Determinants of Household Saving:
Evidence from Slovakia[1]

Renáta PITOŇÁKOVÁ*

Abstract

The paper focuses upon determinants of household savings in Slovakia apply-ing quarterly data 1995 Q1 – 2015 Q1. The results contradict to the Life-Cycle Hypothesis as positive relation between saving rate and dependency ratio was identified. Applying ARDL framework we identified the following relations. In the long-run, rising property income and dependency ratio increase household saving, while higher unemployment has a negative influence. In the short-run, savings are positively impacted by property income, dependency ratio, unem-ployment and saving rate from previous quarter. The speed of adjustment is fast, while about 60% of disequilibrium in the previous quarter will be corrected in the current quarter.

Keywords: *saving rate, household, dependency ratio, ARDL framework, speed of adjustment*

JEL Classification: C50, D14, E24

1. Introduction

Saving is a prerequisite of investment, which improves capital equipment, drives economic growth hence increases living standard of inhabitants. Eco-nomic environment, institutional and social differences and demographics de-termine the level of saving rate of households. Saving rates were high in Central and Eastern European countries (CEECs) during the socialist era; in the eighties, average domestic saving rates of around 35% were reported for these countries while in the industrial world domestic saving rates reached only about 20% of Gross domestic product (GDP) (Schrooten and Stephan, 2003). The vast majority

 * Renáta PITOŇÁKOVÁ, Comenius University in Bratislava, Faculty of Social and Eco-nomic Sciences, Institute of Economics, Mlynské luhy 4, 821 05 Bratislava, Slovak Republic; e-mail: renata.pitonakova@fses.uniba.sk

of studies inspect household saving behaviour due to their importance in the determination of national saving,[2] while government saving is obviously excluded from the analysis as it is determined on policy decision (Sturm, 1983).

Keynes (1936), points out eight motives why people save: to build up a reserve against unforeseen contingencies; to provide for an anticipated future relation between the income and the needs of the individual or his family different from that which exists in the present (for example, in relation to old age, family education, or the maintenance of dependents); to enjoy interest and appreciation, i.e. because a larger real consumption at a later date is preferred to a smaller immediate consumption; to enjoy a gradually increasing expenditure, since it gratifies a common instinct to look forward to a gradually improving standard of life; to enjoy a sense of independence and the power to do things; to secure a masse de manoeuvre to carry out speculative or business projects; to bequeath a fortune; to satisfy pure miserliness. Saving is important for ensuring social and economic stability of economic entities (households) in a short and long-run. An empirical inspection into saving behaviour requires view into theoretical postulates (hypotheses) focusing on relation between consumption and income. These are Absolute, Permanent and Relative Income hypotheses.

Absolute Income Hypothesis (AIH) introduced by Keynes (1936), assumes real consumption as a function of real disposable income. Owing to this model, saving depends entirely on current income. Then, according to Modigliani and Brumberg (1954), the ability to make intertemporal transfers of resources constitutes the very foundation of the Life-Cycle Hypothesis (LCH). Within the LCH (Modigliani and Brumberg, 1954), individuals plan their consumption and saving along their life-cycle to ensure a required level of their consumption for elderly times. Permanent Income Hypothesis (PIH) (Friedman, 1957), postulates, that consumption depends not only upon current income but on the future income as well, and, that individuals will save if they expect their current income exceeds their permanent income. Relative Income Hypothesis (RIH) (Duesenberry 1949), claims that the satisfaction an individual is getting from the consumption depends on its relative importance in the society rather than its absolute level.

The magnitude of income in the consumption and saving is expressed by above mentioned hypotheses. Beside income, theory considers other variables (described in section 2 of this article) determining saving behaviour according to saving motives (Husár, 2007). Sturm (1983), points out the general motives such as saving for retirement, precautionary saving, saving for bequest and he adds Target saving that is to acquire tangible assets.

---

[2] Household saving and the business saving form private saving. National saving is the aggregation of private saving and government saving.

The aim of this article is to identify determinants of household savings[3] in Slovakia, as majority of empirical papers devoted to savings in Slovakia present achievements within a group of countries. The structure of the rest of the article is as follows. Section 2 presents corresponding theory and selection of empirical studies. Following part analyses national saving and saving rate of households in Slovakia. The fourth section describes model and variables, fifth part presents achieved results, the last one concludes.

