



Do Children Matter to the Household Debt Burden?

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Abstract

In this paper, we assess the scale of indebtedness of households with children and investigate the impact of having children on the likelihood of falling into excessive debt. Using the unique dataset on indebted households in Poland, we employ two indicators to identify over-indebtedness: debt service-to-income ratio (DSTI) and subjective debt burden (SB). Applying two different debt measures allows encompassing both the economic and psychological dimensions of debt burden. In addition, we divide households into two groups: young (with a reference person aged under 35) and middle-aged and older adults (aged 35+). We find that the number of children increases the monthly debt repayments and reduces the likelihood of over-indebtedness, both according to DSTI and SB, for middle-aged and older adult households. There is no evidence for the influence of children on the over-indebtedness of young families. Our results suggest that for this age group of households, the other variables related to their economic situation and debt structures may explain the likelihood of over-indebtedness better than the presence of children.

Keywords Household · Children · Debt repayments · Over-indebtedness · Quantile regression

JEL Classification G51 · D14 · J13 · C21

Introduction

Indebtedness is attracting widespread interest due to its significant impact on the economic well-being of households (Białowolski & Weziak-Białowolska, 2021; Cai et al., 2021; Heintz-Martin et al., 2021) and family formation (Nau et al., 2015; Sieg & Wang, 2018). On the one hand, it is a way to smooth consumption over the life cycle. On the other hand, debt repayments not only crowd out other expenses but also, if the amount is significant compared to income, can cause financial difficulties. The latter, in turn, amplifies the negative psychological impact of debt (Bridges & Disney, 2010; Lea, 2021). Hence, the profit and loss balance of indebtedness is an open question.

The overall level of indebtedness in Poland remains low compared to highly-developed countries. Although household debt increased more than tenfold between 2000 and 2018 (NBP, 2020), the share of household debt in GDP was approximately only 35% in 2018, which was almost twice as low as the EU15 average and one-and-a-half times lower than the EU28 average (IMF, 2020). Taking into account the experiences of developed countries, further increases in household indebtedness can be expected in Poland, such that the issues associated with it will undoubtedly begin to gain in importance. Inevitably, when households accumulate debt, there is a greater likelihood that they will face difficulties in servicing it.

Household borrowing is determined by, among other factors, the size and structure of the family, including the presence of offspring (Betti et al., 2007; Ferretti & Vandone, 2019). It seems that children may increase the demand for credit, according to the life cycle theory. Do they, however, act as an important driver of excessive indebtedness? Or maybe the strength of their impact on household debt burden depends on the age of the parents?

The objectives of this study were to assess debt repayment amounts in households with children and to analyse the

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influence of children in a household (as well as other socio-economic factors) on the likelihood of over-indebtedness.

This study contributes to the literature in three ways. First, existing research on household over-indebtedness and debt types by family structure is limited and dominated by American and Western European data (Heintz-Martin et al., 2021; Xiao & Yao, 2014, 2020). We aim to fill this research gap by examining relevant characteristics of Polish households. Second, by distinguishing young households and middle-aged and older adult households as separate categories, it is possible to identify the differences in debt repayment amounts and debt burden among households with different age profiles. Third, to identify households whose debt burden should be considered excessive, and simultaneously to meet the demands of assessing household financial conditions through a combination of objective and subjective measures (Bialowolski & Weziak-Bialowolska, 2014; Keese, 2012), we apply two different indicators: debt-service-to-income (DSTI) and subjective burden of debt (SB).

Our findings may contribute to the ongoing debate on financial security and its relations with contemporary demographic processes. Development of pro-family policies using tax credits and child support requires a broader perspective on the financial situation of households, including their debt burden.

Results of this study may also help policy-makers to identify the social groups most vulnerable to over-indebtedness, and therefore better address the necessary measures to mitigate debt problems. The identification of credit risk associated with demographic characteristics of borrowers may also prove helpful for financial service professionals.

The rest of the paper is structured as follows. The first section provides a brief overview of the results regarding the extent to which children affect the financial standing of a household, in particular its indebtedness and excessive debt. Data and the methodology are described in the next section. Then, we investigate the monthly debt repayments and the likelihood of over-indebtedness among young and middle-aged and older families with children. The discussion section is followed by our conclusions which are presented in the final section.

Literature Review: Conceptual Framework and Hypotheses

Several studies have found that the size and structure of households, especially the number of dependent children, determine household financial decisions regarding saving (Lugauer et al., 2019) and wealth accumulation (Grinstein-Weiss et al., 2008; Van Winkle & Monden, 2022).

The birth of a child changes household structure and thus significantly impacts the level and structure of consumption

(Bradbury, 2014). Children generate demand not only for basic goods but also durables and housing. Moreover, the influence of children on consumption varies as their needs evolve throughout the life course (Douthitt & Fedyk, 1988; Kornrich & Furstenberg, 2013). Some expenses are necessary immediately after childbirth (e.g., healthcare) while others are postponed (e.g., education). Higher expenses in families with children, by significantly reducing their saving capacity, especially among less-wealthy households (Maroto, 2018), increase the likelihood of indebtedness as a way to balance their budgets.

The influence of children on the financial situation of households is not limited to consumption but also covers income opportunities. Parental duties affect time management, including the capacity for paid work (Fouarge et al., 2010; Kalwij, 2005). Therefore, families with children may experience greater desynchronisation of flows in accordance with the Life Cycle Hypothesis, which entails the necessity of smoothing consumption through debt.

The impact of children on debt was confirmed in the study by Pastrapa and Apostolopoulos (2015) in Greek households. They found that the number of children under six years of age significantly and positively affected the amount borrowed by a household in the first and second quartiles. Deng and Yu (2021) also demonstrated that there exists a positive relation between the number of children and household debt. The results of their research demonstrated that a marginal child significantly increases family debt, especially in urban areas. The above findings support earlier studies by Lewin-Epstein and Semyonov (2016) and Yilmazer and DeVaney (2005) who showed that the number of children in a household has a positive impact on the probability of holding mortgage debt. Similar results were obtained by Xiao and Yao (2020), indicating that compared to other types of households families with children are more likely to use mortgages, credit cards, and car credits.

The above considerations led us to propose the following hypothesis: the amount of debt repayments is positively associated with the number of children in households (*H1*).

Growing indebtedness may result in negative consequences in the form of objective over-indebtedness when the household experiences difficulties in servicing its liabilities. Kempson et al. (2004) pointed out that families with children not only tend to have more credit liabilities but also, more often than other types of households, experience problems with timely repayments. Moreover, Keese (2009) showed that childbirth increases the likelihood of having consumer credit and leads in the long run, as does the number of children, to worse debt performance. Essentially, the same impact of the number of children on the likelihood of debt enforcement was found by Lea et al. (1993) and Oksanen et al., (2015, 2016). However, the latter additionally showed that this relation is not linear—families with two children

have fewer debt problems than others. In addition, men are more likely to have debt problems after having their first child than women, and for them, these problems usually increase within two to three years after childbirth.

