ECONOMICS
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EMPIRICAL COMPARATIVE ANALYSIS OF HOUSEHOLD SECTOR LIABILITIES AND ASSETS IN THE CONTEXT OF FINANCIAL CRISIS

ABSTRACT. This paper presents the characteristics and trends in household debt and assets in Poland and selected European countries (Germany, Ireland, Spain, Greece, Lithuania) over the period of 2005-2012. The empirical analysis presented in this paper aims to support the thesis that although the changes in the level and structure of household debt in those countries were not the primary source of the crisis, they had some impact on its course, and the financial crisis influenced the direction of these changes. Data are taken from the ESA, mainly the Eurostat Database. The analysis is carried out on the basis of a simple measure which is the relation of liabilities (by types of household debt) to assets compared with the relation of savings to the household assets.

Introduction

In the literature concerning the financial crisis that began in 2007 on the U.S. market of riskier loans granted to persons (households) with a low credit rating, much attention is paid to the analysis of changes in financial market, as well as in the whole economy, both those which were the cause of the crisis and those which were its consequence. In most analyses, issues relating to institutional sectors are not considered, particularly for the household sector, whose specific debt in the United States was the direct impulse for the crisis. Lending / borrowing of the sector in European countries with respect to individual segments of financial markets underwent significant changes during their collapse and recovery. This paper presents the characteristics and trends in household debt and assets for the years 2005-2012 in Poland and selected European countries. The analysis was carried out mainly on the basis of the ESA data (European System of Accounts…, 1996). The empirical analysis presented in this paper aims to support the thesis that in Poland, like in other European countries, changes in the level and structure of household debt had influence on the course of the crisis, although they were not its primary source, and that the financial crisis undoubtedly influenced the direction of these changes.

The structure of the paper is the following. The first section is a brief description of the financial crisis in Poland, Spain, Greece, Ireland, Germany and Lithuania – its origins,

phases and effects on the financial markets. It also includes remarks on the whole economy. The second section presents the characteristics of the ESA, especially the financial account as a source of data (mainly Eurostat Database) used for comparative empirical analysis of changes of financial instruments for the selected countries presented in the third section. The assets and liabilities of households divided into the basic instruments of the financial market in the selected countries are analysed. The choice of the countries listed above was dictated by the specific course of the crisis, its determinants and effects in these countries. In section four, the financing of households' wealth with saving and acquisition of liabilities in specified instruments of financial market is widely analysed. Some comments concern the USA as well. This analysis is carried out on the basis of a simple measure, which is the relation of liabilities (by types of household debt, mainly long-term loans) to assets compared with the relation of savings to the wealth of households. A brief summary contains conclusions with reference to the assumed thesis.

1. Financial crisis – main data characteristics

The globalization of the world economy substantially strengthened the linkages among countries. There is not only the increase in the role of trade links, direct investment and the flow of human capital, but the most important was the increase in capital flows and financial markets relations between countries. All this often causes the fluctuations and decline in one economic area to bring significant and immediate effects in other areas. Their sectoral coverage, depth and the velocity of formation depends on the specific linkages between economies. Financial markets and their instruments play an increasingly important role in the financing of non-financial (tangible) and financial assets, and are also used for speculative purposes. The primary source of the global crisis was situated on the U.S. market, where subprime loans created a kind of financial pyramid scheme (see e.g. Tsujimura and Tsujimura, 2011). The sources of the crisis are the subject of many theoretical and empirical studies (in Polish literature see inter alia: Wojtyna, 2010; Rosati, 2009; Sławiński, 2010; Konopczak, *et al.*, 2010; elaborations by the Polish National Bank (NBP, 2009a, 2009b) and other authors cited further). In the discussion on the causes of the crisis, particular attention is paid to the strong interactions between the financial and the real sphere, which is clearly visible in the model approach to the financial crisis presented by Minsky (1986) (see e.g. Adamczyk, 2012).

From the point of view of the changes in liabilities and financial assets of households, the following events were particularly important in the course of the crisis.

The fall in share prices on the stock markets, which started in the second half of 2007 and continued into 2008, practically in all counties, particularly dramatic in Poland and the countries of Central and Eastern Europe (in Poland WIG20 index declined by 48% in 2008, the second drop of 22% occurred in 2011, http://www.gpw.pl/analizy_i_statystyki_pelna_wersja (referred on 30/03/2014) caused a significant decrease in the financial assets of individual investors and the withdrawal of resources from mutual funds, which in turn forced these funds to sell shares. The situation was worsened by the collapse of Lehman Brothers Bank, causing a decrease in liquidity of interbank deposits, which seriously disrupted bond market, foreign exchange market and the money market. Disturbances on financial markets had a negative impact on the real economy. European countries recorded negative GDP growth. In the majority of countries that decrease became particularly evident in the second quarter of 2009 (Eurostat Database) – Germany – 6.2%, France – 3.7%, Great Britain – 6.3% Italy – 6.7%, Czech Republic – 5.5% Hungary – 7.6%, Ireland – 7.3% (third quarter); Greece – 7.4% (in 2010) and the Baltic countries with particularly dramatic declines in Lithuania – 15.6% and Latvia – 18.8% (third quarter).

Generally, a fall in GDP means a decrease in disposable income of the household sector. On the one hand, it is usually associated with a decrease in saving, on the other hand with a decrease in the ability to incur liabilities, because of increased restrictions of banks with respect to the creditworthiness of borrowers. It seems that the psychological effects of the crisis, as well as the formal requirements of banks will make the return to the situation from before the crisis a long process. The macroeconomic conditions and, above all, the state of public finances have an impact on the course of the crisis and its consequences in different countries. The crisis especially affected so-called PIIGS countries (Portugal, Italy, Ireland, Greece, Spain). These are the countries that were found by the crisis with excessive public finance deficit.

According to Eurostat Database, in 2009 in Ireland, the deficit was 13.7% of GDP (public debt 64.4% of GDP), Greece 15.7% (public debt 129.7%), Spain 11.1% (public debt 54.0%), Lithuania 9.4% (public debt 29.3% of GDP). For example, the public finance deficit for that year in Germany was 3.1% and in Poland – 7.5%.

The financial crisis in Ireland had its main roots, as in the U.S., in the bursting of the speculative bubble in the housing market (Walkowski, 2012). In the first wave of the crisis, the earlier fast-rising real estate prices fell by 50-60%, which caused a significant decrease in the growth of household assets. In 2009-2010, wages decreased by over 20%. The crisis in Ireland was particularly influenced by the fact that the capital of the Irish banks amounted to over 37% of deposits and securities of international capital conglomerates. Government aid granted to banks increased in 2010, the public finance deficit to 30% of GDP. At the same time, at the end of 2010, Ireland received support in the form of 85 million euros from the European Financial Stabilisation Mechanism.

