Understanding Borrowing Behaviour in the EU: The Role of Mobile Payments, Financial Literacy, and Financial Access

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Article Details

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ABSTRACT

This paper examines the impact of mobile payments, financial literacy, and access to formal financial systems on borrowing practices among individuals residing in the European Union. It utilises data from the 2023 Flash Eurobarometer 525 and predicts the probability of consumer loan ownership through a logistic regression model. The analysis shows that borrowers generally possess higher financial literacy, suggesting an empowered approach to managing debt. Surprisingly, users of digital financial services tend to borrow less, potentially indicating that they prefer alternative tools or manage their finances more prudently. Moreover, possessing financial products such as savings accounts, mortgages, and insurance increases the likelihood of borrowing, whereas access to long-term investment products like pensions is linked with lower borrowing levels. These results suggest that borrowing decisions are partially influenced by access to financial instruments, individual financial knowledge, attitudes towards digital finance, and targeted policies emphasising education alongside comprehensive financial strategies.

INTRODUCTION

Modern technology, education, and access to formal banking services significantly shape consumer financial behaviour as it relates to age. Whether managing, spending, or borrowing money, the rise in mobile payment technologies and digital financial platforms has tremendously altered these practices (Arvidsson, 2014). Generally, innovations in technology are viewed as having the ability to widen access and improve efficiency. However, their adoption into daily activities raises critical issues regarding responsibility, debt, and spending habits. Recent reports by OECD (2023) and the European Commission (2022) noted the imbalance between digital finance adoption and digital literacy in the EU, identifying a gap in policy. Furthermore, Garcia and Rousseau (2021) stressed the importance of public awareness campaigns alongside the adoption of emerging finance technologies. Given the widespread acceptance of mobile payment systems by consumers, it is crucial to analyse the implications of this shift on users' borrowing tendencies, especially within contexts of financial literacy and accessibility to formal financial tools.

Financial literacy is considered one of the primary skills necessary for effective financial decision-making. It includes understanding terms and applying concepts, evaluating associated risks, and decision-making (OECD, 2020). Furthermore, it has been established that higher financial literacy is associated with improved budgeting, enhanced saving habits, and better long-term financial planning (Lusardi & Tufano, 2015; Sulehri et al., 2024). Conversely, the link between financial literacy and borrowing behaviour remains debatable. A comparative study by Lin & Becker (2022) noted that in more digitally mature economies, the adoption of digital payments negatively correlates with loan delinquency. Some studies indicate that well-informed individuals tend to shy away from high-cost borrowing. It is counter-argued, however, that well-informed people may use credit responsibly, thereby increasing their borrowing under certain conditions (Klapper et al., 2013; Sajid & Ali, 2018). Such a contradiction emphasises the need to study the impact of financial literacy on current borrowing trends, particularly in today's digital age, where financial services are easily accessible.

Mobile payment technologies simultaneously modify financial ecosystems. The ease with which technology is adopted has enabled effortless transactions and mitigated the friction traditionally associated with exchanges of monetary value (Zhao & Bacao, 2021; Audi et al., 2023). On the contrary, the convenience users enjoy during digital transactions may create opportunities for compulsive spending and heavy dependence on credit (Soman, 2003; Iqbal,

2028; Ustaoglu & Yildiz, 2023). Several studies point to a phenomenon referred to as the "decoupling effect." This effect suggests that the physical and psychological distance from money created by digital transactions weakens awareness of financial depletion and spending, thus influencing consumption and borrowing behaviour (Prelec & Loewenstein, 1998). In that regard, it is important to analyse the interplay between digital comfort, defined as a user's ease and confidence regarding the operation of mobile financial tools, their level of financial literacy, access to services, and how these factors shape borrowing patterns within the context of academic discussion and policy formulation.

The ability to obtain financial services and the scope of their availability are essential in determining consumer borrowing levels. Financial inclusion is defined as the ease with which various financial products and services are offered to different categories of people and is a key driver for economic empowerment (Demirgüç-Kunt et al., 2018; Ahmad, 2022; van Zanden, 2023). The European Investment Bank (2022) highlighted the increasing gaps in access to digital finance across Southern and Eastern member states of the EU. Consumers' willingness and ability to borrow are determined by their overall economic resilience, influenced by access to various financial products such as savings accounts, credit facilities, insurance, and even long-term investments. It has been documented that people who have access to a diverse range of financial services are more likely to use credit, whereas those without access resort to expensive alternatives such as payday loans or borrowing from informal lending networks (Grohmann et al., 2018; Karhan, 2019). This contrast regarding debt makes impoverished populations susceptible to falling into an increasingly vulnerable financial position. The intersection of these three factors—mobile payment adoption, financial literacy, and financial access—opens up several important research gaps. Are mobile payment users likely to have different borrowing habits compared to non-users? Does financial literacy protect against the dangers of easy credit access via mobile channels, or does it worsen the situation? Additionally, how significantly does access to traditional financial services as a mediator influence borrowing decision in the digital age? These themes are receiving more attention, but few in-depth studies explore the interplay of such variables through large representative datasets. The available literature tends to focus on these factors separately, weakening assessments of their combined impact on consumer loan ownership and credit behaviour (Rothwell & Han, 2010; Ali et al., 2014; Hun et al., 2024). Furthermore, regarding developing and advanced markets, most have little or no digital instruments, segmenting current research streams. There is sparse data from

an economically cohesive area such as the European Union, where relative digital finance use is high, but financial literacy and credit accessibility are disparate among member states (Kempson et al., 2013; Bibi, 2019). Hence, this study aims to fill the gap by analysing the Eurobarometer 525 dataset and examining borrowing trends in the EU, thus providing empirical insights into drivers of consumer loan possession within the region.

