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**EMPIRICAL EVIDENCE ON FACTORS SHAPING
THE SAVINGS RATE OF POLISH HOUSEHOLDS**

**CZYNNIKI WARUNKUJĄCE ZMIENNOŚĆ
STOPY OSZCZĘDZANIA POLSKICH GOSPODARSTW
DOMOWYCH W ŚWIETLE BADAŃ EMPIRYCZNYCH**

DOI: 10.15611/ekt.2015.4.10

JEL Classification: C51, D12

Summary: The paper aimed at identifying the effects of the coincidence of socio-economic status and the advancement of the family life cycle on the savings rate. The multilevel regression model for data from empirical surveys was used. The obtained results allow us to explain how the differentiation of the saving rate that causes a poor fit of LCH models to the observed reality occurs. Ascribed to this differentiation is the explanation that allows us to reduce the area of unpredictability of the savings rate. These results show that the social representations of saving characteristic for various socio-economic groups are crucial factors that explain the variability of the savings rate, moderating its sensitivity to the demographic factors as defined in the economic theory. Moderation leads to two different tendencies. The first occurs among the households of a relatively low status and lies in the extension of consumption along with age, and it is stronger the lower the status of the household head is. The second, completely reverse, is present among households of a relatively high social status. The contraction of the time horizon of consumption manifests among these households, and it is stronger the higher the socio-economic status of a household head is.

Keywords: LCH, multilevel regression model, multivariate correspondence analysis, social representation of saving, savings rate.

Streszczenie: Celem artykułu jest rozpoznanie wpływu współwystępowania statusu społeczno-ekonomicznego i zaawansowania w cyklu życia rodziny na stopę oszczędzania w gospodarstwach domowych. W analizie wykorzystano dane z badania empirycznego, dla których zastosowano podejście wielopoziomowe w modelowaniu badanej zależności. Uzyskane wyniki wyjaśniają obserwowaną zmienność stopy oszczędzania, odmienną względem postulowanego w literaturze modelu cyklu życia. Wyniki te pokazują, że społeczne reprezentacje oszczędności, charakterystyczne dla różnych grup społeczno-ekonomicznych, są decydującym czynnikiem, który wyjaśnia zmienność stopy oszczędności, odmienną względem postulowanej w literaturze, i moderuje jej wrażliwość na czynniki demograficzne opisane w teorii ekonomii. Moderacja ta prowadzi do dwóch odmiennych tendencji. Pierwsza dotyczy go-

spodarstw domowych o stosunkowo niskim statusie społeczno-ekonomicznym i polega na wydłużaniu horyzontu konsumpcji wraz wiekiem i jest tym silniejsza, im niższy jest status gospodarstwa. Druga, przeciwstawna, dotyczy gospodarstw o wyższym statusie społeczno-ekonomicznym, polega na krótkim horyzoncie czasowym konsumpcji i jest tym silniejsza, im wyższy jest ten status.

Słowa kluczowe: wielopoziomowy model regresji, wielowymiarowa analiza korespondencji, społeczne reprezentacje oszczędzania, stopa oszczędzania.

1. Introduction

The historical events at the turn of the 1980s and 1990s that led to a sweeping change in social and economic conditions exerted a crucial impact on the opportunities to accumulate wealth by Polish households. In 1999 the complex reform of the old-age pension system was introduced in Poland and the process of changes is still ongoing. The multi-pillar system replaced the PAYG (pay-as-you-go) system. The voluntary third pillar will guarantee higher pensions for those who that decide to save more. However, the systemic changes were placed in the new market economy which was just being implemented in Poland. The new economic reality involves a series of processes influencing the management of the current budget. On one hand the principles of a market economy impose a rigorous environment for the management of the disposable income, while on the other the dynamically developing market of goods, services and modern banking systems create pressure to spend.