An in-depth analysis of the impact of children on consumer debt delinquency was carried out by Xiao and Yao (2014). They distinguished 15 lifecycle categories of families based on the presence of children in a household, age, and marital status of respondents. Their results showed that children are an important factor contributing to debt delinquency. Higher than average probability of debt problems is noticeable in young families with children and middle-aged families with children (regardless of their marital status). These findings also confirm the higher odds ratio of being debt delinquent among the early family lifecycle stages. Similar observations regarding young households, albeit without taking into account children, were made by Chantararat et al. (2020). Further analyses by Xiao and Yao (2020) focused on serious debt burden measured by debt service-to-income ratio ($DSTI > 40\%$) and arrears of at least 60 days. The higher likelihood of delays in debt repayment turned out to be significant only for married couples with children, as compared to other types of families. Moreover, there were no significant differences between different family structures in terms of objective over-indebtedness ($DSTI > 40\%$). This stands in contrast to the findings by Rajjas et al. (2010) who argued that families with children in particular are more likely to have high debt-to-income ratios.

When considering the relationship between children and debt, it is important to pay attention to the broader context. Problems with debt are not limited to financial matters but have also a psychological dimension (Kasoga & Tegambage, 2021; Lea, 2021). The psychological debt burden is usually investigated by referring to the household's appraisals of their financial situation and perception of repayments, so it is subjective (Betti et al., 2007; D'Alessio & Iezzi, 2016). This burden is manifested in the anxiety, stress, or pressure that household members are subjected to. An over-indebted household is therefore one that sees itself as such.

Research shows that the presence of children, through its negative impact on household financial situation, is one of the drivers of financial stress (Anderloni et al., 2012). Moreover, the impact of children on financial stress defined in terms of meeting needs and debt management is even stronger than that of debt characteristics (Worthington, 2006). Children are indicated also as a key factor in this context by Dunn and Mirzaie (2016) – using self-reported psychological stress from debt, they attributed high level of stress to married couples and single-headed households (regardless of gender), mainly due to the presence of children under the age of 18 in these families. Furthermore, Hojman et al. (2016) demonstrated that high

debt-to-income burden, likewise the presence of children over the age of 4, is a significant factor causing depressive symptoms. Similar results were obtained by Drentea and Reynolds (2012) who investigated drivers of mental health and found that indebtedness and children had a detrimental effect on emotional condition (or, more specifically, increased symptoms of anger) in older adults.

Based on these considerations, we formulate our second hypothesis as follows: the number of children increases the likelihood of household objective and subjective over-indebtedness ($H2$).

According to the life-cycle theory, young households appear to be the most exposed to over-indebtedness. At the beginning of their professional activity, their income is relatively low. Expenditure related to housing and children, combined with expectations for an improvement in their income situation in the future, make them incur high debt. In practice, however, the ability to borrow depends on the household's creditworthiness. The level of income and education are of great importance in this regard (Han & Shi, 2009; Pastrapa & Apostolopoulos, 2015; Tseng & Hsiao, 2022). Education determines individuals' ability to get good jobs, and the quality of the positions secured is reflected in income levels and the stability of employment. Xiao and Yao (2020) showed that a family headed by a person with college education or above and who was currently working were more likely to have debt. Furthermore, when individuals also possess better economic knowledge (French & McKillop, 2016; Lusardi & Tufano, 2015), they can manage household budgets better, which reduces the likelihood of over-indebtedness (Anderloni et al., 2012). Therefore, it seems that consumption smoothing through debt in the life cycle is determined only to a limited extent by having children, but primarily by the household's economic situation.

Differences in the level of household income are also reflected in the debt characteristics. Rajjas et al. (2010) showed that housing debtors are the most vulnerable to over-indebtedness. Studies by Morse (2011) and Zinman (2010) indicated that low-income households with limited access to the mainstream credit market are more likely to use non-bank loans. Considering that these types of loans typically involve lower loan amounts and that young people are more often credit-constrained consumers (Grant, 2007), these factors may act to reduce the likelihood of over-indebtedness in this group of households.

Thus, the question of the relative importance of other determinants of over-indebtedness, apart from children, remains open, so we formulated the following hypothesis: the likelihood of over-indebtedness is driven more by other socioeconomic characteristics of households and debt characteristics than the number of children ($H3$).

Method

Sample and Data Collection

This study is based on the unique dataset obtained from the nationwide CATI survey conducted among Polish households in the second quarter of 2018. All the respondents were adults aged 18 or above, with at least one loan commitment (secured or unsecured). CEM Market and Public Opinion Research Institute (CEM Instytut Badań Rynku i Opinii Publicznej), a professional market and opinion research agency, partnered in the data collection phase of the survey. Respondents were selected using the Random Digit Dialling (RDD) method. The initial sample was composed of approximately 35,500 telephone numbers. It was decided to base the research on mobile telephones due to their prevalence—in 2018, 96.7% of households had a mobile phone with an active number (GUS, 2019).

Within the survey, 1107 individuals from across Poland were interviewed. The interview questionnaire contained questions that addressed issues of household indebtedness and socio-demographic characteristics of households. Due to missing data on income and repayments and removal of those observations where DSTI exceeded 100% the final size of the sample amounted to 997 households. The structure of the sample covering socio-economic and demographic factors, such as age, gender, education, number of children, and income, does not differ significantly from that of the official statistics provided by Statistics Poland (Household Budget Survey database). This allows for a generalisation of the results on indebted households in Poland.

Measures

We used two indicators to assess household objective debt burden and subjective debt burden. The first was the debt-service-to-income ratio (DSTI), which is regarded as the most useful of the objective indicators because it shows the ability to service debt on an ongoing basis without resorting to asset sales (Brown & Taylor, 2008). It was assumed that a household was objectively over-indebted when its debt-to-income ratio was higher than 30% (DSTI30). This threshold has been used in many studies (e.g., D'Alessio & Iezzi, 2016; Sánchez-Martínez et al., 2016; Tiongson et al., 2009; Wałęga & Wałęga, 2021). The second indicator employed to assess over-indebtedness was the subjective debt burden (SB), which allowed us to determine whether respondents perceived themselves as over-indebted or not (“Do you feel excessively indebted?”; dummy variable). The application of two types of indicators allowed us to reveal both economic and psychological debt burdens.

Analytical strategy

We divided all households into two groups: young households (with a reference person aged under 35) and households of middle-aged and older adults (35+). These groups accounted for 30.29% and 69.71% of the sample, respectively. It allowed us to determine to what extent the influence of children on household debt depended on the stage of the household life cycle. The threshold of 35 years of age for young households was used, among others, by Berg et al. (2021) in their analysis of consumption expenditure under monetary policy shocks, Li (2021) in reference to household debt, as well as in studies on consumption and credit constraints (Gerlach-Kristen & Merola, 2019), housing wealth (Disney et al., 2010), and consumer debt delinquency (Xiao & Yao, 2014).

