

# Household wealth in Poland: the results of a new survey of household finance

Kacper Grejcz\*, Zbigniew Żółkiewski#

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## Abstract

The study discusses the main results of the new survey of household wealth and indebtedness in Poland and compares the main statistics of the wealth position of Polish households vis-à-vis euro area countries. Quantile regression is applied to identify the drivers of net wealth along the net wealth distribution. Wealth inequality is analysed with the use of the Gini coefficient decompositions by wealth component and by household group and the basic methodological features of the new survey of households finance are highlighted. A short review of the latest literature on household finance in Europe supplements the paper.

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\* Narodowy Bank Polski; e-mail: kacper.grejcz@nbp.pl.

# Narodowy Bank Polski; e-mail: zbigniew.zolkiewski@nbp.pl.

# 1 Introduction

## 1.1 Background and motivation

The progress of the Poland's transition has been analysed extensively since 1989 with the culmination in a series of studies in 2014 when Poland celebrated the 25th anniversary of the political and economic transformation after the downfall of the communist rule. As for the success side of the 25 years of transition, the following factors have been usually highlighted (e.g., Bogumił, Wielądek 2014; Aslund, Orłowski 2014; Bogdan et al. 2015; Gomułka 2016): record high growth figures vis-à-vis regional peers, tremendous progress in the convergence to the prosperous countries of Western Europe, significant opening to the world and remarkable improvement in international competitiveness. Exceptional resistance of Poland's economy to shocks from the global economy during the latest crisis has also been emphasised.

These analyses focused rather on aggregate measures of convergence than on distributional issues, including the situation of households (current international USD – PPP). For instance, only Gomułka (2016) out of the authors mentioned above, points to some distributional questions (poverty level) as problematic. Indeed, the average level of living of the Polish family, as measured by the GDP per capita, improved impressively during this time, from 36% of GDP per capita of the core European Union countries (the euro area) in 1990 to 65% in 2015 (The World Bank, The World Development Indicators). Not only did the average Polish family become much more affluent but also the percentage of people living in poverty<sup>1</sup> declined sharply from 11.5% to 3.3% since 2005 (Czapiński, Panek 2015). The latter study provides also evidence of positive distributional changes. For instance, income inequality as measured by the standard Gini coefficient fell during the last ten years by 7 percentage points to 28.5%, well below the EU-27 average level (30.6%). However, other sources provide other, not that optimistic estimates of the Gini coefficient evolution during this time (see a comment below). Poland was among a few EU-28 countries with such a sizeable improvement of the Gini coefficient over the last decade (e.g., see European Parliament 2015).

Even if the issues of economic disparities were not at the forefront of the anniversary publications, they have been systematically studied from the very beginning of the transformation; e.g., see for (publications in English only) Szulc (2000); Keane, Prasad (2002); Newell, Socha (2007); Brzeziński, Kostro (2010); Brzezinski, Jancewicz, Letki (2013). On the one hand, these studies documented a steady increase of income inequalities in Poland during transition, from approximately 0.25 as measured by the Gini coefficient in the 1980s to around 0.35 in 2005 (Brzezinski, Jancewicz, Letki 2013). It was rather unsurprising given the egalitarian pattern of the society under the centrally planned economy. Therefore, Poland was by 2005 far above the average EU-27 level in terms of the thus measured income inequality (Gini coefficient at 0.306), and also had one of the highest income disparity in the region (Gini coefficient at 0.332 for the new member states average). However, since then income disparity in Poland has not increased and according to some sources it might have decreased quite considerably. For instance, the latest available results of various surveys provide the following figures for the Gini coefficient: 0.326 (GUS 2015), 0.307 (GUS 2014), 0.285 (Czapiński, Panek 2015).<sup>2</sup> As for other measures

<sup>1</sup> According to the objective poverty concept, i.e. below the objective poverty line, defined as the officially estimated minimum of existence.

<sup>2</sup> Data adjusted with OECD equivalence scale for EU-SILC and *Social Diagnosis*, and rough data in the case of the household budget survey.

of economic disparity, Brzezinski, Jancewicz and Letki (2013) document significant decline of absolute poverty, in line with the results of the *Social Diagnosis* (Czapiński, Panek 2015).

Up to now, economic disparities in Poland have been mostly analysed with the use of income or wage data. As for wealth, which is another natural variable to be used for this purpose, there is virtually no study on Poland. Brzezinski, Jancewicz and Letki (2013), who provide some preliminary contribution, start by stating that "...there is no reliable comprehensive micro data on wealth and debt of Polish households..." (p. 15). Indeed, the Household Wealth and Debt Survey (Badanie Zasobności Gospodarstw Domowych – BZGD), conducted by Narodowy Bank Polski in cooperation with the Central Statistical Office is the very first study that provides comprehensive data on wealth and household debt in Poland at the micro level, supplemented with key socio-economic characteristics of respondents.

Our paper is structured as follows. A concise survey of relevant literature on household wealth in Europe will conclude this section. In Section 2 the BZGD survey will be described, including the motivation behind its launch and the short summary of its methodological underpinning. Section 3 will give an overview of the main results of the survey in comparison with euro area countries and quantile regression is applied to identify the drivers of net wealth along the net wealth distribution. Wealth and income inequality in Poland, as portrayed by the BZGD survey, will be discussed in Section 4. Section 5 concludes.

## 1.2 The latest literature on household wealth – a short review

Publication of the results of the first wave of HFCS surveys (ECB 2013a), complemented by access to full micro-data from the survey provided to academics for research purposes, triggered an outburst of research on household finance. The current list of publications using HFCS data is around 120 items long although many of them still have a working paper status, an understandable feature given the short preparation time (available at [https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher\\_hfcn.en.html](https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher_hfcn.en.html)). Part of them just reported the main results of the national HFCS surveys and our study belongs to this strand of literature. Some authors analytically did not go beyond establishing the stylized facts (e.g., von Kalckreuth et al. 2012; Banca d'Italia 2014; de Caju 2013; CSO 2015). Other publications offer more in-depth studies based on national HFCS data, especially in the countries with more experience in comprehensive household finance surveys. For instance, a couple of papers on Austria covered the questions of indebtedness of the Austrian households in terms of their vulnerability to shocks (Albacete, Lindner 2013), additionally exploring the ways of applying HFCS data to the purposes of macroprudential policy (Albacete et al. 2014). The question of indebtedness and the risk of over-indebtedness are handled by Vale and Camoes (2015) for Portugal. The authors investigate, in particular, if and how the household perception of wealth impacts its propensity to incur a debt and possibly to get overindebted. According to this study, the households that estimate themselves as wealthy are more inclined to contract non-mortgage loans. In the case of France, Arrondel, Lamarche and Savignac (2015) document the use of HFCS data to estimate the propensity to consume out of wealth on micro-data. The authors confirm that wealth effects on consumption in France rather small, as already known from the previous studies applying aggregate data, but they find additional significant heterogeneity in the marginal propensity to consume out of wealth across the wealth distribution.

As for the countries of Central and Eastern Europe (CEE) there is a limited stock of publications on this subject, given the fact that most of these countries do not participate in the HFCN as non-euro area countries. Notable exceptions are euro area members: Slovakia (Zavadil, Messner 2014) and Estonia (Meriküll, Rõõm 2016), joined also by Poland (NBP 2015a) and Hungary (Boldizsár et al. 2016). Additionally, Fessler, Jager-Gyovai and Messner (2015) offer a study on the indebtedness of households in Slovakia, using HFCS data.

Most of the latest studies on household finance in Europe take advantage of the multi-country dimension of the HFCS survey data base. Some authors use these data to establish stylized facts on determinants of household wealth or asset holdings in the euro-area (e.g., Mathä, Porpiglia, Ziegelmeier 2014a; Arrondel et al. 2014). The authors tentatively explained these heterogeneity by institutional and policy setup diversity within the euro area. These and some other studies (e.g., Teppa et al. 2015; Fessler, Schürz 2015) analyse the main drivers of wealth accumulation: savings out of the current incomes and inheritance. Again, the key message from these studies is considerable heterogeneity in various aspects of savings and inter-generational transfers across euro area countries. Fessler and Schürz (2015) also show that euro area countries differ significantly, with respect to the importance of inheritance as the factor determining the relative position of household in the distribution of wealth. The latter study is also important for testing the hypothesis that social expenditures under the welfare state substitute private savings and thus hamper accumulation of the private wealth, as claimed originally by Feldstein (1974) and uses the HFCS multi-country data base for this purpose. Indeed, the authors found this hypothesis valid for euro area countries. Since the mechanism at work consists in less precautionary savings, especially on the part of poor households, then this implies more wealth inequality along with increases in welfare state activities, as pointed out in the paper (see Skopek, Buchholz, Blossfeld 2011 for the analysis of Scandinavian countries).

Other strand of papers deals with the borrowing and debt of households in euro area countries. For instance, Bover et al. (2014) studied the distribution of household debt across euro area countries by various socioeconomic and demographic characteristics of households. They demonstrated considerable heterogeneity in the relative importance of these characteristics across countries and then found some explanations of this heterogeneity in institutional factors. Ampudia, van Vlokhoven and Żochowski (2014) propose a framework for stress-testing individual household balance sheets to assess their sensitivity to various types of adverse shocks. The authors offer two main conclusions: first, the household sector in the euro area is relatively resilient as a whole, and second, there is substantial heterogeneity across countries. They also emphasize the potential usefulness of their work for macroprudential policy purposes.

Wealth inequality in the euro area has been analysed in numerous papers. Leitner (2015) investigates which household characteristics (e.g., age, education, size of the family) determine its location in wealth distribution. The author concludes that while for most of the euro area these socio-demographic features explain wealth inequality to a large extent, there are some countries (e.g., Austria, Germany, Greece, Cyprus) where intergenerational transfers are very important for wealth inequality. Kaas, Kocharkov and Preugschat (2015) analyse the importance of homeownership for explaining cross-country wealth inequality and demonstrate that it is the most important factor behind wealth disparities. Müller and Schmidt (2015) focused on poor households in euro area in terms of income and net wealth. The authors check out various measures of poverty but according to their experience the percentage of households living in poverty remains similar irrespective of the definition.

