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Inequality and Public Pension Entitlements

Eva Sierminska¹ and Marcin Wroński²

Abstract

The literature on wealth inequality is expanding very fast. Wealth is usually more concentrated than income. However, traditional measures of wealth inequality are based only on private wealth, and thus exclude public pension entitlements. In this chapter, the literature on the impact of public pension entitlements on wealth inequality is discussed. Empirical research shows, that wealth inequality is significantly reduced after accounting for public pension wealth. The value of Gini index is usually reduced by 20 – 40%.

JEL Classification: D31, H55

Keywords: Inequality, Public Pensions

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1. Introduction

In recent years, the literature on wealth inequality, and economic inequality in general expanded significantly. After the financial crisis, the “top 1%” came into the focus of the public opinion (See for example, the Chapter by Bartels and Waldenstrom). Policymakers expressed the need for better distributional data on income, wealth, and consumption, both at the macro and micro level. The Financial Stability Board and International Monetary Fund recommend that aggregate data on household consumption, income, and wealth should be accompanied by distributional data [FSB and IMF, 2009, 2015]. Data on household wealth and its’ distribution are useful for monetary policy, monitoring of financial stability, and analysis of household indebtedness [HFCN, 2009]. The OECD (2013a) framework emphasized the need to better measure economic well-being using income, consumption and wealth. Today economic inequality is one of the most important topics in economic research and is prominent in the public debate, while the topic of wealth inequality has gained increasing attention.

Household wealth is usually limited to private wealth and excludes entitlements in public pension systems. Securing consumption in retirement is one of the most important reasons for households to accumulate wealth. The life cycle hypothesis [Modigliani, 1968] and permanent income hypothesis [Friedman, 1958] emphasize the importance of this saving motive. According to these theories, households optimize utility by intertemporal consumption smoothing. Households save in the periods of high incomes and dissave when income is low. The importance of saving for old age is also discussed by economic theorists working on the intertemporal choice before Modigliani and Friedman such as Irving Fisher [1907, 1930], Frank Ramsey [1928], and John M. Keynes. Read [2011] discusses the role of saving for old-age in the various theories of consumption.

Today, public pension systems play the most important role in securing consumption in the old-age for the overwhelming majority of the households. For many people, the rights to a pension on retirement represent one of their most valuable assets [Atkinson, 1972]. Therefore there are strong arguments for including them in the concept of household wealth. A rich empirical literature investigates the impact of public pension income on the income distribution

.While public pension benefits equalize income distributions in Western economies (Feldstein and Liebman, 2002; Lefèbvre, 2007; Neugschwender, 2013), in some Asian economies public pension benefits increase income inequality (Hwang, 2016, Li et al. 2020). However, the impact of public pension entitlements on wealth inequality has been rarely studied until recently.

The goal of this chapter is to review the literature on the impact of public pension entitlements (also known as *social security wealth* or *public pension wealth*) on wealth inequality. The concept of augmented wealth is discussed in Section Two. The empirical literature on the impact of public pension entitlements on wealth inequality is discussed in Section Three. Firstly the methods used in the literature are presented then outcomes of single-country studies and international research are reviewed. The research limitations and directions for future research are discussed in Section Four. Conclusions and policy implications are presented in the last section.

Augmented wealth concept

Household wealth is usually defined as the value of a household's assets minus the value of household liabilities (debts). Therefore it is sometimes called "*net wealth*" or "*net worth*". The traditional concept of household wealth excludes public pension entitlements. According to the OECD Guidelines for Micro Statistics on Household Wealth [OECD, 2013b], the main reason for the exclusion is the lack of comparable data on public pension entitlements. The second reason is limited liquidity. However, many other types of assets have limited liquidity and are included in the OECD concept of household wealth, e.g. various forms of savings in private pension plans. The OECD definition is a worthwhile reference for scholars of household wealth, but in practice, data availability dictates, which items are covered by the research and included in household wealth [Jäntti, and Siermińska, 2008].

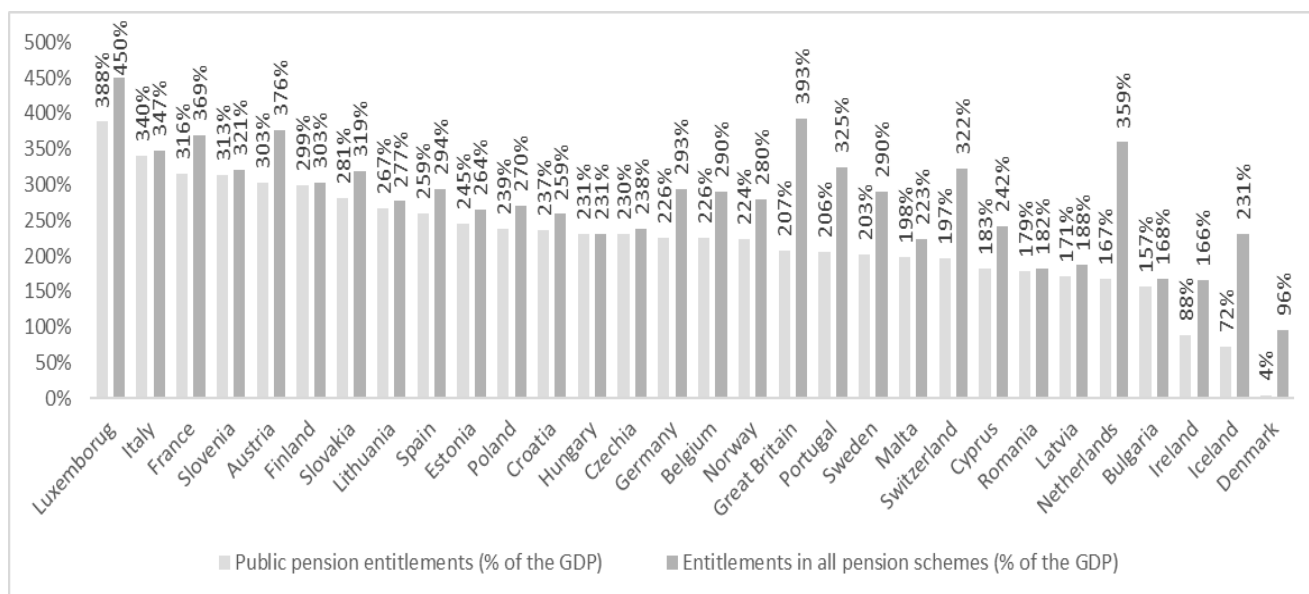
Savings in the public pension system, similarly to private savings allow for intertemporal consumption smoothing. Therefore researchers extend the classical concept of household wealth and include public pension entitlements (also known as social security wealth or public pension wealth) in the research of household wealth. Because the institutional setting of public pension systems varies across countries, the extension of the wealth concept may be useful for cross-country wealth comparison. If households make optimal choices they should accumulate less private wealth in countries, where public pension systems are more generous [Wolff, 1996, 2006, Cowell and Van Kerm, 2015; Cowell et al., 2018]. Wroński [2021a]

