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CHANGES IN THE CONSUMPTION OF CREDIT INSTITUTIONS' SERVICES BY INDIVIDUALS AND HOUSEHOLDS AND THEIR ROLE IN THE ECONOMY: A CASE OF ESTONIA, LATVIA AND LITHUANIA

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Abstract

The purpose is to assess the scope and dynamics of financial services consumed from credit institutions and their role in economic growth, based on theoretical frameworks and empirical analysis, using the cases of Lithuania, Latvia, and Estonia.

Methodology: The research methods employed in this article include analysis of scientific literature, methods of comparison and generalization, correlation analysis, pairwise regression analysis, and multivariate regression analysis.

Findings: The role, changes and extent of financial services consumed by individuals and households can be analysed from different theoretical perspectives. Findings indicate that in Lithuania and Latvia, the greatest increases in GDP are associated with the number of individuals using the internet for internet banking, whereas in Estonia, the most significant driver of GDP growth is household lending for house purchase.

Originality: after highlighting the theoretical approaches, financial services consumed

by individuals and households, focused on indicators of loans, financial leasing, use of payment cards, internet banking, and deposits, and regression analysis with GDP of Lithuania, Latvia, and Estonia.

Keywords: Financial services consuming, Economic growth, Household and individual loans, Deposits, Payment cards, Internet banking

JEL Classification Codes: G2, G51, D12, D14, H31

1. Introduction

Assessing the scope and dynamics of financial service consumption provided by credit institutions – while identifying the specific characteristics of these services – is a highly relevant area of research. The accessibility and utilization of such services play a crucial role in ensuring the efficient allocation and use of financial resources, thereby supporting overall economic growth. Financial services and their role in economic growth have attracted significant attention from researchers and practitioners across various countries. According to the International Monetary Fund, Estonia is gradually re-emerging from a prolonged downturn. GDP is projected to grow by 1.0 percent in 2025 and accelerate to 1.8 percent in 2026. Real GDP of Latvia growth is projected to increase to 1.7 and 2.4 percent in 2024 and 2025. Lithuania has proved resilient to multiple shocks in recent years. Loan growth to households recovered in 2024 and early 2025, and credit-to-GDP ratios have increased moderately.

Research on the debt-to-GDP ratio has attracted considerable attention. however, over the past decade, both theoretical and empirical studies on the measurement of household and individual consumption of financial services have been limited.

A review of the literature reveals that services provided by credit institutions can significantly influence economic indicators. In this context, the research problem is to identify which theoretical approaches are most suitable for examining the specific nature and economic role of household and individual consumption of key financial services within a national economy.

The aim of article is to assess the scope and dynamics of financial services consumed from credit institutions and their role in economic growth, based on theoretical frameworks and empirical analysis, using the cases of Lithuania, Latvia, and Estonia.

Objectives of the study:

– To identify the specific characteristics of financial services provided by major credit institutions to households and individuals, and to examine their consumption patterns and their impact on the economy.

– To identify appropriate research methods and indicators for assessing the impact of financial service consumption from credit institutions on a country's gross domestic product (GDP).
– To evaluate the impact of credit institutions' service consumption on the gross domestic product of Lithuania, Latvia, and Estonia.

Research methods used in an article are analysis of scientific literature, methods of comparison and generalisation, correlation analysis, pairwise regression analysis, multivariate regression analysis.

2. Theoretical approaches and the role of credit institutions, services and consumption in the economy

Credit institutions – defined as financial institutions engaged in providing at least one financial service – play a critical role in the modern economy. Beyond their core function of connecting savers with borrowers, they offer a wide range of financial services and actively contribute to the regulation and support of broader economic processes. These services include, but are not limited to: accepting deposits, issuing loans, leasing, issuing and processing payment cards and other payment instruments, and engaging in financial intermediation. As noted by Boehme et al (2023), credit institutions utilize the financial resources of savers to finance those in need of capital. However, their role extends well beyond this traditional intermediation function. By effectively managing financial resources, credit institutions help maintain economic stability and foster growth. They ensure the efficient circulation of money within the economy, thereby encouraging investment, stimulating consumption, and supporting overall economic development.

Credit institutions – particularly banks – play a pivotal role in the economy by facilitating the flow of funds between various market participants, thereby enhancing access to credit. This process not only aids in the mobilisation of financial resources but also ensures their efficient allocation and utilisation. Such efficiency is especially critical for households and individual consumers, for whom access to credit supports consumption, investment, and financial stability.

Mwonge and Naho (2021) emphasize the importance of strengthening credit institutions to improve access to credit for individuals and businesses. They argue that well-functioning credit institutions play a vital role in stimulating economic activity by enabling investment, business expansion, and the financing of everyday operations. Enhancing the capacity and resilience of these institutions also contributes to the development of a more robust financial system - one that can respond effectively to economic challenges, ensure a stable flow of credit, and meet the evolving needs of financial service consumers.

The role, changes and extent of financial services consumed by individuals and households can be analysed **from different theoretical perspectives**.

Firstly, acording of the concept of financial inclusion highlights the need to analyse

the financial services provided to households by credit institutions. The role of credit institutions extends beyond traditional functions such as lending and deposit-taking; they also offer a broad spectrum of services that support both financial inclusion and economic growth. As noted by Nanez Alonso, Jorge-Vázquez, Sastre-Hernández, and Ziębicki (2023), credit institutions play a central role in promoting financial inclusion by encouraging broader participation in financial activities, particularly among local populations. These institutions not only provide savings accounts with competitive interest rates but also offer diverse lending and leasing options, enabling individuals to finance major purchases, make investments, or start businesses, thus contributing to personal financial stability and wider economic development.