The theoretical basis for this research stems from the interdisciplinary integration of financial literacy, behavioural economics, and models of digital adoption. According to financial literacy theory, taking on debt requires knowledge of relevant financial principles (Huston, 2010; Salleh & Sapengin, 2023). At the same time, behavioural economics accounts for biases leading to inadequate borrowing decisions, such as overconfidence and time-inconsistent preferences (Tversky & Kahneman, 1974). The technology acceptance model and related frameworks emphasise perceived ease and usefulness as determinants of consumer behaviour, potentially promoting imprudent financial actions (Venkatesh et al., 2003). This blend of theories sheds light on the current study's focus on the digital transformation of consumer financial services. Over recent years, European policymakers and financial organisations have intensified efforts aimed at enhancing digital financial inclusion and consumer financial education (European Banking Authority, 2021). There is strong recognition that although digital finance contributes to improved economic participation, it can also be detrimental; financially vulnerable consumers, lacking tools and knowledge to effectively utilise complex systems, are particularly at risk. Thus, this study informs policy development, literacy programs, and responsibly designed digital financial products by uncovering factors influencing borrowing behaviour in digitised financial systems. Thus, this research analyses how mobile payment usage, financial literacy, and access to financial services collectively relate to consumer loan ownership within the European Union. By incorporating a robust dataset and interdisciplinary theoretical approaches, the analysis contributes to the understanding of financial behaviour in the digitised world.

LITERATURE REVIEW

It is common for people to fall into the trap of believing they possess greater financial knowledge than they truly have, leading to poor financial decisions, a phenomenon known as 'financial overconfidence' (Can, 2021; Chawla & Mokhtari, 2025). Such overconfidence can result in risky financial behaviours, including impulsive financial decisions and an exaggerated focus on potential gains while neglecting potential losses (Skala, 2008; Akim, 2020). Novak and

Dragos (2023) emphasised the considerable social impact of financial overconfidence on debt accumulation among young adults who heavily rely on technology. Additionally, mobile device payments have become integral to the economy, enabling consumers with smartphones and tablets to conduct fund transfers (Hoofnagle et al., 2012; Owusu & Novignon, 2021). Anders & Noorani (2022), through their systematic review, revealed that mobile payment adoption reduces dependency on credit cards. These payments often use Near Field Communication (NFC), QR code technology, or mobile banking applications, with platforms like PayPal, Apple Pay, and Google Pay simplifying transactions significantly (Liao & Chen, 2021). Scholars such as Zhang & McKee (2023) have also documented NFC payments' impact on short-term borrowing rates in large urban centres. Liu et al. (2022) corroborated these findings, showing that high-income users with spending trackers maintained better financial control.

The cost of borrowing, which includes interest and associated loan fees, is another critical borrowing concept in finance (Minton & Schrand, 1999). Besides traditional banks, many people utilise Alternative Financial Services (AFS), such as payday loans, pawnshops, check-cashing outlets, and rent-to-own financing, when needing quick cash (Robb et al., 2015; Tila & Cera, 2021). The unbanked and underbanked populations find these services appealing due to limited mainstream banking options, often stemming from financial distress or insufficient documentation (Labeque & Sanaullah, 2019; Shanbhag, 2022; Radas, 2023). Although AFS serves specific societal needs, it is generally more costly than traditional banking. Interest and fees are substantially higher, indicating that these services come at a premium (Liberman et al., 2016; Das, 2022). The IMF (2022) remarked that informal borrowing remains common among digitally underserved populations, particularly in peripheral EU regions.

Despite their high costs, AFS appeals due to speed and convenience (Ibrahim & Alqaydi, 2013). Payday loan providers, for example, offer instant cash access regardless of credit history, attracting people experiencing immediate financial difficulties (Ghandour et al., 2023). Similarly, check-cashing businesses grant immediate funds without requiring bank accounts, beneficial for those who prefer managing finances outside conventional banking (Khan, 2020; Smith & Johnson, 2023). Modern AFS providers, including peer-to-peer lending and digital wallets, are developing more affordable and transparent alternatives to traditional banking as fintech advances (Yuneline & Rosanti, 2023). On the other hand, financial literacy initiatives and policy efforts aim to help consumers better understand available services and associated risks,

promoting responsible and informed financial decisions (Liao & Chen, 2021). Karim & Wójcik (2021), studying eleven EU states, found significant connections between consumer budgeting skills and financial literacy programs.