reviews the literature on the substitution between private savings and social security wealth and finds Although the literature is not conclusive, many important contributions identify statistically significant displacement effects of social security wealth. Fessler and Schürz [2018] find that in countries with higher public pension expenditures private wealth tends to be lower.

The second reason for the inclusion of public pension entitlements as a component of household wealth is their huge value. In the case of the majority of households, public pension entitlements are the most important assets [Atkinson, 1972, 1983]. Novel standards of national accounts – SNA2008 and ESA2010 enhanced the reporting on pensions, covering both entitlements of pension schemes recorded in the core national accounts, and unfunded "pay-as-you-go" pension schemes managed by the general government. These latter entitlements are excluded from the core national accounts but the data is published in supplementary tables. In 2011, Eurostat and EBC published technical standards on the valuation of pension entitlements (including public pension entitlements) and in 2020 revised them [Eurostat and EBC, 2011, 2020].

According to Eurostat the value of accrued-to-date entitlements in social insurance varies between 4% of the GDP in Denmark (which is a clear outlier, because social insurance guarantees only basic income for pensioners, who do not have other income sources) and 388% of the GDP in Luxembourg. The value of households public pension entitlements is equal to the value of public pension system liabilities. Altogether, Eurostat in official publication use the term “accrued-to-date entitlements in social insurance”, this term has the same meaning as public pension entitlements. The median value of public pension entitlements in the European Union is 222% of the GDP. In the majority of countries, accrued-to-date entitlements in social insurance have the lion’s share in accrued-to-date entitlements in all pension schemes (core and non-core accounts). Data on the value of accrued-to-date entitlements in social insurance (public pension entitlements) and the whole value of accrued-to-date pension entitlements is presented in Figure 1.

Figure 1. The value of accrued-to-date entitlements in social insurance (public pension entitlements) and accrued-to-date entitlements in all pension schemes.



Source: own [Wroński, 2021b] based on Eurostat data.

To better assess the value of public pension entitlements it would be beneficial to compare it with the value of (private) household wealth. According to the OECD in 2014 net wealth of households varied between 159% of net disposable income in Poland and 662% of net disposable income in Belgium. In all countries except Poland and Lithuania net wealth of households was higher than 300% of net disposable income. Thus, the value of public pension entitlements is significant in comparison with the value of household wealth. The data on accrued-to-date liabilities in social insurance published by Eurostat may be compared with aggregate household net wealth assessed using Household Finance and Consumption Survey [HFCN, 2020a, 2020b] data. The value of accrued-to-date liabilities is comparable to the value of private wealth in all countries except Cyprus, Ireland, and Malta (all exceptions are tax heavens). In the remaining countries, the value of accrued-to-date liabilities ranges from 53% of private household wealth in Belgium and 117% of private household wealth in Lithuania [Wroński, 2021]. In the case of pensioners, the ratio of mean augmented wealth (the sum of private wealth and public pension entitlements) to mean private wealth varies between 154% in Finland to 369% in Greece [Wroński, 2022]. Although, neither national accounts nor survey data provides a perfect assessment of the aggregate value of household wealth (see Watl and Chakraborty, 2022 for the discussion), it confirms that public pension entitlements are a major component of households' wealth portfolio.

Including public pension entitlements as the component of household wealth may be beneficial also for the investigation of wealth inequality. The literature confirms that public

pension systems are important wealth equalizers (see Section Three). The distribution of public pension entitlements is much more equal than the distribution of private wealth. Therefore public pension entitlements equalize wealth distribution.

As discussed above there are at least four important reasons for extending the household wealth concept and including public pension entitlements in the value of household wealth. Firstly, public pension entitlements have a similar value as private wealth. Secondly, public pension wealth entitlements affect wealth accumulation. Public pension entitlements may crowd-out private wealth (see e.g. Wroński, 2021a for the literature review). In countries with more generous public pension system household may accumulate less private wealth (Cowell et al., 2018). Therefore coverage of public pension entitlements is important for cross-country comparisons of household wealth. Thirdly, public pension entitlements are important equalizers and mitigate wealth inequality. The fourth reason is the increased availability of the data. Limited data availability was the most important reason why OECD excluded public pension entitlements from the household wealth concept. Today availability of the data on entitlements in the public pension system is much higher than it was a decade ago when OECD guidelines were published.. Thus in our view, when data are available household wealth concept should be extended, at least in the auxiliary analysis complementing wealth inequality estimates based only on private wealth.. The investigation of augmented wealth distribution may significantly enrich our understanding of wealth inequality.