Budget cuts in Greece resulted in a reduction of public finance deficit in 2010 to 10.7% of GDP, but still budget revenues were lower than expected (the estimated grey area is 25% GDP, see Walkowski, 2012). The disposable income of households and their saving significantly decreased after 2009 as a result of budget cuts. Greece is the only one of the analysed countries whose economy recorded negative saving growth rate in 2010-2012, which meant the necessity to cover its liabilities and current expenses from the sale of assets. In 2010, Greece received support amounting to 110 billion euros (Greek Loan Facility), including 80 billion from bilateral loans from Eurozone countries coordinated by the European Commission, and 30 billion from the IMF.

In Spain, like in Ireland, there was a burst of the speculative bubble in the housing market (prices decreased by more than 130%, see Walkowski, 2012), and the decline in employment in the construction industry worsened the overall high unemployment rate in 2010, reaching 20% which even came to 25% in 2012 (Eurostat database; employment and social policy indicators). High unemployment reduced the disposable income of the household sector, which was characterized by high rates of wage growth – 3.3% on average in 1996-2007, with practically no change in labour productivity in those years (Mucha-Leszko, 2013). In addition, the liquidity problems of banks tightened credit conditions for households.

GDP declines in Germany barely influenced disposable income or saving of the household sector. It is the only economy among the analysed countries where disposable income of households in general, in the whole analysed period, actually grew (minimum decrease of 0.3% was observed in 2009). The same concerned saving.

In the analysis of the course of the crisis in Poland (see e.g. Konopczak et al., 2010), it is emphasized that positive GDP growth throughout the analysed period (in the second quarter of 2009, 1.2%) was the result of a large domestic demand and fairly diversified export structure, compared to other countries. Another very significant factor was that the assets were slightly financed from external sources. Household debt was growing worryingly, especially in 2007-2008. After 2008, the rate of increase in liabilities was reduced, but it was

still positive (0.5% in 2012). In contrast, in 2009-2010 saving grew. Large declines observed in 2008 and 2011 resulted from the revaluation of assets in pension funds (see below). The microeconomic studies of households' propensity to save show however that it was growing until 2011 (the explanation of such a situation – see e.g. Liberda, 2013 and also Fatuła, 2010).

The Lithuanian economy is a small, open economy (about 3 million people), highly reactive to changes in the global economic situation, especially in the countries with which it has the largest volume of trade. More than 60% of imports and exports of Lithuania is the turnover with the EU and approximately 30% and 40%, respectively, with the economies of the CIS. Among the latter, the biggest partner is Russia (16% of exports and 33.4% of imports). The next partners are Germany and Poland (Economic situation … (Sytuacja gospodarcza…), 2010). The reaction of very open economies to a downturn is usually stronger, but also recovering from the crisis can be quicker. This kind of scenario was observed in Lithuania. The sharp decline in GDP in the fourth quarter of 2008, after a period of intensive growth in the years 2000-2007 at the level of 7-10%, triggered further declines, which lasted until the first quarter of 2010; in 2013 the growth rate was already 3%. Lithuanian disposable income of households decreased in 2009 by 5%. The macroeconomic situation in Lithuania before the crisis was characterized by a large increase in inflation and wages (24%) in 2006-2008 and already gave signals to inhibit the growth of GDP. However, foreign trade turnover significantly increased in 2008 – exports by over 28%, imports by more than 18%. A very deep decline occurred in 2009 – exports fell by 27% and imports by 40%, but in the following year, the turnover increased by over 30% again in both exports and imports (Economic situation … (Sytuacja gospodarcza…), 2010). A significant increase in foreign trade, especially export growth in 2008, was one of the reasons of the above mentioned annual shift of the negative effects of the crisis observed in Lithuania in 2009, in contrast to other countries, in which the effects were observed mostly in 2008.

2. Financial accounts in the system of national accounts

The system of national accounts is the international standard for reporting the national economy data that enables its international comparison (ESA'1995 currently in force). It is an internally consistent set of macroeconomic accounts for subjects and accounts by kinds, balance sheets and tables, based on agreed conceptual standards, definitions, classifications and accounting rules. The basic principle is the rule of double-entry of each transaction – on the side of resources on one account and on the side of uses on another account. The side of uses for each account includes a balancing item, which opens the side of resources in the next account of the sequence. This creates a system of interlinked accounts.

At the same time, SNA creates conceptual and analytical framework for the study of the economy through the process of income circulation. Statistical information about the economy includes a description of the creation, distribution, redistribution of income and its use for consumption and accumulation in institutional sectors. These sectors (subjects) are households, general government, financial and non-financial corporations, non-profit institutions and the rest of the world sector, the accounts of which record transactions by kinds that take place in the real economy (in terms of products, wages, taxes, etc.) and in the field of the financial market instruments.

The first stage of the income circulation is the process of producing goods and services, which results in gross output. This category, as well as the production costs, is recorded in the production account. Primary income generated in particular economic activities is the newly generated output, which is the value added recorded on the income generation account and also the cost of production written down on the previous account. At this stage, an important category of SNA is gross domestic product, the definition of which

(from the point of view of the primary income generation) includes the total value added in particular economic activities, as well as taxes on products.

In the process of the primary income allocation described on the primary distribution account, it can be observed that different sectors of the economy, such as households or corporations, receive their incomes from the involvement of primary production factors (labour and capital) in the activities. This is the income in the form of wages for households and profits for the other institutional sectors, including mixed income and profits of micro-enterprises belonging to the household sector. Profits in the SNA are defined as operating surplus. At this stage, the definition of gross domestic product (in terms of the production factors involved) comprises the sum of wages and profits in sectors plus taxes on production (on products and manufacturers).

On the secondary distribution of income accounts, the result of a redistribution of income (which is disposable income) is shown. Redistribution occurs primarily between general government and other sectors. Spending disposable income creates a demand for consumer goods (consumption). The balancing item of the use of (adjusted) disposable income account is saving. The sequence of non-financial accounts is closed by capital account, on which the non-financial accumulation (fixed capital formation, changes in inventories and changes in valuables) plus capital transfers are shown on the uses side, whereas saving and capital transfers are on the resources side. The balancing item is net lending / net borrowing. In general, accumulation accounts in SNA include: capital account (non-financial accumulation), financial account (financial accumulation), other changes in volumes of assets account, revaluation account (Manual on Sources…, 2002).

The financial account includes information concerning transactions on assets (recorded on the debit side) and liabilities (recorded on the resources side), made among national institutional units and among these units and abroad. This account records changes in assets and liabilities, which took place in a given year as a result of these transactions (thus, these are streams). Eurostat database includes the following instruments of financial market in which transactions are made on the market (in brackets are the symbols used in the paper): currency and deposits (F2), securities other than shares (F3), loans (F4, in which: short-term loans F41, long-term loans F42), shares and other equity (F5), insurance technical reserves (F6), other accounts receivable/payable, including trade credits and advances (F7) and the net acquisition of financial assets (FA), the net incurrence of liabilities (FL).