2. Theoretical Framework and Empirical Evidence

2.1. Determinants of Household Saving

Based on saving motives, theory explains determinants of saving behaviour. Majority of studies use demographics, level of education, inflation, unemployment rate, interest rate, government saving, household wealth, terms of trade, proxies for financial intermediation (number of credit institutions), credit standards, credit restrictions. According to Callen and Thirmann (1997), saving motives indicate variables determining the household saving decision and, results from their investigation showed that there was an important role for public and corporate saving, growth, and demographics in influencing household saving, with a role for inflation, unemployment, the real interest rate, and financial deregulation. Saving for retirement is the most important saving motive and it is the core of (LCH) models of household consumption behaviour (Sturm, 1983). The LCH assumes that saving is positive in the pre-retirement time and negative later on. Modigliani and Shi Larry (2004), claim that the relation between the working and non-working populations (retired and too young for regular employment) is the most important factor because the latter group tends to reduce national household saving, since it consumes without producing income. People with higher education are assumed to have higher incomes and higher saving (Grace, Bersales and Mapa, 2006). Increasing inflation requires putting more money on present consumption and reduces consumption in the future. Inflation deteriorates saving. Unemployment rate is a proxy variable for precautionary saving motive (higher unemployment tends to increase saving). Rising real interest rate stimulates economic subjects to save more. Keynes (1936) relates to the magnitude of fiscal policy of the government. Government spending stimulates consumption of households, and, positive expectations on economic growth may increase saving. If government is permanently borrowing, individuals are aware, that the deficit will be financed by deferred taxation; therefore saving is

---

[3] Households plus non-profit institutions serving households.

supposed to increase. Rising household wealth is expected to increase saving. Kolasa and Liberda (2014), point out, that an increase in household wealth, for instance through an acceleration in property prices, could negatively influence saving, and that a deterioration in the terms of trade causes drop in savings due to a decrease in real income, however, a positive relation applies only to the short time and transitory shocks. They found out, that the most important variables influencing private and household savings in Poland were income and its growth, the interest rate, government savings and corporate savings. Horioka and Wan (2006), conducted analysis of the determinants of the household saving rate in China using a life-cycle model. Saving rate was determined by lagged saving rate, the income growth rate, the real interest rate, and the inflation rate.

Outcomes from majority of studies proved consistency between theory and empirical research. Psychological determinants such as consumption behaviour of individuals or advertisement of financial institutions are possible factors influencing saving manners. People tend to adopt consumption patterns of their neighbours, relatives and are in a certain extend under the influence of a promotion.

Determinants of household saving can be grouped into following categories: Demographics (structure of age: dependency ratios), Education (people with lower education earn less), Labour Force (female, male), Macroeconomics (economic growth, inflation, interest rate) and Institutional infrastructure (number and size of banks, investment funds, the role of National regulator).

2.2. Selected Papers on Household Saving Involving Slovakia

Saving is in Slovakia elaborated among others by Bruncková, Machlica and Vaňko (2010), Páleník et al. (2012), Puhofová et al. (2012), and Pécsyová, Vaňko and Machlica (2013). The first and the last study are backed by empirical analysis of saving rate focusing on the year 2009. The saving rate is determined by income, interest rate, financial wealth, inflation, government saving and availability of credits. The LCH was not proved, as inhabitants 65 and older tend to increase saving. Outcomes explain the bequest motive of elder people in Slovakia.

The other two studies inspected saving within a complex analyses titled Silver Economy in the Slovak, European and Global Context, and Paradigms of Future Changes in the 21st Century (geopolitical, economic and cultural aspects). Studies present among others paradox in saving of retired inhabitants in Slovakia.

Paper worked out by Beckmann, Hake and Urvová (2013), was searching for determinants of Households' Savings in Central, Eastern and South Eastern

Europe (CESEE). Findings suggest that age, education, and income drive the propensity to save and reveal that the hump-shaped relationship between age and savings as predicted by the life-cycle hypothesis holds for CESEE. Schrooten and Stephan (2003), focused on private savings in Eastern European EU-Accession Countries taking into consideration determinants such as:[4] *Demographics* (dependency ratio), *Uncertainty* (unemployment rate, inflation), *Persistence* in saving behaviour (private savings ratio), *Income variables* (annual growth rate of real per capita GDP, log of smoothed real per capita GDP). A Generalized Method of Moments (GMM) estimator was used to identify the determinants of saving. The main results are: saving rates are persistent, income growth increases saving, public saving reduces private saving.

3. Overview of Household Saving in Slovakia

According to OECD Economic Outlook 97 database, in 2014, the household saving rate (Net saving)[5] recorded in Slovakia 5.6%, that is, within the Visegrad group (V4) countries lower by 1,6 percentage point (p.p.) in comparison to Hungary (7.2%) and higher than in the Czech Republic and Poland (4.5%; 0.4%). Within 1997 and 2014 the average annual net household saving rate[6] was in Slovakia the lowest from all V4 countries (Slovakia – 3.4%; the Czech Republic – 6.14%; Hungary 6.6% and Poland 6.22%). Figure 1 presents the Gross national saving in Slovakia, in the Czech Republic, Hungary[7] and the Gross household saving rate in Slovakia.

At the beginning of the period of observation, the Gross national saving (private and government saving) was nearly 29% in Slovakia, falling gradually down within 1995 – 2004, and, achieving a deepest decline in 2009 relating to increased government supports such as different compensations for employers and employees to mitigate the effects of the global financial and economic crisis on the labour market.