Scholars working in this field, usually refer to the augmented wealth concept. The augmented wealth is the sum of private wealth (net wealth) and public pension entitlements (social security wealth, public pension wealth). Sometimes private pension wealth is introduced as a separate component of augmented wealth. This classification is widely used in the research on the impact of public pension systems on wealth inequality. Although there are also broader concepts of household wealth available, they are mostly theoretical. It is possible to include future earnings as a component of household wealth [Wolff, 1987; Dagum, 1999]. Scholars also try to include human capital and social capital as a component of household wealth/national wealth [Hamilton and Liu, 2017; Hamilton et al., 2017]. These concepts may be interesting but are not used in the literature reviewed in this chapter. Therefore, they are not discussed here.

2. The impact of public pension entitlements on wealth inequality

2.1 Research methods

Scholars interested in the impact of public pension entitlements on wealth inequality firstly estimate the value of public pension entitlements. Here, two approaches exist. Some authors try to cover the whole population, including those who have not yet reached the retirement age and may not reach it in the coming decades. Other focus on pensioners and people near the retirement age. This choice is often dictated by data availability. While data on pension benefits is available, both in administrative and survey data, data on public pension entitlements of the working population is scarce. Sections on pension plans in wealth surveys are usually the most difficult for respondents [Bucks and Pense, 2015]. Even collecting data on private pension plans is challenging. Not all public pension schemes have individual accounts, and even in countries in which such accounts exist respondents usually do not know their value. For example in Poland, where everyone is insured in the main public pension scheme operated by the Social Insurance Institution (covering approx. 80% of the population) can simply check the value of the account on the internet, in the Household Finance and Consumption Survey 70% of respondents refused to answer the question on the value of public pension plans, while answers of remaining 30% were simply incorrect. On average, the value of accounts in the public pension system stated by respondents was ten times lower than when based on the administrative data [Wroński, 2021b, 2021c].

Extending the research to the whole population is of course beneficial because it captures the whole impact of the public pension entitlements. Research, which covers only pensioners may overestimate the equalizing power of public pension systems because it focuses on the population with the highest value of public pension entitlements. However, estimating public pension entitlements of the working-age population comes with some limitations. Firstly, the value of public pension entitlements of the working-age population may be curtailed by pension reforms introduced before they reach the retirement age. Although pensioners are sometimes also impacted by reforms (e.g. by changes in indexation rules), reformers usually focus on the working-age population (e.g. by increasing the retirement age, changes in rules determining the value of pension benefits). Borgmann and Heidler [2007] show that pension reforms implemented in Germany lowered the value of public pension entitlements of the working-age population by 30 - 60%. Moreover, the estimation of the value of public pension entitlements is complicated by many non-linearities in the rules determining the value of public pension benefits (e.g. existence of minimum pensions). The life-cycle trajectory of public pension entitlements may complicate the assessment of the impact of public pension entitlements on wealth inequality. While pensioners already benefit from their public pension

entitlements, in the case of the working-age population pension entitlements are to some extent only a theoretical concept.

To estimate the value of public pension entitlements researchers discount the value of a future stream of pension benefits. Therefore results are prone to the change in the discount rate. Currently, 2% is most often used as the discount rate. This discount rate is also used by the OECD in the influential reports *Pensions at the Glance* [OECD, 2021]. It is beneficial to provide not only baseline results but also sensitivity analysis covering the change in the discount rates (see e.g. Banks et al. 2005; Bönke, et al. 2019)

Scholars use various estimation formulas, but the basic form may be presented as:

$$(1) \quad PPE_i = \sum_{t=0}^T \frac{1}{(1+r)^t} * P_{i,t}$$

$$(2) \quad P_{i,t} = benefit_i * q_{i,t,g}$$

where PPE_i stands for public pension entitlements of person i , r is the discount rate, $P_{i,t}$ represents the actuarial value of pension benefits, which will be collected by a person i , in the year t , and q is the survival probability differentiated by year (t) and gender (g). Researchers usually assume that pension indexation equals inflation, and thus the real value of pension benefits stays the same. Survival probabilities may be further differentiated, e.g. by education status [Oliveria, 2019, Wroński, 2021b]. Life expectancy tables and demographic forecasts are used here as a source of data. Using static life expectancy tables may introduce a downward bias in entitlements in countries where life expectancy is rising since in reality individuals will live longer than it's assumed today. On the other hand, however, demographic forecasts are not perfectly accurate.

Here some caveats should be noted. Survivor benefits (also known as widowers pension), which allow for collecting part of the pension of deceased partners exist in all countries of the European Union. In some countries, rules determining the value of survivor benefits are relatively simple (e.g. a given percentage of the pension of a deceased person), in others, formulas depend on the value of the pension (here formulas are usually progressive), work seniority, or the length of the marriage [see MISSOC, 2021 for a discussion]. Thus, the actuarial value of survivor's benefits, which may be collected in the future should be included in the total value of public pension entitlements. Otherwise, a significant part of pension wealth may be missed, important especially for women. Although single-country studies usually

include it, covering survivor benefits in cross-country studies is challenging because of institutional variation. Some authors implement simplifying assumption that a living partner may collect 50% of the pension of a deceased partner in countries, where no simple percentage parameter exists [e.g. Cowell et al., 2017; Olivera, 2019]. Others do not include survivor benefits at all [e.g. Belloni et al., 2021]. Another point to mention is that since often women earn less, retire earlier and live longer than men, most claimants of pension benefits are female. Therefore excluding survivor benefits from public pension entitlements introduces a gender bias and most likely lowers the equalizing impact of public pension entitlements. This is an important bias because public pension entitlements lower the gender wealth gap [Sierminska et al., 2010; Cordova et al., 2022]. Including survivor benefits may also have important consequences for a gendered analysis of wealth accumulation and retirement preparedness [Gornick and Sierminska, 2021]. Another point to mention here would be benefits in case of divorce.