The account of other changes in the volume of assets records changes in national wealth associated with discoveries of natural resources or production and purchase of certain assets (e.g. trademarks) or financial assets that are not accompanied by formation of any obligations.

The revaluation account records gains or losses on assets (non-financial assets, financial assets and liabilities) acquired by the owners, which arise as a result of changes in the price of asset. Profit from the possession of certain liabilities is equal to the change in price of that commitment, but with the opposite sign.

Generally, the financial account indicates changes in liabilities and financial assets by instruments of financial market, as a result of executed transactions in a given year in a given institutional sector, which results in the change of net lending / net borrowing. These changes should be the same as the balancing item of the capital account. Usually, it is not (see further section 4) due to difficulties in estimating certain transactions involving the acquisition of assets and incurring liabilities of institutional sectors.

The system of national accounts also presents the balance sheet type of accounts (ESA'1995), which is the statement of the stock of financial assets and liabilities on a given day. Thus, for each institutional sector, the balance sheet is a source of information on its financial and non-financial wealth. The closing item of the balance sheet is the net value of

the institutional sector, which is the value of non-financial assets plus net financial assets and liabilities. It is possible to write the following sequence of operations linking the opening balance and the closing balance (in parentheses, along with the signs introduced earlier are symbols used further in Section 3 and Section 4).

The financial balance sheet for assets and liabilities includes the following items (see Manual on Sources…, 2009):

stock of financial assets FAS(0) or liabilities FLS(0) at the beginning of the accounting period (opening balance sheet)

+ transactions during the accounting period: FA or FL

+ other changes in the volume of assets (and liabilities)

+ holding gains less holding losses accruing during the accounting period

= stock at the end of the accounting period (closing balance sheet): FAS(1) for financial assets and FLS(1) for liabilities.

3. Empirical analysis – the structure of lending and borrowing of household sector

The structure of financial assets and liabilities of the household sector in 2005-2012 in the countries selected for the analysis is presented below. The analysis is carried out on the basis of data for the period 2005-2012 (Eurostat database – annual sector accounts; financial balance sheets), taking into account the provisional (mainly in relation to the year of the crisis) split of this period into three sub-periods: before the crisis (to 2007), the years of crisis (2008-2009) and after 2009 – recovery.

Liabilities of households are the following: loans (F4) and other accounts receivable/payable (F7), including trade credits and advances. The financial assets of households include a broader set of instruments: currency and deposits (F2), securities other than shares, loans (F3), shares and other equity (F5), insurance technical reserves (F6), other accounts receivable/payable (F7).

The analysis of data from the balance sheets shows that the structure of assets in all the analysed countries was generally similar (see *Figure 2*). Currency and deposits (F2) and shares and other equity (F5) constitute the largest share of the assets, which stands at about 70% to over 80%. The exception is Ireland, where the proportion of these assets is much lower (50-60%), while the share of assets in the form of insurance technical reserves (F6) is much higher than the proportion in other countries. While the share of aggregate F2+F5 is relatively stable in the analysed period, the proportions within F2+F5 are changing. In the period 2005-2007, the share of F2 stood at 30-40% of the stock of assets (FAS) in all countries except for Greece, where F2 prevailed in the entire analysed period. The initial increase in the share of F5 in 2005-2007 was sharply halted in 2008 due to the crisis on the stock market; shares of this instrument in FAS decreased by 10-15 percentage points in Poland, Spain, Germany and by more than half in Greece, as illustrated by the negative growth rate of these assets (see *Table 1*), particularly evident in 2008 in all analysed countries, except Lithuania. The assets of this type have decreased not only due to share sale transactions, and above all the negative valuation of these instruments, registered in the accounts of other changes in the volume of assets. There was also an escape of households from instruments of higher realizable rate of return, but also a higher risk of investment to instruments with a much lower risk – F2. In most countries, the ratio between F2 and F5 has not reached the level from the beginning of the period. Generally, in all countries, a significant decrease in financial wealth of households was recorded in 2008 – from a negative growth rate in Greece at the level of -17.4% to -3.9% in Germany, and -9.4% in Poland. The exception is Lithuania, with a certain "shift" drop in financial assets for the year 2009, of – 14.4% (see further Section 4).

Table 1. Assets – percentage change on previous period

	Assets[s]	2005	2006	2007	2008	2009	2010	2011	2012
Poland	F2	6,3	11,2	10,4	24,1	11,2	8,2	12,5	6,8
	F5	21,6	15,4	20,6	-44,7	21,3	15,8	-7,4	6,9
	FAS	15,3	15,5	16,4	-9,4	15,0	12,7	3,5	9,4
Germany	F2	3	2,8	5,6	7,2	2,9	4,1	3,6	4,5
	F5	13,7	-3,3	6,5	-27,1	5,4	4,8	-6,6	8,9
	FAS	5,8	0,7	5,8	-3,9	3,9	4,1	1,2	4,9
Ireland	F2	12,7	11,8	6	3,2	4,4	0,4	-1,4	3,1
	F5	9,7	-0,5	-6,5	-18,5	9,7	-3	-2,7	-2
	FAS	14,6	11,7	-0,9	-7,3	8,4	2,8	-0,4	4,3
Greece	F2	14,1	7,0	10,1	14,5	6,2	-0,8	-3,2	-5,2
	F5	26,8	8,2	6,2	-76,8	52,2	-38,9	-28,8	36,9
	FAS	16,4	9,4	6,4	-17,4	6,7	-6,3	-5,6	-1,0
Spain	F2	9,2	13,4	8,8	10,3	3,5	3,1	-0,2	0,4
	F5	18,8	19,6	-0,1	-32,4	5,7	-10,9	-1,5	6,6
	FAS	13,4	16,3	3,8	-11,3	4,3	-1,0	0,3	1,7
Lithuania	F2	31,2	34,9	20	0,8	1,9	8	3,3	12,9
	F5	17,2	14,9	7,5	90,2	-38,1	10,8	12,4	-8,6
	FAS	21,5	24,6	16,8	33,5	-14,4	6,6	9,7	2,3