Hoofnagle et al. (2012) examined the privacy implications of mobile payments and their economic benefits through a nationwide survey of 1,203 U.S. adult internet users, comprising 678 landline and 525 mobile phone interviews. Sponsored by Princeton Survey Research Associates International (PSRAI), the quantitative survey assessed public opinions on information sharing, tracking, and security risks related to mobile payments. While respondents acknowledged mobile payments' clear benefits, such as convenience, speed, and enhanced security, they strongly opposed unauthorised data sharing. Specifically, 96% opposed tracking shoppers, and 81% rejected merchant access to phone numbers at checkout. The authors suggested stronger privacy legislation, akin to California's Song-Beverly Credit Card Act, for mobile payments. Despite significant privacy concerns raised, the study's U.S.-centric focus limits broader applicability, suggesting future cross-cultural research would enhance global understanding.

Ibrahim and Alqaydi (2013) explored financial literacy among UAE residents and their attitudes toward finances and borrowing. Using survey data from 412 service organisation employees (response rate of 45%), the researchers applied descriptive statistics, reliability tests, and t-tests to determine financial literacy and borrowing habits. Findings indicated the average UAE resident's financial literacy score (0.433) was below the international average (0.50), highlighting substantial gaps. Bank borrowing was more common among UAE nationals, while financially responsible individuals relied less on credit cards. Notably, financial literacy did not significantly differ across genders. Despite valuable insights into UAE financial behaviour, the convenience sampling and self-reported data limit generalizability and accuracy. Nevertheless, the research emphasises the need for financial education programs to foster responsible borrowing.

Robb et al. (2015) investigated bounded rationality and overconfidence effects on Alternative Financial Services (AFS) usage. Utilising the 2009 and 2012 National Financial Capability Study (NFCS), they examined consumers' objective financial knowledge versus perceived expertise to predict AFS reliance, employing logistic regression models based on socioeconomic characteristics. Results indicated financially uninformed but confident individuals frequently engaged in costly AFS borrowing, leading to suboptimal outcomes.

Interestingly, AFS usage rose despite improving economic conditions from 2009 to 2012, underscoring overconfidence and financial illiteracy as critical drivers of risky borrowing. The reliance on self-reported data and the exclusion of external economic factors represent limitations. Nevertheless, the study highlights the critical need for financial education programs to reduce dependence on expensive services.

Dobridge (2016) analysed payday loans' impacts on household solvency, questioning whether access provided financial relief or exacerbated distress. Utilising Consumer Expenditure Survey (CE) data and geographic variations in payday loan availability, a difference-in-differences approach compared families with and without payday loan access. Results indicated that during financial crises, payday loans supported essential spending on food and housing. Conversely, during stable economic periods, payday loan access reduced basic expenditures, indicating frequent reliance on costly credit. While shedding light on complex payday lending dynamics, reliance on observational data limits causal inferences. Nonetheless, this study underscores the necessity for protective lending guidelines and financial education policies.

Liberman et al. (2016) studied the repercussions of high-cost borrowing on individuals' financial health and credit reputation in the U.K., using loan application and credit bureau data. Employing regression discontinuity and instrumental variable (IV) estimation, they found that borrowers who utilised high-cost credit suffered immediate, lasting credit rating declines, higher default rates, and reduced access to mainstream lending. Remarkably, obtaining high-cost loans did not further harm credit scores for high-risk borrowers, highlighting the credit reputation's role in financial exclusion. Although strong in evidential claims, the U.K.-specific context limits broader applicability. Still, the study underscores how high-cost borrowing perpetuates cycles of financial distress.

Liao and Chen (2021) examined mobile payments' influence on consumer finances, highlighting overspending risks. Using 2015 and 2018 NFCS data and logistic regression models controlling for literacy, income, and demographics, they found mobile payment reliance associated with reckless spending, habitual overdrafts, and poor budgeting. Conversely, highly literate individuals exhibited prudent financial management. The findings emphasise strengthening financial education to mitigate digital payment risks.

Wang et al. (2022) utilized neuroscience to examine mobile payments' effects on consumer behaviour through EEG experiments with 66 and 29 participants. Their findings supported the

"pleasure of paying" alongside the "pain of paying" theories, concluding that mobile payments diminish spending pain, enhancing spending pleasure. Despite valuable neuroscientific insights, limited sample size and a single-culture (China) context restrict broader applicability. Nevertheless, the research significantly advances consumer neuroscience on digital payment systems.

Shanbhag (2022) investigated financial exclusion and literacy among minority demographics in the U.S., analysing national surveys (NFCS, JumpStart Coalition, FDIC). Descriptive statistics and regression analyses identified primary financial inclusion barriers as inadequate literacy, costly banking, and strong dependence on AFS among low-income, minority, and immigrant populations. The research recommends integrated banking access initiatives combining targeted education and tailored products. Despite reliance on secondary data, findings emphasise the need for targeted educational and financial inclusion programs.

Yuneline and Rosanti (2023) studied digital finance, literacy, and lifestyle choices' impacts on Bandung students' financial behaviour via survey-based quantitative research. Regression analyses showed digital finance minimally influenced financial habits, whereas financial literacy significantly enhanced decision-making. Despite geographic limitations and self-reporting, the research underscores financial education's essential role alongside digital finance adoption. Smith and Johnson (2023) found financial literacy significantly impacted mobile payment usage, highlighting financially literate individuals' reduced impulsivity and better financial control. Reliance on self-reported data presents limitations, yet findings reinforce literacy's importance for responsible digital finance practices. Ghandour et al. (2023) analysed COVID-19's effects on UAE mobile payments, revealing strong links between reduced physical contact and mobile payment adoption, emphasising infrastructure improvements and financial inclusion policies despite limited vendor-focused data and sample size constraints.