"Financial inclusion not only affects the income of individual (through losing the opportunity of income generation) but it also affects the aggregate income (GDP) of the country. The modern economic and social development agenda is based on the broad access to financial services, across the world, mainly for two reasons (Beck & Torre, 2006): (i) a large theoretical and empirical literature showing the importance of a well-developed financial system for economic development (Beck et al, 2000, 2004; Honohan, 2004); and (ii) access to financial services which can be seen as a public good enabling participation in the benefits of a modern, market-based economy, (Peachey & Roe, 2004). As a result, financial inclusion/exclusion is considered essential from the viewpoint of developing a conceptual framework and identifying the underlying factors that lead to access to the financial system (RBI, 2008)." (op.cit. Anand, & Kuldip, 2013).

"Access to finance for large parts of the population is not only important for expanding opportunities beyond the rich and connected but also crucial for a thriving democracy and market economy (Rajan & Zingales, 2003). Financial inclusion broadly includes access, utilization and welfare (Impact) components. It is well established in the literature that access and utilization are different (Beck, Demirgüç-Kunt, & Peria, 2005). People may have access to financial services, but they may choose not to use those services due to several reasons (Financial Inclusion Data Working Group [FIDWG], 2014). Access to financial institutions is the primary dimension of financial inclusion and the next step is to ensure that they can use it in ways that allow them to benefit from financial inclusion fully (FIDWG, 2014)" (op.cit. Ray, and Rout, Ray, 2020).

Greater access to financial services is essential to people's well-being as it promotes entrepreneurship, moves people out of poverty, and provides hope for a better economic future. Tools such as credit services, savings, and payment are crucial to smoothing household-level consumption, helping insure against risk, and allowing investment in education and other capital forms (Batala, 2022).

Second, the macroeconomic impact of household debt in a country can affect economic indicators, depending on the short or long term and the cyclicality of the business.

It is often argued that debt has positive effects on growth because it facilitates spending by credit-constrained households, particularly following a financial crisis. However, those supposedly short-run positive effects should be temporary if debt adversely affects

spending in the long run. The long-run negative effects of debt eventually outweigh their short-term positive effects, with household debt accumulation ultimately proving to be a drag on growth (Lombardi, Mohanty and Shim, 2017). "A number of post- Keynesian scholars have addressed the macroeconomic implications of household debt using formal models. For example, Palley (1994) or Cynamon and Fazzari (2008) implies, that Hyman Minsky's financial instability hypothesis can be read as highlighting distinctive debt effects depending on the time frame under consideration. Debt-financed household spending may provide a source of additional economic stimulus in the shorter time period, but eventually the accumulation of debt could become excessive, generating a negative impact on consumption and output level in the long run (for example through the higher debt service payments and frugal consumer behaviour due to the excessive debt level). From this point of view, there are distinguishing effects of debt in the short and longer time period." (op. cit. Kim, 2016).

Household borrowing levels are closely linked to economic cycles and are significantly influenced by the financial services offered by credit institutions, particularly loans and financial leasing. These services are among the primary tools individuals use to achieve various personal and business goals. According to a research by Ngo, Le, and Le (2021), lending activities account for approximately 50-75% of commercial banks' profits, highlighting the central role of credit provision in the financial performance of these institutions.

Loan types are typically categorized based on the consumer's needs and objectives. The primary types of loans sought by individuals from credit institutions include consumer loans, housing loans, and special-purpose loans such as student loans (Kowalski, Strzelecka, Walega, and Walega, 2023). Consumer loans are typically unsecured and do not require a down payment. These loans are often used for personal expenses such as travel, purchasing household goods, or refinancing existing debts. Due to the higher credit risk associated with unsecured lending, consumer loans generally carry higher interest rates compared to other types of loans. Housing loans, by contrast, are designed to finance the purchase of real estate and represent one of the most substantial financial commitments undertaken by individuals. These loans are secured by the property itself, which serves as collateral. As a result, housing loans usually offer lower interest rates and longer repayment periods. However, the requirement for a down payment can present a significant barrier for individuals lacking sufficient savings (Yang, Moreira, Archibald, 2023). In fact, the absence of a down payment is often cited as a major obstacle to homeownership. Shah, Nikita, and Modi (2022) emphasize that homeownership is becoming increasingly difficult for middle-income families, prompting many governments to implement targeted programs offering lower-interest loans to enhance housing affordability. Nevertheless, Gambo et al (2021) found that a significant number of respondents lack property to offer as collateral, which further limits access to housing loans. Moreover, rising property values have contributed to an increase in loan sizes, but the underlying risk profile has remained relatively stable (Adelino, McCartney and Schoar, 2020). This situation presents ongoing challenges for both lenders and borrowers, highlighting the need for responsible lending practices and

effective credit risk management.

Novotný (2021) observes a steady increase in the popularity of *leasing services* among both legal entities and individual consumers. Similarly, Tian and Li (2023) emphasize that leasing is particularly attractive to private individuals seeking flexible financial solutions, as it enables the acquisition of goods without the need for a substantial initial investment. The authors also highlight the growing use of leasing in the purchase of electronic devices, noting that it allows consumers to upgrade to newer models more affordably while gaining access to the latest technologies (Tian, Li and Li et al., 2022). Li at al (2021) further note that a growing number of credit institution customers are turning to leasing due to limited initial capital, as it allows them to obtain higher-value assets without upfront full payment. Veesar at al (2020) similarly stress that leasing is a viable option for individuals who lack sufficient capital but wish to acquire costly items such as cars or household appliances. Rissman at al (2021) point out that leasing is often chosen for its lower upfront costs, flexible terms, access to the newest product models or technologies, tax advantages, and enhanced cash flow management. In addition, Gulserliler, Blackburn, and Wassenhove (2021) argue that leasing can positively contribute to the circular economy, as it promotes longer asset lifecycles, facilitates product replacement, and supports more sustainable consumption practices.