2. Theoretical background

The origins of contemporary theory of savings can be traced to Keynes' hypothesis of absolute income [Keynes 1946] that gave rise to models of life cycle [Modigliani, Brunberg 1954; Friedman 1957]. These theories assume that a desire to have a smooth pattern of consumption (Friedman's permanent income) in conjunction with the unpredictable volatility in current income (life-cycle hypothesis by Modigliani and Brunberg) constitute the basis of saving. Modern theories of saving that arose on these grounds included modifications of the classic model such as Hall's random-walk hypothesis [1978], a hypothesis about the excess sensitivity of consumption to predictable changes in income [Flavin 1981] and excess smoothness of consumption when it responds to unpredictable changes in income [Campbell, Deaton 1989], uncertainty about the length of life, variability in interest rates [Hall 1988; Summers, Carroll 1987] and the constrained liquidity of households [Deaton 1990]. Contemporary theories of the life cycle take into account the fact that the utility of consumption may depend on factors such as the need to hold precautionary financial wealth to protect the household against adverse events (the precautionary motive is a consequence of rejecting the quadratic utility function [Carroll 1992]),

willingness to leave a bequest, perception of social status through the level of consumption (snobbism) and the fact that some social protection systems discourage outright low-income individuals to save [Hubbard, Skinner, Zeldes 1994].

These ramifications of the overly rigorous classical life-cycle model have not helped the theory fit to the observable reality. In the first place, there is no empirical basis to accept the proportionality hypothesis of the life-cycle model. Empirical evidence has it that a considerable part of saving is generated by a narrow group of wealthy households. The facts that consumption follows income [Summers, Carroll 1987] and saving continues after the end of the labor-market activity do not give grounds to upholding the thesis about consumption smoothing in the short and long-run. Empirical data are also ambiguous with regard to the hypothesis of excess sensitivity of consumption to predictable income changes. The precautionary motive of saving was detected only in selected groups of households [Browning, Lusardi 1996].

The development of economic theories proceeded in parallel with work on the role of subjective factors that shape the economic behavior of individuals in particular decisions about saving [Warneryd 1999]. A distinct role in the development of this strand of research played the work that discussed the impact of the subjective perception of economic reality on economic behavior [Katona 1975]. Empirical results singled out subjective economic expectations as a key factor that shapes decisions about consumption. These expectations, in the view of the theory's author, were to be formed on the basis of the individual perception of economic reality. Katona suggested that it is the diversity of these expectations that is the driving force of the observed dispersion of decisions on consumption and, in consequence, saving in groups of households, homogenous with regard to demographic and economic traits. Following this approach, A. Lindquist [Lindquist 1981] has presented a simple model of saving behaviour which has been tested by many researchers (e.g. [Furnham 1985]). Relatively recently G.V. Veldhoven et al. [1993] presented a framework for research on saving behaviour. In response to this approach, P. Webley [Webley 1995] suggested different kinds of methods to understand saving behaviour better. Such views have been noted by E.A.G. Groenland, J.G. Bloem, A.A.A. Kuylen [Groenland, Bloem, Kuylen 1996]. Subsequent to the development of such new theories, economic explanations for the behaviour of savers have been expanded to take into consideration risk aversion and time preferences, accounting for psychological interpretations of individual behaviour (cf. [Kahneman, Tversky 1979; McCarthy 2011]). Apart from objective factors such as sufficiency or insufficiency of disposable income for the creation of financial reserves, the subjective judgment about one's economic situation should be considered as a determinant of wealth accumulation [Worthington 2006; Khaneman, Deaton 2010; Anderloni et al. 2012]. At present it is obvious that in any analysis on saving behaviour (of households or individuals) not only economic factors but sociological, psychological, demographic and cultural factors have to be taken into account as well. Results from many studies show that there is still a lot to explore in saving behaviour.

The new approach to the mechanism of how savings are created, tightly tied to economic psychology, emphasizes the thesis that the way people perceive economic reality is individualized, leading to representations of economic phenomena that depend on cognitive circumstances. They may cause differences in “framing” [Kahneman, Tversky 1979] and “pricing” [Shefrin, Thaler 1988]. Subjective experience plays a crucial role but the knowledge and experience of the social group in which the individual exists is important as well. According to this strand of literature, the way in which individuals allocate its endowment to consumption and saving depends on a set of factors, among which one finds subjective economic expectations, formed on the basis of individual perception of reality. These expectations depend not only on individual predispositions but also on the way how economic events and economic objects are defined and interpreted by the social group to which the individuals belong, i.e. social representations of saving and consumption, formed in a given time.

In line with the theory by Moscovici [Moscovici 1988] that explains how social representations of events and objects are created, the acquired knowledge on economics and social representations of economic phenomena will not be objective and will not carry universal content. Along with Moscovici, dissimilarities of social groups constitute grounds for the differentiation of social representations of occurrences and objects that all groups experience, and in this way lead to the differentiation of behavior in response to these occurrences or objects [Webley, Nyhus 2001].