---

[4] Apart from those, another set of variables involve: Financial market performance (real interest rate, credit provision, M2/nominal GDP); International financial integration (current account deficit, foreign direct investment); fiscal policy (public saving ratio).

[5] Gross saving minus consumption of fixed capital by households and unincorporated business (% of disposable household income).

[6] For any given country, the Gross household saving ratio is always higher than the net household saving ratio. This is because the numerator (saving) is always much less than the denominator (disposable income), so that the resulting ratio is lower as depreciation is deducted from both of them (ECB, OECD: Comparison of Household Saving Ratios) available on <http://www.oecd.org/std/na/32023442.pdf>.
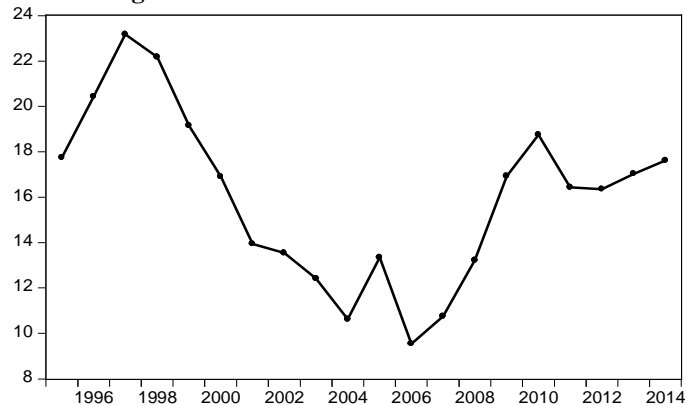
[7] No data available for Poland.

Figure 1

Gross National Saving (% of nominal GDP) 1995 – 2013
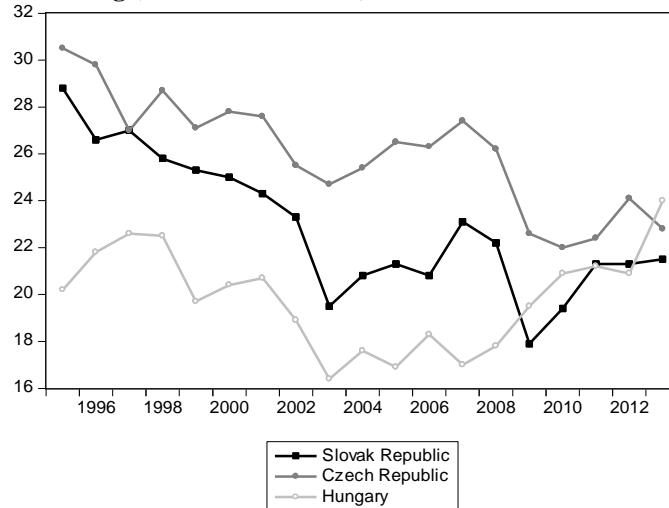
Source: National Accounts of OECD countries database.

Gross Household Saving Rate in Slovakia 1995 – 2014

Source: Based on data from Statistical Office of the Slovak Republic.

On the contrary to the government saving, household savings were increasing in 2009 under declining employment and real disposable income. Changes occurred in consumption patterns of households, when households cut off buying goods of long-term consumption, reduced costs on services at hotels and restaurants. Gross household saving rate was declining since 1998 up to 2006 in observed economies (Slovakia, the Czech Republic and Hungary), and since that, it was on the rise. While in 2009 the gross saving was declining both in Slovakia and the Czech Republic, Hungary recorded a rise. Within 1997 and 2007, the national saving was moving nearly the same way within countries under observation.

4. Description of Variables and Model

The empirical part of this paper is based on data from Eurostat, National Bank of Slovakia (NBS), Statistical Office of the Slovak Republic, and the Economic Research of Federal Reserve Bank of St. Louis. Figure 2 presents quarterly variables[8] seasonally adjusted by Census X12 that are applied in the modelling: Elderly dependency ratio DE (aged 65 and above), Young dependency ratio DY[9] (0 to 14 years), unemployment rate, property income of households and household saving rate for Slovakia. Property income is expressed in real terms (deflated by *Consumer price index* – CPI) in log, other variables as percentage. For Dependency ratios (DE and DY) a break is remarkable in 2004 due to the pension reform[10] according to which the age of retirement was extended for men from 60 to 62 and for women from 53 and 57 depending on number of children to 62.[11]

At the beginning of observation period, Dependency ratio (DE) was quite stable up to 2004, then, after a sharp decline in 2004, up to 2007 there was a relatively constant path, with a slight increase[12] later on. The figure presents a gradually narrowing gap between dependency rations DY and DE (young and elder generations).

Unemployment rate was rising within 1999 and 2004 (average unemployment rate about 19%) touching 9% in 2008, and, rising within 2009 – 2013 due to global financial and economic crisis to about 14%. The unemployment rate in 2015 Q1 recorded nearly 12%.