Thirdly, financial services provided by credit institutions, such as accounts, deposits, etc. should be considered in the context of savings. Several studies have observed the relationship between savings and economic growth. "Solow (1956) stressed the importance of saving on economic growth in 1956, when arguing that larger savings result in higher investments and increased production. Sajid and Sarfraz (2008) concluded that there is a long-term interrelationship between saving and GDP. Furthermore, Anoruo and Ahmad (2001) conducted a study to explore the causal relationship between economic growth and growth rate of domestic savings, and their results determined the existence of a long-run relationship between economic growth and growth rate of savings (Anoruo & Ahmad, 2001)." (op.cit Ribaj, Mexhuani, 2021).

It can be concluded that household and individual saving plays a crucial role in accumulating financial resources for the future, thereby enhancing overall economic resilience. A study by Guo at al (2022), conducted during the COVID-19 pandemic, revealed that individuals tended to favour safe savings instruments, such as bank deposits, in response to economic uncertainty. These findings underscore that, in times of financial and economic instability, *deposits* remain a preferred option due to their guaranteed returns and low risk. This trend highlights a broader behavioural pattern: even under unstable conditions, individuals prioritize savings tools that offer security and financial stability.

It is important to note that household saving and investment decisions are influenced by a range of factors, including the broader economic environment, individual levels of financial literacy, and life-cycle stages. Term deposits – one of the most common forms of household savings – are particularly valued for their predictable returns and financial stability, making them an attractive option for risk-averse savers. However, research indicates

that household saving behaviour can vary significantly depending on changing economic conditions and personal circumstances. While fixed-term deposits remain a popular choice, especially during periods of uncertainty, their appeal may fluctuate in response to inflation, interest rate changes, and evolving financial goals.

As noted by Drivas and Vlamis (2023), households are more likely to choose fixed-term deposits when they have a clear financial outlook, as these products offer guaranteed interest rates and lower risk compared to other investment options. The fixed and often long-term nature of these interest rates provides a sense of security, making term deposits particularly appealing to risk-averse savers. Similarly, a study by Kozlovskyi, Mazur, and Zemliakova (2020) confirms that many households prefer time deposits precisely because of their low risk and fixed returns, which support long-term financial planning. This preference is especially evident among individuals seeking stable and predictable income, unaffected by short-term market fluctuations. On the other hand, a study by Kozlovskyi et al (2020) , Mukhamedyarova-Levina, Bekbossinova and Kredina (2024) shows that term deposits remain popular among households despite economic growth factors such as gross domestic product. This may indicate that households still value the stability and security offered by fixed-term deposits, even in the face of rising economic activity, which may be one of the reasons why this investment instrument remains

However, contrasting findings have been reported in other studies. For instance, Grivec and Devjak (2023) highlight a continued preference among many households for open-ended (demand) deposits, primarily due to the greater liquidity these products offer. This preference is particularly evident among individuals who are unwilling to commit their funds for extended periods and prefer the flexibility to access their savings at any time – a consideration that becomes especially important during periods of economic volatility. Supporting this view, Rezende, Styczynski, and Vojtech (2021) emphasize that liquidity regulations play a crucial role in shaping household deposit behaviour, as such policies directly influence their ability to access funds and make timely financial decisions. These findings suggest that for many households, liquidity and financial flexibility can outweigh the benefits of higher, but fixed, returns offered by term deposits.

Fourthly, in the context of financial innovation theory and the digital economy, the consumption of services such as digital payments, internet banking access, etc. is being actively developed.

Based on earlier works by Schumpeter (1912) argue that innovations taking place in the financial sector involve the introduction of new products and techniques that lead to better financial systems. these financial systems are characterized by increased coverage of service provision, increased variety of financial products and services, efficient institutions, availability of credit for investment, and improved channels of resource mobilization. Further, the theory asserts that financial innovation provides the much-needed financial intermediation that promotes borrowers' capacity to mobilize savings for investment and, thus, improving the overall performance of the economy (Amutabi, 2024). As the author notes, "there is a strand of literature that finds a positive relationship between financial

innovations and economic growth (Domeher et al., 2022; Misati et al., 2021; Nazir et al., 2020). Generally, these studies posit that financial innovations generate a positive effect on financial depth and or inclusion through increased saving, borrowing, and investment activities in the economy which ultimately translate to high economic growth." (op.cit. Amutabi, 2024)

Growing competition among credit institutions is driving the adoption of advanced technologies across a wide range of services, particularly in the area of internet banking. In their 2023 study, Xuan, Roslan, Ismail, and Tajudin identified key services commonly offered through internet banking platforms, including account management, balance inquiries, fund transfers, loan applications, mobile banking, secure authentication, and customer support. These digital features allow users to perform various financial transactions efficiently and access real-time information with ease. To remain competitive, many banks are increasingly integrating modern payment solutions such as Apple Pay, Google Pay, and similar platforms into their online services (Amit, 2023). These innovations not only enhance the convenience and speed of transactions, but also boost user engagement by embedding banking into consumers' daily financial routines. As a result, the adoption of such technologies contributes to the steady growth in the number of active internet banking users.

