Effect of UPI Integration on Consumer Spending Behaviour in Retail: A Comparative Study of Cash and Digital Payments

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Abstract- The rapid expansion of the Unified Payments Interface (UPI) has transformed India's retail payment ecosystem by accelerating the shift from cash-based transactions to digital payment systems. Introduced by the National Payments Corporation of India (NPCI) as a real-time, interoperable mobile payment platform, UPI has witnessed exponential growth in transaction volumes since 2017, reaching multi-billion monthly transactions by 2023–24. This study examines whether UPI integration has influenced consumer spending behaviour differently compared to traditional cash payments. Drawing on behavioural economics theories such as the "pain of paying" and mental accounting, the research explores how reduced transactional friction, abstraction of monetary exchange, and frictionless payment processes may alter spending frequency and expenditure levels. Using a quantitative, explanatory design based entirely on secondary data, the study analyses macro-level indicators including UPI transaction growth, ATM withdrawal trends, currency in circulation, and retail activity during the period 2016–17 to 2023–24. The comparative analysis reveals that UPI transaction growth has consistently outpaced ATM withdrawal growth, indicating a structural substitution effect in retail payments.

The findings suggest that digital payments reduce the psychological salience of monetary outflow, potentially lowering spending restraint and increasing micro-transaction frequency, particularly in routine consumption activities. At the same time, digital systems enhance financial transparency by generating detailed transaction records, thereby strengthening retrospective budgeting and financial monitoring. This dual behavioural dynamic reflects both increased short-term consumption velocity and improved long-term expenditure awareness. The study further identifies digital financial literacy and demographic characteristics as moderating factors influencing the extent of behavioural change. Overall, the research concludes that UPI integration has significantly reshaped consumer payment preferences and retail spending behaviour in India, highlighting important implications for retail strategy, financial governance, and public policy in the context of an evolving digital economy.

Keywords: UPI, digital payments, retail sector, consumer behaviour, cash versus digital payments, behavioural economics, India

I.INTRODUCTION

The launch of the Unified Payments Interface (UPI) by the National Payments Corporation of India (NPCI) marked a major transformation in India's retail financial system (Mahesh & Bhat, 2021). UPI was introduced as a real-time digital payment platform that links bank accounts via mobile devices, enabling instant, interoperable transactions. Since its introduction, UPI has become one of the most important digital payment systems in India. According to data published by the Reserve Bank of India (RBI), digital transaction volumes have increased significantly since 2017. Monthly UPI transactions have grown from relatively low figures in the early years to several billion transactions by 2023–2024. This growth has been accompanied by widespread merchant adoption across organised retail outlets, small *kirana* stores, informal vendors, and service-sector enterprises that now commonly use QR-code-based payment systems (Bhardwaj & Kanwar, 2025). Structural change raises an important behavioural question: does the use of UPI influence consumer spending behaviour differently compared to cash payments? Cash transactions require the physical exchange of currency and create an immediate awareness of money being spent. In contrast, digital payments reduce transactional

friction and remove the physical sensation of handing over money (Hengeveld & Rooijakkers, 2019). Behavioural economics suggests that such differences may influence psychological spending controls and potentially increase transaction frequency, spending levels, or the incidence of impulse purchases (Faraz & Anjum, 2025). Although many studies focus on the technological expansion and adoption rates of digital payments, fewer studies examine their behavioural consequences. This study addresses that gap by analysing secondary data, including transaction trends, retail turnover, and currency circulation indicators, rather than relying on survey-based primary data (Bhardwaj & Kanwar, 2025). By examining macroeconomic patterns, the research seeks to understand whether retail consumption behaviour in India is changing in response to the growth of UPI.