There are four dependent variables in our models: the amount of monthly debt repayments, DSTI ratio, DSTI30, and SB. Since we have different types of these variables (dummy and continuous), the developed hypotheses were tested by quantile regression or logit regression.

To test *H1*, we employ the quantile regression method. The analysed sample encompasses households with high values of monthly repayments, therefore we decided that the appropriate approach would be to use robust methods that allow for including outliers in the analysis. It enabled us to estimate the entire distribution of the dependent variables and focus on the relationship between the size of the quantile and the explanatory variables (Koenker et al., 2018).

The quantile regression on the microeconomic level has already been used in income analysis (Demir et al., 2020) as well as household expenses (Belaid & Rault, 2021) and savings (Hua & Erreygers, 2019). Examples of applied quantile regression can also be found in studies on indebtedness focused on analysis of the amount of loan (Pastrapa & Apostolopoulos, 2015), debt repayments (Han & Shi, 2009), and debt-to-income ratio (Tseng & Hsiao, 2022).

Estimation of regression function in quantiles is semiparametric, which means that no assumptions are made about the type of distribution for the random residual vector in the model. Only in the deterministic part of the modelling, the parametric form of the model was adopted. Since the estimation is always performed on the entire sample, outliers receive lower weights which eliminates their influence on the model estimation. If the form of the distribution function is known, then the quantile of the order τ may be determined from the formula (Cameron & Trivedi, 2005):

$$\xi_{\tau} = F_y^{-1}(\tau), \quad (1)$$

where ξ_{τ} —quantile of the order $\tau \in [0, 1]$, F —distribution function of variable y .

The estimation of regression parameters of any quantile consists in minimising the weighted sum of the absolute values of the residuals by assigning them appropriate weights:

$$\min_{\beta \in R^k} \sum_{i=1}^N \rho_{\tau} \left(\left| y_i - \xi_{\tau}(x_i, \beta) \right| \right), \quad (2)$$

where:

$$\rho_{\tau}(z) = \begin{cases} \tau z & \text{for } z \geq 0 \\ (1 - \tau)z & \text{for } z < 0 \end{cases} \quad (3)$$

While applying the quantile regression method, it was decided to estimate the amount of debt repayments and the DSTI ratio in three different groups of households based on the amount of debt repayments and the share of debt repayments in income (hereafter marked accordingly; $\tau = 0.25$; $\tau = 0.50$; $\tau = 0.75$).

To test *H2* and *H3*, the determinants of over-indebtedness were analysed using a logit model. The dependent variables (DSTI30 and SB) could take two values: $Y = 1$ (identifying households assigned to the over-indebted group) or $Y = 0$ (identifying households that were not over-indebted). In this model, depending on used variables (x_j), the probability can be interpreted as the value of the distribution function defined by the formula (Maddala, 2001):

$$P(Y_i = 1) = \frac{\exp(\alpha_0 + \alpha_1 x_{i1} + \alpha_2 x_{i2} + \dots + \alpha_k x_{ik})}{1 + \exp(\alpha_0 + \alpha_1 x_{i1} + \alpha_2 x_{i2} + \dots + \alpha_k x_{ik})}. \quad (4)$$

The parameters of the logit model are typically obtained by the maximum likelihood estimation method (MLE) in which the logarithm of the likelihood function is maximised through the use of iterative numerical procedures.

In addition to the number of children, the list of explanatory variables for the model was proposed to include socio-demographic and economic characteristics of the households (Table 1).

Results

Descriptive Statistics of the Sample

Table 2 shows descriptive statistics for all the indebted households, distinguishing between indebted households with and without children and respondents below the age of 35 and those aged 35 and over. More than half of the households had children (52.5%), and the majority of them had one child, whereas three or more children were more common in families of respondents aged 35 or more (11.3%). The households with children had mixed debt almost twice as frequently as those without children. While for young households, taking loans only from banks or only from

non-bank lenders was equally common, the other types of households show a clear preference for borrowing in the banking system. Households with children usually have more than one loan and monthly repayments exceeding 1000 PLN. In the young households, with or without children, low monthly repayments (up to 500 PLN) were generally recorded more frequently than in the 35+ group.

The box and whiskers graph (Fig. 1) for monthly repayments showed that they were more varied in households of respondents aged 35 and over. In these households, both the median and the mean amount of repayments were highest in families with two children. Among the young respondents (under 35 years of age), high repayments were recorded in households with three or more children.

Having or not having children did not considerably differentiate households in terms of the debt burden (Table 3). The share of households with DSTI up to 20% was only slightly higher, and for $\text{DSTI} > 30\%$ it was slightly lower for households with children as compared to those without children. The division into age groups revealed significant differences between them. Young households with children were distinctly more often burdened with debt repayments than households with no children from the same age group. A different situation was observed in middle-aged and older adult households—among families with children, the share of debt-burdened, according to most of the applied indicators (except for $\text{DSTI} > 10\%$), was lower than in families with no children. However, the patterns identified in this way stemmed not so much from differences in the debt burden experienced by households with children (which were insignificant), but rather from disproportions between households with or without children. The percentage of indebted households of this type is significantly higher among 35+ households than in young households for all levels of DSTI.

Considering the subjective criterion of over-indebtedness, middle-aged and older adult households more often declared excessive burden of debt than young ones, regardless of whether they had children or not. Moreover, whereas children seem to be ‘irrelevant’ for the households aged 35+ (similar values of the SB indicator for households with and without children), they still had a strong impact on young households (share of over-indebted households with children was higher by 6.79 percentage points than that of over-indebted childless households).

Regression Results

The impact of children in a household on the amount of monthly debt repayments was confirmed by the results of estimation of the multiple regression and quantile regression models (Table 4). The amount of monthly debt repayments increased with the number of children. This effect was especially pronounced in the models for all households and those

Table 1 Explanatory variables

| Symbol | Variable | Description and measurement | Questionnaire question |
|--------|--|---|--|
| CHILD | No. of children | Categorical: 4 categories, from 0 to 3+ children | What is the number of dependent children in your household? |
| SEX | Gender | Dummy: 1 if the respondent is male, 0 if the respondent is female | What is your gender? |
| EDU | Education | Categorical: education level of the respondent: 3 levels, from basic vocational or lower to tertiary education | What is your education? |
| RES | Place of residence | Categorical: 3 categories, from village to town over 100,000 population | What is the size of your place of residence? |
| INCQ | Per capita income quintiles | Dummy: 5 variables from the first (ref.) to the fifth quintile of the monthly net income per capita | What is the total monthly net income of your household? |
| SAFS | Subjective assessment of the financial situation | Categorical: 5 categories | Choose the statement which describes the situation of your household: 1. We lack money for even basic, everyday expenditure, 2. We have enough money for our basic needs and nothing more 3. We live frugally in order to meet at least our basic needs, and sometimes we succeed in putting some money aside for larger purchases 4. We have enough to satisfy all of our needs 5. We live very well and we can satisfy all of our needs—however sophisticated |
| REP | Monthly debt repayments | Categorical: 5 categories—1: up to 200 PLN; 2: (200–500] PLN; 3: (500–1000] PLN; 4: (1000–2000] PLN; 5: over 2000 PLN | What is the average monthly amount that your household spends on debt repayment in total? |
| NL | Number of loans | Categorical: 4 categories: 1–4+ | What is the number of loans taken by your household? |
| BANK | Bank loan only | Dummy: 1 if the household has bank loan, 0 otherwise | What type of loans does your household currently have? |
| NBANK | Non-bank loan | Dummy: 1 if the household has non-bank loan, 0 otherwise | |
| MIX | Mixed debt | Dummy: 1 if the household has bank loan and non-bank loan, 0 otherwise | |
| SI | Source of income | Dummy: 5 variables; self-employed (ref.) | What is the main source of income of the household? 1. self-employed 2. blue-collar work 3. white-collar work 4. retirement pension or disability pension 5. other |

