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ESTIMATION OF THE VALUE, DISTRIBUTION AND CONCENTRATION OF WEALTH IN BULGARIA, 1995-2020[2]

This paper estimates private wealth in Bulgaria using different official sources of macroeconomic and survey data. Due data availability reasons, the 1995-2020 period is analysed. Net wealth is calculated by capitalising incorporated and non-incorporated entrepreneurs' income, combining it with administrative and survey sources of data on real and financial wealth and liabilities. The net wealth of Bulgarian households is rising in nominal EUR and PPP terms, so is inequality. From the end of 1995 until the end of 2020 net wealth of Bulgarian households (individuals) has grown eightfold, from EUR 41.7 bln to EUR 381.8 bln, while per adult and per capita measures have grown tenfold, from 8.5 thousand euro to 92.2 thousand euro and from 4.9 to 55.2 thousand euro respectively. The geometric average rate of growth (CAGR) amounts to 9.3% yearly for the net wealth, 10% for the net wealth per adult and 10.1% for the net wealth per capita. For the period under review, the bottom half of individuals own less than 5.1% of net wealth on average, while the top decile and percentile own 65.3% and 10.6% of total net wealth on average, respectively, while the Gini coefficient grows to 0.75 at the end of the period but accepting values between 0.63 and 0.81 over the analysed period.
Keywords: wealth; inequality; wealth distribution; wealth concentration; income capitalisation; GINI
JEL: D31; E01; G51; D63

1. Introduction

The topic of wealth accumulation and distribution is maintaining the interest of economists, researchers and decision-makers in the government and private sector on a global and, recently, on a national level. Effective policies about more equal wealth distribution are needed, but at the same time, they should not prevent individuals from accumulating wealth and stimulating the investment process. The lack of reliable sources of wealth data for most

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of countries around the world challenges addressing the problem of rising wealth concentration.

Wealth is one of the highest needs and wants of people, even being an ultimate goal for many, providing a higher degree of utility for individuals, according to the work of Michaillat and Saez (2018). Deaton (2003) suggests the existence of a strong association between wealth and well-being and life expectancy. The high-wealth and high-income concentration prevents societies from reaching higher overall well-being and causes obstacles to economic growth (see Barro, 2000; Bagachi, Svejnar, 2013). Wealth and income inequality are threatening the functioning of modern democratic societies, according to Mankiw (2015) and the economic and political development's agenda is tightly related to top wealth percentiles (see Stiglitz, 2012). Wilkinson and Pickett (2020) find a positive association between inequality (wealth and income) and addictions to the use of drugs and alcohol, suicides and mental diseases.

According to Saez and Zucman (2017), the wealthiest 0.1% of the US owns net wealth equal to the bottom 90% of the population. Piketty (2014) estimates that the wealthiest 0.1% in the world own as much wealth, as the bottom 50% of the population. According to Shorrocks et al. (2021), the wealthiest 1% own around 90% of global wealth. Wealth dynamics follows a distinct upward trend in the last couple of decades, according to the works of Wolf (2015), Zuckman (2019), Grabka (2015) of Lundberg & Waldenström (2018), Peshev (2015), Peshev et al. (2019) and many more. Results of the just-cited authors' research assume that wealth Gini coefficients vary between 0.7 and 0.9, confirming that wealth is times more concentrated than salaried incomes.

Negative economic shocks, caused by different events, e.g. the COVID-19 pandemic, the Financial Crises, etc., are causing wealth concentration to grow (see Stewart, 1939). Higher economic and social inequality is in a position to cause social unrest and become a factor for long-term political, social, and institutional changes in separate countries and regions. This fact raises the need to effectively address poverty and wealth concentration. Wealth Inequality needs to be modelled and included in institutional macroeconomic models in order better explain wealth variation and coin effective distributional policies (see De Nardi, Fella, 2017; Cagetti, De Nardi, 2006)).

Bulgarian economic development aligns with the EU and global business cycle and experiences ascending dynamics. Economic growth is associated with higher productivity, higher incomes, improved living conditions and increased financial and real wealth. During the 25-year period between 1995 and 2020, the Bulgarian economy went through a tremendous transformation, starting as a post-communist economy and turning itself into an upper-middle-income market-based economy according to World Bank's classification. Periods of hyperinflation, high-unemployment rate, currency board introduction, ageing population, negative migration, NATO and EU accession, assets bubbles and bursts, local and global financial crises, COVID-19 lockdowns, and many other negative and positive local and global shocks shaped the economy of Bulgaria.

Dealing with wealth concentration is not an easy task since taxing the wealthiest people makes them more creative in tax evasion (see Kanbur, Stiglitz, 2015; Scheuer, Slemrod, 2020). Wealth is on the path of self-fulfilling prophecy, because the rich communicate and date rich people, and rich parents send their kids to quality schools and prepare them better

for life challenges, giving them an advantage (see Milanovic, 2019; Pfeffer, Schoeni, 2016; Stiglitz, 2018).

In this study, the net wealth of Bulgarian households is analysed, on an aggregate level, on the "per capita" and "per adult" level, during the 1995-2020 period. The main objective of the article is to estimate the level of wealth and its distribution and to analyse them using commonwealth inequality indicators. Financial and real assets and financial liabilities of households are considered, through combining reported data for wealth components and by capitalising entrepreneurs' income. The article is organised as follows: a brief survey on the wealth inequality literature is performed; a data and methological section follows, laying down the foundations and assumptions for the calculation of net wealth and its components and for estimating the wealth distribution; in the results, main section findings are summarised and analysed.

2. Survey on the Wealth Inequality Measurement Literature

Wealth concentration around the world has been on the rise since the 80s and 90s in various developed and developing countries, opposing the theory of Kuznets (1955) of declining inequality with reaching developed status. The Gini coefficient ranges between 0.70 and 0.95; the top 1% wealth share accepts values between 19 and 37% based on Wolf's (2015) and Zuckman's (2019) analysis for the US, Grabka's (2015) results for Germany and Lundberg & Waldenströms' (2018) analysis of Sweden. Analysing the long-term trend of US wealth development, Saez & Zucman (2017) conclude that since the 1980s, there has been a distinct upward trend of rising wealth inequality, with TOP 0.1% increasing its wealth share from 7% in 1979 to 22% in 2012. The TOP 1% steadily increased its wealth share in the EU, China and the US since the 80s and 90s, owning between 33 to 40% of the wealth, while the wealth of the bottom 90% steadily deteriorated (Zuckman, 2019).

Top tails of the distribution usually don't provide the real value of their income and/or net worth by intentionally or non-intentionally underestimating income and wealth. Nevertheless, it is hard for extreme tails of the real distribution to be surveyed. In the analysis of Estonian households' survey data Meriküll and Rõõm (2022) find that not-contacted high-income and wealthy households have much higher possession of net wealth, with net worth Gini being suppressed by around 6 percentage points, while the top decile net wealth share is underestimated by hefty 11.3 percentage points. The top percentiles of net wealth also seem heavily underestimated (ibid.). Contacted but non-reported wealthy households also have a higher share of wealth in comparison to reporters (ibid.). Survey data heavily underestimate the more realistic wealth pattern presented by tax (administrative data), according to the results of Saez and Zuckman (2016). In 2012 tax data shows a net wealth share of 42% for the wealthiest 0.1%, while survey data points to 30% share, or an underestimation equal to 12 pp (see ibid.). Atkinson (1975) finds that the reported wealth Gini coefficient has values of 0.68, while adjusted for unreported wealth sources increases the Gini coefficient to 0.87, supporting the hypothesis that reported data omitted important sources of wealth in the right tail of the distribution. Survey data underestimate financial wealth since regression dummy for surveyed data negatively affects wealth (see Davies et al., 2011).

According to OECD Data bottom, 40% of net wealth own a negative net wealth on average in the US, Norway, Netherlands and Denmark, during the period between 2010 and 2019, with values between -7.7% (For Denmark) and -0.24% (For USA), with an average value of -3.7% share of total net wealth. In Ireland, Chile, Canada, Hungary and Latvia, a negative net worth has been recorded for some of the years throughout the above-mentioned period. For all OECD countries, the share of net wealth for the bottom four deciles is between -7.7 and 11.14% of total wealth, with an average value of 3%. During the 2009-2019 period top decile's share of net wealth has grown from 45% to 63% on average for OECD countries. For the period considered, the top decile owns between 36 and 78% on average of total net wealth for the OECD countries. According to this variable, in the US, wealth inequality is highest while being lowest in Slovakia.

