Borrowing from Family and Friends: Study of the European Union

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Abstract

Informal borrowing from family and friends suffers from the lack of formal agreements and can lead to severe consequences. Self-control theory suggests some strategies for improving saving tendencies, which can reduce such borrowing. To examine what factors can enhance these strategies in the European Union, this study analyzes balanced panel data from the Global Findex and Eurostat databases for the years 2014, 2017, and 2021, identifying a pivotal role for debit card use and saving behavior in addressing informal borrowing. The study also raises questions about the effectiveness of public financial education and emphasizes the importance of improving related policies in the FinTech landscape. By elucidating these findings, this paper deepens our knowledge of the relationship between debit card use and borrowing practices in the European Union.

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Introduction

Borrowing is a central theme in human history. While individuals in ancient societies relied extensively on borrowing from their communities, modern history has been characterized by borrowing from financial institutions. A problem is that the lower the ability of households to access formal financial credit, the greater their likelihood of encountering financial issues. In such situations, households may be forced to seek financing from nearby communities, such as family and friends (Lee & Persson, 2016). Seeking informal loans can thus be perceived as an indicator of less favorable socioeconomic conditions.

Borrowing from family and friends can be beneficial but also lead to adverse outcomes, including potential personal conflicts. Additionally, such arrangements often lack the flexibility to be rescheduled (Karaivanov & Kessler, 2018), and in the event of default, such borrowing may result in financial instability for the lending party (Blanc et al., 2015). Between 2017 and 2021, there was a notable rise in borrowing from family and friends in parts of the European Union (EU). For example, there was a 73.33% increase in such borrowing in Greece (Demirgüç-Kunt et al., 2022). This trend could be attributed to higher living costs aggravated by external factors, which triggered a surge in gas prices and led to high inflation rates.

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Borrowing behavior can be related to self-control theory and two related strategies (Thaler & Shefrin, 1981): the control-based strategy focuses on households' financial management in order to prevent overconsumption, whereas the incentive-based strategy concerns the importance of saving money for the future. These strategies require the use of tools, and financial technology (FinTech) offers various opportunities to help households manage their personal finances. Debit and credit cards are commonly used FinTech tools, and their use has grown remarkably in households. Demirgüç-Kunt et al. (2022) surveyed debit card use by European households, reporting an increase from 68% in 2011 to 88% in 2021. Using debit cards can help households in two ways: first, to enforce a reasonable spending limit and, second, to establish and adhere to a saving plan. Nourallah et al. (2024) reported that debit card use would likely enhance financial capabilities, and Stango and Zinman (2023) argued that education was a crucial factor enhancing cognitive skills, which in turn could mitigate the biases that usually affect financial decisions.

When examining borrowing from family and friends, focusing on the EU rather than on a single country is essential due to the interconnected nature of the economies of EU Member States. External shocks, economic conditions, and policy decisions in one country can have significant effects across the entire Union (Nourallah et al., 2024). By evaluating data from various countries in the EU, we can identify broader trends that might not be apparent when studying an individual country, enabling the implementation of more effective policies to help individuals and households overcome financial challenges.

We further argue that it is vital to focus on factors that can mitigate the negative impact of borrowing from family and friends, in order to support policymakers with insights into household financial conditions in various EU Member States. In this regard, it is important to consider the arguments of Nourallah and Öhman (2021) about the role of appropriate FinTech solutions and of Lusardi et al. (2021) about the effectiveness of savings plans in helping households to manage expenses and minimize undesirable financial behavior.

The aim of this study is, therefore, to empirically investigate how the use of debit cards and saving behavior can affect borrowing from family and friends in the EU context. This study also tests intercalibrations of other factors that may affect households' informal borrowing.

The results suggest a significant effect of using debit cards and practicing saving behavior in terms of controlling borrowing from family and friends. However, educational background does not affect the targeted borrowing behavior. In addition, it is important to recall that inflation can provoke borrowing behavior due to its effect on prices.