in which the respondent was at least 35 years old. On the other hand, for respondents under 35 years of age, the impact of children became noticeable only for the higher sums of repayments ($\tau=0.75$). Therefore, this evidence leads to confirming *H1*.

The determinants of the amount of debt repayments, which were significant regardless of the age of the respondents, were: the number of loans, the level of monthly income, and having non-bank debt. The higher the quantile of income and the number of loans, the higher the amount of debt repayments. The non-bank debt was associated with lower repayments than debt resulting from borrowing money from a bank. In households of respondents aged 35 and over the

amount of repayments was also significantly and negatively affected by incurring debt from mixed sources. Moreover, the level of education played an important role in households of respondents aged under 35. The results showed a positive relation between the amount of debt repayments and the level of education. Moreover, the strength of this effect increased with the amount of repayments.

The results of regression models for DSTI shows that an increase in the number of children in the households aged 35 + leads to a decrease of debt burden (Table 5). Another significant factor in these households as well as in all households is the subjective assessment of the financial situation: the better, the lower DSTI ratio.

Table 2 Summary statistics (% of the sample)

| Specification | All households | | | Age under 35 | | | Age 35+ | | |
|--------------------------------|----------------|---------------|------------------|--------------|---------------|------------------|---------|---------------|------------------|
| | Total | With children | Without children | Total | With children | Without children | Total | With children | Without children |
| Number of children | | | | | | | | | |
| 0 | 0.4751 | | | 0.4878 | | | 0.4788 | | |
| 1 | 0.2669 | 0.5017 | | 0.2835 | 0.5536 | | 0.2503 | 0.4803 | |
| 2 | 0.2102 | 0.4024 | | 0.2012 | 0.3929 | | 0.2118 | 0.4064 | |
| 3+ | 0.0479 | 0.0958 | | 0.0274 | 0.0536 | | 0.0591 | 0.1133 | |
| Type of debt | | | | | | | | | |
| Bank loan only | 0.4811 | 0.4611 | 0.5031 | 0.4268 | 0.4048 | 0.4500 | 0.5199 | 0.5025 | 0.5389 |
| Non-bank loan only | 0.3247 | 0.2865 | 0.3669 | 0.4238 | 0.3690 | 0.4813 | 0.2734 | 0.2365 | 0.3137 |
| Mixed debt | 0.1942 | 0.2524 | 0.1300 | 0.1494 | 0.2262 | 0.0688 | 0.2067 | 0.2611 | 0.1475 |
| Number of loans | | | | | | | | | |
| 1 | 0.5986 | 0.5275 | 0.6771 | 0.6220 | 0.5476 | 0.7000 | 0.5982 | 0.5246 | 0.6783 |
| 2 | 0.2719 | 0.2998 | 0.2411 | 0.2470 | 0.2976 | 0.1938 | 0.2734 | 0.2980 | 0.2466 |
| 3 | 0.0827 | 0.1006 | 0.0629 | 0.0884 | 0.0893 | 0.0875 | 0.0809 | 0.1084 | 0.0509 |
| 4+ | 0.0468 | 0.0721 | 0.0189 | 0.0427 | 0.0655 | 0.0188 | 0.0475 | 0.0690 | 0.0241 |
| Monthly debt repayments | | | | | | | | | |
| Up to 200 PLN | 0.2141 | 0.1689 | 0.2642 | 0.2400 | 0.1916 | 0.2911 | 0.1964 | 0.1510 | 0.2459 |
| (200–500] PLN | 0.2819 | 0.2600 | 0.3061 | 0.3046 | 0.2994 | 0.3101 | 0.2700 | 0.2401 | 0.3027 |
| (500–1000] PLN | 0.2440 | 0.2372 | 0.2516 | 0.2092 | 0.1976 | 0.2215 | 0.2558 | 0.2525 | 0.2595 |
| (1000–2000] PLN | 0.1962 | 0.2505 | 0.1363 | 0.1969 | 0.2695 | 0.1203 | 0.2016 | 0.2525 | 0.1459 |
| Over 2000 PLN | 0.0637 | 0.0835 | 0.0419 | 0.0492 | 0.0419 | 0.0570 | 0.0762 | 0.1040 | 0.0459 |

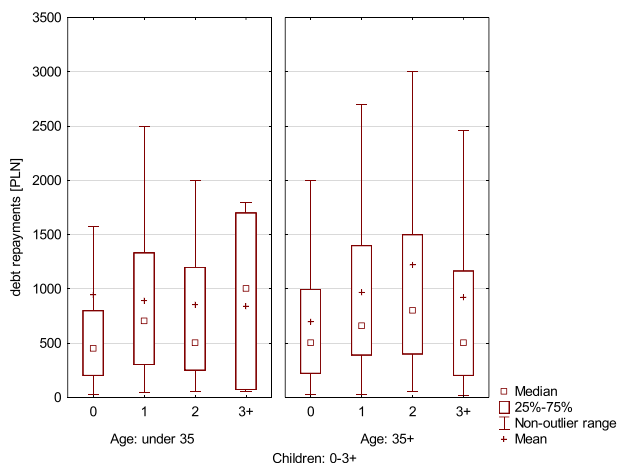


Fig. 1 Box and whiskers plot with no outliers for monthly debt repayments by number of children and age of the respondent

For households aged under 35, the debt burden would be greater if the family sustained from other sources (as compared to self-employment). In this age group of households, the place of residence also has a significant, though the negative effect on the DSTI ratio. For all types of households, the DSTI ratio is positively influenced by the number of credits, whereas having non-bank loans has the opposite effect.

Among the proposed determinants of over-indebtedness, only a few variables proved to have a statistically significant impact on the likelihood of being over-indebted (Table 6). For households of respondents aged 35+, the results of the estimation of logit models parameters indicated that increasing the number of children in the family reduces the probability of classifying the household to the group of objectively and subjectively over-indebted. A similar relationship applies to overall households. These findings do not support H2.

