

Exploring the Influence of Fintech on Household Consumption and Debt Dynamics: Insights from the G20

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ABSTRACT

The rapid advancement of Financial Technology (FinTech) has a profound impact on domestic consumers' financial decision-making by enhancing convenience and access to a diverse array of financial services. This study aims to examine the relationship between FinTech development and domestic consumption and credit behaviors in G20 countries. Furthermore, it seeks to elucidate how factors such as economic growth, government education expenditure, and inflation mediate this relationship. Utilizing a ten-year period from 2012 to 2021, we employ both static and dynamic panel data models to ensure the robustness of our findings. The results demonstrate a significant positive influence of FinTech on domestic consumption across both analytical approaches. However, the dynamic analysis reveals that FinTech's impact on domestic debt depends on temporal changes and future expectations, suggesting a more complex relationship. Among the control variables, inflation emerges as the most influential factor in both models, indicating that price fluctuations significantly affect the propensity of G20 consumers to consume and incur debt.

Keywords: FinTech, household spending, household debt, G20, panel data analysis.

JEL Codes: G23, D12, G51, O33.



I. Introduction

Rapid advances in digital technology are reshaping the financial landscape. FinTech has the potential to increase efficiency, competition, and financial inclusion (Cevik, 2024). It now encompasses a wide range of tools and services — personal finance apps, digital loans, budgeting and spending tools, credit-tracking systems, debt management solutions, and savings and investment platforms (Gunawan & Tandiono, 2026; Gao et al., 2023). Evidence suggests that FinTech use is associated with improved budgeting, repayment, and saving behavior, as well as expanded access to credit (Adbi & Natarajan, 2023). However, its net impact on low-income or financially less-literate consumers remains uncertain (Aoun et al., 2026). Some studies show that FinTech can encourage excessive spending and borrowing or expose users to predatory practices (Cook et al., 2023), meaning adoption does not always enhance financial decision-making, particularly regarding consumption and indebtedness (Abis et al., 2025; Sampat et al., 2024). Other research highlights more systemic risks, suggesting FinTech may contribute to household debt expansion and even financial instability (Yuan et al., 2024), especially in countries with advanced financial systems, extensive information sharing, weaker regulation, or high levels of digitization (Anestiawati et al., 2026; Yuan et al., 2024).

The transformation of financial services began in the 1990s with the Internet revolution and the emergence of the World Wide Web (WWW), which enabled the rise of electronic finance (e finance) (I. Lee & Shin, 2018). E finance refers to the delivery of financial services electronically via the Internet, enabling consumers and businesses to access services without physical interaction (Wang et al., 2023; Lee & Shin, 2018).

Following the 2008 global financial crisis, financial technologies gained further relevance, expanding access to financial products in both developed and developing economies (Koranteng & You, 2024; Arner et al., 2015). As Cumming et al. (2023) note, the crisis marked “a true turning point” in FinTech development as the traditional financial landscape shifted (p. 415).

The COVID 19 pandemic accelerated this trajectory. Social distancing and reduced physical contact increased reliance on digital alternatives, driving widespread adoption of applications and software tools (Durak et al., 2024; OECD, 2023a). Since 2017, the number of FinTech users, especially in digital payments, has grown rapidly and is expected to continue rising through 2027 (Figure 1).

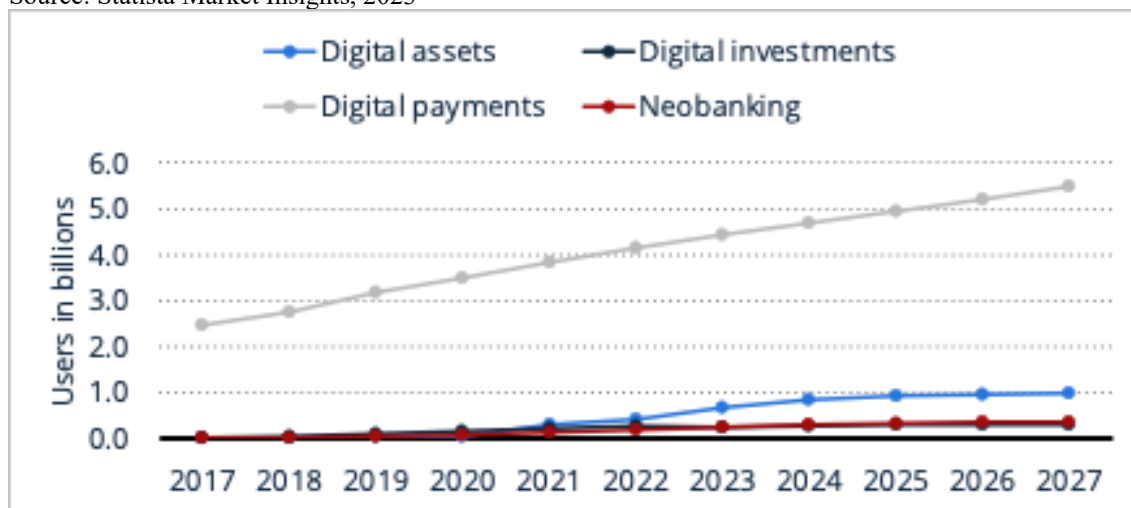
As pandemic era norms eased, many habits formed during that period persisted, becoming embedded in daily life (Tut, 2023; Ciumara, 2022). Consequently, the FinTech industry continued to expand after the pandemic, reflecting two key trends: broader access to digital financial services and rising consumer interest in using them (Liu & Chu, 2024; World Economic Forum, 2024; Tut, 2023).

Aduba et al. (2023), examining 80 economies, found that financial technologies can strengthen financial development in countries with less advanced or less efficient financial sectors. However, FinTech adoption may also generate negative outcomes by altering household habits and quality of life, thereby increasing the influence of

household behavior on the financial system (Yuan et al., 2024). As Agarwal et al. (2022) note, households supply land, labor, and capital to the economy in exchange for income, thereby serving as central agents in the economic cycle. Their behavior can therefore affect both national economic performance and financial stability. Yuan et al. (2024), in a study of 100 economies, identified household debt as the main channel through which FinTech influences financial stability, showing that FinTech expansion tends to increase domestic debt.

Figure 1
Number of FinTech Users Worldwide (2017–2027), by segment

Source: Statista Market Insights, 2023



In China, Li et al. (2020) observed that digital finance—enabled by FinTech—shaped household consumption through online loans, digital payments, online financial management, digital insurance, and related tools. These findings suggest that both household consumption and household debt are influenced by the FinTech era and merit further investigation. Li et al. (2020) posed three research questions regarding digital finance: whether its rapid growth affects domestic consumption, which consumer groups are most affected, and which factors drive these effects. Reframing these questions at a macroeconomic level and replacing “digital finance” with “FinTech,” this study addresses the first question and introduces an additional one concerning domestic debt. The question of consumer group segmentation is not examined here. Accordingly, this research investigates:

Question 1: Has the rapid growth of FinTech significantly influenced household consumption?

Question 2: Has the rapid growth of FinTech significantly influenced household debt?

Given that Yuan et al. (2024) found FinTech’s impact to be stronger in more developed economies, this study focuses on the G20 group. To explore cross country differences, the analysis incorporates economic growth, inflation, and government education spending. This leads to a third research question:

Question 3: Do economic growth, inflation, and investment in education explain

differences in the impact of FinTech on household consumption and debt across countries?

This study differs from previous research by examining FinTech's effects on consumption and household debt specifically within the G20, focusing on more advanced economies. Moreover, unlike studies that analyze FinTech's general effects, this research integrates macroeconomic variables—economic growth, inflation, and education spending—to capture cross country variation. This approach provides a more context specific understanding of both the potential benefits of FinTech and the risks associated with rising household debt and financial stability.

The remainder of this paper proceeds as follows. The literature review presents definitions of FinTech, discusses its benefits and challenges, and examines the business models associated with the FinTech era. It also reviews studies linking FinTech to household debt and consumption, as well as literature on the control variables. The subsequent section describes the data, presents descriptive statistics, and outlines the methodology. The final sections report the results, followed by conclusions, recommendations, and directions for future research.

II. Literature Review

A. *FinTech* definition

The term FinTech, short for Financial Technology, broadly refers to technological innovation applied to financial services (Caixa Geral de Depósitos, 2023; Puschmann, 2017). More specifically, it encompasses “technological innovation in financial services, represented by a variety of business models that have been transforming the financial industry” (Comissão do Mercado de Valores Mobiliários, n.a., p. 2). According to Puschmann (2017), the term likely emerged in the early 1990s, introduced by Citicorp president John Reed in the context of the Smart Card Forum initiative.

