DETERMINANTS OF LOAN REPAYMENTS: EVIDENCE FROM HOUSEHOLD BUDGET SURVEY IN POLAND

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Abstract

The last decade was a period of rapid growth of household debts in Poland. Households more often use credit to defray current expenses and purchase of durable goods. The using of a wider range of loans is also accompanied by gradually extension of average loan maturity. These processes are reflected in the level of the burden of household budgets repayments of loans. The volume of loan repayments is an important element of household budget not only due to maintain solid liquidity, but also influence the level of consumer spending, which determines the possibility of meeting needs in the long term.

The aim of this paper is to determine the burden of household budgets repayments of loans, as well as knowledge of the socio-economic profile of indebted households. Using econometric modelling, based on data from the household budget survey in Poland conducted by the Central Statistical Office in the years 2005–2013, the authors identified the determinants of the expenditure level related to repayment of loans incurred by households. The study indicates that the amount of household expenditure on loans and credits repayments is impact by income, age of household head and the size of the city, which is situated household.

Key words: consumer debt, loan repayments, Household Budget Survey

JEL Code: D12, D14, D91

Introduction

It is typical of all modern societies of highly developed countries that they use credits to finance their consumer spending and buy durable goods and immovable property (Doling, Horsewood & Neuteboom, 2007). The prolongation of average credit repayment period is evidence of the permanent nature of this phenomenon. This is visible especially in Central and Eastern European countries which experienced a boom in the retail lending market in the first decade of the 21st century (Wałęga, 2013).

Although greater debt level of households creates additional buying power at the time when credit is incurred, this entails more considerable burden on the budget from the repayment of credits in a long term. This still affects the purchasing potential and the ability to satisfy the needs of household members during the repayment period. In extreme cases, excessive increase in debt and related high level of payments make it impossible for a household to function properly and may lead to bankruptcy.

The outline of this paper is as follows. The next section presents the theoretical basis of the study in the field of household loan repayment. The third section provides some basic information about the statistical material used in the analysis, while the subsequent section details the characteristic of household loan repayments in Poland. In the fifth section, results of the statistical analysis are presented. The paper concludes with some remarks about the findings.

1   Theoretical determinants of household loan repayment

The income level is the main determinant of the indebtedness of a household and of the level of repayments on account of this. Current income affects the debt in two ways. On the one hand, it creates a capacity to incur loans. On the other hand, if one assumes that a similar level of income is maintained in subsequent periods, it encourages households to go to a higher consumption path. Higher income combined with relatively stable employment reduce the risk of difficulties related with settling liabilities in case the level of income decreases in future. This is an impulse for keeping lower savings and it increases the tendency to run up a debt (Duca& Rosenthal, 1993, p. 91). Therefore, if a household expects an increase in weighted average income during its life time, it will be inclined to use the credit market to reduce dissonance between current income and permanent income. Intuitively, it can be stated that households which expect an unfavourable income situation in the future will be less inclined to incur debts (cf. (Bertola, Disney& Grant, 2006, p. 7)). High-income households use credits or loans to satisfy their high consumer aspirations (*credit for convenience*). The situation looks different in case of people with a low income. Less well-off households take credits or loans (*credit for needs*) to satisfy the elementary consumer needs of household members (to buy, for example, food, clothing, household equipment, health care services), especially when faced with adverse events (theft, serious disease, need to repair basic equipment, etc.).

Another factor which has an influence on the total indebtedness level is the age of the head of household. In objective terms, during their life cycles, households incur credits not only to cover their current consumer spending but also to purchase durable goods and pay for education (Yilmazer&DeVaney, 2005, p. 278; Mankiw& Taylor, 2009, p. 549). The diversification of credit kinds reflects the changing needs of a household during its existence.