For all households, without distinguishing between age groups, the probability of objective over-indebtedness increased with the number of loans. In the same way, the

Table 3 Percentage of debt-burdened households with and without children according to different debt indicators

| Children | Overall | | Age under 35 | | Age 35+ | |
|----------|---------|-------|--------------|-------|---------|-------|
| | Yes | No | Yes | No | Yes | No |
| DSTI | | | | | | |
| > 10% | 66.53 | 65.47 | 63.92 | 61.11 | 67.66 | 67.37 |
| > 20% | 37.07 | 35.58 | 36.71 | 27.08 | 37.23 | 39.27 |
| > 30% | 15.97 | 17.05 | 13.92 | 9.03 | 16.85 | 20.54 |
| > 40% | 8.37 | 9.47 | 8.23 | 4.86 | 8.42 | 11.48 |
| SB | 17.87 | 16.84 | 15.82 | 9.03 | 18.75 | 20.24 |

number of loans affected subjective over-indebtedness, with the exception of young households. Similarly, if we consider objective debt burden, the households of respondents under 35 years of age also did not follow the observed pattern of reducing the likelihood of over-indebtedness when improving self-perceived financial situation.

For middle-aged and older adult households as well as for overall households the likelihood of subjective over-indebtedness diminished along with a higher income quantile and when the respondent was a man.

The likelihood of objective over-indebtedness was lower for respondents borrowing from mixed sources compared to those who use bank loans only, while the likelihood of subjective over-indebtedness increased, as expected, with the amount of monthly debt repayments.

The values of the estimated parameters and the statistical significance of the variables allow us to conclude that the socioeconomic characteristics of households and debt characteristics have a greater impact on the probability of over-indebtedness than the number of children. Therefore our findings support hypothesis *H3*.

Discussion

The relationships between the number of children and debt is a complex question. We found that the number of children did influence the amount of debt repayments (especially in households of respondents aged 35+), which is consistent with *H1*. This tendency can be explained by the observed consumption pattern over the life cycle determined by demographic changes in families (Attanasio et al., 1999; Browning & Ejrnæs, 2009; Villaverde & Krueger, 2007). The increase in consumption associated with the presence of children in the household, financed partially by debt, manifests itself both in parenting expenses and in the purchase of additional durable goods.

We found that a higher number of children does not lead to a greater likelihood of over-indebtedness. Thus, our findings do not support *H2*. Moreover, we were surprised to find that children in the general model and in households aged

35+ had a negative impact on the level of DSTI ratio. Our results are in line with those obtained by Hurst (2011).

One of the explanations of impact of children on the objective over-indebtedness observed in this study may be the introduction of government programme “Rodzina 500+” in 2016 (childcare benefit of 500 PLN paid per month for every child, irrespective of family income) which significantly improved the financial situation of households (Brzeziński & Najsztub, 2017; Jędrzejczak & Pekasiewicz, 2020). Similarly, Kempson et al. (2004), while investigating the situation of British households, pointed to the increase in state child benefits and tax credits as a possible explanation for the lack of impact of having children on debt performance. Using data from 14 European countries, Van Winkle and Monden (2022) provided evidence that the generosity of family transfers is a relevant factor in preventing households from falling into debt. The support offered by grandparents to their children in caring for grandchildren, which in Poland is markedly higher than in other European countries may also be significant, allowing young parents to avoid paid childcare facilities (in the face of poor public provision of such services), and the possibility of intergenerational co-residence (Albertini, 2016; Brandt & Deindl, 2013).

We hypothesise that the lower likelihood of objective over-indebtedness (DSTI > 30%) in households with children may also indicate that these families are more conservative in budget planning. As Livingstone and Lunt (1992) pointed out, households with more children may be more cautious when deciding to borrow money or even actively avoiding indebtedness, due to the nature of the economic demands on them. With regard to middle-aged and older adult households (35+) reaching the peak of earning capacity by these households may also be an important factor (Lea et al., 1993). Considering this issue from a slightly different perspective, one can speculate that childless families are more actively using debt to implement their consumption plans. Our study confirmed that the percentage of households with a DSTI ratio exceeding 30% was higher in this group.

The estimated parameters of the logit model indicate that children diminish the likelihood of psychological over-indebtedness both in the case of all households and in the group of middle-aged and older adult households, which is

