

# **BEYOND FINANCIAL ACCESS: BEHAVIORAL FRICTIONS AND DIGITAL FINANCIAL PARTICIPATION IN EMERGING ECONOMIES**

**Răzvan-George Cotescu\***

*The Bucharest University of Economic Studies, Bucharest, Romania*

## **Abstract**

The rapid expansion of digital financial infrastructures has substantially increased formal financial inclusion across low- and middle-income economies. However, greater access to financial services does not necessarily translate into active participation within digital financial systems. This paper investigates the distinction between formal financial inclusion and operational digital financial participation by examining whether financial stress, formal saving behavior and persistent cash preference are associated with digital merchant payment usage across emerging economies. Using cross-country data from the Global Findex Database (2024), the study employs a cross-sectional Ordinary Least Squares (OLS) framework. The analysis focuses on digital merchant payment usage as an indicator of functional digital financial integration, moving beyond conventional measures centered exclusively on account ownership. The results indicate that formal saving behavior is strongly and positively associated with digital merchant payment usage, suggesting that repeated interaction with formal financial institutions contributes to deeper operational integration into digital financial ecosystems. Persistent cash preference is negatively associated with digital payment usage, supporting the argument that behavioral persistence and transactional habits may limit the transition toward digital financial participation even when formal financial access exists. Financial stress also displays a negative relationship with digital payment usage, although the statistical evidence is comparatively weaker. Empirically, formal saving emerges as the dominant correlate of digital merchant payment usage, and the specified model accounts for roughly three quarters of the cross-country variation in functional digital financial participation. The paper contributes to the literature in three ways. First, it develops the distinction between institutional financial access and functional digital financial integration. Second, it introduces persistent cash preference as a behavioral friction affecting digital financial transition. Third, it provides comparative cross-country evidence regarding the interaction between financial engagement, financial vulnerability and transactional persistence in shaping operational digital financial participation across emerging economies. The findings suggest that the effectiveness of financial inclusion policies should be evaluated not only through the expansion of formal access but also through the

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\* Corresponding author, **Răzvan-George Cotescu** – [cotescu.razvan@gmail.com](mailto:cotescu.razvan@gmail.com)

extent to which households become behaviorally integrated into routine digital financial activity.

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digital financial integration; digital payments; cash preference; financial stress; formal saving; emerging economies

**JEL Classification**

D14; G21; G23; O16; O33

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**Introduction**

The rapid unfolding of digital financial infrastructures has had a profound impact on financial intermediation of the emerging and developing economies. Over the past decade, the governments, central banks and international organizations became more engaged in fostering digital financial inclusion, with the aims of increasing financial access, reducing financial exclusion and improving the cost-efficiency of payments. Those changes have been linked to a significant increase in formal financial access. In fact, account penetration increased substantially across developing nations during the last decade, mainly due to the development of digital financial infrastructure and mobile payment services, as reported by (Demirguc-Kunt and Klapper, 2012).

As the level of access increased, the levels of usage did not follow the same pattern, and a significant proportion of the population formally included still does not actively use these services. This paradox points to a broader conceptual question about what specifically is meant by financial inclusion and how can it be measured. (Allen et al., 2016) argue that variation of behaviour still exists across the formally included, suggesting that only being formally included to the financial system is not equated with active consumption.

The gap between formal access and operative engagement with the digital financial world is perhaps clearest in its implications for digital financialization. Its infrastructure might proliferate much faster than the behavioural changes that underpin widespread adoption. Hence, digital financial inclusion becomes a function, not just of financial technology access, but how homes incorporate such technologies into daily financial life.

Perhaps the best-known illustration of the divergence of these two trends is the prevalence of cash-centric transactability in the face of widening digital payments capabilities. (Wang and Wolman, 2016) provide strong transaction data to illustrate that cash still constitutes a significant portion of retail transactions, even when financial transactions in the rest of the economy is becoming more and more digitalized. More recently, (Trütsch, 2020) documents how even penetration of contactless payment technology did not diminish cash payments during the initial phases of cashless transaction introduction.