In line with Hamid et al. (2023), our study of informal borrowing supplies policymakers with empirical knowledge that can promote financial resilience in the EU. In fact, the study offers two significant contributions to the fields of FinTech and household finance. The first contribution lies in identifying the potential for FinTech solutions to enable more efficient financial management practices. The study concludes that using appropriate FinTech solutions such as debit cards can help promote financial independence and will most likely help households to navigate financial setbacks and improve financial stability. The second contribution concerns the limited effectiveness of traditional financial education and training in fostering sound financial decision-making. This makes it possible to question the effectiveness of financial literacy policies in the EU. While financial education remains important (Kaiser et al., 2022), it may not necessarily address the complexities of modern financial behaviors. This study provides evidence supporting the need for enhanced financial literacy programs within the EU, particularly those tailored to addressing the various unique situations of households.

The rest of the article is structured as follows: section 2 presents the literature review and section 3 the methods. The results are reported in section 4, while the conclusion, policy recommendations, and suggestions for future research are addressed in the final section.

Literature review

The self-control theory of Thaler and Shefrin (1981) explores the dilemma of setting consumption limits and the resulting issues that arise from the conflict between consumption and saving. The theory suggests two main strategies for resolving these issues, either setting strict rules to control consumption or altering the incentives to save money.

The two strategies require tools in order to be properly implemented, and bank debit cards are such tools. Through using debit cards, households can follow a strict rule that limits their consumption (Bachas et al., 2021). Households could also sort their expenses into predefined categories, enabling them to assess their overall consumption in a period. Nevertheless, the development of online stores and the availability of various digital payment methods in the FinTech landscape have introduced challenges, such as impulse buying. Meyll and Walter (2019) provided evidence of a relationship between innovative payment methods and surges in individuals' overall spending, which might affect consumption and saving behavior.

When households face financial setbacks, they often rely on readily accessible resources, such as emergency funds, to navigate these challenges (Demirgüç-Kunt et al., 2022). These emergency funds are typically built through consistent saving, highlighting the importance of applying a disciplined approach (Asebedo et al., 2019; Despard et al., 2020). The more a household saves, the better equipped it is to build a sufficient emergency fund. Such financial protections not only provide immediate substitutes during unexpected situations but also promote long-term financial stability, reducing the stress associated with unexpected expenses or income disruptions. Browning and Lusardi (1996) stated that a primary motivation for households to save money is to enhance their ability to manage unforeseen contingencies, and Tufano (2009) argued that saving is an irreplaceable element of households' sound financial management that enables them to invest money and increase their wealth. Notably, households that lack emergency fund savings to cover unexpected life events may be forced to take disadvantageous loans.

Besides debit cards and saving behavior, educational background is essential to making sound financial decisions (Nourallah et al., 2024). In a meta-analysis, Kaiser et al. (2022) concluded that financial education has a positive effect on financial behavior. Similarly, Lusardi et al. (2021) reported that well-educated households tend to manage their money properly, which likely helps them deal with financial shocks. Relatedly, Nokulunga and Klara (2023) found that people with low education levels have a higher probability of using the informal rather than formal financial sector, which may negatively affect their financial well-being. It is worth highlighting that limited access to borrowing options from financial institutions often compels households to seek alternative sources of financing (Xiao & Tao, 2021), such as borrowing from individuals in their social networks, thereby hindering them from achieving long-term financial stability.

Higher financial well-being means a better quality of life and less stress related to financial concerns. The literature describes various consequences of financial well-being and emphasizes the negative societal impacts when a significant percentage of households face financial issues (Brüggen et al., 2017). Lower levels of financial well-being result in financial vulnerability (Beckmann & Kiesl-Reiter, 2023), which, in turn, can hinder households from accessing financial credit, compelling them to borrow money from surrounding communities, such as family and friends. Inflation and gross domestic product (GDP) per capita are other factors that can affect household financial management and all kinds of borrowing (Nourallah et al., 2024).