The other general conclusion from this study is that using poverty measures extended by adding wealth produces similar results to income based indicators. In both cases it is smaller households, single-parent households and households with a less educated head that are mostly at risk of poverty.

The general motivation of our paper is both to discuss the general results of the household wealth and debt survey for Poland and to provide analytical results on specific issues like wealth inequalities or the determinants of household wealth. Our paper contributes to the literature along the following lines: it is the first analysis of the households' wealth in Poland at micro level, following the publication of the BZGD survey (NBP 2015a). Moreover, it is one of few contributions on household wealth for Central and Eastern European countries. Additionally, we apply quantile regression to explain wealth formation along wealth distribution, which is still non-standard in the literature on household wealth in Europe.

## **2 BZGD – a new survey of households finance**

### **2.1 BZGD and the existing household finance surveys**

There is quite a long international experience of collecting micro data on households finance, including their assets and liabilities. For instance, the US Federal Reserve Board has undertaken a Survey of Consumer Finance (SCF) regularly (bi- or triennially) since 1983 but the prototype survey was launched already in 1963 (Projector 1964). Similarly, Banca d'Italia started its work on this issue in early 1960s and then the Survey of Household Income and Wealth (SHIW) has been carried out regularly since 1965 (Banca d'Italia 2014). The first surveys of this type were then launched in some other countries, the first followers being the Netherlands and Portugal where the origin may be traced back to the early 1990s (ECB 2009). These newly available data could not be fully utilised for comparative purposes, given the methodological heterogeneity of these early studies. Afterwards, two international initiatives undertaken in 2000s changed the picture significantly. First, the Luxembourg Wealth Study (LWS) was started in 2004 as the joint venture of the Luxembourg Income Study (LIS), statistical offices, central banks and some research institutions, with the main purpose to compile internationally comparable database on household wealth from the existing national micro-data sources (<http://www.lisdatacenter.org>). Second, the Household Finance and Consumption Network (HFCN) was established in December 2006 as a research network consisting of the representatives of the ECB, the national central banks of the Eurosystem and national statistical agencies. Its main task was to design and then conduct a household survey that would collect household-level data on households' finances (including debt and assets) and consumption in an internationally harmonized manner. While the former undertaking was only a partial solution of the problem, given the limited number of countries included in the database and considering that the data had yet to be harmonized, the HFCN project may justifiably be regarded as a breakthrough. It covers all the euro area members and gradually a growing number of other EU countries (e.g., Hungary, Poland) and all the national surveys use harmonized methodology in terms of the list of output variables, definitions etc.

The Household Wealth and Debt Survey (BZGD) is a national survey undertaken within the framework of the ESCB Household Finance and Consumption Network (HFCN). It is the very first survey that provides a detailed and exhaustive information on households' finance in Poland, and in particular the value of assets and liabilities in possession of households. Other surveys covering

household finance, carried out up to now in Poland like household budget survey or EU-SILC, focus only on flows of income, consumption expenditures and savings out of current income. BZGD covers additionally a wide range of complementary information concerning the respondents like incomes, consumption, labour market status, living conditions etc. The BZGD survey is methodologically harmonized with the Household Finance and Consumption Survey – HFCS (see: [https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher\\_hfcn.en.html](https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher_hfcn.en.html)) as launched by the national central banks of the Eurosystem and national statistical institutes/agencies in 2006.

## **2.2 Methodological details – a summary**

The Household Wealth and Debt Survey (BZGD) has a status of a pilot study but given its methodologically advanced stage, a relatively large sample and a satisfactory rate of response, its results were published as the official publications of Narodowy Bank Polski. The results were published in 2015 in the form of two complementary volumes: the analytical report (NBP 2015a) and the methodological report (NBP 2015b). The BZGD survey was completed in January – February 2014 on the representative sample of 7000 households, of which over 3500 satisfactorily (almost fully) filled the questionnaire. Oversampling of the potentially wealthiest households based on tax and dwelling size was applied, which is standard for this kind of surveys (see NBP 2015b). The data collected during the survey were then transferred to the common international database of the HFCS survey, which implied some corrections and definitional adjustments. We used the latter version of the data for Poland in our paper.

The data collected under the BZGD survey are based on nationally representative probability sample of private households residing in Poland. A special sample design has been applied to combine the desirable quality of the representativeness of the sample with the procedure to neutralize the relative unwillingness of the wealthiest households to participate in the survey, a typical phenomenon for wealth surveys. A two-stage stratified sampling scheme was applied. At the first stage, the population of households was divided into a fixed number of strata from which sampling units were drawn, and then in the second stage, addresses of dwellings were sampled. The strata (106 altogether) were defined with respect to: voivodship (NUTS 2) – 16 regions, class of locality (6) and the affluence as measured by the combination of residence size and personal income tax incidence (4). A thus defined affluence criterion was then used in the oversampling of the wealthiest households. To this purpose a two step procedure was applied. First, the gminas (the basic unit of territorial division in Poland) with the biggest revenues from the personal income tax per capita were identified (ca. 15% of addresses). In the second step, the sampling units characterized by the largest dwelling size by floor area were identified within the potentially wealthiest gminas, identified in the first step. Finally, households living in precisely those sampling units were oversampled.

The data from the questionnaires collected during the BZGD were then subject to imputation to handle lacking answers to certain important questions (item non-response). As is well known (e.g., ECB 2013b) the problem of a higher percentage of missing answers is especially relevant to surveys of household finance, given the particular sensitivity and complexity of the core questions in these surveys. In the case of the BZGD survey, a so-called stochastic multiple imputation method has been

applied, which follows the HFCN practise in this respect. Under this approach, the missing values are simulated with the sequential use of the regression models, with the regressors representing potential explanatory variables fitted to the observations from the survey. Altogether 30% of the values of quantitative variables at household level and 13% at household member level have been imputed.

The ECB SAS-based multiple imputation routine (EMIR) was used for imputation in BZGD. As in case of the HFCS survey, five imputates were estimated. Accordingly, variance calculation routines suitable for the complex survey data including multiple imputation were applied (see Appendix).

While multiple imputation has been used to deal with the missing observations (item non-response), some other observations had to be edited since they were identified as clearly erroneous for some respondents. This was done through expert-type edition, with the use of partial information from the survey and external data sources. Private pension schemes, life insurance and mortgage loans in foreign currencies were finally edited.

### 3 Overview of the main results

#### 3.1 How wealthy are households in Poland?

The Poland's net wealth position against the background of the euro area countries, including the data on the incidence of ownership of the household's main residence, is illustrated in Figure 1. The median net household wealth in Poland (EUR 57.1 thousand) is about 54.8% of the net wealth of the median euro area household (EUR 104.1 thousand). This result positions Poland at the lower tail of the distribution, close to such countries as Portugal (EUR 71.2 thousand), Greece (EUR 65.1 thousand), Germany (EUR 60.8 thousand), Slovakia (EUR 61.2 thousand), Estonia (EUR 43.6 thousand) or Hungary (EUR 26.2 thousand). On the other hand, it is consistent with the position of Poland vis à vis euro area countries in terms of GDP per capita (e.g., 65% GDP per capita of the euro area, 2015, PPP) that is rather similar to Greece (64%), Slovakia (73%) or Portugal (72%). However, at the lower tail of the wealth distribution there are countries very affluent in terms of the GDP per capita like Germany or Austria (respectively, 117% and 120% GDP per capita of the euro area, 2014, PPP). As the HFCS survey clearly shows, it is the variation in the propensity to possess the residence the household is living in that is crucial for the explanation of the differences in the level of private wealth among the countries. Poland is a country where households rather frequently tend to possess their dwelling (77.4%) in comparison with 61.2% for the euro area and 47.7% for Austria or 44.3% for Germany (see Table 6). This relative popularity of the homeownership in Poland explains why the wealth of the median Polish household is almost comparable to Germany, despite the disparity in GDP per capita. Obviously, the value of the household residence is much lower in Poland (EUR 64.4 thousand) than in Germany (EUR 162.0 thousand) or Austria (EUR 250.0 thousand).

### 3.2 Where does Poland conform to pan-European stylized facts?

#### Real assets as the main component of wealth

In many respects, pattern of the median wealth of households in Poland conforms to European stylized facts as documented in ECB (2013a, 2016a). For the purpose of international comparisons, the results of the BZGD were recalculated from the Polish currency (złoty) to euro. As recommended by HFCN, the 12-month average exchange rate of the reference year (2014) was applied, i.e. 4.1845 PLN/EUR. In particular, real assets are the main component of wealth although its share in total assets is much higher in Poland (approx. 95.4%) than in the euro area (approx. 82.2%). Both in the euro area and especially in Poland the household main residence is the most important element of the real assets (60.2% versus 69.9% in Poland). Additionally, Polish households more often than their euro area counterparts are owners of their main residence (77.4% versus 61.2%), which is very important for the explanation of the gap between the two areas in terms of net wealth. Real estate property and self-employment businesses are significant components of household wealth both in the euro area and in Poland. Real estate weighs less in the portfolio of Polish households comparing to the euro area (10.5% of real assets versus 22.3% in the euro area); however, households in Poland accumulated relatively more resources in the form of self-employment business (16.1% of real assets versus 11.8% in the euro area). As for the financial wealth, deposits are the main item across countries although they are more dominant in Poland (68.2% of financial assets versus 44.2% in the euro area). The second largest share in the total financial assets both in Poland and in the euro area belongs to voluntary private pensions and whole life insurance. It is relatively more important in the euro area than in Poland (24.5% versus 15% of the financial assets). Other financial assets have secondary importance both in Poland and in the euro area.

Households in Poland are less indebted than in the euro area, both in absolute terms (respectively, EUR 2.4 thousand versus EUR 28.2 thousand, medians) and in terms of debt to assets (DTA) ratio that equals 6.8% for Poland and 25.7% for the euro area.