When the value of public pension entitlements is calculated researchers estimate the distribution of augmented wealth. Augmented wealth is defined as the sum of private wealth and public pension entitlements or sometimes private pension entitlements are introduced as a separate component.

$$(3) \quad \textit{Augmented wealth} = \textit{private wealth} + \textit{public pension entitlements}$$

(e.g. Shamsuddin, 2001; Maunu, 2010))

$$(4) \quad \textit{Augmented wealth}$$

$$= (\textit{private wealth} - \textit{private pension entitlements})$$

$$+ \textit{public pension entitlements} + \textit{private pension entitlements}$$

(e.g. Wolff, 2015; Cowell et al., 2017; Bönke et al., 2020)

To assess, the impact of public pension entitlements on wealth inequality scholars compare the value of inequality measures calculated for the distribution of augmented wealth and the distribution of private wealth. In recent years, an increasing number of studies use inequality decomposition techniques [see Cowell, 2011, Cowell and Flachaire, 2021 for a discussion on inequality measurement and decomposition]. Wolff [1990, 1992] provides a broader discussion of methodological issues in the estimation of retirement wealth.

2.2 Single-country studies

The literature on the impact of public pension entitlements on wealth inequality in several countries is reviewed in this section. An overview of results of studies discussed in this paper covering the period after the year 2000 can also be found in Table 1.

The impact of the public pension system on wealth inequality in the **United States** has been studied extensively. Williams [1965] estimate the value of social security wealth and discuss its importance for various income groups. He finds that in the case of the bottom 99% of households the share of social security wealth in private wealth is higher than 60%, while in the case of the top 1% it's lower than 40%. Feldstein [1976] finds that social security wealth equalizes the wealth distribution in the US. In the 1960s, the Gini index calculated for the distribution of augmented wealth (0.52) is lower than the Gini index calculated for the distribution of private wealth (0.72). Wolff and Marley [1989] estimate the impact of social security wealth on wealth inequality since the 1920s. They find that initially, in the 1920s, the public pension system increased wealth inequalities given that it was limited to public employees. Due to pension reforms introduced during the New Deal, social security wealth began to decrease wealth inequality. The equalizing impact of the public pension system increased over time. However, later research by Wolff [2015] shows that the equalizing impact of the public pension system declined between 1983 and 2007 because the value of public pension entitlements increased slower than the value of private wealth. Public pension entitlements are particularly important for African American and Latin American households [Veghte et al., 2016, Wolff, 2018].

The interest in the impact of social security wealth on wealth inequality in the United States increased after the publication of "*Capital in the Twenty-First Century*" [Piketty, 2014]. Piketty [2014] demonstrated that wealth inequality in the United States increased significantly and reached levels similar to those in the 1920s. However, his estimates do not cover social security wealth, which is an important component of household wealth today [Leymore, 2015]. Catherine et al. [2020] find that between 1989 and 2016 augmented wealth inequality increased only marginally. The augmented wealth share of the top decile declined by 4 percentage points, while the augmented wealth share of the top 1% increased by less than one percent. On the other hand, however, Sabelhaus and Voltz [2022] find that between 1995 and 2019 augmented wealth inequality increased similarly to private wealth inequality. Here, scholars use the same data source (the *Survey of Consumer Finance*), but cover different periods and estimate the value of social security wealth differently. This example highlights, that research outcomes to a large extent depend on methodological choices. However, both groups of authors confirm that

public pension entitlements equalize wealth distribution in the United States. The equalizing impact of the public pension system on wealth inequality in the US has also been confirmed by Gustman et al. [1997], Kennickel and Sundén [1998], and Jacobs et al. [2022].

Dunn and Hoffman [1983] assess the impact of public pension entitlements on wealth inequality in **Great Britain** in the 1970s. They combine survey data with official statistics and find that the public pension system mitigates wealth inequality. In 1971, the top 1% had 31% of private wealth and only 21% of the augmented wealth. In 1981, it controlled 23% of private wealth, and 12% of the augmented wealth. The Gini index estimated for augmented wealth distribution [0,46 – 0,51] was significantly lower than the Gini index estimated for private wealth distribution (0.74). Atkinson [1983], Feinstein [1996], Alvaredo et al. [2016], and Crawford and Hood [2016] also confirm the equalizing impact of public pension entitlements on wealth inequality. Earlier research by Lydall and Typpling [1961] and Atkinson and Harrison [1978] show that occupational pension wealth mitigates wealth inequality, but at that time data on public pension entitlements were not yet available.

Frick and Grabka [2013] investigate the impact of social security wealth on wealth inequality in **Germany**. They combine administrative data with survey data (SOEP) and find that the aggregate value of public pension entitlements (5 581 billion euros) is similar to aggregate private wealth (5 908 billion euros). Many different measures of inequality confirm the equalizing impact of the public pension system. The Gini index calculated for the distribution of augmented wealth is 25% lower than that calculated for the distribution of private wealth (0.60 vs 0.80). The gap between the 90th percentile and the median decreased from 14.1 (private wealth) to 3.8 (augmented wealth). Rasner [2012] investigates the importance of public pension entitlements for different occupational groups. She finds that they are particularly important for the least privileged groups. The gap between the value of augmented wealth and private wealth is highest in the case of the unemployed (338%), and unskilled workers (168%). Public pension entitlements are the least important for entrepreneurs employing workers. In the case of the majority of occupational groups, the value of public pension entitlements is higher than the value of private wealth. Bönke et al. [2019] confirm the equalizing impact of the public pension system and provide novel results using inequality decomposition methods. Public pension entitlements mitigate the gender wealth gap in Germany, but the gap remains significant also in the case of augmented wealth [Cordova et al., 2021].

Shamsuddin [2001] investigates the impact of public pension entitlements in **Canada** based on survey data from 1983 and 1984. He finds that in the case of the bottom 70%

augmented wealth shares are higher than private wealth shares and thus the public pension system equalizes wealth inequality in the country.

Roine and Waldenström [2009] study the impact of public pension wealth on wealth distribution in **Sweden**. In their seminal paper on the long-term evolution of wealth inequality in the country between 1873 and 2006, they estimate the distribution of augmented wealth in 1978, 1985, and 2004. They find that public pension entitlements mitigate wealth inequality. In 1978, the top 1 percent owned 17% of private wealth and only 7% of the augmented wealth. In 2004, it controlled 26% of private wealth and 14% of the augmented wealth. Public pension wealth mitigates wealth inequality in the country. However, its inclusion in household wealth does not invalidate the general trend of increasing wealth inequality in Sweden.