Studies are starting to relate sustained cash use to more generic measures of behavioural inertias and experiential familiarity. For example, in a recent study, (Arango, Huynh and Sabetti, 2015) suggested payment choice is heavily influenced by habitual behavior, merchant incentives, and familiarity of existing means of payment. This is consistent with the finding of (Aurazo and Vega, 2021) that digital payment usage depends not just on the existence of technologies but also on socio-economic and behavioral elements

determining routine payment behavior. Further support comes from behavior-based approaches to technology adoption. For example, (Oliveira et al., 2016) found that trust, convenience and perceived ease-of-use determine the acceptance of mobile payments. Indeed, the original framework the model explored by (Venkatesh et al., 2003) demonstrated perceived usefulness, trust, and behavioral change are essential determinants of technology adoption.

Low digital finance participation, therefore, possibly shows that people adopt behavioral changes in using payment technology with delays rather than purely technological barriers. Even the rapid widespread adoption of various payment technologies does not entirely mean that the use of cash declines immediately, as is particularly true in the initial period of adopting payment.

Simultaneously, the degree of financial engagement is expected to be correlated with the likelihood of participating actively in digital finance. Households' financial literacy and capacity inform the capability to appraise, rely on, and regularly utilize formal financial instruments. Financial and digital literacy are positively associated with financial resilience and participation in developing countries, especially when the pace of digital penetration is uneven. Similarly to the analysis below, (Kass-Hanna, Lyons and Liu, 2022) provide that both contribute to financial resilience and participation in emerging economy contexts, characterized by variable adoption of digital technologies.

Financial vulnerability provides an extra channel through which households' engagement with the formal financial systems is restricted. Short-run cash flow pressures or cash stresses limit households' ability to utilize digitally enabled financial instruments on a persistent basis. Indeed, (Gross and Souleles, 2002) show that liquidity constraints largely determine household behavior, and more recent studies suggest that, when struggling financially, households are likely to prioritize short term liquidity and transactional services, such as payments, over wider financial involvement (Chen, Tan and Liu, 2024) and (Bettocchi et al., 2018).

While considerable literature exists on financial inclusion or about digital finance, research has not been extensively concerned about the distinction between actual participation in the financial sector and the effective use of digital instruments in cross-country studies of developing countries, with a particular emphasis on the links between behavioral persistence, financial commitment and financial fragility in relation to ongoing use of digital payment systems.

In more detail, limited comparative evidence addresses how the joint impact of financial engagement, stress and cash persistence accounts for digital merchant payment use among formally included people, a critical gap, because traditional access metrics can overstate the degree of actual digital financial penetration. Thus, identifying why formal access doesn't translate into equally strong engagement in transactions may offer deeper insights into the success of financial inclusion policies. This paper approaches these challenges, considering how financial stress, formal savings practices, and a persisting preference for cash use affect digital merchant payment use across low- and middle-income countries. This is analyzed using cross-country data from the Global Findex Database (2024), inquiring about the role of behavioral and structural frictions of variations in digital financial activity among the formally included.

The paper makes two conceptual and one empirical contribution. Conceptually, it distinguishes formal financial inclusion from operational digital financial participation, arguing against using institutional access as a sole measure of penetration, and introduces persistent cash preference as a behavioral friction constraining digital adoption. Empirically, it provides comparative cross-country evidence on how financial engagement, vulnerability and transactional persistence jointly shape operational use of digital financial services across emerging economies.

In essence, this study suggests that policy outcomes in financial inclusion should be judged not by the breadth of access indicators alone, but by the rate at which households become operationally engaged in digital finance for everyday purposes. This transition is not merely technological progress. It reflects a wider process of financial behavioral change.

## **1. Review of the scientific literature**

### **1.1 Financial inclusion beyond institutional access**

In this paradigm, the exclusion from financial inclusion was interpreted as a problem of access into formal financial institutions. Hence the centrality of the ownership of accounts and membership of formal financial service and access to a physical infrastructure was considered the primary means to achieve integration into the formal financial system. Using a rich data set for over 120 economies of the Global Findex, (Demirguc-Kunt and Klapper, 2012) provided comparable measures on individuals' account holding, payment behavior, savings and borrowing behavior around the world. However, the more recently produced literature debates whether formal access to financial services and infrastructure actually necessarily means inclusion.