Taken together, it can be hypothesized that the use of debit cards, saving behavior, educational background, the opportunity to borrow from a formal financial institution, financial well-being, inflation, and GDP all affect the behavior of borrowing from family and friends.

Method

In this study, we extract annual data for a sample of 24 EU Member States for 2014, 2017, and 2021 to examine factors that might affect

borrowing from family or friends. Due to the lack of data, Luxembourg, Slovenia, and the Slovak Republic are excluded. The selected time frame is determined by data availability. We use data from the World Bank's Global Findex Database on borrowing from family or friends (BFF), savings (SAVING), and borrowing from a formal financial institution (BFI) (Demirgüç-Kunt et al., 2022). Inflation (INF) and the growth rate of gross domestic product per capita (GDP) are taken from the World Development Indicators Database (The World Bank, 2024). Moreover, we use data on the total number of debit (DEBIT) and credit (CREDIT) cards from the Financial Access Survey (International Monetary Fund, 2024). Since DEBIT and CREDIT are expressed in billions, whereas the remaining variables are expressed as percentages, these two variables are standardized by subtracting their respective means and dividing by their standard deviations to ensure comparability. Information about the adult participation rate in learning (APL) and financial well-being (FWB) is based on data from Eurostat (n.d.). We further incorporate data on the participation rate of youth and adults in formal and non-formal education and training (EDUC) from the UNESCO Institute for Statistics (n.d.).

In line with Nourallah et al. (2024), the variable SAVING is computed as an average of the percentages of respondents who save money for any reason, those who save for old age, and those who save at any financial institution. Calculating the average of these three distinct percentages provides a holistic measure of saving behavior. Moreover, FWB is assessed through two variables: the average rating of satisfaction, and the distribution of the population aged 18 and over by health status (very good).

The Appendix reports all employed variables along with their definitions and the sources from which we extract them. At the top, we find the dependent variable, i.e., borrowing from family and friends, followed by the independent variables and finally the two control variables, i.e., inflation and GDP.

To study the determinants of borrowing from friends or family, we employ the following panel regression model:

$$BFF_{i,t} = \beta_0 + \beta_1 * DEBIT_{i,t} + \beta_2 * SAVING_{i,t} + \beta_3 * EDUC_{i,t} + \beta_4 * BFI_{i,t} + \beta_5 * FWB_{i,t} + \beta_6 * INF_{i,t} + \beta_7 * GDP_{i,t} + \varepsilon_{i,t}$$

where $BFF_{i,t}$ represents the percentage of borrowing from family and friends, $DEBIT_{i,t}$ the standardized total number of debit cards, $SAVING_{i,t}$ the percentage of respondents saving money, $EDUC_{i,t}$ the participation rate of youths and adults in education and training, $BFI_{i,t}$ borrowing from a formal financial institution, $FWB_{i,t}$ financial well-being, $INF_{i,t}$ the inflation rate, and $GDP_{i,t}$ the gross domestic product per capita, all for country i across time t. Finally, $\varepsilon_{i,t}$ is the stochastic error term.

The Hausman test does not reject the null hypothesis at the 5% significance level (Prob = 0.5525 > 0.05), indicating that the random-effects model is appropriate for capturing unobserved heterogeneity. Ignoring this heterogeneity could lead to omitted variable bias. It is also worth noting that the random-effects model is an appropriate specification because the data are drawn from a survey with a randomly selected sample and because the data for some variables remain constant over time. Hence, employing a fixed-effects model may lead to collinearity issues. Moreover, we conduct the Woolridge test for serial correlation, failing to reject the null hypothesis of no autocorrelation at the 5% significance level (Prob = 0.1895 > 0.05). We further conduct the Ramsey RESET test for omitted variables in the random-effects model. The results indicate a failure to reject the null hypothesis of no omitted variables at the 5% significance level (Prob = 0.3267 > 0.05), showing that our model is well-specified.