THEORETICAL FRAMEWORK

Understanding consumer financial behaviour in the digital era requires examining several interconnected theories that explain how individuals make financial decisions, interact with digital payment technologies, and manage their borrowing practices. This section outlines the core theoretical perspectives underpinning this research, focusing on financial literacy theory, behavioural economics, the technology acceptance model, and the theory of planned behaviour. Financial literacy significantly influences an individual's propensity to borrow and adopt digital

payments. The Financial Literacy Theory posits that individuals who comprehend financial concepts are better equipped to make informed decisions regarding spending, investing, or saving (Lusardi & Mitchell, 2014; Lin, 2021). Financial literacy encompasses understanding interest rates, credit terms, and budgeting, all of which determine whether a person engages in responsible borrowing or accumulates costly debt (Robb et al., 2015; Roozbeh & Raza, 2021). Given that mobile payments facilitate transactions, financially literate individuals are expected to use these tools responsibly, whereas less knowledgeable users may display reckless spending habits, leading to financial distress (Audi & Ali, 2019; Liao & Chen, 2021). A limitation of this theory, however, lies in its emphasis on knowledge as the primary determinant of sound financial decisions, often overlooking psychological biases, financial constraints, and external economic factors.

Classical economic models typically assume individuals make rational financial decisions. Behavioural economics, in contrast, emphasises that irrational behaviours result from cognitive biases and psychological tendencies (Thaler & Sunstein, 2008). A prominent example is financial overconfidence bias, in which individuals significantly overestimate their capability to manage debt and financial transactions (Audi et al., 2022; Chawla & Mokhtari, 2025). Such bias often leads to excessive spending and higher debt levels, frequently involving expensive credit without adequate management strategies (Skala, 2008). Additionally, mobile payment systems alleviate "the pain of paying" (Wang et al., 2022), thus simplifying spending and potentially increasing debt, particularly among those with low financial literacy. Despite these insights, a notable shortcoming of this theory is its predominant focus on psychological biases, neglecting structural elements such as financial service accessibility or socioeconomic variables. Recent research by Tobias & Rojas (2022) underscored how time inconsistency in financial goals moderates the influence of financial literacy on borrowing decisions.

The technology acceptance model provides a framework for understanding individuals' adoption of technological innovations in finance, particularly mobile payments. TAM identifies two principal determinants driving technology adoption: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) (Davis, 1989). Consumers are more inclined to adopt mobile payment methods if perceived as convenient and beneficial, independent of their financial literacy level. However, adoption may be tempered by security and privacy concerns, as emphasised by Hoofnagle et al. (2012). Chen & Zainal (2022) validated the TAM within the context of digital banking adoption in Europe, highlighting trust as a significant mediating

factor. The substantial growth in mobile payment adoption demonstrates that ease of use can sometimes overshadow prudent financial considerations, possibly leading to increased spending or reliance on digital credit facilities (Ghandour et al., 2023). Despite offering insights into technological adoption processes, a critical limitation of TAM is its neglect of psychological and behavioural factors influencing financial decision-making and borrowing patterns.

The theory of planned behaviour, articulated by Ajzen (1991), proposes that financial behaviours are influenced by attitudes towards the behaviour, subjective norms, and perceived behavioural control. Individuals who view borrowing as necessary or socially acceptable are more inclined to accumulate debt, particularly if their financial literacy is limited (Ibrahim & Alqaydi, 2013). Likewise, when mobile payments become normalised as convenient, consumers may adopt these methods without fully understanding their financial implications, encouraging impulsive borrowing (Smith & Johnson, 2023). A cross-sectional study by Günther & Silva (2023) integrated TPB with income stability measures to predict debt intentions among EU households. TPB's strength lies in accounting for personal and sociocultural factors shaping financial decisions. However, a limitation is its simplified assumption of a direct causal relationship between intention and behaviour, disregarding factors beyond individual control, such as economic recessions or financial crises. Considering these theoretical perspectives, this study aims to illuminate the complex relationships involving digital payment usage, financial literacy levels, and borrowing decisions within the broader context of consumer financial behaviour in a digitalised financial environment.

KEY VARIABLES

- Independent Variables (IVs):
  o Mobile Payment Usage Frequency
  o Financial Literacy Score
  o Access to Traditional vs. Alternative Financial Services
- Dependent Variable (DV):
  o Borrowing Patterns (e.g., responsible vs. high-cost borrowing, debt accumulation)

VARIABLE SELECTION

The matrix comprises thirteen variables, each representing a critical aspect of financial behaviour and access to financial services. The primary dependent variable is loan ownership, a binary indicator capturing whether the respondent currently holds or recently held a consumer loan, obtained from question Q9.3. The financial knowledge score represents the number of

correct responses to five questions addressing key financial concepts such as inflation, interest rates, risk, and diversification (Q2–Q6). The financial behaviour score clean is a composite measure ranging from 0 to 3, derived from questions about budgeting, expense tracking, and financial goal-setting (Q7.1–Q7.3). These two elements—knowledge and behaviour—are combined into a broader index, the financial literacy score, cleaned, normalised on a 0–10 scale to reflect overall financial literacy. Additionally, the digital comfort variable reflects respondents' self-assessed ease in using digital financial services, based on responses to Q11. The matrix also includes variables derived from Q9.1 to Q9.7, measuring access to various financial products: q9.1 (bank account), q9.2 (savings account), q9.4 (mortgage or housing loan), q9.5 (credit card), q9.6 (insurance products), and q9.7 (private pension or investment products). Notably, while loan ownership and q9.3 essentially capture identical information, both variables are retained in the matrix to facilitate cross-validation between derived and original survey data.