Rupeika-Apoga and Thalassinou (2020) reviewed multiple international definitions of FinTech to propose a more comprehensive conceptualization. Among these, the Financial Stability Board (2019) defines FinTech as “technology-enabled financial innovation that results in material changes to the provision of financial services” (p. 8). However, the OECD considers this definition too narrow, as it focuses primarily on technology. The OECD offers a broader perspective, stating that “FinTech involves not only the application of new digital technologies to financial services but also the development of business models and products which rely on these technologies and more generally on digital platforms and processes” (OECD, 2018, as cited in Rupeika-Apoga & Thalassinou, 2020, p. 140).

A similarly comprehensive view is reflected in the Bali FinTech Agenda, launched in 2018 by the World Bank Group and the International Monetary Fund to promote international cooperation and assess the effects of technological innovation in finance. It defines FinTech as “advances in technology that have the potential to transform the provision of financial services, spurring the development of new business models, applications, processes, and products” (International Monetary Fund, 2018, as cited in Rupeika-Apoga & Thalassinou, 2020, p. 138).

The term FinTech may refer to both the technologies themselves and the companies that develop or use these innovations to deliver financial services (Caixa Geral de Depósitos, 2023; Banco de Portugal, 2018). Following Feyen et al. (2021), this study adopts the definition of FinTech as “digital technologies with the potential to transform the provision of financial services, through the development of new – or modification of existing – business models, applications, processes, and products” (p. 117). FinTech companies or start-ups, in turn, are entities that provide such services through these digital innovations (Mansurov & Pilon, 2026; Feyen et al., 2021).

Because these innovative business models largely drive changes in household financial behaviour, this research focuses on FinTech enabled business models and their effects on household consumption and debt (Dunbar, 2025; Pham et al., 2025).

B. Financial Transformation: Opportunities and Challenges

The FinTech industry is expanding rapidly across users, product offerings, funding, and market valuation (Ramdas et al., 2026; Sayari, 2023). According to Alt et al. (2024), this rapid growth has created a scenario of ubiquity in financial services—available anytime, anywhere, and integrated into a wide range of devices. However, this evolution also increases the complexity of the financial system, posing challenges for regulators (International Monetary Fund, 2018). Ensuring financial stability, therefore, requires balancing the benefits of innovation with the risks it introduces (International Monetary Fund, 2018).

The Financial Stability Board (2017) identifies several ways in which FinTech can enhance financial stability. First, it promotes decentralization and diversification in areas such as credit—where access becomes more open—and robo advisory, which allows smaller firms to compete with larger institutions. Distributed ledger technologies also reduce concentration in settlement processes. Second, FinTech increases efficiency by enabling technologies that improve productivity and support new business models. Third, it enhances transparency by reducing information asymmetries; for example, FinTech financing and crowdfunding can make markets more accessible to households and businesses. Finally, FinTech improves accessibility and convenience, particularly in rural or financially underserved regions, where online banking facilitates quick access to credit and payments.

Despite these benefits, several challenges remain. Regulatory and supervisory difficulties arise because FinTech innovations often fall outside existing legal frameworks (Financial Stability Board, 2017). Blockchain technologies, for instance, raise concerns about data security and privacy. Another issue is the growing dependence of financial institutions on third party providers (Financial Stability Board, 2017). Cloud computing services, concentrated among a few firms, create operational risks if external service delivery fails. Cyber risks are also increasingly significant as digital solutions expand, enabling the storage and sharing of large volumes of personal data (Financial Stability Board, 2017). Sensitive information stored on mobile devices—which can be lost or stolen—poses particular risks for widely used payment applications (I. Lee & Shin, 2018).

Additional challenges relate to the competitive business environment, which requires greater precision in investment decisions (I. Lee & Shin, 2018). Effective customer

management becomes essential, as FinTech companies must clearly define their market niche to deliver high quality, targeted services (I. Lee & Shin, 2018). Providing personalized experiences without significantly increasing costs is difficult but crucial for customer acquisition and retention (I. Lee & Shin, 2018). From a global perspective, Werth et al. (2023) highlight two further challenges: maintaining cost effectiveness and continuously updating technology to avoid obsolescence. The macroeconomic environment also plays a decisive role in FinTech development. Propson and Zhang (2024) estimate that macroeconomic factors account for approximately 56% of the elements that negatively affect FinTech's growth potential. Consequently, countries must develop adequate digital infrastructure to support the digital economy and strengthen international competitiveness (Adam & Michał, 2017).

C. Business models

Using FinTech technologies, companies develop new business models that influence consumer behavior, with recent innovations concentrated in payments, lending, and investments (Agarwal & Chua, 2020). According to Agarwal and Chua (2020), "Payments refer to the different ways to transfer money," and innovations in this area include mobile money and digital payments.

Mobile money enables users to deposit, transfer, and withdraw funds via mobile phones without holding a bank account (Agarwal & Chua, 2020). Although similar in appearance, mobile money differs from online banking, which provides banking services exclusively online and requires customers to have a bank account (Chiu et al., 2024). Online banking is an extension of traditional banking, while telecommunications companies offer mobile money through SIM card-based transactions (Agarwal & Chua, 2020).

Digital payments allow households to make transactions quickly and conveniently without relying on cash or checks (Agarwal & Chua, 2020). FinTech firms in this segment operate in both non corporate markets—consumer, retail, and wholesale payments—and corporate markets (Lee & Shin, 2018). These services, which include credit and debit cards, electronic wallets, and mobile payment tools, are among the most widely used and least regulated (Agarwal & Chua, 2020; Lee & Shin, 2018).

In lending, Agarwal and Chua (2020) highlight FinTech lenders and marketplace (P2P) lending. FinTech lenders provide fully online, automated loans through digital platforms, a model closely linked to digital credit—access to loans exclusively through digital channels (Francis et al., 2017). P2P lending enables individuals and businesses to lend and borrow directly through online platforms, bypassing traditional financial intermediaries (Agarwal & Chua, 2020; Lee & Shin, 2018). By streamlining processes and focusing solely on connecting lenders and borrowers, these platforms can offer competitive interest rates (Lee & Shin, 2018).

In the investment domain, robo advisory services and crowdfunding are key innovations. Robo advisors use algorithms to recommend asset mixes based on investor preferences and characteristics (The Economist, 2015, as cited in Lee & Shin, 2018). These tools enhance automation and efficiency in wealth management (Waliszewski &

Warchlewska, 2020). So et al. (2024) found that robo advisors positively influence consumer trust by improving perceptions of ease of use and usefulness.

Crowdfunding, an alternative to traditional financing, involves three parties: the project initiator, contributors, and the platform facilitating their interaction (Lee & Shin, 2018). Fundraising periods are predetermined, and projects are canceled if targets are not met (Lee & Kim, 2015). This model enables collective financing for entrepreneurial and social initiatives (Ciobotaru et al., 2021).

FinTech business models are also expanding into capital markets and insurance. Trading platforms allow investors to connect, execute transactions, and manage risks in real time. At the same time, FinTech firms in foreign currency markets help reduce barriers and costs for individuals and SMEs engaged in global exchange (Lee & Shin, 2018). In insurance, FinTech enables direct interaction between insurers and customers by leveraging data analytics to assess risks and offer tailored products—an emerging sector known as InsurTech (Lee & Shin, 2018; Saidat et al., 2023).

D. Household Debt and Consumption

Li et al. (2020) found that several factors explain how digital finance increases household consumption in China. Online shopping, digital payments, online credit, internet-based investment products, and commercial insurance all act as mediators, showing that digital finance boosts consumption by easing liquidity constraints, simplifying transactions, expanding investment opportunities, and improving financial security. Thus, innovative FinTech business models drive changes in household consumption behavior. As Agarwal and Chua (2020) note, domestic consumption rises mainly due to more frequent online purchases, which grow alongside digital payments. These methods increasingly replace cash and checks because they are more convenient, user friendly, and secure, allowing payments to be tracked (Agarwal & Chua, 2020; Agarwal et al., 2019).

However, the ease of card and mobile payments can also encourage overspending. Agarwal et al. (2019) showed this effect in India, while Huang et al. (2023) reported concerns in China about excessive consumption and reliance on credit, particularly among younger individuals. In more developed countries, big data driven online marketing increases the likelihood of impulsive online shopping (Zhao et al., 2021).

During India's 2016 Demonetization, consumers who were forced to adopt digital payments increased their spending, purchased more expensive goods, and used promotions less (Agarwal et al., 2019). So et al. (2024) emphasized the need to raise awareness about cashless systems to support FinTech development, noting that rural populations still face financial and technological exclusion, which fuels insecurity about digital payments. Nonetheless, rising mobile device use and internet access have significantly increased the adoption of digital payments (So et al., 2024).

Fast, secure payment methods and efficient delivery systems strengthen consumer confidence in e commerce, increasing the likelihood of online purchases (Dheepalakshmi & Geetha, 2024). Mobile payments have become widely used for online shopping, especially in developing countries such as African nations (Z. Wang & Huang, 2023). Previously, many consumers had to travel long distances to access cash; digital payments eliminate this need and also simplify and secure online selling, increasing its frequency.