To ensure our results' robustness and account for potential model misspecifications, we employ ordinary least squares (OLS) and panel random-effects approaches to estimate our model. OLS provides a straightforward method for estimating relationships among variables, and panel random-effects models offer additional advantages, such as controlling for unobservable characteristics that are individual-specific and time-invariant. By doing this, we aim to validate the consistency of our findings across different strategies and enhance the reliability of our conclusions.

Results

By analyzing the data on the percentage of people borrowing from family or friends in 2021 compared with 2014 across the 24 EU countries under study, we can observe the emergence of distinct trends in Figure 1. The percentage of such borrowing remained stable between 2014 and 2021 in Austria, Belgium, Cyprus, and the Czech Republic. An increase is observed in 2021 as opposed to 2014 in Bulgaria, Denmark, France, Germany, Greece, Malta, and Poland. The remaining countries experienced a decline in the borrowing percentage during the same period.

Figure 1. Borrowed from Family or Friends (% age 15+)

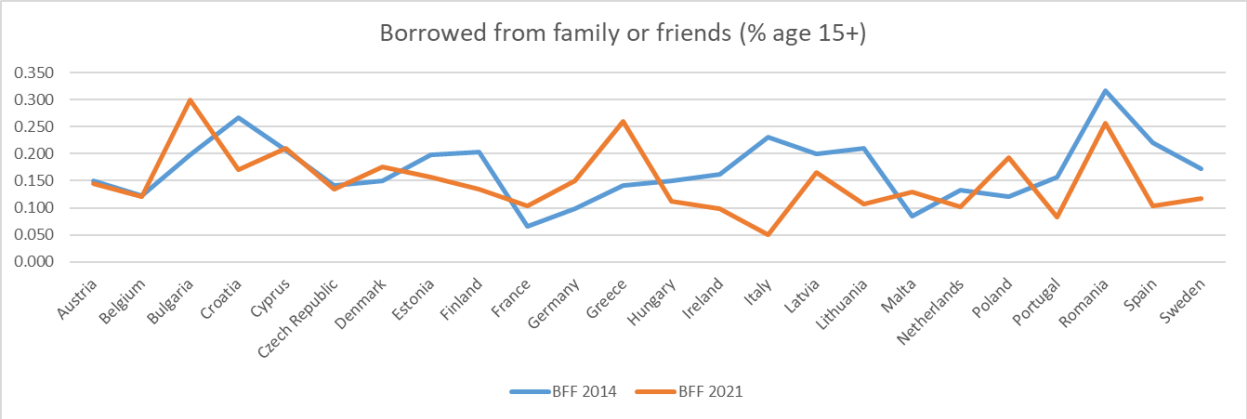

Figure 1 compares the level of borrowing from family or friends (% age 15+) in 24 countries representing Member States of the European Union, i.e., all countries except Luxembourg, Slovenia, and the Slovak Republic, between 2014 and 2021. Data sources: the Global Findex and Eurostat Databases.

Table 1 reports the mean, median, minimum, 25th percentile (first quartile), 75th percentile (third quartile), and maximum for all the variables. Regarding borrowing from family and friends, the interval extends from 0.051 to 0.317, which indicates that all countries in the Union have some informal borrowing, although to different extents.

Table 2 displays the results obtained from estimating our model using OLS, i.e., Model (1), and the panel random-effects approach, including one variable at the time, i.e., Models (2)–(7). Model (1) indicates that the total number of debit cards, saving behavior, and GDP per capita negatively influence the likelihood of borrowing from family or friends, while borrowing from a formal financial institution and the inflation rate positively affect the household's informal borrowing.

However, utilizing the OLS approach might lead to erroneous causal inferences among the variables, as it does not adequately address individual-specific effects or time-invariant unobserved heterogeneity. Hence, Models (2)–(7) represent the estimated results of applying a panel random-effects methodology. When including the education variable alone, the results reveal a significant negative impact on borrowing from family or friends, as shown in Model (2). Yet, the significance is lost when other variables are included in the model.