According to WID.org data of Blanchet et al. (2021), during the period 1995-2021, the bottom five deciles own around 5%(between 4.7 and 5.1% for the period) of net wealth in Bulgaria, 2.5% on average for East European countries and 3.6% on average for the EU. The bottom decile's share of net wealth is negative for Bulgaria, Eastern Europe and the EU, owning on average minus 1.8% of total net wealth, i.e. debts exceed assets. The second decile owns around 0.3 % of net wealth in Bulgaria for the period of 1995-2021; 0.2% on average for Eastern Europe and 0.1% for the EU. The third decile owns around 0.9% of net wealth in Bulgaria for the period of 1995-2021; 0.5% on average for Eastern Europe and 0.6% for the EU. During the 1995-2021 period, the average net wealth owned by the top decile ranges between 57 and 61% for Bulgaria, the EU and Eastern Europe. In Bulgaria, the top decile owns between 56 and 59% of the total net wealth, between 56 and 61% in the EU, and between 60 and 62% in Eastern Europe. The share of the total wealth of the top decile advances in the EU, while in Bulgaria and in Eastern Europe, the trend is flat.

In the research of Davies et al. (2017), the bottom decile holds more debt than assets, hence having negative net wealth. The Bottom 10% of households (individuals in some data) in selected countries possess minus 1.2% of net wealth. Households (individuals) from the bottom decile have the highest gap between debts and assets, i.e., the lowest share of total net wealth, of minus 15.3% in Denmark, minus 5 in Norway and -3.5% in Ireland and Netherlands, while for other selected EU countries (Greece, Cyprus, Finland, France, Italy, Portugal, Slovakia, Slovenia, Spain) the bottom decile net wealth amounts to minus 0.3%. In the same research, authors reveal that on a World regional level, the bottom decile owns a negative portion of total net wealth, in the range of -0.8 – -0.1%, with European representative members of the bottom decile having on average -0.8% of total net wealth (see Davies et al. 2017). Yet, the top decile on a world regional level owns between 70 and 88% of total net wealth, with around 80% for Europe and 76% for the US (see ibid.).

In this direction are the main findings of Thomas Pikkety. World wealth concentration has grown since the fourth quarter of the 20th century, according to the results of Piketty (2014). He claims that faster return to capital, than the growth of GDP results in higher inequality and it is inevitable in the modern economy when tech start-ups help their creators join the top of the wealth of distribution (ibid). Davies & Shorrocks (2000) analyse different methods of evaluating wealth, incl. the capitalising of income methods, and in their study, they assume the existence of a common descending trend of wealth concentration during the 20th century, especially for the UK, Sweden, Australia and mostly USA (ibid.).

In 2014, the Gini coefficient ranged between 0.72 и 89.5 for selected countries, while accepting a value of 0.83 for Europe and North America, according to Davies et al. (2017). The world Gini coefficient accepts values of 0.91 and signals even higher inequality (ibid.). The richest decile in Europe, North America and the World owns between 69 and 88% of the net wealth. Liabilities of Low and Min-wealth families grow faster in comparison to High-income members of society, while real assets grow faster for high-wealth individuals. In their research, Davies et al. (2017) use a combination of household balance sheets, survey data and econometric techniques to derive missing data for countries and groups of countries.

Analysing US wealth inequality over the 1989-2013 period reveals that the Top wealth percentile in the US increased its wealth share from 30 to 35.5% respectively, the top decile increased its holdings from 67 to 75%, and the Gini Coefficient rose from 0.79 to 0.85 (see Pfeffer & Schoeni, 2016). Using SCF data for 1989-2019, a distinct up trend in wealth concentration exists, with the top 10% wealth owning 85.3% of total wealth as of the end of the period, starting from 79% at the beginning of the period (ibid).

Wealth inequality is usually two-three times higher than income inequality, justified by Gini coefficient values and top deciles, top percentile values and by bottom decile and quartile values. Assets' structure varies within wealth deciles and percentiles of the distribution of households' wealth, according to Wolf (2015). Mainly housing assets comprise the middle class's wealth, while the top decile and top percentiles possess much more financial assets.

Different factors affect wealth inequality, and it is common to vary over countries with different traditions, political and economic systems

In the modern meritocratic world, there is a tendency for the "winner takes it all" when it comes to wealth and inequality (see David et al. 2017). Income inequality is a growing factor of wealth inequality, according to Piketty and Saez (2014). Usually, the older and better-educated part of the population concentrates a higher share of wealth, owning larger value assets, mostly real estate (Gale et al., 2020; Fuller et al., 2020). Wealth is concentrated not only among old and educated people, but also members of the white race have a higher chance of climbing the distributional ladder (Zhan and Xiang, 2016). In modelling wealth, inequality Humber et al. (2016) find that lower progressiveness of tax rates in the post-60s period is the main factor for higher wealth inequality.

The regression results of Davies et al. (2017) reveal that consumption is in positive association with financial and real assets, and with debt accumulation, so is the density of the urban population. GDP per capita growth rate leads to lower financial assets; on the other hand, the market capitalisation of traded companies' is in positive association with financial asset accumulation. Publicly and non-publicly traded equity (sold shares, distributed dividends, retained corporate earnings) is the biggest contributor to wealth inequality, especially in the right tail (see Benhabib et al. 2017).

Income capitalisation for deriving wealth and wealth distribution is a well-known method, suggested by various analysts on the topic of wealth, e.g. Stewart, C. (1939), Saez & Zucman (2016), Lundberg & Waldenström (2018), Hubmer, et al. (2016, 2018). The method of capitalising incomes for deriving wealth values is sensitive to assumptions and to the quality of source data; however, it is in a position to hypothesise direction and overall wealth levels

(see. Lundberg & Waldenström, 2018). Nevertheless, capitalising income for deriving wealth matches wealth values and distribution from the Survey of Consumer Finances in the US, according to Saez & Zucman (2016).

By shifting the focus to Bulgaria, it could be concluded that not many research papers cover the evaluation of wealth in Bulgaria, solely or as a larger study, including more countries. According to Grimm et al. (2019), in 2018, Financial wealth in Bulgaria stood at 72 bln. EUR, with 10 258 EUR gross financial assets per capita and 8 033 EUR net financial assets per capita, and a Gini coefficient of 0.69. Financial assets include cash and bank deposits, receivables from insurance companies and pension institutions, securities (shares, bonds and investment funds) and other receivables (see ibid.).

Deposit wealth GINI's value in Bulgaria oscillates between 0.85 and 0.88 in the 12.2005-02.2015 period, while Loans' (mostly backed by collateral) Gini is in a steady uptrend, accepting values between 0.73 and 0.8 (see Peshev, 2015).

Shorrocks et al. (2019) identify the country's level of wealth after that, use a pattern distribution of wealth based on existing data of peers, and lastly, use Forbes world billionaires' lists. In mid-2019 average net wealth per Bulgarian adult equals 42 700 USD, or 243 billion USD in total for Bulgaria, assuming that in mid-2019 the population amount to 7.013 mln. citizens and 5.697 adults (see ibid.). In mid-2019, the average financial wealth per adult accounts for 26 070 USD, non-financial wealth stood around 19 900 USD and Debt per adult amounts to 3 273 USD, with a median wealth per adult equal to 18 950 USD. The financial wealth is comprised of 37% liquid assets (deposits mostly), 46.3% equities and 20% other financial assets (pensions, life-insurance accumulated contribution) (see ibid.). The Gini coefficient has a value of 0.659 (see Shorrocks et al., 2019).

In comparison to the mid-2019 data of Shorrocks et al. (2019), using the end of the 2019 year data of Shorrocks et al. (2021), the total wealth of Bulgaria declined to USD 198 bln. USD, with the adult population declining to 5.64 mln., wealth per adult declined to USD 35 154; financial wealth shrank to 17 540 USD, non-financial wealth rising and having a value of 21 165 USD, with debt per adult also rising to USD 3 550 USD, respectively.

For the six-month period between mid-2019 and the end of 2019, wealth per capita fell by 17.7%, financial wealth per capita declined by 33% and non-financial wealth grew by 6.3%. The decline in overall net wealth and financial wealth, in particular, is not justified by the facts, however. Bulgarian stock exchange benchmark, the SOFIX index, declined by only 3.3%, while the euro appreciated against the dollar by 1.2%. Bank deposits have the largest share in financial wealth in Bulgaria and experienced modest growth in the respective 6 months period, so are assets under the management of institutional investors (Private pension companies, life insurers, investment funds, etc.). One can expect at least financial wealth to be subject to a negligent change. Comparing wealth data for older periods in the Shorrocks et al. (2021, 2019), it seems that only the mid-2019 wealth value and wealth structure differ in comparison to data for other years. For the closest mid- and end-year period, the wealth pattern changes smoothly, e.g. the ratio between financial wealth and total wealth, the ratio between non-financial wealth to total wealth and the ratio between debt to total wealth maintain relatively constant proportions, around 50% is the share of financial wealth to total wealth; around 60% is the share of non-financial assets to total assets and around 10% is the

share of debt to total assets. This leads to the conclusion that mid-2019 data of Shorrocks et al. (2019) for Bulgaria is wrongly calculated and confirms how difficult it is to derive reliable data for wealth on countries.