Decreases in property income of households[13] were at the beginning associated with magnitudes of monetary and capital market institutions and application of standard monetary policy instruments. Within 2005 and 2011 households were obtaining higher income resulting from favourable financial market conditions (e. g. higher interest rate and rent earnings). Disturbances on the global financial

---

[8] More variables were considered as *education* (workers with basic education, higher education and university education), *growth of real disposable income of households*, *inflation* (CPI), *real interest rate* (up to 2008 real interbank BRIBOR 3M deflated by CPI, then EURIBOR), *number of credit institutions*, *government spending in real terms* (deflated by CPI), *real GDP per working day*, these, however, did not appear statistically significant.

[9] DY is not used in model; it is, however, depicted just to show the gap between these two ratios.

[10] The working age population (15 – 64) gradually changes.

[11] Unification of retirement age for men and women to 62 since 2014.

[12] Dependency ratio increased as a result of pension reform (a gradual depart of workers aged 62 from working process).

[13] Property income results from the ownership of financial assets, i. e. deposits, bonds or tangible non-produced assets which the owner obtains as compensation for providing them to or making them available for another institutional unit (def. according to the Statistical Office of the Slovak Republic).
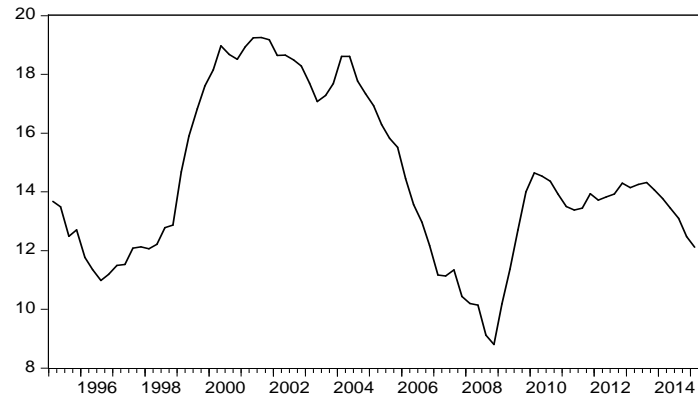
market caused decline in property earnings after 2011. Annual data on Gross household saving rate were described in section 3.
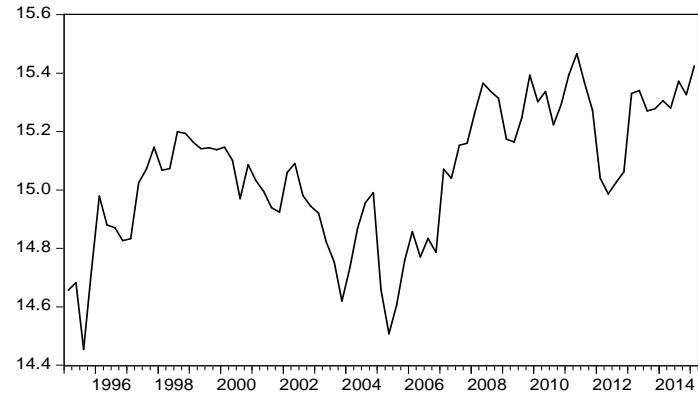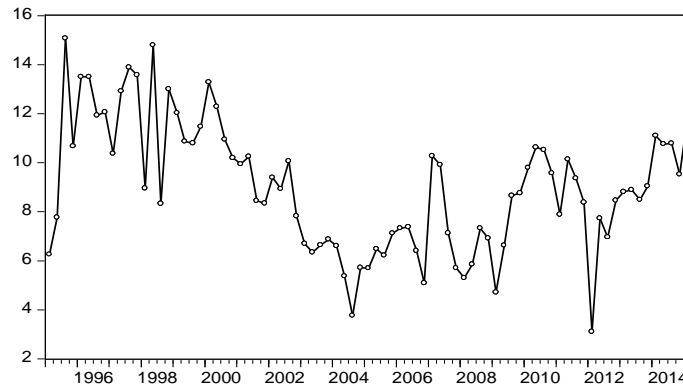
Figure 2

Dependency Ratio (DY and DE)
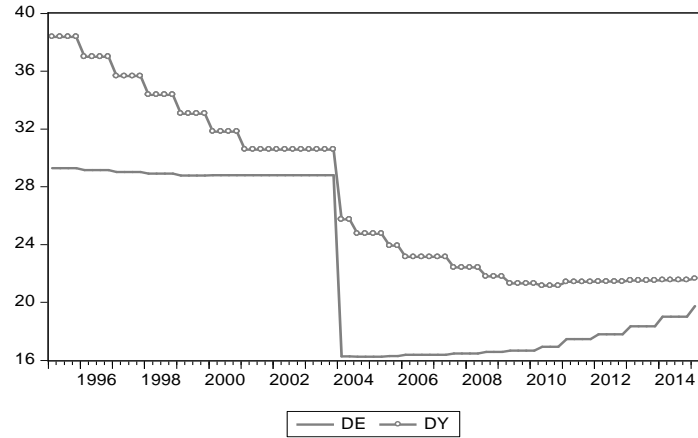
Unemployment Rate

Households Property Income (log)

Gross Household Saving Rate

Source: Based on data from Statistical Office of the Slovak Republic and data from National Bank of Slovakia.