#### Income and education as important wealth enhancing factors

Certain characteristics of the household, like an income or education level of its head, plausibly determine the position of the family in the distribution of wealth, as in the other countries of the euro area. In particular, net wealth increases sharply along with the household's income (see Figure 2b). For instance, the median household from the top income decile has the net wealth of EUR 130.2 thousand, i.e. more than four times bigger than the median household belonging to the first quintile<sup>3</sup> (EUR 28.7 thousand). Education is also an important wealth enhancing factor (see Figure 2a). A household with its head holding a university diploma may expect on average<sup>4</sup> the net wealth of EUR 83.2 thousand while it is only EUR 37.2 thousand for households with the head with primary education. Therefore the relative higher education premium measured in that way is 2.2 in Poland and is bigger than in the euro area (1.9).

<sup>3</sup> Given the strong asymmetry of the net wealth distribution, we will prefer to compare deciles of the wealthiest to the quintiles of the poorest (in terms of wealth).

<sup>4</sup> Here and throughout the paper 'on average' denotes 'in terms of the median value' of the respective variable. The term 'mean' will be used wherever the arithmetic mean is commented, to avoid confusion.



### Wealth formation along the life cycle

Wealth distribution profile with respect to the age of the household's head for Poland (see Figure 3) conforms to theoretical predictions of the life cycle model proposed by Modigliani and Brumberg (1954), usually supported by empirical data across countries. Hence, it exhibits the expected hump-shaped pattern, with the youngest (16–24) possessing on average the smallest net wealth (EUR 2.1 thousand), then increasing monotonically till the peak at 45–54 years (EUR 73.6 thousand), and subsequently declining gradually to EUR 42.6 thousand for the oldest households (75+).

The household's income distribution by the age of the household's head also follows the hump shape pattern. As may be expected, income tends to increase faster than wealth in the early years of the household's economic activity, culminates at a similar moment (slightly earlier) and then decreases, more steeply than wealth, to much lower levels by the end of the household's life cycle.

### 3.3 Where is Poland different?

Generally speaking, this type of net wealth profile, with a dominant share of capital in the form of owned home, a smaller contribution of financial assets and moderate debt burden at the same time is not far from the typical one for the euro area country, as portrayed by the HFCS survey. In this respect, Poland seems to be quite similar to countries at a modest level of financial system development, corresponding to a relatively low level of household income, like Slovakia or Slovenia, where neither widespread borrowing nor extensive channelling of savings through the financial system are widely established. Relative underdevelopment of the financial intermediation in Central and Eastern European countries is analysed in Caporale et al. (2009) and its impact on economic growth is assessed in Aghion, Harmgart and Weisshaar (2010).

There are however some specificities of the way in which Polish households accumulate wealth that are worth highlighting. First, households in Poland run self-employment businesses more often than their peers in the euro area (18.9% in Poland versus 11.0% in the euro area). Moreover, this part of the household's wealth is on average bigger in Poland (EUR 38.3 thousand) than in the euro area (EUR 30.0 thousand), which is not the case for other assets. As for the other types of assets in possession of households, their value on average is usually much lower in Poland in comparison with the euro countries. For instance, while Polish households own their residence much more often than in the euro area (77.4% versus 61.2%), its median value is much lower (EUR 64.4 thousand versus EUR 165.8 thousand).

Second, households living in the countryside report (on average) bigger net wealth than city inhabitants (EUR 87.7 thousand versus EUR 49.8 thousand). Even if we take only the larger cities (more than 200 thousand inhabitants), still village residents are better off in terms of net wealth (EUR 57.3 thousand). This result stands in stark contrast to the GDP per capita data that show strong income disparity between the urban and rural areas in favour of the urban population. For instance, the GDP per capita in the largest municipalities in Poland (as a proxy of the urban area) is in the range of EUR 17.8 thousand (Wrocław) to EUR 27.9 thousand (Warsaw) while in typical rural districts<sup>5</sup> it is 3 to 4 times lower (about EUR 5.5 thousand), as of 2010–2012. The relative affluence of rural population in terms of

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<sup>5</sup> The approximate average for the Przemyski, Chełmsko-Zamojski and Elcki regions (NUTS3 level).

net wealth may be explained by three factors. First, rural households own their main residence much more frequently (86.9%) than their urban peers (72.7%), and additionally they have more expensive dwellings (EUR 76.3 thousand versus EUR 55.6 thousand). In the case of the rural families these are almost exclusively detached houses with a plot of land, while they are mostly apartments in the case of the urban households. Second, rural households run self-employment businesses almost 3 times more often than their urban counterparts (32.3% versus 12.3%), and on average the former have accumulated bigger wealth resulting from the production activities than the latter (EUR 48.0 thousand versus EUR 26.4 thousand). And third, rural families are much less indebted in comparison with urban ones (EUR 1.6 thousand versus EUR 2.7 thousand), although this factor is of lesser importance.

Another specific feature of the wealth profile of the Polish households is a very high, prevalence of the main residence in possession of young households (with the head aged 16–34) in comparison with the euro area countries. In Poland almost 60.3% of young households own their house or apartment while less than one third of young families in the euro area follow this pattern. Accordingly, younger families (25–34 years) hold mortgage loans (28.2%) more frequently than any other age group. In the euro area, older households (35–44, 45–54 and 55–64) display a higher percentage of mortgage loans participation relative to the younger ones. That strikingly high propensity of young households in Poland to buy their dwelling instead of renting may be explained by the various reasons. Partly this may be a sign of cultural attitudes to home ownership, resulting in the large weight of the real estate in the portfolio vis-à-vis other nations. The importance of the cultural factor is quite often highlighted in the literature explaining cross-country differences in wealth patterns (e.g., Doorley, Sierminska 2014; Andrews, Sánchez 2011). However, it may also be in part an effect of the type of regulation of the rental market in Poland and of policies supporting home ownership (e.g., tax credits on mortgage debt repayment, government subsidies to dwellings purchase by young couples). According to Cuerpo, Kalantaryan and Pontuch (2014) rental market in Poland is characterized by the lowest (the most unfavourable) level of the tenant-landlord relationship indicator among the EU-27 countries.

### 3.4 Determinants of net wealth along its distribution

After having portrayed stylized facts on net wealth distribution by certain characteristics of households, we will perform a formal analysis using quantile regression (the technical note on proceeding with quantile regression on complex survey data in STATA is located in Appendix). As claimed in the literature, this approach is more suitable than linear regression in the case of highly skewed distributions (the case of net wealth) and thus non-normally distributed data (see Koenker, Hallock 2001; Humer et al. 2014; Bezrukovs 2013). Given these properties of the data on net wealth, one may assume various explanatory mechanisms for the dependent variable along its distribution, e.g. at different quantiles of net wealth, and a quantile regression approach provides us with a tool to study this effect.

The results of quantile regressions (for the 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup> and 90<sup>th</sup> percentiles) and the standard ordinarily least squares (OLS) regression are given in Table 1. As anticipated, using only the OLS estimates we lose more detailed information about the distribution of net wealth. For example, such variables as *single-parent*, *higher education*, *other not working* turned out to be insignificant in OLS regression whereas they proved to be valid (statistically significant) explanatory variables of the net wealth at some quantiles distribution. Moreover, the OLS method produces average results which may

depend to a large extent on extreme observations, i.e. the characteristics of more affluent households due to the high skewness of net wealth distribution.

While the estimates of the quantile regression generally confirm the observations made above upon the initial inspection of the data and correlations between net wealth and certain households' characteristics hold, those correlations vary along the net wealth quantiles.

Household net income is one of the main factors that stimulate net wealth independently of the quantile. The more money household members earn, the higher net wealth they accumulate (a value of the parameter of net equivalent income increases for higher quantiles). This result may also support the hypothesis of higher saving rate for households that earn more. The similar situation applies for variables characterizing the ownership of household main residence (*owner-outright* and *owner with housing credit*). Both have positive impact on net wealth and are statistically significant at a confidence level of 1%, so having a property raises household net wealth depending on the value of one's house (values of the parameters for owners increase for higher quantiles). In all cases, the parameter for owner-outright exceeds the parameter for owner with a housing credit which is an intuitive result given that the use of housing credits reduces net wealth by the value of outstanding debt.

When households inherit something, this increases their net wealth in a statistically significant manner even in the case of the poorest households. In the 1<sup>st</sup> decile only 6% of households inherit something, however 42% of those inheritances are houses or dwellings. The strongest reaction is noted for the 75<sup>th</sup> and 90<sup>th</sup> quantiles. The results might suggest that inheritances in Poland concern mostly the wealthier households and therefore are likely to be a disequalizing factor for the net wealth distribution. Given the early phase of the research, this should be treated as a hypothesis that requires a separate and much deeper analysis with a more sophisticated approach to deal, for instance, with the potential endogeneity problem. Evidence in the international literature for the impact of inheritance on wealth inequality is rather mixed and it is not clear whether this factor increases or decreases wealth inequality. In the case of the US economy, the equalizing impact of inheritances on wealth distribution seems to be proven (Wolff, Gittleman 2011). Elinder, Erixson and Waldenström (2016) demonstrate the same effect for Sweden while the conclusions from the literature based on HFCS data on the euro area are not so clear (Fessler, Schürz 2015; Korom 2016).

The signs of the parameters of the two age variables (*age of RP* – positive, *squared age of RP* – negative) reflect the expected hump-shaped pattern of the age-wealth relationship: household net wealth increases along with the age of the reference person up to some point and afterwards it decreases as the household is ageing along its life cycle. As for the tails of the distribution, for the 10<sup>th</sup> percentile these variables are insignificant and for the 90<sup>th</sup> percentile the statistical significance declines to 10%. It may suggest that in the case of the poorest and the wealthiest, other factors are more important in explaining net wealth. As for the type of household, various demographic factors concerning the composition of households influence net wealth distribution in different ways along the wealth distribution. Being a *couple with children* or an *extended family* is conducive to accumulating net wealth independently of the quantile. An *extended family* is defined as a family augmented by a person (or more) who is biologically related to at least one member of the family (e.g., couple with/without children plus grandmother or husband's sister etc). A variable *couples without children* is statistically significant along all the quantiles but for the 90<sup>th</sup> percentile. The variable seems to be the best determinant of the less affluent households (1<sup>st</sup> decile, 1<sup>st</sup> quartile) which consist of younger

reference persons (about 20% of households from the 10<sup>th</sup> percentile and 36% of households from the 25<sup>th</sup> percentile have heads aged 16–34). The variable *single-parent household* is positively related to net wealth accumulation for the 1<sup>st</sup> quartile, the median and the 3<sup>rd</sup> quartile (at least at a 10% significance level) but not at the tails of the distribution.