Davies et al. (2011) combine Household balance sheets and survey data and regression equations to identify households' gross and net wealth across a different set of countries. Davies et al. (2011) regression results suggest that consumption is in a strongly positive association with non-financial wealth, financial wealth, and liabilities, hence with neg wealth. Life expectancy is in positive association with net wealth, financial and non-financial wealth and in negative correlation with liabilities. Population density is a factor for non-financial wealth and for net wealth, while market capitalisation is a factor for financial wealth accumulation, while urban population and domestic credit are positively related to liabilities growth (see ibid.).

According to the World inequality database (WID), the average market value of Bulgarian wealth per adult in 2019 has a value of 55 958 USD, down from 57 884 USD in 2018 and up from the 2017 value of USD 56 972. Total wealth in 2019 accepted a value of USD 317.04 bln., down from USD 331.24 bln. in 2018 and down from a 2017 value of USD 329.8 bln. According to WID data, the top 10% owns between 55 and 57.8 % of total wealth in Bulgaria, during the period 1995-2019., and 57.8% as of 2019. The bottom 50% own between 6.2 and 5.7% for the same period and hold 5.7% of total wealth as of the end of 2019. The top percentile holds between 21.9 and 24.5% of the wealth during the respective period, owning 24.5% of total wealth as of 2019.

According to Kuypers & Marx (2019), the wealth-to-income ratio for the elderly is much higher in comparison to non-elderly Belgium people in the survey data. The elderly possess a much higher value of net assets in comparison to younger participants in the survey. Bottom income decile may have negative net worth if they are less educated, young and from minority groups, with a wealth-to-income ratio having a value of 5.1, while elderly representatives from the bottom income deciles usually have low income and high net assets value, with their wealth-to-income ratio having a meaning of 28.1.

Petranov et al. (2022) find that the shadow economy in Bulgaria is shrinking, from 32 to 21% in the 2006-2019 period, but still, its share is the highest among EU members. The structural break of the EU accession and related legislation synchronisation, together with financial innovation and digitalisation and other factors, decrease the share of the shadow economy (see ibid.) Shadow economy prevents recording real wealth meaning and its distribution, proving that wealth is supposed to be underreported and undervalued. Zucman (2013) provides proof of why real wealth distribution is hard to measure- because of off-shore zones wealth, which accounts for about 10% of global wealth. Wealth inequality is underestimated in survey data (Meriküll and Rõõm, 2022), and so is income inequality (Peshev et al., 2022).

Among the long-term determinants of financial wealth (deposits) inequality in Bulgaria are: inflation (increasing inequality); financial deepening(increasing inequality); equity prices(increasing inequality); real estate prices (lowering inequality) (see Peshev et al., 2019). The Global recession and the flat rate introduction in Bulgaria have helped lower the financial (deposit) wealth inequality in Bulgaria (ibid.).

Addressing wealth and income inequality is not an easy task, but Yotzov (2014) suggests the following measures for tackling growing inequality in Bulgaria: taxing progressively large and expensive real estate assets, applying higher marginal tax rates for higher corporate incomes; lowering the value added tax for goods and services of higher importance to poorer society groups; heavily taxing bequests and taxing idle homes in cities. Tosheva et al. (2016) conclude that social transfers and income level criteria benefit lower income inequality using the tax-benefit EUROMOD model. The lack of survey and/or administrative data on wealth level and distribution, however, is challenging to create and direct effective policies for supporting households and individuals with negative or very low net wealth and making analysis similar to the work of Tosheva et al. (2016).

3. Data and Methodology of the Research

In this paper, only official sources of survey and aggregated data have been considered for the period 1995-2020. The main source of raw data considered are: The national statistical institute (NSI); Bulgarian national bank (BNB); EUROSTAT; European central bank (ECB); Missing data have been imputed for some of the unavailable variables' years in the dataset. Human capital is also an important source and component of wealth but is not subject to analysis.

In this scientific article, wealth has been defined as net wealth, or the difference between real assets wealth-Wr and financial wealth-Wf, on one side and debts of households, comprised mainly by financial banking and non-banking loans and lease claims, on the other. A common representation of the wealth accumulation process is to present current wealth as a function of the last period's wealth multiplied by different asset yearly returns for the period and adding the difference between disposable income and consumption, as laid out in the work of Saez & Zucman (2016). Nevertheless, this study considers wealth components as of the end of the period. The net wealth calculation follows the formal representation given in eq.1.

$$W = Wr + Wf - D \quad (1)$$

where:

W-net wealth;
Wr-Wealth is comprised by real assets (residential real estate and utilised agricultural land) owned by individuals. Due to the lack of foreign real assets ownership data, only Bulgarian real wealth components are considered.;
Wf-Wealth is comprised by financial assets (deposits, equity of public and non-public companies, life-insurance and non-life insurance claims on accumulated premiums by individuals, investment funds investments of local individuals). Only Bulgarian financial assets are considered due to the lack of data for foreign financial assets holdings.

Debt-financial liabilities of households (bank loans lent to individuals, loans lent by companies specialised in lending, including leasing claims on individuals). Foreign financial liabilities of individuals are not considered due to the lack of data.

In the following subsections are presented some of the variables' calculation assumptions and techniques.

3.1. Calculating the equity in the Bulgarian economy

Income capitalising is a common technique supporting the works of many researchers, incl. the works of Stewart, C. (1939), Saez & Zucman (2016), Lundberg & Waldenström (2018), Hubmer et al. (2016, 2018). Saez & Zucman (2016) multiply each individual capital income component by 1/rate of the return for the respective assets. Saez & Zucman (2016), however, use tax data of returns of wealth components. In the current study, only incorporated and non-incorporated income is capitalised for deriving equity owned by individuals. For the purpose of calculating the monetary amount of equity owned by individuals, the entrepreneurship income in the economy is capitalised, following the logic of eq. 2-5 and the results.

Equity=FV-debt (2);

where:

Equity-value of the equity of the firm;
FV-Firm value= value of the capital of the firm (equity+debt);
Debt-Interest bearing liabilities;

$$FV=\frac{FCFF}{k} \quad (3)$$

where:

FCFF-free cash flow to the firm;
k-cost of capital rate;

FCFF=Sales-COGS-OE+DnA-CAPEX-NWCI + NFCFI+IE*(1-TxR)-Tx (4)

where:

Sales-revenues from common activity=quantity * item price;
COGS-cost of goods sold;
OE-Operating expenses;
DnA-Depreciation and amortisation;
CAPEX-Capital expenditures;
NFCFI -Net foreign capital factor income;
NWCI-Net working capital investments;
IE-interest expenses;
TxR- Corporate tax rate;
Tx-corporate tax.

Calculating the firm value and then the equity value on an aggregate national level is done through National accounts for Gross domestic product calculation using the income approach. In this paper, it is assumed that the capital income can be capitalised for the purpose of estimating the equity value of equity owners. Gross value added in the economy is a source of income for factor owners in the economy; respectively, the gross domestic product under the income approach is comprised by labour income, gross operating surplus(GOS), gross mixed income(GMI) and net taxes. For deriving FCFF, the GOS and GMI, together with additional positive and negative cash flow adjustments, are capitalised since they represent entrepreneurs' income (see eq. 5).

FCFF=GOS+GMI-CAPEX-NWCI + NFCFI-Tx (5)

where:

GOS – gross operating surplus;
GMI – gross mixed income;
DnA – Depreciation and amortisation;
CAPEX – Capital expenditures;
NWCI – Net working capital investments;
NFCFI – Net foreign capital factor income;
Tx – corporate tax.

The following assumptions for the variables have been made in accordance with the calculation in eq.5 derived as the difference between primary investment income received from abroad and paid to foreigners. FCFF is adjusted for corporate tax paid and the tax reduction due to interest payments. In Table.1 in mln. EUR and in current prices (without inflation adjustment) are presented as the values of: FCFF; the capitalisation rate-k(being WACC itself); the Firm value (derived as capitalised FCFF using capitalisation rate-k) and equity (difference between the . The corporate tax accounts for interest expenses and is adjusted accordingly. NFCFI is firm value and debt, assuming that debt comprises 40% of the firm value).

