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(Ir)rational households' saving behavior? An empirical investigation

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Abstract

What is the households' saving behavior during different stages of economic cycle? What is the reaction of households' to the external shocks? Which factors motivate households' to save in foreign currency rather than in national currency? Are households' saving decisions rational and based on fundamentals economic indicators or, in contrary, irrational and resulted by 'herding' behavior? While these research questions are important for various reasons they are investigated in this empirical study. The objective of this study – to identify the economic and psychological factors influencing the households' saving behavior. The research methods: the systemic, logical and comparative analysis of the scientific literature and panel regression. The results of this empirical study show that the households' saving behavior is more irrational especially during economic downturn and financial crisis periods. These empirical findings can be explained by low degree of financial literacy, ineffective communication strategy of the central banks and governments during financial turmoil and economic downturn periods, etc.

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1. Introduction

National savings are determined by the behavior of governments, firms and households which may be influenced in different ways by changing socio-economic and demographic factors. The main sector of a national economy that saves is the household sector which savings behavior has been studied most extensively. Households' saving

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behavior is determined by a complex of economic, demographic, social, and cultural factors. Economists (Fidrmuc et al., 2013; Crespo Cuaresma et al., 2014 etc.) have only recently begun to study the households' saving behavior from behavioral economics perspective while most of empirical studies focus on the socio-economic and demographic determinants of individual's saving behavior. Investigation of psychological and economic factors of households' saving behavior is important for various reasons. Savings are of interest to economists and psychologists because of savings' importance to both the economy and the individual. The importance of savings to the economy lies in a multiplicity of purposes of savings and influence on two fundamentals of the economy – growth and distribution. Households can use their savings as insurance or a protection means against unanticipated changes in economic circumstances as well as a means for redistribution of economic resources over the lifecycle. Material goods in a form of savings can be easily transferred from one generation to the next. Savings are used to finance domestic and foreign investment, thereby contributing to economic growth. The households' saving behavior is also important for financial institutions and monetary authorities. Schlueter et al. (2015) argue that “banks face a ‘behavioralization’ of their balance sheets since deposit funding increasingly consists of non-maturing deposits with uncertain cash flows exposing them to asset liability risk”. The sudden decisions of households' to save in foreign currency rather than in national currency could also increase the foreign currency risk of commercial banks' balance sheets. The dominance of savings in foreign currency creates a transmission channel of exogenous monetary disturbances. Foreign shocks increase the pressure on the monetary authorities to adjust these shocks using foreign reserves.

While most of economists focus attention on the role of socio-economic and demographic determinants rather than on psychological factors, psychological concepts almost disappeared from economic discussions on households' saving behavior. Economic theory has traditionally acknowledged some psychological individuals' saving behavior factors such as self-control, pessimism about the economy, and fear of economic uncertainty. However, scientific attempts to predict households' saving behavior using economic and psychological variables have met with limited success. This study aims to answer the following research questions: What is the households' saving behavior during different stages of economic cycle? What is the reaction of households' to the external shocks? Which factors motivate households' to save in foreign currency rather than in national currency? Are households' saving decisions rational and based on fundamentals economic indicators or, in contrary, irrational and resulted by ‘herding’ behavior? The objective of this study – to identify the economic and psychological factors influencing the households' saving behavior.

2. Literature review

Most of scientists investigate public or private savings behavior employing a Life Cycle Hypothesis (LCH) of individual savings developed by Modigliani (1966). According to Sturm (1983) there are four main motives leading to individuals' decision to save current income rather than to consume: saving for retirement, precautionary saving, saving for bequest, and saving for the acquisition of tangible assets. One of the most important saving motive – saving for retirement – forms the basis of LCH explaining the individual's consumption and saving behavior. This hypothesis generates the time profile of the individual's consumption and saving over the economic life-time of the individual. The individual accumulates net wealth (savings) during the pre-retirement period by consuming less than its disposable income. The maximum level of net wealth of the individual reached at retirement age will gradually decrease during the retirement period to finance current consumption. Sturm (1983) argues that individual's saving decisions can be determined by various motives and “in a rational society, savings decisions should be based on some kind of optimizing behavior by which the levels of consumption and saving are chosen so as to equalize the marginal benefits of these alternative uses of income”. Sturm (1983) distinguishes main determinants of aggregate saving behavior. Firstly, Sturm (1983) argues that only in a growing economy the various saving motives of individual will lead to a positive aggregate saving while “in stationary equilibrium the positive retirement saving of ‘young’ (i.e. pre-retirement) individuals’ will be offset by dis-saving of individuals in retirement age”. Sturm (1983) also states that the bequest motive of saving does not generate any net saving in stationary equilibrium while a constant level of assets is transferred from generation to generation. According to Sturm (1983) precautionary saving motive does not generate positive net saving of individuals' in stationary steady state because once reached its target level will remain constant. Concluding Sturm (1983) states that depending on the individual's income expectations, the implications of the different types of economic growth in terms of sources and nature for the

