

## **CONSUMER PAYMENTS SURVEY OF INDIA: A CLOSER LOOK AT HOUSEHOLD FINANCES AND PAYMENT INSTRUMENTS**



**Anirudh Tagat, Mehmet Ozmen and Pushpa L. Trivedi**

# CONSUMER PAYMENTS SURVEY OF INDIA: A CLOSER LOOK AT HOUSEHOLD FINANCES AND PAYMENT INSTRUMENTS

*Anirudh Tagat*

PhD Scholar, Department of Humanities and Social Sciences,

Indian Institute of Technology Bombay, Powai, Mumbai; and School of Mathematics,  
Monash University, Clayton, Australia.

[anirudh.tagat@monash.edu](mailto:anirudh.tagat@monash.edu)

*Mehmet Özmen*

Faculty of Business and Economics, University of Melbourne, Melbourne, Australia.

[mehmet.ozmen@unimelb.edu.au](mailto:mehmet.ozmen@unimelb.edu.au)

*Pushpa L. Trivedi*

Department of Humanities and Social Sciences, IIT Bombay, Powai, Mumbai.

[trivedi@hss.iitb.ac.in](mailto:trivedi@hss.iitb.ac.in)

**Acknowledgement:** This report has been completed under the supervision and guidance of Mehmet Özmen, Pushpa Trivedi, and Gregory Markowsky as part of the NCAER National Data Innovation Centre student project supervised by faculty during the period September 2018-August 2019. This report has benefited immensely from discussions with Ayushi Bajaj, Nikhil Damodaran, Pushkar Maitra, Hansika Kapoor, and Nishith Prakash, and participants at the NCAER Seminar. The authors are also grateful to Sonalde Desai, Santanu Pramanik, and Pallavi Chaudhuri for their helpful comments and feedback on the study design and findings. All errors are solely attributable to the authors. This project was completed with the support of the NCAER-NDIC Student Research Grant and a Department Grant from the School of Mathematics, Monash University. The views presented in this report do not necessarily reflect those of the supervisors, or any of the institutions involved in supporting this project.

**Funding Support and Disclaimer:** This research is supported by the National Council of Applied Economic Research through the NCAER National Data Innovation Centre. The views presented in this paper are those of the authors and not those of NCAER or its Governing Body. Funding for the NCAER National Data Innovation Centre is provided by Bill & Melinda Gates Foundation.

**Suggested Citation:** Tagat, Anirudh, Mehmet Özmen, and Pushpa L. Trivedi. (2020). “Consumer Payments Survey of India: A Closer Look at Household Finances and Payment Instruments”, Report submitted to NCAER National Data Innovation Centre, New Delhi: National Council of Applied Economic Research.

## Contents

Abstract	4
1. Introduction	4
2. Literature	5
3. Data and Summary Statistics	13
3.1. Approach	14
3.1.1. <i>Methods of Payments Survey (MoP; Appendix A)</i>	15
3.1.2. <i>Payments Diary (PD; Appendix B)</i>	16
3.2. Sampling Method	17
3.2.1. <i>Pilot</i>	18
3.3. Summary Statistics	21
4. Empirical Strategy	30
4.1. Cash Use	30
4.2. Payment Choice	32
5. Results	34
5.1 Cash Use	34
5.2. Payment Choice	37
6. Conclusions and Implications for Policy	41
References	42
Appendix A: Methods of Payment Survey Questionnaire	46

Appendix B: Payment Diary Questionnaire	57
Appendix C: Memory Aid and Instructions	68
Appendix D: Results of the First-Stage Probit Estimation	73

### **List of Tables**

Table 1: Sample Size for MoP and Payment Diary	18
Table 2: Survey Design Summary—Comparison with Other Countries	20
Table 3: Summary Statistics of Socio-demographic Variables (MoP)	22
Table 4: Estimation Results of the Cash Held	35
Table 5: Estimation Results of the Payment Method	39