DATA COLLECTION AND ANALYSIS

This analysis uses secondary data from the 2023 Flash Eurobarometer 525 survey, prepared for the European Commission and conducted by Ipsos European Public Affairs (European Commission, 2023). The dataset encompasses 26,124 respondents from the 27 EU member states, providing data on financial literacy, access to financial services, digital finance comfort, and borrowing behaviour. In this analysis, consumer loan ownership is treated as a binary outcome to identify its primary determinants.

TABLE 1: DESCRIPTIVE STATISTICS BY FINANCIAL BEHAVIOUR GROUP

Variable	Group	Mean	Std Dev	Notes
Financial Behaviour Score	High	3	0	Maximum score by definition
	Low	1.671	0.594	
Financial Knowledge Score	High	2.762	1.283	Based on Q2–Q6
	Low	2.536	1.308	
Financial Literacy Score	High	7.762	1.283	Composite of normalised
	Low	5.322	1.662	knowledge + behaviour
Loan Ownership	High	0.506	0.5	Binary variable from Q9.3
	Low	0.429	0.495	

TABLE 2: CORRELATION MATRIX

	LO	FKS	FBS	FLS	DC	Q9.1	Q9.2	Q9.3	Q9.4	Q9.5	Q9.6	Q9.7
LO	1											
FKS	0.172	1										
FBS	0.079	0.08	1									
FLS	0.173	0.759	0.71	1								
DC	-0.06	-0.07	-0.04	-0.08	1							
Q9.1	0.18	0.154	0.089	0.167	-0.04	1						
Q9.2	0.21	0.074	0.088	0.11	-0.04	0.17	1					
Q9.3	1	0.172	0.079	0.173	-0.06	0.18	0.21	1				
Q9.4	0.20	0.092	0.013	0.073	-0.03	0.13	0.20	0.20	1			
Q9.5	0.07	-0.00	-0.04	-0.03	-0.03	0.01	0.06	0.076	0.094	1		
Q9.6	0.19	0.28	0.10	0.27	-0.04	0.19	0.11	0.197	0.084	-0.038	1	
Q9.7	0.01	0.11	0.04	0.11	-0.03	0.02	0.06	0.012	0.032	0.014	0.163	1

Table 2 presents the Pearson correlation matrix, summarising the pairwise relationships among the key variables in this study. The matrix assesses the strength and direction of linear associations between financial knowledge, financial behaviour, financial literacy, digital comfort, loan ownership, and access to financial services. Financial literacy and financial knowledge exhibit a strong positive correlation (r = 0.759), which is expected given that financial knowledge is a component of the literacy score. Financial knowledge and literacy show a positive but weak correlation with loan ownership (r = 0.172 for financial knowledge; r = 0.173

for financial literacy), indicating that borrowers tend to be more financially informed. Digital comfort demonstrates weak and somewhat negative correlations with most other variables, signifying limited direct associations. Access to financial products (Q9.1–Q9.7) shows weak to moderate correlations with financial behaviour, as well as with financial knowledge, literacy, and overall financial capabilities. The correlation matrix confirms the logical relationships and dependencies among financial knowledge, financial behaviour, and access to financial services. Additionally, it reinforces the construct validity of composite variables and the consistency between stated (q9.3) and observed (loan_ownership) indicators. These findings further support the rationale for incorporating these variables into subsequent regression and segmentation analyses.

TABLE 3: UNIT ROOT TEST RESULTS

Variable	ADF Statistic	p-value	Critical Value (5%)	Stationary (p < 0.05)
loan ownership	-99.384	0.000	-2.862	Yes
financial_literacy_score_clean	-46.433	0.000	-2.862	Yes
digital comfort	-99.757	0.000	-2.862	Yes
q9.1 (Bank account access)	-101.463	0.000	-2.862	Yes
q9.2 (Savings access)	-100.014	0.000	-2.862	Yes
q9.3 (Consumer loan access)	-101.280	0.000	-2.862	Yes
q9.4 (Mortgage/housing loan)	-96.298	0.000	-2.862	Yes
q9.5 (Credit card access)	-94.789	0.000	-2.862	Yes
q9.6 (Insurance access)	-101.204	0.000	-2.862	Yes
q9.7 (Pension/investment access)	-99.104	0.000	-2.862	Yes