aggregate saving ratio may be different. Secondly, Sturm (1983) distinguishes a number of demographic variables can have a direct effect on the aggregate saving ratio. The LCH implies that in a growing economy the aggregate saving ratio can be determined by several demographic variables such as expected life time, retirement age, age distribution while individuals' saving behavior can be affected by individual's characteristics such as family size varying over the life cycle, average age of entry into the job market of young people, normal period of formal education, female participation in labor market ratio, etc.

In recent years the LCH has become controversial, and an increasing number of economists have expressed doubts concerning general validity of the LCH. According to Diamond and Vartiainen (2007), many economists have turned to new approaches explaining private saving behavior. Shefrin and Thaler (1988) developed an alternative Behavioral Life Cycle Hypothesis (BLCH). This hypothesis posits that self-control problems cause individuals' to depart substantially from rational behavior and is based on three assumptions. First, individuals are tend to spend all their financial resources on current consumption instead of saving for the future. Second, saving individuals undergo this self-control problem by investing in a variety of assets that have different levels of temptation associated with them. Third, setting up these mental accounts implies that individuals engage in 'framing'. Essentially, the BLCH posits that there are financial as well as psychological transaction costs associated with spending from different types of assets. Laibson (1997) proposed a model of saving intended to capture some of the self-control problems called Model of Saving with Quasi-Hyperbolic Discounting. Individuals behave as if they optimize subject to lifetime preferences changing over time. In each time period the individual acts as if he picks the feasible consumption path maximizing a utility function. This model includes an additional discount factor which is applied to the utility function associated with all future consumption. Bernheim and Rangel (2004) proposed an alternative model of savings in which individuals make stochastic mistakes called Model of Savings with Cue-Triggered Mistakes. The individual makes decisions in two distinct modes: with a certain probability decision processes function properly and individual optimizes the decisions while with certain probability decision processes are faulty and individual consumes excessively. Individual can influence the probability of encountering cues triggering the faulty decision mode through choices of activities. Gul and Pesendorfer (2004 a,b) proposed an alternative model to account for the role of self-control in determining saving called Model of Savings with Nonstandard Preferences. They adhere to the principle of revealed preference, thereby excluding the possibility that lapses of self-control involve mistakes.

Most of academics focus on determinants of private and public saving rate and try to explain private saving behavior during different stages of life cycle. Many empirical studies (Feldstein, 1980; Fry, 1980; Tachibanaki and Shimono, 1986; Craigwell and Rock, 1992; Jain and Joy, 1997; Lane and Tornell, 1998; Levin, 1998; Meier et al. 1999; Corneo and Jeanne, 1998; Denizer et al., 2002; Baharumshah et al., 2003; Athukorala and Sen, 2004; Euwals et al., 2004; Erskine et al., 2006; Odhiambo, 2009; Fisher and Montalto, 2010; Gu and Tam, 2013; Ismail and Rashid, 2013; Sahoo and Dash, 2013; Munozmoreno et al., 2014, etc.) focus on the case studies of specific countries, however, a comprehensive cross-country analysis on determinants of saving is performed only in a few empirical studies (Koskela and Viren, 1983; Graham, 1987; Edwards, 1996; Niculescu-Aron and Mihaescu, 2012; 2014 etc.). The main findings of aforementioned empirical studies are the following. The socio-economic variables such as economic growth, development level of an economy, financial development, growth of disposable private income, inflation, and real interest rate on bank deposits have a significant positive impact on private saving rate while the savings rate is negatively related with the changes in the external terms of foreign trade, foreign capital inflows, domestic credit to public sector, and political instability. The demographic variables such as marital status, family size, and education of the head of the household is linked to savings ratio, however, the employment characteristics have no influence on savings. The savings rate varies pro-cyclically in the short-term, however, it remains constant in the steady state. The empirical studies confirm that most of the savings determinants identified in the scientific literature can be applied to the developing countries as well as to the developed countries.