Mazzaferro and Toso [2009] estimate the distribution of augmented wealth in **Italy** in the years 1991 – 2001. In all years, the distribution of augmented wealth was more equal than the distribution of private wealth. The gap between augmented wealth inequality and private wealth inequality declined over time. In 1991, the difference between the value of the Gini index estimated for the distribution of private wealth and the value of the Gini index estimated for the distribution of augmented wealth was equal to -0.133. In 2001, it declined to -0.086. Pension reforms limiting the generosity of public pension schemes are the most important reason for this decline.

Maunu [2010] investigates the impact of public pension wealth on wealth inequality in **Finland**. She combines administrative data on the value of pension accounts with survey data on private wealth. To evaluate the impact of the public pension system on wealth inequality he compares the gap between the 10th and 90th percentiles of the distribution of private wealth and augmented wealth in 2004. In the case of private wealth, the value of the 10th percentile of the distribution was equal to only 6% of the value of the 90th percentile. In the case of augmented wealth, this share stood at 33%. This result shows that the public pension system mitigates wealth inequality in Finland.

Kuhn [2020] measures the impact of social security wealth on wealth inequality in **Switzerland** in 2015. She uses survey data with administrative data and finds that social security wealth equalizes wealth distribution. The Gini index estimated for the augmented wealth distribution drops by nearly a quarter (from 0.75 in the case of private wealth to 0.55 in the case of augmented wealth). The top decile controls 74% of private wealth and only 13% of public pension entitlements.

Longmuir [2021] estimates the distribution of augmented wealth in **Australia** in the years 2002 – 2018. In this period, the wealth of Australian households increased significantly, but there was only a small change in wealth inequality. In 2018, the Gini index estimated for augmented wealth distribution (0.59) was smaller than the Gini index estimated for private wealth distribution (0.66). The methods used in the paper are similar to those used by Bönke et al [2020] for Germany and the US, and as those used by Kuhn [2020] for Switzerland. Therefore, research outcomes may be compared. This comparison leads to striking results, which highlight the importance of public pension wealth in cross-country comparisons of wealth inequality. If wealth inequality is assessed based on the distribution of private wealth, the distribution of wealth in Australia would be the most equal among these four countries. However, if wealth inequality is evaluated based on augmented wealth, wealth inequality in Australia would be the most unequal due to differences in the generosity of the pension systems.

Wroński [2021b, 2021c] investigates the impact of public pension entitlements on wealth inequality in **Poland** based on the data from the third wave of the Household Finance and Consumption Survey for 2016. His research covers pensioners and households near the retirement age. He finds that public pension entitlements significantly equalize the wealth distribution in Poland. The Gini index calculated for the augmented wealth distribution (0.35) is much lower than the same metric calculated for the private wealth distribution (0.50). Wroński estimates the value of public pension entitlements using education-specific survival probabilities. The unequal mortality of different education groups has significant consequences at the individual level, especially for men. The value of public pension entitlements of men with higher education is nearly 20% higher than if it is calculated using uniform, gender-specific mortality. In the case of women with higher education, this gap is only 6%. However, the gap between education-specific estimates and baseline estimates to a large extent disappears at the household level, because of the low level of assortative matching in the investigated population. Jabłonowski (2021) also investigates the impact of public pension entitlements on wealth inequality in Poland. His research covers not only pensioners, but also working age population. Both authors use different data source and methods but obtain similar estimates of the value of public pension entitlements and equalizing power of the public pension system.

3.2. Cross-country studies

Next, an overview of cross-country studies that assess the impact of public pension entitlements on wealth inequality is provided.

Oliviera [2019] investigates public pension wealth inequality in the European Union in 2006 and 2014. His research is based on EU-SILC data. The Gini index estimated for public pension wealth distribution varies between 0.259 in Estonia and 0.489 in Portugal. Between 2006 and 2014 pension wealth inequality increased in the majority of EU countries. The author presents separate outcomes for the distribution of pension wealth calculated using education-specific mortality. After taking into account that better educated individuals live longer, pension wealth inequality increases. This increase varies from 0.3% in Slovakia to 3.9% in Greece. Although this confirms that mortality differentials may be taken into account, the resulting change is not huge. Belloni et al. [2020] estimate the distribution of social security wealth in 12 EU countries based on the Survey of Retirement and Aging (SHARE) data. They find that social security wealth is most unequally distributed in Belgium, while its distribution is most equal in Denmark. Both contributions significantly increase our knowledge of public pension entitlements in Europe, but because of the data source used the impact of public pension entitlements on wealth inequality is not investigated. Moreover, both authors cover only pensioners or people near the retirement age.

Frick and Headey [2009] compare the living standards of pensioners in Australia and Germany. They estimate the distribution of public pension entitlements in both countries using survey data (SOEP in Germany, and HILDA in Australia). They find that taking public pension entitlements into account reverses the countries rankings. The private wealth of pensioners is 63% higher in Australia. However, the augmented wealth of this group is slightly (3%) higher in Germany. The authors do not investigate the impact of public pension entitlements on wealth inequality.

Bönke et al [2020] provide comparable estimates of the impact of social security wealth on wealth distribution in Germany, and the United States. Their research is based on survey data (SOEP for Germany, and SCF for the U.S.). Their research covers the whole population, not only the elderly. They find that public pension entitlements are more important in Germany than in the US. In the former country, their share in augmented wealth equals 61%, and in the latter, it stands at 48%. After including public pension entitlements the wealth Gini index decreases by 0.25 in Germany (from 0.76 to 0.51) and by 0.19 in the US (from 0.90 to 0.70). The equalizing impact of public pension entitlements on wealth inequality in both countries is confirmed by inequality decomposition techniques. Authors decompose Gini index by factors (components of augmented wealth: private wealth and pension wealth). The estimated effects of an equi-proportional one percent increase in pension wealth (holding other wealth

components constant) are negative and statistically significant different from 0. The paper emphasizes the point that public pension systems should be taken into consideration in cross-country research on household wealth.