In line with the theory of social representations, social status should be considered among the factors of savings, along with factors such as age and income stipulated by the economic theory, since this status may lead to the differentiation of social representations of saving. Were this hypothesis is correct, then the departures from the life-cycle model, in particular with regard to demographic conditions, registered in empirical research, should be explained by the differences in the social and economic profiles of individuals. Therefore the socio-economic status of individuals that determines social representations of saving should interact with the progression of individuals in the family life cycle.

3. Data

This hypothesis was verified on the basis of two questionnaire surveys, conducted in the form of an interview using a questionnaire among representative groups of Polish households at the end of 2012¹. Effective stratified sample size was achieved

¹ These studies were commissioned with a grant of the National Science Center No UMO-2011/01/B/HS4/00970. The Centre for Social Opinion Research in Warsaw, Poland, conducted the surveys. Computer software IBM Predictive Solution version 19.0 was used to analyze the results of the questionnaires.

by 1479 households with a 15% non-response rate. The face-to-face interviews were conducted at the home of the respondents. The size of the sample was given proper consideration when evaluating the statistical significance of the results, likewise the fact that sampling was two-stage stratified. The presented results satisfy the relative random error criterion below 15% in most cases. The subject of the surveys was savings rate, declared by household heads during a year at the end of which the research was conducted.

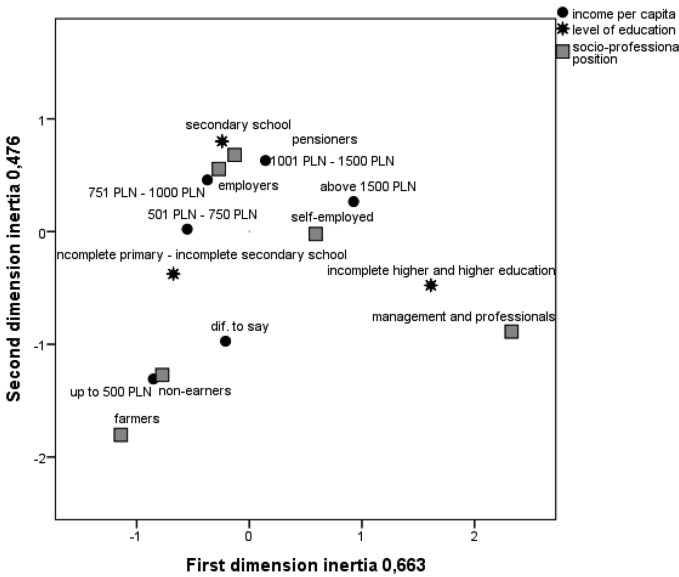


Fig. 1. Coincidence between scores of social-economic dimension and its indicators

Source: own elaboration.

Social status is controlled by educational level, professional position and income level per capita. A one-dimension category was constructed that allows to aggregate these social-demographic features of the examined households into one dimension. The construction of a one-dimensional variable that would integrate the singled-out social-economic features was also prompted by the correlation between education, the socio-professional position of the household head and income. The variable, constructed by means of a multivariate correspondence analysis, that describes the socio-economic status of a household displays features of sufficient quality and has good properties when diagnosing this status. For first dimensions, the coefficient of inertia was high and higher average values of the variable scaling socio-economic status were recorded for groups of households that had a relatively higher average income per person and whose head attained higher levels of education, as well as for groups of households in which their head is a manager, professional or self-

employed. The adequacy of first correspondent variable as a description of social-economic status is exhibited in Figure 1.

4. The structure of dependence of the savings rate on the progression in life cycle and the socio-economic status of examined households

In the subsequent analysis of the impact of the interaction of the socio-economic status and demographic factors on the saving rate, the age of the household head was taken as an indicator of the demographic conditions connected to the progression in the family life cycle. The Pearson simple and partial correlation coefficients for the savings rate and its two singled-out main determinants are shown in Table 1.

Table 1. Pearson correlation coefficients for the savings rate and household-head age and socio-economic position

Independent variable	Correlation coefficient for savings rate	<i>p</i> -value
Age of household head		
Simple correlation	-0.110	0.000
Partial correlation	-0.065	0.014
Socio-economic position		
Simple correlation	0.312	0.000
Partial correlation	0.300	0.000

Source: own calculations.

