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FINANCIAL WEALTH INEQUALITY DRIVERS IN A SMALL EU MEMBER COUNTRY: AN EXAMPLE FROM BULGARIA DURING THE PERIOD 2005-2017

In this scientific paper financial wealth inequality (FWI) in Bulgaria during the period of 2005:Q4-2017:Q4 has been analysed. Households' bank deposits are the best-known and most popular means for storing financial wealth (FW) among local individuals, assuming to be a relevant proxy for calculating FWI measures. By using real data on quarterly bank deposit's distribution, we calculate Gini coefficients, Top 1 percentile and Top 10 decile FWI indicators. Using these variables as dependent variables several econometric models have been developed using the ARDL bound testing approach of Pesaran and Shin (1999) and Pesaran et al. (2001). Long-term and short-term drivers of the FWI has been identified. Econometric results suggest that financial deepening, stock prices, interest rates and inflation contributes to FWI in the long run. Some of those variables help however decrease the wealthiest decile and percentile's financial wealth. House prices are having a limited negative impact on the FWI. In the short term higher FWI in the past is indicative for higher values of the FWI measures in the future. Also, a positive short-term relationship is maintained by the stock market performance. Higher financial deepening is in a negative association with the quarterly change of the FWI in the short-run. Amon the important short-term determinates of the FWI are also: interest rates on loans, general price level, introduction of a flat tax rate of 10%, the Great Recession, and Corporate commercial bank default on liabilities. Some of these factors have the opposite meaning for the FWI measured through the wealthiest percentile and wealthiest decile.
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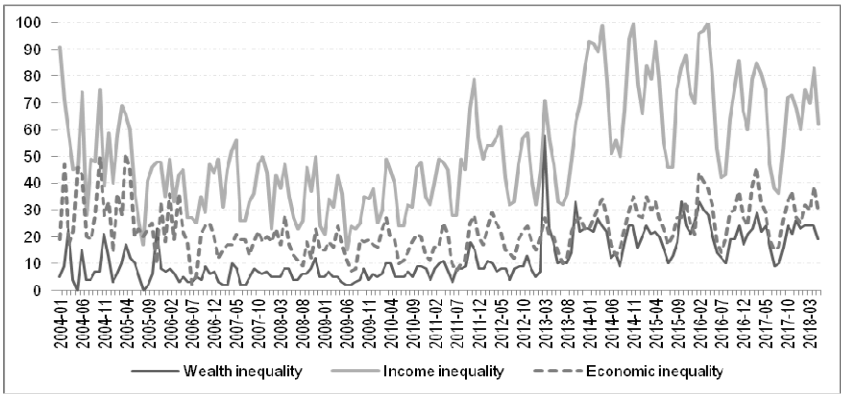
1. Introduction

Wealth and income inequalities' topic popularity has undergone a cyclical development in the past centuries, with peaks and troughs respectively. Influential economists and great thinkers like Karl Marx, Simon Kuznets, Anthony Atkinson, Thomas Piketty, Emannuel Saez, Angus Deaton and many other predecessors and successors of theirs have been trying to decipher the causes and consequences of wealth and income inequality.

Global data sets reveal that income and wealth inequality are steadily rising in the developed world since the 70s and 80s of the 20th century (see Salverda, 2015; Piketty & Saez, 2014; Wolff, 1998).[5] Perhaps statistical facts disagree with Kuznets' theory and even in the developed world many people are left without an access to stable employment, good education, medical and social support, eventually falling in the self–fulfilling vicious cycle of poverty (see Kuznets, 1955). Election results in the past decade in EU member states and the last presidential election results in the US are proving that voters are looking for non-systematic politicians, often elected for their populist views, which is a sign that people are looking for economic justice. The inequality has a price – social and economic. Stiglitz (2012) argues that the price for inequality is the consequences for the economic system that becomes less stable and less efficient, with lower growth, and a democracy that has been put into peril.

Figure 1

Google trends in search terms of "Wealth inequality", "Income inequality" and "Economic inequality"



Note: Values between 0 to 100 reveal the term popularity with 100 being an all-time high. The numbers show the interest in the search with respect to the point with the maximum value in the chart for the region and time interval. With 100 means the maximum popularity of the term, 50 means that the popularity of the term is two times smaller and 0 means there is not enough data for it. Each data point is divided by the total searches of the geography and time range it represents to compare relative popularity.

Source: Google Trends.

[5] In the period 1983-1995 wealth inequality in the US is in a steady UP-trend, but more worrying is the growing stratification between non-Hispanic whites and the rest, who are having lower access to good education, health services, inherited wealth (see Wolf, 1998).

After a reaching a trough around the Great recession Google trends data reveals that the popularity of terms "Income inequality, "Wealth inequality and "Economic inequality" is rising, with income inequality being more often entered into Google search engine queries (see Fig.1). This is yet different evidence for the topic popularity lately. The topic popularity is rising during times with positive growth for the economy, when stratification in the society is evolving and when the perception for inequality is sharpened.

Accumulated wealth in the family has an important impact on social outcomes as educational attainment level; life opportunities and place in the society regardless of the level of income (see Piketty, 2014; Grabka and Westermeier, 2014). As Grabka and Westermeier (2014) noted, in addition to their regular incomes, people's individual net wealth, the sum of all their assets, contributes separately to their individual economic welfare and their opportunities for self-realization. They define the security function of wealth as serving to stabilize consumption in the event of a lack of income.

The type of the accepted social model in a certain country affects the dependence on the level of personal wealth of the ability of individuals to handle with phases of economic insecurity and social risks due to illness, unemployment, etc. According to the general theoretical classification of social models or welfare regimes in Europe (see Esping-Andersen, 1990; Ferrera, 1996; Bonoli, 1997; Sapir, 2005) the model of Scandinavian countries shows the least dependence on the individual's income and wealth. Conversely, liberal welfare regimes are characterised by a weaker social security system.

Through empirical classification, Bulgaria is generally attached to the socio-economic model of the CEE countries (Fenger, 2007; Petrova, 2014). According to Giannetti and Nuti (2007) in the end the transition countries have embraced a hyper-liberal version of the market economy, very different from the model that dominates in the rest of Europe. Their model is characterized by higher dependence on the income and wealth in the process of overcoming social risks. Therefore, households' wealth represents a very important part of welfare especially in times of crisis in Bulgaria. According to Bogliacino and Maestri (2016) "when households face negative shocks, the availability of wealth-based assets provides an instrument for absorbing negative consequences without incurring abrupt lifestyle changes".

In this relation, it is important to investigate wealth inequality in Bulgaria and the determinants, which affect it. Financial wealth, measured by bank deposits, is taken into account because, compared to real assets, it consists of more liquid assets, which can be used from individuals to ensure unforeseen social risks. Kus (2012) argues that one of the major economic trends contributing to wealth concentration in recent decades is ownership of financial assets. This approach is applied additionally because, compared to real assets, it consists of more liquid assets, which can be used from individuals to ensure unforeseen social risks. Carroll et al. (2014) proved that housing assets are completely illiquid and are not used to smooth consumption. Using financial assets as a measurement of wealth inequality it will be possible to encompass also the possibility of households to meet unforeseen economic shocks. Inequality regarding financial wealth is a major social problem in Bulgaria, where the level of redistribution by the state is less compared to the developed social models and it is important to find the proper instruments to reduce it.

Other argument for taking into account financial wealth inequality is that real assets like housing assets are usually distributed more equally than financial assets (see Bogliacino and Maestri, 2014), especially in Bulgaria as a country of Eastern Europe, where traditionally house property is the main assets of each household and there are high housing ownership rates. Bogliacino and Maestri (2014) stated that whereas housing wealth is an important channel to explain differences in wealth inequality at the cross-country level, trends in financial inequality have significantly contributed to the change in within-country wealth trends. In the scope of this article are tendencies of wealth inequality and its determinants namely in a single country.

Financial wealth is one of the biggest contributors to wealth inequality, but also FW is very sensitive to war, economic slumps and to other structural breaks (see Lindert and Williamson, 2016). If not addressed properly deregulation in the financial sector, poor education and lack of proper taxation of heritable wealth are leading to large FWI, hence to overall wealth inequality (see ibid.). Financial wealth in Bulgaria has been steadily growing since the year 2000. Financial wealth surpasses the non-financial wealth for households in Bulgaria (see Credit Suisse Global Wealth Databook, 2016). However, the share of middle class in total net financial assets wealth is declining, according to the Allianz Global Wealth Report (2016).

Using Eurostat and NSI (National statistical institute of Bulgaria) data for the period of 2006-2016 total financial assets of households in Bulgaria rose by a hefty 203%, from EUR 22 bln. to EUR 66 bln. respectively, compared to 29.3% for the EU-28 and 28.1% for the Eurozone.[6] As of the end of 2016 currency and deposits comprise half of the financial wealth in Bulgaria if equity holdings are adjusted for equity of firms lower than the nominal (initial) capital of companies owned by households. Currency and deposits to GDP ratio stood at 52% compared, revealing the important meaning of this most liquid part of FW.

As of the end of 2017 wealthiest percentile holds around 31% of the deposit wealth of households in Bulgaria, while the richest decile is holding 79% of the deposit wealth. In addition, the value of the Gini coefficient is at 0.85 out of 1.00 for it can be concluded that the distribution of households' deposit is extremely skewed, leading to higher overall financial wealth and wealth inequality.

In this scientific paper financial wealth inequality has been analysed, following the assumption that FW represents well the FWI in Bulgaria and due its liquidity has more important implications to total wealth distribution. Households' bank deposits are assumed to be a fair proxy to overall FW and due to the correctness and completeness of the data are supposed to create a relevant picture for FW distribution. The purpose of this paper is to explain the determinants of financial wealth inequality in Bulgaria, which is a scientific challenge, but could have implications for policymakers.

[6] See Households – statistics on financial assets and liabilities, Eurostat, http://ec.europa.eu/eurostat/statistics-explained/index.php/Households_-_statistics_on_financial_assets_and_liabilities.

The paper is structured as follows: The next paragraph represents the data selection process. Paragraph III gives a brief overview of the dynamics and trends of dependent variables. In the fourth paragraph we have laid down the methodology we use. Paragraph V reveals the results from the conducted original empirical research. The last paragraph comprises the concluding remarks.