*Place of residence* is a statistically significant factor supporting net wealth accumulation. If a household is living in the rural area, this will have positive impact on its wealth along the net wealth distribution except for the tails. As discussed above, rural households have an advantage over the urban ones in terms of prevalence of their main residence ownership and running self-employment businesses, and also less inclination to indebtedness. These are strong net wealth enhancing factors. The other factor that makes rural households richer than urban ones is a higher value of real assets owned by the former population of households (see Table 5).

*Higher education* of the reference person has a positive impact on net wealth. The more affluent a household is the higher the increase in net wealth provide by tertiary education. Hence, higher education plays an important role in the process of net wealth accumulation but its positive influence seems to weaken above the median (tertiary education may be less important in the case of the richest).

As for the status at the labour market, belonging to the household with the reference person being *self-employed* clearly has a positive impact on net wealth accumulation (significance level of 1%), and an effect is getting stronger along the net wealth distribution. Being *retired* as a reference person in the household is not statistically important for this specification of the model so it does not seem to be a good determinant of net wealth. However, if the reference person does not work but at the same time is not a retiree (variable: *other not working*) this status is conducive to wealth accumulation in the case of the 75<sup>th</sup> percentile and especially 90<sup>th</sup> percentile (significance of 5%). For the 10<sup>th</sup>, 25<sup>th</sup> and 50<sup>th</sup> percentiles, this variable is not statistically significant, thus this result may point out to the group of rentiers who live on their accumulated wealth and thus do not need to work.

## 4 Wealth and income inequality

### 4.1 Wealth inequality in Poland

The distribution of wealth in Poland is skewed towards the upper tail of the wealthiest households, which seems to be a stylized fact both in developed and developing countries (e.g., OECD 2015; UN DESA 2013). According to our results, 10% of the wealthiest households own 41.8% of the total net wealth, while the poorest (in terms of wealth) 20% of households possesses only 0.3% of the total. The 5.5% fraction of the household population reports no positive net wealth value, of which 2.2% of households possess negative net wealth (i.e. their debt exceeds assets) and net wealth equals zero for 3.3% of the households. For the 1% of the poorest households (in terms of wealth), the net wealth does not exceed EUR -1.0 thousand, for the median household it is EUR 57.1 thousand and participation in the richest 1% requires to possess at least EUR 665.1 thousand (see Figure 4).

Net wealth in Poland is distributed more equally than for the euro area as a whole. If measured by the Gini coefficient, it is 0.587 for Poland against the 0.686 in the euro area. It is close to the score of countries with relatively low wealth inequality, like Greece (0.599), Slovenia (0.628) or Slovakia (0.492), and much lower than in the leading countries in terms of the wealth concentration like Austria (0.731)

and Germany (0.762). Also others measures of wealth inequality (e.g., percentile ratios, HSCV – half the squared coefficient of variation<sup>6</sup>) confirm at most a moderate level of wealth inequality in Poland (see Table 2). Only in terms of the p90/p50 index, Poland is close to the middle of the sample which indicates relatively stronger wealth inequality above the median than below it. However, the estimate of the HSCV measure, which is sensitive to inequality at the upper tail of the distribution, does not support this hypothesis since it indicates noticeably lower wealth concentration in Poland (1.37) relative to the euro area average (4.43).

Income disparities in Poland are less pronounced than in the case of net wealth, which conforms to the pattern in other countries. The Gini coefficient for household income amounts to 0.392 (rough data) and 0.355 when data were adjusted by the OECD equivalence scale. Consequently, the upper 10% of the household population earn 26.1% of the total income while the lower 20% of households accounts for only 5.2% of the total. Therefore our estimate of the Gini coefficient implies somewhat stronger income inequality in Poland in comparison with other studies as mentioned in the introduction. This might be at least partly due to the fact that our sample most probably represents better the most affluent households, given the oversampling of the wealthiest procedure applied in BZGD (in contrast to other studies).

## 4.2 Wealth inequality in Poland by component

The picture of inequality in terms of net wealth, which is an aggregate of various assets and liabilities, may mask diverse inequality characteristics of wealth components. Indeed, Figure 5 sheds some light on this question.

Clearly, real assets (mostly dwellings) are much more equally distributed (Gini 0.57) than financial assets (0.70), and debt is particularly concentrated: Gini is equal to 0.9 which means that 10% of those most heavily indebted holds 88% of the total liabilities. Hence, composition of portfolio matters for the inequality features of wealth distribution. If the propensity to hold a certain type of assets prevails then it may 'equalize' the distribution of wealth (like dwellings in case of the Polish households) or 'disequalize' it (like financial assets or debt). This question can be formally analysed by the use of the decomposition of the inequality metrics for the net wealth aggregate. For this purpose, we will use the Gini coefficient and the decomposition technique developed by Pyatt, Chen and Fei (1980). This procedure enables the quantification of the individual contribution of assets and debt to overall net wealth inequality, taking into account (Bezrukovs 2013): the share of the given specific asset (liability) in total wealth, its own inequality as measured by the Gini index and how it is correlated with the distribution of the aggregate. We use the following decomposition formula, attributed to López-Feldman (2006):

$$G = \sum_{i=1}^I S_i G_i R_i$$

where:

- $G$  – Gini coefficient,
- $S_i$  – share of source  $i$  in total wealth,
- $G_i$  – Gini index of a wealth source  $i$ ,
- $R_i$  – the Gini correlation of wealth from source  $i$  with total net wealth.

<sup>6</sup> Half the squared coefficient of variation (HSCV) – the inequality index of the generalised entropy class measures (alpha = 2). It is more vulnerable to values at the tails of a distribution comparing to the Gini index.

Finally, we will arrive for each component of net wealth at its absolute ( $S_i G_i R_i$ ), relative ( $S_i G_i R_i / G$ ) and marginal ( $S_i G_i R_i / G - S_i$ ) contributions. For our purpose of identifying the ‘equalizing’ and ‘disequalizing’ factors of net wealth we will focus on the marginal contribution estimate for each wealth component. The results of our calculations are displayed in Table 3 (a negative value of marginal contribution denotes equalizing impact, positive – a disequalizing one).

The most significant factor in equalizing households’ net wealth in Poland is household main residence (HMR) whose marginal contribution amounts to -10.4%. This is the result of a high level of participation rate for this kind of assets in Poland (77.4% of households own a HMR) and a high value of HMR relative to other assets. Other equalizing components of net wealth are: deposits, vehicles, voluntary private pensions and the whole life insurance, and valuables. However, their significance is much weaker than in the case of HMR.

The most important disequalizing factor is self-employment business wealth (marginal contribution equals 7.0%). Other components of net wealth that intensify its concentration at the margin are: housing loans (marginal contribution of 3.8%), other real estate property (marginal contribution of 1.6%) and other than housing debt (marginal contribution of 1.0%). A relatively high value of the above assets and liabilities and their relatively high shares in the portfolio of Polish households result in their strengthening impact on net wealth inequality.

The general picture of factors working at margin towards equalization or disequalization of net wealth inequality in Poland looks similar to the results for the euro zone (Bezrukovs 2013). The only difference worth mentioning here is a much more pronounced role of self-employment business versus other real estate property as a disequalizing factor in Poland in comparison with the EA-15 as a whole. This may be explained by the fact that, as already mentioned, self-employment in Poland is more widespread than in the euro area and wealth accumulated this way is also relatively larger.

### 4.3 Wealth inequality in Poland by household group

The Gini coefficient for net wealth may be also decomposed so as to estimate contributions of different household subgroups to general net wealth inequality. For this purpose, we will use the decomposition technique developed by Rao (1969), with further contributions by Lambert and Aronson (1993), according to the following formula:

$$G = G_W + G_B + R, \text{ where } G_W = \sum_{k=1}^K v_k \lambda_k^2 G_k$$

where:

- $G_W$  – the within-group component,
- $G_B$  – the between-group component (the wealth of each group represented by its mean),
- $R$  – the residual term (the measure of the degree of overlap between groups),
- $G_k$  – the Gini coefficient for group  $k$ ,
- $v_k$  – the share of group  $k$  in the population,
- $\lambda_k$  – the ratio of the mean wealth of group  $k$  to the population mean.

As known from the discussion in the literature (e.g., Lambert, Aronson 1993), this decomposition formula may be considered as somewhat problematic, given the difficulties with the interpretation

of the residual (the 'overlap' term). An example of an empirical application of this technique is given in Azpitarte (2010).

When looking for the household characteristics that contribute the most to the overall net wealth inequality, we will accordingly identify those of them for which the weight of the 'between inequality' predominantly exceeds the 'within inequality' term. Following Azpitarte (2010), we will also look at the same type of decomposition for incomes, for the purpose of comparison.

The results of the Gini decomposition computations are given in Table 4. These results indicate that the household characteristic that is the most conducive to overall net wealth inequality is the employment status of the reference person at labour market. Indeed, the households with a self-employed person as the reference person are likely to have much bigger net wealth than any other household group (the 'between' factor explains 37.0% of overall inequality vs 26.4% for the 'within' factor). The between group variation of means is much lower for other household characteristics. For the *age of the reference person* and the type of household, the 'between inequality' term has a greater contribution to overall inequality than the 'within inequality' term. However, in those cases the 'overlap' term explains about 50% and more of the overall inequality, which makes these results less transparent. The picture is slightly clearer in case of income inequality for which both the employment status of the reference person and the type of household provide a relatively good explanation of the overall inequality.

