spain). Only the Netherlands and Switzerland do not offer such a pension scheme.

Thirdly, old-age security for the self-employed can be mandatory for all self-employed or not. In Italy, Spain and Germany, there is no mandatory old-age security for all self-employed. In Denmark, self-employed can choose to be insured in the contribution-based public scheme ATP if they have been at least 3 years in dependent employment and have paid contributions in this period (Traub, 2013). Old-age security is mandatory for all self-employed in the other seven welfare states.

Fourthly, the contributions the self-employed pay toward their pensions might differ from those of employees.⁴ The contribution base is not identical in the 11 countries, and for all countries, we can expect that some self-employed do not report their income correctly. This is especially the case in Spain and Poland. In both countries, the level of old-age security contributions is the same for employees and self-employed, but self-employed can self-assess their income basis to determine how much in social security contributions they have to pay. Most self-employed choose to report the lowest possible income (Boldrin, Jimenez-Martin, & Peracchi, 1999; Choi, 2009). Farmers, who represent a large group of the self-employed in Poland, have special contribution regulations in their pension scheme. Contributions are flat rate and therefore the amount of the pension benefit depends mainly on the duration of insurance (Chłoń-Domińczak, 2004). In Italy, Belgium and (to a lesser extent) in France, Switzerland and the Netherlands, self-employed pay lower contributions than employees. This is also the case in Austria, but the welfare state grants pension entitlements equal to those of employees, though lower contributions are paid. In Denmark and Sweden as well as in Germany in the GRV, there are no differences in the contribution level for self-employed and employees.

Finally, there might be differences between self-employed and employees in the way pension benefits are calculated. Among our study countries, there are mostly no differences in the calculation rules. However, some countries that have special pension schemes for at least some groups of self-employed apply different calculation rules. This is the case in France, Poland and Germany where there are special schemes and rules for farmers. In Belgium, differences in the benefit calculation for employees and self-employed concern all self-employed: Not only is the minimum

TABLE 1 Characteristics of the first pension pillar for self-employed

| | AT | DE | SE | NL | ES | IT | FR | DK | CH | BE | PL |
|---|--------------------|--------------------|-------|--------------|-------|-------|--------------------|--------------------------------------|--------------|----------------------------|--------------------|
| Universal basic pension | No | No | Yes | Yes | No | No | No | Yes | Yes | No | No |
| Earnings-related public pension | Yes | Yes | Yes | No | Yes | Yes | Yes | Yes | No | Yes | Yes |
| Mandatory for all self-employed | Yes | No | Yes | Yes | No | No | Yes | Basic pension: Yes Yes ATP: No | Yes | Yes | Yes |
| Contribution level compared with that of employees ^a | Equal ^b | Equal (GRV) | Equal | Little lower | Equal | Lower | Little lower | Equal | Little lower | Lower | Equal ^b |
| Benefit calculation compared with that of employees | Equal | Equal ^c | Equal | Equal | Equal | Equal | Equal ^c | Equal | Equal | Different (lower benefits) | Equal ^c |

^aThe reference is total pension contributions of labour costs including the employee's and employer's share of the pension contributions.

^bDifferent contribution rate for farmers.

^cDifferent schemes and benefit calculation for farmers.^aSource: Author's own compilation based on Choi (2009), Fachinger (2003), Schludi (2005) and Traub (2013).

pension level lower for self-employed who fulfil the requirements for such a pension (Cantillon, 2004; Peeters, 2016:56ff.); also the maximum pension they can receive is lower than the maximum pension for employees (Peeters, 2016:73f.). Table 1 presents an overview of the institutional characteristics discussed in this section.

4 | DATA AND METHODS

4.1 | Database

To study pension incomes of older persons with different working careers, data from SHARE are analysed (Börsch-Supan, 2019a, 2019b). SHARE is based on a probability sample of respondents aged 50 or older and their spouses independent of age (the sampling design of the countries differs somewhat; see Klevmarcken, Swensson, & Hesselius, 2005). The third wave (SHARELIFE) carried out in 2008/09 contains retrospective questions on the respondent's working life, capturing the whole employment career. Variables on the pension income are taken from the fourth wave of SHARE carried out in 2011, because SHARELIFE contains information on only the first pension the respondent ever received. The variables refer to the previous year, that is, 2010. Because the focus is on respondents of pension age, respondents born before 1944 were selected, that is, who were at least 65 years old in the third wave and reported that they were retired. The sample contains respondents from 11 European countries: Denmark, Sweden, Germany, France, Belgium, the Netherlands, Poland, Austria, Switzerland, Italy and Spain. In total, 8,533 individuals were selected, 3,828 men and 4,705 women who participated in the third as well as in the fourth wave of SHARE.