For our investigation we apply ARDL technique presented by Pesaran and Shin (1999), and Pesaran, Shin and Smith (2001). This approach enables to identify cointegration relation in small samples and can be applied to regressors of I(1) and I(0). In ARDL (*Autoregressive Distributive Lag*) procedure variables can have different number of lags.[14] This framework requires the existence of long-term relationship among variables (based upon F-test), the estimation of coefficients of the long-term relation and the estimation of short-term elasticity of variables with ECT (Error Correction Term) of the ARDL model. According to Pesaran and Shin (1999), if the computed Wald or F-statistic falls outside the critical value bounds, a conclusive inference can be drawn without needing to know the integration/cointegration status of the underlying regressors. However, if the Wald or F-statistic falls inside these bounds, inference is inconclusive and knowledge of the order of the integration of the underlying variables is required before conclusive inferences can be made. A basic form of the ARDL model is as follows:

$$Y_t = \beta_0 + \sum_{k=1}^{r} \chi_k L^k Y_t + \sum_{m=0}^{s} \delta_m L^m X_t + u_t \qquad (1)$$

where

β_0 – Intercept;

χ_k, δ_m – Coefficients;

L – Lag operator (e. g. $LX_t = X_{t-1}$);

u_t – Error term.

As it is well known the ARDL model helps us to study

a) the short-run reaction and

b) the long-run reaction that are important in many economic problems.

---

[14] Hatrák (2007); Vogelvang (2005).

ARDL can be reproduced to ECM[15] ARDL version by transforming variables (1) into differences and lags. Equation (2) displays unrestricted ARDL ECM structure that we apply for identifying short and long-term relations among variables.[16]

$$\Delta SR_t = \sum_{j=1}^{m} \beta_j \Delta SR_{t-j} + \sum_{j=0}^{m} \gamma_j \Delta U_{t-j} + \sum_{j=0}^{m} \delta_j \Delta PI_{t-j} + \sum_{j=0}^{m} \theta_j \Delta DE_{t-j} + $$
$$+ \lambda_1 SR_{t-1} + \lambda_2 DE_{t-1} + \lambda_3 U_{t-1} + \lambda_4 PI_{t-1} + u_t \tag{2}$$

where

Δ	– First difference operator;
β, γ, δ, θ	– Coefficients of short-run relation;
$\lambda_1 - \lambda_4$	– Coefficients of long-run relation;
u_t	– Error term;
DE	– Elderly Dependency Ratio (ratio of the population aged 65 or older to the working age population 15 – 64);
U	– Unemployment Rate;[17]
PI	– Property Income.[18]

SR: Gross Household Saving Rate[19] calculated as: $SR_t = \dfrac{I_t - C_t}{I_t} * 100\%$

where

I_t – Household Disposable Income at time t;
C_t – Total Expenditure of Households at time t;

The restricted ARDL ECM model involving error correction term (ECT) is the following:

$$\Delta SR_t = \sum_{j=1}^{m} \beta_j \Delta SR_{t-j} + \sum_{j=0}^{m} \gamma_j \Delta U_{t-j} + \sum_{j=0}^{m} \delta_j \Delta PI_{t-j} + \sum_{j=0}^{m} \theta_j \Delta DE_{t-j} + \omega ECT_{t-1} + u_t \tag{3}$$

where

Δ – First difference operator;
ω – Speed of adjustment;
ECT – Error correction term: lag residuals from the long-run relationship.

---

[15] ECM includes variables in first differences and with an error-correction term.

[16] Estimations in EViews 7.

[17] Calculated as the ratio of the unemployed to total labour force.

[18] Property income includes interest, distributed income of corporations (dividends, withdrawals from the income of quasi-corporations), other investment income and rent.

[19] The *household sector* covers individuals or group of individuals whose principal function is consumption. It also includes own-account workers or entrepreneurs and unincorporated partnerships producing goods and services, when their activities cannot be separated from those of their owners. The household sector has been complemented by non-profit institutions serving households (NPISH). This generally small sector includes charities, trade-unions, churches, political parties, sports clubs etc. The G*ross household saving rate* is calculated by dividing gross saving by gross disposable income (def. according to Eurostat).

To prove the cointegration relation among variables the ECT coefficient has to be negative and significant.

5. Interpretation of Results

ARDL procedure needs to set appropriate lags of variables, according to the information criteria, two lags should be appropriate (see Table 1).