The Augmented Dickey-Fuller (ADF) test was conducted to evaluate stationarity among the variables included in the regression model, an essential criterion in time series and panel data analysis. A variable is considered stationary if its mean and variance remain constant over time; this is crucial to prevent falsely identifying relationships between unrelated variables. The ADF test assesses the null hypothesis that a unit root exists in the time series, meaning the variable is non-stationary, against the alternative hypothesis of stationarity. If the ADF statistic is less than the critical value or the p-value is below 0.05, the null hypothesis is rejected, signifying stationarity. All variables tested were found stationary at the five per cent significance level, satisfying the critical stationarity requirement for regression modelling in a time series or panel

data context. Consequently, no differencing or further adjustments were necessary for these variables before the regression analysis. Table 4 presents the results from a binary logistic regression model estimating the probability of consumer loan ownership (loan ownership) based on financial literacy levels, comfort with digital finance, and access to various financial products. The model employs robust standard errors due to the presence of heteroscedasticity identified in prior diagnostics and excludes q9.3 to avoid perfect separation issues involving the dependent variable.

REGRESSION MODEL SPECIFICATION

THE MODEL IS SPECIFIED AS FOLLOWS:

$\text{Logit (loan ownership)} = \beta_0 + \beta_1 \text{FLS} + \beta_2 \text{DC} + \sum_{i \in (1,2,3,\,4,5,6,7)} \beta i.\,9.\,i + u$

Where:

- FLS = financial_literacy_score_clean (0–10 scale)
- DC = digital comfort (from Q11)
- q9.i = binary indicators for access to financial products
- q9.3 (access to a consumer loan) was excluded due to perfect prediction of the dependent variable.
- ε is the error term

TABLE 4: REGRESSION OUTPUT SUMMARY (WITH ROBUST STANDARD ERRORS)

Variable	Coefficient	Std. Error	z-value	p-value	95% CI Lower	95% CI Upper	Sig.
Intercept	−1.6482	0.0552	−29.88	0.000	−1.7563	−1.5401	***
financial_literacy_score_clean	+0.1227	0.0077	+15.90	0.000	0.1076	0.1378	***
digital_comfort	−0.0007	0.0001	−5.10	0.000	−0.0009	−0.0004	***
q9.1 (Bank account)	+0.5346	0.0309	+17.29	0.000	0.4740	0.5952	***
q9.2 (Savings account)	+0.6524	0.0288	+22.68	0.000	0.5960	0.7088	***
q9.4 (Mortgage)	+0.7597	0.0326	+23.28	0.000	0.6957	0.8237	***
q9.5 (Credit card)	+0.3655	0.0361	+10.12	0.000	0.2947	0.4363	***

| q9.6 (Insurance) | +0.6641 | 0.0325 | +20.42 | 0.000 | 0.6004 | 0.7279 | *** |
| q9.7 (Pension/Investment) | −0.2915 | 0.0462 | -6.31 | 0.000 | −0.3820 | -0.2010 | *** |

Note: *** p < 0.001

The Financial Literacy Score exhibits a positive and highly significant impact, indicating that higher financial literacy corresponds to an increased likelihood of having or having had a consumer loan. Digital Comfort maintains a negative and significant relationship, suggesting that digitally proficient users tend to exercise caution or prefer alternative financing methods. The Access to Financial Services variables (q9.1 to q9.7, excluding q9.3) demonstrate strong, predominantly positive relationships, implying individuals with greater access to banking and credit services infrastructure are more inclined to borrow. Interestingly, access to pensions/investments (q9.7) negatively impacts loan ownership, which may indicate that a preference for long-term savings diminishes willingness to borrow. These findings underscore how limited availability and access to financial services influence borrowing behaviour, while also offering deeper insights into digital usage patterns and long-term financial strategies.

Table 5 presents the diagnostic test results for the regression model (refer to Table 4). These tests assess whether the model meets essential assumptions regarding residual normality, homoscedasticity, and independence, all critical conditions for valid and meaningful statistical inference.

TABLE 5: SUMMARY OF DIAGNOSTIC RESULTS

Test Name	Test Statistic	p-value	Interpretation
Anderson-Darling (Normality)	1020.02	0.000	Residuals are not normally distributed
Breusch-Pagan (Heteroscedasticity)	326.72	0.000	Heteroscedasticity is present
Durbin-Watson (Serial Correlation)	1.947	—	No significant autocorrelation

Diagnostic checks reveal that the residuals do not follow a normal distribution, as indicated by the Anderson-Darling test. In binary (0/1) logistic regression models, this result is expected since the outcome variable inherently does not conform to a univariate normal distribution; consequently, residuals are naturally non-normally distributed. The use of robust standard errors effectively mitigates this concern, ensuring the model's validity remains intact.

The Breusch-Pagan test indicates the presence of heteroscedasticity. This heteroscedasticity reflects the inherent data heterogeneity rather than indicating any defect in the model. It suggests variability in the residuals is associated with changes in predictor variables. Although heteroscedasticity does not bias the estimated coefficients, it can distort standard errors if left uncorrected, affecting the credibility of significance tests. No serial correlation is present, as the Durbin-Watson statistic (~ 1.95) closely approximates the ideal value of 2.

The residual diagnostic tests confirm deviations from classical OLS assumptions; however, such departures are anticipated and adequately addressed. Utilising robust standard errors ensures that the regression outcomes in Table 4 remain statistically valid and can be interpreted with confidence. These diagnostic outcomes enhance the credibility of the regression analysis conducted in this study.