Li et al. (2020) also found a significant positive relationship between easier access to digital credit and household consumption. Similar conclusions were reached by Bacchetta and Gerlach (1997) in the United States, Canada, the United Kingdom, Japan, and France, and by Jin et al. (2022), Yue et al. (2022), and Zhang and Guo (2020) in China. Insurance technologies likewise transform consumer services by offering real time solutions (Sosa Gómez & Montes Pineda, 2023). Big data reduces operational costs, encouraging insurance acquisition and increasing consumption in China (Li et al., 2020).

While many studies highlight FinTech's role in increasing consumption, some show the opposite effect. Bachas et al. (2021) found in Mexico that debit cards can increase savings by lowering transaction costs and enabling balance monitoring, which builds trust in financial institutions. Cecchetti et al. (2006) showed that greater credit access helps consumers smooth spending, contributing to stable consumption growth. Debelle (2004) argued that indebted households become more sensitive to income and interest rate fluctuations, leading to more cautious consumption. Lombardi et al. (2017) noted that although debt helps smooth consumption, it is not the main determinant of this behaviour. These findings justify examining whether FinTech development significantly affects household consumption.

H1: FinTech significantly impacts household consumption.

Household debt is defined here as families' financial obligations involving interest payments or principal repayment, excluding interest (OECD, 2023). Consumption is the portion of household income remaining after savings (Agarwal, Zhang, et al., 2022).

Online banks now provide full banking services conveniently through internet connected devices (Tan & Teo, 2000). Mobile or online access enables faster, cheaper loans without visiting physical branches (Dong & Zang, 2023). Easier sharing of financial information — especially regarding repayment capacity — also democratizes credit. The share of households holding debt rose from 70% in 1983 to 77% in 2007 (Dyran, 2009).

Digital credit offers advantages such as greater liquidity, lower transaction costs, faster approval, and immediate fund availability (Francis et al., 2017). However, these products are often short-term loans with high interest rates, which may encourage unnecessary borrowing (Francis et al., 2017).

As household debt rises, families become more sensitive to interest rates and income changes (Debelle, 2004), and their purchasing power becomes more limited, potentially slowing economic activity (Mian et al., 2015). Yuan et al. (2024) observed that FinTech increases the likelihood of household debt accumulation and may even contribute to financial crises, especially in countries with developed financial systems and extensive information sharing. Strengthening regulations on data retention and information sharing is therefore essential (Yuan et al., 2024). These findings support examining whether FinTech development affects household debt.

H2: FinTech significantly impacts household debt.

To summarize the literature, Table 1 presents an overview of the most relevant studies examining the relationships among FinTech, household consumption, and household debt. The findings on consumption are notably inconsistent: some studies report positive effects, others negative, and some find no statistical significance.

Table 1– Literature Review Summary – Dependent Variables.

Source: Own elaboration.

Household consumption	
Agarwal & Chua (2020). Agarwal et al. (2019), Huang et al. (2023)	Digital and cashless payments increase household consumption.
Dheepalakshmi & Geetha, (2024)	Online purchases increase consumption.
Li et al. (2020). Bacchetta & Gerlach (1997), Jin et al. (2022), Yue et al. (2022), Zhang & Guo (2020)	Easy access to digital loans increases household consumption.
Bachas et al. (2021).	Digital bank decreases household consumption
Cecchetti et al. (2006), Debelle (2004)	Easy access to digital loans decreases household consumption
Lombardi et al. (2017)	Easy access to digital loans is not relevant in explaining household consumption.
Household debt	
Tan & Teo (2000)	<i>Fintech</i> makes banking services easier and more convenient, increasing credit availability.
Dong & Zang (2023), Francis et al. (2017)	<i>FinTech</i> allows faster, more convenient, and cheaper loans, increasing credit availability.
Dynan (2009)	<i>FinTech</i> has democratized credit and facilitates the sharing of financial information.
Yuan et al. (2024)	Digital finance increases household debt and increases the likelihood of a financial crisis.

E. Control Variables

Economic growth is closely linked to changes in consumption and debt, as it shapes household income and, consequently, consumer decisions (Mian et al., 2015). Kolios (2021), studying the Australian population, found that households may increase loan applications when they expect future income to rise, enabling repayment. However, as household credit expands, purchasing power becomes constrained, potentially slowing economic growth (Kolios, 2021). Lombardi et al. (2017) showed that when the household debt to GDP ratio exceeds 60%, negative effects on consumption emerge, hindering growth; above 80%, the impact becomes more severe, posing risks to economic and financial stability.

If FinTech contributes to rising household debt, it may therefore hinder economic growth. Conversely, digital tools and the Internet accelerate economic activity by facilitating the exchange of goods and services, thereby supporting growth (Afonasova et al., 2019). This study thus examines whether economic growth influences consumption and debt decisions in the FinTech era.

H3: A country's economic growth is relevant for understanding the evolution of domestic consumption in the FinTech era.

H4: A country's economic growth is relevant for understanding the evolution of domestic debt in the FinTech era.

Investment in education also plays a key role. Education friendly policies create a positive cycle in which higher educational attainment drives innovation and technological progress, promoting economic growth (World Economic Forum, 2022). Education is therefore an important factor in FinTech development and adoption, as shown in the World Economic Forum (2024) study across APAC, Europe, LAC, MENA, the US, Canada, and SSA.

Education also influences consumer spending behaviour. Long et al. (2024) found that higher investment in education equips individuals with technical and social skills that lead to better jobs and higher salaries, fostering greater concern for saving and reducing consumption. Similarly, Bollinger et al. (2022) showed that the expansion of higher education in China increases households' concern for future savings. This study, therefore, examines whether government investment in education affects household consumption and credit decisions in the FinTech era.

H5: Investment in education is relevant for understanding the evolution of household consumption in the FinTech era.

H6: Investment in education is relevant for understanding the evolution of household debt in the FinTech era.

Inflation also shapes household financial behaviour. When inflation falls, borrowing capacity increases; when it rises, borrowing becomes more difficult (Debelle, 2004). Thus, inflation may influence household debt and consumption levels.

Narayan and Sahminan (2018) found that FinTech development in Indonesia contributes to a more predictable economic environment, reducing uncertainty and influencing consumer decisions. Ben Romdhane et al. (2024) demonstrated a direct relationship between FinTech development and lower inflation in Asian countries with high FinTech usage. Since FinTech affects inflation and, in turn, financial decisions, this study proposes the following hypotheses:

H7: The inflation rate is relevant for understanding the evolution of household consumption in the FinTech era.

H8: The inflation rate is relevant for understanding the evolution of household debt in the FinTech era.

Table 2 summarizes the main studies and their findings, highlighting how economic growth, inflation, and education relate to household consumption and debt, and how these factors intersect with the rapid expansion of FinTech adoption.

Table 2 – Summary of the Literature Review – Control Variables.

Source: Own elaboration.

Economic growth	
Mian et al. (2015)	Economic growth is related to the way consumers make decisions about consumption and debt.
Kolios (2021)	The increase in household credit conditions and purchasing power may lead to a slowdown in economic growth.
Lombardi et al. (2017).	A debt-to-GDP ratio above 80% has a negative effect on economic growth
Afonasova et al. (2019)	The Internet and digital tools accelerate economic growth.
Education	
Long et al. (2024)	Investing in education shapes individuals who are better informed and more concerned about their consumption and debt decisions.
Bollinger et al. (2022)	Families' concern about saving for the future increases as higher education expands.
Inflation	
Debelle (2004)	When the inflation rate falls, families have greater borrowing capacity, and vice versa.
Ben Romdhane et al. (2024)	There is a direct relationship between the development of financial technologies and the reduction of inflation.

III. Data

The data were collected from the World Bank, the International Monetary Fund, the Bank for International Settlements, and the OECD, and analysed using Stata. The sample consists of the G20 countries, a group of highly developed economies that cooperate, providing a strategic advantage in addressing the opportunities and challenges arising from the rapid expansion of the digital economy (Cozendey, 2011). The G20 fulfils two main roles: influencing crisis management to support resilient and sustainable global recovery and serving as a forum for cooperation on sustainable development, particularly in regulating the implementation of the Sustainable Development Goals (SDGs) (OECD, 2023).

The analysis covers the period from 2012 to 2021, marking the beginning of significant technological advancements and the most recent year with complete data. Household consumption and household credit serve as the dependent variables, allowing us to examine how they vary with FinTech development, the independent variable.