T a b l e 1

Lag Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	–541.8214	NA	29.97689	14.75193	14.87647	14.80161
1	–253.3920	537.8817	0.019031	7.388974	8.011694*	7.637384
2	–224.0482	51.54998	0.013322*	7.028329*	8.149226	7.475469*
3	–214.0197	16.53342	0.015811	7.189722	8.808795	7.835590
4	–196.5607	26.89632*	0.015486	7.150289	9.267538	7.994886
5	–185.9803	15.15576	0.018487	7.296764	9.912189	8.340090
6	–173.5611	16.44700	0.021334	7.393544	10.50715	8.635598
7	–164.7764	10.68405	0.027714	7.588553	11.20033	9.029335

* Indicates lag order selected by the criterion; LR – Sequential modified LR test statistic (each test at 5% level); FPE – Final prediction error; AIC – Akaike information criterion; SC – Schwarz information criterion; HQ – Hannan-Quinn information criterion.

Source: Estimation in EViews 7.

For testing unit root, ADF and PP test were applied. Table 2 presents the results. Additionally, for deciding the order of integration, in cases where ADF and PP test gave different results, test of Zivot-Andrews (1992) was applied.

T a b l e 2

Unit Root Tests (p-values)

ADF p-values					PP p-values			
	SR	DE	U	PI		SR	DE	U	PI
C	0.1065	0.6286	0.3815	0.1964	**c**	**0.0032**	0.6171	0.5055	0.2163
ct	0.1665	0.8511	0.6375	0.2561	**ct**	**0.0030**	0.8159	0.7711	0.2434
diffc	**0.0001**	**0.0000**	**0.0005**	**0.0000**	**diffc**	**0.0001**	**0.0000**	**0.0005**	**0.0000**
diffct	**0.0001**	**0.0000**	**0.0028**	**0.0000**	**diffct**	**0.0001**	**0.0000**	**0.0028**	**0.0000**

(SR) Saving Rate is I(0),[20] (DE) Elderly dependency ratio I(1), (U) Unemployment is I(1), (PI) Property income is I(1).

Source: Estimation in EViews 7.

---

[20] For testing unit root with a structural break of variables, test of Zivot-Andrews (1992) was additionally applied to decide on the order of integration. H0: SR has a unit root with a structural break in the *intercept*: Zivot-Andrews test statistic –4.892. 1%, 5% and 10% critical value: –5.34; –4.93; –4.58. H0: SR has a unit root with a structural break in both the *intercept and trend*: Zivot--Andrews test statistic –6.390. 1%, 5% and 10% critical value: –5.57; –5.08; –4.82. According to this, SR is I(0).

To test for cointegration, the F test (to test the null hypotheses of no cointegration against the alternative of cointegration) was applied.

$$H_0: \lambda1 = \lambda2 = \lambda3 = \lambda4 = 0$$
$$H_1: \lambda1 \neq \lambda2 \neq \lambda3 \neq \lambda4 \neq 0$$

Table 3 presents Critical Value Bounds for the F-statistics.

T a b l e 3

Critical Value Bounds for the F-Statistics

	90%		95%		97.5%		99%	
K	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
3	2.01	3.10	2.45	3.63	2.87	4.16	3.42	4.84

Source: Pesaran, Shin and Smith (2001).

The computed F-statistic (9.59) is higher than the upper bound value (4.84) tabulated by Pesaran, Shin and Smith (2001), for unrestricted intercept and no trend for three variables (without lagged dependent variable). This confirms long-run equilibrium among variables and justifies the application of an ARDL procedure. Table 4 presents the estimations of the Enterprise Content Management (ECM) ARDL (equation 2 and 3) after applying General-to-specific (Gets) modelling.

The coefficient of the lagged dependent variable (Saving Rate) has negative sign and is significant (variables are cointegrated). The results are the following:

Saving rate is in the long-run negatively impacted by unemployment. Jobless people cover their expenditure either from transfers or accumulated savings. The coefficient of the demographic variable is positive. Higher proportion of old people (65 and older) on the working age population (15 – 64), rises household saving. This is a paradox to the life-cycle model which stipulates that elderly population should be dissaving.[21]

Empirical papers elaborated by Grace, Bersales and Mapa (2006), Bruncková, Machlica and Vaňko (2010), Pécsyová, Vaňko and Machlica (2013), also present positive impact of dependency ratio of elderly people on household saving. Property earnings show a positive influence on saving; as such earnings increase income of people and hence, influence the behaviour of households to save more. In the short-run, unemployment has a positive effect on saving rate, because, higher unemployment rate expresses unsafe conditions in the macro economy and on the labour market. People feel uncertain and frightened about the present situation as well as their future and that leads them to decline current consumption. In the short-run, people are able to save, however, in the long-run,

---

[21] According to Sturm (1983), saving behaviour can be reconciled with the LCH within a bequest motive (households accumulate wealth beyond the levels required to finance retirement consumption).

they have to drain out their accumulated finances. Positive relation between saving and unemployment rate in Slovakia was identified in the short-run by Pécsyová, Vaňko and Machlica (2013). Lagged saving rate, property income, and dependency ratio positively impact current saving.