[s] – stocks of assets.
Source: Eurostat Database; annual sector accounts; financial balance sheets.
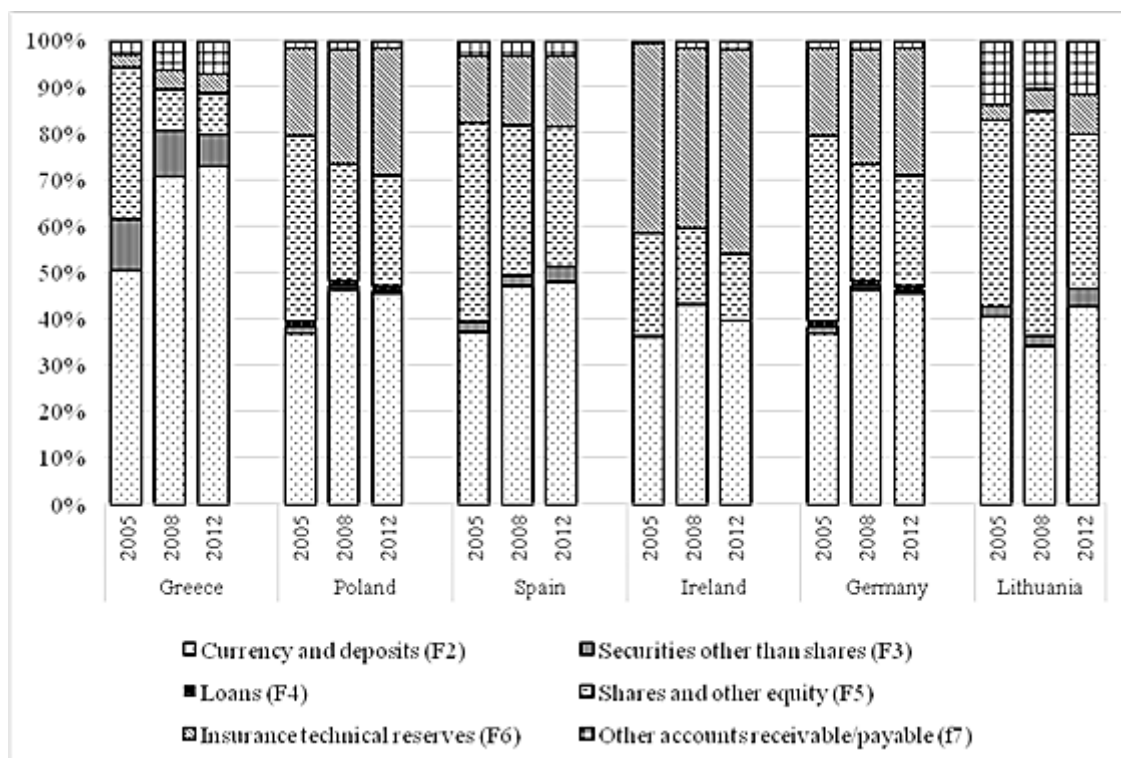

Figure 1. Structure of financial assets
Source: Eurostat Database; annual sector accounts; financial balance sheets.

The structure of households' liabilities (FLS) shown in *Figure 2*, indicates that long-term loans (F42, granted for a period exceeding one year) dominate. This is particularly

evident in the case of countries with a sufficiently high level of disposable income to incur long-term loans which takes place in developed countries. As shown by the example of Germany, current needs are satisfied to a small extent by short-term loans.

In the case of Poland, a significant increase in the share of housing loans was observed, by 35% in 2005 and 50% in 2008, it reached 50% of total borrowing to households in 2012 (http://www.nbp.pl/home.aspx?f=/statystyka/pieniezna_i_bankowa/nal_zobow.html (referred on 30/03/2014). The analysis of the Polish households' loans and deposits especially with the attention paid to the boom on the housing market can be found in Świetlik (2010).

With the declining share of short-term loans in the range of 2-10 percentage points and a negative growth rate of long-term debt since 2008, most countries have proved negative growth rate of total liabilities (Lithuania, Greece, Ireland, Spain), with a virtually unchanging share of long-term liabilities. A completely different situation took place in Poland, where the decline in the growth rate of short-term liabilities was not accompanied by a negative growth rate of long-term liabilities (with a clear increase of over 48% in 2008), which did not entail negative rate of total liabilities after 2008. In general, the decreasing rate of liabilities' growth after 2008 reached a negative value in the year 2012 in all the analysed countries except Poland and Germany.

Table 2. Liabilities – percentage change on previous period

	Liabilities[S]	2005	2006	2007	2008	2009	2010	2011	2012
Poland	F41	-2,0	8,8	19,9	14,8	9,7	6,3	-2,4	-6,7
	F42	27,5	38,5	40,9	48,8	12,6	14,9	13,6	1,3
	F7	12,8	37,4	0,3	6,4	-7,8	5,9	10,4	0,2
	FLS	19,4	32,3	35,4	42,2	11,7	13,7	11,8	0,5
Germany	F41	-5,2	-6,3	-1,7	1,5	-5,4	-0,2	-2,3	-1,7
	F42	0,1	0,5	-1,3	-1,1	0,1	0,4	1,1	1
	F7	-17,6	-23,5	-2,2	5,2	7,8	0,1	15,4	6,8
	FLS	-0,4	-0,1	-1,3	-0,9	-0,2	0,3	1,1	1
Ireland	F41	33,4	36,6	4,2	-9,5	-0,9	-31,5	-17,4	-20,8
	F42	28,1	19,2	15,7	5,4	-2,6	-4,9	-2,7	-2,9
	F7	48,4	-2,3	5,9	71,8	-5,3	-2	21,1	7
	FLS	29,1	19,5	14,5	6,3	-2,6	-6,3	-2,2	-2,9
Greece	F41	22,7	11,6	16,7	12	-5,3	23,7	-11,2	-10,1
	F42	30,1	27,8	22,1	12,7	3,7	9,9	-3,1	-5,6
	F7	9,5	-1,0	3,7	-2,6	7,5	0,2	37,9	-29,0
	FLS	25,3	20,8	19,0	10,9	2,7	10,9	-0,7	-9,2
Spain	F41	17,6	15,6	6,3	3,7	-8,5	-11,5	-6,6	-0,5
	F42	20,8	19,7	12,6	4,2	-0,4	0,0	-2,9	-4,4
	F7	6,3	8,9	-6,2	-12,7	-8,5	25,5	5,5	3,4
	FLS	19,3	18,6	10,9	3,1	-1,2	0,8	-2,5	-3,8
Lithuania	F3			1264,7	92,1	-70,1	239	-73,3	-49,3
	F41	18,4	36,8	54,1	1,9	29,6	12,9	14,9	24
	F42	78,4	72	56	21,1	-6,2	-5,9	-3,3	-3,7
	F7	1,3	125,8	21,2	25,5	-32,7	-34,5	72,2	-6,3
	FLS	54,3	81,1	47,9	21,6	-10,9	-9,6	5,3	-3,2

[S] – stocks of liabilities.