## 5 Concluding remarks

In this paper, the new survey of household finance in Poland (BZGD), focusing on wealth and indebtedness was introduced and its main results were discussed in comparison with the relevant statistics for euro area countries, as resulting from the first wave of the HFCS survey. These results seem to confirm the image of a middle income country with a modest average level of net wealth, with dominant share of the housing stock, and rather marginal role of the financial assets and indebtedness. The most prominent idiosyncratic feature of net wealth pattern in Poland is relatively high incidence of the self-employment business and its elevated value vis-à-vis euro area on average. Quantile regression models were applied to show how various household characteristics contribute to the net wealth accumulation along the net wealth distribution.

Wealth and to some extent income inequality in Poland was analysed by standard inequality measures and limited comparison to euro area was undertaken. More in-depth examination of the net wealth inequality was implemented with the use of the Gini coefficient decomposition technique by wealth component and by household group. These analyses imply that Poland may be considered as a country with moderate inequality of net wealth relative to the euro area, with the housing stock as the most equalizing factor and self-employment wealth as the most disequalizing factor. This latter conclusion on the contribution to overall wealth inequality by household residence (negative) and self-employment business wealth (positive) are a common feature among euro area countries (Bezrukovs 2013).

This paper constitutes a preliminary step to examine and understand wealth distribution among Polish households, based on the results of the first Polish survey focusing on the wealth and indebtedness of households (NBP 2015a). Further steps will include both an enhancement of the tools

applied in the analysis and its scope as well as an improvement of the survey itself. As for the former, other inequality measures than Gini (e.g., entropy class of inequality indices) may be applied for the decomposition exercises to better understand wealth inequality morphology and its drivers, given the acknowledged limitations of the Gini coefficient. As for the latter, the BZGD 2014 survey reported here is still a pilot study, even if a methodologically advanced one, and further work on improvement of data quality and on better representativeness of the sample is necessary. As long as the new waves of BZGD are available for research, questions of wealth inequality and the determinants of net wealth formation along wealth distribution will be addressed in more detail and with more sophistication.

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## Appendix

### 1 Variance calculation

#### Multiply-imputed data

The total variance in the case of a multiply-imputed dataset is calculated with the following multiple imputation (MI) formula:

$$T = W + \left(1 + \frac{1}{M}\right)Q$$

where:

$M$  – a number of implicates (each implicate is indexed by  $m$ ),

$W$  – the average within-imputation variance associated with the estimate  $W = \frac{1}{M} \sum_{m=1}^M \theta_m$ ,

$Q$  – the between-imputation variance  $Q = \frac{1}{M-1} \sum_{m=1}^M (\theta_m - \bar{\theta})^2$ ,

$\theta_m$  – the estimator of interest; in this case  $\bar{\theta} = W$ .

Standard errors in our quantile regression model were calculated in this manner.

#### Combining replicate weights and multiple imputation

In complex survey data like in BZGD, each observation also has a final estimation weight  $w_i$ . In addition, there are  $M$  implicates indexed by  $m$ ,  $B$  replicate weights  $w_{ib}$  marked by  $b$  and  $i$  corresponds to each observation. While combining replicate weights ( $w_{ib}$ ) and multiply-imputed survey data with  $m$  implicates, the first component of the MI formula should be modified. Let:

$$W = \frac{1}{M} \sum_{m=1}^M U_m$$

where:

$$U_m = \frac{1}{B-1} \sum_{b=1}^B (\theta_{mb}^* - \bar{\theta}_m^*)^2,$$

$$\bar{\theta}_m^* = \frac{1}{B} \sum_{b=1}^B \theta_{mb}^*,$$

$\theta_{mb}^*$  is the estimator of interest calculated by using  $w_{ib}$ .

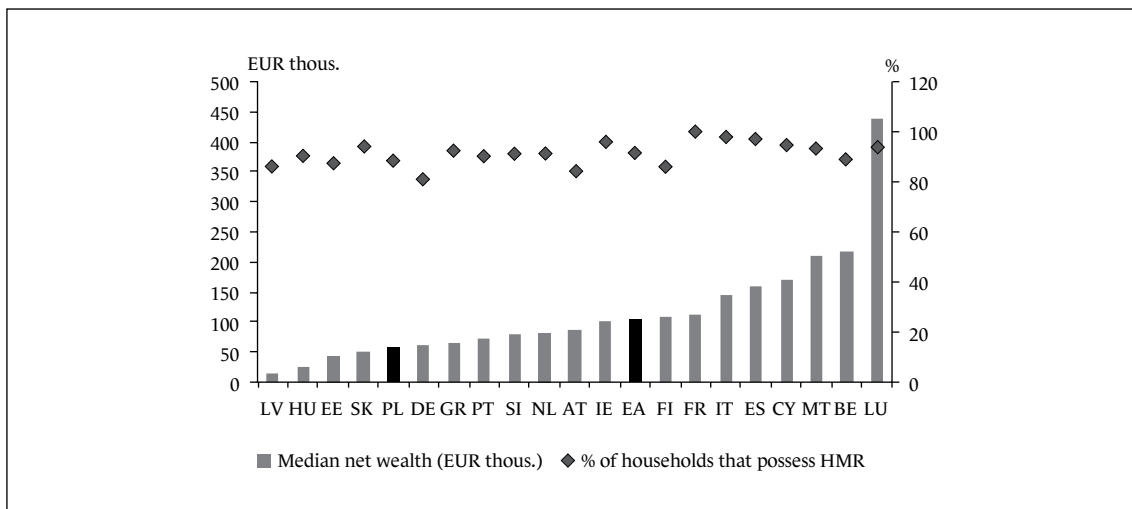
Such a procedure was used in estimating standard errors presented in Table 5.

## 2 Quantile regression – problems with analysing complex survey data in STATA

While analysing complex survey design data such as BZGD, it is preferable to use weighted regression since weights allow us to get the results concerning the whole population rather than the selected sample (Magee, Robb, Burbidge 1998; Faiella 2010). As STATA 14 does not provide a possibility to deal with multiple imputed data and sample weights simultaneously in the case of estimating quantile regression, the final sampling weights were included as additional covariate in order to reduce any potential selection bias normally corrected for by weighted regressions (following the procedure as proposed in the literature – Mathä, Porpiglia, Ziegelmeyer 2014b). Additionally, robust standard errors were finally adjusted by the additional STATA option *vce* with a view to addressing problems with heteroscedasticity and sampling uncertainty. While presenting the results of the quantile regression, we skipped the values of the coefficients and standards deviations concerning final weights as we are not interested in the parameters themselves.

Figure 1

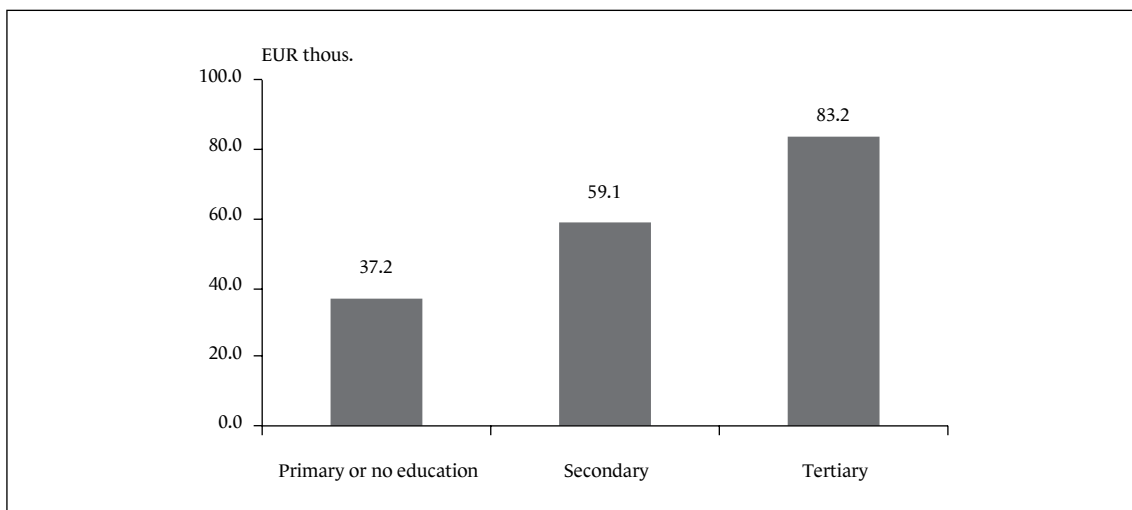
Net wealth (median) and incidence of the main residence ownership in the euro area countries and Poland



Source: ECB (2016a).

Figure 2a

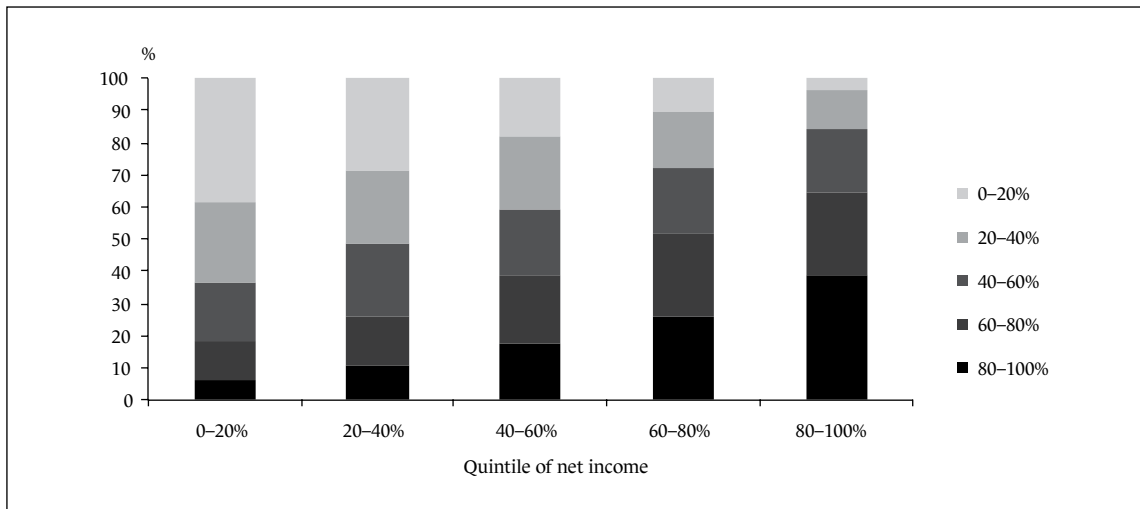
Net wealth by education level of reference person (median)



Source: ECB (2016a).