The main research questions of this empirical study suggest to focus on the analysis of the scientific literature related to households' saving behavior during different stages of economic cycle, the reaction of households' to the external shocks, the role of sentiments in the households' saving behavior, the factors motivating households' to save in foreign currency rather than in national currency. Eiriksson (2011) analyzed the influence of the volatility of macroeconomic (productivity) shocks on savings and investment correlation. The empirical results suggest that common shocks have greater positive effects on the savings and investment correlation than country-size.

Chowdhury (2015) investigated the saving decisions of economic agents in the developing countries using cross-country analysis and the reaction of agents to the adverse shocks to commodity prices and in the terms of trade. Chowdhury (2015) states that although the effect of terms of trade shocks is asymmetric, the magnitude of the shocks impact is relatively small.

Lindqvist (1981) analyzed the influence of both socioeconomic characteristics and “softer” variables, such as attitudes and expectations on bank savings, total savings, repayments of debts, and a liquidity estimate. He found no statistically significant variables explaining bank savings, while the traditional socioeconomic variables have an impact on the debt measure. The effects of socioeconomic variables such as household income and educational level of the family head and the behavioral predictors are substantial in explaining the liquidity measure. Van Raaij and Gianotten (1990) investigated the influence of both the ability to buy (household income) and the willingness to buy (attitude, expectation) on consumer expenditure, saving and credit at the aggregate level. The results show that income is the most important determinant of consumer spending and saving behavior. Lunt et al. (1991) used a wide range of economic, demographic and psychological variables in explaining recurrent saving and total savings. The results of multiple regression analysis show that both recurrent saving are predicted by economic variables as well as psychological variables and total saving – by economic variables and demographic variables. Rabinovich and Webley (2007) investigated the factors that impact on the process of saving intention realization. On the basis of insights from the BLCH three factors (time horizon, usage of certain expenditure control techniques and perceived easiness of expenditure control) are hypothesized to explain the implementation of saving intention. The results show that time horizon and control techniques are significant in explaining saving intention. Burdekin and Redfern (2009) examined the sentiment effects on asset allocation decisions in China. They state that rising stock market sentiment have a negative and significant impact on Chinese savings account growth. Loibl et al. (2011) combined insights from economics and social psychology by examining the role of savings habits in regular saving. The results suggest that savings habits matter for regular saving of individuals and influence savings amounts and deposit frequency measures. Post and Hanewald (2013) investigated the effect of individuals’ awareness of longevity risk on saving behavior. The analysis of savings behavior shows that individuals do not save more on average when faced with longevity risk.

Arifovic (2001) explored economic agents’ decisions about the currency of their savings and investment portfolio. According to Arifovic (2001), the currency of the country with larger deficit becomes valueless and a flight away from the currency of this country is observed. Sharma et al. (2005) investigated the importance of the U.S. dollar to six Asian economies (Indonesia, Japan, Korea, Malaysia, Singapore and Thailand) as a substitute or complement to domestic monetary assets. They found that the U.S. dollar and the domestic currency are Morishima substitutes and the demand for the U.S. dollar relative to the domestic currency appears to respond to the exchange rate depreciation than the domestic interest rate. Bresser-Pereira et al. (2014) investigated the relations between domestic savings, foreign savings, and the real exchange rate and in Brazil. The results of an econometric analysis of the Brazilian case study indicate a long-run relationship between the real exchange rate and domestic savings and confirm the presence of substitution of foreign for domestic savings. Bresser-Pereira et al. (2014) state that a positive and statistically significant effect of relative devaluation of the real exchange rate on domestic savings is observed.

The empirical studies highlight the importance of the economic context as well as the socio-cultural context of households’ financial behavior and consumption, saving and investment decisions.

3. Research methodology and data

The empirical analysis is based on the panel-data regression. It includes time and country fixed effects, which can cover a large part of the endogeneity bias, which is time or country invariant. The dependent variable represents the share of foreign savings in total savings for a country i in time t :

$$foreign\ savings_{it} = \sum_{s=1}^S \beta_s macro\ shocks_{it}^s + \sum_{l=1}^L \beta_l perception_{it}^l + \mu_i + \theta_t + \varepsilon_{it}, \quad (1)$$

where variable *macro shocks* represent selected macroeconomic shocks and variable *perception* covers selected perception indicators. We include country fixed effects μ , time effects θ , and apply OLS robust estimator to estimate robust standard errors ε . Second, all independent variables are interacted with dummy variable D for a country c :

$$\text{foreign savings}_{it} = \sum_{s=1}^S D_i \times \beta_s \text{macro shocks}_{it}^s + \sum_{l=1}^L D_i \times \beta_l \text{perception}_{it}^l + \mu_i + \theta_t + \varepsilon_{it}. \quad (2)$$

The dummy is determined by the GDP changes in a country i . Thus, we differentiate between the impact of selected factors during the expansionary and contractionary movements in economic activity.