As noted by Hussain (2024), the growing use of digital platforms for transactions within credit institutions has contributed to increased revenue streams for banks. This trend reflects a shift in consumer behaviour toward internet banking, where customers are increasingly willing to pay for the benefits of convenience, efficiency, and security. The ability to charge fees for digital services not only enhances profitability but also incentivizes banks to continue investing in technological advancements and service quality improvements. According to Faccia, Mosteanu, Cavaliere, and De Santis (2020), the digitalisation of banking services has also simplified financial transactions, significantly reducing the reliance on large physical branch networks and the associated operational costs. As a result, one of the key advantages of internet banking is its potential to lower infrastructure expenses while maintaining or even enhancing the customer experience.

Boehme, Craft, and LeCompte (2023) identify payment cards as a key service provided by credit institutions and highlight their role in enhancing individuals' engagement with financial institutions. This engagement can positively influence personal financial outcomes - particularly in terms of return on assets - by enabling consumers to manage their spending more effectively. Moreover, the use of payment cards fosters the development of positive financial habits, such as responsible borrowing and honouring financial commitments, which can strengthen a consumer's creditworthiness and improve future access to other financial services, including loans. Kose, Uluoz, and Coskun (2022) further note that the popularity of payment cards has increased significantly with the rise of contactless payment technologies and improvements in transaction security. These advancements have reduced transaction times and enhanced the overall efficiency and convenience of payments, contributing to broader consumer adoption and deeper integration of payment

cards into everyday financial behaviour.

Sun (2023) confirms that payment cards significantly enhance consumer engagement with credit institutions. This indicates that such services not only improve individuals' financial capabilities, but also help foster long-term relationships between consumers and financial institutions. Moreover, Sun highlights that a country's economic context directly influences the use of payment cards. In economies where the population remains more reliant on cash, the adoption rate of payment cards tends to be lower. Cornea (2021) supports this view, noting that cash dependency continues to be a limiting factor in the broader adoption of digital payment methods in certain regions, despite the growing availability of card-based financial services.

Nabisaalu and Bylund (2021) emphasize that innovation in the provision of financial business services has a direct and measurable impact on economic growth. By integrating technological advancements and innovative solutions into their operations, credit institutions enhance the efficiency and quality of their services. This, in turn, not only improves customer experience but also contributes to broader economic development by promoting financial inclusion, increasing access to capital, and supporting entrepreneurial activity.

In summary, credit institutions offer a broad range of services to households and individuals, including deposit-taking, lending, leasing, and the provision of payment cards and other payment instruments. The nature and significance of these services can be understood through various theoretical perspectives, particularly those related to financial inclusion. The availability and extent of use of these services reflect the degree to which individuals and households are integrated into the financial system. Changes in household borrowing, influenced by economic cycles in both the short and long term, are closely linked to the financial products offered by credit institutions – most notably consumer loans, housing loans, and financial leasing. Similarly, the size and growth of the economy and the volume of household savings, especially in the form of deposits, must be analysed within the context of individual saving behaviour, which plays a crucial role in building financial resilience. Moreover, the rise of financial innovation, driven by advances in information technology, is reshaping the landscape of service consumption. Innovations such as digital payments and internet banking have transformed how individuals engage with financial institutions. By integrating these technologies, credit institutions are expanding access, increasing the intensity of financial service consumption, and contributing to accelerated economic growth.

3. Methodology, data collection tools and techniques

The period from 2014 to 2024 has been selected for assessing changes in the indicators related to the consumption of specific financial services provided by credit institutions and their impact on the gross domestic product of Lithuania, Latvia, and Estonia. The indicators chosen for this research, which reflect the relevant services offered and used, along

with their corresponding data sources, are presented in the table below.

Table 1. Model variables and indicators for use in empirical research

Financial services for individuals and/or households	**Indicators**	**Data source**
Loans	Households lending for house purchase Credit for households consumption (stocks) Other lending vis-a-vis euro area households reported by MFIs excl. ESCB (stocks)	ECB Data Portal
Financial leasing	Loans and advances - Finance leases	ECB Data Portal
Use of payment cards	Total number of credit cards and debit cards in circulation in country	Statista Data Portal
Internet banking	Individuals using the internet for internet banking	Eurostat Data Portal
Deposits and savings	Deposits with agreed maturity vis-a-vis euro area households reported by MFIs excl. ESCB in countrys (annual growth rate) (%)	ECB Data Portal

Source: created by the authors.

The following methods were applied to the research, maintaining an appropriate sequence of steps.

As the first stage of the analysis, a correlation analysis is conducted. To assess the strength and direction of linear relationships between variables, Pearson correlation coefficients are used. These coefficients range from -1 to 1, where values close to 1 indicate a strong positive linear relationship, values close to -1 indicate a strong negative linear relationship, and a value of 0 suggests no linear relationship between the variables. In addition to the strength of the correlation, the statistical significance of the relationship, measured by the p-value, is also considered. A commonly accepted threshold for significance is $p < 0.05$, which indicates a 95% confidence level; that is, in 95 out of 100 randomly drawn samples, a similar correlation would be observed.

A statistical relationship is examined between the gross domestic product (GDP) of the selected countries and all the indicators listed in the 1 table. Prior to conducting the analysis, the normality of each indicator's distribution is tested individually for each country. This was assessed using a quantile-quantile (Q-Q) plot, which provides a visual method for evaluating whether the data follow a normal distribution. In this study, the points for all indicators were either aligned with the theoretical distribution curve or fell within a short distance from it, thereby confirming the normality assumption for the data.