2. Data

Accounting for local economy characteristics, e.g. high housing ownership rates; low capital markets services penetration; low-financial literacy; lower equity holdings of households than the nominal value of the initial capital invested; at least half of the FW is stored in the form of bank deposits. Bank deposits comprise between 30-40% of total gross wealth of individuals, thus we assume they are a good proxy for the FW distribution.[7] Usually, the financial wealth is highly concentrated in the hands of the Top wealth groups (see Azpitarte, 2008), especially in the form of public-traded financial instruments, non-marketable equity, investment funds and life insurance.

$$W_t = FW_t + RW_t \quad (1)$$

$$W_t=W_{t-1}+DPI_t-C_t \quad (2)$$

$$FW_t = W_{t-1}+DPI_t- C_t - RW_t \quad (3)$$

Where:

W stands for wealth;

FW – financial wealth (e.g. deposits, money market accounts, listed and non-listed shares, mutual funds, life insurance policies, etc.);

RW – real wealth (all type of real assets, usually focusing only on real estate, mainly living real estate (e.g. houses, flats, etc.), and no matter whether they are acquired through a purchase or inheritance);

DPI – Disposable personal income comprise all income sources (net labour income, net social benefits, net investment income, inherited income, etc.)

C – individual consumption.

2.1. Variables

In order to explain the determinants of financial wealth inequality (FWI) in Bulgaria we use following dependent and explanatory variables for the period from the last quarter of 2005 to the last quarter of 2017 (inclusive). The source of dependent and explanatory variables

[7] FWI is assumed to be skewed on the upside due the high housing ownership rate of households that would otherwise reveal more even distribution of total wealth.

has been publicly available data-sets, published by Bulgarian national bank, National statistical institute of Bulgaria and own calculations based on the raw data available.

Dependent variables:

Dependent variables have been calculated using publicly available data of Bulgarian National Bank. On a monthly basis, BNB publishes data about the number and the size of deposits in intervals.[8]

The time frame is a function of data availability and the aim one major economic downturn, as the one impacting the local economy heavily in 2009 due to the Global recession, to be included.

In selecting the dependent variables we've been following the common practice for calculating a Gini coefficient and/or calculating the share of wealthiest one-tenth of the wealthiest percentile, percentile, decile as suggested by Kuznets (1955), Piketty (2014), Saez and Zucman (2016), Smith (2008). In this regard following dependent variables have been selected:

GINID – Gini coefficient on households' bank deposits;

TOP10 – the Top 10%, which is the richest decile of households holding bank deposits, i.e. the wealthiest ten percent in terms of gross financial wealth, measured through households' deposits;

TOP1 – the Top 1%, which is the richest percentile of households holding bank deposits, i.e. the wealthiest one percent in terms of gross financial wealth, measured through households' deposits

Gini coefficient calculation

For calculating the Gini coefficient the approach laid out by Peshev (2015) is adopted. He is using BNB data to calculate Gini coefficients on households' bank deposits and loans, assuming these measures are very indicative for the FW distribution and inequality.[9]

The deposit Gini coefficient is calculated as the difference between the hypothetical area below an ideal equality curve (the 45° line) and the hypothetical area of the actual

[8] Intervals of below BGN 1 000, between 1 000 and BGN 2 500, between 2 500 and BGN 5 000, between 5 000 and BGN 10 000, between 10 000 and BGN 20 000, between 20 000 and BGN 30 000, between 30 000 and BGN 40 000, between 40 000 and BGN 50 000, and above BGN 50 000. BNB ranges households' loans below BGN 1000, between 1 000 and BGN 2 500, between 2 500 and BGN 5 000, between 5 000 and BGN 10 000, between 10 000 and BGN 25 000, between 25 000 and BGN 50 000, and above BGN 50 000.

[9] Despite the fact that Gini coefficient on households' loans can be calculated as in the paper "Analysis of the Wealth Inequality Dynamics in Bulgaria" of Peshev (2015), the low penetration of households'' loans in the economy is going to draw inferences with low significance to WI and FWI.

inequality (denoted by the Lorenz curve, noted as Actual FWI cumulative distribution curve) divided by the area of ideal equality.

This area can be calculated by using the following definite integral:

$$B = \int_{0}^{1} f(x)dx, \tag{4}$$

Where, $f(x)$ is a polynomial and *B* is the hypothetical area of the actual inequality, while f(x) is the function of cumulative deposit wealth distribution with x representing the cumulative share of deposit holders.

Top 1 and Top 10 shares calculation

Top 1 and Top 10, or the wealthiest percentile and wealthiest decile of deposit holders have been calculated as the sum of the proportion of the total wealth of 1 and 10 percent largest deposit holders.[10]

Explanatory variables:

In regards to the explanatory variables selection process we've performed a literature survey, cross-correlation analysis, general reasoning and also, we have accounted for data availability. The selection of independent variables depends also on the choice of dependent variables. Then follows the stationary check process, with which we've selected the appropriate time series analysis method.

Most of the selected explanatory variables are used in other similar researches. In his bestseller "Capital in the 21st Century" Piketty (2014) outlines three main factors for inequality: the higher return on capital then GDP growth rate; non-optimal progressive taxation (especially on inherited income) and higher wealth to income ratios. The higher return on capital compared to GDP growth rates contributes to higher wealth inequality (see ibid).

[10] For calculating quarterly values of Top 1 and Top 10 dependent variables we first calculate the number of deposit holders, representing 1 and 10 % of the total. Then we continue with summing the proportionate wealth until the number of deposit holders is matched. Since BNB publishes its deposit data in notional amount intervals, there are some peculiarities of the calculation process. For example, in the last quarter of 2017, 1% of total deposit holders equals 100 148, also 833 deposit holders own 4.25% of total deposit wealth (falling in the above 1 mln. BGN interval), 1386 deposit holders own 2% of total deposit wealth (falling int the 0.5 to 1 mln. BGN interval), 8456 people from the 0.2 to 0.5 mln. BGN interval own 4.87% of total deposit wealth, 45 431 deposit holders from the 0.1 to 0.2 mln. BGN group own 13.28% of total deposit wealth, and 44 042 (the difference to 100 148 which is 1% of the TOP percentile) owns the 40% (44 042 of 109 952 deposit holders) of the 15.71% total wealth of the 0.05-0.1 mln. BGN interval. Following such an approach we find that wealthiest 100 148 (one percent of total deposit holders) own 30.7% of total deposit wealth in the last quarter of 2017.

Regarding the selection of GDP as an explanatory variable it should be noted that the inequality-growth relationship is a common research topic, especially in income inequality literature (see Kuznets, 1955, 1963; Piketty, 1997; Aghion et al., 1999; Barro, 2000).

Since households' bank deposits are growing in importance to the banking sector at a much higher rate than the other bank liabilities, they've turned in to bigger factor for lending, hence for investments and economic development (see Stattev, 2009).[11] Financial deepening – economic inequality nexus has been analysed by Lopez (2004), Beck et al. (2007) and Dabla-Norris et al. (2015).

Capital and housing market dynamics and economic equality are representing strong interdependency according to the results of Wolff (1998), Benjamin et al. (2004) and Bostic et al. (2009).

Inflation is considered as an important factor of wealth inequality. Piketty noted that inflation "can also play a fundamental role in the dynamics of the wealth distribution" (Piketty, 2014).

Furthermore, it is a common belief that progressive taxation can help in decreasing income and wealth inequality. Taxation-wealth distribution nexus has been scrutinized by Laitner (2001) and Meh (2005).

Another important factor to wealth distribution is the interest rate. Piketty (1997) is considering the interest rates-inequality nexus in a modified Solow model framework.

Education and inheritances are also a very important factor for WI, usually causing uneven wealth distribution (see Elinder et al., 2016 and Lusardi et al., 2017).[12] This scientific article is analysing quarterly data and applying specific time series modelling accordingly; however, due to the lack of these important availability, they have been omitted from the analysis.

The models' explanatory (independent) variables are as follows:

DY – households' bank deposits to GDP ratio;

[11] In the 1991-1997 period Investment lead to higher bank deposits, while in the period 1997-2006 the opposite long-term association is evident, maintaining the general savings-to-investments reasoning (see Stattev, 2009).

[12] In their recent research of Lusardi et al (2017) confirm the positive association between education and economic inequality. Educated people (with a college degree or higher) are maintaining wealth to income ratios at around 7.3 times, compared to 3 times for groups without a high school diploma while the average income for educated people is around 50% higher compared to population groups not possessing a high-school diploma. It can easily inferred Educated people are in better position to understand sophisticated financial products and to manage their wealth, hence not surprisingly financial knowledge is responsible for 30-40% of wealth inequality, with people with higher financial literacy being in position to better manage their wealth (see ibid.). Elinder et al. (2016) examined the inherited wealth as a key determinant of wealth inequality. They used new population-wide register data on inheritances and wealth in Sweden to estimate the causal impact of inheritances on wealth inequality. They found that inheritances reduce relative wealth inequality (e.g., the Gini coefficient falls by 5-10 percent).

HPR – Residential properties price index (2010=100);

ID – interest rates on deposits of households;

IL – interest rates on bank loans of households;

Log(CPI) – natural logarithm of CPI;

Log(Y) – natural logarithm of quarterly seasonally adjusted real GDP;

LY – households' loans to GDP ratio;

SFXR – Bulgarian stock market benchmark values deflated by CPI;

D1 – Global financial crisis impact on Bulgarian economy, beginning Q1 of 2009;

D2 – Dummy variable accountable for imposing 10% proportional (flat) tax rate on personal income;

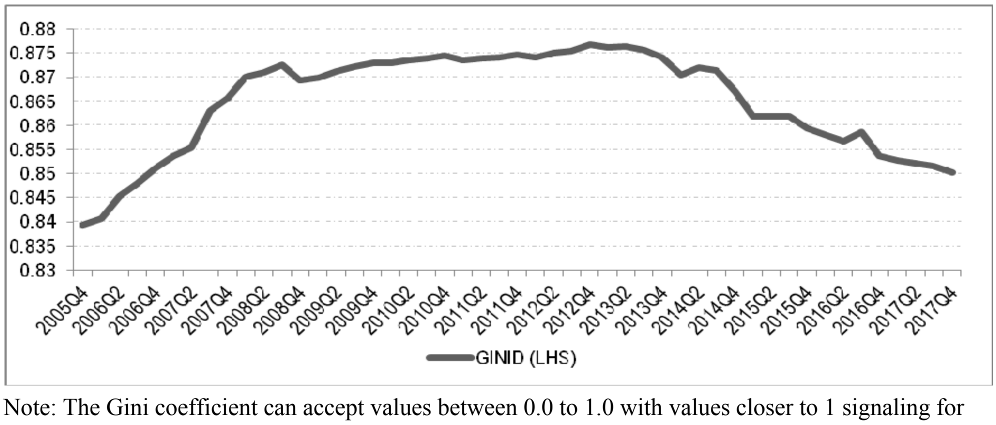
D3 – Corporate commercial bank crisis dummy.