4.2 | Variables

The four dependent variables are the self-reported total amount of pensions received, comprised of public pensions (these can be regular old-age pensions, but also survivor pensions or pensions paid to former civil servants), occupational pensions as well as private pensions and life insurances. For the analysis, the multiple imputed variables provided by SHARE were used for public, occupational and private pensions. The variable for total pensions was computed from the three pension components. Information is given as the annual pension income after taxes, which is logarithmised and given in purchasing power parities (PPP). For the Netherlands, it was not possible to use the imputed variables for the public and occupational pensions because these variables were computed differently than the imputed variables for the other countries. This is why for the Netherlands, non-imputed data were selected for the analysis of the public and occupational pensions and these variables are based on the same sub-categories of pension schemes as the imputed variables for public and occupational pensions.

Importantly, the total pension income does not equal the total old-age income of formerly self-employed persons. Revenues from capital or income from rent or sublet are also important components of total old-age income. Especially self-employed who were high earners during their working career are likely to have other sources of income in old age beside pensions. However, these sorts of old-age income are not considered in this analysis because it is the goal of this paper to study whether and how differences in *the institutional design of old-age security systems* are likely to affect pension income. Including other sources of income beside pensions would bias the conclusions, which can be drawn from the analysis.

To investigate the influence of self-employment on pension income, the share of self-employment in the working career is used as the central independent variable. The variable is computed as the share of self-employment in order to avoid multicollinearity when controlling for the duration of the working career in years. The second independent variable of interest is the respondent's country, as it is the goal of the analysis to study how the effect of the share of self-employment differs among individuals from each of the 11 countries.

As control variables, the duration of the working career in years and the share of part-time employment in the working career are included in the analysis. A long employment career has a positive effect on the pension income

while a higher share of part-time employment has the opposite effect (Hinrichs & Jessoula, 2012). To avoid problems due to implausible data entries in the SHARELIFE data, computation of the variables for the working career in years, the share of self-employment and part-time employment in the working career is based on the Job Episodes Panel. Moreover, the respondent's education level is considered a control in the analysis because a higher education is associated with higher pensions (Fasang, Aisenbrey, & Schömann, 2013). The education level is coded on the basis of the ISCED 1997 classification and summarised in three categories for the purpose of this analysis: high (ISCED levels 5–6), medium (ISCED levels 3–4) and low (ISCED levels 0–2) educational attainment (UNESCO, 2018). Another important determinant of pension income is the position of the job the respondent has worked in, since a higher occupational position leads to a higher income and therefore higher pension entitlements and savings (Vandecasteele, 2010). Here, the last job position before retirement is used as control variable. It is based on the ISCO 88 code and given in five categories (unskilled worker, skilled worker, clerk/sales worker, technician, professional/manager). Finally, the share of working years in different parts of the industry is used as control variable based on the NACE code and summarised in four categories (agriculture, production industry, trade/transport, other service sector). The respondent's industry is important in the study of pension income and self-employment because old-age security of the self-employed is in many countries organised by profession or occupational group. Old-age security schemes for farmers in Germany, Poland or Spain are an example for this (Choi, 2009).⁵

4.3 | Method

In the data for this analysis, the individual respondents are nested within the countries. As it is the goal of the paper to analyse whether and in what way the effect of self-employment in the working career differs between individuals from the 11 study countries, a method is necessary that includes the country level as well as variables on the individual level. For the purpose of this paper, mixed or random effect models are not an appropriate

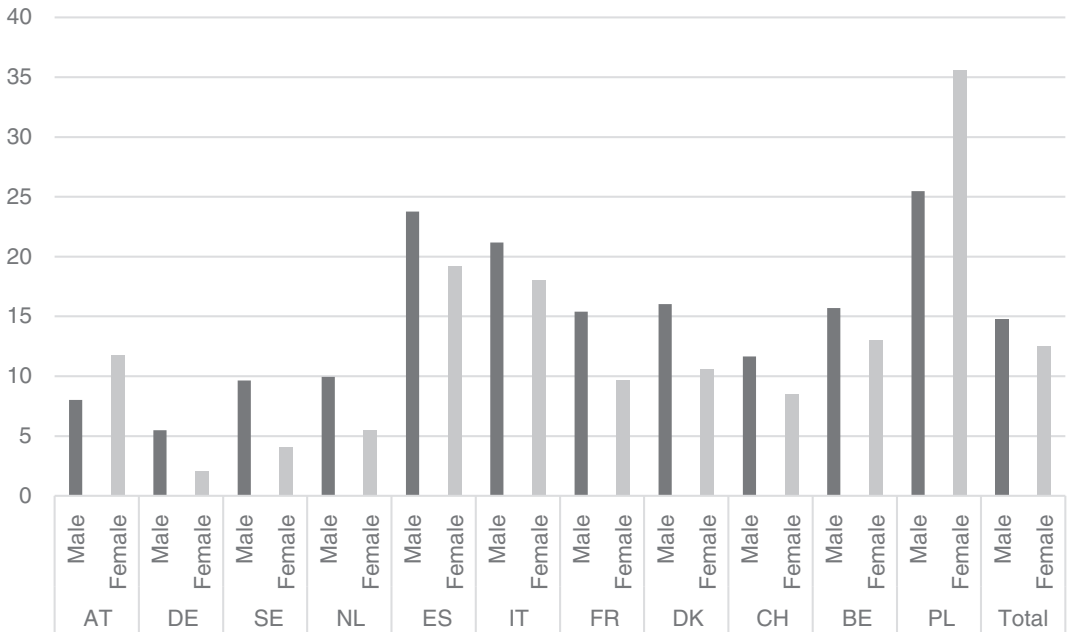


FIGURE 1 Average share of self-employment in the working career per country. Source: Author's own compilation based on the third and fourth wave of SHARE