The second step is Pairwise Regression Analysis. The aim of the paired regression analysis is to determine the stochastic relationship between two variables. In this research, the dependent variable is the GDP of each country, while the independent variables represent key financial services provided and consumed through credit institutions. These include: loans, credit cards, leasing, internet banking, and deposits.

The coefficient of determination (R^2) is equal to the square of the correlation coefficient and indicates the percentage of variance in the dependent variable that is explained by the regression equation. A higher R^2 value signifies a better model fit, as it suggests that the included independent variable has a stronger explanatory power for the changes in the dependent variable (Pabedinskaitė, 2008). The coefficient of determination is calculated using Formula (1), as described by Ciulla & Amico (2019):

$$R^2 = 1 - \frac{\sum_{i=1}^{N} (x_i - y_i)^2}{\sum_{i=1}^{N} \left(x_i - \overline{x}\right)^2}, \quad (1)$$

here: x_i - output of the x variable; y_i - output of the y variable; $\overline{x}$ - average of all outputs; N - number of outputs.

For the regression line to be interpreted and the equation to be considered statistically valid, two conditions must be met: the coefficient of determination (R^2) must be greater than 0.25, and the p-value must be less than 0.05. If either of these conditions is not satisfied, the regression equation cannot be reliably constructed or interpreted. The regression equation will indicate how a country's GDP is expected to increase or decrease with a one-unit change in each of the independent variables - loans, credit cards, leasing, internet banking, and deposits. The general form of the regression line is presented in Formula (2), as defined by Pabedinskaitė (2008):

$$y = a_0 + a_1 x, \quad (2)$$

here: y - dependent variable; x - independent variable; a_0 - free member (intercept); a_1 - independent variable.

The third step is a multivariate regression analysis. After conducting the pairwise regression analysis and identifying which independent variables exhibit a stochastic relationship with the dependent variable (GDP), a polynomial regression analysis is performed. This approach is particularly relevant for evaluating how multiple independent variables may simultaneously and non-linearly influence a country's GDP. To ensure comparability across countries, the models for Lithuania, Latvia, and Estonia are constructed using the same set of variables.

A linear regression model is constructed only with those independent variables that meet the following criteria based on the results of the pairwise regression analysis: a coefficient of determination greater than 0.25 and a p-value less than 0.05.

In the multivariate regression analysis, a linear regression model is constructed based on formula (3) (Pabedinskaitė:, 2008)

$$y = a_0 + a_1x_1 + a_2x_2 + \ldots + a_mx_m, \quad (2)$$

here: y - dependent variable; a_0 - free member (intercept); $a_1, a_2, \ldots, a_m$ - independent variables.

4. Results and discussion

Although the survey data is normally distributed, several indicators show sharp changes, while others show a gradual upward trend. The indicators with the largest changes over the 2014-2024 period are the two households deposits and households lending for house purchase.

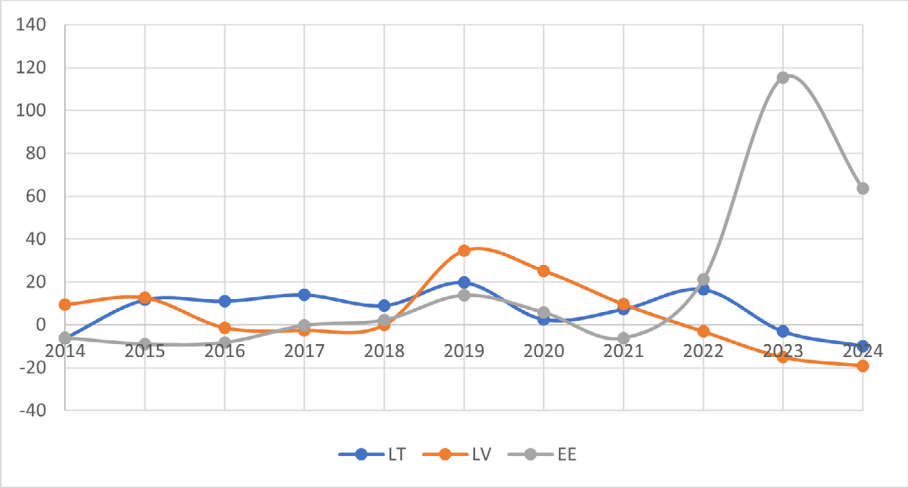

Figure 1. Households deposits, in Estonia, Latvia and Lithuania in 2014–2024

Source: ECB data

An analysis of the Baltic Household Deposits indicator reveals a significant shift in 2019, likely associated with a decline in household consumption during the onset of the COVID-19 pandemic (see Figure 1). That year, Lithuania's household deposits were nearly three times higher than the country's average for the analysed period, Latvia's were approximately 7.5 times higher, while Estonia recorded a more modest increase – about 0.8 times above its average.

However, from 2020 onwards, all three countries experienced a decline in household deposit values. It is worth noting that Estonia's strong performance in 2023 may be attributed to the restructuring of the country's second-pillar pension system, which enabled individuals to terminate contracts with pension funds and transfer accumulated assets into

deposits and current accounts.

Figure 2 illustrates the dynamics of the household lending for house purchase indicator across the Baltic countries. The graph reveals an overall upward trend, indicating increasing access to home purchase financing for households. However, Latvia consistently lags behind Lithuania and Estonia in terms of loan volume. This disparity is further confirmed by the calculated averages: Lithuania recorded an average of EUR 8,204.45 million, Estonia EUR 8,548.27 million, while Latvia's average was significantly lower at only EUR 4,523 million. Although Lithuania and Estonia show relatively similar average loan volumes, both countries exhibit a steady upward trend throughout the analysed period.