Recent empirical evidence suggests the opposite. As the report by (Demir et al., 2022), their analysis shows that for the successful integration into the daily economic life of an individual, what really matters is how these new technologies and digital services are used within daily economic life, rather than simply the availability of financial services or products. Also, more recent policy work notes how despite digital technological progress, the unequal distribution of access in the developing world continues to dominate the digital financial inclusion narrative.

(Anakpo, Xhate and Mishi, 2023) argue that ongoing institutional frailties, deficiencies in digital literacy, and disparate technology adoption have remained to limit effective engagement with digital finance in most developing countries. The result is that financial inclusion is perceived progressively as an intricate, multilevel phenomenon rather than a single-level one, where some may have formal financial access while having very little routine usage of financial activities, while at the other extreme, some households are able to achieve operational integration into formal financial systems via frequent use of mobile payments, savings facilities and various other financial innovations. Here, we build on this principle by distinguishing on operational engagement in the digital financial sphere from merely having a formally open account.

### 1.2 Digital payments and operational financial participation

Of all the measures discussed, digital payments would likely constitute the single strongest manifestation of functional participation, as it directly measures the actual implementation of financial services in common transaction patterns. Rather than reflecting institutional participation through accounts, digital merchant payment measures reflect the depth of engagement in usage. The active and intentional integration of formal financial services in everyday life is perhaps best represented by the routine of making transactions through digital means. The reasoning presented in this study from (Petrikova and Kocisova, 2024) is that, while access to the formal economy is a good indicator, digital payments can serve as actual operating figures of financial inclusion.

The authors concluded that payment practices might be a better measure of the actual level of financial inclusion that is seen with measuring merely ownership of financial accounts, but this conclusion, however, does not apply to the current discussion, as the present study measures the use of the actual digital payment.

The fintech studies already discussed above also serve to demonstrate the behavioral nature of digital payments utilization. (Ryu, 2018) has found that the perceptions of risk, as well as uncertainty, are an equally important barrier to the adoption of fintech solutions that are exacerbated in areas where individuals have little confidence in digital financial platforms. This kind of result is very relevant in emerging countries that has both less financial literacy and lower institutional trust. (Alrawad et al., 2023) further found that security issues, as well as trust, both have a positive and statistically significant impact on users' decision to adopt NFC payments.

This again confirms the view of the digital payment system utilization, as based on more than just accessibility. The system usage is driven by behavior and confidence.

Additional evidence is provided by (Slade et al., 2015), who show that innovativeness, trust and perceived risk jointly shape remote mobile payment adoption. These findings suggest that operational digital participation depends on a broader process of behavioral adaptation and technological readiness.

Technology acceptance literature provides the broader theoretical foundation for these mechanisms. In a similar perspective, (Cheng, Lam and Yeung, 2006) show that internet banking adoption depends heavily on trust, perceived usefulness and behavioral attitudes toward digital financial services.

Taken together, the literature suggests that digital payment participation should be understood not merely as a technological outcome but as a behavioral dimension of financial integration shaped by trust, familiarity, perceived risk, and technological readiness.

### 1.3 Cash persistence and behavioral frictions

The predominant friction to digital participation in payment operations is the enduring role of cash-based payment behavior. Even with relatively developed digital payment infrastructure at hand, payment behaviors of consumers might still anchor to the use of cash, driven by user's habits and their perception of easier money control, such as immediacy or liquidity. According to (Wakamori and Welte, 2017), the consumers' decision concerning whether to use a certain payment instrument is strongly dependent on its transaction value, and the usage habit as well as convenience remain key decision

attributes, particularly in the case of regular and small payment transaction, even among sophisticated ones. Additionally, (Shy, 2020) provides evidence that financially excluded consumers or those at the bottom of the income distribution are often more tied to cash due to better control of budgets and immediacy offered by this method of payment.

For financially distressed households, it applies even more in developing and emerging countries.

Research in this area also touches upon financial literacy's implications on cash preference. Recent literature indicates that persistence of cash during uncertain times is deeply linked with financial literacy and behavioural confidence with digital financial systems. (Sadok and Elouaouarti, 2025) suggest the payment persistence can be driven not simply by constraints of digital infrastructure but by informational and behavioral factors. Considering a larger ecosystem, mobile payments diffusion rely on various interactions in payment ecosystem, including consumers, financial institutions, merchants and technology suppliers, as demonstrated by (Au and Kauffman, 2008), which implies that payment decisions not only result from individual choices, but from the structure of the payment ecosystem. In conclusion, it implies that cash persistency should be considered as a behavioral friction, hindering a transition from formal financial access to active operational digital inclusion.