Table 1. FCFF capitalisation, in mln. EUR and current prices

Year	FCFF	k	FV	Eq
1995	5 331	14.7%	36 259	21 755
1996	4 679	11.4%	41 026	24 616
1997	3 755	8.5%	44 116	26 469
1998	3 546	7.6%	46 864	28 118
1999	2 919	8.5%	34 467	20 680
2000	3 322	9.4%	35 286	21 172
2001	3 333	9.7%	34 518	20 711
2002	4 278	10.8%	39 501	23 701
2003	4 137	8.8%	47 220	28 332
2004	4 216	8.3%	50 710	30 426
2005	4 095	6.9%	59 212	35 527
2006	3 295	7.5%	43 710	26 226
2007	4 314	8.5%	50 864	30 519
2008	3 827	20.3%	18 870	11 322
2009	7 498	11.2%	66 947	40 168
2010	9 798	12.1%	80 877	48 526
2011	11 125	16.4%	67 880	40 728
2012	10 867	11.5%	94 891	56 935
2013	9 783	8.3%	117 294	70 376
2014	9 783	9.0%	108 810	65 286
2015	9 890	7.5%	132 496	79 498
2016	11 110	6.1%	182 627	109 576
2017	11 048	5.3%	208 960	125 376
2018	10 797	5.2%	208 748	125 249
2019	12 139	4.3%	281 503	168 902
2020	11 944	3.8%	310 626	186 375

Source: Own calculations.

Capitalising of the non-labour factor income derived from the GVA macroeconomic statistics has been performed using a capitalising rate equal to the weighted average cost of capital (WACC) formula, as follows:

$$WACC=[E/(E+D)](r_e)+ [E/(E+D)](r_d)(1-t) \quad (6)$$

where:

WACC – is weighted average cost of capital;
E – equity;
D – Debt (interest-bearing liabilities);
r_e – is cost of equity;
r_d – is cost of debt;
t – corporate tax rate.

For the WACC calculation, an assumption is made that equity comprises 60% of capital, whilst the rest 40% belong to debt financing. The corporate tax rate uses values laid out in Table.2. The **corporate tax rate** denotes the upper boundary rate for the marginal tax rate on corporate income prior to the years of 2007 and the tax rates equal the flat tax rate introduced in the post-2007 period In 2007 flat corporate tax rate of 10% was introduced cost of equity is calculated by using the Capital assets pricing model (CAPM) as presented in eq. (7).

$$r_e=r_f+\beta.ERP \quad (7)$$

where:

ERP – equity risk premium derived as the difference between the cost of equity and the risk-free rate of return;
r_f – is risk-free rate of return;
β-beta – correlation between the individual rate of return and market return, i.e. being a systematic risk measure.

For calculating the equity risk premium, an **ERP/risk-free rate ratio**, readily available at the data section of the Aswath Damodaran's website, has been employed[3]. The ratio is applied to the Bulgarian risk-free rate in order to derive the ERP values. If Bulgarian ERP accepts lower values in comparison to a developed equity market, e.g. US implied ERP, then values for the developed equity market apply. In this regard, for the period 2016-2020, calculated ERP values are lower than the ones from the Implied ERP for the US market; hence US market ERP values, calculated by Aswath Damodaran, have been applied[4]. The risk-free rate is the yield to maturity (YTM) on Bulgarian 10-year government bonds and no data has been available for 1995-2001, applying a 5-year average on the ratio between YTM on Bulgarian gov bonds and German peers. For missing 1995-2001 years, **RFR** has been calculated by

[3] https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histimpl.html (Implied Equity Risk Premiums – United States), Aswath Damodaran's web site: https://pages.stern.nyu.edu/~adamodar/New_Home_Page/data.html (the data section).

[4] https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/histimpl.html (Implied Equity Risk Premiums – United States), Aswath Damodaran's web site: https://pages.stern.nyu.edu/~adamodar/New_Home_Page/data.html (data section).

multiplying German 10-year gov bonds YTM by the 5-year average ratio of 1.357(see Table.2 for **RFR** values). The Bulgarian ministry of finance does not issue treasury bills or treasury notes, while the ministry of finance issues only mid-term and long-term bonds. The 10-year government bonds are the most liquid and tradable, and their prices are referred to in this regard. Due to higher yields to maturity of 10-year government bonds compared to shorter maturities, the RFR variable in this study leads to a higher cost of equity, a higher weighted average cost of capital and to lower valuation of equity. In Table 2 the cost of debt ($\mathbf{r_d}$) has been derived as an average of interest rates on newly lent loans in euro, with data being fetched from the Bulgarian national bank's database and reports. The **Tr** (tax rate) denotes the upper boundary rate for the marginal tax rate on corporate income prior to the year 2007 and the tax rate equals the flat tax rate introduced in the post-2007 period (see Table.2).

Table 2. WACC components, in %

Year	ERP	RFR	r_e	r_d	WACC	Tr
1995	4.82	8.16	12.98	26.32	14.70	0.34
1996	3.93	7.87	11.79	16.47	11.40	0.34
1997	3.45	7.26	10.71	7.94	8.51	0.34
1998	2.55	5.24	7.79	11.01	7.57	0.34
1999	2.31	7.26	9.57	10.38	8.47	0.34
2000	3.70	6.59	10.29	12.00	9.42	0.33
2001	4.86	6.78	11.64	9.28	9.66	0.28
2002	6.78	6.30	13.08	9.74	10.83	0.24
2003	5.07	5.84	10.91	7.24	8.76	0.24
2004	4.50	5.20	9.70	7.75	8.31	0.20
2005	3.61	3.89	7.50	7.11	6.92	0.15
2006	3.69	4.17	7.85	8.31	7.54	0.15
2007	4.84	4.45	9.29	8.07	8.48	0.10
2008	21.44	7.37	28.81	8.31	20.28	0.10
2009	7.35	6.47	13.81	8.09	11.20	0.10
2010	9.13	5.78	14.90	8.81	12.11	0.10
2011	16.75	5.24	22.00	8.87	16.39	0.10
2012	11.27	3.43	14.70	7.31	11.45	0.10
2013	5.87	3.60	9.47	7.38	8.34	0.10
2014	8.39	3.15	11.54	5.75	8.99	0.10
2015	7.07	2.62	9.69	4.59	7.46	0.10
2016	5.69	1.95	7.64	4.17	6.08	0.10
2017	5.08	1.40	6.48	3.89	5.29	0.10
2018	5.96	0.90	6.86	2.93	5.17	0.10
2019	5.20	0.40	5.60	2.65	4.31	0.10
2020	4.72	0.40	5.12	2.15	3.85	0.10

Source: Aswath Damodaran's web page, BNB, Own calculations.

3.2. Financial wealth (other forms)

Commercial bank deposits of Households and NPISH comprise a large portion of households' wealth. In the analysis, the bank deposits of Households and NPISH include all

money of the institutional sector held in banks, e.g. current accounts holdings and short-term and long-term deposits.

Still lower, but the increasing source of wealth is funds accumulated in private mandatory individual pension accounts. With the pension system reform at the beginning of the century, the second pillar of the pension system was introduced. Contributions made from their social security payments are added to individual universal pension funds, professional pension funds and voluntary pension funds. Wealth in universal pension funds accounts for 85% of total private pension funds wealth in Bulgaria.

Another small, but growing source of financial wealth, are the investment funds and life insurance holdings of households. Various mutual funds, alternative funds and investment funds are increasing assets under the management of households. The life-insurance funds held in individuals' insurance policies and funds accumulated in non-expired general insurance policies are also considered. Due lack of data, direct investments of households in bonds, equities and other financial instruments are excluded from the analysis. Nevertheless, capitalising the income of companies and adjusting it for capital outflows, it is assumed that the ultimate owners of publicly traded equity and non-public companies' equity are households (individuals).

3.3. Real assets wealth

In the analysis, the value of the living area of residential buildings and dwellings and the value of usable agricultural land is included. Sources of information are NSI and the Ministry of Agriculture, Food and Forestry reports. These real assets are usually a main component of the wealth of the middle class and due high-ownership rate of homes and agricultural land of Bulgarian households[5]. A strong positive association is assumed between net households' wealth and real asset values. An important source of wealth that is omitted in the analysis is vehicles owned by households. Currently, the number of vehicles and motorcycles is close to 3 mln. units, according to open-source Bulgarian government data[6].

3.4. Debt

Households' debt is comprised mainly of various loans lent to households and NPISH (commercial, mortgage and other short- and long-term bank loans lent to households and NPISH) and, to a lesser extent, by loan claims of corporations specialised in lending and by lease agreement claims of lease companies.

[5] The homeownership rate for Bulgarian households stood at 84.3% for 2020 according to Housing in Europe – 2021 interactive edition (https://ec.europa.eu/eurostat/web/products-eurostat-news/-/wdn-202112301#:~:text=In%202020%2C%2070%25%20of%20the,and%20Croatia%20(both%2091%25).

[6] https://data.egov.bg/data/resourceView/d3695872-380d-4440-b56a-29dcd4debc3b?rpage=2.