A negative correlation between the indebtedness level and the age of a household head was confirmed by research carried out in the USA by J.V. Duca and S.S. Rosenthal (1993, p. 81) as well as D. Cox and T. Jappelli (1993, pp. 207 and 209). Demand for credits is on the increase in case of households where the head of household is at the age of approximately 35 or less (then, the disposable income exceeds the desired consumption level), and subsequently decreases (see also: (Gropp, Scholz& White, 1997, p. 239)). J.N. Crook (2001, p. 89) noted a decrease in the indebtedness of households where the head of household was at the age between 55–64 and was older than 65. Thus, the above empirical research confirms the behaviour of households resulting from the assumptions of the life cycle hypothesis (LCH).

The education level of a reference person also influences the extent to which the credit market is used to finance consumption. A higher education level of a head of household has an impact on a higher credit limit as it is assumed that a group of households with higher education has greater capabilities to assess its ability to pay debts and is, in principle, considered more prudent when it comes to the assessment of the future (Crook, 1996, p. 479). A better situation in the labour market (in principle) of people with higher education and the resulting higher income are also important here.

2   Disbursements on account of the repayment of credits and loans

The elementary representative research on revenues, disbursements, consumption of households in Poland and equipment with durable goods is the annual Household Budget Survey. The data collected in this research enables the evaluation of the diversification of living conditions of basic social and economic groups of the population and the determination of the causes of these differences.

This research also collects information on the disbursements on account of the repayment of credits and loans. In case of credits and loans, it is more justified to analyse expenses on these grounds than the value of household revenues related with the incurring of credits or loans. The problem of omitting the fact that a liability is incurred is the consequence of using the monthly rotation method in this research. In order to note this in statistics, the

situation must take place in the month in which research was conducted. For this reason, the cases when households have revenues from credits or loans are less common than credit or loan repayments. Furthermore, with a few exceptions, debts are repaid in a monthly cycle. This gives a more reliable picture of the impact of credits and loans on the budget structure of a given household.

The amount of real disbursements of households on account of credits and loans is characterised by right-tailed asymmetry. This means that such expenses of the majority of households were lower than the total mean for households. Additionally, an increase in the modal value (distribution movement to the right) can also be noted during the period covered by the research.

During the years 2005-2013, the share of total disbursements of households on the repayment of credits and loans in the disposable income increased from 14.8% to 16.1% (table 1). This share depends on the affluence of households. The lowest share of expenses connected with the share of expenses on the repayment of credits and loans in the disposable income can be observed in households belonging to the third quintile group whereas the highest share is noted in households belonging to the first income quintile group. It must be also pointed out that during the analysed period households classified in the fifth quintile group increased their burden in the budget with the repayment of credits and loans by 2.35 percentage points.

Table 1: Share (%) of expenses related with the repayment of credits and loans in the disposable income according to a quintile group of income per capita and education level of a head of household during the years 2005–2013

Description	2005	2009	2013
quintile group of income per capita			
I	17,30	16,83	17,46
II	15,14	14,71	14,65
III	13,83	14,20	15,17
IV	14,13	14,41	15,42
V	15,06	15,22	17,41
level of education of the household's head			
Up to gymnasium	15,93	15,05	14,84
Basic vocational	14,24	14,08	14,41

Secondarygeneral	14,47	14,64	16,37
Secondary vocational	14,64	14,82	15,68
Higher	15,23	16,30	18,40
Total	14,81	14,91	16,12

Source: authors' own calculations based on unidentifiable individual data derived from household budget survey in the years 2005–2013.

The analysis of disbursements on account of the repayment of credits and loans according to the education level of the head of household indicates that people with higher education are more burdened than those with lower education level. What is more, in the analysed period households with persons with better education used the credit market more frequently.