#### **1.4 Financial engagement, literacy and digital readiness**

Another key area of work identifies financial capability and digital preparedness as the main drivers of effective financial inclusion. Households with higher levels of financial literacy are better able to critically assess financial instruments, take risks, and adopt new financial technology tools to be engaged in day-to-day financial management. Cross-country studies also indicate a close link between financial literacy and the degree to which a person can achieve successful financial outcomes, with evidence showing how financial literacy and capability help to convert financial access into effective usage of these facilities (Grohmann, Klühs and Menkhoff, 2018). For instance, debt literacy has also been identified as an important aspect of the capacity to act and has been shown to be related to overindebtedness and poor financial decision-making (Lusardi and Tufano, 2015).

However, a recent line of inquiry suggests a stronger tie between financial sophistication and the digitalization of finance (Lee, Jiang and Wen, 2024). From this viewpoint, digital transformation reconfigures household financial decision-making, affecting choices both in terms of portfolio allocation and by changing patterns of interaction with financial services and information. Therefore, we hypothesize that greater engagement with digital payments could also extend to greater engagement with other types of formal financial products. This view is consistent with the broader literature on financial literacy, which emphasizes that financial knowledge affects not only isolated financial decisions, but also the capacity of households to participate effectively in increasingly complex financial systems (Lusardi and Mitchell, 2014).

A similar logic appears in (Serban, 2012) analysis of labour market flexibility in Romania, where employability is linked to adaptability, education and the capacity to respond to changing economic conditions. Applied to digital finance, this supports the view that

formal access alone is insufficient: individuals also need adaptive skills and behavioral readiness to transform financial infrastructure into active digital participation.

Formal saving can thus be interpreted not simply as a proxy for access, but also as reflecting deeper financial sophistication and engagement due to prolonged interaction with formal saving mechanisms. Hence, we would expect a correlation between saving behavior and digital merchant payments, because these reflect the depth of financial participation.

### **1.5 Financial stress and constrained participation**

Another factor that impacts financial participation is financial vulnerability and liquidity constraint. For those households experiencing the stress, it could be difficult to consistently use formal financial facilities due to short-term financial hardship. As shown by (Chen, Hu and Wen, 2025), financial fragility is highly correlated with lower financial resilience and lower financial capability. They also point out the general observation that household financial vulnerability, not only income shortfall, captures broader structural and behavioural determinants. Accordingly, financial vulnerability could affect the way individuals engage with formal financial infrastructure and payment instruments.

During the periods of stress, individuals could prioritize their liquidity and simple or customary payment options, reducing engagement with innovative payment instruments. All these studies seem to imply that periods of stress limit the operational digital usage of individuals because they force them to act under a short-term focus and refrain them from the adoption of the innovation instruments. However, the association cannot be direct, and the digital innovation instruments may lower the cost and facilitate money transfer.

### **1.6 Synthesis and research gap**

Based on the literature review, it is reasonable to interpret financial inclusion as a multifaceted and layered phenomenon. Physical access to the institution is not sufficient for operational inclusion into the digital finance systems. However digital engagement is determined by the interplay among financial engagement, behavioral routine, technological adoption, financial stress and vulnerability. Most studies document strong correlations between account ownership, digital finance, fintech, payment patterns and financial ability.

Separate examination of each of these topics has produced considerable empirical findings. However, research in financial inclusion, payment, fintech, and payment system has remained largely understudied. Access indicators constitute the core of financial inclusion studies, payment behavior is investigated, and trust, perceived usefulness and risk are at the center of technology adoption. But the interplay between persistent cash behavior, financial engagement, and financial vulnerability in shaping how many people who have accounts actually use them is not a significant research area and is relatively unexplored, especially for developing economies.

The purpose of this study is to bridge this research gap and analyze how the dynamic between consistent use of cash in transactions as one friction, the consistent engagement into formal saving, as a measure of the active use, and the stress induced by precarious conditions play out their roles in the operational digital financial inclusion. This articles

analyzes how these often isolated mechanisms interact in order to understand why, once they open an account, the participation of individuals in formal digital financial systems doesn't automatically mean an operational one.