3. Dynamics and trends of dependent variables

As shown on Fig 1 the Gini coefficient based on deposits of households rises until the end of 2012 reaching a peak value of 0.88, then it starts declining to 0.85, oscillating between 0.84 to 0.88 for the period 2005 Q4 to 2017 Q4. For the whole period under review a slight increase by 1.1 pp is evident. The Gini coefficient value reveals a very uneven distribution of households' bank deposits, which is comprising the largest part of households' financial wealth and is the most liquid part of the overall wealth of households. FWI is much larger than the income inequality.

Figure 2

Dynamics of the GINI coefficient on households' deposits dependent variable for the period 2005:Q4-2017:Q4



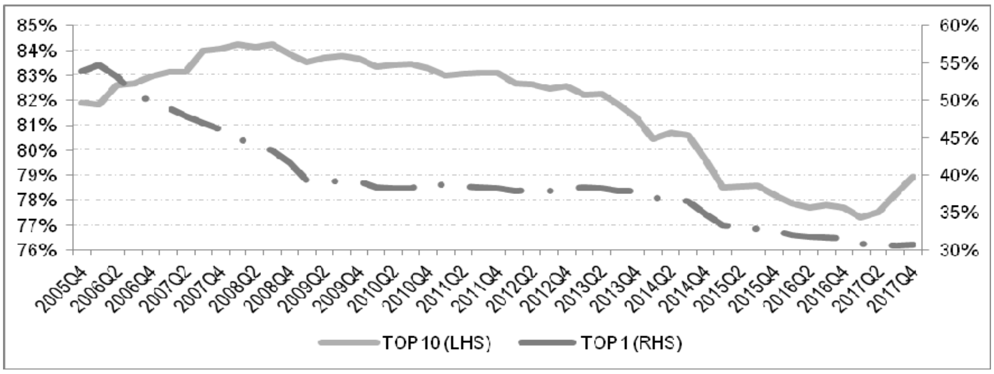
Note: The Gini coefficient can accept values between 0.0 to 1.0 with values closer to 1 signaling for larger inequality.

Source: Own calculations with public BNB data.

The top 1% and top 10% deposit holders lost share, with the wealthiest percentile dropping considerably its share, by hefty 43% for the observed period. The decline of the share of biggest 1% deposit holders is the main contributor for the decline in the deposit Gini coefficient, especially at the end of 2012 onwards (see Fig.3). The top decile share also declines but more gradually. As of the end of 2017 top 1% hold around 31% of the nominal value of deposits, while the top 10%' s share in deposit wealth corresponds to around 79% (see Fig. 3). FW distribution in Bulgaria is very skewed, however following international trends (see Cagetti and De Nardi, (2005) and Saez and Zucman (2014)),[13] 100 000-200 000; 200 000-500 000; 500-1 000 000; > 1 000 000.

Figure 3

Dynamics of TOP 10 % and TOP 1 % dependent variables for the period 2005:Q4-2017:Q4



Note: Values between 0 to 100 % reveal the share in deposit wealth of the wealthiest percentile and decile with a value closer to 100% meaning a closer to 100% share of deposit wealth of the Top 1% and Top 10%. Left-hand side axis applies to the Top 10% variable, while the right-hand side vertical axis applies to the Top 1% variable.

Source: Own calculations with public BNB data.

[13] FW distribution in Bulgaria is very skewed, however following international trends. Cagetti and De Nardi (2005) investigated wealth inequality in the USA and the determinants that explain it. They noted that in the USA a large fraction of the total wealth in the economy is concentrated in the hand of the richest percentiles: the top 1% hold one third and the richest 5% hold more than half of total wealth. At the other extreme, a significant fraction of the population holds little or no wealth at all. They used as a comprehensive measure of the most marketable wealth net worth that includes all assets held by the households (real estate, financial wealth, vehicles) net of all liabilities (mortgages and other debts). They have found evidence that individual savings, bequests and wealth accumulation are important determinants of wealth inequality in the USA. They also have highlighted the role of entrepreneurs in determining capital accumulation and wealth inequality in the United States. As the data of Saez and Zucman (2014) suggest the top 0.1% wealth share in 2012 in the US have increased by hefty 214% in a period of 33 years until 2013, while the bottom 90% wealth share even started stately declining after reaching a peak in the mid-80s. From the late seventies until the end of 2012 the wealth share of top 0.1% has been in a steady uptrend, being the main factor for wealth inequality gap widening. Wealth inequality in the US is approaching the highest levels, reached in the beginning of the 20th century.

BNB publishes quarterly data on the number and the size of deposits in following ranges (all amounts are in BGN): 1 000<; 1 000-2 500; 2 500-5 000; 5 000-10 000; 10 000-20 000; 20 000-30 000; 30 000-40 000; 40 000-50 000; >50 000. Since the third quarter of 2009 BNB started publishing data for the ranges (all amounts are in BGN) 50 000-100 000.

For the whole period under review, the number of households' deposits rose by 7.1% to just above 10 mln., while the value more than tripled, from BGN 11.7 to BGN 47.7 bln. The steady growth of the value of deposits even after the outbreak of the Corporate commercial bank crisis at the end of the second quarter of 2014 shows the confidence and trust of households in the local banking system. The number of deposits starts declining in the post-2009 period, with rising banking fees being one of the main contributors to this process. This assumption is based on the fact that only the number of below BGN 1000 deposits declines.

Deposits in the range above BGN 50 000 rose by the strongest pace from all other intervals, with their number increasing by tremendous 872% to 166 058 for the whole period under review, and their value rose by 816% to BGN 19.2 bln. Owners of deposits in this range increased in number and value the most compared to other ranges. i.e. this group is the biggest contributor to the FWI. At the beginning of the period only 0.183% of all deposit holders were holding deposits above the BGN 50 000 threshold, owning 17.85% of notional value of deposits, while at the end of the period 1.66% of the total number of deposits fall in this range, representing 40.11% of the deposits' value. The growth rate of share of people owning deposits above BGN 50 000 outpaces considerably the growth rate of the share in total deposits' value. The biggest contributor of the number of deposits above BGN 50 000 is the deposit range of 100 000 to BGN 200 000. One of the reasons is that deposits under BGN 196 000 are covered by Deposit insurance fund and after the outbreak of the Corporate commercial bank crisis deposits above the DIF coverage were split into smaller notional value deposits to be insured.

Deposits in the higher than BGN 200 000 ranges are experiencing a much slower growth rate in this regard. The process of splitting larger deposits above the maximum insured amount is artificially impacting the FWI on the downside, so is the fact that many individuals have more than one bank deposit account. We assume that this process, however, is not skewing the FWI considerably.

4. Methodology

Analysing the literature on economic inequality and focusing on financial wealth inequality determinants has helped us in the data selection process. The model creation process was buoyed by cross-correlation analysis of selected variables (see Table.1. in the VII.1. Correlation analysis section in the appendix). A combination between high and low correlated variables leads to the creation of viable econometric models that account for hidden associations and transmission mechanisms.

Results from unit root tests are advocating the use of a specific time series method (see VII.2. Unit root tests' results in the appendix). Usually economic time series at their levels change their mean and variance over time, i.e. they are non-stationary in levels which make them unreliable for model-creation, analysis and forecasting, unless they are turned into stationary variables, trough first-, sometimes trough second differencing. Among the most popular approaches for dealing with non-stationarity series are the methods developed by Engle and Granger (1987), the approach of Johansen (1988) and Johansen and Juselius (1990) and the ARDL bounds testing procedure developed by Pesaran and Shin (1999) and Pesaran et al. (2001). However, the methods of Engle and Granger (1987), Johansen (1988) and Johansen and Juselius (1990) require I(1) data, i.e. stationary at first differences. Besides that, the approach of Johansen (1988) and Johansen and Juselius (1990) requires large data sets, usually with over 100 observation per variable, (see Hargreaves, 1994 and Ahking, 2002), with around 50 observations for each variable from our dataset. The approach of Pesaran and Shin (1999) and Pesaran et al. (2001) allows for mixed-stationary data, i.e. I(0) and I(1) variables (a combination of stationary at levels and first differences stationary variables).

Performing Im, Pesaran, and Shin test, together with Augmented Dickey-Fuller and Phillips-Perron test reveal that some of the variables are I(0) (i.e. stationary) and other are I(1) (i.e. have unit root) variables at the intercept, intercept and trend, and none option, or in some instances the null hypothesis is barely rejected at the level data (as can be seen for some of the results from the unit root tests in the Appendix VII.2. Unit root tests)[14]. The ARDL bound testing procedure of Pesaran and Shin (1999) and Pesaran et al. (2001) has been considered after accounting for the combination of level-stationarity and first difference-stationarity of variables.

Considering data peculiarities and model creating requirements we have built dynamic ARDL model that is cable of representing short-term and long-term interdependencies, considering the approach of Pesaran and Shin (1999) and Pesaran et al. (2001). With selected variables, we create an ARDL model with one lag of level data and lags of first differences of variables. If found that variables are cointegrated a cointegrated equation, representing the long-term associations, and error-correction dynamic model accounting for short-term associations is created.

$$\Delta Y_t = c + \phi Y_{t-1} + \theta_k x_{k,t-1} + \sum_{m=1}^{n} \eta_m \Delta Y_{t-m} + \sum_{m=1}^{n} \xi_m . \Delta X_{k,t-m} + \gamma_m d_{m,t} + \varepsilon_{t,} \quad (5)$$

Where:

$\Delta \mathbf{Y_t}$ – first differences of the dependent variable;

c – constant (an intercept in the model);

ϕ – autoregressive coefficient related to the first lag dependent variable;

$\mathbf{Y_{t-1}}$ – first lag of the dependent variable;

$\boldsymbol{\theta_k}$ **–** coefficient related to the first lag of the k^{th} explanatory variable;

[14] In this research paper the common procedure for applying the regular options of a unit root test has been applied, respectively the intercept, intercept and trend, and none option. Visual inspection of data is not enough for considering whether tested data (e.g. single variable) is having, constant, constant and trend, or the data is not having constant and trend. This is the reasoning behind the common practice for testing the data for unit root with one of the three assumptions and options.