### **List of Figures**

Figure 1: Distribution of Sample by Monthly Income for MoP	23
Figure 2: Payment Instruments Preference Ranking (Payments Diary)	24
Figure 3: Assessment of Characteristics of Payment Instruments (MoP)	25
Figure 4: Denomination-wise Cash Holdings by Income Groups (MoP)	26
Figure 5: Median Transaction Amounts by Day of the Week (PD)	27
Figure 6: Average Transaction Amounts by Payment Instrument (PD)	28
Figure 7: Distribution of Use of Payment Instrument by Purpose of Payment	29
Figure 8: Distribution of Use of Payment Methods by Transaction Amount Quintile (>75%)	

## **Abstract**

This paper provides first evidence of the determinants of consumer payment preferences and prevailing cash usage for transactions using the novel payment diary data in the Mumbai Metropolitan Region Area of India. The project adapted methods of payments and payment diary surveys from other countries to the Indian context to investigate how payments are made in India. Consistent with the macroeconomic indicators of currency demand, the sample in the paper shows the domination of cash use for transactions, even with the advent of non-cash alternatives and policy measures to transition India to a less-cash use economy. The empirical findings suggest that cash held by individuals is a function of a range of socio-demographic factors, behavioural parameters, and the cost of accessing cash (that is, the distance to the closest automated teller machine [ATM] or bank). In turn, the preferences for cash as a method of payment are found to vary significantly by the size and purpose of the transaction, by whether merchants accepted non-cash alternatives, and perceptions of the usefulness of cash. This study is relevant for policy stakeholders such as the Reserve Bank of India, which may wish to facilitate the use of digital payment systems in the near future.

*JEL Codes:* D12, D14, E41, O23

*Keywords:* Currency Demand; Payment Methods; Digital Payments; Behavioural Economics

## **1. INTRODUCTION**

In November 2016, the Government of India and the Reserve Bank of India (RBI) passed and implemented a law to deem two high-value currency notes (₹500 and ₹1000) invalid overnight. The resulting policy, popularly known as demonetisation, was aimed at tackling the issue of counterfeit money being used in the parallel economy as well as for transitioning a traditionally cash-dependent India to a less-cash economy. This involved significant boosts to alternate payment mechanisms such as mobile banking as well as electronic wallets and credit/debit cards.

There is little past evidence in India on what determines payment choices and cash use at the household or individual levels. This is largely on account of the lack of representative or robust data, which is why researchers (Agarwal et al., 2019) have made use of proprietary data, such

as grocery store data, to assess changes in payment preferences over time, particularly in the context of assessing the economic effects of demonetisation . In the case of Agarwal et al. (2019), prior cash dependencies induced more digital payments post-demonetisation and also caused over-spending.

Furthermore, there is no clarity regarding the determinants of persistent cash use in India, at least at the individual level (see also Nachane et al. 2013). In order to ensure that policies such as demonetisation have the intended effects, it is important to first understand the preferences for specific payment instruments, particularly the various uses of cash. Theoretically, the earliest models of holding money (Baumol, 1952; Tobin, 1956) suggested that they were used for the following two reasons: (a) making payments; and (b) storing value. More recently, theoretical models of cash demand and payment preference have drawn on a variety of factors, such as the availability of automated teller machines (ATMs), banking facilities, and merchant acceptance of digital payment methods (Alvarez and Lippi, 2009).

In this context, the RBI's Vision for Payment and Settlement Systems in India (2018b) expects a decrease in paper-based clearing systems such as cheques, and an increase in the use of electronic payment systems such as electronic transfers, card payments, and mobile banking in India. Indeed, as the recent payment systems data from the RBI shows, there is an upward trend for digital payments in India, particularly for mobile banking transactions, which exceed that of debit cards used at point-of-sale machines (Bajaj and Damodaran, 2018; Tagat and Trivedi, 2020). However, cash use remains persistent, though the use of debit cards at ATMs has been steadily rising post-demonetisation.