Source: Eurostat Database; annual sector accounts; financial balance sheets.
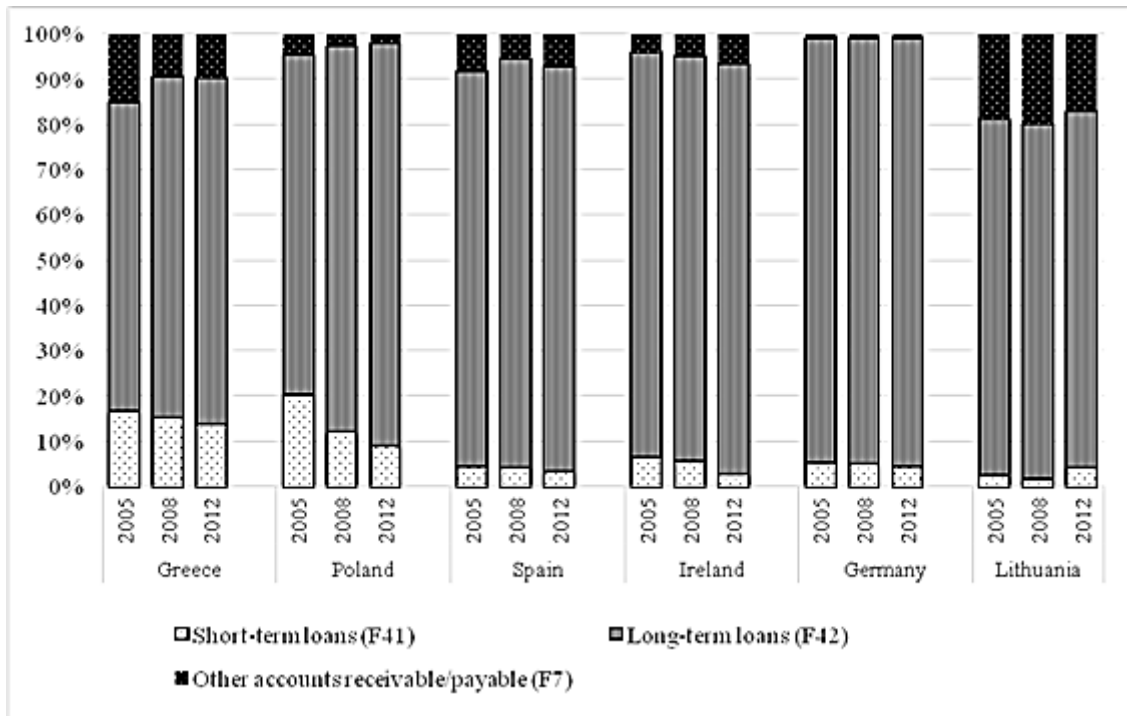
Figure 2. Structure of liabilities
Source: Eurostat Database; annual sector accounts; financial balance sheets.

4. Households' assets financing

The following balance equation for accumulation account (non-financial and financial), with changes in uses on the left side of the equation and changes in resources on the right side, can be written down as follows:

$$TA + RA + F = S + TL \quad \text{or} \qquad (1a)$$

$$TA + RA + (FA - FL) = S + TL \qquad (1b)$$

where: S – gross saving (as an annual change),
RA – gross fixed capital formation and changes in inventories,
TA – capital transfers that are expenditures of the sector,
TL – capital transfers that are received by the sector,
F – net lending(+) / net borrowing(-),
FA – net acquisition of financial assets,
FL – net incurrence of liabilities,

$$F = FA - FL. \qquad (2)$$

In the practice of statistical reporting, the right and the left side of equation (1b) are not equal, the equation (2) is not fulfilled due to the lack of integration of non-financial and financial accounts in the SNA. This means that net lending (+) / net borrowing (-) as the balancing item of the entire sequence of non-financial accounts is not equal to the difference between the net acquisition of financial assets and net incurrence of liabilities. Therefore, it is necessary to insert a corrective item Z to the equation (1b):

$$Z = F - (FA - FL) \quad \text{thus,} \quad F = (FA - FL) + Z. \qquad (3)$$

The lack of consistency between financial and non-financial accounts is observed for every country and is marked in the Eurostat database as a category by symbol DB9, though not every of them publish its value.

The discrepancy between the non-financial and financial accounts of the household sector (Abad, 2005; Cagetti *et al.*, 2012; Groon, 2005) is caused by various independent, heterogeneous data sources used for the compilation of non-financial and financial accounts, various dates of compilation and unlimited number of revisions, definitional and classification issues related to specific financial transactions, and the lack of relevant statistical information on some forms of assets (such as unquoted shares, foreign assets, securities and currency as assets of households, etc.).

Equation (1b) can be presented in the following form:

$$TA + RA + FA + Z = S + TL + FL. \qquad (1c)$$

Thus,

$$(S + TL + FL)/(TA + RA + FA + Z) = 1 \quad \text{and} \quad \frac{S}{W} + \frac{TL}{W} + \frac{FL}{W} = 1, \qquad (4a,b)$$

where W is the change of financial and non-financial assets.

For a given sector j, the expression:

$$\frac{FL_j}{W_j} = l_j \qquad (4c)$$

is a coefficient of external financing the j-th sector's assets, which means its financing with an increase in liabilities (Klein, 2003).

In turn, the first component of equation (4b) is a coefficient of assets self-financing:

$$s_j = \frac{S_j}{W_j},$$

where S_j − gross saving of the j-th sector.

Apart from the coefficient characterizing the share of transfers as a source of assets financing − $TA_j/W_j = c_j$ (these transfers are usually insignificant), the coefficients l_j and s_j can take different values.

A positive growth in households' assets (positive values in a given year) takes place if:
  a) the stream of saving and increment of liabilities are positive, then $l_j \in (0,1)$, $s_j \in (0,1)$;
  b) the stream of saving is negative but the increment of liabilities is positive, exceeding the negative stream of saving, then $l_j > 1$, $s_j < 0$;
  c) the stream of saving is positive, exceeding the negative stream of liabilities, then $s_j > 1$, $l_j < 0$.

Declines in the value of households' assets (negative values in a given year) take place when:
  a) the increments of saving and liabilities are negative, the repayment of liabilities and covering current expenditures over disposable income involves the sale of assets, then $l_j < 0$ and $s_j < 0$;

b) the increment of saving is negative, but the growth of liabilities is positive, exceeding the negative saving stream, then $l_j < 0$, $s_j > 1$;

c) the stream of saving is positive, but the increase in saving does not cover the repayment of liabilities, which must be made from the sale of assets, then $l_j > 1$, $s_j < 0$.

However, if capital transfers play an important role in assets financing, their inclusion in the analysis makes other cases than those listed above possible (cf. the situation of Greece after 2008, described below).

The coefficients s_j, l_j and c_j were calculated using Eurostat database: annual sector accounts for non-financial transactions and financial transactions.