## **2. Research methodology**

The research paper is built to provide a way to assess whether formal financial inclusion corresponds to active digital financial engagement in low- and middle-income countries. Particularly, the paper checks if financial stress and the level of involvement in formal financial services, along with recurrent use of cash, are related to how much families are effectively integrated functionally to the digital financial system.

The strategy applied reflects the contrast between formal financial inclusion and functional financial integration formulated earlier. Unlike the standard approach, which usually checks bank accounts or institutional presence, the empirical design emphasizes on the use in digital financial markets based on the patterns of transactional actions.

### **2.1 Data**

Empirical analysis uses cross-country data collected from the 2024 Global Findex Database, a product of the World Bank that contains standardized cross-country indicators on financial inclusion, saving habits, and use of payments, credit, loans, and insurance with and between formal financial service providers and household participation in financial systems. The database is one of the main international sources of empirical evidence on financial inclusion and digital financial behavior, owing to its standardized approach and extensive cross-country coverage.

The analysis limits its scope to only low- and middle- income economies according to the classification by the World Bank for several reasons: firstly, emerging countries have witnessed arguably the most significant development in digital financial technology over the past decade; secondly, these economies often exhibit a great deal of variation across countries on indicators of digital finance use, cash dependence, and overall financial participation which makes them ideal to study the gap between access and utilization of formal finance; and finally, some behavioral and structural constraints that shape engagement with digital finance might appear more vividly in situations where financial transitions are not complete and a sizable share of financial activity remains informal.

After deletion of observations with missing values for the variables included in our specification, the final sample consists of 93 countries. Each country-level observation reflects an aggregate variable that is measured as the share of adult population in the country that exhibits a particular behavior or financial status.

Using aggregate cross-country data is consistent with the exploratory intent of this paper to describe broad associative relationships rather than micro-level causal ones. Because all indicators are measured as country-level shares, the estimated associations hold between aggregate national characteristics and cannot be interpreted at the individual level; inferring household behavior from these coefficients would risk an ecological fallacy. The results should therefore be read as cross-country regularities consistent with the proposed mechanisms.

## 2.2 Variable definition

The empirical specification is centered on the concept of functional digital financial integration. The dependent variable is represented by the share of adults reporting the use of digital merchant payments. This indicator captures active participation within digital financial systems through routine transactional usage and therefore reflects a deeper form of financial integration than formal account ownership alone.

The explanatory variables are selected to capture three complementary dimensions potentially associated with functional financial usage: financial constraints, active financial engagement and behavioral persistence.

Financial stress is proxied by the share of adults reporting that it would be very difficult to obtain emergency funds within a short period of time. This variable captures the presence of short-term financial pressure and liquidity constraints that may limit stable participation within formal digital financial systems.

Formal saving behavior is measured as the share of adults reporting savings through formal financial institutions. This variable reflects active engagement with formal financial mechanisms and repeated interaction with institutional financial structures. In contrast to simple account ownership, formal saving behavior may indicate a deeper level of financial participation and familiarity with formal financial services.

Persistent cash preference is proxied by the share of adults reporting that they continue to use cash payments primarily out of habitual preference. This variable is particularly important within the conceptual framework of the paper, as it captures behavioral persistence and potential resistance to the transition toward digital financial usage. Rather than reflecting technological exclusion alone, the variable may also indicate behavioral inertia and continued reliance on traditional transactional practices. These three variables are not merely descriptive proxies. Each is intended to capture a distinct mechanism through which formal financial access may, or may not, translate into operational digital participation. Formal saving is expected to be positively associated with digital merchant payment usage (H1): sustained interaction with formal saving institutions reflects accumulated familiarity and trust, lowering the cognitive and perceived-risk barriers emphasized in the technology-adoption literature and making routine digital transacting more likely. Persistent cash preference is expected to be negatively associated (H2): it proxies behavioral inertia rather than a lack of access, and should therefore constrain the transition to digital usage even where digital infrastructure is available. Financial stress is expected to be negatively associated (H3): short-term liquidity pressure is hypothesized to narrow households' transactional horizon toward immediate, low-friction instruments, reducing consistent engagement with digital financial systems. The specification that follows is designed to test whether these three mechanisms operate jointly at the cross-country level.