Studies elsewhere have discussed the 'puzzle' of cash use in an increasingly digitised world of payments, particularly in India (Bech, et al., 2018). The only large-scale survey of the manner in which payments are changing in India comes from the People Research on India's Consumer

Economy (PRICE) survey. The report suggests that the use of cash is still predominant in India, and that respondents (who were mainly Delhi residents) preferred it as it allowed them to negotiate and transact quickly (Mazzotta et al., 2014). India's share of currency in the national income (as measured by its Gross Domestic Product, or GDP) is high relative to other developed and similar developing countries, at 12 per cent, as of 2019. Furthermore, as of 2018, there were reports of nearly ₹13,362 per capita of currency circulating in the economy, predominantly in high-value (>₹500) bank notes (Reserve Bank of India, 2018a). As Rogoff (1998) suggests, it is less likely that such high-value bank notes are used in transactions. Thus, it becomes important to assess the determinants of cash use specific to India.

We propose a microeconomic approach using recently collected individual data on transactions and payments in Mumbai, India. Using the payments diary approach for measuring payment preferences has been common in a range of developed countries in Europe, as well as in the United States, Canada, and Australia (Bagnall et al., 2014). By capturing transactions-level data for each individual, one is able to make inferences regarding the motivations for using a particular payment instrument. In this study, we use micro data to explain cash usage (that is, the transactions demand for cash)<sup>1</sup> as a function of the availability of other payment instruments, acceptability of other instruments by merchants, and other price and behavioural factors. To the best of our knowledge, this is the first exploration of the transactions demand for currency and payment preferences in India (and possibly in a developing country context) using payment diaries. We explain it by using not just the traditional factors associated with payment choice (including the availability of ATMs, and alternate instruments, among other things) but also behavioural factors such as risk aversion, time preference, and qualitative questions on economic preferences. The study serves as a starting point for a more

---

<sup>1</sup> Pilot studies indicated that individuals were not open to disclosing details of the cash stored in their residences, offices, or elsewhere, so this study has been unable to explore the store of value function of cash directly, outside of the cash stored in their wallets, which is presumably for transactions purposes. This is acknowledged as a limitation of the analysis.

comprehensive investigation of how such factors can affect payment choice and cash use across India.

The remainder of the paper has been organised as follows. Following this introduction, Section 2 details the literature on payment preferences and determinants of cash use, focusing on India as a special case. Section 3 describes the data collected and provides summary statistics. Section 4 contains an overview of the empirical strategy and a discussion on econometric issues. Section 5 contains the key findings and results of the model for payment preferences and cash use. The paper concludes with Section 6, which offers recommendations for policy and future research directions.

## **2. LITERATURE**

In order To overcome issues of aggregation and to examine a fundamentally household or individual-level decision of payment choice, studies typically adopt payment diaries (or consumer preferences surveys) to understand how consumers use cash (Arango et al. 2015; Borzekowski, et al. 2008; Klee, 2008).<sup>2</sup> Boeschoten and Fase (1992) were the first to adopt a qualitative approach for measuring currency demand indirectly. In line with other evidence, they found that a significant share of transactions is driven by small traders. Similar to findings in macroeconomic cross-country estimates, the authors find that older individuals are more likely to hold higher denomination currency for savings. As with any microeconomic data set collected using surveys, the single largest concern with regard to use of such data relates to the efficacy of self-reporting by respondents (where such data is even available). Typically, studies often account for measurement errors in their estimates to overcome issues related to self-reporting (Jonker and Kosse, 2009). There have been many such studies that employ

---

<sup>2</sup> A comprehensive collection of studies that use the payment diaries method can be found in Bagnall et al. (2014). A key argument in favour of the payment diary method of micro data collection is that unlike survey data, it does not suffer from recall bias.

microeconomic and transactions data to study the effect of alternative payment instruments on the demand for currency. Such studies have been carried out in a variety of geographical and cultural contexts, ranging from Italy (Attanasio et al. 2002) to France (Bounie and François, 2006) to the USA (Briglevics and Schuh, 2014).