Li et al. (2020) measured household consumption using per capita expenditure and the consumption rate (consumption relative to household income). At a macroeconomic level, where the goal is to compare countries rather than individual households, it is more appropriate to express both consumption and credit as proportions of GDP. This approach captures the size of household consumption and debt relative to each country's economy, facilitating cross country comparison. Lombardi et al. (2017) and Yuan et al. (2024) similarly used the household debt to GDP ratio to assess indebtedness. Table 3 describes the dependent variables and their respective data sources.

FinTech development is measured using indicators related to key innovative business models, namely digital payments, online banking, and digital credit. Digital payments and mobile money are among the most widely adopted consumer oriented FinTech

services due to their convenience, ease of use, and security. Accordingly, the analysis includes data on the value of cashless transactions — such as card payments and electronic money (e money) — as well as data on online purchases and sales, which reflect the evolution of digital payment adoption.

As financial technologies have advanced, banking services have increasingly shifted to fully internet-based platforms, significantly improving accessibility (Chiu et al., 2024). For this reason, data on access to online banking are also included. Another important component is FinTech credit, which encompasses digital lending models such as P2P lending for consumers and businesses, but excludes equity-based financing, donations, and reward-based funding (Cornelli et al., 2023). Thus, data on credit flows originating from FinTech companies are incorporated. Table 4 presents the variables used to represent FinTech development and their respective sources.

Table 3 – Dependent variables.

Source: Own elaboration. *Notes:* ¹ According to the World Bank database, household final consumption expenditure refers to the market value of durable goods and services purchased by households. It also includes fees paid to governments for licenses and permits. Purchases of dwellings are excluded; however, the imputed value of housing services consumed by homeowners (i.e., what a person would pay to live in their own home if they were not the owner) is included. In this context, expenditures by non-profit institutions serving households (NPISHs) are also included, as although not made directly by households, they often provide services that directly benefit them—such as healthcare, education, or social assistance. Therefore, including these expenditures provides a more comprehensive and accurate picture of household consumption patterns and well-being in a given economy. ² For countries missing from the Global Debt Database, the indicator “Domestic credit to the private sector (% of GDP)” from the World Bank’s “World Development Indicators” was used. However, in addition to households, it also covers firms and is therefore used solely to maximize data availability for analysis. ³ The primary data sources of the Global Debt Database are central banks, ministries of finance, and national statistical institutes, which are recognized for providing highly credible data (Yuan et al., 2024).

Variable	Proxy	Source
Household consumption	Households and NPISHs final consumption expenditure (% of GDP) ¹	World Development Indicators, World Bank
Household debt	Household debt, all instruments (% of GDP)	Global Debt Database ³ , International Monetary Fund; (Yuan et al., 2024)
	Domestic credit to private sector (% of GDP) ²	World Development Indicators, World Bank

Table 4 – Independent variables.

Source: Own elaboration. *Notes:* ¹ These data also include credit from technology giants (BigTech), identified by their large user bases in e-commerce, social media, internet search, advertising, and telecommunications (Cornelli et al., 2023). Both FinTech credit and BigTech credit are likely more agile and flexible than traditional bank credit. They often offer higher profit rates, which can be crucial for clients with limited access to banking services, encouraging their entry into this market (Cornelli et al., 2023). ² The data cover only the period from 2013 to 2019. For some countries, the indicator value is zero. These countries are Australia, Germany, Italy, Canada, Turkey, and Saudi Arabia.

Variable	Proxy	Source
FinTech	Individuals who have purchased online - last 12 m (%)	OECD Statistics
	Individuals using the Internet for selling goods or services (e.g., on eBay) - last 3 m (%)	OECD Statistics
	Individuals using the Internet for Internet banking - last 3 m (%)	OECD Statistics
	Credit flows by fintech and big tech companies (% of GDP) ^{1,2}	Global Financial Development, World Bank
	Value of cashless payments, all card and e-money payments (% of GDP)	Retail payments, currency, and related indicators, Bank for International Settlements

To control for the relationship between FinTech and credit and consumption, the variables of economic growth, inflation, and education expenditure will be used, as described in the literature review. The variables used to represent our control variables are detailed in Table 5, along with their respective sources from which the information was collected. Variables abbreviations, presented in Table 6, are used.

Table 5 – Control variables.

Source: Own elaboration. *Notes:* ¹ A country's GDP defines the monetary value of all productive activity carried out within that country over a given period. In this case, the annual GDP growth is analyzed in order to understand the evolution of the country's productive activity over the years. ² Expressing government spending on education as a percentage of GDP makes it possible to assess the government's priority given to education, as well as its capacity to generate public revenue in relation to the size of the country's economy (World Bank, n.d.).

Variable	Proxy	Source
Economic growth	<i>GDP per capita growth</i> ¹	<i>World Development Indicators, World Bank</i>
Education spending	<i>Government expenditure on education (% of GDP)</i> ²	<i>Education Statistics – All Indicators, World Bank</i>
Inflation rate growth	<i>Inflation, consumer prices (annual %)</i>	<i>World Development Indicators, World Bank</i>

Table 6 – Variable Legend.

Source: Own elaboration.

Households and NPISHs final consumption expenditure (% of GDP)	C
Household debt, all instruments (Percent of GDP)	D
Individuals using the Internet for selling goods or services (e.g., on eBay) - last 3 m (%)	Int
Individuals who have purchased online - last 12 m (%)	PO
Individuals using the Internet for Internet banking - last 3 m (%)	IB
Value of cashless payments, all card and e-money payments (in % of GDP)	CEMP
Credit flows by fintech and big tech companies to GDP (%)	CFFT
FinTech Index	pca
Economic growth (GDP per capita growth)	EG
Government expenditure on education (% of GDP)	GEE
Inflation, consumer prices (annual %)	Inf

IV. Methodology

The use of panel data is appropriate for this research, as it involves the simultaneous analysis of data from different countries (cross-sectional data) over several years (time-series data) (Duarte et al., 2007; Hsiao, 2007).

The panel data model is generally defined by expression (1).

$$Y_{it} = a + b_1X_{it1} + b_2X_{it2} + \dots + u_{it} \tag{1}$$

In the model, $i = 1, \dots, N$ represents the number of cross-sectional observations, and $t = 1, \dots, T$ represents the number of time observations (Fernandes, 2014; Marques, 2000).

According to Marques (2000), in a static model, the explanatory variables are assumed to be independent of the disturbance terms. Marques (2000) also notes that heterogeneity lies in the regression coefficients, which may vary over time or across

individuals. The “household consumption” and “household debt” models, using static panel data, are specified by equations (2) and (3).

$$C_{it} = \beta_0 + \beta_1 pca_{it1} + \beta_2 EG + \beta_3 GEE + \beta_4 Inf + u_{it1} \quad (2)$$

$$D_{it} = \beta_0 + \beta_1 pca_{it1} + \beta_2 EG + \beta_3 GEE + \beta_4 Inf + u_{it1} \quad (3)$$

It is important to consider the following:

- i represents each of the 19 countries in the sample, and t represents the time periods under analysis (covering 10 years).
- $\beta_0, \beta_1, \beta_2, \beta_3$ e β_4 represent the estimated parameters for each of the models.
- C_{it} represents the household consumption of country i in period t .
- D_{it} represents the household debt of country i in period t .
- pca represents the *FinTech* index.
- u_{it} represents the error term for country i in period t .

In constructing a static panel dataset, it is necessary to determine whether fixed or random effects are more appropriate. The fixed-effects model tests whether intercepts vary across groups or time, while the random-effects model examines differences in the variance components of the error term (Park, 2011). The Hausman test is used to guide this choice.

Because economic relationships often exhibit dynamic behavior, a dynamic panel analysis is also conducted to assess the robustness of the results (Baltagi, 2005). As noted by Fernandes (2014), dynamic panel data are characterized by autocorrelation arising from the inclusion of a lagged dependent variable and by heterogeneity across individuals. This approach allows control for unobserved individual effects, reduces omitted-variable bias, and captures how variables evolve over time. Dynamic models are estimated using the Generalized Method of Moments (GMM), which requires diagnostic tests such as the AR(1) and AR(2) tests and the Sargan test to evaluate model adequacy (Ventura, 2021).

The AR(1) test assesses the correlation between an observation and its lag, while the AR(2) test evaluates the correlation with the second lag. For unbiased estimators, the null hypothesis of AR(1) should be rejected, and the null hypothesis of AR(2) should not be rejected, confirming the validity of lagged instruments (Ventura, 2021). The Sargan test evaluates over-identifying restrictions; failure to reject the null hypothesis indicates valid instruments and an appropriate model (Ventura, 2021).

To construct the FinTech index, Principal Component Analysis (PCA) is applied to the independent variables listed in Table 4. PCA is “a multivariate statistical technique used to analyze interrelationships among a large number of variables in terms of their underlying dimensions” (Oliveira, 2019). Its purpose is to condense information from several correlated variables into a smaller set of uncorrelated components, thereby addressing multicollinearity. However, some information from the original variables may be lost.