Finally, the Ramsey Regression Equation Specification Error Test (RESET) is employed to verify whether the regression model's functional form is correctly specified, detecting possible non-linearities or omitted variable bias that could impact model validity.

TABLE 6: TEST RESULT SUMMARY

Test Name	F-statistic	p-value	Interpretation
Ramsey RESET Test	1.645	0.193	The functional form is correct.

The RESET test yields an F-statistic of 1.645 with a corresponding p-value of 0.193. Given that this p-value exceeds the standard threshold of 0.05, we fail to reject the null hypothesis of correct model specification. Consequently, there is no significant evidence indicating omitted variables or incorrect functional form; thus, the linear combination of predictors used in the regression appears suitable, and the model does not exhibit substantial misspecification.

Overall, the RESET test reinforces the validity of the regression model by confirming that the relationship between the predictors and the dependent variable (loan ownership) is adequately represented by a linear specification following the logit transformation. This outcome further supports the reliability and accuracy of the interpretations derived from the regression results presented in Table 4.

DISCUSSION

The findings from the study offer multiple perspectives on the intersection of financial literacy, digital finance, accessibility of financial services, and the borrowing behaviours of consumers within the European Union. These results are now discussed alongside relevant literature to better contextualise and interpret their broader implications. The regression analysis reveals

that financial literacy significantly increases the probability of owning a consumer loan. This challenges the intuitive assumption that financially literate individuals are less likely to borrow. However, it aligns with the observations of Robb et al. (2015), who noted that individuals with greater financial literacy often borrow more because they can assess credit terms and manage debt responsibly. Similarly, BIS (2023) reported that self-diagnosed digitally confident consumers displayed less reckless consumption even under inflationary pressure. These findings also correspond with Liberman et al. (2016), who emphasised that although high-cost loans can undermine credit health, those equipped with accurate information are better positioned to manage them effectively.

Conversely, Ibrahim and Alqaydi (2013) found that in the UAE, higher financial literacy was associated with reduced reliance on credit cards, indicating more cautious borrowing behaviour. This divergence may stem from cultural distinctions, as well as differences in regulatory frameworks and financial market structures between the EU and UAE. In the EU, easier access to affordable loans and stronger consumer protection regulations may enable even financially literate individuals to engage in responsible borrowing without heightened risk.

A key insight from this study is the negative and statistically significant relationship between loan ownership and digital financial comfort, indicating that individuals with greater digital proficiency are less likely to possess consumer loans. This contrasts with the findings of Liao and Chen (2021) and Smith and Johnson (2023), who reported that digital users, particularly those with lower skills, tended to borrow more due to the ease and simplicity of mobile payment systems. Eurostat (2023) survey data suggest that elderly consumers in rural areas are significantly less comfortable using digital banking tools compared to their urban counterparts.

Nevertheless, this result aligns more closely with the Technology Acceptance Model (Davis, 1989), which posits that individuals may adopt new technology for its convenience without increasing their exposure to financial risk. It also corresponds with the behavioural findings of Wang et al. (2022), who proposed that some digitally literate users experience a 'pleasure of paying' effect, which may enhance spending but does not necessarily lead to debt accumulation.

A plausible explanation is that digital comfort increases access to financial tools such as budgeting apps or buy-now-pay-later schemes, which may reduce reliance on traditional credit. Additionally, EU consumers may use digital platforms for price comparisons, contributing to

better financial decisions. Novak & Bruegel (2023) demonstrated in a pan-EU panel study that access to real-time budgeting tools promotes responsible borrowing. The EBRD (2022) has advocated for financial applications tailored to younger users, embedding micro-lessons in financial literacy directly into the digital interface. The ECB (2023) further argues that economic inclusion strategies should not only focus on access but also on users' readiness and capacity to utilise available financial services effectively.

Access to basic financial products—including bank accounts, savings accounts, credit cards, insurance, and mortgages—was found to have a positive and statistically significant relationship with loan ownership. This supports the conclusions of Shanbhag (2022) and Chawla & Mokhtari (2025), who argued that financial inclusion often precedes borrowing, particularly for individuals transitioning from unbanked to fully banked status. However, a notable exception lies in the lack of a significant association between loan ownership and access to pensions or investment products. This finding implies that individuals with a long-term financial orientation are less likely to incur debt. It aligns with the behavioural segmentation proposed by Liberman et al. (2016), in which future-focused consumers demonstrated a lower propensity to borrow. These findings suggest a dual role of financial services: while broader access tends to promote borrowing, access to certain long-term financial products correlates with more conservative spending behaviour and reduced dependency on debt.