Italy is often considered as a case for understanding the microeconomic demand for currency, given its median position in terms of the currency to GDP ratio relative to other countries in the European region (8.8 per cent in 2001). Attanasio et al. (2002) use a novel household-level survey to explore the impact of the adoption of new transaction technologies and holding of other interest-bearing assets. Data from 1989 and 1995 have been used to estimate a model of household demand for currency explained by the average household consumption expenditure, interest rates on interest-bearing assets, and additional socio-economic controls such as literacy, age composition, and gender of the household head. Card ownership (or bank account holdings) is also included.<sup>3</sup> Attanasio et al. found that the nominal interest rate and consumption were both positively related to having a bank account as well as an ATM card. They also computed the welfare effects of these adoption costs and suggested that they are not significantly large (under 0.1 per cent of consumption).

Lippi and Secchi (2009) revisited the role of technology in determining the currency demand, motivated by a stable currency-to-GDP ratio in Italy. During the periods when the currency change took place (1993 to 2004), they found that only a 2 per cent increase in households having bank accounts (86 per cent in 2004), but a 22 per cent increase in usage of ATMs, going up from 24 per cent in 1993 to 56 per cent in 2004. In line with previous results, the ratio of cash to expenditure for households having an ATM card declined from 85 per cent in 1993 to 69 per cent in 2004. The authors estimate this change in currency demand using the density of

---

<sup>3</sup> The authors account for endogeneity in technology adoption but use the same determinants in the money demand equation, raising concerns of under-identification of the estimates. They instrument the technology adoption decision with the number of ATM points in the area of residence and control for distance to bank.

bank branches and ATMs to reflect that households tend to minimise the opportunity cost of holding cash in the presence of withdrawal limits imposed by ATM networks, that is, a limit of five withdrawals per month from ATMs of banks other than the home bank. They interact this technology variable with the interest rates to show that an increase in ATM density reduces the demand for cash.

This analysis was replicated for US panel micro data between 2008 and 2010 by Briglevics and Schuh (2013). The US economy during this period provides many interesting insights, given the occurrence of the 2008 financial crisis as well as the prevalence of near-zero interest rates. They find that cash demand for users with credit cards is interest-inelastic, particularly so since credit card debt is considered to be revolving debt. Their findings imply that interest rates on credit card debt may also be an important (but indirect) component in determining currency demand.

Bagnall et al. (2014) use cross-country data from seven industrialised economies—Australia, Austria, Canada, France, Germany, Netherlands, and the USA. Given that payment diaries in each of these countries was collected with heterogeneity, it is important to harmonise the data such that they reflect the same set of variables. This method, therefore, allows researchers to understand the relevance of cash in modern transactions where innovations in payment methods are rapidly taking place. Cross-country analyses might differ from traditional macro-level analyses due to variations in the supply of services across countries, while the transactions volumes could also vary endogenously. The authors also suggest that payment diaries could be useful for measuring within-consumer heterogeneities, since the same commodity could be purchased by the same customer using different methods.

In order to ascertain the external validity of data collected through novel methods, one can compare these data with national-level data that is publicly available. The diary-to-aggregate-

expenditure ratio varies from 0.72 to 1.16, indicating that though the measure is noisy, it is not exceptionally under-representing consumption expenditure (Bagnall et al., 2014). Grocery expenditures account for a large share of all transactions (about 1.4 transactions per day). In the first two quantiles of consumption expenditure, the authors found (across countries) that more than 50 per cent of all transactions were carried out using cash. The authors defined the precautionary motive for holding money as the ratio between the cash holdings at the time of withdrawal to the average/median currency holdings. The second measure of this is the ratio of the withdrawal amount to the average/median currency holdings. However, it is unclear if cash management (handling or having cash) spurs such cash usage or otherwise.

The key findings related to currency demand in studies that use payment diaries correspond to macro-level estimates. The choice of cash versus non-cash is determined by transaction size, cash balances held, socio-demographic characteristics, consumer perceptions of acceptance of cash, and non-cash transactions. Similar to Kenny (1991), Bagnall et al. (2014) report that certain socio-demographic characteristics (such as age) contribute to the use of cash. The greater the value of the transaction, the lower is the likelihood that cash will be used. Intuitively, if cards are accepted (or perceived to be accepted), the likelihood of using cash for that particular transaction also declines. Clearly, customer preferences for cash, that is, those who think cash is easy to use, also significantly increase the likelihood of using cash.