As demonstrated in Models (2)–(7), the total number of debit cards, saving behavior, and the inflation rate play crucial roles in shaping households' borrowing behavior within their social networks. The reliance on debit cards for financial control is in line with the conclusion of Bachas et al. (2021). Moreover, the fact that households with higher levels of savings tend to rely less on informal borrowing sources is in line with the argument of Nourallah et al. (2024), who discussed the role of saving in improving households' financial management. The findings regarding debit cards and saving emphasize the importance of financial prudence and preparedness in lowering the need for external financial assistance from social networks. At the same time, higher inflation rates may intensify financial strain on people, leading to higher levels

of borrowing from family or friends as a coping mechanism. The result concerning the interconnectedness between macroeconomic conditions and personal financial habits echoes the argument of Zinman (2015), who emphasized the importance of investigating such issues.

Table 1. Descriptive Statistics

Variables	Minimum	First Quartile	Median	Mean	Third Quartile	Maximum
BFF	0.051	0.115	0.149	0.157	0.198	0.317
DEBIT	–0.801	–0.565	–0.422	$2.230*10^{-9}$	0.253	3.738
CREDIT	–0.538	–0.444	–0.374	$4.190*10^{-9}$	0.010	3.998
SAVING	0.140	0.351	0.497	0.480	0.609	0.784
EDUC	11.020	14.200	17.320	19.754	20.650	42.230
APL	0.011	0.057	0.088	0. 114	0.145	0.347
BFI	0.112	0.262	0.359	0.360	0.477	0.580
FWB	0.347	0.437	0.489	0.493	0.550	0.647
INF	–0.014	0.005	0.014	0.0160	0.024	0.051
GDP	–0.009	0.018	0.040	0.040	0.055	0.147

Table 1 presents the descriptive statistics for the variables used in the models. Borrowing from a formal financial institution (% age 15+), as denoted by BFF, is the explained variable, DEBIT, CREDIT, SAVING, EDUC, APL, BFI, and FWB are the explanatory variables, while INF and GDP are the control variables. The DEBIT and CREDIT variables are standardized by subtracting their means and dividing by their standard deviations to ensure comparability to other variables measured in percentages. The data are drawn from three waves of panel data spanning the years 2014, 2017, and 2021, sourced from the Global Findex (Demirgüç-Kunt et al., 2022) and Eurostat (n.d.) databases. The dataset encompasses all EU Member States, excluding Luxembourg, Slovenia, and the Slovak Republic.

To increase the robustness of our findings and ensure the reliability of our results, we conduct sensitivity tests. In the EU context, it is plausible to argue that, due to the proliferation of educational platforms and diverse continuing education programs, people may engage in various forms of informal education. Therefore, we re-estimate our model by replacing the EDUC variable with APL, which is a broader measure of education that captures the multifaceted nature of learning behavior among adults. APL accounts for ongoing formal and informal learning activities and continuous skill development, reflecting the overall educational exposure of households. As demonstrated in Table 3, the results of this alternative specification align with those presented in Table 2. Notably, the number of debit cards, savings, and inflation are statistically significant across the OLS and panel random-effects regressions. Borrowing from a formal institution and GDP per capita are statistically significant across both models, providing reassurance regarding the robustness of these relationships. Our findings underscore the significance of considering broader educational measures, such as APL, in capturing the diverse nature of adults' learning behavior in the EU.