$X_{k,t-1}$ – first lag of the k[th] explanatory variable;

η_m – autoregressive coefficient related to the first differences of the dependent variable;

ΔY_{t-m} – first differences of the dependent variable at lag “t-m”;

ξ_m – coefficient related to the first differences of the explanatory variable;

$\Delta X_{k,t-m}$ – first differences of the k[th] explanatory variable at lag “t-m”;

γ_n – coefficient related to a dummy variable;

$d_{n,t}$ – dummy variables;

ε_t – residual of the dynamic model.

The ARDL bound testing procedure allows us testing for cointegrating interdependencies between variables through performing Wald F-test on level data (first lag of level data) in a dynamic model. If the F-statistic is above the upper bound value, then variables are considered cointegrated. We use the small sample size (between 30 and 80 observations) reference values for the bottom and upper bounds found at Narayan (2005). Following the approach of Pesaran and Shin (1999) and Pesaran et al. (2001), long-term and short-term associations between the dependent and explanatory variables have been identified and coupled together in a single dynamic model. If variables are found to be cointegrated then an error-correction model with a single error term(vector) is created (see Nkoro and Uko, 2016).

For model selection and for selecting the lag-structure we’ve been guided by low-values of Akaike, Schwarz and Hannan-Quinn information criterion, large adjusted R^2 values, stability checks and omitted variables and misspecification tests.

Models have been checked for reliability through performing tests on residuals for normality, serial correlation, heteroscedasticity, and being subject to stability checks, e.g. for omitted variables and misspecification through Ramsey RESET test.

Besides adjusted R^2, F-value, Wald F-test on the first lag of level data, Akaike, Schwarz and Hannan-Quinn information criterion has been employed for selecting and comparing models A to I (see VII.3. ARDL Bounds testing regression results in the appendix).

Application of Wald F-test to lagged level data in models reveals that variables in models are cointegrated. All models’ F-stat of the Wald test exceeds the upper bound at 1% significance level, referring them to asymptotic critical value bounds for the F-statistic on p.300-301 in Pesaran et al. (2001) and at 1% and 5% significance level critical values found at Narayan (2005). With cointegrated variables we originate regressions with level data, which also are representing the long-term association (see eq.6). between the dependent variable and explanatory variable in the error-correction models (ECMs) (see eq.7).

$$Y_t = k_0 + k_n X_{nt} + v_t \qquad (6)$$

Where:

Y_t – dependent variable;

k_0 – constant of the regression;

k_n – coefficient related to the n^th^ explanatory variable X;

X_{nt} – n^th^ explanatory variable;

v_t – residual of the regression;

ECM models reveal the short-term interdependencies and combine the cointegrating equation represented by the error-correction term (ECT). Though the ECT the error-correction process is revealed, i.e. ECT allows the model to adjust to steady state by each quarter (see eq.7).

$$\Delta Y_t = c + \rho ECT_{t-1} + \sum_{m=1}^{n} \eta_m \Delta Y_{t-m} + \sum_{m=1}^{n} \xi_m . \Delta X_{k,t-m} + \gamma_n d_{n,t} + \varepsilon_t, \quad (7)$$

Where:

ΔY_t – first differences of the dependent variable;

c – constant (an intercept in the model);

ρ – coefficient related to the first lag of the error-correction term, representing the speed of adjustment of the model to sa table state (the coefficient should have a negative sign, accepting values between 0 and 1, representing the error correction mechanism);

ECT_{t-1} – first lag of the residual-v_t of the cointegrating equation which is representing the long-run association;

η_m – autoregressive coefficient related to the first differences of the dependent variable;

ΔY_{t-m} – first differences of the dependent variable at lag “t-m”;

ξ_m – coefficient related to the first differences of the explanatory variable;

$\Delta X_{k,t-m}$ – first differences of the k^th^ explanatory variable at lag “t-m”;

γ_n – coefficient related to a dummy variable;

$d_{n,t}$ – dummy variables;

εt – residual of the dynamic model.

5. Results

Since the ARDL bounds testing procedure of Pesaran and Shin (1999) Pesaran at al. (2001) applied here reveals short- and long-term interdependencies, first, cointegration equation (CE) results which represent the long-term associations have been scrutinized. In this regards it is appropriate to note the fact, that the error-correction mechanism in all presented and analysed models is adhered, through the negative sign of the first lag of the ECT coefficient (first lag of level data), meaning that the dynamic model disequilibrium decreases with each new quarter.

5.1. Long-term results

Following cointegrating equation have been considered after applying the ARDL bounds testing approach of Pesaran and Shin (1999) Pesaran at al. (2001) using small sample size reference values for the bottom and upper bounds found at Narayan (2005). We've created several models with the three dependent variables, Gini coefficient on deposits of households, wealthiest percentile and decile in terms of households' deposits. Our models under the ARDL bounds testing procedure can be found in the appendix section (VII.3. ARDL Bounds testing regression results). Cointegrating equations (CE) reveal the long-term association between FWI (dependent) variables and their determinants (explanatory variables). We use following CE for implementing error-correction terms in the error-correction models:

Model A

*GINID = 0.084 LOG(Y) *** +0.281 LY ***+ 0.05 SFXR *** -0.001 HPR *** +0.003 ID *** +Residual;* (8)

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Model B

*GINID= -0.597 *** +0.102 DY *** +0.168 LOG(CPI) *** -0.002TREND ***+Residual;* (9)

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Model C

*D(GINID)= -0.233 *+0.122 LOG(CPI) *** +0.013 SFXR * +0.128 DY *** +0.115 LY *** -0.002 TREND *** +Residual;* (10)

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Model D

*Top1=3.142*** + 0.013 IL *** -0.329 LOG(CPI) *** +0.151 SFXR **+Residual;* (11)

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Model E

*TOP10= -0.826***+0.009 IL *** +0.189 LOG(CPI)*** -0.204 DY *** +0.109 SFXR ***+Residual;* (12)

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

CE implemented in the models reveal that stock market prices have considerable positive meaning for the FWI (See Models A, C , D and E), while house prices have a minimal negative association with the FWI (as revealed in Model A)[15]. Owning public stock is a common practice for higher educated and richer layers of the society, hence climbing stock prices are enriching the wealthiest percentile and decile leading to even higher overall FWI. Wolff (1998) concludes that stock market prices are having a strong positive association with the wealth of Top 1 percentile (see model D), especially when stock prices are rising faster compared to house prices. High house ownership rates in Bulgaria and rising property prices reduce FWI, but the house price index is having very small meaning for the dependent variable, justified by the small coefficient value. Inherited real estate wealth and the sale of it when property prices are rising is transferred into higher bank deposits, i.e. proceedings from the sale[16].

Cointegrating equations reveal that financial services deepening, measured through penetration of households' deposits and loans in the economy, is in a strong positive association with the FWI, the higher the deposit do GDP and loan to GDP ratio, the larger the inequality in financial wealth distribution. The ratio between households' deposits and GDP and the loan to GDP ratio are in a positive long-term relationship with the Gini coefficient, as can be seen in models A, B, C and E, supporting the hypothesis that financial resources help able individuals gain financial wealth faster than the rest society groups[17]. Dabla-Norris et al. (2015) reached to similar conclusions. They proved that financial deepening, generalized by the ratio of private credit to GDP, is associated with higher income inequality. Lopez (2004) also proved that financial development is associated with increases in inequality.

Negative deposit to GDP association with the wealthiest decile is evident in model E. However, in model E the dependent variable is the wealthiest top decile, assuming that for this specific decile higher deposit to GDP ratio yields to lower share from households' deposits, hence a slightly different association is possible. By analysing remittances Beck et al. (2007) support the hypothesis that a negative association with financial deepening exists, for the bottom quintile though, eventually helping decrease income and wealth inequality.

FWI variables demonstrate a positive elasticity to interest rates on deposits and loans in models A, D and E[18]. Higher interest rates on loans and deposits stimulate credit rationing

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[15] A one-point increase in the deflated value of SOFIX leads to 0.01 to 0.15 percentage points increase in the FWI gauge (accepting values between 0 and 1, i.e. between 0 and 100%).

[16] A one-point increase in deflated House price index leads to 0.001 percentage points decline of the Gini coefficient (accepting values between 0 and 1, i.e. between 0 and 100%).

[17] One percentage point change in the deposit to GDP ratio and in the loan to GDP ratio yields between 0.13 and 0.28 percentage points change of the FWI variable in models A, B, C, while in model E one percentage point change in the deposit to GDP ratio is leading to 0.2 negative percentage points change of the deposit wealth share of the wealthiest decile.

[18] One percentage point change of interest rates on bank deposits yields to 0.0003 percentage points change in the Gini coefficient (accepting values between 0 and 1, i.e. between 0 and 100%). One percentage point change of interest rates on bank loans yields between 0.009 and 0.013 percentage points change in the Top 10 and Top 1 dependent variables (accepting values between 0 and 1, i.e. between 0 and 100%) as can be seen in Models D and E.

and wealth accumulation by capital abundant entrepreneurs, hence increasing the FWI and overall WI, with Piketty (1997) supporting a similar view.

Following the results of models B, C, E it can be concluded that consumer prices lead to higher FWI in the long term, with higher consumer prices being in a distinct strong positive association with dependent variables in CE opposing the findings of Piketty (2014), but supporting the conclusions of Li and Zou (2002), Dollar et al. (2013) and Lopez(2004)[19]. In their research of the Inflation – nominal wealth redistribution nexus Doepke and Schneider (2006) conclude that inflation is helping to restore wealth equality, with the rich, bondholders and old households' share in wealth distribution deteriorating. Fixed-rate mortgage debt holders, middle class and younger part of the population are gaining share in the wealth, buoyed by higher general prices in the economy (ibid.). Piketty (2014) and Doepke and Schnider (2006) are considering general wealth inequality not the financial wealth inequality or the households deposits distribution. Inflation helps in the long run for narrowing the gap between upper and lower percentiles, meaning that larger nominal value deposits grow slower than smaller ones as evident for the wealthiest 1 percent (see model D). If the main source of growth of small-sized deposits comes from salaries and social payments, then they better account for higher prices adjustments, while large-size depositors fail to keep the pace.