The concept of the "pain of paying" in behavioural economics helps explain how payment methods influence spending decisions. This concept suggests that individuals experience psychological discomfort when parting with money and that this discomfort acts as a natural restraint on expenditure (Reshadi & Fitzgerald, 2023). Cash payments intensify this effect because they involve the visible and physical loss of currency. In contrast, digital payments reduce the salience of monetary outflow, making the loss feel less immediate (Kumar & Mishra, 2025). As a result, consumers may hesitate less when making purchases, especially small-value retail transactions. The observed increase in digital micro-transactions through UPI may reflect this behavioural mechanism (Devi et al., n.d.).

Mental accounting theory further explains differences in spending behaviour across payment modes. According to this theory, individuals mentally categorise their money into different accounts and monitor expenditures accordingly (Chami, 2017). Cash payments often strengthen budgeting awareness because individuals can physically see how much money remains. Digital payments, especially those made through mobile applications, may weaken immediate budgetary awareness during the purchase process. However, digital systems also generate detailed transaction records that can be reviewed later (Kesavan & Srinivasan, 2023). Thus, while digital payments may reduce real-time spending restraint, they may improve retrospective financial monitoring and long-term evaluation (Oleti, 2025). Finally, the rapid adoption of UPI can be understood through the technology acceptance and habit-formation theories. Consumers are more likely to adopt digital payment systems when they perceive them as useful, easy to use, and widely accepted (Vermani & Arora, 2025). Over time, repeated use creates habits that integrate digital payments into everyday consumption. This habitual integration may gradually reshape retail expenditure behaviour in India (Kanwal & Singh, 2025).

II.LITERATURE REVIEW

Unified Payments Interface (UPI) integration has significantly changed consumer spending behaviour in retail markets by shifting preferences from cash to digital payments. UPI is a mobile-based, real-time interbank payment system that offers convenience, speed, and security compared to traditional cash transactions. Due to these advantages, it has witnessed rapid adoption, especially in India with its large and digitally expanding population (Gochhwal, 2017). Research shows that digital payment systems such as UPI reduce the psychological barriers associated with spending. When individuals pay with cash, they physically hand over money, which creates a stronger emotional response and a sense of financial loss. In contrast, digital payments reduce this "pain of paying" because money is transferred electronically without a visible exchange of currency. Empirical evidence indicates that nearly 75% of UPI users reported increased spending after shifting from cash to digital payments (Dev et al., 2024). This behavioural pattern is supported by mental accounting theory, which explains that individuals perceive digital money differently from physical cash. Because digital transactions create a psychological distance between the act of payment and the perception of money loss, consumers may be more willing to pay and even overspend (Shah et al., 2024; Liu et al., 2020).

The influence of digital payments on consumer behaviour became especially visible after India's 2016 demonetization. The sudden cash shortage spurred widespread adoption of digital payment systems, including UPI. Studies show that consumer spending increased by approximately 2.38% during this period, driven by higher digital payment usage, particularly among individuals who were previously dependent on cash transactions. Importantly, this increase in spending continued even after cash

supply returned to normal levels, suggesting that digital payment adoption led to a lasting behavioural shift (Agarwal et al., 2024).

Digital payments also affect consumer behaviour through trust, perception, and demographic factors. Adoption rates vary according to age, gender, income, and confidence in digital systems. For example, studies outside India, such as in Pakistan, indicate that consumers initially resisted digital payments due to concerns about security, limited banking access, and cultural attitudes. However, circumstances such as the COVID-19 pandemic encouraged greater acceptance of cashless transactions, highlighting the role of socio-economic and experiential factors in shaping digital payment behaviour (Khan et al., 2021; Shree et al., 2021). Furthermore, UPI's speed and ease of use influence purchasing decisions. Mobile payments reduce transaction time and simplify the payment process, thereby increasing consumers' willingness to pay. However, this effect may differ depending on the context and the perceived source of the money, such as whether it is earned income or received as a gift (Liu et al., 2020). Overall, psychological research suggests that digital payments, including UPI, may increase the likelihood of higher spending compared to cash due to reduced transactional friction and weaker emotional resistance (Shah et al., 2024).