The results presented in Table 1 raise doubts as to whether the analysis of the sensitivity of the savings rate to the age of the household head as a description of advancement in the life-cycle, makes sense. The values of simple correlation as well as the values of partial correlation appeared to be very low when the impact of socio-economic status was eliminated. Therefore in order to explain what was the basis for the significance of the interactions of these traits in determining the savings rate, the hypothesis that the influence of these determinants is hierarchical has been verified in the process of modeling the dependence of the savings rate on the socio-economic status and the age of the household head.

5. Method of analysis

It was assumed that there are effects of social-economic context on individual households, and these effects are mediated by the intervening processes that depend

on characteristics of a social-economic context. As a result the data structure in population is hierarchical, and the sample data are viewed as a multistage sample from this hierarchical population.

It was assumed that there are J groups, with different number of households N_j in each group. On the household level, there is outcome variable referring to the declared savings rate. There is also one explanatory variable (X_{ij}) where $i = \{1, 2, \dots, N_j\}$, and on a group level explanatory variable (Z_j). To analyze these data we can set up separate regression equations in each group to predict the savings rate Y by X or one complex regression equation as follows [Goldstein 1987; Hox 2002]:

$$Y_i = \gamma_{00} + \gamma_{10}X_i + \gamma_{01}Z + \gamma_{11}X_iZ + u_1X_i + u_0 + e_i \quad (1)$$

This is a result of substituting into equation:

$$Y_i = \beta_0 + \beta_1X_i + e_i \quad (2)$$

following equations:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}Z_j + u_{0j} \quad (3)$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}Z_j + u_{1j} \quad (4)$$

as a consequence of the assumption that both the intercept and regression coefficient in equation (2) vary across the groups, where u_{0j} and u_{1j} are residual error terms at the group level. These residual errors are assumed to have a mean of zero, and to be independent from the residual error e_{ij} at the individual household level, and have a multivariate normal distribution. The variance of residual errors u_{0j} is the variance of intercepts between the groups and the variances of residual error u_{1j} are the variances of the slopes between groups. The covariance between the residual error u_{0j} and u_{1j} is generally not assumed to be zero. The estimation of parameters in multilevel modelling was done using the Maximum Likelihood method (ML). The exploratory procedure was used to select a model. At first, the intercept-only model was estimated and various types of parameters were added step by step. At each step the results were inspected to see which parameters are significant, and how much residual error is left at the two distinct levels. The Wald test was used as a significant test for the estimated parameters and Akaike's Information Criterion (AIC) was used as a general fit index to compare the fit of statistical models.

6. Results

It was assumed in the first place that the influence of the socio-economic position on the savings rate is modified depending on the age of the household head. Were this hypothesis correct in the case of the Polish households covered by this research project, then the collected data on the declared savings rate should have a hierarchical structure with respect to the age of the household head. In order to verify this

hypothesis, the level of intraclass correlation was used as a criterion. The age of the household head was selected as the grouping variable, and it was verified whether it moderated the sensitivity of the savings rate to the socio-economic status. The estimated intraclass variation of the savings rate which had been estimated under the assumption that the age of the household head defines classes, did not confirm the hypothesis. The intraclass variance that served as a basis for estimations of this coefficient was insignificant ($p = 0.07$) and the value of the correlation coefficient (0.02) did not exceed 0.1. Moreover, the average values of the savings rate that were estimated, assuming the hierarchical structure of data (these values correspond to the intercept in the estimation procedure) did not differ from the value that resulted from the estimation under the assumption that such a structure does not exist.

Subsequently it was assumed that the rules defined in the LCH, are subject to a modification resulting from the differentiation process of social representations of saving with regard to socio-economic status. Thus, the thesis that the influence of age, described by the LCH is modified depending on the socio-economic status of the household head, was verified. This implies that this status functions as a moderator of the relationship between savings rate and age of household head. The hypothesis about such a structure of the relationship of both considered determinants was confirmed by the significance of intraclass variation of saving rate ($p < 0.001$) and by the values of the intraclass correlation (0.233) whose estimation was based on it, all done assuming that the classes were determined by the socio-economic status of the household head.