Table 4 Results of OLS and quantile regression for the monthly debt repayments

| | Overall | | | | | | | | | | | |
|----------------|-----------------------|-----------------------|--------------------------------|-----------------------|--------------------------------|-----------------------|-----------------------|--------------------------------|-----------------------|-----------------------|-------------------------------|-------------------------------|
| | Age under 35 | | | | | | Age 35+ | | | | | |
| | OLS | $\tau = 0.25$ | $\tau = 0.5$ | $\tau = 0.75$ | OLS | $\tau = 0.25$ | $\tau = 0.5$ | $\tau = 0.75$ | OLS | $\tau = 0.25$ | $\tau = 0.5$ | $\tau = 0.75$ |
| Constant | 105.70 (165.51) | 92.28 (80.90) | 172.22 [†] (97.86) | 542.50*** (73.95) | 56.42 (304.70) | 67.20 (117.03) | 379.94* (187.32) | 368.15 (355.58) | 101.12 (206.11) | 49.73 (110.91) | 173.73 (140.09) | 425.12* (199.01) |
| CHILD | 112.94*** (26.46) | 26.13* (12.93) | 60.34*** (15.64) | 65.83*** (11.82) | 119.35* (47.25) | 10.93 (18.15) | 41.86 (29.05) | 102.50 [†] (55.14) | 95.67** (33.10) | 39.04* (17.81) | 37.41 [†] (22.50) | 53.77 [†] (31.96) |
| SEX | -2.90 (45.57) | 6.68 (22.27) | 32.75 (26.94) | 58.06** (20.36) | -90.37 (78.84) | 10.93 (30.28) | -19.56 (48.47) | -94.02 (92.01) | 17.15 (56.10) | 17.63 (30.19) | 63.50 [†] (38.13) | 53.77 (54.17) |
| EDU | 98.77** (36.58) | 42.83* (17.88) | 37.56 [†] (21.63) | 78.89*** (16.34) | 187.00** (66.40) | 52.33* (25.50) | 127.96** (40.82) | 209.35** (77.48) | 71.11 (45.33) | 33.04 (24.39) | 23.66 (30.81) | 57.09 (43.77) |
| RES | -65.04* (31.24) | -19.32 (15.27) | -20.97 (18.47) | -29.72* (13.96) | -94.22 [†] (53.02) | -11.05 (20.36) | -39.40 (32.59) | -79.57 (61.87) | -45.93 (38.77) | -8.37 (20.86) | -34.04 (26.35) | 15.04 (37.43) |
| SAFS | 9.75 (26.13) | 4.62 (12.77) | 0.50 (15.45) | -8.89 (11.67) | -12.64 (47.65) | 13.72 (18.30) | -43.78 (29.30) | -31.52 (55.61) | 23.87 (33.00) | -1.18 (17.76) | 8.17 (22.43) | 26.76 (31.86) |
| NL | 350.07*** (34.06) | 157.35*** (16.65) | 259.34*** (20.14) | 396.11*** (15.22) | 300.61*** (53.92) | 138.02*** (20.71) | 195.16*** (33.15) | 350.54*** (62.92) | 373.59*** (44.08) | 177.52*** (23.72) | 306.18*** (29.96) | 442.79*** (42.56) |
| NBANK | -548.22*** (51.61) | -276.44*** (25.22) | -414.88*** (30.51) | -618.33*** (23.06) | -519.79*** (86.71) | -317.31*** (33.30) | -419.48*** (53.31) | -545.22*** (101.18) | -559.87*** (65.46) | -266.35*** (35.23) | -423.88*** (44.49) | -544.87*** (63.21) |
| MIX | -236.40*** (75.00) | -4.44 (36.66) | -100.81** (44.34) | -177.22*** (33.51) | -132.32 (133.75) | 22.69 (51.37) | 120.92 (82.23) | -109.18 (156.08) | -270.12*** (91.62) | -56.95 (49.31) | -178.99*** (62.28) | -204.96*** (88.47) |
| SL2 | -156.50** (73.66) | -26.59 (36.01) | -101.28** (43.55) | -311.39*** (32.91) | -20.38 (113.57) | 12.09 (43.62) | -75.62 (69.82) | -125.98 (132.53) | -216.93** (96.94) | -40.28 (52.17) | -130.98** (65.89) | -425.91*** (93.61) |
| SL3 | -23.22 (71.78) | 11.53 (35.09) | 3.75 (42.44) | -142.78*** (32.07) | 133.14 (116.98) | 43.26 (44.93) | 3.26 (71.92) | 4.13 (136.51) | -70.89 (90.25) | 7.41 (48.57) | -6.18 (61.35) | -257.42*** (87.15) |
| SL4 | -210.86** (90.00) | -65.67 (43.99) | -156.56*** (53.22) | -422.22*** (40.21) | -108.48 (469.67) | 56.98 (180.40) | -45.78 (288.73) | -67.61 (548.08) | -269.52** (105.40) | -76.27 (56.72) | -207.32*** (71.64) | -582.22*** (101.77) |
| SL5 | 72.86 (123.31) | -42.16 (60.28) | -31.06 (72.91) | -275.28*** (55.10) | 490.10** (213.24) | 34.80 (81.91) | 96.19 (131.10) | 48.37 (248.85) | -80.54 (152.37) | -51.96 (81.99) | -69.69 (103.57) | -327.87** (147.12) |
| INCQ_2 | 101.51 (71.50) | 47.99 (34.95) | 95.16** (42.28) | 32.50 (31.95) | 102.41 (112.37) | 52.67 (43.16) | 74.50 (69.08) | 42.07 (131.14) | 100.17 (92.30) | 58.31 (49.67) | 80.22 (62.74) | -18.36 (89.13) |
| INCQ_3 | 222.78*** (72.68) | 63.94* (35.53) | 150.78*** (42.98) | 168.89*** (32.48) | 174.71 (118.28) | 16.51 (45.43) | 11.86 (72.71) | 13.04 (138.03) | 233.17** (93.34) | 125.39** (50.23) | 189.53*** (63.45) | 211.19** (90.13) |
| INCQ_4 | 351.18*** (77.30) | 105.65*** (37.79) | 250.97*** (45.71) | 301.67*** (34.54) | 391.97*** (124.91) | 80.48* (47.98) | 213.70*** (76.79) | 253.37* (145.77) | 310.81*** (100.54) | 141.17*** (54.11) | 236.50*** (68.34) | 235.73** (97.08) |
| INCQ_5 | 722.97*** (83.80) | 235.36*** (40.96) | 554.22*** (49.55) | 616.11*** (37.44) | 498.38*** (135.84) | 151.16*** (52.17) | 241.77*** (83.51) | 583.91*** (158.52) | 788.08*** (108.76) | 306.90*** (58.53) | 567.48*** (73.92) | 625.97*** (105.01) |
| Log likelihood | -7933.62 | -7592.74 | -7719.1 | -7961.97 | -2358.12 | -2250.81 | -2295.47 | -2370.9 | -5562.12 | -5333.17 | -5411.24 | -5578.15 |
| AIC | 15,901.23 | 15,219.48 | 15,472.2 | 15,957.94 | 4750.235 | 4535.616 | 4624.947 | 4775.796 | 11,158.25 | 10,700.34 | 10,856.48 | 11,190.29 |
| R ² | 0.3736 | | | | 0.4009 | | | | 0.3758 | | | |

Table 4 (continued)

| | Overall | | | Age under 35 | | | Age 35+ | | |
|---------------|-------------|------------|-------------|--------------|------------|-------------|-------------|------------|-------------|
| | $\tau=0.25$ | $\tau=0.5$ | $\tau=0.75$ | $\tau=0.25$ | $\tau=0.5$ | $\tau=0.75$ | $\tau=0.25$ | $\tau=0.5$ | $\tau=0.75$ |
| OLS | | | | OLS | | | OLS | | |
| <i>F</i> Test | 36.52 | | | 11.88 | | | 25.55 | | |
| | $p < 0.001$ | | | $p < 0.001$ | | | $p < 0.001$ | | |

Standard errors are presented in parentheses

[†] $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

not consistent with *H2* regarding subjective over-indebtedness. Our findings are in line with Loibl et al. (2022), who focused their research on older adults and concluded that children did not have a significant impact on financial stress (bill-paying difficulty and ongoing financial strain). A lower likelihood of experiencing over-indebtedness in households with children may, of course, be linked to the aforementioned conservative debt management strategy, as well as to the fact that facing everyday challenges and spending time on child-care ‘covers’ the problem of excessive debt. While looking for an explanation for the observed relationship, one cannot omit cultural differences and how they determine the attitudes to debt (Gomes et al., 2021) as a potential factor differentiating the links between debt and the presence of children.

Distinguishing two age groups of households allowed for one more noteworthy observation. Among the young households, the impact of children proved to be insignificant ($p > 0.1$) for both the objective and the subjective over-indebtedness. These results suggest that even though many empirical studies (e.g. Betti et al., 2007; del Río & Young, 2008; Majamaa et al., 2019) indicate that people from the youngest cohorts are most vulnerable to over-indebtedness, the other variables related to their economic situation and debt structure still explain the likelihood of over-indebtedness better than the CHILD variable. Although children proved to be an important driver of over-indebtedness in middle-aged and older adult households, the impact of this variable is smaller than the other statistically significant variables in the model. These findings support *H3*.

The likelihood of over-indebtedness (both according to DSTI30 and SB) decreases with a better subjective assessment of the financial situation (SAFS). This concurs well with Anderloni et al. (2012), Handayani et al. (2016), and Norvilitis et al. (2003). Our results suggest that households are less eager to be serious debtors when meeting their life cycle consumption aspirations.

The amount of debt repayments is positively correlated with the level of education. Simultaneously, in our study, the EDU variable was found to be statistically insignificant ($p > 0.1$) for over-indebtedness.