The Household Finance and Consumption Survey (HFCS) is a promising data source for scholars working in the field. Although, the value of public pension entitlements may be estimated only for pensioners and people near the retirement age (based on the data on expected pension benefits), it is still a unique and rare source of internationally comparable data on household wealth and pension benefits (harmonized ex-ante). Cowell et al. [2017] use data from the first wave of the HFCS (for 2010) to study the impact of public pension entitlements on wealth inequality in 12 European countries. They include survivor benefits in social security wealth assuming that the living partner additionally collects 50% of the deceased partner's pension. They find that public pension entitlements equalize the wealth distribution in all countries under the investigation. The gap between the Gini index estimated for the augmented wealth distribution and the private wealth distribution is the highest in Germany (-0.25) and the smallest in Slovenia (-0.06). In countries, where the value of social security wealth relative to the value of private wealth is bigger, the equalizing power of public pension systems is stronger. Wroński [2022] uses data from the third wave of the HFCS (data for 2016/2017), which allows for an increasing number of investigated countries (19) and larger sample sizes. However, he does not include the value of survivor benefits. He confirms that public pension wealth equalizes the wealth distribution in all European countries. This result is confirmed by the decomposition of inequality measures (decomposition of the Gini index by factors). The impact of an equi-proportional marginal increase in public pension entitlements (holding other components constant) on augmented wealth inequality is negative and statistically different from zero. Augmented wealth inequality measured using the Gini index is ca. 30% lower than private wealth inequality. The equalizing power of the public pension system differs across countries. It is strongest in Austria, Netherlands, Estonia, and Germany, where the value of the Gini index calculated for the augmented wealth distribution is ca. 40% lower than its value calculated for private wealth distribution. The equalizing impact of social security wealth is rather weak in Slovenia and Luxembourg, where augmented wealth inequality measured by the Gini index is only 18-20% lower than private wealth inequality. The strength of the equalizing impact of public pension wealth is positively correlated with the value of public pension wealth relative to the value of private wealth and the share of single households in a country. It is negatively correlated with homeownership and the correlation between the position of the

household in the distribution of private and augmented wealth. Public pension wealth equalizes wealth distribution not only within countries but also at the level of the European Union (19 countries taken together). However, results of the decomposition of the Theil index show that the share of between-country inequality is higher in the case of augmented wealth (22%), than in the case of private wealth (12%). Despite using data for different years and slightly different estimation methods outcomes of Cowell et al. [2017] and Wroński [2022] are similar (see Table 1).

In Table 1, the data on the absolute change in the Gini index ($\text{Gini Index}_{\text{Augmented wealth}} - \text{Gini Index}_{\text{Private wealth}}$), a relative change in the Gini index $[(\text{Gini Index}_{\text{Augmented wealth}} - \text{Gini Index}_{\text{Private wealth}}) / \text{Gini Index}_{\text{Private wealth}}]$, and discount rate are presented. An information on the reference population and implementation of inequality decomposition methods is also provided in Table 1. Data presented in the Table show that despite differences in data and methods authors studying the same country usually obtain similar results. Studies focusing only on pensioners identify a higher equalizing impact of public pension wealth. Significant variation in equalizing the power of public pension systems is observed across countries.

Before 2000 our knowledge on the impact of public pension entitlements on wealth inequality was limited to the United States and the United Kingdom. Today, the estimates for 25 different countries are available. In many cases, more than one estimate for a given country. Although data sources and research methods used by authors differ, their results are similar. Public pension systems are important wealth equalizers. In all countries, the distribution of augmented wealth is more equal than the distribution of private wealth. Public pension entitlements have a lion's share in the wealth of the bottom deciles of wealth distribution.

Base on research by Cowell et al. [2017] and Wroński [2022] we may propose following ranking of equalizing power of public pension systems in the European Union.

Strong impact (reduction of private wealth inequality in the pensioners population by 30% or more): Austria, Germany, Estonia, Finland (Wroński), France, Greece (Wroński), Hungary, Latvia, Netherlands, Poland, Slovakia

Medium impact (reduction of private wealth inequality in the pensioners population by less than 30% and more than 20%): Belgium, Croatia, Cyprus, Greece (Cowell), Italy, Lithuania, Portugal,

Low impact (reduction of private wealth inequality in the pensioners population by 20% or less): Finland (Cowell), Luxembourg, Slovenia, Spain.

Research on the impact of public pension entitlements on wealth inequality in the United States puts the country on the margin (20%) between medium impact and low impact group. Cowell et al. (2017) shows that equalizing power of the public pension system (measured by the gap between the Gini index for private wealth and the Gini index for augmented wealth) is strongly correlated with its generosity measured by the relation of mean public pension entitlements to mean private wealth. Wroński (2022) confirms this correlation. He also finds that the share of single households is another positive correlate of the equalizing power of public pension systems. In countries with higher homeownership and higher rank-rank correlation between private wealth and augmented wealth distribution equalizing power of social security wealth is lower.

Table 1. Review of the literature for the period post 2000.