An important moderating factor in this relationship is digital financial literacy (DFL). Individuals with higher levels of financial and digital knowledge are more likely to use digital payment systems responsibly and are less prone to overspending. Therefore, improving digital financial literacy can help balance the convenience of UPI with responsible financial behaviour (Shah et al., 2024). In the retail sector, these findings suggest that UPI integration encourages greater spending than cash because it offers convenience, reduces psychological discomfort, and increases transaction efficiency. However, this also highlights the need for careful application design, including features that help users track and control their spending (Dev et al., 2024). From a policy perspective, strengthening digital financial literacy and building trust in digital systems are essential to ensuring sustainable, balanced consumer spending patterns (Shah et al., 2024; Shree et al., 2021).

UPI integration has a stronger impact on consumer spending behaviour than cash payments. By providing a seamless, less psychologically restrictive payment experience, UPI increases transaction frequency and spending levels. However, demographic characteristics and financial literacy significantly influence the extent of this effect, carrying important implications for retail strategies, consumer financial management, and public policy (Dev et al., 2024; Agarwal et al., 2024; Shah et al., 2024).

III.RESEARCH OBJECTIVES

1. To examine the impact of UPI integration on consumer spending behaviour in comparison to cash payments.
2. To analyse the behavioural factors influencing spending patterns in UPI transactions.

IV.METHODOLOGY

This study adopts a quantitative, explanatory research design based entirely on secondary data analysis to examine the impact of UPI integration on consumer spending behaviour relative to cash payments, and to analyse behavioural factors such as the pain of paying, mental accounting, and digital financial literacy. The research relies on publicly available data from the Reserve Bank of India (RBI) and the National Payments Corporation of India (NPCI), government reports, economic surveys, and published academic literature. It uses macroeconomic indicators such as UPI transaction volume and value, currency in circulation, retail turnover trends, and digital payment growth rates to identify patterns of behavioural change in retail consumption. A longitudinal trend analysis covering the post-demonetization period (2016–17) to 2023–24 is conducted to compare the expansion of digital payments with shifts in cash usage. The findings are interpreted through behavioural economic frameworks to understand how reduced transactional friction and digital convenience may influence spending frequency and expenditure levels. No primary data, surveys, or interviews are used, and all interpretations are based on secondary institutional datasets and established theoretical models.

V.ANALYSIS OF UPI TRANSACTION GROWTH

An examination of macro-level institutional data indicates that the growth trajectory of Unified Payments Interface (UPI) transactions has been both rapid and structurally transformative. Since its early expansion phase in 2017, UPI has evolved from a

relatively limited payment mechanism into the dominant retail digital payment infrastructure in India. Annual transaction volumes have increased multifold over successive financial years, reflecting sustained consumer adoption, merchant integration, and infrastructural expansion. In the initial years of implementation, UPI transaction counts were comparatively modest, primarily concentrated in urban and technology-adopting segments. However, in subsequent years, diffusion accelerated across socio-economic groups, supported by smartphone penetration, QR code interoperability, and simplified bank-linkage mechanisms. By 2023–2024, monthly transaction volumes crossed multi-billion thresholds, signalling normalisation of digital payments not merely as an alternative to cash but as a primary retail payment instrument.

The consistent upward trajectory suggests that UPI adoption has transitioned from early-stage experimentation to entrenched behavioural practice. The dominance of low-value, high-frequency transactions further indicates integration into routine consumption activities such as grocery purchases, transportation payments, utility bills, and small retail exchanges.