Table 2: Share (%) of expenses related with the repayment of credits and loans in the disposable income according to the age of a household head and class of the location of a household during the years 2005–2013

Description	2005	2009	2013
age of a household head			
Up to 34years	15,25	16,84	17,24
35–44years	14,64	14,88	16,36
45–55 years	14,04	13,84	15,17
Morethan 55 years	15,35	14,66	15,66
class of the location of a household			
Village	15,59	14,71	15,58
Town below 100 thousand. residents	14,12	14,31	15,69
City 100–500 thousand. residents	14,78	15,15	16,49
City over 500 thousand. residents	14,56	16,77	18,72
Total	14,81	14,91	16,12

Source: authors' own calculations based on unidentifiable individual data derived from household budget survey in the years 2005–2013.

The greatest share of expenses related to the repayment of credits and loans in the disposable income was noted in 2013 by households where the head of household was not older than 34 years of age. Throughout the analysed years, this group of households noted the greatest increase in the considered share – in 2013 it increased by 2 percentage points in relation to 2005.

The high share of disbursements on the repayment of credits and loans in the disposable income confirms that households run by young people are mostly responsible for the credit boom in the recent years. At the same time, greater burden of repayment in the

budgets of "young" households may be related to a different attitude of this group to indebtedness and consumption financing. Based on higher than average share of expenses on the repayment of credits and loans in the disposable income, it can be indirectly deduced[1] that the greatest debts are noted by households whose main member (house of household) is younger than 34. Older age of heads of households entails the decreased nominal value of debt and amount of credit instalments.

The conducted analysis indicates that households in the countryside had the greatest share of disbursements on the repayment of credits or loans in the disposable income in 2005. In subsequent years, the share increased with the size of the city in which the household was located. In 2009 and 2013, the households in cities with a population of more than 500 thousand had the greatest budget burden. In each group of households, one can observe an increase in the share of expenses on the repayment of credits and loans in the disposable income whereas the greatest increase in the value of this indicator was noted during the analysed years in households situated in cities with a population of more than 500 thousand – by more than 3 percentage points.

3   Econometric modelling of the disbursements on the repayment of credits and loans

Apart from the presentation of distributions and average expenses on the repayment of credits and loans, an attempt was made to build an econometric model which explains the dependence of these expenses on social and economic characteristics of households. The model was used to examine the power and direction of impact of individual variables on the expenses of households related to the repayment of credits and loans. Therefore, the following exogenous variables have been proposed in the model which explains the expenses on credits and loans:

- – income per capita in the household;
- – the education level of the head of household expressed with five dummy variables; people with basic vocational education are the basis of comparison due to the fact that they are the largest group among respondents;

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[1] Household budget surveys do not collect data on the amount of debt of particular households resulting from the incurred credits and loans. This can only be estimated indirectly on the basis of the paid amounts. However, it must be remembered that in a given month the expenses of a given household on the repayment of loan or credit may be higher (for example, when the tripled amount of instalment is paid or if the remaining debt is repaid on a single basis) or lower (when a household pays instalments but not the full amount or does not pay them at all) than the regular level as specified in the repayment schedule.

– age of the head of household - four dummy variables; people at the age of 55+ are the basis of comparison due to the fact that they are the largest group among respondents;

– location of household – four dummy variables; households in the countryside are the basis of comparison.

An independent variable of "time" was taken for the model. This made it possible to verify whether the value of the analysed expenses changed over time.

Table 3: Results of the estimation of an exponential and power model which describes the dependency of disbursements on the repayment of credits and loans on social and economic characteristics of households

Description	Parameter	Standard error	$t(43667)$	*p-value*
Constant	2,0357	0,0513	39,70	0,0000
Lnincome per capita	0,4772	0,0077	61,76	0,0000
Up to gimnasium	-0,0362	0,0136	-2,66	0,0078
Secondaryvocational	0,0738	0,0106	6,95	0,0000
Highereducation	0,2979	0,0126	23,62	0,0000
Up to 34years	0,3507	0,0123	28,57	0,0000
35–44years	0,3983	0,0119	33,39	0,0000
45–55years	0,2271	0,0113	20,12	0,0000
Town below 100thousand. residents	-0,1424	0,0102	-13,97	0,0000
City 100–500 thousand. residents	0,1204	0,0122	9,89	0,0000
Cityover 500thousand. residents	0,0477	0,0148	3,23	0,0012
Time	0,0853	0,0041	21,03	0,0000
$R^2 = 0,2138$; $F(11,44) = 1079,4$ $p < 0,0001$				

Source: authors' own calculations based on unidentifiable individual data derived from household budget survey in the years 2005–2013.