3.5. Distribution of wealth

Deriving wealth distribution is a difficult endeavour since there is no complete information on individuals and their assets and liabilities in Bulgaria, neither through survey data, nor through administrative data. Bulgarian national bank provides distributional data on households' deposits and loans, but it is impossible to match individual deposits and loans. There is a large concentration in deposits and loan distributions, evidenced by BNB data and the research of Peshev (2015) and Peshev et al. (2019). The provided by the Financial Supervision Commission distributional data of pension fund wealth reveals more even distribution with much lower Gini and other inequality measures in comparison to the distribution of loans, wealth and overall wealth. Distributional data for other assets and liabilities of households/individuals is not available, neither gathered through a survey nor through an administrative approach. For calculating the distribution of wealth, several assumptions have been made. First, it is assumed that the bottom decile has a negative worth in accordance with its own calculations and in accordance with averages for the OECD countries and for the WID.org of Blanchet et al. (2021) that are also considered, and inferring from HBS of NSI, regarding incomes, expenditures, loans and savings of households. Second, the distribution of the property income of Bulgarian households laid out in HBS of NSI is considered. Third, the distribution of the property income is adjusted under the assumption that survey data underestimates reality, which is better represented by administrative data applying specific decile ratios between administrative and survey data of Peshev et al. (2022).

Comparing households' income and expenses (excluding loans and deposits), using NSI HBS data, it is common for the first three deciles during the period of 1990-1995 to have higher expenses than income, hence having negative savings. In the crisis of 1996, the bottom five deciles had higher expenses than income, while in the also crisis of 1997, the first two deciles couldn't meet ends, which also kept a tendency until 2004. In 2004, 2005, 2007, 2011, 2014, 2015, 2018 and 2019, the bottom three deciles recorded higher expenses than income, while in 2006, 2008-2010, 2013, 2016 and 2017 bottom two deciles experienced negative savings. In 2012 bottom four deciles had expenses exceeding income. On the contrary, in 2020, the bottom decile had negative savings. If the total income (loans lent and savings withdrawn included) and total expenses (with deposited funds and repaid loans included), then in 18 years in the 1990-2020 timespan, the first decile has a negative income, i.e., total expenses exceed total income, whilst in 10 years of the selected period the first two deciles are with negative income, in 2011 first bottom three deciles have negative income and in 1990 bottom four deciles expense more than their total income.

The assumption of negative wealth comes not only from property income data of Bulgarian households but also is supported by empirical research. In the research of Davies et al. (2017), the bottom (first) decile holds more debt than assets, hence having negative net wealth. The Bottom 10% of households(individuals in some data) in selected countries possess minus 1.2% of net wealth. The negative wealth assumption of the bottom decile is also supported by OECD and WID data. The wealth of the bottom 90% consists of pension wealth and housing (net of mortgages), while the wealth of the top 0.01% comprises equities and fixed-income claims mainly, in the findings of Saez and Zuckman (2016).

4. Results

Using the methodology and consideration, laid out in the before section, the value of the wealth of households in Bulgarian has been evaluated. In Table 3, the variables for wealth, wealth per capita and wealth per adult, over the 1995-2020 period have been revealed. All values are in current EUR prices[7]. During the analysed period Bulgarian economy went through tremendous structural change and lifetime challenges: the financial crisis of the mid-90-s; galloping and hyper-inflation; high unemployment; the introduction of the currency board arrangement; the structural unemployment and mass privatisation during the 90s; the mass emigration and the ageing population which led to a severe deterioration of the local demographics; the 2008-2009 global financial crisis; COVID-19 pandemics and caused by it lockdowns and supply chain bottlenecks; asset bubble; the economic convergence in response to the 2007 EU acceptance of Bulgaria, the low-inflation period post the currency board arrangement introduction in 1997; FDI inflows and the know-how and technology transfers made Bulgarian incomes, asset prices and net worth grow; the 2007 and 2008 introduction of the 10% flat tax rate on incomes of firms and individuals. Facts that are more detailed can be provided on the negative and on the positive side, justifying net wealth evolution during the period covered in this research.

Table 3. Nominal wealth in Bulgaria

Year	Net Wealth in EUR billion	Net wealth per adult in EUR	Net wealth per capita in EUR
1995	41 699.13	8 535.80	4 973.24
1996	37 707.88	7 759.33	4 520.84
1997	29 359.24	6 083.47	3 544.43
1998	63 686.70	13 281.06	7 737.98
1999	62 828.75	13 165.33	7 670.56
2000	63 486.82	13 370.85	7 790.30
2001	63 825.59	13 657.74	8 088.31
2002	65 453.65	13 890.69	8 342.46
2003	71 389.93	15 040.44	9 151.06
2004	83 134.86	17 385.81	10 711.81
2005	104 799.97	21 769.33	13 577.32
2006	105 995.76	21 991.57	13 802.81
2007	132 515.63	27 509.42	17 344.44
2008	138 733.26	28 867.33	18 238.66
2009	144 322.78	30 231.45	19 080.95
2010	145 401.03	30 932.40	19 374.23
2011	155 516.02	34 385.13	21 224.41
2012	175 459.22	38 947.52	24 086.48
2013	190 431.29	42 586.52	26 282.06
2014	189 939.79	43 135.06	26 372.48
2015	215 508.50	49 552.38	30 125.11
2016	256 623.77	59 618.44	36 134.73
2017	287 100.29	67 576.81	40 723.25
2018	297 674.68	70 859.59	42 524.72
2019	353 288.01	85 002.69	50 821.97
2020	381 767.53	92 235.41	55 196.25

Source: own calculations.

[7] Using Eurostat's EUR to BGN exchange rate.

From the end of 1995 until the end of 2020 net wealth of Bulgarian households(individuals) has grown eightfold, from EUR 41.7 bln to EUR 381.8 bln, while per adult and per capita measures have grown tenfold, from 8.5 thousand euro to 92.2 thousand euro and from 4.9 to 55.2 thousand euro respectively and in nominal terms (see Table 3). The geometric average rate of growth (CAGR) is 9.3% yearly for the net wealth, 10% for the net wealth per adult and 10.1% for the net wealth per capita.

In Table 4, the inflation adjustment challenge of using nominal monetary values in euro has been addressed by using PPP indexes for comparing prices and volumes of products in Bulgaria and EU (for the 27 members and in 2020 prices) for deriving Net wealth, Net wealth per adult and Net wealth per capita variables in PPP terms, revealed in Table 4. As of 1995, Net wealth stood at EUR 156.6 bln, while at the end of the period, the value of the variable rose to EUR 708.4 bln. The same upward tendency is valid for per-adult and per-capita values. According to the calculations of Grimm et al. (2019), in 2018 the net financial wealth in Bulgaria amounted to 8 033 EUR per capita. Shorrocks et al. (2019) identify the country's level of wealth per adult as having a meaning of 42 700 USD. Blanchet et al. (2021) assign a net wealth per adult value of 49.5 000 EUR. All those calculations are in nominal currency terms.

Table 4. Wealth in Bulgaria in PPP

Year	Net Wealth in PPP billion	Net wealth per adult in PPP	Net wealth per capita in PPP
1995	156 566.3	32 049.1	18 672.9
1996	186 206.6	38 316.6	22 324.5
1997	116 652.3	24 171.3	14 083.0
1998	201 150.8	41 947.5	24 440.0
1999	195 513.0	40 968.4	23 869.5
2000	192 055.7	40 448.5	23 566.7
2001	185 148.4	39 619.0	23 463.0
2002	187 302.0	39 749.6	23 872.8
2003	204 041.2	42 987.4	26 154.9
2004	228 637.6	47 814.5	29 459.6
2005	281 373.1	58 447.6	36 453.2
2006	266 520.8	55 296.6	34 706.4
2007	311 724.6	64 712.1	40 800.4
2008	310 653.2	64 640.1	40 840.2
2009	307 440.9	64 400.0	40 646.8
2010	317 934.0	67 636.8	42 363.7
2011	323 397.1	71 504.2	44 136.4
2012	365 903.7	81 221.4	50 230.1
2013	395 128.0	88 363.2	54 532.9
2014	402 535.0	91 415.1	55 890.6
2015	446 432.6	102 649.3	62 405.1
2016	522 750.0	121 444.5	73 607.5
2017	570 156.2	134 201.7	80 872.8
2018	580 567.5	138 200.5	82 937.8
2019	667 200.0	160 531.3	95 979.5
2020	708 433.9	171 158.3	102 425.9

Source: own calculations.

Applying the assumptions for the wealth distribution on the net wealth measures from the methodological section in the article, the following decile and cumulative distribution results are produced. In Table 4, the decile distribution has been revealed, while in Table 5, the cumulative distribution has been presented. The first decile D1 has a negative net worth on average. Different deciles' wealth declines over time, with only the top decile benefiting the most, concentrating an even larger share of wealth. During the beginning of the period, the wealth distribution was much more even, because of the unreformed former socialist economy. The top decile's net wealth concentration, together with the negative net wealth of the bottom decile and declining net wealth for the other deciles, is a common pattern of wealth distribution.