Table 7 – Kaiser-Meyer-Olkin test.

Source: Own elaboration. Notes: See Table 6 for variable acronyms.

Variable	KMO
Int	0.7565
PO	0.6391
INB	0.5831
CEMP	0.4235
CFFT	0.4027
Geral	0.5805

V. Empirical Results

A. Descriptive Statistics

Table 8 presents the descriptive statistics for all variables used in the study. On average, household consumption accounts for about 57% of GDP, a level that is not considered excessive, despite exceeding half of total output. Saudi Arabia and China are the only countries where household consumption remains below 50% of GDP throughout the period, with Saudi Arabia recording the lowest value in 2012. In contrast, Mexico consistently shows the highest levels, with household consumption exceeding 68% of GDP in all years (country level details appear in Table A.1).

Household debt averages approximately 68% of GDP. According to Lombardi et al. (2017), this level is not immediately alarming, as it remains below the 80% threshold associated with stronger negative effects. However, values above 60% may already signal pressures on economic performance. Several countries – Australia, South Korea, the United Kingdom, Canada, South Africa, and China – remain above this threshold throughout the entire period, with China showing the highest levels. Argentina, by contrast, has the lowest household debt to GDP ratio. Still, no direct conclusions about economic growth can be drawn solely from these figures, as the impact of debt varies across countries depending on institutional characteristics such as creditor protection (Lombardi et al., 2017). Detailed values are provided in Table A.2.

Table 8 – Descriptive statistics.

Source: Own elaboration. Note: The acronyms are listed in Table 6.

Variable	Obs.	Mean	Standard deviation	Min	Max
C	190	56.6791	8.6018	28.3092	70.8084
D	182	68.3939	40.9033	13.6676	182.8681
Int	83	17.2227	9.5765	2.8455	40.8
PO	98	48.6596	24.1546	2.0018	90.2248
IB	99	40.1241	23.1954	0.8115	91.8378
CEMP	189	23.649	20.2673	2.0636	118.724
CFFT	133	0.1902	0.679	0.00	4.3888
EG	190	1.3734	3.4814	-10.7703	10.4294
GEE	168	4.6848	0.8793	2.6699	6.5621
Inf	190	5.1118	8.874	-16.5815	53.8405

China presents a noteworthy case: household consumption remains below 50% of GDP while household debt is consistently high, which may pose financial risks. Low consumption may not be sufficient to sustain growth when debt accumulation is substantial. Nevertheless, China maintains strong economic growth—averaging around 6%—supported by infrastructure investment, openness to trade, and policies such as tax incentives, subsidies, and R&D investment. It should also be noted that World Bank debt data for China include corporate debt, which may influence these results. In contrast, Mexico and Argentina show the highest consumption levels and the lowest debt levels, which, if demand exceeds production, may generate inflationary pressures.

Economic growth ranges from -10.77% in Argentina to 10.43% in Turkey, although neither country shows consistent performance. On average, GDP growth is slightly above 1% per year, a modest but positive figure (country level details in Table A.3).

Education spending averages about 5% of GDP. Indonesia records the lowest value (2.67%), reflecting budgetary constraints and structural challenges, while South Africa reaches the highest level (6.56%). Most countries show relatively uniform values, consistent with the G20's profile as a group of developed economies (details in Table A.4).

Inflation patterns vary widely. Mexico shows volatile growth with inflation around 5%, while Argentina faces extreme inflation and unstable economic growth, including the lowest value in the sample (-10.77%). Argentina's inflation reflects political uncertainty, institutional instability, pressure on the central bank, and excessive public spending. On average, inflation is around 5%, but its volatility makes interpretation difficult (country level details in Table A.5).

The FinTech variable includes indicators on online purchases and sales, online banking, credit provided by FinTech and BigTech firms, and cashless payments via cards or e money. Although data availability is limited for some indicators, all countries show a general upward trend in FinTech adoption between 2012 and 2021. The methodology described below evaluates whether this increase significantly explains changes in household consumption and household debt.

The data were analyzed using static panel data models, followed by dynamic panel estimations for robustness. Each model—household consumption and household debt—was estimated with the FinTech index and control variables. Additionally, five regressions were run for each model to assess the individual significance of each independent variable. The results are first interpreted separately and then synthesized in the final conclusions.

B. Static Panel: Household Consumption Model

Table 9 presents the results for the household consumption model. Based on the Hausman test (p value = 0.0000), the random effects specification is preferred for the regression including the FinTech index and the control variables. The FinTech index shows a negative and highly significant coefficient (1% level), indicating that greater FinTech adoption is associated with lower household consumption. Thus, Hypothesis 1 is supported.

These findings diverge from several studies in the literature. Huang et al. (2023) reported that rapid FinTech growth in China has encouraged excessive consumption and credit dependence. Agarwal and Chua (2020) also argue that digital payments tend to increase consumption, while Li et al. (2020), Bacchetta and Gerlach (1997), Jin et al. (2022), Yue et al. (2022), and Zhang and Guo (2020) show that easier access to credit raises consumption.

However, the results align with Bachas et al. (2021), who found in Mexico that financial technologies such as debit cards can increase savings and reduce consumption by lowering transaction costs, improving trust in financial institutions, and facilitating balance monitoring. Similarly, Cecchetti et al. (2006) and Debelle (2004) argue that easier access to credit may lead households to reduce spending because debt increases sensitivity to interest rates and income fluctuations.

Table 9 – Static panel model of household consumption.

Source: Own elaboration.

C	(1)	(2)	(3)	(4)	(5)	(6)
pca	-0.6629***					
Int		-0.0373				
PO			-0.0778***			
IB				-0.0778***		
CEMP					0.0013	
CFFT						0.5182**
EG	-0.10627	0.0685	0.0890*	0.0727	-0.0195	-0.1389*
GEE	1.2183*	0.2797	0.67695	0.5132	0.1708	0.2841
Inf	-0.3914***	-0.2905***	-0.2106***	-0.1987***	-0.1261***	-0.1103***
FE/RE	RE	RE	RE	RE	FE	FE
Hausman	2.41	7.46	3.39	4.41	24.17	17.07
p-value	0.6613	0.1137	0.4953	0.3531	0.0001	0.0019
Wald (RE) / F (FE)	72.63	31.01	70.82	71.31	4.24	4.1
p-value	0.0000	0.0000	0.0000	0.0000	0.0028	0.0041

Regarding the control variables, economic growth does not significantly affect household consumption, contrary to expectations based on Mian et al. (2015). Thus, Hypothesis 3 is not supported. Education expenditure has a positive effect (significant at the 10% level), suggesting that higher investment in education is associated with higher consumption, opposite to the findings of Long et al. (2024) and Bollinger et al. (2022). Inflation is highly significant and negative, consistent with Debelle (2004): higher inflation reduces households' borrowing capacity and, consequently, consumption. Therefore, Hypotheses 5 and 7 are not rejected.

A disaggregated analysis of the FinTech index components shows that random effects are appropriate for Int, PO, and IB, whereas fixed effects are preferred for CEMP and CFFT (Hausman test p-values of 0.0001 and 0.0019, respectively). Online purchases (PO) and internet banking (IB) have significant negative effects (1% level). In contrast, credit granted by FinTech and BigTech firms has a positive and significant effect (5% level). These results do not confirm the findings of Dheepalakshmi and Geetha (2024)

regarding online purchases, but again support Bachas et al. (2021) concerning digital banking. The positive effect of FinTech credit contradicts the findings of Cecchetti et al. (2006) and DeBelle (2004), who argue that easier access to credit may reduce consumption. Online sales and cashless payments are not significant, differing from Agarwal et al. (2019) in the context of India's demonetization.

Overall, Table 9 indicates that the reduction in consumption associated with FinTech is primarily driven by digital banking and online purchases. These results suggest that, in response to these technologies, individuals may adopt more cautious spending habits and manage their finances more carefully, possibly due to increased trust and transparency enabled by financial technologies.

C. Dynamic Panel: Household Consumption Model

At the 5% significance level, the null hypothesis of the first order autocorrelation test is rejected, while the null hypothesis of the second order test is accepted, indicating that the estimators are unbiased (Table 10). The Sargan test also shows no evidence against the null hypothesis, suggesting that there are no over identification problems and that the dynamic panel model is appropriate.

Table 10 – Dynamic Panel Data Model of Household Consumption.

Source: Own elaboration.