The household sector in the developed countries of the European Union generates disposable income up to 70% of the total GDP (in 2012 in Germany – 68%, in Spain – 66%, in Ireland – 52%). The share of this sector's saving in the total saving of these countries is also significant (in 2012 in Germany – 47%, in Spain and Ireland – 37% each), with the 2012 saving rate of 17% in Germany, and 10% in Spain and Ireland. In the less developed EU countries, generating disposable income is set at a similar level (in Poland – 70%, Lithuania – 64%), while the share of households' saving in the total saving is smaller. The lower saving rates result primarily from the lower *per capita* income in these countries (the share of households' saving in the total saving in 2012 was: in Poland – 18%, Lithuania – 3%, Greece – dissaving; saving rates: in Poland – 5%, Lithuania – 1%). However, it should be also considered that the motivations to save and saving factors in the developing economies cannot be fully explained by the existing theories explicating the correlations between saving and income (see e.g. Bosworth, 1990).

In the theoretical discussion and empirical application, a significant issue is the relation between saving and tangible assets increase in individual institutional sectors and on macro-scale (see e.g. Feldstein, Bachetta, 1991). Much less attention (mainly in the less developed economies) is devoted to financing both tangible and financial assets with liabilities, and to the relations between saving and the household sector's liabilities in particular.

We would like to point to the publication by Fatuła (2010), which stands out from other Polish works regarding the process of household behaviour on financial markets. This theoretical and empirical study allows a better understanding of the nature of this process, its motives and determining factors. However, the empirical analysis concerns the period of 2000-2008, which includes only the initial stage of the financial crisis.

The lj and sj coefficients presented below, along with the analysed assets and liabilities increase rates, may shed some light on the households' financial behaviours, also at the time of crisis, and form the basis for further research.

The increase of the Polish households' assets was observed in the entire analysed period. Financing this growth with saving was prevalent before 2006. Growing debt, especially in 2006-2008, substantially changed the proportions in assets financing. The rate of increase in assets was growing in the years 2005-2007, there was a slowdown in 2008 and in the following years, mainly due to the decrease in liabilities but not because of the reduction in the growth of saving (in 2009-2010 the streams of saving increased). A big drop in the growth of assets was visible in 2011. Both in 2011 and 2008 there was a decrease in household saving due to the changes in net equity of households in pension funds reserves, which were caused by the decrease in the value of financial instruments, mainly shares, in which pension funds invest. With a constant increase in the stream of liabilities, the proportions of wealth financing with saving (s_j) and liabilities (l_j) changed in those two years substantially, with a predominance of the latter.

Table 3. Results for Poland

	2005	2006	2007	2008[a]	2009	2010	2011[a]	2012[a]
W_j (in millions euro)	21297,5	31263	36959,2	31596,6	31614,6	30948,6	16286,8	18887,6
l_j	0,3246	0,4382	0,5749	0,7893	0,3660	0,3267	0,6241	0,3081
in which:								
F41	-0,001	0,027	0,058	0,0216	0,037	0,008	-0,048	-0,021
F42	0,317	0,389	0,517	0,7621	0,335	0,314	0,656	0,328
F7	0,009	0,022	0,000	0,0056	-0,006	0,005	0,016	0,000
s_j	0,6602	0,5272	0,3920	0,1722	0,5952	0,6389	0,3106	0,6308
c_j	0,0153	0,0346	0,0331	0,0385	0,0388	0,0344	0,0653	0,0611

[a] The imbalance between the financial and non-financial accounts was especially large in the years 2008, 2011 and 2012, which means that the numbers for those years require careful interpretation.
Source: own calculation.

Table 4. Results for Greece[b]

	2005	2006	2007	2008	2009	2010	2011	2012
W_j (in millions euro)	25001,0	26742,0	34656,0	17850,0	11951,0	-2290,0	-5744,0	-16711,0
l_j	0,6811	0,6669	0,5748	0,7359	0,3691	0,6415	0,0966	0,6248
in which:								
F41	0,1051	0,0674	0,0795	0,1295	-0,0774	0,6917	0,3738	0,0792
F42	0,5331	0,6041	0,4825	0,6254	0,3680	-0,0376	0,6114	0,2230
F7	0,0428	-0,0046	0,0129	-0,0189	0,0785	-0,0127	-0,8886	0,3225
s_j	0,2659	0,3029	0,4005	0,2061	0,5075	1,0345	1,1851	0,4453
c_j	0,0530	0,0302	0,0247	0,0580	0,1234	-0,6760	-0,2817	-0,0701

[b] Serious problem of low reliability of statistical data - provisional data or breaks in time series and large discrepancy are the reasons why the numbers resulting from Table 4 should be interpreted cautiously.
Source: own calculation.

By 2008, wealth of Greek households had been funded predominantly by incurred liabilities (coefficients l_j far exceeded coefficients s_j). After 2010, the value of newly granted loans was lower than the value of repayments of liabilities, which means their negative growth. In turn, the balance sheets show that the growth rate of liabilities was positive, but it was due to other changes in the volume of liabilities, and not the transactions in liabilities engaged during a given year. The Greek crisis of public finance influenced the household sector mainly through the restrictive policy of granting new loans, which was commanded by the European Central Bank (Annual Report 2011, 2012). The values of l_j coefficients corresponding to negative increments of assets in 2009-2012, indicate a negative net debt of households. It means that the excess of income over consumption was spent on debt repayment rather than on wealth enlarging and, in the absence of the growth of saving (streams of saving were negative in the years 2011-2012) it was necessary to sell assets to repay liabilities. It is worth mentioning that in 2011, with a significant decrease in loans (F4), liabilities in the form of trade credits and advances (F7) increased substantially, which could mean the postponement of payments by micro-enterprises classified as households. A three-year bailout given to Greece (110 billion euros) could have an indirect impact on this situation. In 2010-2012, the increments of liabilities (except for F7) and saving were negative, but because of the positive capital transfers, assets decreased less than the total decline in saving and liabilities.

The predominant share of liabilities in assets financing is even more evident in Spain. In 2005-2007, more than 90% increase in assets was covered by liabilities with a negligible increase of saving, and even with their negative stream in 2006. "Belt clamp", which took place from 2008 onwards, did not protect the Spanish households against decreasing, but still positive, growth rates of assets towards the significant negative flow of liabilities, especially in 2011-2012. In 2011 the increase in wealth of Spanish households was almost half less than in the previous year, and in 2012 more than 75% less. Liabilities were paid from both the rising saving and other sources, as it is seen in the significant increase in the value of coefficient c_j.

Table 5. Results for Spain

	2005	2006	2007	2008	2009	2010	2011	2012
W_j (in millions euro)	115526,1	131366,5	107234,6	61211,2	71039,9	71624,6	39010,9	8587,8
l_j	0,9097	0,9535	0,9007	0,2882	-0,2333	0,1260	-0,4186	-3,3044
in which:								
F41	0,0430	0,0395	0,0227	0,0248	-0,0555	-0,0625	-0,0586	-0,0169
F42	0,9251	0,9339	0,8877	0,6008	0,0179	0,0794	-0,5128	-4,1192
F7	-0,0584	-0,0199	-0,0096	-0,3374	-0,1957	0,1091	0,1527	0,8317
s_j	0,0011	-0,0347	0,0290	0,5757	1,1352	0,7556	1,3061	3,8876
c_j	0,0892	0,0811	0,0703	0,1362	0,0981	0,1184	0,1125	0,4168

Source: own calculation.