Real GDP (natural logarithm of seasonally adjusted quarterly values) positively relates to FWI (as seen in model A), supporting the hypothesis that wealthier layers of society take advantage in boom economic times and loose more wealth during down economic times[20]. After reviewing the pattern of economic development of developed and underdeveloped countries Kuznets (1955, 1963) suggests that economic growth (especially in the long term) is restoring economic equality. Economic growth that is nowadays mainly technological innovations induced contributes to wage inequality in UK and US since 1980s; hence it can be assumed it is impacting in the same way the income inequality and WI (see Aghion et al. 1999). Our results support the view of Aghion et al. (1999), i.e. the positive association between the change of GDP and the FWI.

5.2. Short-term results (Error-correction models)

As a final step, we've created error-correction models, allowing us to identify short-term associations between the dependent and explanatory variables and implementing the error-correction mechanism. The models' summary of statistical significance and robustness of models have been disclosed in the Appendix (VII.4. Error-correction models summary). Short-term results' analysis and comments follow the ECM laid out below.

Model A

[19] A 100% positive change of the consumer prices index would lead between 12.2 and 18.9 percentage points increase of the FWI variables (accepting values between 0 and 1, i.e. between 0 and 100%) in models B, C and E, while in model D the wealthiest percentile share declines by hefty 33% on a 100% positive change in CPI.

[20] A 100% change of quarterly real GDP leads to 8.4 percentage points change of the Gini coefficients (accepting values between 0 and 1, i.e. between 0 and 100%) ceteris paribus. (see model A).

$$\Delta GINID=+0.006^{***} -0.203ECT_{(t-1)}^{**} -0.222\Delta GINID_{(t-1)} -0.143\Delta GINID_{(t-2)}-0.297\Delta GINID_{(t-3)} -0.012\Delta LNY_{(t-1)}+0.142\Delta LY_{(t-1)} -0.153\ \Delta LY_{(t-2)}^{*} -0.005\Delta SFXR_{(t-1)}+0.011\Delta SFXR_{(t-2)}+0.037\Delta SFXR_{(t-3)}^{**}-0.001\Delta HPR_{(t-1)}-0.001\Delta HPR_{(t-2)}+0.001\Delta HPR_{(t-3)}-0.001\Delta ID_{(t-1)} -0.005\ D1^{**} -0.004\ D3^{***} \quad (13)$$

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Model B

$$\Delta GINID=0.011^{***} -0.703ECT_{(t-1)}^{***} +0.315\Delta GINID_{(t-1)} +0.344\Delta GINID_{(t-2)}^{*} +0.337\Delta GINID_{(t-4)}^{*}+0.02\Delta DY_{(t-1)}-0.045\Delta DY_{(t-2)}-0.033\Delta DY_{(t-3)}-0.048\Delta DY_{(t-4)}-0.094\Delta DY_{(t-5)}^{**} +0.008\Delta DY_{(t-6)} -0.094\Delta LOG(CPI)_{(t-1)}^{***}+0.005\Delta LOG(CPI)_{(t-2)}-0.008\Delta LOG(CPI)_{(t-3)}-0.052\Delta LOG(CPI)_{(t-4)}^{*}-0.046\Delta LOG(CPI)_{(t-5)}^{**}-0.033\ \Delta LOG(CPI)_{(t-6)}-0.001@TREND^{***} -0.005\ D2^{***} \quad (14)$$

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

ECM Model C

$$\Delta GINID=0.006^{**}-0.826ECT_{(t-1)}^{**}+0.37\Delta GINID_{(t-1)}+0.155\Delta GINID_{(t-2)}-0.159\Delta GINID_{(t-3)}-0.059\Delta LOG(CPI)_{(t-1)}+0.002\Delta LOG(CPI)_{(t-2)}-0.005\Delta SFXR_{(t-1)}-0.001\Delta SFXR_{(t-2)}+0.028\Delta SFXR_{(t-3)}^{**}-0.037\Delta DY_{(t-1)}-0.021\Delta DY_{(t-2)} -0.013\Delta DY_{(t-3)} -0.029\Delta DY_{(t-4)}+0.189\Delta LY_{(t-1)}-0.181\Delta LY_{(t-2)} -0.005D2 -0.003D3^{**} \quad (15)$$

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

ECM Model D

$$\Delta TOP1= -0.02^{***} -0.115ECT_{(t-1)}^{***} +0.31\Delta TOP1_{(t-1)}^{**} +0.151\Delta TOP1_{(t-2)} -0.023\Delta TOP1_{(t-3)} +0.433\Delta TOP1_{(t-4)}^{***} -0.006\Delta IL_{(t-1)}^{**} -0.003\Delta IL_{(t-2)} -0.102\Delta LOG(CPI)_{(t-1)}^{*} -0.031\Delta LOG(CPI)_{(t-2)} +0.148\Delta LOG(CPI)_{(t-3)}^{**} +0.044\Delta SFXR_{(t-1)} -0.003D3^{*} +0.01TREND^{***} \quad (16)$$

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

ECM Model E

$$\Delta TOP10=-0.002 -0.708ECT_{(t-1)}^{***} +0.448\Delta TOP10_{(t-1)}^{**} -0.036\Delta TOP10_{(t-2)} +0.051\Delta TOP10_{(t-3)} -0.006\Delta IL_{(t-1)}^{**}-0.004\Delta IL_{(t-2)}^{*}+0.002\Delta IL_{(t-3)} -0.049\Delta LOG(CPI)_{(t-1)} -0.089\Delta DY_{(t-1)} -0.04\Delta DY_{(t-2)} +0.219\Delta DY_{(t-3)}^{*} +0.076\ \Delta DY_{(t-4)} +0.014\Delta SFXR_{(t-1)} -0.048\Delta SFXR_{(t-2)}^{*} +0.045\Delta SFXR_{(t-3)} -0.012\ D3^{***} +0.001\ @TREND^{**} -0.008\ D1^{*} \quad (17)$$

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

The cointegrating equations' residuals act for the error-correction term. Cointegrated variables shown in the cointegrating equations have been identified using the ARDL bounds testing procedure and found at Narayan (2005) critical values. In all ARDL error-correction models, the ECT coefficient negatively relates with the dependent variable, thus representing the error-correction mechanism. With each quarter the deviation from the long-term equilibrium is adjusted in the next quarter at the speed of 20% for model A, 70% for model B, 83% for model C, 12% for model D, and 71% for model E.

Through analysing short-term results, presented by the first differences of data in the model, we can reasonably conclude that the FWI inequality variable is in a strong positive association with its previous quarters meaning, i.e. positive changes/negative changes of the FWI variable leads to future larger/lower FWI variable values at the future (see models B, D and E).

Financial deepening in the short term, measured through deposit to GDP and loans to GDP ratio is reducing FWI, as seen in models A at 0.10 level of significance and in model B at 5% level of significance[21]. Deposit growth outpacing GDP growth benefits larger deposits holders (wealthiest decile) in model E at 0.10 level of significance[22].

Bulgarian stock market performance is in a positive relationship with the Gini coefficient on deposits, i.e. lower stock prices lead to lower inequality in the distribution of households' deposits and vice versa. Such an association is represented by models A, C at 0.05 level of significance[23]. However, positive stock market quarterly returns lower the TOP10 coefficient (as can be seen in model E at 0.10 level). Ignoring the higher significance level in model E, wealthiest decile FW is growing with lower stock prices and declining when stock prices are ascending.

The general price level (with CPI being a proxy for it) helps to restore equality in households' deposits distribution, with higher price level leading to lower Gini coefficient and to declining wealthiest percentile share of deposits. This association is very strongly represented in model B[24]. Our results are in line with findings of Piketty (2014) and Doepke and Schnider (2006). In model D, however, the first lag of the inflation variables is in a negative association with the Gini coefficient, but the third lag is maintaining the opposite relationship.

Interest rates on households' loans are found to be in a negative short-term relationship with the wealthiest percentile and wealthiest decile, i.e. the decline in interest rates is

[21] One percentage point increase of the quarterly change of the deposit to GDP ratio leads to 0.094 percentage points decline of the quarterly change of the Gini coefficient, while one percentage point increase of the quarterly change of the loan to GDP ratio leads to 0.153 percentage points decline of the quarterly change of the Gini coefficient (see model A and model B).

[22] In model E, however, one percentage point increase of the quarterly change of the deposit to GDP ratio leads to 0.22 percentage points increase of the quarterly change of the Top10 dependent variable, but with the explanatory variable coefficient being significant at 0.1 level.

[23] One-point change of the quarterly change of the Sofix index (deflated values) leads to an increase of 0.028-0.037 percentage points of the quarterly change of the FWI indicator in models A and C.

[24] One percentage point decline of the quarterly growth rate of CPI leads to increase of 0.04 to 0.09 percentage points increase of the quarterly change of the Gini coefficient (see model B).

supporting the inequality in the distribution of households' deposits (see models D and E)[25]. Contemporary interest rates conjuncture in Bulgaria and EU is very challenging, since negative interest rates channel is new and challenging (see Peshev and Beev, 2016). Low-interest rates and high bond prices are fuelling equity prices, leading to higher financial wealth inequality, while house price increase is partially offsetting this effect (see Domanski et al., 2016).

The global recession projection on the local economy dummy D1 variable maintains a negative relationship with the dependent FWI variables in models A and E assuming that the Great Recession's impact on the Bulgarian economy is restoring equality in distribution of FW (see models A at 0.05 level and E at 0.10 level of significance)[26].

Introducing a flat tax rate of 10% on personal income (D2 dummy) from the beginning of 2008 is restoring equality in FW distribution (see model B at 0.01 level of significance)[27]. By lowering taxes entrepreneurship activity is stimulated and also the foreign entrepreneurs' activity in the country intensifies, stimulating employment, hence paying higher salaries and helping the middle-class creation. On the contrary usually it is expected with progressive taxation income and wealth equality to be restored. However, Meh (2005) summarizes in his research that replacing a progressive taxation on income with a proportional tax system has an insignificant effect on wealth distribution, because enhanced entrepreneurial activity leads to higher wages, thus reducing income and accumulated income, i.e. wealth. Laitner (2001) examined wealth inequality in the USA in the period between the 1930s and 1990s. He has found evidence that expansion of social security programs (benefits and taxes) and the increase of the government debt can lead toward more wealth inequality. The research showed also that slower growth implies higher steady-state wealth inequality (see ibid.).