	C	(1)	(2)	(3)	(4)	(5)	(6)
pca		-0.3280*					
Int			0.0090				
PO				-0.0570***			
IB					-0.0591***		
CEMP						-0.0405***	
CFFT							0.1529
EG		-0.0640	0.0717*	0.0806**	0.0801**	0.024	-0.2037***
GEE		0.8584	-0.8296	-0.0572	0.0237	-0.4457	0.0607
Inf		-0.2797***	-0.2364***	-0.1589***	-0.1505***	-0.2102***	-0.1567***
Arellano-Bond 1		0.0069					
Arellano-Bond 2		0.0700					
Sargan		12.8826	54.1795	63.4823	66.4487	56.22634	27.99647
p-value		0.8824	0.0044	0.0003	0.0002	0.0129	0.1095
Wald (RE) / F (FE)		106.64	166.66	192.42	198.44	149.17	31.39
p-value		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

The FinTech index has a negative and significant effect on household consumption at the 10% level, confirming the static model's findings, although with weaker significance. This indicates that, even when accounting for temporal dynamics and expectations, higher FinTech adoption remains associated with lower consumption. Thus, FinTech development remains a relevant determinant of household consumption.

In this specification, inflation is the only control variable that remains significant, again showing a negative effect. Economic growth and education expenditure lose significance in the dynamic model, meaning that Hypothesis 5 is rejected from a dynamic perspective, despite being supported in the static model.

Among the disaggregated FinTech indicators, PO (online purchases), IB (internet banking), and CEMP (cashless electronic/mobile payments) exert the strongest influence on household consumption, all showing negative and significant effects. In contrast, Int (internet access) and CFFT (credit from FinTech and BigTech) are not statistically significant, although both coefficients are positive. These results suggest that PO, IB, and CEMP represent financial innovations that encourage consumers to be more cautious and deliberate in their spending.

However, the negative effect of CEMP contradicts the findings of Agarwal et al. (2019) on India’s 2016 demonetization, in which digital payments were associated with increased spending.

D. Static Panel: Household Debt Model

Table 11 shows that fixed effects models are consistently more appropriate than random effects models. For the relationship between FinTech, the control variables, and household debt, the p value of the F test exceeds 0.05, indicating that the data do not provide sufficient evidence to support or reject Hypotheses 2, 4, 6, and 8.

Table 11 – Static Panel Model of Household Debt.

Source: Own elaboration.

D	(1)	(2)	(3)	(4)	(5)	(6)
pca	0.0443					
Int		0.1112				
PO			0.1542***			
IB				0.1086*		
CEMP					0.3628***	
CFFT						4.5099***
EG	-0.2791	-0.1617	-0.2017	-0.1908	-0.3686**	-0.2159
GEE	1.7535	2.1953	2.8044	3.0276*	-1.8558	0.9885
Inf	-0.5099**	-0.01166	-0.1281	-0.0917	-0.0282	-0.1521
FE/RE	FE	FE	FE	FE	FE	FE
Hausman	19.24	10.11	9.89	19.95	14.43	12.49
p-value	0.0007	0.0386	0.0424	0.0005	0.0061	0.0140
Wald (RE) / F (FE)	1.61	2.27	4.29	3.09	18.68	13.72
p-value	0.1892	0.0716	0.0036	0.0207	0.0000	0.0000

Given this, it is more informative to examine the individual impact of each FinTech component. The results show that increases in PO (online purchases), CEMP (cashless electronic/mobile payments), and CFFT (credit from FinTech and BigTech) significantly increase household debt (1% level). IB (internet banking) also has a positive effect, though with lower significance. These findings confirm the democratization of credit through easier loan access (Dong & Zang, 2023; Francis et al., 2017) and through more convenient banking services that enhance confidence in financial operations and borrowing (Tan & Teo, 2000).

CFFT has the largest coefficient, indicating that FinTech and BigTech credit play the most prominent role in increasing household debt. This is largely due to the speed and convenience of obtaining loans without visiting traditional financial institutions (Dong

& Zang, 2023; Francis et al., 2017; Tan & Teo, 2000). The divergence between expected and observed results can be explained by limitations in the available data and by the use of static models, which do not capture consumer expectations or temporal dynamics.

It is also important to consider the broader context. The analysis period includes two major events: the lingering effects of the 2008 global financial crisis, which encouraged caution in consumption and borrowing, and the COVID 19 pandemic, which began in 2020. During the pandemic, supply constraints, economic instability, and income fluctuations negatively affected consumption expectations (Andersen et al., 2020; Ridhwan et al., 2024). For these reasons, a dynamic panel analysis was conducted to assess whether temporal changes and consumer expectations play a decisive role in household consumption and debt decisions.

E. Dynamic Panel: Household Debt Model

For household debt, the p value of the first order autocorrelation test is above 0.05, indicating insufficient evidence to reject the null hypothesis of no first order autocorrelation (Table 12). The same applies to the second order autocorrelation test, meaning the null hypothesis of no second order autocorrelation also cannot be rejected. Thus, the Arellano Bond test does not confirm the adequacy of the estimators. The Sargan test, however, shows no evidence of over identification, suggesting that the dynamic panel model remains appropriate.

The FinTech index has a positive and significant effect on household debt at the 5% level, contrasting with the static model results. Therefore, Hypothesis 2 is accepted in the dynamic specification: higher FinTech adoption is associated with higher household indebtedness. This indicates that temporal dynamics and consumer expectations play an important role in debt related decisions. As noted earlier, expectations may have been shaped by the lingering uncertainty following the 2008 financial crisis and the disruptions caused by the COVID 19 pandemic.

Easier access to credit can alter consumers' perceptions of affordability, encouraging higher spending and greater indebtedness. Incentives offered by digital banks — such as lower interest rates — may also influence expectations about borrowing. Economic fluctuations, including changes in interest rates, inflation, and labour market conditions, can further affect consumers' willingness to take on debt, as highlighted by Kolios (2021). However, economic growth remains insignificant in this model. As in the static analysis, only inflation is significant, and its effect is negative. Thus, Hypothesis 8 is accepted, while Hypotheses 4 and 6 are rejected.

In the dynamic model, only PO (online purchases) and IB (internet banking) are significant determinants of household debt, unlike the static model, where only online sales were non-significant. These results suggest that the ability to shop online and access financial services digitally strongly influences households' willingness to incur debt. Online shopping increases convenience and may stimulate consumption, while constant access to banking services enhances confidence in financial operations, making consumers more comfortable taking on debt.

Table 12 – Dynamic Panel Model of Household Debt.

Source: Own elaboration.

D	(1)	(2)	(3)	(4)	(5)	(6)
pca	0.4770**					
Int		-0.0166				
PO			0.14209***			
IB				0.1035***		
CEMP					0.0296	
CFFT						0.1311
EG	0.0263	-0.5296***	-0.450008***	-0.43698***	-0.6147***	-0.4049**
GEE	0.9815	-0.4662	-0.8142	-0.5766	-1.1794	-0.1111
Inf	-0.2255**	0.0677	-0.1022	-0.0745	-0.3573***	-0.3123***
Arellano-Bond 1	0.0556					
Arellano-Bond 2	0.1931					
Sargan	20.33222	49.62034	48.37314	47.5821	88.77271	37.17549
p-value	0.4373	0.0136	0.0182	0.0288	0.0000	0.0111
Wald (RE) / F (FE)	189.40	178.39	108.63	102.29	282.59	126.96
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

F. Results Discussion

The empirical results reveal several implications for public policy, financial regulation, and the strategic development of digital financial services. Across both static and dynamic models, the FinTech index shows a predominantly negative effect on household consumption, suggesting that the expansion of digital financial technologies encourages more cautious spending. This effect is largely driven by digital banking, online purchases, and cashless electronic/mobile payments, which increase transparency, enable real time financial monitoring, and strengthen trust in financial institutions. These mechanisms help explain why households may reduce consumption when adopting FinTech tools, consistent with Bachas et al. (2021), who found that digital banking can promote savings by lowering transaction costs and increasing financial awareness.

At the same time, FinTech and BigTech credit (CFFT) exerts the strongest positive influence on household debt. This variable consistently shows the largest coefficient, indicating that digital credit is the most powerful driver of indebtedness among the FinTech components. The speed, convenience, and accessibility of digital loans — often obtained without interacting with traditional financial institutions — help explain this effect, as highlighted by Dong and Zang (2023), Francis et al. (2017), and Tan and Teo (2000). Online purchases and cashless payments also contribute to higher debt levels in the static model, reinforcing the idea that frictionless digital transactions can stimulate borrowing even when they do not necessarily increase consumption.

The divergence between expected and observed results can be partly attributed to data limitations and the use of static models, which do not fully capture consumer expectations or temporal dynamics. Additionally, the analysis period includes two major global shocks: the aftermath of the 2008 financial crisis and the COVID 19 pandemic. Both events significantly influenced household behaviour, reducing consumption expectations, increasing precautionary savings, and altering attitudes toward credit (Andersen et al., 2020; Ridhwan et al., 2024). These contextual factors help explain why

FinTech adoption may have encouraged financial prudence rather than excessive consumption during the studied period.