### Model specification

The empirical analysis is based on a cross-sectional Ordinary Least Squares (OLS) model, specified as follows:

$$\text{DigitalUsage}_i = \beta_0 + \beta_1 \text{Stress}_i + \beta_2 \text{Saving}_i + \beta_3 \text{CashPreference}_i + \varepsilon_i$$

where

DigitalUsage<sub>i</sub> - represents the share of adults making digital merchant payments;

Stress<sub>i</sub> - captures financial stress and liquidity constraints;

Saving<sub>i</sub> - represents formal saving behavior;

CashPreference<sub>i</sub> - captures persistent cash-based transactional behavior;

ε<sub>i</sub> - Error term

The specification is parsimonious for conceptual clarity and to limit the endogeneity bias, with an observation in the rather small cross-country dataset (cross-sectional estimation). These include variables relating directly to central theoretical mechanisms proposed throughout the paper. The estimation strategy is therefore one of association rather than causality in nature (and, therefore, any estimate interpreted as an estimate of a structural causal effect should be rejected by any sensible standard of causal inference). Rather, this model attempts to isolate cross-country associations that are consistent with the theory, as conceptualized in functional financial integration.

OLS estimation is suitable on account of the metric nature of the dependent variable and its focus on estimating average associations. Nevertheless, interpretation remains subject to standard criticisms with regard to aggregate cross-sectional data.

### 3. Results and discussions

#### 3.1 Descriptive overview and model fit

The empirical estimation draws on a cross-sectional sample of 93 low- and middle-income economies. The joint explanatory variables are found to collectively account for the country-level variation in functional digital financial usage. The overall regression is jointly statistically significant.

The model exhibits a relatively strong explanatory capacity for a cross-country behavioral specification. The estimated R-squared value is 0.766, while the adjusted R-squared reaches 0.758. This suggests that approximately three quarters of the cross-country variation in digital merchant payment usage can be associated with the combined effect of financial stress, formal saving behavior and persistent cash preference.

The overall significance of the regression model is confirmed by the F-statistic (F = 97.00, p < 0.001), indicating that the explanatory variables jointly provide meaningful information regarding the variation in functional digital financial integration across the sample.

Table no. 1 presents the estimated regression coefficients.

*Table no. 1 Determinants of functional digital financial integration*

Variable	Coefficient	Std. Error	t-statistic	p-value
Intercept	0.206	0.050	4.136	0.000
Financial stress	-0.161	0.095	-1.700	0.093
Formal saving	1.425	0.100	14.314	0.000
Cash preference	-0.147	0.072	-2.032	0.045

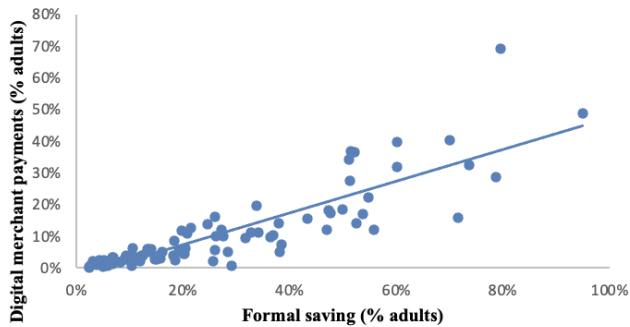
Source: Author's own research

R<sup>2</sup> = 0.766; Adjusted R<sup>2</sup> = 0.758; F-statistic = 97.00; p < 0.001; N = 93.

The observed correlations show that meaningful and full participation in the digital financial services can depend on financial access and depth of usage of financial products, as well as continued focus on cash-based transaction behavior.

Figure no. 1 provides preliminary descriptive evidence regarding the relationship between formal saving behavior and digital merchant payment usage across the sample economies.