Figure 2b

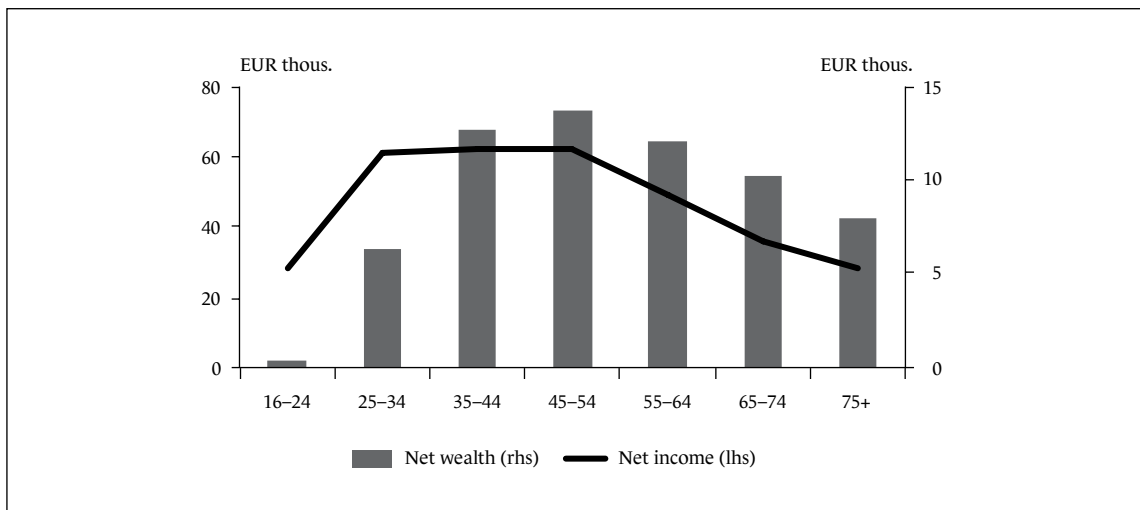
Net wealth quintiles vs. net income quintiles



Source: ECB (2016a).

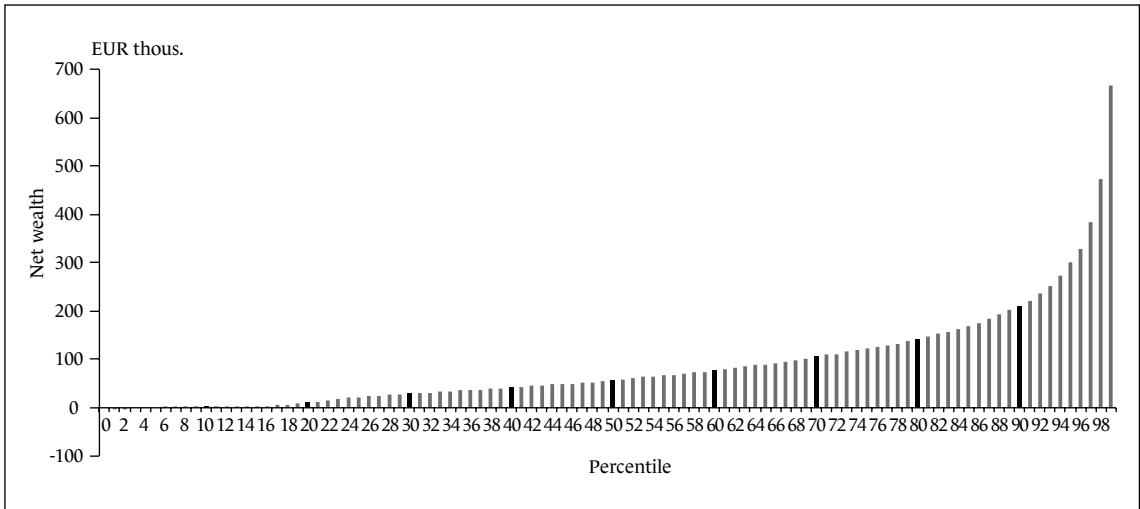
Figure 3

Net wealth and annual net income by age of reference person (median)



Source: ECB (2016a).

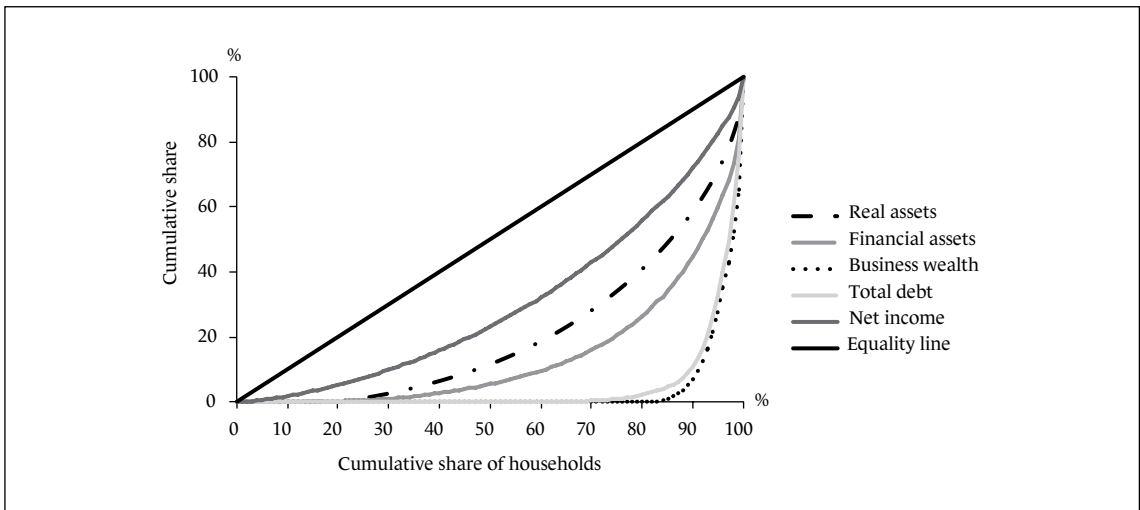
Figure 4  
Distribution of the net household wealth



Notes: P10: EUR 591; P30: EUR 29 thousand; P50: EUR 57 thousand; P70: EUR 106 thousand; P90: EUR 210 thousand.

Source: ECB (2016a).

Figure 5  
Lorenz curve for the net wealth components and net income



Source: ECB (2016a).



Table 1

Determinants of net wealth by selected quantiles – results of quantile regressions and ordinary least squares (OLS) regression

Variable	Coefficients (standard errors)					
	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile	OLS
Intercept	-20.404*** (4.6)	-24.954*** (4.6)	-29.548*** (6.5)	-42.535*** (9.7)	-59.838*** (18.0)	-2.830*** (30.4)
Net equivalent income	1.482*** (0.4)	2.339*** (0.3)	3.485*** (0.6)	6.857*** (1.0)	10.730*** (1.7)	6.786*** (0.6)
Age of RP	0.251 (0.2)	0.458*** (0.2)	0.771*** (0.2)	1.318*** (0.4)	1.906*** (0.7)	2.033* (1.2)
Squared age of RP	-0.002 (0.001)	-0.003** (0.002)	-0.005** (0.002)	-0.010*** (0.003)	-0.014** (0.006)	-0.012* (0.011)
Owner outright	29.745*** (1.1)	41.201*** (1.1)	58.673*** (2.3)	90.584*** (4.7)	134.953*** (8.1)	82.598*** (7.5)
Owner with housing credit	11.048*** (2.7)	19.032*** (2.8)	39.708*** (4.8)	62.549*** (11.0)	88.054*** (17.0)	59.988*** (11.7)
Inheritance	0.019* (0.01)	0.039** (0.03)	0.088** (0.04)	0.219*** (0.1)	0.255** (0.1)	0.116*** (0.03)
Single-parent	2.147 (2.3)	4.511** (1.9)	6.780** (2.7)	6.716* (3.6)	2.723 (5.3)	7.412 (12.0)
Couples without children	4.023*** (1.2)	3.612** (1.4)	3.580* (2.1)	6.840* (4.0)	10.035 (7.3)	24.029*** (8.6)
Couples with children	7.491*** (1.6)	9.775*** (1.6)	13.030*** (2.4)	22.170*** (4.8)	45.586*** (13.0)	38.975*** (9.0)
Extended families	6.294*** (1.6)	10.161*** (1.8)	15.850*** (3.5)	27.700*** (7.8)	44.061*** (13.0)	39.832*** (10.4)
Place of residence	-1.369 (1.2)	3.668*** (1.3)	7.760*** (2.0)	12.263*** (3.8)	5.523 (6.0)	16.204* (6.5)
Higher education	3.904*** (1.3)	9.040*** (1.6)	15.040*** (2.9)	12.096** (4.9)	12.803 (0.2)	12.340 (7.8)
Self-employed	23.672*** (6.1)	63.524*** (7.8)	109.860*** (10.0)	157.180*** (16.0)	277.179*** (55.8)	170.023*** (10.5)
Retired	0.109 (1.4)	-0.109 (1.5)	-2.893 (2.8)	-5.186 (4.8)	-9.221 (9.7)	-13.328 (10.4)
Other not working	0.377 (1.5)	1.777 (1.2)	1.537 (2.1)	7.089** (3.6)	14.001** (7.1)	1.107 (9.1)

Notes:

Statistical significance levels: \*\*\* 1%, \*\* 5%, \* 10%. Robust standard errors are shown in parenthesis below their corresponding figure. Quantile regressions based on bootstrapping procedures (N = 500 replicates). Results adjusted for multiple imputation. The final sampling weights included as additional covariate to reduce any potential bias normally corrected for by weighted regressions.

Dependent variable: net wealth in EUR thous.