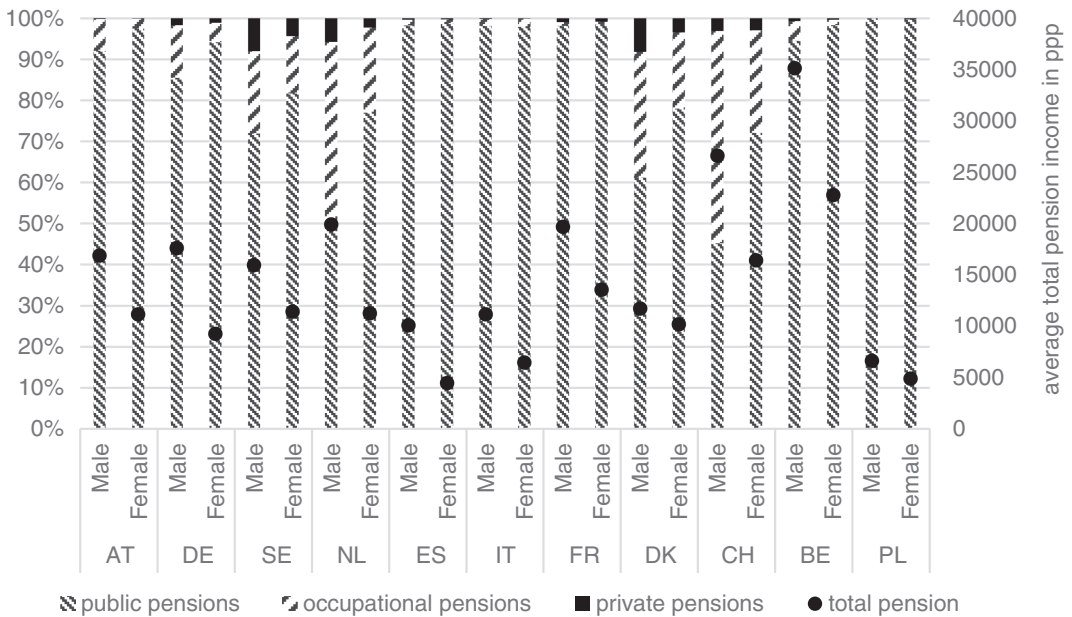


FIGURE 2 Composition of the average total annual pension income in PPP per country.

Source: Author's own compilation based on the third and fourth wave of SHARE, imputed data, for NL non-imputed data were used

approach because in the sample there are only 11 units at the country level. Applying mixed or random effects models is problematic if the number of second-level units is so low because it is difficult to control for a sufficient number of variables on the country level. The consequence would be unreliable estimates for the variables on the country level (Bryan & Jenkins, 2016). An alternative approach to random or mixed models in case of too few country level units is to use fixed-effects models with cross-level interactions between the country and the individual level (country fixed-effects) (Möhring, 2012). Although it is in the nature of fixed-effects models that estimates of the second-level variables (here country dummies) cannot be reported, cross-level interactions do allow us to include country effects in the analysis (Allison, 2009:19). A basic fixed-effects model with a cross-level interaction can be expressed as

$$Y_{ij} = \mu_0 + \beta X_{ij} + \gamma Z_j X_{ij} + \alpha_j + \varepsilon_{ij}$$

with y_{ij} is the estimated value of the dependent variable for a person i in country j ; μ_0 is the intercept for all countries, β is the coefficient of the individual-level variable x of a person i from country j , γ is the coefficient for a cross-level interaction between a country-specific variable z for country j with the individual-level variable x_{ij} , α_j is the residual for the country level, while ε_{ij} is the residual for the individuals in the countries.

In this paper, cross-level interactions between the country and the share of self-employment in the working career are included in the models beside the individual-level variables. To ease the interpretation of the interaction effects only the interaction between the share of self-employment and one country dummy are included at one time. The interaction effect is the effect for the respondents from the respective country, while the main effect is that for respondents from the other countries. Moreover, separate models for men and women are estimated to investigate whether there are gender differences between the countries in the effect of the share of self-employment in the working career.