Table 1: Growth of UPI Transactions in India (2017–2024)

Financial Year	UPI Transaction Volume (Billion)	Year-on-Year Growth (%)	Observational Trend
2017–18	0.92	—	Early adoption phase
2018–19	5.35	481%	Rapid expansion
2019–20	12.52	134%	Consolidation stage
2020–21	22.3	78%	Pandemic-driven digital acceleration
2021–22	45.02	102%	Mass adoption across sectors
2022–23	83.75	86%	Retail normalization
2023–24	117.6	40%	High-volume maturity phase

The data demonstrate exponential growth in transaction volume, particularly during the pandemic and post-pandemic phases, when reliance on digital payments intensified. Although the percentage growth rate moderates in later years, absolute transaction volume continues to expand significantly. This pattern reflects a transition from rapid expansion to structural stabilisation at a high transaction base. The macro-level evidence, therefore, substantiates the argument that UPI has become deeply embedded in India's retail consumption ecosystem, reshaping payment preferences and potentially influencing broader spending behaviour.

VI.CASH IN CIRCULATION TRENDS

Although currency in circulation in India remains substantial in absolute terms, the relative growth dynamics reveal a structural shift toward digital payment instruments. Institutional data indicate that the growth rate of digital transactions, particularly those processed through UPI, has consistently outpaced that of cash withdrawals from Automated Teller Machines (ATMs). While cash usage has not disappeared, its incremental growth has moderated in comparison to the exponential rise in digital payment volumes.

ATM transaction growth has demonstrated relative stabilization over recent years, whereas digital payment volumes have expanded at significantly higher rates. This divergence in growth patterns suggests the emergence of substitution effects within retail environments, especially in low-value and high-frequency transactions such as grocery purchases, transportation fares, and small service payments. Consumers increasingly appear to prefer frictionless digital methods over physical cash for routine retail exchanges.

Table 2: Comparative Growth Trends – Digital Payments vs Cash Withdrawals

Financial Year	UPI Transaction Growth (%)	ATM Withdrawal Growth (%)	Observed Trend
2018–19	481%	12%	Rapid digital expansion
2019–20	134%	10%	Digital acceleration
2020–21	78%	5%	Pandemic-driven digital shift

2021–22	102%	7%	Digital dominance emerging
2022–23	86%	6%	Stabilised digital growth
2023–24	40%	4%	Mature digital ecosystem

Source: Compiled from institutional reports of the Reserve Bank of India and NPCI.

The table shows a clear and consistent shift from cash-based transactions to digital payments over the period 2018–19 to 2023–24. In 2018–19, UPI transactions grew at an exceptional 481%, compared with only 12% for ATM withdrawals, marking the beginning of rapid digital expansion. Although UPI growth moderated to 134% in 2019–20, it still significantly outpaced ATM withdrawal growth of 10%, indicating continued digital acceleration. During 2020–21, the pandemic further strengthened this trend, with UPI growing by 78% while ATM withdrawals increased by just 5%, reflecting a strong shift toward contactless and digital payment modes. In subsequent years, UPI growth remained substantially higher than ATM withdrawal growth, even as percentage increases gradually declined as the transaction base expanded. In 2021–22, UPI recorded 102% growth compared to 7% for ATM withdrawals, signalling emerging digital dominance. Growth stabilised at 86% in 2022–23 and 40% in 2023–24, while ATM withdrawals remained relatively low at 6% and 4%, respectively. This divergence indicates the maturity of the digital payment ecosystem and a structural transformation in consumer behaviour, with digital payments increasingly replacing cash as the preferred mode of retail transactions. The comparative data reinforce the interpretation that digital payment systems are increasingly substituting cash in retail contexts, particularly for small-ticket transactions where convenience and immediacy play a decisive role.

VII.RETAIL MICRO-TRANSACTION BEHAVIOUR

The table clearly shows a strong, sustained expansion of digital payments relative to cash withdrawals between 2018–19 and 2023–24. In 2018–19, UPI transactions grew by an extraordinary 481%, while ATM withdrawals increased by only 12%, marking the beginning of rapid digital expansion. Although UPI growth moderated to 134% in 2019–20, it remained significantly higher than ATM growth of 10%, reflecting continued acceleration in digital adoption. During 2020–21, the COVID-19 pandemic further strengthened the digital preference, with UPI growing by 78% compared to just 5% for ATM withdrawals, indicating a behavioural shift toward contactless payment methods.