In statistical terms, the best results were obtained with the use of the exponential and power model[2]. Variables were chosen with the use of the stepwise regression model and parameters were estimated based on the least squares method. The results of parameter estimation of the model describing the dependency of disbursements on the repayment of credits and loans on social and economic properties of households during the years 2005-2013 are presented in table 3. The model contains all variables which proved statistically significant in the course of estimation[3].

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[2] More – cf. for example (Podolec, 1995; Podolec, 2000).

[3] Coefficient of determination equals 21.38%. It must be emphasised that the modelling of household expenses based on individual data from the household budget survey gives relatively low values of the determination coefficient. However, the results of modelling should not be interpreted as incorrect as apart from exogenous variables in the model, which significantly influence the specific group of expenses, its level in a household depends on multiple individual causes, often non-measurable ones (cf. e.g. (Podolec, Ulman& Wałęga, 2008, p. 273)).

An increase in the real income of a household by 1% leads to an increase in expenses on the repayment of credits and loans by almost 0.5% on average (*ceteris paribus*). If the head of household has higher education, then – with the other characteristics unchanged – the repayment of credits and loans by this household is on average by 34.7% higher than these expenses for households where the head has basic education[4]. In case of households run by a person with secondary vocational education, expenses are higher by 7.7% on average. Such expenses did not prove to be statistically significantly different in households where the head has secondary education from expenses of households run by people with basic vocational education. If one assumes that other properties of a household are constant, the estimation results suggest that the age of the household head is inversely proportional to the repayment amounts of credits and loans. Households run by people at the age under 35 have these amounts higher by 42% on average than households where the head is at the age of 55+. The analysed group of disbursements is higher by 48.9% (for the age group: 35–44) and by 25.5% (for the age group: 45–55) in subsequent age groups than the value of repayments of the reference group (household run by people older than 55 years of age).

The analysis of the expenses of households on the repayment of credits and loans depending on the size of the location (*ceteris paribus*) indicates that those situated in large cities (with a population of more than 500 thousand) are characterised by disbursements higher by 4.89% on average than households in the countryside. Households in small towns (with a population of up to 100 thousand) are characterised by expenses on the repayment of credits and loans lower by 13.27% on average than rural households (*ceteris paribus*).

Furthermore, the research suggests that if one assumes that other characteristics of households are unchanged, the expenses on the repayment of credits and loans increase by 4.25% on average year by year.

Conclusion

The analyses based on data from the household budget survey for the years 2005–2013 demonstrate that households in Poland increase their indebtedness due to credits and loans and this is reflected in the increased burden on disposable income. Despite the credit boom (especially before 2008), the burden of repayments on household budgets is relatively low – below 17%.

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[4] The following algebraic operations are necessary for calculating the power of the dependence of a given variable in the exponential model: $(e^{[\text{value of the estimated parameter}]} - 1) \cdot 100\%$.

The greatest burden from the repayment of credits and loans is on the best-earning households run by well-educated people at the age up to 35, located in the largest cities. Thus, in terms of the incurring of credits, the behaviours of households in Poland do not differ from the regularities observed by other researchers. The results obtained based on the econometric model confirm the above.

Growing burdens on household budgets resulting from the repayment of credits require further constant monitoring of their level in order to identify the risk of insolvency. In the period of turbulent global economy, the analysis of household indebtedness distribution is necessary for guaranteeing the stability of the financial system.

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