Despite the strength of the results and the novelty of the method, there are certain drawbacks that one should consider, particularly in the Indian context.<sup>4</sup> First, it is hard to distinguish between cash management and acceptance of cards to hold cash, and there is often little to no carry forward information available from respondents, that is, what their past period cash

---

<sup>4</sup> That is not to discount the substantial qualitative work using financial diaries in India. Dattasharma et al. (2016) provide an overview of the Ramanagaram Financial Diaries, which measured the financial lives of the poor using detailed record-level data that was collected daily over an unspecified period of time. Although this study does not specifically focus on payment instruments, it does provide some motivation for how informality affects savings and consumption decisions, particularly in rural India.

balances were. Finally, it is possible that consumers have a reservation level of cash holdings (Sprenkle, 1993), which could remain invariant to the changes in interest rates, alternative payment mechanisms, and changes in payment policies. In this case, data on micro-level transactions could uncover cash balances held for precautionary motives and estimate currency demand using this reservation level as a base.

Some studies suggest that behavioural factors such as risk aversion of agents in an economy can also play an important role in the demand for cash (Schreft and Smith, 2000). Although their model does not directly measure this, they propose that the transmission of monetary policy in a cash-dependent economy depends largely on the risk aversion parameters. It has already been seen in the Indian context that over-spending can be induced by varying payment choice, particularly when non-cash alternatives are used (Agarwal et al., 2019). However, even less information is available about factors such as time preference (discounting future gains for smaller gains, like present bias) and qualitative preferences justifying economic dishonesty (Inglehart et al., 2014). Past studies on payment preferences (Bounie and François, 2006; Schuh and Stavins, 2010) point toward the potential of such factors in accounting for the preference for cash over alternatives.

There is also descriptive evidence that perceptions and attitudes toward payment instruments could influence the choice of payment method (Borzekowski et al., 2008). We explored this using the methods of payment (MoP) survey that also collects similar data. Some experiments on consumer behaviour in this regard prove helpful; Soman (2001) shows that rehearsal (writing down the amount paid), immediacy (for example, debit cards where amounts are deducted immediately), and 'recency' (past payments) affect the choice of payment instrument as well as the final purchase decision. Thus, credit cards (which show the amount paid, but wherein the funds are depleted with a delay) might interact with time preference and risk aversion at the time of payment. Similarly, Chatterjee and Rose (2012) find that participants

primed with credit cards are more likely to think about the benefits of a product when considering purchase, as compared to cash users who are likely to consider the costs more. Thus, the salience of the payment decision, the amount, and the choice of payment instrument can all be influenced by behavioural factors (Raghubir and Srivastava, 2008). Although one is unable to measure these preferences using incentivized experiments, measures of risk aversion, time preference, and trust from the Global Preferences Survey (Falk et al., 2018) and the World Values Survey (Inglehart et al., 2014) have been adopted in this study.

### **3. DATA AND SUMMARY STATISTICS**

This sub-section focuses on the recently collected data on consumer payment preferences and prevailing cash usage for transactions using payment diaries. To the best of our knowledge, such a data set is the first-of-its-kind on the use of various payment mechanisms such as debit/credit cards, electronic bank transfers, mobile wallets, and cash, on which currently only macro evidence exists for India. We propose to make use of this data to provide estimates of the demand for cash in the presence of alternate payment mechanisms as well as to comment on the rate of technology adoption of relatively new payment instruments in India. A preliminary empirical framework has been presented below. Payments diary data is complemented by data assessing attitudes and perceptions related to alternate payment mechanisms, in traditionally cash-reliant India. The potential implications of the study include informing RBI's future policies for preparing to transition to a less-cash economy.