TABLE 2 Fixed-effects models for the total pension income with individual-level characteristics only

| | Women | | Men | |
|----------------------------------|-----------|-------|-----------|-------|
| | Estimate | SE | Estimate | SE |
| Share self-employment | −0.007*** | 0.002 | −0.005*** | 0.001 |
| Education low ^a | −0.132 | 0.128 | −0.231** | 0.082 |
| Education medium ^a | −0.022 | 0.127 | −0.107 | 0.076 |
| Last job unskilled ^b | −0.211 | 0.171 | −0.179 | 0.097 |
| Last job skilled ^b | −0.439* | 0.191 | −0.275** | 0.096 |
| Last job clerk ^b | −0.216 | 0.146 | −0.021 | 0.091 |
| Last job technician ^b | −0.145 | 0.212 | 0.065 | 0.099 |
| Working years | 0.039*** | 0.003 | 0.010** | 0.004 |
| Share part-time | −0.002 | 0.001 | 0.003 | 0.003 |
| Share agriculture | 0.001 | 0.002 | 0.001 | 0.001 |
| Share production | 0.003 | 0.001 | 0.001 | 0.001 |
| Share trade | 0.002 | 0.001 | 0.000 | 0.001 |
| Share other service | 0.003* | 0.001 | 0.002 | 0.001 |
| Intercept | 8.827*** | 0.142 | 9.531*** | 0.072 |
| Adjusted R ² | 0.058 | | 0.025 | |
| N | 3,853 | | 3,665 | |

^aReference: high education.

^bReference: Last job professional/manager.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Source: Author's own calculations based on the third and fourth wave of SHARE, imputed data.

As mentioned above, the imputed variables for public and occupational pensions were designed differently for the Netherlands. This is why Dutch respondents were excluded from the fixed-effects models for public and occupational pensions. Instead, robust regressions were estimated with the non-imputed data for the Dutch respondents only. The findings are reported in the next section and the table for the robust regressions is documented in the Appendix (Table A1). In the case of total and private pensions, however, Dutch respondents are included in the fixed-effects models with cross-level interactions.

5 | EMPIRICAL FINDINGS

5.1 | Descriptive statistics

If we compare the average shares of self-employment in the 11 countries, it is particularly high in Poland, followed by Spain and Italy. Also, Belgian, Danish and French men have a share of self-employment in the working career that is above the total average. Poland and Austria are exceptions among the countries as in these two cases women have a higher share of self-employment than men. Polish women are outstanding among the respondents since their average share of self-employment is above 35%. In contrast, we find the lowest share of self-employment in the working career for both sexes combined in Germany, Sweden and the Netherlands (see Figure 1). It is plausible that countries with a traditionally large share of self-employed in the workforce like Poland, Italy and Spain show a higher average share of self-employment in the working career (Spasova et al., 2017:21f.). Recent trends in the

TABLE 3 Country-level interaction effects for the total pension, based on fixed-effects models

| | Women | | Men | |
|-----------------------|-----------|-------|-----------|-------|
| | Estimate | SE | Estimate | SE |
| Share self-employment | −0.007*** | 0.002 | −0.005*** | 0.001 |
| Share self-emp*AT | −0.003 | 0.006 | −0.009 | 0.005 |
| Share self-employment | −0.006*** | 0.002 | −0.005*** | 0.001 |
| Share self-emp*DE | −0.015 | 0.012 | −0.004 | 0.004 |
| Share self-employment | −0.007*** | 0.002 | −0.005*** | 0.001 |
| Share self-emp*SE | −0.002 | 0.008 | 0.003 | 0.004 |
| Share self-employment | −0.007*** | 0.002 | −0.005*** | 0.001 |
| Share self-emp*NL | 0.001 | 0.006 | 0.003 | 0.003 |
| Share self-employment | −0.008*** | 0.002 | −0.005*** | 0.001 |
| Share self-emp*ES | 0.006 | 0.004 | 0.002 | 0.002 |
| Share self-employment | −0.007*** | 0.002 | −0.004*** | 0.001 |
| Share self-emp*IT | 0.002 | 0.004 | −0.002 | 0.002 |
| Share self-employment | −0.007*** | 0.002 | −0.005*** | 0.001 |
| Share self-emp*FR | 0.008 | 0.004 | 0.003 | 0.003 |
| Share self-employment | −0.007*** | 0.002 | −0.005*** | 0.001 |
| Share self-emp*DK | −0.001 | 0.005 | 0.003 | 0.003 |
| Share self-employment | −0.006*** | 0.002 | −0.004*** | 0.001 |
| Share self-emp*CH | −0.004 | 0.006 | −0.007 | 0.004 |
| Share self-employment | −0.004* | 0.002 | −0.005*** | 0.001 |
| Share self-emp*BE | −0.019*** | 0.004 | 0.000 | 0.002 |
| Share self-employment | −0.008*** | 0.002 | −0.005*** | 0.001 |
| Share self-emp*PL | 0.009* | 0.003 | −0.001 | 0.003 |

Note: Separate models per country, main effects are for respondents from the other countries, control variables as in Table 2.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Source: Author's own calculations based on the third and fourth wave of SHARE, imputed data.

development of employment—like the increase of self-employment in the Netherlands since the late 2000s—are however not within the scope of this analysis.