The econometric modelling also revealed a positive impact of the number of loans on the amount of debt repayments and over-indebtedness (objective and subjective), which is in line with the results of previous studies (Chichaibelu & Waibel, 2017; CPEC, 2013).

Our results reveal differences in the type of debt – young households are more likely to use non-bank loans, whereas middle-aged and older adult households prefer bank loans. Such a debt structure does not seem surprising given the development of the online lending sector observed in recent years (Hiilamo, 2018), and the popularity of online loans among young people (Autio et al., 2009; Majamaa et al., 2019). In the estimated models, we found that having non-bank loans

Table 5 Results of OLS and quantile regression for DSTI

| | Overall | | | | | | | | | | | |
|----------------|----------------------------------|------------------------|------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|------------------------|----------------------------------|----------------------------------|------------------------|-------------|
| | Age under 35 | | | | Age 35+ | | | | | | | |
| | $\tau=0.25$ | $\tau=0.5$ | $\tau=0.75$ | OLS | $\tau=0.25$ | $\tau=0.5$ | $\tau=0.75$ | OLS | $\tau=0.25$ | $\tau=0.5$ | $\tau=0.75$ | $\tau=0.75$ |
| Constant | 0.2268*** (0.0325) | 0.1903*** (0.0191) | 0.2931*** (0.0355) | 0.1537** (0.0584) | 0.0675** (0.0221) | 0.1842*** (0.0230) | 0.2680*** (0.0823) | 0.2505*** (0.0409) | 0.0932*** (0.0188) | 0.2009*** (0.0266) | 0.3151*** (0.0389) | |
| CHILD | -0.0117* (0.0050) | -0.0090** (0.0029) | -0.0193*** (0.0054) | 0.0016 (0.0085) | -0.0035 (0.0032) | -0.0059 [†] (0.0033) | 0.0080 (0.0120) | -0.0160* (0.0062) | -0.0048 [†] (0.0028) | -0.0108** (0.0040) | -0.0250*** (0.0059) | |
| SEX | 0.0096 (0.0091) | 0.0078 (0.0054) | 0.0146 (0.0100) | 0.0109 (0.0153) | 0.0088 (0.0058) | 0.0072 (0.0060) | -0.0185 (0.0216) | 0.0065 (0.0113) | 0.0025 (0.0052) | 0.0038 (0.0074) | 0.0148 (0.0108) | |
| EDU | -0.0003 (0.0071) | -0.0022 (0.0042) | -0.0021 (0.0077) | 0.0114 (0.0125) | 0.0075 (0.0047) | 0.0070 (0.0049) | -0.0015 (0.0176) | -0.0034 (0.0088) | -0.0027 (0.0040) | -0.0088 (0.0057) | 0.0057 (0.0084) | |
| RES | -0.0028 (0.0062) | -0.0023 (0.0037) | -0.0021 (0.0068) | -0.0083 (0.0103) | -0.0067 [†] (0.0039) | -0.0081* (0.0041) | -0.0265 [†] (0.0145) | -0.0008 (0.0078) | -0.0058 (0.0036) | 0.0044 (0.0051) | -0.0013 (0.0074) | |
| SAFS | -0.0249*** (0.0051) | -0.0091*** (0.0026) | -0.0275*** (0.0056) | -0.0165 [†] (0.0092) | -0.0044 (0.0035) | -0.0193*** (0.0036) | -0.0208 (0.0130) | -0.0273*** (0.0064) | -0.0103*** (0.0029) | -0.0195*** (0.0042) | -0.0289*** (0.0061) | |
| NL | 0.0605*** (0.0068) | 0.0371*** (0.0035) | 0.0698*** (0.0074) | 0.0565*** (0.0104) | 0.0300*** (0.0039) | 0.0453*** (0.0041) | 0.0762*** (0.0147) | 0.0623*** (0.0089) | 0.0399*** (0.0041) | 0.0479*** (0.0058) | 0.0639*** (0.0085) | |
| NBANK | -0.1064*** (0.0102) | -0.0581*** (0.0052) | -0.1329*** (0.0111) | -0.0906*** (0.0161) | -0.0650*** (0.0061) | -0.0869*** (0.0063) | -0.0815*** (0.0227) | -0.1153*** (0.0132) | -0.0570*** (0.0060) | -0.0992*** (0.0086) | -0.1493*** (0.0125) | |
| MIX | -0.0289 [†] (0.0150) | -0.0015 (0.0077) | -0.0091 (0.0164) | -0.0264 (0.0261) | 0.0074 (0.0099) | 0.0270** (0.0103) | -0.0289 (0.0367) | -0.0301 (0.0185) | -0.0009 (0.0085) | -0.0221 [†] (0.0121) | -0.0006 (0.0176) | |
| SL_2 | 0.0029 (0.0145) | -0.0045 (0.0085) | 0.0016 (0.0158) | 0.0089 (0.0222) | 0.0090 (0.0084) | -0.0096 (0.0087) | 0.0012 (0.0312) | -0.0015 (0.0191) | 0.0067 (0.0088) | -0.0149 (0.0124) | -0.0042 (0.0182) | |
| SL_3 | 0.0023 (0.0143) | 0.0171* (0.0074) | -0.0147 (0.0156) | 0.0242 (0.0227) | 0.0176* (0.0086) | -0.0075 (0.0089) | 0.0104 (0.0320) | -0.0072 (0.0181) | 0.0129 (0.0083) | -0.0030 (0.0118) | -0.0344* (0.0172) | |
| SL_4 | 0.0246 (0.0177) | 0.0193* (0.0091) | 0.0246 (0.0194) | -0.0659 (0.0914) | 0.0027 (0.0346) | -0.0515 (0.0360) | -0.1131 (0.1288) | 0.0153 (0.0207) | 0.0214* (0.0095) | 0.0024 (0.0135) | 0.0046 (0.0198) | |
| SL_5 | 0.0545* (0.0244) | 0.0155 (0.0126) | 0.0614* (0.0266) | 0.0948* (0.0413) | 0.0358* (0.0156) | 0.0311 [†] (0.0163) | 0.0677 (0.0582) | 0.0340 (0.0302) | 0.0088 (0.0139) | 0.0168 (0.0197) | 0.0384 (0.0287) | |
| Log likelihood | 552.80 | 812.74 | 407.51 | 210.23 | 290.36 | 260.08 | 169.08 | 354.96 | 531.95 | 437.99 | 258.06 | |
| AIC | -1079.60 | -1599.47 | -789.01 | -394.47 | -554.71 | -494.16 | -312.17 | -683.92 | -1037.90 | -849.98 | -490.12 | |
| R ² | 0.2333 | | | 0.2399 | | | | 0.2346 | | | | |