Specifically, using the Consumer Payments Survey of India (CPSI) data we aim to: (a) provide a novel understanding of the preferences for cash as a payment mechanism and individual factors driving this preference; (b) generate the first-of-its-kind public-use data set of payment methods in a developing country context, particularly so for India, where there has been a

recent push toward a less-cash society; and (c) explore the attitudes and preferences towards the use of alternate and emerging payment mechanisms using a small urban sample from India.

Given the limitations of the use of survey data to measure currency demand, there have been innovations in the collection of transactions and currency data at the individual or household level. One such method involves the use of payment diaries, wherein respondents are required to maintain a record of each transaction over a period of one to seven days, including: (1) size of the transaction; (2) purpose of the transaction; (3) restrictions on payment choice and the process; and (4) sector of the merchant. A comprehensive collection of studies that use the payment diaries method can be found in Bagnall et al. (2014).<sup>5</sup> A key argument in favour of the payment diary method of micro data collection is that unlike survey data, it does not suffer from recall bias. Further, since presently there is no other such data for Indian consumers, it bridges a crucial micro data gap. There is also a dearth of data addressing attitudes towards cash and other modern payment instruments.<sup>6</sup> This method, therefore, allows researchers to understand the relevance of cash in transactions where innovations in payment methods are rapidly taking place.

The CPSI consists of two components: (i) pre-diary questionnaire about the demographic characteristics of respondents, and their preferences and attitudes about different payment methods, and (ii) a three-day payments diary tracking information on each transaction carried out.

---

<sup>5</sup> The key findings related to currency demand in studies that use payment diaries correspond to macro-level estimates. The choice of cash versus non-cash is determined by transaction size, the cash balances held, socio-demographic characteristics, consumer perceptions of acceptance of cash, and non-cash transactions.

<sup>6</sup> A notable exception is an attitude towards cash survey conducted by People Research on India's Consumer Economy (PRICE) in New Delhi, Meerut, and four villages near Meerut in 2014 (Mazzotta *et al.*, 2014).

### **3.1. Approach**

In order to adapt the existing payment diaries to the Indian context, we began by surveying the existing material available on payment diaries in other countries. This included survey documentation (including questionnaires, coding booklets, and instructions manuals) for the United States of America (USA)'s 2016 Survey of Consumer Payment Choice (SCPC) and Diary of Consumer Payment Choice (DCPC); The Reserve Bank of Australia's Consumer Payments Survey (2016); and the Bank of Canada's Methods-of-Payment Survey (2009). Of these, detailed questionnaires and associated survey material were available only for the US in their entirety, and were hence used as a starting point.

This was followed by identification of the broader set of available payment instruments for India from secondary sources. The sources used are based on recent reports such as the Cost of Cash in India (Mazzotta et al., 2014) and RBI payments data (RBI, 2018a). Typically, methods of payments surveys rely on gathering data through the use of online surveys, thereby requiring a large fraction of their sample to have access to the Internet. Given that Internet penetration and digital literacy in India remain low (even in urban areas), the survey was adapted to a pen-and-paper format, with trained enumerators canvassing data. One of the major challenges in this transition was to follow skip patterns to capture consistent data, particularly in the case of payment diaries.

#### ***3.1.1. Methods of Payments Survey (MoP; Appendix A)***

This has been adapted to the Indian context from the United States Survey of Consumer Payment Choice (SCPC, 2018) and the Canadian Methods of Payments Survey (2009). The methods of payments survey first collects demographic information, such as age, sex, personal and household income, family status, household size, location, employment status, occupation, and education level. Broadly, the areas covered by the survey include: (a) available payment

instruments; (b) preferences and attitudes towards different payment methods; (c) income; (d) behavioural measures of time and risk preference, social norms related to payments, and items adapted from the World Values Survey aimed to elicit attitudes toward economic and social issues. This data was collected using the Computer Assisted Personal Interviewing (CAPI) interface.