A notable exception occurs in Lithuania in 2020, where the number of housing loans issued dropped sharply - by a factor of nine compared to the previous year. This decline was likely influenced by the COVID-19 pandemic, as households became more cautious, prioritized saving, and postponed real estate investments. Nevertheless, from 2021 onward, the trend resumes its upward trajectory, indicating a renewed willingness among households to invest in housing, suggesting a gradual recovery in consumer confidence.

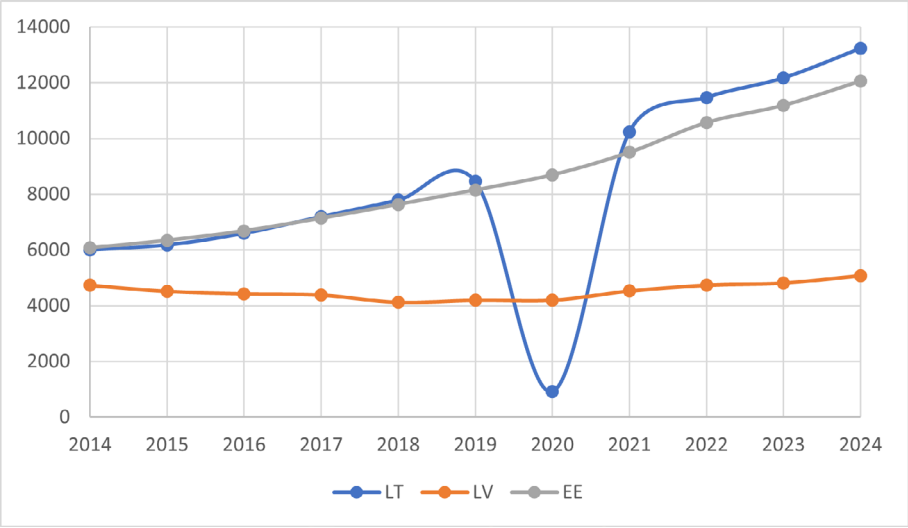

Figure 2. Households lending for house purchase, in Estonia, Latvia and Lithuania in 2014–2024

Source: ECB data

According to Garba, Kaur, and Ibrahim (2023), 42% of internet banking users primarily utilize the money transfer function, 26% frequently check their account balances, and 11% use the platform to pay bills. These findings highlight the strong consumer preference for the convenience, speed, and efficiency offered by internet banking services. As a result, digital banking solutions that prioritize these functionalities are more likely to achieve

higher levels of user engagement.

Supporting this trend, the indicator (see Figure 3) measuring the percentage of individuals using the internet for internet banking shows a consistent upward trajectory. For instance, in 2023, 85.6% of the Lithuanian population reported accessing internet banking services via the internet within the past three months – surpassing the European Union average.

In the case of Lithuania, the first stage of the study involved conducting a correlation analysis, the results of which serve as the basis for selecting indicators for further investigation. Only those indicators that demonstrate a statistically significant correlation with GDP will be carried forward to the second stage of the study – pairwise regression analysis.

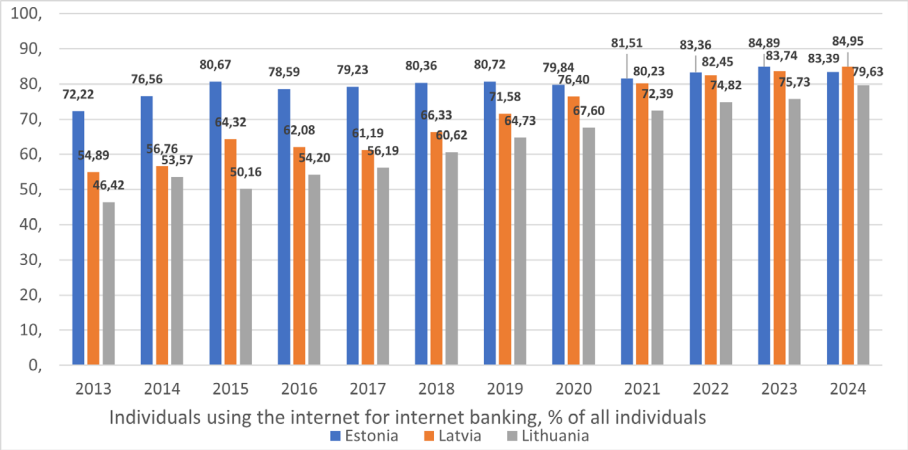

Figure 3. Individuals using the internet for internet banking, in Estonia, Latvia and Lithuania in 2013–2024

Source: Eurostat

To summarise the results of the Pearson correlation analysis, GDP has a very strong relationship with finance leases and individuals using the internet for internet banking. There is also a strong relationship between GDP and total number of debit cards in circulation, households lending for house purchase, households credit for consumption and other lending of households. There is no statistically reliable relationship between GDP and households deposits, as the p-value exceeds the 0.05 threshold.

Table 2. Pairwise regression analysis results for Lithuania

	$R^{(2)}$ ($R^{(2)}$ >0,25)	**p value (p < 0,05)**	**Constanta**	**Independent variable**	**Conclusion**
GDP with Number of debit cards in circulation	0,7945	0,0002294	45,69	0,0000009709	There is a stochastic relationship
GDP with Finance leases	0,9517	0,0000003146	33,62	0,0001445	There is a stochastic relationship
GDP with Individuals using the internet for internet banking	0,9315	0,000001535	-30,115	1,383	There is a stochastic relationship
GDP with Households lending for house purchase	0,543	0,009678	33,6817	0,0031	There is a stochastic relationship
GDP with Households credit for consumption	0,741	0,0006679	32,2479	0,0297	There is a stochastic relationship
GDP with Other lending of households	0,5282	0,01129	-8,7639	0,0587	There is a stochastic relationship

Source: created by the authors.