Figure 2 presents the descriptive findings for the average composition of the total pension income in the study countries. It is striking that the composition of the average total pension differs considerably between the countries. Although in all countries, public pensions are the most important part of the pension mix, their average share of the overall pension varies between roughly 50% in case of Dutch men to almost 100% in case of Polish women. The share of occupational pensions is in general higher in men than in women. In Dutch, Swiss and Danish men, the share of occupational pensions is particularly high. In Swedish pensioners, occupational pensions constitute a smaller part of the total pension income. In the countries with pension systems belonging to the Bismarckian cluster, public pensions play an even more important role. Among these countries, occupational pensions are on average highest in Germany. Private pensions present the smallest part of the pension mix. The degree of private pensions is highest in Swedish, Danish and Dutch men.

Figure 2 also shows the average total pension of men and women in PPP. Pension payments are highest for respondents from Belgium and Switzerland, and lowest for respondents from Poland, followed by Spain and Italy. In

TABLE 4 Overview of the fixed-effects models with cross-level interactions for public, occupational and private pensions

| | | Women | Men |
|-----------------------|-----------------|------------------------------------|--|
| Public pensions | Not significant | AT, DE, SE, NL, ES, IT, FR, DK, CH | AT, DE, SE, NL, ES, IT, FR, DK, CH, BE, PL |
| | Positive | PL | – |
| | Negative | BE | – |
| Occupational pensions | Not significant | AT, DE, ES, IT, FR, BE | AT |
| | Positive | PL | FR, BE, PL |
| | Negative | SE, DK, NL, CH | DE, SE, IT, ES, DK, NL, CH |
| Private pensions | Not significant | AT, DE, NL, ES, IT, FR, CH, BE, PL | AT, DE, SE, IT, FR, CH, BE, PL |
| | Positive | DK, SE | SE, DK, NL, ES |
| | Negative | – | – |

Abbreviations: AT, Austria; DE, Germany; SE, Sweden; NL, Netherlands; ES, Spain; IT, Italy; FR, France; DK, Denmark; CH, Switzerland; BE, Belgium; PL, Poland.

Source: Author's own compilation based on the third and fourth wave of SHARE, imputed data; for NL, non-imputed data were used for public and occupational pensions.

all countries, men have on average higher pensions than women. The gender gap is less pronounced in Poland and Denmark, and most pronounced in Belgium and Switzerland.

5.2 | Multivariate statistics

5.2.1 | Findings for total pensions

In the fixed-effects models that include only the individual-level variables (see Table 2), we find that in both men and women, a higher share of self-employment in the working career has a negative effect on the total pension income. Studying the control variables, in both sexes a higher number of working years has a positive effect on the pension income. If the respondent was employed as a skilled worker in the last job before retirement, there is a negative effect on the total pension in both men and women (compared with the effect of a higher occupational position). In men, low educational attainment has a negative effect on the pension income compared with the effect of a high education. Finally, in women, a larger share of employment in the “other” service sector has a slightly positive effect on their pension income. It is striking that the variable for part-time employment does not show a statistically significant effect on women's total pension income.

Table 3 presents the main effects of the share of self-employment in the working career and the cross-level interactions between the country and the share of self-employment which are based on the fixed-effects models. While the interaction effect presents the conditional effect of the respective country, the main effect indicates the effect of respondents from the other countries in the sample. The main effects in Table 3 are in all cases very similar to the effect of the share of self-employment in the working career in the models with only the individual-level variables displayed in Table 2.

By including the interaction effects, we find that in men, there are no statistically significant interactions between the country and the share of self-employment in the working career. These findings indicate that, although in the sample men with a higher share of self-employment have lower total pensions, there are no significant differences between the studied welfare states in the way self-employment affects men's pension income. In contrast, in women, there are statistically significant interaction effects between the country and the share of self-employment

in Belgium and Poland. While the effect in Belgium is clearly negative, it is slightly positive in the case of Polish women. To some extent, these findings confirm previous research showing that the institutional design of pension systems moderates the effect of the employment history on the pension income of women, while the effect is not relevant in men (Möhring, 2015). However, country differences play only a limited role in women, too, as only for two countries are there significant interactions.

To understand the country-specific effects of the share of self-employment in the working career, a look at the different components of the total pension is worthwhile.

5.2.2 | Unpacking total pensions

Table 4 contains an overview of the fixed-effects models with country-level interactions for public, occupational and private pensions (the detailed Tables A2–A4 are in the appendix). The findings on public pensions for men and women are in line with the findings for the total pensions. Only in Belgian and Polish women is there a statistically significant effect, indicating the same direction as in total pensions. A higher share of self-employment affects occupational pensions negatively in Swedish, Danish, Dutch and Swiss women, as well as in German, Swedish, Danish, Dutch, Italian, Spanish and Swiss men. In Polish women as well as Polish, Belgian and French men, there is a positive effect of the share of self-employment on occupational pensions. This finding is rather surprising. In Austrian men and Austrian, German, Spanish, Italian, French and Belgian women, we do not find a significant effect on occupational pensions. Lastly, there is a positive effect of the share of self-employment on private pensions in Danish and Swedish women as well as Danish, Swedish, Dutch and Spanish men. In the other cases, there is no significant effect.