## Independent variables:

- net equivalent income (in EUR thous.),
- age of RP (age of reference person),
- squared age of RP (squared age of reference person),
- owner outright (dummy: 1 – RP is an owner outright of HMR; base level – renter or other),
- owner with housing credit (dummy: 1 – RP is an owner of HMR with housing credit; base level – renter or other),
- inheritance (in EUR thous.),
- single-parent (dummy: 1 – RP is a single-parent; base level – one-person household),
- couples without children (dummy: 1 – household consist of couple without children; base level – one-person household),
- couples with children (dummy: 1 – household consist of couple with children; base level – one-person household),
- extended families (dummy: 1 – other type household; base level – one-person household),
- place of residence (dummy: 1 – countryside; base level – city),
- higher education (dummy: 1 – RP with high education; base level – RP with secondary, primary or no education),
- self-employed (dummy: 1 – RP is a self-employed person; base level – RP is an employee),
- retired (dummy: 1 – RP is a retired; base level – RP is an employee),
- other not working (dummy: 1 – RP that doesn't work and isn't retired; base level – RP is an employee).

Source: ECB (2016a).

Table 2

Wealth inequality indicators, Poland and euro area countries

	<b>HSCV</b>	<b>GINI, %</b>	<b>p90/p50</b>	<b>p75/p25</b>	<b>Top 1%</b>	<b>Top 5%</b>	<b>Top 10%</b>	<b>Bottom 90%</b>
Poland	1.37	58.7	3.7	5.6	12.1	29.0	41.8	58.1
Belgium	1.27	58.9	3.2	6.9	12.2	29.7	42.5	57.4
Germany	5.53	76.2	7.7	41.2	21.7	46.7	60.0	43.7
Estonia	6.82	69.1	4.5	8.3	21.4	43.2	55.7	44.3
Ireland	2.36	75.2	5.4	63.0	14.6	37.7	53.8	46.2
Greece	1.03	59.9	3.7	7.6	9.7	28.8	42.4	57.5
Spain	3.78	59.9	3.4	4.5	16.4	33.3	45.6	54.4
France	5.50	67.6	4.7	16.6	18.8	37.4	50.7	49.2
Italy	1.36	60.3	3.5	12.5	11.7	29.7	42.8	57.1
Cyprus	3.48	71.7	4.8	7.0	20.9	43.6	56.7	43.1
Latvia	4.72	78.5	5.8	11.5	23.6	49.1	63.3	36.6
Luxembourg	3.75	64.6	3.5	11.9	19.1	36.3	48.7	51.3
Hungary	2.85	64.3	4.1	5.7	17.3	35.7	48.5	51.5
Malta	4.96	58.6	2.9	3.6	20.5	35.5	45.8	54.0
Netherlands	1.20	69.8	4.7	28.8	10.0	28.7	43.6	56.3
Austria	11.54	73.1	6.0	28.6	25.5	43.4	55.5	44.4
Portugal	3.03	67.8	5.1	10.4	14.6	36.5	52.1	47.8
Slovenia	4.58	62.8	3.2	5.4	23.1	37.7	48.5	51.5
Slovakia	1.55	49.2	2.6	3.3	9.5	23.0	34.3	65.4
Finland	2.83	64.8	4.2	25.2	13.3	31.4	45.2	54.8
Euro area	4.43	68.6	4.8	18.4	18.4	37.9	51.2	48.8

Source: ECB (2016a).

Table 3  
Gini decomposition by the net wealth component (in %)

	<b>Wealth share</b> $S_i$	<b>Gini correlation</b> $R_i$	<b>Gini coefficient</b> $G_i$	<b>Absolute contribution</b> $S_i \cdot R_i \cdot G_i$	<b>Relative contribution</b> $S_i \cdot R_i \cdot G_i / G$	<b>Marginal contribution</b> $(S_i \cdot R_i \cdot G_i / G) - S_i$
Household main residence (HMR)	70.6	91.3	54.9	35.4	60.2	-10.45
Other real estate property	10.6	73.1	92.2	7.2	12.2	1.55
Vehicles	3.2	56.0	71.1	1.3	2.2	-1.04
Valuables	0.4	40.4	91.4	0.1	0.2	-0.13
Self-employment business wealth	16.3	90.4	93.0	13.7	23.2	6.96
Deposits	3.3	48.9	76.0	1.2	2.1	-1.22
Mutual funds, bonds, shares	0.6	60.2	97.7	0.3	0.6	0.00
Voluntary private pensions / whole life insurance	0.7	26.1	70.4	0.1	0.2	-0.50
Other financial assets	0.1	64.5	99.3	0.1	0.1	0.01
Housing loans	-4.3	-7.8	-93.7	-0.3	-0.5	3.81
Other forms of debt	-1.4	-18.7	-92.6	-0.2	-0.4	1.02

Source: ECB (2016a).

Table 4  
Gini decomposition by group contribution (in %)

	<b>Net wealth</b>				<b>Net income</b>			
	<b>within</b>	<b>between</b>	<b>overlap</b>	<b>total</b>	<b>within</b>	<b>between</b>	<b>overlap</b>	<b>total</b>
Homeownership	47.5	36.1	16.5	100.0	47.2	24.7	28.1	100.0
Type of household	23.2	27.5	49.3	100.0	20.4	42.7	36.9	100.0
Place of residence	50.8	21.5	27.7	100.0	56.2	1.4	42.4	100.0
Employment status of reference person	26.4	37.0	36.6	100.0	28.5	41.2	30.3	100.0
Age of reference person	17.7	22.5	59.8	100.0	17.2	28.2	54.6	100.0
Education of reference person	46.2	11.6	42.2	100.0	42.0	31.7	26.3	100.0
Inheritance	50.8	24.4	24.8	100.0	55.8	7.7	36.5	100.0

Source: ECB (2016a).

Table 5

Household net wealth, assets and debt in Poland by household groups in 2014 (participation in %)

	Participation	Net wealth		Assets						
				real assets			financial assets			
		%	median	mean	%	median	mean	%	median	mean
			EUR thous.	EUR thous.		EUR thous.	EUR thous.			
All households (standard error)	100.0	57.1 (2.3)	96.4 (3.2)	88.8 (0.7)	70.1 (2.3)	109.1 (3.5)	88.9 (0.6)	2.0 (0.1)	5.2 (0.2)	
<b>Housing status</b>										
Owner-outright	65.7	85.3	125.5	100.0	76.7	120.0	91.2	2.1	5.4	
Owner with mortgage	10.7	65.9	114.2	100.0	97.0	141.6	97.0	3.0	8.0	
Renter or other	23.6	1.1	16.0	52.4	3.1	22.7	78.9	1.1	3.2	
<b>Household type</b>										
Single	30.3	38.3	59.2	77.5	46.9	70.9	78.7	1.0	4.3	
Couples without children	19.3	59.1	98.3	94.0	62.9	103.2	92.5	2.4	6.2	
Couples with children	32.3	76.0	116.6	93.7	82.3	126.4	94.1	2.4	5.7	
Extended families	18.0	97.0	131.9	93.2	99.2	137.7	93.0	2.1	4.6	
<b>Age of reference person</b>										
16–34	15.5	33.2	64.5	85.1	57.4	79.7	91.3	2.1	4.6	
35–44	18.3	68.3	112.0	92.1	83.4	125.8	92.4	2.2	6.0	
45–64	43.4	73.8	116.3	90.9	75.0	122.8	90.6	2.2	5.7	
65+	22.7	52.8	77.7	84.8	58.0	87.1	81.4	1.2	4.1	
<b>Work status of reference person</b>										
Employee	43.9	60.1	87.4	91.9	68.9	96.1	94.4	2.3	5.9	
Self-employed	11.1	181.6	252.9	100.0	172.0	249.6	95.0	3.7	7.8	
Retired or other not working	45.0	48.4	71.2	83.1	55.2	81.3	82.3	1.2	3.7	
<b>Education of reference person</b>										
Primary or no education	15.7	37.2	65.7	73.0	59.0	87.4	70.3	0.8	2.2	
Secondary	61.0	59.1	101.2	89.9	64.5	109.9	90.4	1.8	4.0	
Tertiary	23.3	83.2	113.1	96.5	88.1	117.8	97.6	3.8	9.8	
<b>Area</b>										
Urban	32.9	49.8	80.2	86.5	59.3	91.2	90.7	2.1	5.7	
Rural	67.1	87.7	135.6	93.4	91.7	142.8	85.4	1.7	4.1	

	Participation	Net wealth		Assets					
				real assets			financial assets		
		median	mean	median	mean	median	mean		
		%	EUR thous.	%	EUR thous.	%	EUR thous.		
<b>Percentile of net income</b>									
0–20%	20.0	28.7	46.8	69.8	43.8	64.2	68.6	0.6	2.0
20–40%	20.0	42.7	67.4	84.8	46.4	76.9	87.8	1.1	2.9
40–60%	20.0	60.7	87.4	93.3	61.8	90.6	92.5	1.8	3.6
60–80%	19.9	85.4	129.2	96.9	87.6	128.0	97.4	2.5	5.2
80–90%	10.1	96.4	125.7	99.2	99.0	137.2	98.2	4.1	6.8
90–100%	10.0	130.2	196.6	98.9	138.0	197.5	98.4	7.5	15.3
<b>Percentile of net wealth</b>									
0–20%	20.0	0.5	1.4	44.7	1.7	7.2	75.3	0.8	1.5
20–40%	19.9	31.1	29.9	99.2	30.1	31.4	89.8	1.5	3.1
40–60%	20.1	61.7	62.0	100.0	56.0	59.2	90.4	2.2	4.6
60–80%	20.0	109.3	110.2	100.0	103.7	105.7	93.2	2.6	5.5
80–90%	10.0	167.3	171.6	100.0	167.9	171.3	94.5	3.1	6.1
90–100%	10.0	302.3	405.3	100.0	297.6	398.0	97.6	6.1	14.7
<b>Liabilities</b>									
		total debt		housing debt		other debt			
		median	mean	median	mean	median	mean		
		%	EUR thous.	%	EUR thous.	%	EUR thous.		
All households (standard error)	37.0 (1.0)	2.4 (0.2)	13.8 (0.9)	12.1 (0.0)	25.0 (2.3)	34.5 (2.1)	29.4 (0.0)	1.1 (0.1)	3.2 (0.3)
<b>Housing status</b>									
Owner-outright	29.0	1.3	5.0	1.5	22.7	25.8	28.0	1.2	3.8
Owner with mortgage	100.0	27.5	36.5	100.0	25.3	35.3	37.1	1.8	3.1
Renter or other	30.5	0.8	3.3	1.4	37.8	34.2	29.8	0.7	1.7
<b>Household type</b>									
Single	23.5	0.9	7.0	5.0	13.7	24.1	20.1	0.6	2.3
Couples without children	36.2	2.9	17.3	12.8	31.0	41.9	27.2	1.2	3.2
Couples with children	49.5	4.2	18.7	22.3	27.6	36.3	36.4	1.2	3.2
Extended families	38.1	1.6	5.8	4.9	10.7	16.9	34.9	1.4	3.9
<b>Age of reference person</b>									
16–34	48.1	7.5	21.4	25.4	32.2	37.7	30.4	1.4	2.3
35–44	51.7	5.5	21.1	24.3	28.0	39.8	37.6	1.3	3.3
45–64	36.1	1.7	8.2	7.6	14.6	25.2	31.7	1.2	3.3
65+	19.7	0.7	4.8	1.7	7.1	18.2	18.4	0.6	3.4