### ***3.1.2. Payments Diary (PD; Appendix B)***

A sub-sample of respondents among all those participating in the MoP were asked if they would like to participate in the payment diary, which was incentivised. If they agreed, informed consent was sought, and a pen-and-paper version of the payment diary was deployed at their residence. A memory aid (Appendix C) was also provided (along the lines of the United States Diary of Consumer Payment Choice) to enhance completion rates. The memory aid provides examples of transactions with details of how to record these in the payment diary appropriately. The respondents were asked to track all purchases, bills, and cash movements over an assigned three-day period,<sup>7</sup> and to enter them into an online or paper survey every evening. In line with past payment diaries (such as the Diary of Consumer Payment Choice, USA), the respondents were asked to report income payments and cash/bank balances the night before the first diary day (Diary Day 0).

Past evidence (for example, Jonker and Kosse, 2009; Schmidt, 2011) on payment diaries indicates that three days is the optimal time period for a payment diary to ensure reasonably high completion rates (<15 per cent attrition). The transactions for payment diaries were, therefore, captured over a period of three days, well after the new financial year began (for example, May 2019) to avoid any bias in transaction characteristics due to the time of the year.

---

<sup>7</sup> Given that the diary period is only three days, we do not expect any heterogeneity in response quality across days due to diary fatigue, though we could potentially control for this by assigning the immediately preceding or forthcoming days for a few respondents. To further control for fatigue effects, we can incorporate skip patterns that are intuitive (in line with the DCPC, USA).

The payment diary was translated into Hindi and all relevant transaction entry codes, including payment method codes and transaction purpose codes, among others, were provided alongside the diary to enhance the comprehension of questions. The memory aid was developed to complement the data requested in the payment diary, and was provided to all respondents who agreed to participate in the PD.

### **3.2. Sampling Method**

The study received approval from the Monash University Human Research Ethics Committee (MUHREC) in April 2019 as a low-risk project. The sample was restricted to Maharashtra, specifically urban, peri-urban, and rural Mumbai (in the Mumbai Metropolitan Region, or MMR) so as to ensure quick and consolidated data collection, as well as limited variation in contextual factors, such as the payments infrastructure and commercial activity.

The sampling design purported to ensure generalisability to the urban Indian population, given the scale of resources at hand as well as the intention to establish validity of the payments diary method in India. Proportional quota sampling was used to determine recruitment targets that covered key demographic variables, including age, sex, monthly per capita consumption expenditure, and location. The recruitment targets were constructed on the basis of data from the National Sample Survey (NSS) 72<sup>nd</sup> Round, collected in June 2014-15. The target sample size was 800 individuals across MMR, of which 400 were invited to participate in the payments diary. Thus, data on the PD and MoP were collected from 400 individuals.

Proportional samples were constructed from the NSS 72<sup>nd</sup> Round for the MMR region, and sample sizes for each cell (location, age group, sex, and income) were determined. The overall sample size is presented in Table 1.

**Table 1: Sample Size for MoP and Payment Diary**

<b>MoP (CAPI)</b>	<i>&lt;INR 15k</i>		<i>INR 15k-30k</i>		<i>INR 30k-50k</i>		<i>&gt;50k</i>		<b>Total</b>
	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>	
18-40	69	52	52	47	55	57	38	45	415
Over 40	55	49	42	41	58	52	48	44	389
Total	124	101	94	88	113	109	86	89	804
<b>Payment Diary (Pen-and-paper)</b>									
18-40	34	26	26	24	27	28	19	22	206
Over 40	27	25	21	20	29	26	24	22	194
Total	61	51	47	44	56	54	43	44	400

Source: CPSI 2019.

### **3.2.1. Pilot**

In order to ensure consistency in the data collected, pilot calls for the MoP and PD were launched in mid-April 2019 with 10 respondents. Data collection was done by Hansa Research Pvt. Ltd., a market research agency contracted to collect data for this project. The sample was collected locally, and the data collected was assessed for missing values as well as non-response. Following is a delineation of specific learnings from the field test that were then incorporated in the questionnaire design and implementation of the survey.