The dynamic panel analysis confirms that temporal changes and expectations matter. While the static model did not show a significant relationship between FinTech and household debt, the dynamic model reveals a positive and significant effect, supporting Hypothesis 2. This suggests that as households anticipate future economic conditions — such as income recovery, lower interest rates, or improved financial stability — they may become more willing to take on debt, especially when digital credit is easily accessible. However, economic growth remains irrelevant in explaining either consumption or debt, while inflation consistently shows a significant negative effect, reducing both consumption and borrowing capacity. This reinforces the importance of price stability in shaping household financial decisions.

In the dynamic debt model, online purchases and internet banking emerge as the most influential components of FinTech. Their significance indicates that the ability to shop and manage finances digitally increases households' willingness to incur debt, likely due to greater convenience, confidence in financial operations, and the perception of easier repayment management.

Taken together, these findings carry several policy implications. First, regulators should strengthen oversight of digital credit markets, ensuring transparent lending practices, responsible credit assessments, and safeguards against over indebtedness. Given the strong effect of CFFT on household debt, regulatory frameworks for FinTech and BigTech lenders should be aligned with those applied to traditional financial institutions. Second, policymakers should promote financial literacy initiatives that help consumers navigate digital financial tools, understand the risks of easy credit, and make informed spending decisions. Third, central banks and financial authorities should monitor the macroeconomic effects of FinTech adoption — particularly its tendency to reduce consumption while increasing debt — as these dynamics may influence monetary policy transmission and financial stability. Fourth, governments should continue investing in digital infrastructure and education, complemented by measures that ensure households use FinTech tools in ways that support long term financial well-being.

These results are relevant to a wide range of stakeholders. Government ministries responsible for finance, economy, and education can use these insights to design policies that balance innovation with consumer protection. Central banks and financial regulators may rely on the findings to refine supervisory frameworks for digital credit and payment systems. FinTech and BigTech companies can better understand how their products influence consumer behaviour and adjust their design strategies, accordingly, integrating features that promote responsible financial management. Traditional financial institutions may also benefit from these insights as they adapt to a rapidly evolving digital landscape. Finally, international organizations such as the IMF, OECD, and World Bank may draw on these results to inform global guidelines on digital finance and household vulnerability.

Overall, the evidence suggests that FinTech is reshaping household financial behaviour in complex ways: encouraging prudence in consumption, expanding access to credit, and increasing debt levels, all while interacting with broader economic conditions

and consumer expectations. These dynamics underscore the need for balanced policies that harness the benefits of digital finance while mitigating its risks.

VI. Conclusion

This study examined whether FinTech development is related to household consumption and credit levels in G20 countries, and how economic growth, education investment, and inflation shape these relationships. Two models — one for household consumption and another for household debt — were estimated using a FinTech index constructed via Principal Component Analysis (PCA), complemented by analyses of each FinTech component to ensure robustness.

The results show that FinTech significantly affects household consumption, primarily by reducing it. Digital banking, online purchases, and cashless payments appear to encourage more cautious financial behaviour. For household debt, the static model found no significant relationship, whereas the dynamic model showed a positive, significant effect, indicating that FinTech development increases households' likelihood of taking on debt. This difference highlights the importance of accounting for expectations and temporal adjustments, which static models cannot fully capture. But across both models, inflation consistently emerges as the most influential control variable, reducing both consumption and borrowing. This suggests that price stability plays a central role in shaping household financial decisions.

The study faces limitations, particularly due to data gaps in the variables used to construct the FinTech index, which constrain the reliability and generalizability of the findings. Future research could examine how FinTech affects household saving and investment decisions, given its role in expanding financial access, lowering transaction costs, and providing personalized financial tools. It would also be valuable to explore how major global events—such as the 2008 financial crisis and the COVID 19 pandemic — shape the relationship between FinTech and household financial behaviour.

Additional limitations relate to causality and endogeneity. The analysis does not establish a strict causal link between FinTech development and household consumption or debt. While FinTech may influence financial behaviour, the reverse may also occur, as consumption and borrowing patterns can drive demand for digital financial services. Static models cannot fully address causal direction, and although the dynamic GMM approach mitigates some concerns, reverse causality cannot be ruled out. Endogeneity is also a concern, as factors such as financial development, institutional quality, digital infrastructure, and regulatory environments may simultaneously affect FinTech adoption and household financial decisions. Data constraints prevented the inclusion of these variables, raising the possibility of omitted variable bias. Future studies should consider instrumental variables, natural experiments, or difference in differences designs, and incorporate broader institutional and regulatory indicators to strengthen causal inference.

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APPENDIX

Table A.1. C – Details of consumption by country.

Source: Own elaboration.

Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
South Africa	64.3015	63.8663	63.6963	63.6811	63.2811	63.0090	63.9687	64.0929	62.5197	61.8193
Germany	54.9070	54.5568	53.4223	52.9700	52.7545	52.1084	52.0997	51.9423	50.1998	49.3577
Saudi Arabia	28.3092	29.9525	32.3355	40.8309	43.6792	42.3535	37.8349	40.3202	44.2598	42.3410
Argentina	64.9034	65.9876	65.3831	65.9058	65.7219	66.7396	69.4702	66.1276	65.7047	62.9901
Australia	53.5584	54.5836	54.7878	56.0377	56.9138	55.4563	55.1160	53.9215	52.0807	50.6045
Brazil	61.4119	61.7153	62.9596	63.9648	64.2515	64.4943	64.6161	65.1440	63.1440	61.0151
Canada	56.0203	55.9609	55.7963	57.8090	58.4843	57.9762	57.8869	57.7546	56.8238	54.2178
China	35.3865	35.8331	36.7079	37.7730	38.6750	38.5427	38.5219	39.2481	38.2003	38.1136
Korea	51.2677	50.5061	49.9359	48.5406	47.9558	47.5455	48.0234	48.6326	46.3909	45.9580
France	54.7189	54.6357	54.3097	54.0462	54.2633	53.9844	53.8818	53.6092	53.1965	52.5751
India	56.4610	57.6458	58.1277	59.0073	59.2953	58.7251	59.2883	60.9113	61.2715	61.1151
Indonesia	56.3892	56.8295	57.1391	57.4500	57.8268	57.2756	56.9799	57.9305	58.9339	55.6288
Italy	61.2987	60.9015	60.6062	60.7686	60.1242	60.2526	60.1881	59.8158	58.0237	56.5548
Japan	57.6791	58.1385	57.6316	55.7708	54.7015	54.6137	54.7747	54.5546	54.0531	53.5366
Mexico	69.1630	70.7479	70.8084	69.1493	68.9306	68.2357	67.3910	67.6130	66.1159	68.1819
Russia	51.4469	53.1656	53.7630	52.6798	53.2478	52.8712	50.3659	51.5990	51.4957	49.2238
Turkey	61.9101	61.3034	60.3678	60.0216	59.4084	58.6089	56.1817	56.8958	56.7681	55.2452
UK	64.1910	64.7310	64.3584	64.0937	64.7427	64.1984	64.6597	63.9208	59.2159	59.9513
USA	67.9672	67.6133	67.6581	67.5460	68.0758	68.2364	67.8635	67.4320	67.4545	68.8094

Table A.2. D – Details of consumption by country.

Source: Own elaboration.

Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
South Africa	125.1678	127.0293	128.8384	127.2032	124.3605	127.0303	118.3809	117.1856	108.9526	93.1761
Germany	56.5947	55.6708	54.2114	53.5956	53.2867	52.9114	52.6646	53.5030	57.0559	56.7557
Saudi Arabia	36.0514	39.8337	43.6977	54.6460	56.2764	51.9798				
Argentina	15.2128	15.7291	13.8238	14.4142	13.6676	15.9585				
Australia	121.1711	124.6900	128.4132	136.3063	142.5758	140.5313	139.8309	136.0245	142.0195	138.4801
Brazil	35.1806	36.1360	38.0750	38.7513	38.0947	28.6945	29.4866	32.5891	33.7400	69.6822
Canada	97.9683	98.1260	97.7995	103.5114	106.9387	106.2803	105.5678	106.0519	115.5878	109.5273
China	128.9226	134.3193	140.2369	152.5945	156.2299	154.8951	157.8121	165.3904	182.8681	177.2674
Korea	80.1991	81.2348	82.9263	85.8264	90.0049	91.9556	94.3083	97.6313	105.6313	108.3264
France	66.1951	66.2847	66.6486	68.4972	68.8766	70.9686	70.9630	72.4956	80.1990	77.2489
India	51.8885	52.3857	51.8822	51.8675	49.1012	48.7940	50.3382	50.7425	54.5717	50.4122
Indonesia	33.4342	36.0581	36.4235	39.1188	39.4024	38.7323	38.8054	38.3727	38.6795	36.9910
Italy	56.4822	56.2191	55.4513	54.5437	53.7928	53.3042	53.1099	53.6376	58.2180	56.1250
Japan	63.5529	63.6388	62.9967	62.1937	62.6862	63.1827	64.6176	65.3837	69.8811	70.1173
Mexico	80.1991	81.2348	82.9263	85.8264	90.0049	91.9556	94.3083	97.6313	105.6313	108.3264
Russia	14.0699	16.6476	17.1270	16.9617	16.8008	17.3851	18.0903	19.9087	22.6782	54.4130
Turkey	18.5817	19.8504	18.9959	18.1935	17.9548	17.3899	15.1163	15.1820	18.0487	15.1742
UK	98.2097	95.5550	94.4651	93.8138	93.9579	92.7652	91.6375	89.4187	97.7486	92.6821
USA	85.5496	83.8710	81.2429	79.6574	79.8609	79.5388	77.7946	77.6616	81.5651	79.2583

Table A.3. EG – Details of economic growth by country.