	<b>Liabilities</b>								
	<b>total debt</b>			<b>housing debt</b>			<b>other debt</b>		
		<b>median</b>	<b>mean</b>		<b>median</b>	<b>mean</b>		<b>median</b>	<b>mean</b>
	%	EUR thous.		%	EUR thous.		%	EUR thous.	
<b>Work status of reference person</b>									
Employee	47.3	3.5	17.6	19.7	28.8	37.8	34.8	1.2	2.4
Self-employed	45.0	4.9	17.6	16.8	19.5	32.7	34.5	1.9	7.0
Retired or other not working	25.0	1.0	5.1	3.4	13.4	18.1	23.0	0.7	2.9
<b>Education of reference person</b>									
Primary or no education	22.5	0.8	4.6	2.0	9.1	14.7	21.0	0.8	3.5
Secondary	37.7	1.7	9.1	9.3	18.7	26.4	32.3	1.1	3.0
Tertiary	45.0	12.3	27.2	26.1	35.6	43.1	27.6	1.5	3.6
<b>Area</b>									
Urban	37.3	2.7	15.2	13.1	27.7	36.8	29.0	1.2	3.0
Rural	36.3	1.6	10.8	10.0	21.3	28.4	30.3	1.1	3.5
<b>Percentile of net income</b>									
0–20%	20.2	0.6	2.7	2.4	11.9	15.6	18.2	0.4	1.0
20–40%	28.6	1.1	4.6	4.7	14.4	17.5	25.2	0.8	1.9
40–60%	39.5	1.8	9.3	11.4	17.4	25.3	32.4	0.9	2.4
60–80%	48.5	3.4	15.9	17.3	28.6	33.9	39.2	1.5	4.7
80–90%	45.0	3.9	17.3	20.3	28.3	33.4	33.2	1.8	3.1
90–100%	51.0	15.7	32.8	28.6	42.9	52.3	30.9	2.2	5.7
<b>Percentile of net wealth</b>									
0–20%	34.0	0.9	7.6	4.3	42.2	46.8	31.6	0.7	1.7
20–40%	43.8	2.8	13.0	16.4	23.9	30.1	33.3	1.0	2.4
40–60%	36.3	2.6	14.7	12.2	24.5	37.8	28.1	1.2	2.5
60–80%	32.6	2.6	13.9	11.4	23.0	32.6	26.1	1.4	3.0
80–90%	39.2	3.4	13.9	15.7	17.3	28.7	30.5	1.6	3.0
90–100%	37.4	6.7	24.9	16.3	29.1	40.0	25.5	2.1	11.0

Notes:

In the row "All households", standard errors are provided in parentheses. They were calculated with the Rao-Wu rescaled bootstrap method using replicate weights (1,000 replicates). See ECB (2013b, Chapter 7) for details.

Source: ECB (2016a).

Table 6

Household net wealth, assets and debt in Poland and euro area countries (conditional medians in EUR thous., participation in %)

	Net wealth	Real assets							
		total		household main residence		other real estate property		self-employment business wealth	
		median	%	median	%	median	%	median	%
Poland	57.1	88.8	70.1	77.4	64.4	18.9	28.9	18.9	38.3
Belgium	217.9	88.5	250.7	70.3	250.0	18.5	179.0	8.5	57.2
Germany	60.8	81.0	90.9	44.3	162.0	20.2	90.2	9.3	21.6
Estonia	43.5	87.1	52.0	76.5	44.9	32.0	27.2	11.7	11.7
Ireland	100.6	95.3	163.0	70.5	150.0	23.0	200.0	20.2	10.0
Greece	65.1	91.9	78.2	72.1	70.0	35.7	50.0	15.7	25.5
Spain	159.6	96.2	182.4	83.1	150.3	40.3	105.1	14.3	29.0
France	113.3	100.0	134.2	58.7	182.3	23.4	114.6	8.8	75.4
Italy	146.2	96.9	151.5	68.2	180.0	23.1	85.0	16.0	30.0
Cyprus	170.1	94.5	218.2	73.5	200.0	46.0	145.2	18.5	80.4
Latvia	14.2	86.7	20.0	76.0	15.1	39.1	10.0	10.8	3.4
Luxembourg	437.5	93.9	507.4	67.6	555.6	26.3	350.0	3.9	161.3
Hungary	26.2	90.4	30.1	84.2	26.1	23.0	19.6	12.0	11.0
Malta	209.9	93.3	207.4	80.2	180.6	34.4	106.9	16.3	18.2
Netherlands	82.0	91.1	183.6	57.5	219.6	8.1	139.5	2.7	110.4
Austria	85.9	84.5	139.7	47.7	250.0	12.1	124.4	7.0	163.0
Portugal	71.2	90.0	101.9	74.7	91.3	30.3	62.2	12.7	49.0
Slovenia	80.4	91.5	89.3	73.7	87.8	30.6	30.0	12.7	11.9
Slovakia	50.3	93.7	54.8	85.4	50.0	19.4	13.8	10.8	5.8
Finland	110.0	85.6	170.5	67.7	159.1	30.5	113.3	7.6	11.7
Euro area	104.1	91.4	136.6	91.4	165.8	24.1	97.2	11.0	30.0

Table 6, cont'd

	Financial assets													
	total		deposits		mutual funds		bonds		shares (publicly traded)		voluntary private pensions/whole life insurance		Debt	
	%	median	%	median	%	median	%	median	%	median	%	median	%	median
Poland	88.9	2.0	82.8	1.1	4.2	3.0	1.0	1.8	3.5	1.9	51.3	1.0	37.0	2.4
Belgium	97.9	28.5	97.5	12.5	21.0	28.8	7.8	12.4	11.0	10.0	44.4	16.7	48.4	49.8
Germany	99.4	16.5	99.0	6.7	13.1	14.8	4.2	10.8	9.6	9.8	46.3	13.5	45.1	15.2
Estonia	98.8	2.1	98.6	1.2	3.2	1.1	0.1	N	3.6	1.4	19.8	2.2	36.8	6.4
Ireland	94.1	5.5	93.9	3.8	3.3	20.0	4.5	2.8	13.1	4.0	10.0	44.7	56.8	63.0
Greece	74.6	2.0	73.9	2.0	0.5	N	0.3	N	0.8	N	1.3	3.2	27.1	12.1
Spain	99.6	8.0	99.6	4.0	5.7	10.3	2.1	12.0	11.0	6.7	24.5	8.0	49.3	43.4
France	99.6	11.6	99.6	7.0	8.6	7.0	1.2	12.5	11.7	6.1	38.5	12.0	47.2	27.0
Italy	93.3	7.0	93.2	5.1	5.9	26.3	13.0	25.0	3.7	7.6	9.3	14.0	21.2	19.0
Cyprus	82.7	15.8	76.3	12.3	1.4	11.2	0.6	N	20.4	0.1	19.5	9.6	59.1	75.7
Latvia	80.2	0.4	78.5	0.3	0.1	N	0.3	N	0.8	N	8.9	0.9	33.5	7.2
Luxembourg	97.1	32.1	96.7	15.4	14.6	44.5	2.6	55.7	9.0	15.3	32.0	24.5	54.6	89.8
Hungary	82.8	3.4	81.1	2.8	7.4	13.1	7.3	13.1	1.3	3.3	15.3	6.5	36.9	6.2
Malta	95.4	22.1	95.2	13.2	7.8	20.4	22.4	15.0	16.4	6.7	26.0	14.8	37.1	19.3
Netherlands	99.2	21.4	98.6	8.9	13.3	8.9	3.8	12.7	8.0	7.2	35.3	50.7	63.1	86.7
Austria	99.8	15.4	99.7	11.9	10.0	15.1	4.0	11.7	5.4	10.4	14.5	9.1	34.4	12.4
Portugal	96.3	5.1	96.1	3.4	3.0	8.2	0.7	10.0	5.7	2.2	17.2	4.9	45.9	48.5
Slovenia	94.6	1.1	93.3	0.6	5.6	3.0	0.7	N	8.0	1.6	14.0	4.0	38.6	5.0
Slovakia	88.7	2.6	88.2	1.8	2.0	5.8	0.3	N	2.1	0.4	15.5	2.7	36.7	6.0
Finland	100.0	9.0	100.0	5.0	27.0	4.2	0.9	15.0	21.4	4.7	23.6	5.5	57.4	40.7
Euro area	97.2	10.6	96.9	5.9	9.4	12.3	4.6	18.2	8.8	7.0	30.3	13.0	42.4	28.2

Note: N stands for "not calculated" because less than 25 observations are available.

Source: ECB (2016a).