How can we interpret these findings? At first glance, it seems the findings for total pensions are determined by the same effect we find for public pensions. This is because the direction and significance of the country effects are the same for total and public pensions. Nevertheless, there are some important findings for occupational and private pensions. It seems that, in some countries (Denmark and Sweden for men and women and the Netherlands and Spain for men), higher private pensions compensate at least to some extent for lower occupational pensions. In contrast, in Poland, France and Belgium, the share of self-employment has a small but positive effect on occupational pensions. This can be due to the fact that specific occupational groups of self-employed are offered additional occupational pension schemes beside the mandatory earnings-related old-age security in these countries.

6 | DISCUSSION

The empirical findings show that there are gender differences in the way the share of self-employment in the working career affects the total pension income. In men, none of the cross-level interaction effects is statistically significant. This confirms previous research that differences in the institutional design of pension systems hardly affect men's pension income.

In contrast, we find a significant effect of the share of self-employment on women's total pension income in two countries. While there is a clearly negative effect for Belgium, the effect is small but positive for Poland. This observation raises the question: what characteristics of the pension systems are relevant for the empirical findings on pension incomes? A detailed investigation of public, occupational and private pensions has shown that the results for women's total pensions in Belgium and Poland are most likely due to corresponding effects of public pensions. Therefore, the regulation of public pensions in the two countries needs to be studied.

Although Belgium has implemented a mandatory public old-age security for all self-employed, the contribution level is lower and the benefit calculation rules are disadvantageous compared to those for employees (see Section 3). These regulations are especially problematic for women because of their lower incomes (in comparison to those of

men). Moreover, many self-employed women have problems meeting the eligibility conditions for the minimum pensions and therefore have to rely on very low earnings-related pensions (Peeters, 2016:66).

The findings for Poland are striking because, contrary to the general finding, a higher share of self-employment in the working career has a positive effect on the total pension income of Polish women. Among the Polish respondents, the majority of the self-employed persons worked as farmers. Comparing women with various employment careers, the pension regulations in the scheme for farmers might be advantageous for women's pensions. This is because the contributions in the farmers' scheme are flat rate and especially women with lower earnings are likely to profit from these regulations.

Summarising this discussion, it becomes apparent that the relevant institutional characteristics for the country differences are the contribution level and the benefit calculation rules for the self-employed as compared with those for employees. While Polish women with a higher share of self-employment in their working career profit from the contribution regulations of the farmers' scheme, Belgian women who have worked as self-employed are not only disadvantaged because of the benefit calculation rules, but also because of the pension contribution level. The other institutional characteristics studied, that is, whether a welfare state has a universal basic pension, an earnings-related public pension or a mandatory old-age security for all self-employed, do not seem to be relevant in the findings for total pensions.

7 | CONCLUSION

Comparative welfare state research has so far paid little attention to self-employed and their old-age security. This is surprising because the changes in the character of self-employment of the last decades might lead to lower old-age incomes and a higher risk of poverty among the formerly self-employed. This will put old-age security systems of European welfare states under pressure. The goal of this study was twofold: First, the aim was to investigate whether and in how far the duration of self-employment in the working career affects pension incomes in various European welfare states, considering differences between men and women. Second, country differences were to be explained by an analysis of institutional characteristics of the pension systems of the 11 countries under study.

The findings show that in men and women, a higher share of self-employment in the working career has a negative effect on pension income. However, in men, there are no statistically significant country differences; and in women, we only find such effects in two of the 11 countries. Consequently, country differences in the effect of the share of self-employment on the pension income are rather limited, and this is why country differences in the institutional design of old-age security for self-employed only play a minor role in the overall finding. Nevertheless, the findings for women in Poland and Belgium are very insightful. According to the institutional analysis, the causes of the positive effect in Poland and the negative effect in Belgium are due to the regulations on contributions and benefit calculation of public pensions. While previously self-employed women in Poland—who have often worked as farmers or helping family members—profit from the flat-rate contribution scheme, Belgian women with a higher share of self-employment in the working career are disadvantaged by the lower contribution level and the benefit calculation rules. Other institutional characteristics such as universal basic pensions, earnings-related public pensions or mandatory old-age security for self-employed do not contribute to the explanation of the findings. This is why it is not possible to link the findings to general classifications of old-age security systems such as the Bismarck/Beveridge dichotomy.

Finally, some limitations of this paper have to be mentioned. Above all, the paper only deals with pension income and does not consider old-age income based for example on revenues from capital or income from rent. This is why the findings do not allow conclusions about the effect of self-employment on old-age income in general. Moreover, the SHARE respondents represent a specific cohort and recent reforms to old-age security systems have affected the respondents only slightly if at all. It will be interesting to study the effect of self-employment on pension income in different European welfare states for younger cohorts, in light of more recent policy reforms. Future research may

show whether the country differences in the effect of self-employment on pension incomes, and the negative effect of self-employment, will increase or not.