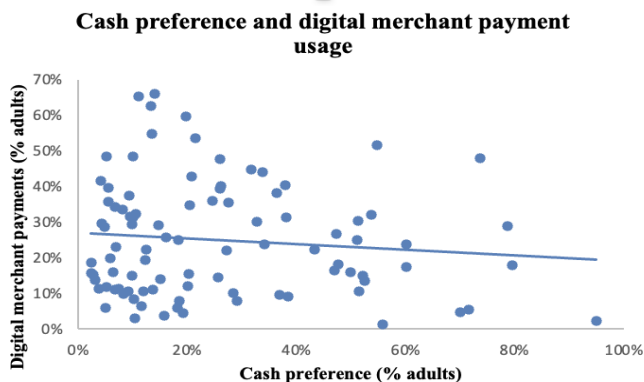
*Figure no. 1- Formal saving behavior and digital merchant payment usage*  
**Formal saving and digital merchant payments**



**Source:** Author's own research

The figure suggests a positive association between formal saving behavior and operational digital financial participation. Countries characterized by higher levels of formal saving activity also tend to exhibit higher levels of digital merchant payment usage. Although the relationship remains descriptive and does not imply causality, the pattern is broadly consistent with the hypothesis that deeper engagement with formal financial systems is associated with stronger integration into digital payment ecosystems. Additionally, the next figure provides a graphical illustration of the relationship between persistent cash preference and digital merchant payment usage across the sample economies.

Figure no. 2 - Cash preference and digital merchant payment usage



**Source:** Author's own research

The figure suggests a negative relationship between cash preference and operational digital financial participation. Countries characterized by stronger reliance on cash transactions tend to exhibit lower levels of digital merchant payment usage. The descriptive pattern is broadly consistent with the regression results and supports the argument that persistent cash usage may operate as a behavioral friction limiting digital financial integration.

### 3.2 Empirical Findings

The estimated coefficients yield a number of key insights regarding the relationship between financially inclusive behavior and functional digital inclusion. First, active formal savings behavior has the largest (strongest), positive, and highly statistically significant relationship with usage of merchant payments to digital merchants ( $\beta = 1.425$ ,  $p < 0.001$ ). The evidence suggests that active use of formal financial providers is linked to the practical integration of people within digital payment ecosystems. More relevantly, the inclusion of formal saving implies more than having a bank account—savings represent ongoing interaction, adaptation, and trust with the formal financial system that may encourage people to transact digitally in a retail context.

Persistent cash preference is negatively correlated and statistically significantly related to the adoption of digital merchant payment methods ( $\beta = -0.147$ ,  $p = 0.045$ ). These findings are central to the paper's framework, where behavioral persistence serves as the identified friction to the development of successful functional digital integration.

Specifically, the modeled relation between the persistent behavior and formal finance infrastructure shows that the people who have stronger inclination for cash behavior are likely less likely to actively use their digital finance infrastructure in an environment in which such is readily available, hence corroborating the idea that the transition to digital finance is neither only institutional or technologic, nor purely human behavioral.

The relationship between financial stress and digital merchant payment usage is negative, although statistically weaker ( $\beta = -0.161$ ,  $p = 0.093$ ). The estimated coefficient remains directionally consistent with the theoretical expectation that financial pressure and liquidity constraints may reduce the capacity of households to participate consistently within formal digital financial systems.

Even if not at standard levels of statistical significance at the 5 percent level, this negative association continues to hold an important economic interpretation in the broader conception of limited financial engagement. We may infer financial stress creates financial constraints, pushing households into focusing exclusively on short-term transactional cash flow management. Overall, the analysis indicates that active financial engagement and behavioral persistence, rather than financial stress alone, drive higher degrees of functional digital financial integration.

The results reinforce the differences drawn throughout the paper as a formal measure and the actual functional participation in digital finance.

### 3.3 Discussion

Beyond the macro-level results, there are few broader implications to our findings on financial inclusion in emerging economies. First, the study demonstrates that, for emerging economies, formal financial infrastructure alone does not necessarily ensure the active functioning of citizens in digital financial ecosystems. Consequently, the extent of financial infrastructure can provide a poor approximation of the actual level of financial inclusion.

On the one hand, functional digital financial integration is significantly associated with formal saving behavior. On the other hand, an overwhelming prevalence of informal money flows, particularly the strong preference for and heavy use of cash transactions, hinders active engagement with digital financial systems.

Through this lens, financial integration may remain shallow even under broad account penetration: individuals can be formally included yet still route much of their activity through other channels, so traditional access measures may overstate actual digital integration.