Standard errors are presented in parentheses
[†] $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 6 Results of the logit model for over-indebtedness (DSTI30 and SB)

| | Overall | | Age under 35 | | Age 35 + | |
|----------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|-------------------------|
| | DSTI30 | SB | DSTI30 | SB | DSTI30 | SB |
| Constant | − 0.6850 (0.6460) | − 0.4194 (0.6950) | − 3.2419* (1.6249) | − 1.4927 (1.5302) | − 0.2524 (0.7419) | − 0.3152 (0.8220) |
| CHILD | − 0.2228* (0.1106) | − 0.2792* (0.1267) | 0.0673 (0.2334) | 0.2099 (0.2595) | − 0.3008* (0.1286) | − 0.4271** (0.1522) |
| SEX | 0.0914 (0.1896) | − 0.4369* (0.1957) | 0.0408 (0.4158) | − 0.1612 (0.4161) | 0.1141 (0.2165) | − 0.5274* (0.2297) |
| EDU | 0.0917 (0.1492) | 0.0327 (0.1652) | 0.2911 (0.3485) | − 0.1612 (0.3767) | 0.1053 (0.1698) | 0.0834 (0.1929) |
| RES | − 0.0566 (0.1288) | − 0.0204 (0.1351) | − 0.1401 (0.2803) | 0.3896 (0.2949) | − 0.0444 (0.1465) | − 0.1403 (0.1587) |
| SAFS | − 0.4020*** (0.1044) | − 0.8538*** (0.1155) | − 0.1068 (0.2476) | − 0.7644** (0.2348) | − 0.4520*** (0.1220) | − 0.9081*** (0.1413) |
| NL | 0.6588*** (0.1261) | 0.3529** (0.1355) | 0.6910** (0.2386) | 0.0494 (0.2672) | 0.6311*** (0.1529) | 0.4829** (0.1671) |
| NBANK | − 1.7557*** (0.2992) | − 0.3227 (0.2947) | − 1.3353** (0.5093) | 0.0049 (0.5492) | − 2.0133*** (0.3953) | − 0.3646 (0.3662) |
| MIX | − 0.4552† (0.2686) | 0.3516 (0.2741) | − 0.4435 (0.5830) | 0.7778 (0.5767) | − 0.4247 (0.3076) | 0.1910 (0.3235) |
| SI_2 | − 0.0937 (0.3063) | 0.1783 (0.3283) | 0.4819 (0.6341) | 0.3500 (0.6076) | − 0.1680 (0.3632) | 0.1140 (0.4086) |
| SI_3 | − 0.2717 (0.3017) | − 0.4961 (0.3283) | 0.4233 (0.6370) | − 0.4253 (0.6654) | − 0.4606 (0.3494) | − 0.5230 (0.3858) |
| SI_4 | 0.1042 (0.3552) | 0.4599 (0.3864) | | 2.6639 (1.6800) | − 0.1314 (0.3848) | 0.3661 (0.4335) |
| SI_5 | 0.6249 (0.4571) | 0.9756* (0.4759) | 1.5852 (0.9749) | − 0.2390 (1.2454) | 0.2987 (0.5260) | 1.2617* (0.5434) |
| INCQ_2 | | 0.0166 (0.3022) | | 0.0686 (0.5927) | | 0.0526 (0.3620) |
| INCQ_3 | | − 0.3285 (0.3113) | | 0.0892 (0.6294) | | − 0.3903 (0.3688) |
| INCQ_4 | | − 0.8567* (0.3623) | | − 0.7372 (0.7839) | | − 0.7705† (0.4243) |
| INCQ_5 | | − 0.7561* (0.3821) | | − 0.4149 (0.8210) | | − 0.8477† (0.4496) |
| REP | | 0.7513*** (0.1196) | | 0.6829** (0.2399) | | 0.8235*** (0.1433) |
| McFadden R^2 | 0.1300 | 0.2392 | 0.1062 | 0.2039 | 0.1390 | 0.2646 |
| Log likelihood | − 380.63 | − 350.00 | − 93.02 | − 90.86 | − 283.42 | − 251.77 |
| AIC | 787.27 | 735.99 | 210.05 | 217.73 | 592.83 | 539.55 |

Standard errors are presented in parentheses

† $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

reduce the amount of debt repayments as well as objective over-indebtedness.

Conclusions, Limitations, and Future Research Directions

Based on unique data from the nationwide CATI survey on Polish indebted households, we assessed the debt repayments amounts and debt burden in households

with children and the influence of children, as well as other socio-economic factors on the likelihood of over-indebtedness.

To conduct a more detailed analysis of debt in households with and without children we divided households into two groups: young and middle-aged and older adult households. In addition, over-indebtedness has been comprehensively assessed with the use of objective and subjective indicators. By applying the quantile regression method, we were able to solve the problem of outliers and

identify factors determining over-indebtedness on different levels of debt-service-to-income ratio. These are our contributions to the research literature.

The general conclusion is that the presence of children in households is associated with a greater amount of debt repayments, and its impact is most pronounced at higher levels of repayments.

The division of respondents into age groups allowed us to identify the significant influence of children on the debt repayment amounts in all quintile groups of debt repayments for households aged 35+. It also turned out that the number of children impacts the amount of debt repayments only in the highest quantile group among the households of respondents under 35 years of age.

Analysing two age groups of respondents also allowed us to identify the significant influence of children on over-indebtedness among middle-aged and older adult households. In this group of respondents, the likelihood of over-indebtedness, both according to DSTI30 and SB, decreases with the number of children, and their impact is stronger for SB than DSTI30. For young households, this variable proved to be statistically insignificant.

Moreover, the evidence from this study suggests that children are a weaker determinant of over-indebtedness than factors related to other socioeconomic characteristics of households and debt characteristics.

We are aware that our research has some limitations. First, the caution in international comparisons is dictated by the differences in the mean and distribution of the number of children in households. In our study, the percentage of families with children exceeded 50%, with 90% of them having no more than two children. For comparison, in the research sample analysed by Xiao et al. (2014) less than 40% had dependent children; in a study focused on China (Deng & Yu, 2021) the average number of children was less than one, whereas the research by Kasoga and Tegambwage (2021) reported that the majority of families had three or more children. Second, the employed dataset misses some information due to the strictly limited length of survey questionnaire. For instance, we had no data on the age of children. Hence, we explored the differences between various types of households based solely on the age of the respondents. It seems that this information would allow for better recognition of the needs changing throughout the life cycle and thus, perhaps, the diversity in the debt burden. Third, the used indicator of the subjective burden of debt is a dichotomous variable. Determining a scale of debt stress would enable a better understanding of the situation of over-indebted families.

The question that requires further research is certainly the reverse causality. Although it seems intuitively logical to infer the impact of children on debt, it should be noted that previous studies demonstrate that high debt burden

increases the propensity to postpone marriage and affects the decision about having children (Nau et al., 2015; Sieg & Wang, 2018).

Undoubtedly, further research should also be encouraged to explore issues not yet addressed in the literature on households in countries that have undergone a political and economic transformation and are experiencing particularly urgent social change, such as Poland. This includes topics related to family structures, e.g. the impact of the first child on household debt or the financial condition of different types of families (for instance, marriage vs cohabitation).

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Declarations

Conflict of interest The authors declare no competing interests.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee.

Informed consent Informed consent was obtained from all individual participants included in the study.

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