Satisfactory solutions was achieved in modeling the dependence of the savings rate on the socio-economic status and the age of the household head under the assumption that this status is a variable which influences the savings rate at the level of the household group while the age is a variable that influences the savings rate at the individual household level. The highest fit to the empirical data and significant values of parameters were achieved by means of the two-level model with a random intercept and a random regression coefficient, assuming that the regression coefficient and the intercept are correlated (Table 2). This implies that the socio-economic status in exerted an impact not only on the level of the savings rate but also on its sensitivity to the age of the household head. The intercept represents the average savings rate (in%) intercept represents the average savings rate (in%) estimated for the total population in 2012.

The random effects in the estimated model are described by the variables whose average values are assumed to be zero. Their standard deviations are described by the mean deviations of the model parameters (standard errors), depending on which class, defined by the socio-economic status, the household belongs to. Therefore it is possible to construct basic regression models that describe the dependence of the savings rate on the age of the household head when the variability of the socio-economic status is fixed. The basis for distinguishing these classes were the subsequent multiples of standard deviations, defining the limits for typical values

Table 2. Estimation results of model with cross-level interaction: both the regression slope and regression intercept are assumed to vary across the groups and they are correlated

Components	Coefficient	SE	p-value
Fixed effects			
Intercept	5,2254	0,4169	0,000
Age of head of household-centered	-0,0639	0,0254	0,0128
Random effects			
Variance of the individuals level residual errors	91,7136	3,6495	,000
Variance of the residual errors at the class level for intercept	24,7547	4,2118	,000
Covariance between residual errors (intercept and slope)	-0,7791	0,1708	,000
Variance of the residual errors at the class level for slope	0,0523	0,0145	,000
Deviance (-2log L)	12 192,8632		

Source: own calculations.

Table 3. Estimated parameters of regression models of the savings rate on the head of household, taking into account how the socio-economic status moderates this dependency (controlling for the socio-economic status)

Limiting values of the variable, describing the socio-economic status of a household head	Intercept	Slope
The lowest (-3 standard deviations)	-9,7008	-0,7499
Moderately low (-2 standard deviations)	-4,7254	-0,5213
Typical lower (-1 standard deviation)	0,2499	-0,2926
Typical higher (1 standard deviation)	10,2008	0,1648
Moderately high (2 std.)	15,1762	0,3935
The highest (3 std.)	20,1516	0,6222

Source: own calculations.

(\pm one standard deviation), moderately low and moderately high values (\pm two times the standard deviation), the lowest and the values highest (\pm 3 times the standard deviation) of the variable that describes the socio-economic status. The parameters of these models are given in Table 3. In each of the estimated models intercept represents the average savings rate (in%) for the sub-population.

The estimated values of parameters of regression models suggest that the socioeconomic status of the household head determined not only the level of the savings rate but also the strength of the impact of the household age on this level and the direction of the relationship in those years. Age turned out to be a stimulus to savings rate among the households of a relatively high socio-economic status. Moreover, the higher the socio-economic status of the household head the stronger was the stimulation of the savings rate by the rise in age. This means that the time

horizon of consumption among households of a relatively high socio-economic status extended more with their age, the higher their status was. On the contrary, this relationship was negative among households of a relatively lower socio-economic status. The lower was the status of the household head, the stronger the negative stimulus of the household head's age turned out to be. In this case, a given rise in the age of the household head reduced the savings rate more, the lower the social-economic status of a household was. The older the household head was among households of a relatively higher socio-economic status, the longer was the time horizon of consumption. The rise in the socio-economic status magnified the rate at which this horizon got extended.

7. Conclusions

The obtained results cast light on the mechanism which causes the differentiation of the savings rate of Polish households, independent of the conditions that are defined in the economic theories of saving. The explanation that allows us to reduce the area of unpredictability of the saving rate is ascribed to this differentiation. This paper points to the social representations of saving characteristic for various social groups as the driving force of the process of differentiation and resulting from it, the poor fit of empirical data to LCH models. According to the empirical research, Polish households of a different socio-economic status are characterized by distinct attitudes toward saving. This gives grounds for the statement that different social representations of saving are connected with this status. It has been shown that among Polish households, socio-economic status moderates the dependence of the savings rate on the progression in the family life cycle. The influence of the socio-economic status on the relationship, defined in the LCH model, lies in the result that the time horizon of the consumption of households of a relatively higher status extended with age the more the higher their status was. On the other hand, this relationship became reversed among households of a relatively lower social status. The lower the household head status was, the stronger the negative stimulus of the age of the household head turned out to be. In this case, the rise in the household head's age cut the time horizon of consumption more, the lower the social-economic status of the household head was.

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