Source: Own elaboration.

Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
South Africa	1.0442	1.0995	-0.1722	-0.7579	-0.3092	0.7669	0.3198	-1.0301	-7.1066	3.6624
Germany	0.2302	0.1639	1.7843	0.6171	1.4081	2.2972	0.6782	0.8478	-3.9053	3.1202
Saudi Arabia	3.1336	0.6911	1.9453	2.6945	0.3216	-2.3401	0.3412	-1.4452	-4.7925	4.4617
Argentina	-2.1453	1.2657	-3.5786	1.6297	-3.1101	1.7576	-3.6016	-2.9696	-10.7703	9.6739
Australia	2.1199	0.8553	1.0883	0.7414	1.1863	0.6475	1.3783	0.6825	-1.5564	1.9681
Brazil	1.0077	2.1143	-0.3545	-4.3583	-4.0574	0.5233	0.9789	0.4483	-3.9180	4.4354
Canada	0.6620	1.2536	1.8410	-0.0893	-0.1358	1.8113	1.3356	0.4354	-6.0882	4.4093
China	7.1345	7.0507	6.7508	6.4207	6.2382	6.3019	6.2517	5.5753	1.9956	8.3517
Korea	1.8656	2.6962	2.5562	2.2684	2.5391	2.8702	2.4622	1.8889	-0.8462	4.4889
France	-0.1712	0.0581	0.4846	0.7540	0.8291	1.9950	1.5005	1.4959	-7.7910	6.1318
India	4.0608	5.0146	6.0862	6.7211	6.9810	5.5683	5.3024	2.8119	-6.7263	8.1844
Indonesia	4.7067	4.2848	3.7961	3.7177	3.9267	4.0176	4.1630	4.0391	-2.8851	2.9851
Italy	-3.2421	-2.9724	-0.9178	0.8755	1.4657	1.8203	1.1178	1.6485	-8.5297	8.8737
Japan	1.5368	2.1524	0.4294	1.6685	0.8054	1.7586	0.7712	-0.2622	-3.9966	2.6134
Mexico	2.1170	-0.4676	1.2391	1.5107	0.6257	0.7770	1.0062	-1.1323	-9.3135	5.2474
Russia	3.8492	1.5390	-1.0453	-2.1839	0.0102	1.7094	2.8155	2.2440	-2.4510	6.0455
Turkey	3.4612	7.1013	3.5335	4.6786	1.9423	6.1170	1.6282	-0.6126	0.8762	10.4294
UK	0.8095	1.1129	2.4386	1.4135	1.1515	1.9600	0.7912	1.0698	-10.6872	8.7640
USA	1.5331	1.1387	1.5404	1.9530	0.9334	1.5971	2.4049	1.8297	-3.7010	5.7795

Table A.4. GEE – Details of government expenditure on education by country.

Source: Own elaboration.

Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
South Africa	5.5232	5.3507	5.4898	5.4829	5.4442	5.5987	5.6440	5.9277	6.1834	6.5621
Germany	4.9284	4.9354	4.9210	4.8552	4.8392	4.8718	4.9793	5.1168	5.5876	4.5310
Saudi Arabia	5.3458	5.4366	5.3614	5.7761	5.5455	5.4543	4.8777	4.7776	5.2796	4.6476
Argentina	4.8667	5.2291	5.1645	5.3155	5.2869	5.1382	5.1243	5.1343	5.6084	5.5560
Australia	5.8551	5.8389	5.9485	6.2411	6.3140	6.3205	6.0885	5.9635	5.7715	
Brazil	4.6926	4.5890	4.8436	4.7394	4.8164	4.9600	4.8890	4.7729	4.8879	4.5940
Canada	3.9441	3.7105	3.5803	3.8138	3.7611	3.6675	3.5425	3.5411	3.5730	3.2978
China				4.4542	4.3331	4.3282	4.4581	4.6847	4.8017	
Korea	5.4565	5.5004	5.5121	5.4642	5.4191	5.4516	5.4072	5.3544	5.6778	5.2450
France	4.0848	3.8447	3.8988	4.1150		4.3064			4.2933	4.6351
India	3.4075	3.3590	3.2880	3.5836	3.5700	2.6700	2.7542	2.8421	3.4910	3.0476
Indonesia	4.0560	4.1437	4.0613	4.0736	3.8158	4.0449	4.2561	4.0953	4.4419	4.1309
Italy	3.6474	3.6250	3.5516	3.2290	3.1464	3.1306	3.0778	3.1553	3.4170	3.3174
Japan	5.1031	4.6961	5.2575	5.2294	4.9068	4.5182	4.2542		4.6257	
Mexico	3.7931	3.7638	4.0139	3.8340	3.7604	4.6899	4.6782	3.5093	3.7015	
Russia	4.3872	4.3448	4.4126	4.3222	4.6277	4.3237	4.3000	4.4540	4.0086	2.8453
Turkey	5.6279	5.5268	5.5984	5.5536	5.4151	5.4313	5.1981	5.2487	5.4977	5.3274
UK	6.2539	6.2293	6.1292	4.9468	4.8067	5.1229	4.9289	4.9873	5.4354	
USA	5.5232	5.3507	5.4898	5.4829	5.4442	5.5987	5.6440	5.9277	6.1834	6.5621

Table A.5. Inf – Details on inflation by country.

Source: Own elaboration.

Country	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
South Africa	4.6852	5.8441	5.3665	5.5455	6.9522	5.4733	3.9933	4.6135	5.2596	6.5001
Germany	1.4965	1.9594	1.8779	1.8537	1.3278	1.5037	2.0075	2.1303	1.8726	3.0196
Saudi Arabia	3.9940	-1.1967	-2.2470	-16.5815	-2.8170	7.4315	15.2215	-1.7648	-8.4632	14.1142
Argentina	22.3149	23.9488	40.2830	26.5800	41.1194	26.0064	42.0337	49.1956	40.0831	53.8404
Australia	1.8052	-0.1638	1.4049	-0.6229	-0.6558	3.6512	1.8788	3.4637	2.1138	3.0788
Brazil	7.9431	7.5046	7.8467	7.5662	8.1036	3.6714	4.4935	4.2243	6.4725	11.3841
Canada	1.2184	1.7407	1.9412	-0.8677	0.7170	2.5710	1.6511	1.5461	1.0708	7.6649
China	2.3312	2.1634	1.0311	-0.0029	1.4073	4.2327	3.4997	1.2867	0.4925	4.5523
Korea	1.2518	1.0185	0.9069	3.1856	1.9860	2.2228	0.4829	-0.8393	1.5637	2.7629
France	1.1618	0.7781	0.5769	1.1382	0.5226	0.5216	0.9922	1.2786	2.8399	1.4239
India	7.9344	6.1865	3.3318	2.2796	3.2380	3.9693	3.8842	2.4055	4.7465	8.5385
Indonesia	3.7539	4.9660	5.4432	3.9802	2.4389	4.2927	3.8183	1.5985	-0.4017	6.0034
Italy	1.5473	1.1476	0.9132	0.9319	1.1344	0.7263	1.0681	0.9381	1.5792	1.2779
Japan	-0.7561	-0.3544	1.6863	2.1113	0.4199	-0.0743	-0.0002	0.6348	0.9414	-0.1901
Mexico	4.5422	1.7039	4.3684	3.2254	6.0776	6.5676	5.2045	4.2876	4.8413	4.4070
Russia	8.9079	5.3201	7.4901	7.2497	2.8442	5.3498	9.9980	3.2631	0.8982	18.9905
Turkey	7.4227	6.2801	7.3895	7.8449	8.1305	10.9824	16.5123	13.8677	14.7894	28.9730
UK	1.5388	2.1171	1.3178	0.6610	1.9648	1.8565	1.9221	2.1157	5.0836	-0.1204
USA	1.8706	1.7509	1.8699	1.0005	1.0022	1.8996	2.4041	1.7939	1.3049	4.4928