Table 2. OLS Results

VARIABLES	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)
DEBIT	–0.019***	–0.021***	–0.014**	–0.015**	–0.017**	–0.018**	–0.020***
	(0.0058)	(0.0080)	(0.0066)	(0.0069)	(0.0073)	(0.0076)	(0.0072)
SAVING	–0.284***		–0.161***	–0.154***	–0.189***	–0.186***	–0.259***
	(0.0592)		(0.0412)	(0.0527)	(0.0646)	(0.0653)	(0.0785)
EDUC	0.00007			–0.00018	–0.00028	–0.00037	–0.00017
	(0.0006)			(0.0010)	(0.0010)	(0.0011)	(0.0010)
BFI	0.152*				0.0716	0.0849	0.145
	(0.0771)				(0.0771)	(0.0816)	(0.0880)
FWB	–0.016					–0.0533	–0.0294
	(0.0936)					(0.0964)	(0.0916)
INF	1.122**						0.946*
	(0.5120)						(0.5070)
GDP	–0.410**						–0.363
	(0.1940)						(0.2280)
Constant	0.258***	0.174***	0.245***	0.245***	0.240***	0.263***	0.262***
	(0.0387)	(0.0110)	(0.0204)	(0.0217)	(0.0225)	(0.0473)	(0.0446)
Observations	71	71	71	71	71	71	71
R squared	0.392	0.110	0.322	0.321	0.331	0.333	0.390
Number of countries	24	24	24	24	24	24	24

*Table 2 presents the estimation results. Model (1) presents the results of regressing the model using OLS with robust standard errors to eliminate heteroskedasticity. Models (2)–(7) present the results of estimating the model using the panel random-effects model, including one variable at a time. The data are drawn from three waves of panel data spanning the years 2014, 2017, and 2021, sourced from the Global Findex (Demirgüç-Kunt et al., 2022) and Eurostat (n.d.) databases. The dataset encompasses all EU Member States, excluding Luxembourg, Slovenia, and the Slovak Republic. Note: ***, **, and * denote the 1%, 5%, and 10% significance levels, respectively. Standard errors are shown within parentheses. For Model (1), robust standard errors are reported. The DEBIT variable is standardized by subtracting its mean and dividing by its standard deviation to ensure comparability to other variables measured in percentages.*

Table 3. OLS Results (when replacing EDUC with APL)

VARIABLES	Model (1)	Model (2)
DEBIT	–0.021***	–0.022***
	(0.0059)	(0.0073)
SAVING	–0.242***	–0.205**
	(0.0610)	(0.0827)
APL	–0.103	–0.153
	(0.0913)	(0.1180)
BFI	0.158**	0.149*
	(0.0759)	(0.0885)
FWB	–0.0157	–0.0273
	(0.0900)	(0.0924)
INF	1.083**	0.880*
	(0.5151)	(0.4970)
GDP	–0.479**	–0.424*
	(0.2080)	(0.2321)
Constant	0.255***	0.253***
	(0.0349)	(0.0442)
Observations	71	71
R squared	0.401	0.396
Number of countries	24	24

*Table 3 presents the estimation results of replicating the models in Table 2 while replacing EDUC with APL. Model (1) presents the results of regressing the model using OLS with robust standard errors to eliminate heteroskedasticity. Model (2) presents the results of estimating the model using the panel random-effects model, including all variables. The data are drawn from three waves of panel data spanning the years 2014, 2017, and 2021, sourced from the Global Findex (Demirgüç-Kunt et al., 2022) and Eurostat (n.d.) databases. The dataset encompasses all EU Member States, excluding Luxembourg, Slovenia, and the Slovak Republic. Note: ***, **, and * denote the 1%, 5%, and 10% significance levels, respectively. Standard errors are shown within parentheses. For Model (1), robust standard errors are reported. The DEBIT variable is standardized by subtracting its mean and dividing by its standard deviation to ensure comparability with other variables measured in percentages.*

Although debit and credit cards both involve transactions, they represent two distinct financial behaviors. To explore how borrowing from family or friends may be influenced by these different behaviors, we replicate the test presented in Table 3 and include the total number of credit cards. The presence of the DEBIT and CREDIT variables allows us to examine the interplay among various financial instruments. Including the total number of credit cards in the model adds the element of debit cards and acts as a robustness check regarding our findings on the significance of the DEBIT variable.