Table 6. Results for Ireland

	2005	2006	2007	2008	2009	2010	2011	2012
W_j (in millions euro)	40106,0	36924,0	33108,0	22733,0	13905,0	3552,0	3031,0	4414,0
l_j	0,7746	0,7784	0,7543	0,3764	-0,1809	-2,5999	-2,4216	-1,1502
in which:								
F41	0,0592	0,0941	0,0163	-0,0132	0,0370	-0,8139	-0,3962	-0,1214
F42	0,7161	0,6695	0,7357	0,3450	-0,1819	-1,9505	-2,5407	-1,5220
F7	-0,0006	0,0148	0,0022	0,0446	-0,0361	0,1641	0,5153	0,4932
s_j	0,2060	0,1983	0,2074	0,5226	1,0996	3,3339	3,2405	2,0043
c_j	0,0194	0,0233	0,0383	0,1010	0,0813	0,2660	0,1811	0,1459

Source: own calculation.

Among the analysed countries, Ireland's economy follows Greek and Spanish economies, where the increase in household wealth in the period before the crisis was financed mainly by its liabilities – in more than 70%. The role of liabilities as a source of wealth's financing declined in 2008, in contrast to the rising role of streams of saving, and from 2009 onwards net repayment of liabilities by Irish households was observed. Despite a significant degree of wealth's financing with saving, Irish households were unable to avoid considerable decline in the growth rate of assets (in 2009 annual increase in wealth was over 40% less than in the previous year, in 2010 up to 75% less). In 2011-2012, there was an increase in liabilities arising from trade credits and advances, which seems to be explained, like in the case of Greece, by the Irish aid funds granted in the amount of 85 billion euros.

However, in Ireland – in contrast to Greece – a significant reduction in the growth rate of wealth did not entail its negative growth rate.

The high share of debt in financing wealth is also seen very clearly in the case of Lithuanian households. It is the only country among those analysed in this paper where the financing of financial and non-financial assets with liabilities was greater than with saving ($l_j > 1$ in 2007-2008, with negative values of coefficients s_j, which meant negative saving streams). In general, a large share of liabilities in financing households' wealth was observed before 2009. As it was mentioned above, in the case of Lithuania, a certain "shift" in revealing the effects of the crisis in terms of assets and liabilities was observed. In 2009, the increase in wealth fell more than six times in comparison with 2008. Assuming that the adjustment that was made (see comment below *Table 7*) for 2012 reflects changes in assets properly, the repayment of liabilities necessitated their sales – the increment of assets was negative.

Table 7. Results for Lithuania

	2005	2006	2007	2008	2009	2010	2011	2012[c]
W_j (w mln euro)	1594,9	3289,8	2891,5	1997,5	281,8	574,9	1484,8	-131,1
l_j	0,7842	0,8784	1,0699	1,0330	-2,7896	-1,7500	0,3817	2,4256
in which:								
F3	0,0000	0,0002	0,0021	0,0031	-0,0933	0,0073	-0,0065	0,0130
F41	0,0088	0,0105	0,0240	0,0017	0,2094	0,0577	0,0295	-0,6163
F42	0,7705	0,6129	0,9331	0,7925	-1,9965	-0,8894	-0,1318	2,1609
F7	0,0050	0,2549	0,1106	0,2357	-0,9092	-0,9257	0,4905	0,8680
s_j	0,1699	0,0973	-0,1342	-0,0561	3,6764	2,6805	0,5671	-1,2204
c_j	0,0458	0,0243	0,0643	0,0230	0,1136	0,0696	0,0512	-0,2059

[c] The data on non-financial accounts show that in 2012, households net debt was very high, which is not reflected in the financial account, hence the correction of assets was needed – as in equation 3.
Source: own calculation.

Table 8. Results for Germany

		2005	2006	2007	2008	2009	2010	2011	2012
W_j (in millions euro)		270475	275211	267259	276425	289804	309104	313529	325212
l_j		-0,0267	-0,0199	-0,0794	-0,0526	-0,0229	0,0172	0,0388	0,0485
in which:	F41	-0,0188	-0,0198	-0,0045	0,0043	-0,0148	-0,0073	-0,0067	-0,0031
	F42	0,0016	0,0012	-0,0737	-0,0592	-0,0116	0,0238	0,0404	0,0496
	F7	-0,0095	-0,0014	-0,0011	0,0024	0,0035	0,0007	0,0051	0,0020
s_j		0,9361	0,9507	1,0242	1,0533	0,9790	0,9402	0,9368	0,9252
c_j		0,0906	0,0692	0,0552	-0,0007	0,0439	0,0426	0,0244	0,0264

Source: own calculation.

The analysis of the data in *Table 8* shows that German households' assets hardly suffered from the crisis. Changes in wealth recorded positive growth rates over the whole period of 2005-2012. Moreover, entirely different trends (compared with the analysed countries) were observed as regarded liabilities and saving shares in the financing of the assets – more than 90% increase in assets was funded from the increase in saving. Unlike

other countries, repayment of liabilities (generally small in relation to assets – from 2 to 8%) was observed in the years before and during the crisis (2005-2009). Slight increases in the share of liabilities in financing assets followed in 2010-2012, when the propensity to save and the growing share of the increase in saving in financing assets increased in other countries.

Figure 3 shows the change in the share of liabilities and saving in the financing of U.S. households assets – the left scale. On the right scale, the values of changes in assets are shown (based on statistical data from *Z1. Financial Accounts…*, 2013; The Integrated Macroeconomic Accounts and historical data, http://www.federalreserve.gov/ RELEASES/z1/Current/data.htm (referred on 30/03/2014). In the case of American households, the growth of assets was about five times less in 2010 than in 2006, and the assets grew substantially slower in 2009-2012, but did not decline in those years. The change in financing assets is clearly visible from 2008 onwards, when the net repayment of liabilities with a significant increase in the share of saving in financing wealth is observed. It made it possible to maintain a positive growth rate of wealth.
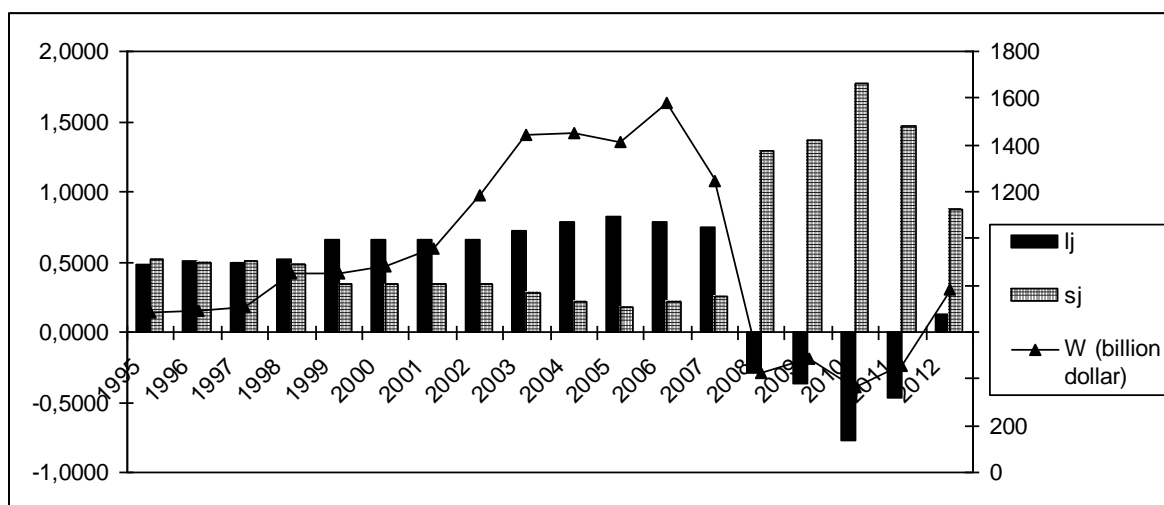