Country	Author	Year	The gap in the Gini index for augmented wealth and private wealth (absolute)	The gap in the Gini index for augmented wealth and private wealth (relative)	Discount rate	Notes
Austria	Cowell et al. [2017]	ca. 2010	-0.246	-35.3%	2%	only pensioners
Austria	Wroński et al. [2022]	2016/7	-0.212	- 43.3%	2%	only pensioners, inequality decomposition
Australia	Longmuir [2021]	2018	-0.072	-10.8%	2%	including working-age population
Belgium	Cowell et al. [2017]	ca. 2010	-0.148	- 26.5%	2%	only pensioners
Belgium	Wroński et al. [2022]	2016/2017	-0.167	- 29.6%	2%	only pensioners, inequality decomposition
Croatia	Wroński et al. [2022]	2016/2017	-0.119	-23.3%	2%	only pensioners, inequality decomposition
Cyprus	Wroński et al. [2022]	2016/2017	-0.184	- 23.6%	2%	only pensioners, inequality decomposition
Germany	Rasner (2012)	2007	-0.200	-24.6%	2%	including working-age population
Germany	Frick i Grabka [2013]	2007	-0.196	-24.8%	2%	including working-age population,
Germany	Cowell et al. [2017]	ca. 2010	-0.251	-36.4%	2%	only pensioners

Germany	Bönke et al. [2019]	2013	-0.191	- 24.3%	3%	including working-age population, inequality decomposition
Germany	Bönke et al. [2020]	2013	-0.247	-31.5%	2%	including working-age population, inequality decomposition
Germany	Wroński et al. [2022]	2016/17	-0.247	- 36.4%	2%	only pensioners, inequality decomposition
Estonia	Wroński et al. [2022]	2016/17	-0.244	-37.8%	2%	only pensioners, inequality decomposition
Finland	Maunu (2010)	2004/2005	-0.145	-29.8%	3%	45 years old and older and not yet retired
Finland	Cowell et al. [2017]	ca. 2010	-0.063	-12.2%	2%	only pensioners
Finland	Wroński et al. [2022]	2017	-0.210	-30.2%	2%	only pensioners, inequality decomposition
France	Cowell et al. [2017]	ca. 2010	-0.194	- 31.0%	2%	only pensioners
France	Wroński et al. [2021]	2016/17	-0.184	-31.5%	2%	only pensioners, inequality decomposition
Greece	Cowell et al. [2017]	ca. 2010	-0.146	-28.8%	2%	only pensioners
Greece	Wroński et al. [2022]	2016/17	-0.154	-30.1%	2%	only pensioners, inequality decomposition
Hungary	Wroński et al. [2022]	2016/17	-0.187	-32.3%	2%	only pensioners, inequality decomposition
Italy	Mazzaferro and Toso [2009]	2002	-0.086	-15.4%	2,5%	including working-age population, inequality decomposition

Italy	Cowell et al. [2017]	ca. 2010	-0.150	-25.8%	2%	only pensioners
Italy	Wroński et al. [2022]	2016/17	-0.152	-26.5%	2%	only pensioners, inequality decomposition
Latvia	Wroński et al. [2022]	2016/17	-0.2246	-34.1%	2%	only pensioners, inequality decomposition
Lithuania	Wroński et al. [2022]	2016/17	-0.133	-23.6%	2%	only pensioners, inequality decomposition
Luxembourg	Cowell et al. [2017]	ca. 2010	-0.114	-20.2%	2%	only pensioners
Luxembourg	Wroński et al. [2022]	2016/17	-0.124	-20.0%	2%	only pensioners, inequality decomposition
Netherlands	Cowell et al. [2017]	2010	-0.203	-36.2%	2%	only pensioners
Netherlands	Wroński et al. [2022]	2016/17	-0.295	-42.2%	2%	only pensioners, inequality decomposition
Poland		2016		-30.6%	2%	only pensioners, inequality decomposition
Poland	Jabłonowski (2021)	2014	-0.110	-19.3%	3.3%	including working-age population
Poland	Wroński et al. [2022]	2016/17	-0.163	-32.9%	2%	only pensioners, inequality decomposition
Portugal	Cowell et al. [2017]	ca. 2010	-0.147	-22.4%	2%	only pensioners
Portugal	Wroński et al. [2022]	2016/17	-0.152	-23.8%	2%	only pensioners, inequality decomposition
Slovakia	Cowell et al. [2017]	ca. 2010	-0.121	-31.9%	2%	only pensioners
Slovakia	Wroński et al. [2022]	2016/17	-0.151	-33.2%	2%	only pensioners, inequality decomposition

Slovenia	Cowell et al. [2017]	ca. 2010	-0.060	-12.4%	2%	only pensioners
Slovenia	Wroński et al. [2022]	2016/17	-0.083	-17.8%	2%	only pensioners, inequality decomposition
Spain	Cowell et al. [2017]	ca. 2010	-0.073	-13.2%	2%	only pensioners
United States	Wolff [2005]	2001	-0.146	- 18.3%	Discount rate equal to state bonds yield	including working-age population
United States	Wolff [2015]	2010	-0.168	-20.3%	3%	including working-age population
United States	Bönke et al. [2019]	2013	-0.189	- 21.2%	2%	including working-age population, inequality decomposition
United States	Jacobs et al. (2022)	2019	-0.150	-18.3%	3%	only 40 – 59 years old
Switzerland	Kuhn [2020]	2015	-0.200	- 26.7%	2%	
United Kingdom	Crawford and Hood [2016]	2012	-0.142	- 27.1%	2%	only pensioners

Note: for Cowell et al. [2017] the results excluding private pension wealth are presented.

Source: own

3. Limitations of the literature and directions for future research

The literature on the impact of public pension entitlements on wealth inequality expanded significantly in recent years. The equalizing impact of public pension systems on wealth distributions has been confirmed in many economies. Although important progress has been achieved, the literature is still young and has some important limitations.

The national character of the literature is probably its most important limitation. Usually, data on public pension entitlements are available only at the national level. Therefore the wide majority of studies on the impact of public pension entitlements on wealth inequality cover only single countries.

The international comparability of the results is limited because the research method and data sources differ. As a result, it is known that public pension systems equalize wealth distribution, but cross-country comparisons of equalizing impact remain difficult. This limitation has important consequences also for cross-country comparisons of household wealth and its inequality. Fortunately, in recent years first studies providing comparable estimates of the impact of public pension systems on wealth distribution for more than one country have been published [Frick and Headay, 2009; Cowell et al., 2017; Oliviera 2018, Belloni et al., 2020; Bönke et al., 2019; Wroński, 2022].