Our findings provide evidence that the relationship between the total number of debit cards and borrowing from family or friends holds even when considering a broader range of financial behavior. The additional results reveal that DEBIT, SAVING, and INF remain statistically significant across both models, as shown in Table 4, aligning with those presented in Table 3. Additionally, GDP is significant across both models. However, unlike the results presented in Table 3, BFI no longer exhibits statistical significance.

Table 4. OLS Results (when replacing EDUC with APL and including CREDIT in the models)

VARIABLES	Model (1)	Model (2)
DEBIT	–0.023**	–0.025**
	(0.0092)	(0.0118)
CREDIT	0.0078	0.0084
	(0.0089)	(0.0112)
SAVING	–0.250***	–0.216**
	(0.0658)	(0.0870)
APL	–0.069	–0.117
	(0.0929)	(0.1240)
BFI	0.136	0.131
	(0.0833)	(0.0934)
FWB	0.0016	–0.0104
	(0.0945)	(0.0939)
INF	1.074**	0.913*
	(0.5261)	(0.5069)
GDP	–0.492**	–0.457*
	(0.2179)	(0.2390)
Constant	0.253***	0.252***
	(0.0355)	(0.0446)
Observations	68	68
R squared	0.388	0.384
Number of countries	23	23

*Table 4 presents the estimation results of replacing EDUC with APL and including CREDIT in the models. Model (1) presents the results of regressing the model using OLS with robust standard errors to eliminate heteroskedasticity. Model (2) presents the results of estimating the model using the panel random-effects model, including all variables. The data are drawn from three waves of panel data spanning the years 2014, 2017, and 2021, sourced from the Global Findex (Demirgüç-Kunt et al., 2022) and Eurostat (n.d.) databases. The dataset encompasses all EU Member States, excluding Luxembourg, Slovenia, and the Slovak Republic. By including the CREDIT variable, we lost three observations due to the absence of data for France. Note: ***, **, and * denote the 1%, 5%, and 10% significance levels, respectively. Standard errors are shown within parentheses. For Model (1), robust standard errors are reported. The DEBIT and CREDIT variables are standardized by subtracting their means and dividing by their standard deviations to ensure comparability with other variables measured in percentages.*

Conclusion, Policy Recommendations, and Suggestions for Future Research

Households may depend on informal borrowing due to a low level of financial resilience (Lusardi et al., 2021), including inadequate safety nets. Nevertheless, such behavior can lead to serious financial problems and personal conflicts (Karaivanov & Kessler, 2018). Applying the self-control theory and using balanced panel data from 2014, 2017, and 2021, this study focuses on various factors that can affect the behavior of borrowing from family and friends and underscores the pivotal role of debit card use and saving behavior in reducing the tendency for such borrowing.

Despite the development of many advanced FinTech payment tools, debit cards are still popular. According to the European Central Bank (2024), card payments accounted for 54% of all non-cash transactions in the first half of 2023. This highlights the widespread use of debit and credit cards in the EU. Moreover, many

contemporary FinTech solutions such as Mobile Wallets require that account holders charge their accounts by transferring money via debit cards. Due to the functionality of debit cards (which do not allow holders to spend more than the money they actually possess), households can control their spending. The work of Bachas et al. (2021), which emphasizes the positive effect of using debit cards in increasing overall saving and controlling consumption, can shed light on the present findings. Therefore, we conjecture that the use of debit cards could improve households' financial resilience and their capability to deal with unexpected financial shocks.

Policymakers should therefore promote the adoption and usage of debit cards over credit cards due to the role the former has in decreasing informal borrowing. Policymakers should also raise awareness of the benefits of formal borrowing such as consumer protections, ensure the availability of affordable formal borrowing options for low-income households, promote access to bank loans and microfinance, and strengthen social safety nets to act as a buffer against financial shocks and hardships. In such a financial landscape, financial robo-advisors are promising technology tools because they can help households conduct sound financial management at a reasonable cost and without time or place constraints (D'Acunto & Rossi, 2023).