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ENDNOTES

- ¹ For all countries, the data in this section refer to the time period 2003–2006 if nothing else is indicated.
- ² Means-tested social assistance benefits are not considered here.
- ³ Sweden has reformed its pension system in 1999/2001. Under the current system, the basic flat-rate *Garantipension* is tapered off against the amount of the earnings-related *Inkomstpension*. Previously, the Swedish pension system included a basic pension which was not tapered off against the contribution-based pension. Only from 2017 onwards, pensions were completely based on the new rules (MISSOC, 2020). This is why Sweden is here still characterised as a country with a basic pension.
- ⁴ The references are total pension contributions of labour costs including the employee's and employer's share of the pension contributions.
- ⁵ The marital status and the number of children were also included in the analysis to test whether family related variables have an effect on the pension income. However, there was no significant effect in any of the models, so these variables were excluded from the analysis.

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APPENDIX A

TABLE A1 Robust regressions for public and occupational pensions, only Dutch respondents

| | Public pensions | | | Occupational pensions | | |
|------------------------------------|---|--------|---------|--|-------|---------|
| | Estimate | SE | t-value | Estimate | SE | t-value |
| Intercept | 6.529*** | 0.038 | 171.103 | 4.586*** | 0.406 | 11.309 |
| Sex | 0.042 | 0.034 | 1.240 | −1.944*** | 0.361 | −5.390 |
| Share self-employment | −0.000 | 0.001 | −0.315 | −0.038*** | 0.007 | −5.892 |
| Sex*share self-employment | −0.000 | 0.001 | −0.080 | 0.018* | 0.010 | 1.834 |
| Working years | 0.000 | 0.001 | 0.003 | 0.055*** | 0.010 | 5.371 |
| Share part-time | −0.000 | 0.000 | −1.032 | 0.002 | 0.004 | 0.366 |
| Share agriculture | −0.001 | 0.001 | −1.529 | −0.013* | 0.007 | −1.928 |
| Share production | −0.001 | 0.001 | −1.536 | −0.003 | 0.005 | −0.540 |
| Share trade | −0.001* | 0.001 | −2.308 | −0.007 | 0.005 | −1.377 |
| Share other service | −0.001 | 0.000 | −1.343 | 0.002 | 0.005 | 0.430 |
| Last job unskilled ^a | 0.045 | 0.037 | 1.200 | 0.014 | 0.397 | 0.035 |
| Last job skilled ^a | −0.015 | 0.032 | −0.480 | 0.383 | 0.339 | 1.131 |
| Last job technician ^a | −0.016 | 0.051 | −0.311 | −0.052 | 0.541 | −0.096 |
| Last job professional ^a | −0.021 | 0.0392 | −0.539 | 0.552 | 0.417 | 1.324 |
| Education low ^b | 0.013 | 0.025 | 0.517 | −0.375 | 0.267 | −1.407 |
| Education high ^b | 0.013 | 0.033 | 0.402 | 1.011** | 0.348 | 2.907 |
| | Residual standard error: 0.2419 on 652 degrees of freedom | | | Residual standard error: 2.506 on 652 degrees of freedom | | |

^aReference: Last job clerk.

^bReference: Medium education.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Source: Author's own calculations based on the third and fourth wave of SHARE.

TABLE A2 Country-level interaction effects for the public pension, based on fixed-effects models

| | Women | | Men | |
|-----------------------|-----------|-------|-----------|-------|
| | Estimate | SE | Estimate | SE |
| Share self-employment | -0.006*** | 0.002 | -0.005*** | 0.001 |
| Share self-emp*AT | -0.003 | 0.006 | -0.009 | 0.005 |
| Share self-employment | -0.006*** | 0.002 | -0.005*** | 0.001 |
| Share self-emp*DE | -0.015 | 0.013 | -0.004 | 0.005 |
| Share self-employment | -0.006*** | 0.002 | -0.005*** | 0.001 |
| Share self-emp*SE | -0.002 | 0.008 | 0.004 | 0.004 |
| Share self-employment | -0.008*** | 0.002 | -0.005*** | 0.001 |
| Share self-emp*ES | 0.006 | 0.004 | 0.002 | 0.002 |
| Share self-employment | -0.007*** | 0.002 | -0.004*** | 0.001 |
| Share self-emp*IT | 0.001 | 0.004 | -0.003 | 0.002 |
| Share self-employment | -0.007*** | 0.002 | -0.005*** | 0.001 |
| Share self-emp*FR | 0.008 | 0.005 | 0.002 | 0.003 |
| Share self-employment | -0.007*** | 0.002 | -0.005*** | 0.001 |
| Share self-emp*DK | 0.001 | 0.005 | 0.003 | 0.003 |
| Share self-employment | -0.006*** | 0.002 | -0.005*** | 0.001 |
| Share self-emp*CH | -0.001 | 0.006 | 0.001 | 0.004 |
| Share self-employment | -0.004* | 0.002 | -0.005*** | 0.001 |
| Share self-emp*BE | -0.019*** | 0.004 | -0.000 | 0.003 |
| Share self-employment | -0.008*** | 0.002 | -0.005*** | 0.001 |
| Share self-emp*PL | 0.008* | 0.004 | -0.002 | 0.003 |

Note: Separate models per country, main effects are for respondents from the other countries, control variables as in Table 2.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Source: Author's own calculations based on the third and fourth wave of SHARE, imputed data.