T a b l e 4

Results of ECM ARDL

	ECM ARDL Unrestricted	ECM ARDL Restricted
Variable	Δ SR	Δ SR
SR (–1)	–0.626*** [–6.099]	
DE (–1)	0.153*** [3.291]	
U (–1)	–0.170** [–2.152]	
PI (–1)	0.310*** [3.659]	
Δ SR (–2)	0.166* [1.863]	0.165* [1.889]
Δ U (–2)	0.820** [2.426]	0.784** [2.404]
Δ PI (–1)	2.966* [1.666]	3.078* [1.793]
Δ DE(–2)	0.285* [1.898]	0.275* [1.922]
ECT (–1)		–0.630*** [–6.255]
R^2	0.38	0.37
Adj R^2	0.31	0.34
No	78	78

***,**,* imply significance at 1%, 5%, 10% levels respectively; t-statistic in brackets.

Source: Estimation in EViews 7.

The coefficient of adjustment (ECT) is negative and significant. The speed of adjustment is high, as more than 60% of disequilibrium in the previous quarter will be corrected in the current quarter. Calculated elasticity of variables from the ECM ARDL unrestricted model (2) identifies impact of explanatory variables upon dependent variable. This is done by dividing the coefficients of explanatory variables DE (–1); U (–1); PI (–1) by negative value of the coefficient of dependent variable (SR (–1)). The results are presented in Table 5.

T a b l e 5

Long-run Effect of Explanatory Variables

Variable	Elasticity
DE(–1)	0.2446
U (–1)	–0.2723
PI (–1)	0.4958

Source: Estimation in EViews 7.

Following Table 6 presents the results from residual tests (Breusch-Godfrey test and Breusch-Pagan Godfrey test).

T a b l e 6

Results from Residual Tests

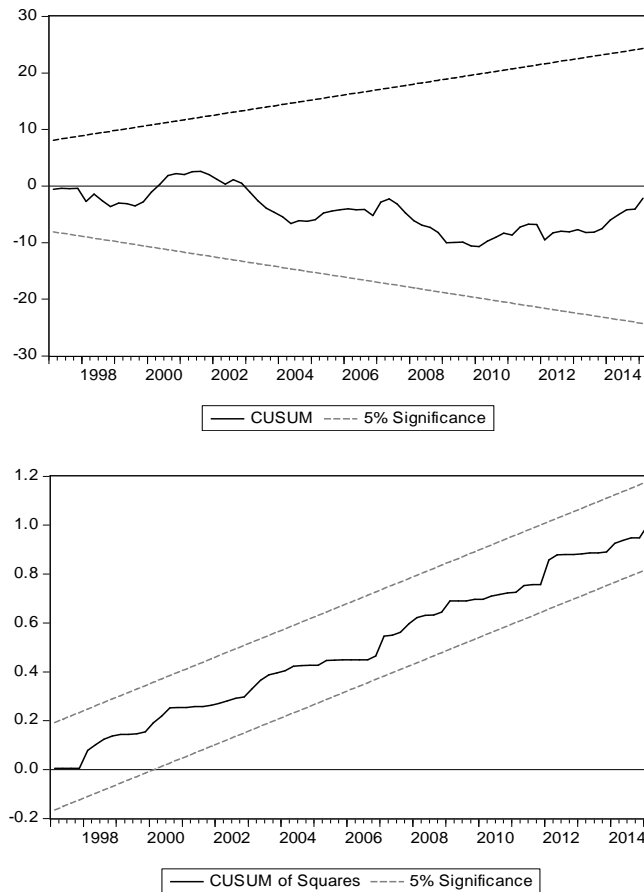|		
LM-test (Breusch-Godfrey)	2.913	(0.233)
Heteroscedasticity Test: Breusch-Pagan-Godfrey	2.773	(0.734)

Note: P-values in brackets.

Source: Estimation in EViews 7.

The p-values of the autocorrelation (BG-test) and heteroscedasticity (BP-test) show that the null hypothesis of non-autocorrelation and homoscedasticity is not rejected.

F i g u r e 3

CUSUM a CUSUM Squares Tests

Source: Estimation in EViews 7.

The plots of the CUSUM and CUSUM of Squares indicate that parameters are constant over the observed period of time.

Conclusion

The outcomes from the model suggest that demographic factors and economic indicators significantly influence saving of households in Slovakia. From demographic factors it is the old dependency ratio. This result contradicts to the life-cycle hypothesis, however, there are research papers focusing on household saving relating to Slovakia which present elderly population active on saving. Elderly population can contribute to saving if the level of their pension enables them to do so and, elderly population may accumulate wealth for bequest motive and that is the case for Slovakia. From economic indicators it is the unemployment rate that plays important role in determining saving rate in the short- and long-run. Favourable conditions on the labour market along with wage policy stimulate households to increase consumption and spending accordingly, however, unemployment is usually a proxy for general macroeconomic uncertainty and individual´s uncertainty on the labour market relating to income. In the short-run individual is able to save for uncertain working and income conditions, however, in the long-run as it has been proved, savings (if any), are used for covering necessary expenditures where transfer payments are not sufficient.