This empirical research focuses on the European Union (EU) countries outside the euro area with their own currencies: Bulgaria, Czech Republic, Hungary, Poland, Romania, Sweden, the United Kingdom, and three Baltic countries (Estonia, Latvia, and Lithuania) that have recently adopted the euro (Estonia in 2011, Latvia in 2014 and Lithuania in 2015). Croatia was not included in the data sample while this country joined the EU only on 1 July 2013 as well as Denmark due the statistical data availability. The dataset covers quarterly observations on nine variables (see Table 1) for the period 2004Q1–2014Q4.

Table 1. A list of dependent and independent variables and their description

Variable	Description of variables	Data source
Foreign deposits share (FDS)	The share of household deposits in foreign currency to total volume of households' deposits in the economy.	National central banks of data sample countries
Nominal effective exchange rate (NEER)	The nominal effective exchange rate is the weighted average of bilateral nominal exchange rates against the currencies of selected 42 trading partners.	Eurostat
Interest rate differential (IRD)	Interest rate differential of short-term money market interest rates in the national country and the Eurozone.	Eurostat, Eurostat, IMF IFS, Czech National Bank, OECD
Gross domestic product (GDP)	Nominal GDP at market prices (seasonally adjusted and adjusted by working days).	Eurostat
Current account (CA)	Current account provides harmonized information on international transactions (goods, services, income, and current transfers).	Eurostat, Central Bank of Bulgaria
Inflation differential (ID)	Inflation differential in the national economy and the Eurozone measured by GDP deflator.	Eurostat
Confidence indicator (CI)	The consumer confidence indicator is the arithmetic average of the balances (in percentage points) of the answers to the questions on the financial situation of households, the general economic situation, unemployment expectations (with inverted sign) and savings, all over the next 12 months.	European Commission
Expected savings (ES)	Savings over next 12 months (the answer to the question: over the next 12 months, how likely is it that you save any money?)	European Commission
Expected financial situation (EFS)	Financial situation over next 12 months (the answer to the question: how do you expect the financial position of your household to change over the next 12 months?)	European Commission

4. Research results

Table 2 presents the results of four models (Eq. 1) that vary according to variables representing macroeconomic shocks and perception indicators. As already mentioned above, we use several indicators of macroeconomic shocks based on the International Fisher Effect. Against the theoretical background, our empirical findings do not show significant impact of interest rate differential, inflation differential, and economic activity or exchange rate changes. However, we found a negative impact of current account at the 1% significance level. The economic intuition is that countries use their assets to buffer or smooth the effects of changes in the terms of trade (Kraay and Ventura

(2002)). In addition, we also use perception indicators in the last three models. In comparison with macroeconomic shocks, all used perception indicators are significant at 10% of significance level. The negative impact of the composed confidence indicator as well as expected savings and financial situation can be explained by the savings redistribution with the risk perception in the selected country. Increasing confidence indicators, expected savings and better financial situation lead to stability in the country and the currency which decrease demand for foreign savings in comparison to local savings. Finally, there are two yearly effects represent global financial crisis in the year 2007 and European debt crisis in the year 2010. The positive effects of dummy variables related to the increasing risk perceptions and effort of general public to transfer their savings in the euro as the stable currency.

Table 2. Determinants of foreign deposits (dependent variable – ΔFDS)

Independent variables	Model 1	Model 2	Model 3	Model 4
$\Delta NEER$	0.0954 (0.1448)	-0.0166 (0.1716)	0.0184 (0.1573)	0.0067 (0.1538)
IRD	0.0089* (0.0043)	0.0028 (0.0026)	0.0047 (0.0026)	0.0048 (0.0029)
ΔGDP	-0.1079 (0.1064)	0.0072 (0.1233)	0.0012 (0.1178)	-0.0044 (0.1091)
ΔCA	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)
ID	0.0005 (0.0008)	0.0009 (0.0007)	0.0011 (0.0008)	0.0009 (0.0008)
CI		0.0010* (0.0005)		
ES			-0.0016* (0.0008)	
EFS				-0.0025* (0.0011)
Y2007	0.0238* (0.0114)	0.0164** (0.0062)	0.0179** (0.0071)	0.0175* (0.0086)
Y2010	0.0393* (0.0196)	0.0161 (0.0096)	0.0159 (0.0102)	0.0179 (0.0099)
R ²	0.1705	0.1985	0.2275	0.2304
Adj. R ²	0.1333	0.1568	0.1873	0.1903
Observations	374	304	304	304
Number of countries	10	8	8	8