The strength of the relationship between GDP and each independent variable that showed a statistically significant correlation was assessed using the correlation coefficient. The results of the pairwise regression analysis are presented in Table 2, which demonstrate that GDP exhibits a stochastic relationship with all the independent variables included in the analysis. This conclusion is supported by the fact that both the coefficient of determination (R^2) and the p-value for each variable meet the established criteria.

Table 3. Stochastic relationship between GDP and credit institutions' services for Lithuania

	Equation	**Conclusion**
GDP with Number of debit cards in circulation	$y = 45,69 + 0,0000009709x$	If the total number of debit cards in circulation increases by 1 unit, GDP increases by 0.0000009709.

GDP with Finance leases	y = 33,62 + 0,0001445x	If finance leases increase by 1 unit, GDP increases by 0.0001445.
GDP with Individuals using the internet for internet banking	y = -30,115 + 1,383x	If the number of individuals using the internet for internet banking increases by 1 unit, GDP will increase by $ 1,383.
GDP with Households lending for house purchase	y = 33,6817 + 0,0031x	If households lending for house purchases increase by 1 unit, GDP increases by 0.0031.
GDP with Households credit for consumption	y = 32,2479 + 0,0297x	If the household's credit for consumption increases by 1 unit, GDP increases by 0.0297.
GDP with Other lending of households	y = -8,7639 + 0,0587x	If other lending of households increases by 1 unit, GDP will increase by 0.0587.

Source: created by the authors.

Table 3 shows the equations and their interpretation of the stochastic relationship between the GDP and the indicators of household consumption of financial services by credit institutions. The largest change in GDP will be seen if the number of individuals using the internet for internet banking increases by 1 unit, as the coefficient on the independent variable for this indicator is the largest.

Equation shows the result of a regression analysis, which was possible because the square of the coefficient of determination and the p-value meet the criteria. All the variables that were analysed in the paired regression analysis were included in the equation, as all variables were found to have a stochastic relationship with GDP. The multivariate regression analysis is considered to adequately describe the results of the study as the square of the coefficient of determination exceeds the threshold of 0,25 and the p-value is less than 0,05.

$$y = -1{,}949 - 0{,}00000000006845x_1 + 0{,}00004124x_2 + 0{,}9889x_3 + 0{,}0003323x_4 + 0{,}005033x_5 - 0{,}01495x_6 \quad , \qquad (4)$$

here: x_1 - total number of debit cards in circulation; x_2 - finance leases; x_3 - individuals using the internet for internet banking; x_4 - households lending for house purchase; x_5 - households credit for consumption; x_6 - households other lending .

In a multivariate regression analysis, Equation 4 shows that the largest change in GDP occurs when the number of individuals using the internet for internet banking changes. If Individuals using the internet for internet banking increase by 1 unit, then GDP will increase by 0.9889, provided that other factors remain unchanged. The conclusion can be drawn by observing the magnitude of the independent variables in the equation.

In a Pearson correlation analysis for Latvia, a strong relationship is observed between GDP and finance leases, individuals using the internet for internet banking, household credit for consumption, and other lending of households. However, the total number of debit cards in circulation, household deposits, and household lending for house purchase are not statistically correlated with GDP. The conclusion of no statistical relationship was reached on the basis of a p-value result that exceeded the 0.05 norm. Indicators that are not statistically correlated with GDP will not be included in the pairwise regression analysis.

Table 4. Pairwise regression analysis results for Latvia

	R^2 ($R^{(2)}$ >**0,25**)	p value (p < 0,05)	Constanta	Independent variable	Conclusion
GDP with Finance leases	0,7926	0,0002391	28,12	0,00001199	There is a stochastic relationship
GDP with Individuals using the internet for internet banking	0,8111	0,0001557	-2,9217	0,5156	There is a stochastic relationship
GDP with Households credit for consumption	0,7284	0,0008325	9,58560	0,04547	There is a stochastic relationship
GDP with Other lending of households	0,7229	0,0009147	66,19762	-0,08483	There is a stochastic relationship

Source: created by the authors.

Table 4 shows the results of the pairwise regression analysis, which confirms that GDP in Latvia has a stochastic relationship with finance leases, individuals using the internet for internet banking, household credit for consumption, and other lending of households.

The results in Table 5 show that GDP in Latvia will increase the most with a change in individuals using the internet for internet banking, as is the case for Lithuania. It is also important to note that GDP in Latvia will decrease with an increase in other lending of households.

Table 5. Stochastic relationship of GDP with credit institution services for Latvia

	Equation	Conclusion
GDP with finance leases	$y = 28,12 + 0,00001199x$	If finance leases increase by 1 unit, GDP increases by 0.00001199.

GDP with Individuals using the internet for internet banking	y = -2,9217 + 0,5156x	If Individuals using the internet for internet banking increases by 1 unit, GDP will increase by 0.5156.
GDP with Households credit for consumption	y = 9,58560 + 0,04547x	If the Households credit for consumption increases by 1 unit, GDP increases by 0.04547.
GDP with Other lending of households	y = 66,19762 - 0,08483x	If Other lending of households increases by 1 unit, GDP will decrease by 0.08483.

Source: created by the authors.