The finding related to the role of savings in reducing informal borrowing aligns with arguments presented by, for example, Browning and Lusardi (1996), Tufano (2009), and Despard et al. (2020). They have argued that a reason for saving and establishing emergency funds is to mitigate unexpected events, emphasized the importance of the precautionary principle in dealing with contingencies, and suggested that saving and sound financial management can successfully stimulate the investing of money. This study identifies a significant effect of saving behavior in addressing undesirable informal borrowing. However, it is essential to go one step further and investigate what factors can prompt saving behavior, particularly among low-income households. Also, when focusing on saving behavior, financial robo-advisors can be useful for households (Nourallah et al., 2023). We also encourage future research to explore interventions to enhance financial decision-making and sustainable saving practices and consider how to improve financial well-being across diverse socioeconomic contexts.

To address the potential impact of general knowledge on borrowing behavior, this study utilizes a measure based on the percentage of households participating in formal or non-formal education or training within the last 12 months. The results reveal an insignificant effect of education on informal borrowing behavior. This suggests that the education provided to the public may not effectively enhance households' financial knowledge or address money-related issues. Hence, and in line with Lusardi et al. (2021), we recommend improving financial literacy education and embedding more financial knowledge into formal education curricula in order to focus on money management skills such as financial planning and debt management. This would seem to be increasingly important, as the search for effective retirement savings strategies has more than doubled over the past two decades (Lusardi & Mitchell, 2023). Related to this, we suggest future financial literacy education studies around the world.

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Appendix: Definition of Variables

Borrowed from family or friends (% age 15+)	"The percentage of respondents who report borrowing any money from family, relatives, or friends in the past year." (Demirgüç-Kunt et al., 2022)	The Global Findex Database
Saved any money (% age 15+)	"The percentage of respondents who report personally saving or setting aside any money for any reason and using any mode of saving in the past year." (Demirgüç-Kunt et al., 2022)	
Saved for old age (% age 15+)	"The percentage of respondents who report saving or setting aside any money in the past year for old age." (Demirgüç-Kunt et al., 2022)	
Saved at a financial institution (% age 15+)	"The percentage of respondents who report saving or setting aside any money at a bank or another type of financial institution in the past year." (Demirgüç-Kunt et al., 2022)	
Borrowed from a formal financial institution (% age 15+)	The percentage of respondents who report borrowing any money from a bank or another type of financial institution or using a credit card in the past year.	
Use of financial services, number of cards, debit cards	The total number of debit cards in circulation (excluding expired and withdrawn cards) of all financial institutions in the reporting jurisdiction. (IMF, n.d.)	International Monetary Fund – Financial Access Survey
Use of financial services, number of cards, credit cards	The total number of credit cards in circulation (excluding expired and withdrawn cards) of all financial institutions in the reporting jurisdiction. (IMF, n.d.)	
Education	"Percentage of youth and adults in a given age range (e.g. 15–24 years, 25–64 years, et cetera) participating in formal or non-formal education or training in a given time period (e.g. last 12 months)." (UIS, n.d.)	UNESCO Institute for Statistics
Adult participation rate in learning	The adult participation rate in learning covers participation in formal and non-formal education and training. It encompasses all learning activities undertaken with the aim of improving knowledge, skills, and competences within the personal, civic, social, or employment-related domains.	Eurostat
Financial well-being Average rating of satisfaction	Overall life satisfaction.	
Distribution of population aged 18 and over by health status very good	Distribution of population aged 18 to 64 years who responded that their health status is very good. (Eurostat, n.d.)	
Inflation, consumer prices (annual %)	"Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed annually." (The World Bank, n.d.)	World Bank – World Development Indicators
Gross domestic product (GDP) per capita growth	"Annual percentage growth rate of GDP per capita based on constant local currency. GDP per capita is gross domestic product divided by midyear population." (World Bank, n.d.)	