Figure 3. Accumulation financing with debt and saving in the U.S.

Conclusions

An attempt to rank the effects of the crisis observed among households in some European countries leads up to the conclusion that the most influenced by them are the households of Greece and Lithuania, which recorded declines in wealth. The large values of the discrepancies between non-financial and financial accounts require approaching these findings with caution.

In terms of households' behaviour, which contributed to the scale of the crisis – skipping the determinants of economic and financial policies in individual countries, also Greece is a country where no growth of financing assets with saving was observed neither in the years of crisis nor in the subsequent years, unlike in the other analysed countries, including the U.S. The effects of the crisis, measured by the fall of assets increment, are seen in a decline in the financial and non-financial assets of households in the countries where the share of households assets financing with liabilities was much higher than the share of financing with saving (Greece, Ireland, Spain) in the period before the crisis and additionally, a substantial share of mortgages in liabilities was observed (Greece, Ireland). Compared to the analysed countries, the changes of assets of Polish households remained almost at the same level in the period 2005-2010. In the subsequent years, the decline in growth of assets was observed, but the growth rates were not negative. In Poland (to a smaller extent than in

Germany), saving prevailed as a source of assets financing (coefficients s_j are over 70%). In Germany, the growth rates of households' assets were positive, their wealth was financed with saving in more than 90% throughout the analysed period.

References

Abad, P. (2005), Compiling the flow of funds of the Spanish economy, *IFC Bulletin*, No. 21.

Annual Report 2011 (2012), European Central Bank.

Adamczyk, M. (2012), Współczesny kryzys finansowy – przyczyny i konsekwencje dla gospodarki światowej, [in:] *Wyzwania gospodarki globalnej*, Prace i Materiały Instytutu Handlu Zagranicznego Uniwersytetu Gdańskiego, No. 31, s. 13-29.

Cagetti, M., Holmquist, E.B., Lynn, L., McIntosh S.H., Wasshausen, D. (2012), The Integrated Macroeconomic Accounts of the United States, *Finance and Economics Discussion Series*, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, Washington, D.C.

Bosworth, B. (1990), International Differences in Saving, *American Economic Review*, Vol. 80, No. 2.

European System of Accounts ESA 1995 (1996), European Commission, Brussels-Luxembourg.

Fatuła, D. (2010), *Zachowania polskich gospodarstw domowych na rynku finansowym*, Wydawnictwo Uniwersytetu Ekonomicznego w Krakowie, Kraków.

Feldstein, M.S., Bacchetta, P. (1991), National Savings and International Investment, [in:] *Flow of Funds Accounts of the United States. Flows and Outstandings Third Quarter 2007*, Board of Governors of the Federal Reserve System, Washington DC 20551.

Groon, A. (2005), Net lending of households and non-profit institutions serving households: an analysis of discrepancies between financial and non-financial accounts, *IFC Bulletin*, 21.

Klein, L.R. (2003), Some Potential Linkages for Input-Output Analysis with Flow-of-Funds, *Economic Systems Research*, Vol. 15, No. 3.

Konopczak, M., Sieradzki R., Wiernicki M. (2010), Kryzys na światowych rynkach finansowych – wpływ na rynek finansowy w Polsce oraz implikacje dla sektora realnego, *Bank i Kredyt*, 41(6), s. 45-70.

Liberda, B. (2013), *Przezorność. Kto oszczędza w Polsce*, WUW, Warszawa.

Manual on Sources and Methods for the compilation of ESA95 Financial Accounts (2002), First edition, European Commission.

Manual on sources and methods for the compilation on ESA 95 financial accounts 2nd Edition (2009), European Commission.

Mucha-Leszko, B. (2013), Hiszpania w unii walutowej – czynniki rozwoju, przyczyny problemów gospodarczych i procesy dostosowawcze, *Annales Universitatis Marie Curie-Skłodowska*, Lublin – Polonia, Vol. XLVII, 1, s. 107-120.

Narodowy Bank Polski (2009a), *Raport o stabilności systemu finansowego* – czerwiec 2009, NBP, Warszawa.

Narodowy Bank Polski (2009b), *Raport o stabilności systemu finansowego* – grudzień 2009, NBP, Warszawa.

Rosati, D. (2009), Przyczyny i mechanizm kryzysu finansowego w USA, *Ekonomista*, No. 3, s. 315-351.

Sławiński, A. (2010), Wpływ globalnego kryzysu na bankowość centralną, *Ekonomista*, No. 2, s. 145-162.

Sytuacja gospodarcza w Grecji, Hiszpanii, Irlandii, Islandii, Estonii, na Litwie oraz w Polsce – skutki kryzysu (2010), Kancelaria Senatu RP, Warszawa, dnia 16 kwietnia 2010, prepared by Dragan, A.

Świetlik, K. (2010), Ekonometryczna analiza depozytów i kredytów gospodarstw domowych w Polsce w latach 2000-2009, *Pieniądz i Więź*, No. 3.

Tsujimura, M., Tsujimura, K. (2011), Balance Sheet Economics of the Subprime Mortgage Crisis, *Economic Systems Research*, Vol. 23(1).

Walkowski, M. (2012), *Europa w kryzysie: perspektywy gospodarcze Unii Europejskiej do 2020 roku w kontekście problemów rozwojowych państw grupy PIIGC*, PP 1'12, Poznań.

Wojtyna, A. (2010), Gospodarki wschodzące w obliczu kryzysu finansowego: duża odporność czy podatność? *Gospodarka Narodowa*, No. 9.

Z1. Financial Accounts of the United States (2013), Federal Reserve Statistical Release.