References

BECKMANN, E. – HAKE, M. – URVOVÁ, J. (2013): Determinants of Households´ Savings in Central, Eastern and Southern Europe. Vienna: Oesterreichische Nationalbank.

BRUNCKOVÁ, M. – MACHLICA, G. – VAŇKO, M. (2010): Miera úspor na Slovensku. Bratislava: Ministerstvo financií SR, Inštitút finančnej politiky.

CALLEN, T. – THIRMANN, CH. (1997): Empirical Determinants of Household Saving: Evidence from OECD Countries. [IMF Working Paper, 97/181.] Washington, DC: International Monetary Fund.

CARROLL, CH. D. (1997): Buffer-Stock Saving and the Life Cycle/Permanent Income Hypothesis. The Quarterly Journal of Economics, 112, No. 1, pp. 1 – 55.

DUESENBERGERY, J. (1949): Saving and the Theory of Consumer Behavior. Cambridge, MA: Harvard University Press.

FRIEDMAN, M. (1957): A Theory of the Consumption Function. Princeton: Princeton University Press.

GRACE, L. – BERSALES, S. – MAPA, D. (2006): Patterns and Determinants of Household Saving in the Philippines. Washington, DC: USAID. Available on: <http://pdf.usaid.gov/pdf>.

HATRÁK, M. (2007): Ekonometria. Bratislava: Iura Edition.

HORIOKA, Ch. Y. – WAN, J. (2006): The Determinants of Household Saving in China: A Dynamic Panel Analysis of Provincial Data. [NBER Working Paper Series, 12723.] Cambridge, MA: National Bureau of Economic Research.

HUSÁR, J. (2007): Makroekonomická analýza. Bratislava: Vydavateľstvo EKONÓM.

KEYNES, J. M. (1936): The General Theory of Employment, Interest and Money. Available on: <http://cas.umkc.edu>.

KOLASA, A. – LIBERDA, B. (2014): Determinants of Saving in Poland: Are They Different than in other OECD Countries? [Working Papers, No. 13/2014.] Warsaw: University of Warsaw, Faculty of Economic Sciences.

MODIGLIANI, F. – BRUMBERG, R. (1954): Utility Analysis and the Consumption Function: An Interpretation of Cross-section Data. In: KURIHARA, K. K. (ed.): Post-Keynesian Economics. New Brunswick: Rutgers University Press, pp. 338 – 436.

MODIGLIANI, F. – SHI LARRY, C. (2004): The Chinese Saving Puzzle and the Life-Cycle Hypothesis. Journal of Economic Literature, *XLII*, No. 1, pp. 145 – 170.

PÁLENÍK, V. a kol. (2012): Strieborná ekonomika v slovenskom, európskom a svetovom kontexte. [Monography.] Bratislava: Ekonomický ústav SAV.

PAUHOFOVÁ, I. a kol. (2012): Paradigmy zmien v 21. storočí. [Monography.] Bratislava: Ekonomický ústav SAV.

PÉCSYOVÁ, M. – VAŇKO, M. – MACHLICA, G. (2013a): Determinanty miery úspor na Slovensku. 1. časť. BIATEC, *21*, No. 9, pp. 10 – 13.

PÉCSYOVÁ, M. – VAŇKO, M. – MACHLICA, G. (2013b): Determinanty miery úspor na Slovensku. 2. časť. BIATEC, *21,* No. 10, pp. 10 – 14.

PESARAN, M. H. – SHIN, Y. (1999): An Autoregressive Distributed-Lag Modelling Approach to Cointegration Analysis. In: STRØM, S. (ed.): Econometrics and Economic Theory in the 20th Century. [Online.] Econometric Society Monographs, No. 31, pp. 371 – 413. Cambridge: Cambridge University Press, Cambridge Books Online. Available on: <http://dx.doi.org/10.1017/CCOL521633230.011>.

PESARAN, H. M. – SHIN, Y. – SMITH. J. R. (2001): Bounds Testing Approaches to the Analysis of Level Relationships. Journal of Applied Econometrics, *16*, No. 3, pp. 289 – 326.

SCHROOTEN, M. – STEPHAN, S. (2003): Private Savings in Eastern European EU-Accession Countries: Evidence from a Dynamic Panel Data Model. Berlin: DIW.

STURM, P. H. (1983): Determinants of Saving: Theory and Evidence. OECD Journal: Economic Studies, Vol. 1, pp. 147 – 196.

VOGELVANG, B. (2005): Econometrics: Theory and Applications with EViews. Amsterdam: FT Prentice Hall.

ZIVOT, E. – ANDREWS, D. (1992): Further Evidence of Great Crash, the Oil Price Shock and Unit Root Hypothesis. Journal of Business and Economic Statistics, *10*, No. 3, pp. 251 – 270.

<www.eurostat>.

<www.nbs.sk>.

<http://www.oecd-ilibrary.org/>.

<www.statistics.sk>.

<https://www.stlouisfed.org/>.