TABLE A3 Country-level interaction effects for the occupational pension, based on fixed-effects models

| | Women | | Men | |
|-----------------------|-----------|-------|-----------|-------|
| | Estimate | SE | Estimate | SE |
| Share self-employment | -0.006*** | 0.002 | -0.011*** | 0.002 |
| Share self-emp*AT | 0.000 | 0.006 | 0.006 | 0.009 |
| Share self-employment | -0.006*** | 0.002 | -0.010*** | 0.002 |
| Share self-emp*DE | -0.014 | 0.013 | -0.021** | 0.008 |
| Share self-employment | -0.005** | 0.002 | -0.008*** | 0.002 |
| Share self-emp*SE | -0.046*** | 0.008 | -0.047*** | 0.006 |
| Share self-employment | -0.007*** | 0.002 | -0.013*** | 0.002 |
| Share self-emp*ES | 0.004 | 0.004 | 0.012** | 0.004 |
| Share self-employment | -0.007*** | 0.002 | -0.013*** | 0.002 |
| Share self-emp*IT | 0.005 | 0.004 | 0.012** | 0.004 |
| Share self-employment | -0.007*** | 0.002 | -0.012*** | 0.002 |
| Share self-emp*FR | 0.007 | 0.005 | 0.018*** | 0.005 |
| Share self-employment | -0.004* | 0.002 | -0.008*** | 0.002 |
| Share self-emp*DK | -0.026*** | 0.005 | -0.040*** | 0.005 |
| Share self-employment | -0.004* | 0.002 | -0.007*** | 0.002 |
| Share self-emp*CH | -0.022*** | 0.006 | -0.070*** | 0.007 |
| Share self-employment | -0.007*** | 0.002 | -0.012*** | 0.002 |
| Share self-emp*BE | 0.007 | 0.004 | 0.013** | 0.004 |
| Share self-employment | -0.008*** | 0.002 | -0.012*** | 0.002 |
| Share self-emp*PL | 0.011** | 0.004 | 0.017*** | 0.004 |

Note: Separate models per country, main effects are for respondents from the other countries, control variables as in Table 2.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Source: Author's own calculations based on the third and fourth wave of SHARE, imputed data.

TABLE A4 Country-level interaction effects for the private pension, based on fixed-effects models

| | Women | | Men | |
|-----------------------|----------|-------|----------|-------|
| | Estimate | SE | Estimate | SE |
| Share self-employment | 0.003** | 0.001 | 0.005*** | 0.001 |
| Share self-emp*AT | -0.003 | 0.004 | -0.004 | 0.007 |
| Share self-employment | 0.003** | 0.001 | 0.005*** | 0.001 |
| Share self-emp*DE | -0.006 | 0.008 | 0.007 | 0.006 |
| Share self-employment | 0.002* | 0.001 | 0.005*** | 0.001 |
| Share self-emp*SE | 0.019*** | 0.005 | 0.012* | 0.005 |
| Share self-employment | 0.003* | 0.001 | 0.004*** | 0.001 |
| Share self-emp*NL | -0.001 | 0.004 | 0.013** | 0.004 |
| Share self-employment | 0.003** | 0.001 | 0.006*** | 0.001 |
| Share self-emp*ES | -0.003 | 0.003 | -0.006* | 0.003 |
| Share self-employment | 0.003** | 0.001 | 0.006*** | 0.001 |
| Share self-emp*IT | -0.004 | 0.003 | -0.004 | 0.003 |
| Share self-employment | 0.003* | 0.001 | 0.006*** | 0.001 |
| Share self-emp*FR | -0.000 | 0.003 | -0.006 | 0.003 |
| Share self-employment | 0.001 | 0.001 | 0.004** | 0.001 |
| Share self-emp*DK | 0.018*** | 0.003 | 0.017*** | 0.004 |
| Share self-employment | 0.003** | 0.001 | 0.005*** | 0.001 |
| Share self-emp*CH | -0.005 | 0.004 | 0.003 | 0.005 |
| Share self-employment | 0.003** | 0.001 | 0.006*** | 0.001 |
| Share self-emp*BE | -0.002 | 0.003 | -0.003 | 0.003 |
| Share self-employment | 0.003** | 0.001 | 0.005*** | 0.001 |
| Share self-emp*PL | -0.002 | 0.002 | -0.003 | 0.003 |

Note: Separate models per country, main effects are for respondents from the other countries, control variables as in Table 2.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Source: Author's own calculations based on the third and fourth wave of SHARE, imputed data.