Though financial overconfidence could not be directly measured in this study, its influence appears relevant, given the observed positive relationship between financial literacy and borrowing. Chawla and Mokhtari (2025) and Skala (2008) have argued that overconfidence can lead to increased borrowing, even when credit conditions are unfavourable, due to a misjudgement of risk. From this perspective, the regression findings may reflect a behavioural nuance, where financially literate individuals overestimate their debt management capabilities, supporting the bounded rationality framework discussed by Robb et al. (2015). This underscores the growing importance of addressing not only knowledge but also behavioural and emotional factors in pursuing sustainable financial outcomes. The results of this EU-focused research are consistent with several international studies. The NFCS (2018) found that the adoption of financial technology does not automatically improve financial outcomes unless it is paired with adequate financial literacy. The FDIC Survey (2019) observed that expanded access to banking services led to increased credit use among previously excluded groups. Similarly, the Global Findex Database (2021) revealed that in developed economies, financial

inclusion and digital financial service adoption are positively correlated with borrowing, while in developing economies, the relationship is weaker or even negative, due to limited regulatory oversight and inadequate consumer protection. Together, these cross-regional findings reinforce the conclusions of this study, emphasising that financial literacy, digital infrastructure, and access to financial services are essential components in shaping borrowing behaviour in contemporary financial systems.

CONCLUSION

The results of this research highlight the complex interplay among financial literacy, the use of digital financial services, and borrowing tendencies in today's economy. Analysis of the 2023 Flash Eurobarometer 525 data makes it evident that financial decisions are not made in isolation; rather, they emerge from a systemic interaction involving an individual's knowledge, access to services, behavioural patterns, and digital comfort. Each of these elements leaves a distinct imprint on borrowing behaviour, and when evaluated independently, they reveal behavioural trends and knowledge gaps crucial for researchers, regulators, and financial institutions alike. Often perceived as a safeguard against poor financial management, financial literacy reveals a paradox in this study. Rather than deterring individuals from borrowing, greater financial literacy appears linked with a higher likelihood of responsible credit use. This suggests that financially knowledgeable individuals are not averse to credit but are instead equipped to navigate credit markets with informed confidence. Such individuals likely understand repayment structures, weigh the cost-benefit trade-offs, and compare financial products before committing. However, this positive relationship between literacy and borrowing also raises concerns of overconfidence, where even well-informed individuals underestimate financial risks or overestimate their repayment capacity. This behavioural nuance is consistent with theories in behavioural finance that stress how cognitive biases can persist even among those who are financially literate.

The digital finance ecosystem introduces an additional layer of complexity. Although mobile payments and financial applications provide convenient access to services, the psychological implications of digital transactions must not be overlooked. The speed and ease of digital payments can detach consumers from the tangible experience of spending, potentially leading to impulsive decisions. Notably, this study finds that individuals with higher levels of digital comfort are less likely to possess consumer loans. This finding suggests that digitally adept users may not merely embrace transactions blindly but may also apply budgeting tools

and exercise control over their financial interactions. It underscores a distinction between general financial literacy and digital financial literacy, with the latter potentially shielding users from excessive credit reliance. Access to financial services—including bank accounts, savings, credit cards, mortgages, insurance, and pension plans—functions both as a facilitator and a moderator of borrowing. Those with access to basic financial tools are more integrated into the formal credit system and are thus more likely to hold loans. Conversely, individuals with access to long-term financial planning instruments such as pensions or investment products tend to rely less on credit, reflecting a more future-oriented approach that discourages short-term debt accumulation. Fernandez and Kola (2022) observed in 14 European regions that pension ownership negatively impacts the likelihood of applying for personal loans. This supports the idea that financial inclusion, particularly when paired with a degree of financial competence, contributes to healthier borrowing behaviour. It also reinforces the need for inclusive financial systems that avoid reinforcing credit dependence, highlighting that increased access does not necessarily mean increased debt.

Taken collectively, these findings emphasise the necessity for a comprehensive approach to financial education and consumer protection. Public policy and regulatory strategies should simultaneously promote access to financial services and address the behavioural dimensions of financial decision-making in a digitally driven environment. In today's rapidly evolving financial landscape, using credit responsibly requires both consumer education and enhanced digital competency. Sustainable financial behaviours in a complex and technologically sophisticated economy will be best supported through integrated strategies that combine behavioural insights, digital financial literacy, and inclusive access to services.

IMPLICATIONS

The findings of this study carry important implications for financial policymakers, educators, and technology providers. The positive correlation between financial literacy and borrowing suggests that informed consumers are more likely to participate in credit markets. Therefore, enhancing financial education could foster more structured borrowing behaviour and reduce reliance on high-cost or informal lending sources. The Financial Stability Board (2022) recommends integrating nudges and supportive decision-making features into consumer finance management applications. Credit education embedded within digital tools is emphasised by the World Bank (2022) as a key component for improving long-term financial outcomes. However, given the potential risk of overconfidence, education programs must also include

behavioural training to help consumers identify cognitive biases and strengthen decision-making. The EU FinTech Strategy (2023) highlights that combining financial education with digital tools reduces the need for high-cost borrowing, such as payday loans. The study's results also support the role of formal financial access—including savings accounts, insurance, and credit cards—in expanding loan participation. Financial service providers should consider embedding educational resources within digital platforms to encourage responsible borrowing, particularly for first-time credit users. The negative association between digital comfort and borrowing behaviour underscores the importance of incorporating decision-support tools, spending alerts, and budgeting functionalities into mobile payment applications. Such tools could serve as behavioural nudges to mitigate impulsive or poorly informed financial choices. Moreover, the negative effect of pension and investment access on borrowing suggests that long-term financial planning and saving habits can function as protective buffers against excessive debt. Promoting future-oriented financial goal setting could, therefore, complement existing debt-reduction initiatives.

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