Next, a multivariate regression analysis is carried out including the independent variables (Finance leases, Individuals using the internet for internet banking, Households credit for consumption, Other lending of households), as a stochastic relationship has been found between these variables and GDP. The multivariate regression analysis is considered to describe the results adequately, as the square of the coefficient of determination is 0.9047 and the p-value is 0.003214, which falls within the range of the constraints set.

$$y = 19{,}6 + 0{,}000004382x_1 + 0{,}1589x_2 + 0{,}1369x_3 - 0{,}01712x_4, \qquad (5)$$

here: x_1 - Finance leases; x_2 - Individuals using the internet for internet banking; x_3 - Households credit for consumption; x_4 - Other lending of households.

Equation 5 describes that the largest change in GDP is seen when individuals using the internet for internet banking increases by 1 unit, conditional on other factors remaining constant. In this case, GDP will increase by 0.1589. It is also important to note that if other lending of households increases by 1 unit, GDP will decrease by 0.01712, provided that other factors remain unchanged.

In the correlation analysis for Estonia, a very strong Pearson correlation between GDP and total number of debit cards in circulation, finance leases, households lending for house purchase. A strong correlation is seen between GDP and individuals using the internet for internet banking, households deposits. Meanwhile, GDP has no statistical relationship with households credit for consumption and other lending of households, as the p-value is greater than 0,05.

Table 6. Pairwise regression analysis results for Estonia

	R^2 ($R^{(2)} > 0,25$)	p value ($p < 0,05$)	Constanta	Independent variable	Conclusion
GDP with Total number of debit cards in circulation	0,9221	0,000002755	-97,48	0,00008286	There is a stochastic relationship
GDP with Finance leases	0,8867	0,00001507	18,64	0,000005066	There is a stochastic relationship
GDP with Individuals using the internet for internet banking	0,6883	0,001581	-154,981	2,319	There is a stochastic relationship
GDP with Households deposits	0,5671	0,007462	30,1824	0,1301	There is a stochastic relationship
GDP with Households lending for house purchase	0,9468	0,000000487	5,335522	0,003172	There is a stochastic relationship

Source: created by the authors.

Table 6 shows that GDP has a stochastic relationship with total number of debit cards in circulation, finance leases, individuals using the internet for internet banking, households deposits, lending for house purchase households. Table 6 shows the results of the pairwise regression analysis for Estonia. As can be seen, GDP will increase the most with a change in individuals using the internet for internet banking. The result is the same as for Lithuania and Latvia.

Table 7. Stochastic relationship of GDP with credit institution services for Estonia

	Equation	Conclusion
GDP with total Number of debit cards in circulation	y = -97,48 + 0,00008286x	If the total number of debit cards in circulation increases by 1 unit, GDP increases by 0.00008286.
GDP with Finance leases	y = 18,64 + 0,000005066x	If finance leases increase by 1 unit, GDP increases by 0.000005066.

GDP with Individuals using the internet for internet banking	y = -154,981 + 2,319x	If Individuals using the internet for internet banking increases by 1 unit, GDP will increase by 2,319.
GDP with Households deposits	y = 30,1824 + 0,1301x	If the Households credit for consumption increases by 1 unit, GDP increases by 0.1301.
GDP with Households lending for house purchase	y = 5,335522 + 0,003172x	If other lending of households increases by 1 unit, GDP will decrease by 0.003172.

Source: created by the authors.

In the final stage of the study, a regression analysis is carried out for the Estonian case, which includes the independent variables that were subjected to the paired regression analysis. The relevant variables between which a stochastic relationship has been found for GDP are transferred to the multivariate regression analysis. The multivariate regression analysis is considered to describe the results correctly, since the square of the coefficient of determination is 0,9687 and the p-value is 0,0009114.

$$y = -10{,}49 + 0{,}00007467x_1 + 0{,}000001376x_2 - 1{,}036x_3 - 0{,}0001448x_4 + 0{,}0006874x_5 \quad , \qquad (6)$$

here: x_1 - total number of debit cards in circulation; x_2 - finance leases; x_3 - individuals using the internet for internet banking; x_4 - deposits with agreed maturity households; x_5 - lending for house purchase households.

Equation 6 describes the result of analysis, which shows that the largest increase in GDP will occur if households lending for house purchase increases by 1 unit, with all other variables held constant. In this case, GDP will increase by 0.0006874. Meanwhile, if Individuals using the internet for internet banking increases by 1 unit, provided that other variables remain constant, GDP will decrease by 1.036.

To summarise the results of the multivariate regression analyses for the Baltic countries, the findings indicate that in Lithuania and Latvia, the greatest increases in GDP are associated with the number of individuals using the internet for internet banking, whereas in Estonia, the most significant driver of GDP growth is household lending for house purchase.

5. Conclusion, limitations, and directions for future research

Reflecting the complexity of the topic, the research literature has developed along several key dimensions: financial inclusion of households and individuals, household debt and

borrowing, savings behaviour, and financial innovation. Credit institutions offer a broad range of services to households and individuals, including deposit-taking, lending, leasing, and the provision of payment cards and other payment instruments. Evaluating the impact of credit institutions' service consumption on the gross domestic product showed thatlargest change in Lithuania and Latvia GDP is seen when the number of individuals using the internet for internet banking changes, that the largest increase in Estonia GDP will occur if households lending for house purchase.

Evaluating the services provided by credit institutions is a complex task that requires a comprehensive understanding of both consumption patterns and the dynamics of their economic impact. To enhance the robustness of the analysis, future research could explore the inclusion of additional control or independent variables – such as inflation, consumption, income, digital payments – which may a relevant avenue for further research.

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