The Corporate Commercial Bank crisis (accounted for by the D3 dummy), which started in June'2014, tested the crisis resolution abilities of local authorities (the Government, leading politicians, the deposit insurance fund and the central bankers) had negative impact on FWI (see models A, C and D, at 0.01, 0.05 and 0.1 level of significance)[28]. The problems of CCB, which eventually defaulted on its liabilities, led to reshuffling bank deposits from Bulgarian owned banks to foreign financial groups owned banks (usually with a parent from a country being a member of the Eurozone) and is with a negative association with the dependent variable.

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[25] One percentage point change of the quarterly change of interest rates on loans leads between 0.006 to 0.004 percentage points of quarterly percentage points change of the TOP1 and TOP10 dependent variables (see models D and E).

[26] The global recession dummy accounts for 0.008 to 0.005 percentage points decline of the change of FWI variables in models A and E.

[27] The introduction of 10% personal income proportional/flat tax rate let to decline of the change of FWI by 0.005 percentage points.

[28] Corporate commercial bank crisis (D3 dummy variable when accepted values from 0 to 1 value) is leading to 0.004-0.0123 percentage points decline of the change of FWI variable in models A, C, D and E.

6. Concluding remarks

In this article we have examined the dynamics of FWI in Bulgaria and its determinants. While the deposit Gini coefficient is in a distinct uptrend until Q4 2012 when the variable starts descending, the wealthiest decile in terms of households' deposit wealth and especially the wealthiest percentile are in a distinct downtrend. We've applied the ARDL approach of Pesaran and Shin (1999) and Pesaran et al. (2001) for analysing a set of dependent and explanatory variables following the characteristics of I(0) and I(1) data. The FWI proxies, measured through a deposit Gini coefficient, the Top 1 and Top 10% share of FW, are driven by similar factors with some specifics. Following the ARDL approach of Pesaran and Shin (1999) and Pesaran et al. (2001) we have created dynamic error-correction models allowing us to identify long-term and short-term factors of FWI.

Our results suggest that there is a strong relationship between stock prices and FWI. Positive stock-market performance increases FWI, in the long- and in the short-run. In the short -run however wealthiest decile's share in FW is declining with higher stock prices, tough at 0.1 significance level.

House prices are having small but negative impact on FWI in the long-run, with higher house prices, helping in restoring the equality of households' deposit distribution. High house ownership rates are supporting the creation of the middle class in terms of deposit ownership.

FWI is negatively impacted by CPI in the short-term, while in the long-run there is a distinct positive association between the dependent and this explanatory variable. Deflation helps to lower the FWI in the long-run, however, it increases the inequality in the short-term.

Financial deepening, measured through deposit to GDP and loans to GDP ratios, is in favour of FWI in the long-run, however in the short term quarterly lags help in restoring FW equality. The share of households' deposits of wealthiest decile is maintaining the opposite interdependences, both in the long- and in the short run.

Interest rates are among the most important drivers of FWI. Lower interest rates on deposits and loans decrease FWI in the long run, however in the short-term lower interest rates on loans lead to higher FWI values.

Year-over-year change of quarterly GDP is increasing the FWI, with higher economic growth being in favour of the wealthiest holders of households bank deposits.

The income flat tax rate of 10% introduction, the Great Recession and its projection on the local economy and the Corporate commercial bank default on its liabilities are events that led to lower FWI, despite having lower effect for the dependent variable dynamics.

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APPENDICES

CORRELATION ANALYSIS

Table 1

Correlation matrix

	GINID	TOP10	TOP1
GINID	1.00		
p-val	**-----**		
TOP10	0.45	1.00	
p-val	***0.00***	-----	
TOP1	-0.27	0.67	1.00
p-val	*0.06*	***0.00***	-----
DY	0.13	-0.81	-0.90
p-val	*0.38*	***0.00***	***0.00***
LY	0.90	0.39	-0.38
p-val	***0.00***	***0.01***	***0.01***
ID	0.59	0.90	0.42
p-val	***0.00***	***0.00***	***0.00***
IL	0.22	0.89	0.76
p-val	*0.14*	***0.00***	***0.00***
SFXR	-0.48	0.28	0.69
p-val	***0.00***	***0.05***	***0.00***
HPR	0.14	0.26	-0.01
p-val	*0.32*	*0.07*	*0.95*
LOG(CPI)	0.56	-0.44	-0.92
p-val	***0.00***	***0.00***	***0.00***
LNY	0.11	-0.71	-0.92
p-val	*0.46*	***0.00***	***0.00***

Unit root tests' results

Table 2

Augmented Dickey-Fuller Unit root test (Akaike Info Criterion)

Series	Levels			First differences		
Option on exog. var.	1	2	3	1	2	3
GINID	0.43	0.48	0.50	0.06	0.40	0.41
TOP10	0.40	0.21	0.56	0.16	0.53	0.99
TOP1	0.22	0.46	**0.01**	0.14	0.48	0.74
DY	1.00	0.69	0.25	0.30	**0.00**	0.74
LY	0.72	0.07	0.08	**0.01**	**0.07**	**0.04**
ID	0.34	0.81	0.22	**0.01**	**0.00**	**0.11**
IL	0.19	0.98	0.36	0.39	**0.03**	**0.00**
SFXR	0.14	0.30	**0.00**	**0.01**	0.10	**0.01**
HPR	0.57	**0.01**	0.71	**0.00**	**0.06**	**0.00**
LOG(CPI)	1.00	**0.00**	0.58	**0.00**	**0.00**	**0.00**
LNY	1.00	0.63	0.51	**0.00**	**0.00**	**0.00**

Note: Values in the table represent probabilities for accepting the null hypothesis of a unit root; Option on exogenous variables 1, 2, 3 is associated with no constant and no trend, constant, constant+linear trend on the ADF test;

Table 3

Augmented Dickey-Fuller Unit root test (Schwarz Info Criterion)

Series	Levels			First differences		
Option on exog. var.	1	2	3	1	2	3
GINID	0.85	0.22	0.50	**0.00**	**0.00**	**0.00**
TOP10	0.40	0.21	0.56	0.16	0.53	0.99
TOP1	**0.00**	**0.00**	0.12	**0.00**	**0.00**	**0.00**
DY	1.00	0.63	0.87	**0.00**	**0.00**	**0.00**
LY	0.72	0.07	0.08	**0.01**	**0.07**	**0.04**
ID	0.38	0.90	0.36	**0.00**	**0.00**	**0.00**
IL	**0.03**	0.99	0.36	**0.02**	**0.00**	**0.00**
SFXR	0.16	0.30	0.51	**0.01**	0.10	**0.02**
HPR	0.74	0.09	0.17	**0.00**	**0.03**	**0.07**
LOG(CPI)	1.00	**0.00**	0.58	**0.00**	**0.00**	**0.00**
LNY	1.00	0.47	0.39	**0.00**	**0.00**	**0.00**

Note: Values in the table represent probabilities (from 0.00 to 1.00) for accepting the null hypothesis of a unit root; Option on exogenous variables 1, 2, 3 is associated with no constant and no trend, constant, constant+linear trend on the ADF test;

Table 4

Phillips-Perron Unit root test

Series	Levels			First differences		
Option on exog. var.	1	2	3	1	2	3
GINID	0.79	0.25	0.35	**0.00**	**0.00**	**0.00**
TOP10	0.32	0.93	0.32	**0.00**	**0.00**	**0.00**
TOP1	**0.00**	0.07	0.59	**0.00**	**0.00**	**0.00**
DY	1.00	0.63	0.95	**0.00**	**0.00**	**0.00**
LY	0.77	0.17	0.42	**0.01**	0.11	**0.03**
ID	0.38	0.91	0.67	**0.00**	**0.00**	**0.00**
IL	0.07	0.97	0.66	**0.00**	**0.00**	**0.00**
SFXR	0.19	0.42	0.68	**0.00**	**0.00**	**0.01**
HPR	0.77	0.25	0.50	**0.01**	0.11	0.31
LOG(CPI)	0.99	**0.01**	0.58	**0.00**	**0.00**	**0.00**
LNY	1.00	0.48	0.31	**0.00**	**0.00**	**0.00**

Note: Values in the table represent probabilities (from 0.00 to 1.00) for accepting the null hypothesis of a unit root; Option on exogenous variables 1, 2, 3 is associated with no constant and no trend, constant, constant+linear trend option on the PP test;

Table 5

Im, Pesaran, and Shin unit root test

Series	Levels		First differences	
Option on exog. var.	1	2	1	2
GINID	0.48	0.50	0.40	0.41
TOP10	0.21	0.56	0.53	0.99
TOP1	0.46	**0.01**	0.48	0.74
DY	0.69	0.25	**0.00**	0.74
LY	0.07	0.08	0.07	**0.04**
ID	0.81	0.22	**0.00**	0.11
IL	0.98	0.36	**0.03**	**0.00**
SFXR	0.30	**0.00**	0.10	**0.01**
HPR	0.09	0.71	0.06	**0.00**
LOG(CPI)	**0.00**	0.58	**0.00**	**0.00**
LNY	0.63	0.51	**0.00**	**0.00**

Note: Values in the table represent probabilities (from 0.00 to 1.00) for accepting the null hypothesis of a unit root; Option on exogenous variables 1, 2 is associated with constant and constant+linear trend, respectively on the IPS test.

ARDL BOUNDS TESTING REGRESSION RESULTS

Model A

$\Delta GINID = +0.455 - 0.241\ GINID_{(t-1)}{}^{**} - 0.026\ LNY_{(t-1)}\quad -0.105\ LY_{(t-1)}{}^{*}\ - 0.026\ SFXR_{(t-1)}$ $+0.001\ HPR_{(t-1)}\quad +0.003\ ID_{(t-1)}{}^{**}\ -0.152\ \Delta GINID_{(t-1)} - 0.345\ \Delta GINID_{(t-2)} - 0.432 \Delta GINID_{(t-3)}$ ${}^{**} +0.01\ \Delta LNY_{(t-1)} + 0.158\ \Delta LY_{(t-1)} - 0.158\ \Delta LY_{(t-2)} + 0.057\ \Delta SFXR_{(t-1)} + 0.032\ \Delta SFXR_{(t-2)} + 0.0520.037 \Delta SFXR_{(t-3)}{}^{**} + 0.001 \Delta HPR_{(t-1)} + 0.001 \Delta HPR_{(t-2)} + 0.001\ \Delta HPR_{(t-3)}\ -0.003$ $\Delta ID_{(t-1)}{}^{**}$ (18)

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Note: Wald test F-statistic on level data with one lag is 5.22 and corresponding p-value of 0.001. Using reference values of Narayan (2005) the F-statistic is above the upper-bound value at 0.05 level, suggesting that variables are cointegrated.