Another important limitation of the literature is its geographical scope. The impact of public pension entitlements on wealth inequality has been investigated only in developed economies and developing economies of Central and Eastern Europe. In these countries, welfare states are developed and cover nearly the whole population. Even households, that are at the bottom of the income and private wealth distribution accumulate public pension entitlements. Therefore the fact that public pension entitlements equalize (augmented) wealth distribution is rather obvious. In contrast, developing economies outside Europe and least developed countries face greater challenges. In many of them, public pension systems cover only a part of the population, usually, those who are relatively more privileged, i.e. have formal employment, enjoy higher incomes, and live in cities. Thus, examining the equalizing effect of these systems seems additionally worthwhile. It is possible that in many countries public pension systems exaggerate wealth inequality. Therefore, extending the geographical scope of the literature is seen as the next big step in this area.

The current literature is based on survey data. Although surveys provide rich household characteristics, they are not a perfect source to study wealth inequality. The richest households do not participate in surveys, and thus survey data underestimate top wealth and consequently wealth inequality [Kennickel, 2017a, 2017b, 2019; Vermeulen, 2019; Bach et al., 2019; Bricker et al., 2019; Brzeziński et al., 2020; Meriküll and Rõõm, 2021]. The share of public pension entitlements in household wealth is highest at the bottom of the distribution, which to some extent mitigates, the imperfect coverage of top wealth and the impact of pension entitlements on wealth inequality, although this remains to a large extent an empirical question that exhibits cross-national variation.

The Survey of Health, Ageing, and Retirement in Europe and Luxembourg Wealth Survey [Sierminska et al., 2006] also offer promising opportunities to study the impact of public pension entitlements on wealth distribution in a cross-country setting. The SHARE for the EU and Israel and the LWS has a larger geographical scope. It would be also interesting to investigate the impact of public pension entitlements on wealth inequality in cross-country setting using administrative data.

To investigate the impact of public pension entitlements on wealth inequality, it's necessary to know the value of public pension entitlements. To estimate this value researchers combine the data of pension benefits (actual and expected) and survival probability and actuarial discounting. Although this method is relatively simple and convincing, it has some important limitations. Usually, survival probabilities come from demographic forecasts and differ for women and men. It is known that people with higher socioeconomic status live longer than the rest of the population. Therefore assuming uniform survival probabilities for both overestimates the value of public pension entitlements of the poor (who will collect less pensions, because they will live shorter than assumed) and underestimates the value of public pension entitlements of the rich (who will collect more pensions, because they will live longer than assumed). Therefore, the equalizing impact of public pension entitlements on wealth inequality may be overestimated. Moreover, some researchers rely on current life expectancy tables and therefore underestimate (overestimate) public pension entitlements in countries, where future increase (decrease) in longevity is not included in the estimation. Authors rely on actuarial discounting, but households may discount their public pension entitlements in a different way [Mirer, 1992], e.g. by simple discounting [Bernheim, 1982] or hyperbolic discounting [Diamond and Köszegi, 2003].

Decomposition of the Gini index by factors allows for identifying the contribution of different wealth components to total wealth inequality. Although decomposition techniques or inequality measures are not novel, many authors only compare the value of inequality measures (usually Gini index) estimated for private wealth distribution and augmented wealth distribution. Decomposing inequality measures provide a richer picture of the impact of public pension entitlements inequality than simple comparisons of the value of chosen inequality metric. The statistical significance of the results (e.g. change in the gap between augmented wealth inequality and private wealth inequality in the studied period) is not always investigated.

4. Summary

Economic inequality is today among the most important topics in economic research and public debate. The availability of research on wealth inequality is increasing fast. The traditional concept of household wealth excludes public pension entitlements. However, in recent years several scholars conducted research projects extending this concept.

There are at least four reasons why including public pension entitlements in household wealth is worthwhile. The value of public pension entitlements is similar to the value of private wealth. For many households, the rights to a pension are the most important asset. Institutional settings of pension systems differ across countries, thus, public pension entitlements are important for cross-country comparisons of household wealth and wealth inequality. Public pension entitlements are particularly important for poorer households, and thus may lower inequality.

In this chapter, the research on the impact of public pension entitlements on wealth inequality was reviewed. In recent years this literature expanded significantly. Before 2000 we had estimates of equalizing the impact of public pension wealth only in the United States and the United Kingdom. Today the estimates for 25 countries are available. In all cases, public pension entitlements are distributed more equally than private wealth, and therefore public pension systems mitigate (augmented) wealth inequality. Important studies presenting internationally comparable measures of the equalizing impact of public pension wealth across many countries are available.

In our view, the results discussed in this chapter support the inclusion of public pension entitlements to household wealth, or at least an auxiliary analysis of public pension wealth in research on wealth inequality. Public pension systems are important wealth equalizers. The impact of public pension systems on income inequality is out of the scope of this chapter, but

the literature confirms that public pensions also equalize the income distribution. Although pension reforms, may be required to increase the sustainability of public pension systems, their distributional consequences cannot be ignored.

The availability of research on distributional consequences of public pension entitlements has increased, but the literature is relatively young and has several limitations. The first and probably most important limitation of the literature is its geographical scope. The impact of public pension entitlements on wealth inequality has been investigated only in high-income, where public pension systems cover the whole population and are usually progressive. The distributional impact of public pension wealth may be different in developing countries and least developed economies, where public pension systems are not fully developed, and public pension insurance is not available to wide segments of the population. The international comparability of results of single-country studies remains low. Socioeconomic differentials in mortality are usually not taken into account in the calculation of the value of social security wealth. Surveys rather than administrative data are still the main data source.

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Cross-References

Inequality Measurement: Methods and Data

Wealth Inequalities

Inequality and Top Incomes

Inequality and Social Policy

Understanding Inequality Within HouseholdsHealth Inequalities and Causality

The Insurance Role of the Family

Fair and Unfair Income Inequality

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