Table 5. Decile distribution of wealth

	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
1995	-0.6%	1.3%	1.8%	2.3%	3.6%	5.2%	7.4%	10.3%	12.4%	56.1%
1996	-1.0%	0.5%	0.8%	1.6%	2.3%	2.8%	5.0%	8.0%	14.7%	65.3%
1997	-0.7%	0.9%	2.1%	2.6%	3.8%	4.8%	7.7%	13.7%	16.9%	48.1%
1998	-0.3%	1.0%	2.4%	1.5%	3.6%	4.3%	5.3%	7.4%	9.6%	65.1%
1999	-0.6%	0.6%	1.3%	2.2%	4.2%	4.2%	7.3%	10.0%	14.5%	56.5%
2000	-0.6%	1.7%	2.0%	1.6%	3.0%	4.2%	5.4%	8.5%	11.8%	62.3%
2001	-1.4%	0.6%	1.4%	1.8%	2.6%	3.9%	5.3%	8.5%	13.6%	63.6%
2002	-0.6%	0.5%	2.4%	3.0%	2.7%	3.8%	6.1%	9.2%	14.0%	58.8%
2003	-1.4%	1.1%	2.0%	2.2%	3.0%	4.2%	5.4%	10.7%	11.2%	61.7%
2004	-0.8%	0.8%	1.4%	2.7%	4.6%	3.4%	4.7%	7.0%	11.6%	64.6%
2005	-0.8%	0.8%	1.3%	1.8%	3.6%	4.0%	5.2%	9.0%	16.7%	58.5%
2006	-0.3%	0.8%	0.9%	1.1%	3.2%	5.1%	6.9%	10.9%	15.8%	55.7%
2007	-1.1%	0.9%	1.3%	1.1%	1.9%	4.0%	7.5%	9.1%	11.3%	63.9%
2008	-1.4%	0.2%	0.5%	1.1%	1.8%	2.3%	5.2%	9.9%	16.6%	63.9%
2009	0.3%	0.9%	2.3%	1.6%	2.4%	3.0%	4.2%	8.2%	10.9%	66.3%
2010	-1.4%	0.7%	1.1%	1.2%	2.0%	4.6%	3.4%	4.0%	12.7%	71.7%
2011	-1.4%	0.3%	1.3%	0.8%	1.7%	2.8%	7.6%	3.8%	15.2%	68.1%
2012	-1.2%	0.5%	1.3%	0.6%	0.7%	1.0%	3.7%	7.3%	9.6%	76.3%
2013	-1.0%	0.5%	0.6%	0.6%	1.0%	1.2%	3.1%	5.1%	15.2%	73.7%
2014	-1.4%	1.6%	0.4%	0.7%	1.3%	2.2%	4.7%	5.7%	10.7%	74.2%
2015	-0.7%	0.3%	0.6%	1.7%	2.1%	2.1%	5.1%	9.2%	9.4%	70.3%
2016	-0.9%	0.1%	0.4%	1.2%	1.8%	2.4%	4.3%	6.4%	10.9%	73.4%
2017	-1.2%	0.0%	0.2%	0.8%	1.4%	2.7%	3.4%	3.7%	12.5%	76.6%
2018	-0.1%	0.2%	1.6%	1.7%	1.9%	2.1%	4.1%	8.0%	12.6%	67.8%
2019	-1.2%	0.5%	1.1%	1.1%	3.2%	4.3%	5.2%	9.3%	9.3%	67.1%
2020	-1.4%	0.2%	1.3%	1.9%	2.1%	2.6%	4.9%	9.5%	9.7%	69.2%

Source: Own calculations

Analysing the cumulative distribution, provided in Table 6, it can be concluded that the bottom 20% of the population usually have more liabilities in comparison to assets; hence their wealth has negative values. The bottom 50% of individuals owned around 8% of the net wealth at the beginning of the period, while their share experienced a steady downward trend in the years prior to the EU accession of Bulgaria onwards, rarely exceeding 4% in some of the years, and reaching a minimum of 1.1% share in 2017. The bottom 80% owned an average 24.4% of net wealth for the respective period, while in the post-2007 period, the average

share fell to 17.4%. The cumulative distribution obeys the Pareto principle, paraphrasing it as that the upper two deciles hold 80% of the net wealth.

The results suggest that half of the adults have net wealth between 7065 and 59 906 PPP euro and between 1156 EUR and 18 956 EUR in nominal terms, over the course of the analysed period. Data in table 7 can justify the hypothesis that Bulgarians become wealthier, with median and mean net wealth exhibiting and distinct upward dynamics. The top decile and percentile, however, benefit the most, by increasing their net worth much faster. During the 1995-2020 period, average and median Net wealth per adult in PPP EUR terms rose by 434 and 186%, respectively. The top decile average net wealth per adult rose by 558% in PPP terms and by 1267% in nominal EUR terms, while the top percentile average net wealth per adult rose by 1158% in PPP terms and by 2514% in nominal EUR terms. A more distinct upward trend can be revealed around and after the years of the EU accession of Bulgaria. As of the end of the period, the wealthiest decile and percentile own 1 183 622 and 3 375 780 in PPP euro terms and EUR 381 702 and EUR 1 088 644 in nominal EUR terms(see Table 7). Due to the different methodologies in this paper, the net wealth per adult and wealth per capita of this study exceed the results of Blanchet et al. (2021), Shorrocks (2019, 2021) and Grimm et al. (2019).

Table 6. Cumulative distribution of wealth

year	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1995	-0.6%	0.7%	2.6%	4.9%	8.5%	13.7%	21.1%	31.5%	43.9%	100.0%
1996	-1.0%	-0.6%	0.3%	1.9%	4.2%	7.0%	12.0%	20.0%	34.7%	100.0%
1997	-0.7%	0.2%	2.3%	4.9%	8.7%	13.5%	21.3%	34.9%	51.9%	100.0%
1998	-0.3%	0.7%	3.1%	4.6%	8.2%	12.5%	17.8%	25.3%	34.9%	100.0%
1999	-0.6%	0.0%	1.3%	3.5%	7.7%	11.8%	19.1%	29.0%	43.5%	100.0%
2000	-0.6%	1.1%	3.1%	4.7%	7.7%	11.9%	17.3%	25.9%	37.7%	100.0%
2001	-1.4%	-0.8%	0.7%	2.4%	5.0%	8.9%	14.2%	22.7%	36.4%	100.0%
2002	-0.6%	-0.1%	2.3%	5.3%	8.1%	11.9%	18.1%	27.3%	41.2%	100.0%
2003	-1.4%	-0.3%	1.7%	3.9%	6.9%	11.0%	16.5%	27.1%	38.3%	100.0%
2004	-0.8%	0.0%	1.4%	4.1%	8.7%	12.0%	16.7%	23.8%	35.4%	100.0%
2005	-0.8%	-0.1%	1.2%	3.0%	6.6%	10.6%	15.8%	24.8%	41.5%	100.0%
2006	-0.3%	0.5%	1.3%	2.4%	5.6%	10.8%	17.6%	28.5%	44.3%	100.0%
2007	-1.1%	-0.2%	1.2%	2.2%	4.2%	8.2%	15.7%	24.8%	36.1%	100.0%
2008	-1.4%	-1.2%	-0.7%	0.4%	2.2%	4.5%	9.7%	19.6%	36.1%	100.0%
2009	0.3%	1.1%	3.4%	5.1%	7.4%	10.4%	14.6%	22.8%	33.7%	100.0%
2010	-1.4%	-0.7%	0.5%	1.6%	3.7%	8.2%	11.6%	15.6%	28.3%	100.0%
2011	-1.4%	-1.1%	0.1%	0.9%	2.6%	5.5%	13.0%	16.8%	31.9%	100.0%
2012	-1.2%	-0.7%	0.7%	1.3%	2.0%	3.1%	6.8%	14.1%	23.7%	100.0%
2013	-1.0%	-0.5%	0.1%	0.7%	1.7%	2.9%	6.0%	11.1%	26.3%	100.0%
2014	-1.4%	0.2%	0.6%	1.3%	2.5%	4.7%	9.4%	15.1%	25.8%	100.0%
2015	-0.7%	-0.4%	0.2%	1.9%	4.0%	6.1%	11.2%	20.4%	29.7%	100.0%
2016	-0.9%	-1.1%	-0.7%	0.5%	2.3%	4.7%	8.9%	15.3%	26.3%	100.0%
2017	-1.2%	-1.2%	-1.0%	-0.3%	1.1%	3.8%	7.2%	10.9%	23.4%	100.0%
2018	-0.1%	0.2%	1.7%	3.5%	5.4%	7.5%	11.6%	19.6%	32.2%	100.0%
2019	-1.2%	-0.7%	0.4%	1.5%	4.7%	9.0%	14.2%	23.5%	32.9%	100.0%
2020	-1.4%	-1.2%	0.0%	1.9%	4.0%	6.7%	11.6%	21.1%	30.8%	100.0%

Source: Own calculations

Wealth concentration in Bulgaria is rising since the bottom half of the population owns a lower share of total net wealth, while the top decile, the top five percentiles and the top percentile own larger shares of wealth. The Gini coefficient, the P90/P50 ratio and the Palma ratio exhibit an upward tendency over the analysed period, of course oscillating around the central tendency with some local extremums, as can be seen in Table 8. The Gini coefficient ranges between 0.63(reached in 1997) and 0.81 (reached in 2013) during the period and has a meaning of 0.75 at the end of the period. Palma ratio, the P90/P50 and S80/S20 ratios also support the hypothesis of a high and growing concentration of wealth.