Model B

$\Delta GINID = 0.35^{*} - 1.301\ GINID_{(t-1)}{}^{***}\ -0.008\ DY_{(t-1)}{}^{*} + 0.17\ LOG(CPI)_{(t-1)}{}^{***}\ +0.786$ $\Delta GINID_{(t-1)}{}^{**} - 0.024 \Delta GINID_{(t-2)} + 0.087 \Delta GINID_{(t-3)}{}^{**} + 0.299 \Delta GINID_{(t-4)} + 0.060\ \Delta DY_{(t-1)}$ $+0.048 \Delta DY_{(t-2)} + 0.040 \Delta DY_{(t-3)} + 0.008 \Delta DY_{(t-4)} + 0.007 \Delta DY_{(t-5)} + 0.10\ \Delta DY_{(t-6)}{}^{**} - 0.160 \Delta LOG(CPI)_{(t-1)}{}^{***} - 0.08 \Delta LOG(CPI)_{(t-2)}{}^{*} - 0.04 \Delta LOG(CPI)_{(t-3)} - 0.046\ \Delta LOG(CPI)_{(t-4)} - 0.062 \Delta LOG(CPI)_{(t-5)}{}^{***} - 0.004 \Delta LOG(CPI)_{(t-6)}{}^{*} - 0.002 TREND^{*}$ (19)

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Note: Wald test F-statistic on level data with one lag is 7.75 and corresponding p-value of 0.001. Using reference values of Narayan (2005) the F-statistic is above the upper-bound value at 0.01 level, suggesting that variables are cointegrated.

Model C

$$\Delta GINID = -0.427^{***} -0.168\, GINID_{(t-1)} +0.089\, LOG(CPI)_{(t-1)}^{***} +0.067\, SFXR_{(t-1)}^{***} -0.148\, DY_{(t-1)}^{***} -0.105\, LY_{(t-1)}^{**} -0.484\, \Delta GINID_{(t-1)} -0.44\Delta GINID_{(t-2)} --0.518\, \Delta GINID_{(t-3)}^{***} -0.101\Delta LOG(CPI)_{(t-1)}^{***} -0.049\Delta LOG(CPI)_{(t-2)} -0.022\Delta SFXR_{(t-1)} -0.008\Delta SFXR_{(t-2)} +0.003\Delta SFXR_{(t-3)} +0.256\Delta DY_{(t-1)}^{***} +0.215\, \Delta DY_{(t-2)}^{***} +0.172\, \Delta DY_{(t-3)}^{***} +0.113\Delta DY_{(t-4)}^{**} +0.003\Delta LY_{(t-1)} -0.176\Delta LY_{(t-2)}^{*} \quad (20)$$

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Note: Wald test F-statistic on level data with one lag is 6.09 and corresponding p-value of 0.001. Using reference values of Narayan (2005) the F-statistic is above the upper-bound value at 0.01 level, suggesting that variables are cointegrated.

Model D

$$\Delta TOP1= -0.228 -0.162\, TOP1_{(t-1)}^{***} +0.001\, IL_{(t-1)} +0.007\, LOG(CPI)_{(t-1)}^{**} -0.009SFXR_{(t-1)} +0.087\Delta TOP1_{(t-1)} -0.145\, \Delta TOP1_{(t-2)} -0.267\, \Delta TOP1_{(t-3)}^{***} +0.206\, \Delta TOP1_{(t-4)}^{**} -0.007\, \Delta IL_{(t-1)}^{***} -0.005\, \Delta IL_{(t-2)}^{***} +0.001\Delta LOG(CPI)_{(t-1)} +0.019\Delta LOG(CPI)_{(t-2)} +0.175\Delta LOG(CPI)_{(t-3)}^{***} +0.044\Delta SFXR_{(t-1)} \quad (21)$$

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Note: Wald test F-statistic on level data with one lag is 8.11 and corresponding p-value of 0.0001. Using reference values of Narayan (2005) the F-statistic is above the upper-bound value at 0.01 level, suggesting that variables are cointegrated.

Model E

$$\Delta TOP10= -0.194 -0.286\, TOP10_{(t-1)}^{***} -0.006\, IL_{(t-1)}^{***} +0.045\, LOG(CPI)_{(t-1)}^{***} -0.287DY_{(t-1)}^{***} -0.026SFXR_{(t-1)}^{**} -0.199\Delta TOP10_{(t-1)} -0.583\Delta TOP10_{(t-2)}^{***} -0.475\Delta TOP10_{(t-3)}^{***} +0.004\Delta IL_{(t-1)}^{**} +0.003\Delta IL_{(t-2)}^{*} +0.002\Delta IL_{(t-3)} -0.055\Delta LOG(CPI)_{(t-1)} +0.271\Delta DY_{(t-1)}^{***} +0.196\Delta DY_{(t-2)}^{**} +0.184\, \Delta DY_{(t-3)}^{**} +0.145\Delta DY_{(t-4)} +0.063\Delta SFXR_{(t-1)}^{***} +0.011\Delta SFXR_{(t-2)} +0.06\Delta SFXR_{(t-3)}^{**} +0.001TREND^{**} \quad (22)$$

Where: *, **, *** denotes statistical significance at the 10%, 5% and 1% levels respectively.

Note: Wald test F-statistic on level data with one lag is 8.81 and corresponding p-value of 0.0001. Using reference values of Narayan (2005) the F-statistic is above the upper-bound value at 0.01 level, suggesting that variables are cointegrated.

ERROR-CORRECTION MODELS SUMMARY

Summary statistics (model A):

Adjusted R-squared 0.51; F-statistic 3.91; Prob(F-statistic) 0.00;

Akaike info criterion -9.74; Schwarz criterion -9.05; Hannan-Quinn criterion -9.48.

Diagnostics: The Jarque-Bera test suggests that the residuals are normally distributed, with Jarque-Bera stat of 2.95 and p-value for the null hypothesis of 0.23. The Breusch-Godfrey Serial Correlation LM Test suggests the absence of serial correlation with p-value of 0.30 for not rejecting the null hypothesis of the absence of serial correlation. The Breusch-Pagan-Godfrey test is indicating that errors are homoscedastic with p-value of 0.91 for not rejecting the null hypothesis of the absence of heteroscedasticity. The null hypothesis of the Ramsey RESET Test that the functional form of the model is correctly specified is not rejected with p-value of 0.42 for the F-test value.

Summary statistics (model B):

Adjusted R-squared 0.64; F-statistic 5.22; Prob(F-statistic) 0.00;

Akaike info criterion -10.03; Schwarz criterion -9.28; Hannan-Quinn criterion -9.76.

Diagnostics: The Jarque-Bera test suggests that the residuals are normally distributed, with Jarque-Bera stat of 1.88 and p-value for the null hypothesis of 0.39. The Breusch-Godfrey Serial Correlation LM Test suggests the absence of serial correlation with p-value of 0.82 for not rejecting the null hypothesis of the absence of serial correlation. The Harvey test is indicating that errors are homoscedastic with p-value of 0.28 for not rejecting the null hypothesis of the absence of heteroscedasticity. The null hypothesis of the Ramsey RESET Test that the functional form of the model is correctly specified is not rejected with p-value of 0.81 for the F-test value.

Summary statistics (model C):

Adjusted R-squared 0.50; F-statistic 3.22; Prob(F-statistic) 0.004;

Akaike info criterion --9.70; Schwarz criterion -8.89; Hannan-Quinn criterion -9.40.

Diagnostics: The Jarque-Bera test suggests that the residuals are normally distributed, with Jarque-Bera stat of 0.25 and p-value for the null hypothesis of 0.88. The Breusch-Godfrey Serial Correlation LM Test suggests the absence of serial correlation with p-value of 0.85 for not rejecting the null hypothesis of the absence of serial correlation. The Breusch-Pagan-Godfrey test is indicating that errors are homoscedastic with p-value of 0.68 for not rejecting the null hypothesis of the absence of heteroscedasticity. The null hypothesis of the Ramsey RESET Test that the functional form of the model is correctly specified is not rejected with p-value of 0.61 for the F-test value.

Summary statistics (model D):

Adjusted R-squared 0.48; Akaike info criterion --7.79; Schwarz criterion -7.31;
Hannan-Quinn criterion -7.62.

Diagnostics: The Jarque-Bera test suggests that the residuals are normally distributed, with Jarque-Bera stat of 0.15 and p-value for the null hypothesis of 0.93. The Breusch-Godfrey Serial Correlation LM Test accepts the null hypothesis of absence of serial correlation with a p-value of just 0.17, however the Correlogram of squared residuals and the Correlogram of residuals reveal an absence of serial correlation. The Breusch-Pagan-Godfrey test is indicating that errors are homoscedastic with p-value of 0.70 for not rejecting the null hypothesis of the absence of heteroscedasticity. The null hypothesis of the Ramsey RESET Test that the functional form of the model is correctly specified is not rejected with p-value of 0.44 for the F-test value.

Summary statistics (model E):

Adjusted R-squared 0.29; F-statistic 1.86; Prob(F-statistic) 0.001;

Akaike info criterion --8.34; Schwarz criterion -7.48; Hannan-Quinn criterion -8.02.

Diagnostics: The Jarque-Bera test suggests that the residuals are normally distributed, with Jarque-Bera stat of 1.74 and p-value for the null hypothesis of 0.42. The Breusch-Godfrey Serial Correlation LM Test accepts the null hypothesis of the absence of serial correlation with a p-value of 0.29. The Breusch-Pagan-Godfrey test is indicating that errors are homoscedastic with p-value of 0.52 for not rejecting the null hypothesis of the absence of heteroscedasticity. The null hypothesis of the Ramsey RESET Test that the functional form of the model is correctly specified is not rejected with p-value of 0.75 for the F-test value.