Notes. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3 presents the empirical results of the second model (Eq. 2). We show a positive impact of interest rate differential during the contractionary phases at 5% and 1% significance levels. Thus, decreasing interest rate differentials (contractionary phase) demotivate saving behavior of general public, concurrently, savings in foreign currency are much more sensitive to macroeconomic shocks than savings in domestic currency. As in the first model, we show negative impact of current account. However, the negative effect is significant only during the contractionary phases at 1% significance level. We can see that current account deficits (contractionary phase) are massively covered by foreign savings. On the contrary, we did not identify significant impact of current account changes (we suppose surplus) in expansionary phases.

Table 3. Determinants of foreign deposits in expansionary (E) and contractionary (C) phases (dependent variable – ΔFDS)

Independent variables	Model 1	Model 2	Model 3	Model 4
$\Delta NEER$ (C)	0.2059 (0.1703)	0.1115 (0.1478)	0.1551 (0.1556)	0.1471 (0.1459)
$\Delta NEER$ (E)	-0.0739 (0.2039)	-0.1733 (0.2574)	-0.1533 (0.2409)	-0.1470 (0.2479)
IRD (C)	0.0091** (0.0038)	0.0044** (0.0014)	0.0058*** (0.0016)	0.0056** (0.0018)
IRD (E)	0.0072 (0.0048)	-0.0000 (0.0028)	0.0025 (0.0026)	0.0025 (0.0025)
ΔGDP (C)	-0.1713 (0.1383)	-0.0108 (0.1751)	-0.0993 (0.1429)	-0.1037 (0.1279)
ΔGDP (E)	0.1442 (0.1417)	0.3594* (0.1881)	0.2549 (0.1983)	0.3155 (0.1996)
ΔCA (C)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)
ΔCA (E)	-0.0001 (0.0003)	0.0000 (0.0002)	0.0001 (0.0001)	-0.0001 (0.0001)

Independent variables	Model 1	Model 2	Model 3	Model 4
ID (C)	0.0009 (0.0010)	0.0012 (0.0010)	0.0014 (0.0011)	0.0012 (0.0011)
ID (E)	0.0006* (0.0008)	0.0010 (0.0007)	0.0012 (0.0008)	0.0011 (0.0007)
CI (C)		-0.0009 (0.0005)		
CI (E)		0.0010* (0.0004)		
ES (C)			-0.0014* (0.0008)	
ES (E)			-0.0016* (0.0007)	
EFS (C)				-0.0025* (0.0009)
EFS (E)				-0.0025** (0.0010)
Y2007	0.0223* (0.0117)	0.0145** (0.0059)	0.0159** (0.0064)	0.0157* (0.0082)
Y2010	0.0382* (0.0194)	0.0151 (0.0099)	0.0157 (0.0106)	0.0176 (0.0102)
R ²	0.1819	0.2253	0.2456	0.2525
Adj. R ²	0.1331	0.1676	0.1894	0.1969
Observations	374	304	304	304
Number of countries	10	8	8	8

Notes. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

As in the first model, we show impact of perception (confidence indicator) on savings in foreign currency during the both, expansionary and contractionary phases. However, there is direct impact primarily connected with the positive expectations about the financial situation and expected savings. In addition, there is no evidence of the impact of overall confidence indicator during the contractionary phases.

5. Conclusions

We provide an empirical evidence on the households' savings behavior in the selected European countries. We focus on savings in the foreign currencies and pointed out irrationalities of the economic agents' behavior. Our findings confirmed that there is not significant impact of traditional motives, such as interest rate or inflation differentials based on the International Fisher Effect. We identified significant impact of the current account deficits on the foreign savings caused by smoothing the effects of changes in the terms of trade. We emphasize irrationalities of the savings behavior and we identify significant impact of confidence indicator, especially overall confidence indicator, perceptions about the future savings and financial situation.

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