Table 7. Monetary value of main wealth indicators

	Net wealth per adult in PPP				Net wealth per adult in nominal EUR			
Year	Top10%	TOP1%	Median	Mean	Top10%	TOP1%	Median	Mean
1995	179924	268429	14188	32049	27920	41654	2202	4973
1996	250344	375016	9795	38317	29537	44247	1156	4521
1997	116297	160939	10444	24171	17054	23600	1531	3544
1998	273177	429910	16539	41947	50392	79305	3051	7738
1999	231451	335431	17049	40968	43335	62803	3192	7671
2000	251990	379480	14423	40449	48533	73087	2778	7790
2001	252102	373615	12842	39619	51467	76274	2622	8088
2002	233657	344178	13084	39750	49039	72235	2746	8342
2003	265163	398239	15328	42987	56447	84776	3263	9151
2004	308975	474110	19067	47814	69219	106214	4272	10712
2005	341982	502916	22004	58448	79442	116827	5111	13577
2006	307974	449988	23001	55297	76875	112323	5741	13803
2007	413439	608810	19222	64712	110812	163176	5152	17344
2008	412803	599935	13385	64640	116475	169276	3777	18239
2009	427142	650984	17225	64400	126557	192879	5103	19081
2010	485195	740035	22386	67637	138982	211979	6412	19374
2011	486611	777591	16315	71504	144439	230810	4843	21224
2012	619716	984834	7063	81221	183779	292056	2095	24086
2013	651416	962474	9696	88363	193752	286271	2884	26282
2014	678320	1159493	15878	91415	195690	334504	4581	26372
2015	721338	1257608	21697	102649	211695	369078	6368	30125
2016	891798	1611672	25144	121444	265347	479539	7481	36135
2017	1027891	1780971	27204	134202	311912	540432	8255	40723
2018	936566	1526386	27931	138200	288184	469674	8594	42525
2019	1077604	2090655	59906	160531	341154	661872	18965	50822
2020	1183622	3375780	40645	171158	381702	1088644	13108	55196

Source: Own calculations.

Data, presented in the following tables and figures, reveal the dynamics of major wealth components. Wealth and liabilities structure over the years reveal that Bulgarian individuals have a low average level of debt (banking and non-banking financial companies' liabilities); however, the distribution assumptions suggest that usually bottom deciles are heavily indebted in comparison to their assets; hence they possess a low level of net wealth.

Table 8. Wealth inequality indicators

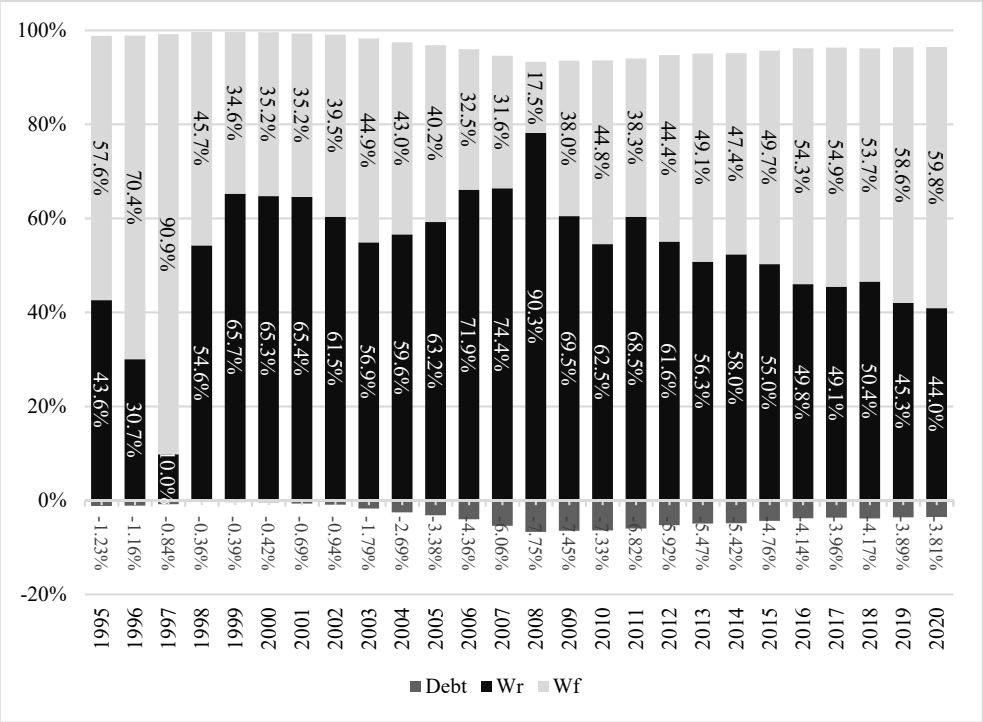
year	Bottom 50%	Top 10%	Top 5%	Top 1%	P90/P50	Palma ratio	Gini
1995	0.08	0.56	0.34	0.08	6.62	11.53	0.65
1996	0.04	0.65	0.40	0.10	15.73	35.11	0.74
1997	0.09	0.48	0.28	0.07	5.52	9.85	0.63
1998	0.08	0.65	0.40	0.10	7.90	14.05	0.69
1999	0.08	0.56	0.34	0.08	7.37	16.18	0.67
2000	0.08	0.62	0.38	0.09	8.06	13.12	0.68
2001	0.05	0.64	0.39	0.09	12.64	26.13	0.72
2002	0.08	0.59	0.36	0.09	7.27	11.02	0.67
2003	0.07	0.62	0.37	0.09	8.99	15.87	0.69
2004	0.09	0.65	0.40	0.10	7.43	15.88	0.70
2005	0.07	0.59	0.35	0.09	8.84	19.23	0.69
2006	0.06	0.56	0.33	0.08	9.93	22.87	0.68
2007	0.04	0.64	0.39	0.09	15.38	28.42	0.72
2008	0.02	0.64	0.38	0.09	28.70	167.65	0.76
2009	0.07	0.66	0.41	0.10	8.92	13.12	0.70
2010	0.04	0.72	0.45	0.11	19.56	44.14	0.77
2011	0.03	0.68	0.43	0.11	25.83	73.98	0.76
2012	0.02	0.76	0.47	0.12	37.65	57.39	0.80
2013	0.02	0.74	0.45	0.11	43.18	98.94	0.81
2014	0.03	0.74	0.50	0.13	29.27	59.26	0.78
2015	0.04	0.70	0.49	0.12	17.63	37.62	0.76
2016	0.03	0.73	0.52	0.13	28.42	89.11	0.78
2017	0.01	0.77	0.52	0.13	68.48	-270.76	0.81
2018	0.05	0.68	0.45	0.11	12.59	19.48	0.74
2019	0.05	0.67	0.48	0.13	14.36	44.28	0.73
2020	0.04	0.69	0.54	0.20	1709	35.54	0.75

Source: Own calculations.

Real wealth, mostly housing assets, is the largest wealth component of wealth for Bulgarian households, as can be seen in Figure 1. Financial wealth, mainly equity, takes advantage in the post-2010 period, when abundant liquidity and decreasing interest rates, hence lower WACC, support higher valuations. Both wealth components have a largest wealth shares in accordance with the author's calculations. Privately owned equity is among the largest contributors to wealth inequality, also in the works of Bivens and Mishel (2015), Wilkinson and Picketty (2020) and Wolf (2015) supporting the author's results.

In Figure 2, the accumulated funds in private pension funds have been laid out. Individuals accumulated around 8.8 bln.EUR individual private pension accounts, Strong positive dynamics can be seen, with just 170 mln. EUR allocated in private pension funds in the first year of their introduction to 8.8 bln. EUR 20 years later (without adjustments for inflation). Private pension wealth is far more evenly distributed than other sources of wealth, due to its specifics, e.g. the maximum amount of the insurance income and related normatively defined social security contributions.