DATASET

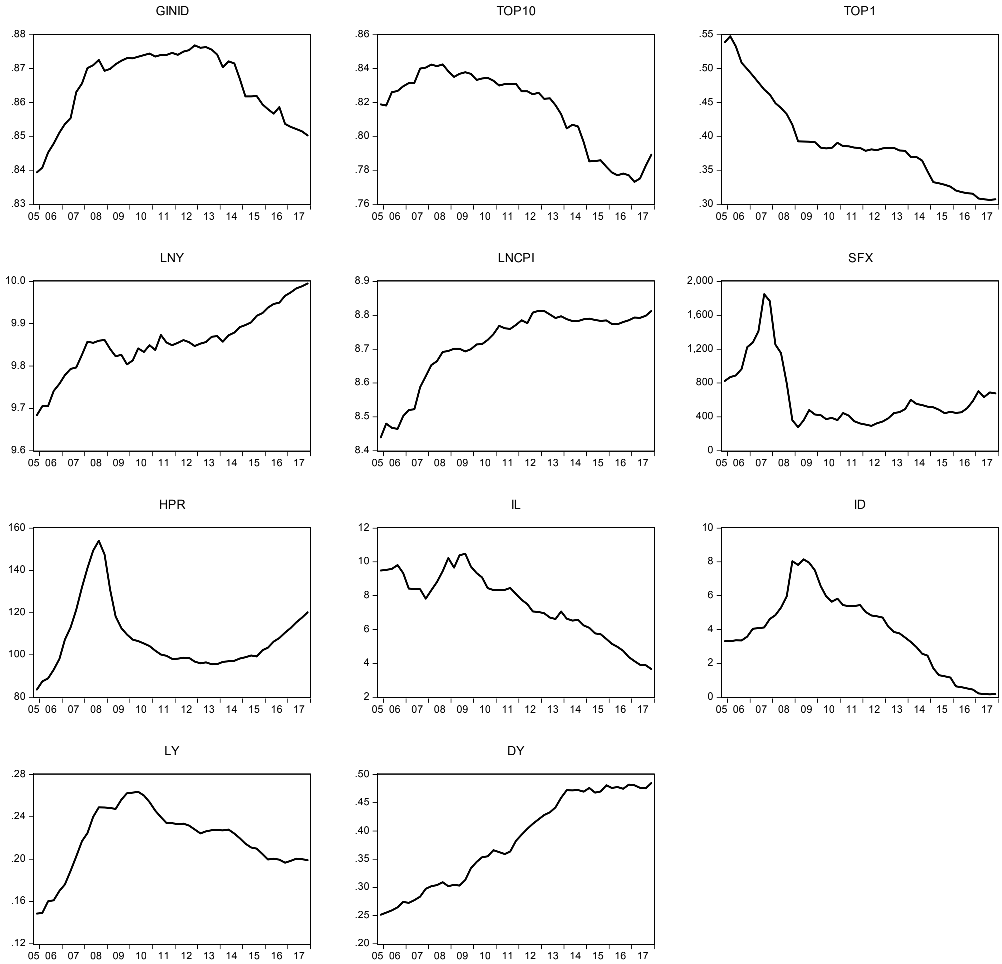
Table. 1

Variables

	GINID	TOP10	TOP1	DY	LY	ID	IL	SFXR	HPR	LOG(CPI)	DY	LNY	D1	D2	D3
2005Q4	0.84	0.82	0.54	0.25	0.15	3.31	9.49	0.18	83.52	8.44	0.07	9.68	0	0	0
2006Q1	0.84	0.82	0.55	0.26	0.15	3.31	9.52	0.18	87.47	8.48	0.06	9.70	0	0	0
2006Q2	0.85	0.83	0.53	0.26	0.16	3.37	9.58	0.19	88.91	8.47	0.06	9.71	0	0	0
2006Q3	0.85	0.83	0.51	0.26	0.16	3.36	9.81	0.20	92.96	8.46	0.07	9.74	0	0	0
2006Q4	0.85	0.83	0.50	0.27	0.17	3.58	9.33	0.25	98.09	8.50	0.08	9.76	0	0	0
2007Q1	0.85	0.83	0.49	0.27	0.18	4.04	8.42	0.25	107.23	8.52	0.08	9.78	0	0	0
2007Q2	0.86	0.83	0.48	0.28	0.19	4.08	8.40	0.28	112.97	8.52	0.08	9.79	0	0	0
2007Q3	0.86	0.84	0.47	0.28	0.20	4.12	8.38	0.34	121.42	8.59	0.07	9.80	0	0	0
2007Q4	0.87	0.84	0.46	0.30	0.22	4.63	7.83	0.32	132.06	8.62	0.07	9.83	0	0	0
2008Q1	0.87	0.84	0.45	0.30	0.22	4.85	8.32	0.22	141.08	8.65	0.07	9.86	0	1	0
2008Q2	0.87	0.84	0.44	0.30	0.24	5.29	8.81	0.20	149.36	8.66	0.06	9.86	0	1	0
2008Q3	0.87	0.84	0.43	0.31	0.25	5.97	9.45	0.13	153.92	8.69	0.06	9.86	0	1	0
2008Q4	0.87	0.84	0.42	0.30	0.25	8.03	10.23	0.06	147.53	8.69	0.04	9.86	0	1	0
2009Q1	0.87	0.84	0.39	0.30	0.25	7.82	9.65	0.05	130.77	8.70	-0.02	9.84	1	1	0
2009Q2	0.87	0.84	0.39	0.30	0.25	8.15	10.39	0.06	118.17	8.70	-0.03	9.82	1	1	0
2009Q3	0.87	0.84	0.39	0.31	0.26	7.95	10.48	0.08	112.62	8.69	-0.03	9.83	1	1	0
2009Q4	0.87	0.84	0.39	0.33	0.26	7.50	9.72	0.07	109.58	8.70	-0.06	9.80	1	1	0
2010Q1	0.87	0.83	0.38	0.35	0.26	6.57	9.33	0.07	107.18	8.71	-0.01	9.81	1	1	0
2010Q2	0.87	0.83	0.38	0.35	0.26	5.97	9.08	0.06	106.52	8.71	0.01	9.84	1	1	0
2010Q3	0.87	0.83	0.38	0.36	0.26	5.65	8.44	0.06	105.38	8.73	0.01	9.83	1	1	0
2010Q4	0.87	0.83	0.39	0.37	0.25	5.83	8.34	0.06	104.15	8.74	0.04	9.85	1	1	0
2011Q1	0.87	0.83	0.39	0.36	0.25	5.44	8.33	0.07	102.03	8.77	0.03	9.84	1	1	0
2011Q2	0.87	0.83	0.39	0.36	0.24	5.38	8.35	0.06	100.23	8.76	0.03	9.87	1	1	0
2011Q3	0.87	0.83	0.38	0.36	0.23	5.39	8.45	0.05	99.54	8.76	0.02	9.86	1	1	0
2011Q4	0.87	0.83	0.38	0.38	0.23	5.44	8.10	0.05	98.10	8.77	0.01	9.85	1	1	0
2012Q1	0.87	0.83	0.38	0.39	0.23	5.04	7.75	0.05	98.23	8.79	0.01	9.85	1	1	0
2012Q2	0.88	0.83	0.38	0.40	0.23	4.83	7.51	0.05	98.67	8.78	0.00	9.86	1	1	0
2012Q3	0.88	0.82	0.38	0.41	0.23	4.78	7.07	0.05	98.57	8.81	0.00	9.86	1	1	0
2012Q4	0.88	0.83	0.38	0.42	0.23	4.71	7.04	0.05	96.82	8.81	0.00	9.85	1	1	0
2013Q1	0.88	0.82	0.38	0.43	0.22	4.18	6.96	0.06	96.00	8.81	0.00	9.85	1	1	0
2013Q2	0.88	0.82	0.38	0.43	0.23	3.85	6.71	0.07	96.48	8.80	0.00	9.86	1	1	0
2013Q3	0.88	0.82	0.38	0.44	0.23	3.77	6.63	0.07	95.52	8.79	0.01	9.87	1	1	0
2013Q4	0.87	0.81	0.38	0.46	0.23	3.52	7.06	0.07	95.66	8.80	0.01	9.87	1	1	0
2014Q1	0.87	0.80	0.37	0.47	0.23	3.27	6.64	0.09	96.66	8.79	0.01	9.86	1	1	0
2014Q2	0.87	0.81	0.37	0.47	0.23	2.95	6.53	0.08	96.97	8.78	0.02	9.87	1	1	0
2014Q3	0.87	0.81	0.36	0.47	0.22	2.57	6.58	0.08	97.21	8.78	0.01	9.88	1	1	1
2014Q4	0.87	0.80	0.35	0.47	0.22	2.45	6.24	0.08	98.32	8.79	0.02	9.89	1	1	1
2015Q1	0.86	0.79	0.33	0.48	0.21	1.70	6.10	0.08	98.85	8.79	0.03	9.90	1	1	1
2015Q2	0.86	0.79	0.33	0.47	0.21	1.30	5.77	0.07	99.71	8.79	0.03	9.90	1	1	1
2015Q3	0.86	0.79	0.33	0.47	0.21	1.23	5.72	0.07	99.21	8.78	0.04	9.92	1	1	1
2015Q4	0.86	0.78	0.33	0.48	0.20	1.16	5.44	0.07	102.23	8.78	0.04	9.93	1	1	1
2016Q1	0.86	0.78	0.32	0.48	0.20	0.64	5.15	0.07	103.38	8.77	0.04	9.94	1	1	1
2016Q2	0.86	0.78	0.32	0.48	0.20	0.59	4.97	0.07	106.24	8.77	0.04	9.95	1	1	1
2016Q3	0.86	0.78	0.32	0.47	0.20	0.52	4.74	0.08	107.94	8.78	0.04	9.95	1	1	1
2016Q4	0.85	0.78	0.32	0.48	0.20	0.44	4.37	0.09	110.52	8.79	0.04	9.97	1	1	1
2017Q1	0.85	0.77	0.31	0.48	0.20	0.22	4.13	0.11	112.66	8.79	0.04	9.97	1	1	1
2017Q2	0.85	0.78	0.31	0.48	0.20	0.19	3.92	0.10	115.37	8.79	0.04	9.98	1	1	1
2017Q3	0.85	0.78	0.31	0.48	0.20	0.16	3.88	0.10	117.62	8.80	0.04	9.99	1	1	1
2017Q4	0.85	0.79	0.31	0.48	0.20	0.18	3.66	0.10	120.17	8.81	0.04	10.00	1	1	1

Figure 1

Dependent and explanatory variables graph set



Source: NSI, Own calculations.