As shown above, the choice of a cash-oriented transactional pattern is not solely to be understood in terms of infrastructure limitations but perhaps can best be understood as a more deeply embedded expression of behavioral inertia, transaction habits, and progressive engagement with institutional finance systems. These results fall squarely within a broader literature that has underscored the fact that financial behavior takes longer to adapt to than financial infrastructure.

Concurrently, the strong link between formal saving behaviors and digital financial service use provides evidence for the behavioral financial integration account of how repeated interaction with the formal financial sector helps deepen overall digital integration, by lowering cognitive barriers and facilitating incorporation into the payment economy. More precisely, the less robust statistical relationship found for financial stress reveals a subtle, but crucial finding. Although liquidity constraints seem to be correlated with poorer digital financial utilization, the data indicates that behavioral and integration mechanisms may matter more for explaining variations in functional digital financial utilization across countries. The shift towards digital financial integration, therefore, does

not rely just on whether an individual has the financial capacity but also on whether they psychologically integrate the formal system into the economics of their day-to-day lives. The evidence thus feeds into ongoing discussion around the effectiveness of financial inclusion interventions. Policies focused solely on the breadth of account ownership may not have a significant impact on levels of active digital financial engagement. The data in fact supports the view that depth of engagement and continuation of transactions, rather than the mere prevalence of an account, form key dimensions of financial integration.

The move from formal access to functional participation involves more than technological availability. Behavioral adaptation, financial know-how and deeper engagement with formal institutions are equally important for operational inclusion, which is better captured through use-intensity and behavioral integration than through access metrics alone.

### **Conclusions**

This paper documented the association of financial stress, formal saving, and persistent cash preference with functional digital financial engagement in developing and middle-income countries. Leveraging country-level evidence from the Global Findex Database (2024), the research investigated whether access to formal access can be leveraged into engagement of the digital financial space. The empirically shown results show that the transition from formal access to functional engagement is far from automatic and varies across emerging countries. Formal savings were strongly positively related to digital merchant payment usage, confirming active engagement with formal financial services is correlated with increased usage of the broader digital financial space.

Consistent with the narrative of behavioral persistence acting as significant obstacle to the transition towards effective digital financial participation, this relationship was negatively associated with persistent cash preference.

Another significant finding from this analysis is that the relationship between financial stress and digital merchant payments is statistically significant and negative, though the data is somewhat weaker for this dimension than the other dimensions discussed in the paper. This result, however, is also in line with what would be expected: Households that have less access to credit may face liquidity constraints that inhibit sustained engagement with the formal digital economy. To sum up, this paper argues that formality and functionality can be treated as separate and distinct concepts related to financial inclusion. Access to modern financial infrastructure formally places households within the financial sector. A more meaningful measure of real inclusion, however, is whether they actively and regularly use these services, relying on digital channels rather than on informal or cash-based alternatives for their daily transactions and long-term financial needs.

This paper advances existing research in three areas: it builds conceptual distinction between formal access and effective financial integration that stresses that the possession of a bank account may not equate with an active presence in digital financial services. It advances the behavioral dimension on persistent cash usage as a potential barrier for digital financial transition. Also, it offers comparative evidence on the intersection of financial engagement, persistent behavior, and digital financial inclusion among countries in emerging economies. It has broader implications for financial inclusion policymakers too, as not all policies to promote account ownership yield the same increase in effective

digital financial integration; while behavioral adaptation, financial engagement, and transactional behaviors appear key to financial inclusion, policies that focus solely on accounts have limits. On the contrary, the most efficient strategy may revolve around encouraging actively using formal financial services in daily activities as an input into everyday households' behaviors.

Several limitations should nevertheless be acknowledged. The cross-sectional nature of the data prevents causal interpretation, while the use of aggregate country-level indicators may conceal substantial within-country heterogeneity regarding financial behavior and digital financial participation. In addition, omitted institutional or macroeconomic factors may also influence the estimated relationships.

Future research could extend the present analysis by employing micro-level or panel datasets in order to examine more directly the behavioral mechanisms underlying the transition from formal access to active digital financial integration. Further research may also investigate how institutional trust, technological adaptation and financial literacy interact with persistent transactional behavior in shaping long-term digital financial participation.

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