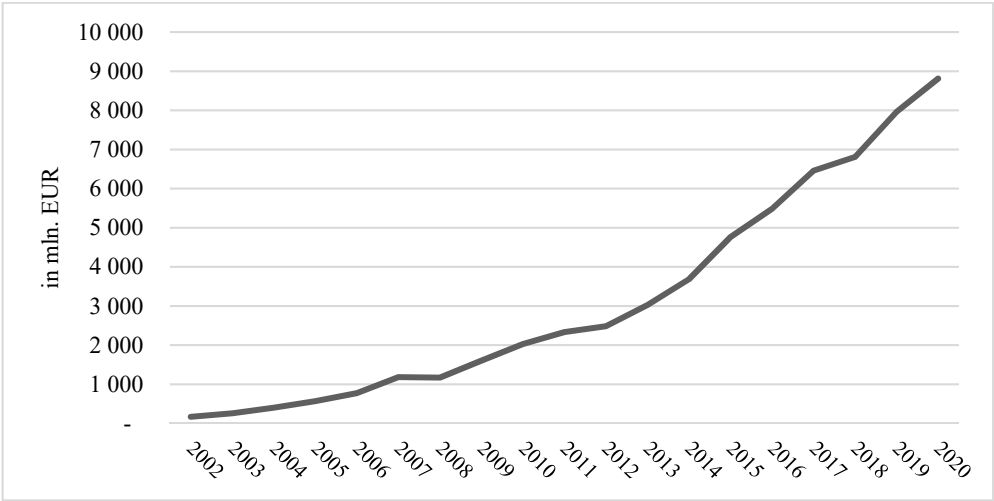
Figure 1. Wealth components



Source: Own calculations.

Loan claims of corporations specialised in lending amount to 1.57 mln. EUR as of the end of 2020 and having a value of around 1 mln. EUR in 2007, when the first available data was provided by the Bulgarian national bank. Loans lent by corporations specialised in lending are a small source of indebtedness, but it is worth mentioning that households and individuals from bottom deciles are usually the consumers using such kinds of loans. Households and individuals who don't qualify for bank loans, usually have no regular labour income and are with poor education. That kinds of loans are of lower importance to middle- and higher-wealth and income deciles but are a common source of debt to poorer and ill-educated individuals.

Figure 2. Pension funds wealth



Note: Monetary values are not adjusted for inflation.
Source: FSC, Own calculations.

Commercial bank deposits of Households and NPISH comprise a large portion of households' wealth, while bank consumer and mortgage loans are the main source of external funding for households. In Table 9, bank loans and deposits of households in mln. EUR without inflation adjustment has been revealed, using the Bulgarian national bank's database. Deposits rose from 6 bln. EUR in 2005 to 31.2 bln. EUR in 2020, while loans grew from 3.5 bln. EUR to 13 bln. EUR during the respective period, reducing the loans-to-deposit ratio from 0.59 to 0.42.

Residential buildings and dwelling are the most common and with largest share source of wealth for individuals and households. NSI" survey covers all residential buildings and dwellings in the country. Valuing housing wealth is made through applying average prices to the floor area of living rooms, bedrooms, recesses for sleeping, dining rooms, rooms for day-stay, cabinets and libraries of scientists, drawing rooms, and the space of the kitchens with over than 4 square meters floor space. Until the end of 2018, the kitchen area was presented separately. Values in mln. EUR (non-inflationary adjusted) of housing wealth can be seen in Figure 3. This wealth component has grown in value from 16.6 bln. EUR in 1995 to 148 bln. EUR in 2020, and achieving local extremums between both cited years, especially the 1997 trough, the 2008 peak and the consequent trough, reached in 2010[8].

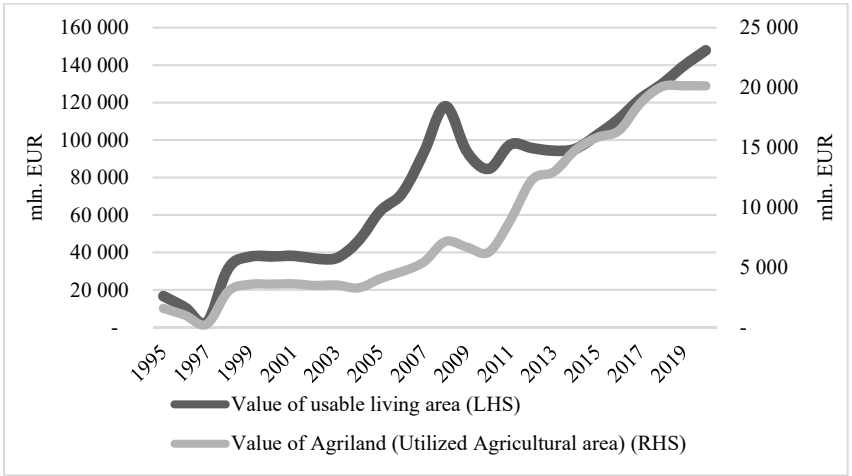
[8] Missing values for 1995-2003 have been imputed as an average ratio between the value of usable living area and value of utilized agricultural land for available years and applied to missing years.

Table 9. Households and NPISH' bank loans and deposits. in mln. EUR

year	*Households and NPISH' bank loans*	*Households and NPISH' bank deposits*
1995	511	2 258
1996	439	1 940
1997	246	1 088
1998	228	1 007
1999	246	1 085
2000	265	1 154
2001	441	1 787
2002	616	1 971
2003	1 279	3 490
2004	2 236	4 959
2005	*3 542*	*6 000*
2006	*4 624*	*7 460*
2007	*7 045*	*9 645*
2008	*9 251*	*11 226*
2009	*9 787*	*12 445*
2010	*9 708*	*13 981*
2011	*9 665*	*15 792*
2012	*9 570*	*17 641*
2013	*9 554*	*19 275*
2014	*9 399*	*20 076*
2015	*9 276*	*21 774*
2016	*9 463*	*23 201*
2017	*10 036*	*24 454*
2018	*11 161*	*26 347*
2019	*12 224*	*28 451*
2020	*13 034*	*31 210*

Note: Data for 1995-2005 and especially for the 90s period was derived under authors assumptions
Source: Bulgarian national bank, own calculations

Figure 3. Value of usable living area and of agricultural land



Notes: LHS-Left-hand side, RHS-Right-hand side.
Source: Eurostat, National statistical institute, Bulgarian national bank, the Ministry of Agriculture, Food and Forestry, the World economic outlook database of International Monetary Fund, own calculations

Nevertheless, agricultural land is among the most important contributors to households' and individuals' wealth in Bulgaria. Agricultural land wealth is presented in Figure 3, ranging between 254 mln. EUR to 20.1 bln. EUR, during the time span between 1995-2020.

5. Conclusions

In this scientific article, the net wealth of Bulgarian individuals has been estimated and calculated as the difference between assets (real and financial) and reported financial debt (bank loans of households and other financial companies' claims). Net wealth distribution and inequality indicators have been derived following a series of assumptions and limitations laid out in the methodological section of the study. Evaluation of Bulgarians' net wealth and its distribution is always an immense challenge, due to the limited availability of public data on wealth and liabilities components. The lack of administrative and/or survey data on households' wealth is worth addressing since proper distributional policies require precise data assessment and modelling.

The findings of this scientific article reveal strong upward dynamics for average and median net wealth per adult and per capita. Larger mean values than median values justify right-skewed distribution, with large right tails of the distribution. Top deciles and percentiles benefit much more than the bottom deciles and percentiles, contributing to growing inequality. A more distinct upward trend can be revealed around and after the years of the EU accession of Bulgaria. As of the end of the period, the wealthiest decile and percentile representatives own an average of 1 183 622 and 3 375 780 in PPP EUR terms and EUR 381 702 and EUR 1 088 644 in nominal EUR terms, while median and average wealth per adult stood at 40 645 and 171 158 in PPP terms and at EUR 13 108 and 55 196 EUR in nominal terms.

For the period under review bottom half of individuals own less than 5.1 % of net wealth on average, while the top decile and percentile own 65.3% and 10.6% of total net wealth on average, respectively. A positive long-term tendency for growing wealth and wealth concentration is evident from data, despite a short-lived declining wealth concentration in the post-2012 period.

The Gini coefficient ranges between 0.63(reached in 1997) and 0.81 (reached in 2013) during the period and has a meaning of 0.75 at the end of the period. Palma ratio, the P90/P50 and S80/S20 ratios also support the hypothesis of a high and growing concentration of wealth.

Real assets' wealth prevails over financial assets' wealth during most of the years, with housing assets having the largest share in wealth formation. Equity, agricultural land and bank deposits are among the other major contributors to households' wealth.

This article should also be considered as an attempt to raise awareness of the much-needed survey and/or administrative data on the matter of wealth and wealth distribution in order for effective measures to be promoted and taken.

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