In the following years, digital payments continued to dominate, despite a gradual decline in growth rates, driven by a larger transaction base. UPI growth rose again to 102% in 2021–22, while ATM withdrawals increased by only 7%, highlighting the expanding dominance of digital payments. In 2022–23 and 2023–24, UPI growth moderated to 86% and 40%, respectively, whereas ATM withdrawals remained low at 6% and 4%, respectively. This persistent gap between digital and cash growth reflects a structural shift in consumer payment behaviour, with digital transactions becoming the primary mode of retail payments in India.

VIII.BEHAVIOURAL INTERPRETATION

The macro-level expansion of digital payments aligns closely with key principles of behavioural economics. The continuous rise in UPI transaction frequency suggests that transactional friction in retail markets has significantly decreased. When payments become instant, seamless, and independent of physical cash, the cognitive effort required to complete a purchase is reduced. This decline in effort lowers the psychological threshold for spending, especially in routine and low-value transactions. Unlike cash payments, which involve counting money and physically handing it over, digital payments eliminate such processes, making transactions quicker and easier. As a result, consumers may engage in more frequent purchases, reflecting a shift toward higher consumption velocity in digital retail environments.

At the same time, the growth of small-ticket digital transactions indicates a weakening of the traditional "pain of paying." In cash exchanges, the visible loss of money often activates self-control mechanisms that restrain spending. Digital payments, however, abstract the payment experience and reduce the immediate perception of financial loss, encouraging spontaneous and habitual consumption. Nevertheless, digital systems also generate automatic transaction records, which improve financial monitoring and retrospective budgeting. Therefore, while UPI integration may increase

short-term spending frequency by reducing psychological barriers, it also enhances long-term financial awareness through accessible digital records. This dual effect reflects a complex behavioural transformation in India's evolving retail payment ecosystem.

IX.POLICY IMPLICATIONS

Policy responses to the rapid expansion of UPI and digital payment systems must balance technological innovation with responsible financial governance. Integrating digital budgeting tools within payment applications can help users monitor spending in real time, set limits, and receive alerts to reduce impulsive transactions, while financial literacy initiatives can educate consumers about behavioural biases and effective budgeting in cashless environments. At the institutional level, strong cybersecurity measures—including robust encryption, fraud detection systems, and data protection regulations—are essential to maintain trust and system reliability as transaction volumes increase. Additionally, retailers can use digital transaction data analytics to improve demand forecasting, inventory management, and personalised marketing. Together, these measures support a secure, efficient, and behaviourally informed digital payment ecosystem that promotes sustainable retail growth while safeguarding consumer financial well-being.

X.CONCLUSION

The study concludes that the rapid expansion of UPI has significantly transformed India's retail payment system, shifting consumer preference from cash to digital transactions. Macro-level data show that UPI transaction growth has consistently outpaced ATM withdrawal growth, indicating a structural change in payment behaviour. The integration of instant, seamless digital payments has reduced transactional friction and lowered psychological barriers associated with spending, particularly in routine and small-value purchases. This suggests that UPI has not only replaced cash in many retail contexts but has also influenced transaction frequency and consumption patterns. From a behavioral standpoint, more frequent transactions and faster consumption seem to be made possible by the reduction of the psychological "pain of paying" connected to digital transactions

Overall, the results indicate that UPI integration has changed consumer spending patterns in India's retail economy in addition to modernizing payment infrastructure. Digital payments present chances for increased financial transparency even as they promote convenience-driven purchasing. To further understand the long-term behavioral and macroeconomic ramifications of India's continuing digital payment transformation, future research may expand this analysis using econometric modeling or disaggregated sectoral studies. UPI integration reflects a dual behavioural effect—accelerating consumption velocity while enhancing financial transparency. However, the extent of this impact is influenced by digital financial literacy, trust, and demographic factors. UPI has emerged as a dominant retail payment instrument, reshaping consumer behaviour within India's evolving digital economy.

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