1. In some rural/peri-urban samples, respondents did not agree to reveal the number of earning members and their income initially.

- This question was retained and the instructions manual contained added information on how to proceed when households are hesitant to provide essential socio-demographic information.

2. Respondents were apprehensive about providing mobile numbers as they were fearful of misuse with bank one-time passwords being delivered to this number.

- Field staff were trained to assure participants that mobile phone numbers were being collected only to send reminders or to ensure completeness of the data. Alternatively, field staff were instructed to collect mobile phone contact details only if the respondents agreed to participate in the PD.

3. Questions related to sensitive personal financial information such as value of primary home, value of primary home loan, cash stored elsewhere in the house/office, and cash/bank balances did not receive any responses. Many respondents refused to share this information and enumerators proceeded without recording this data.

- As a result of the lack of willingness on the part of the respondents to provide data on these aspects of cash usage/storage, as well as financial information, the questions were removed from the revised instrument. Furthermore, field staff spent additional time in attempting to convince respondents that such information would be anonymous and confidential, leading to lower completion rates.
- Given the proportionate sampling approach adopted, specific sub-samples (for example, male respondents aged 18-40 years and earning more than INR 50,000 per month) were challenging to access. This step was thus attempted and completed with repeat visits.

The period of data collection was designed and planned in such a way as to commence after declaration of the results of the Lok Sabha (General) Election 2019 on May 23. The announcement of the results could potentially have had implications for truthful responses in the survey, and could also have affected transactions recorded in the payment diary. Hence, the data collection period was between May 24 and June 30, 2019. The final sample exceeded the planned sample for both the MoP as well as the PD, with the final sample of 928 and 403, respectively. Table 2 provides a summary of the CPSI in comparison with other similar surveys across the world from where it was adapted. Since the sample size is much smaller (around a third of the sample considered in other country surveys), the number of transactions is also smaller. However, the average number of transactions from the CPSI is 10.03, which is much higher when compared to other three-day PDs such as the Canadian and US payments surveys, which have data on 4.82 and 5.65 transactions per person (over the three-day period), respectively. Notably, in our sample, the share of cash transactions is 94 per cent, closest only to Germany (81 per cent). This is in line with a macro indicator of the respective country such as the currency-to-GDP ratio. For example, at 12 per cent, India’s currency-to-GDP ratio is nearly double that of USA and Canada, but similar to that of France and Germany.

**Table 2: Survey Design Summary—Comparison with Other Countries**

	<b>Australia</b>	<b>Canada</b>	<b>France</b>	<b>Germany</b>	<b>USA</b>	<b>India (CPSI)</b>
Year	2010	2009	2011	2011	2012	2019
Month(s)	October-November	November	October-November	September-November	October	May-June
Data collection method	Paper	Online/Paper	Paper	Paper	Online/Paper	Paper
Sampling frame (age)	18+	18-75	18+	18+	18+	18-60
Diary length (days)	7	3	8	7	3	3
Respondents	1240	3283	1106	2098	2468	403

Total transactions	18,110	15,832	10,759	19,601	13,942	4054
Share of cash transactions (%)	62.0	50.1	58.0	81.0	48.7	94.4
<i>Percentiles of Transaction Amounts</i>						
10 <sup>th</sup>	NA	C\$ 2.5	€1	€3	US\$2.3	₹ 40
50 <sup>th</sup>	A\$ 13.8	C\$ 16.9	€1.8	€15	US\$13.0	₹ 150
90 <sup>th</sup>	NA	C\$ 80	€2	€3.7	US\$65.0	₹ 563
Average number of daily transactions per person	2.08	1.7	1.5	1.4	1.5	3.64
Average cash holdings	A\$ 66.3	C\$ 84.2	€2.4	€103.1	US\$56	₹ 2022
Average daily expenditure per person	A\$ 70.8	C\$ 65.7	€8.2	€10.5	US\$49.2	₹ 286.95

Source: Arango-Arango et al., 2017; Bagnall et al., 2014; Chong et al., 2011; and authors' own calculations (India).

### 3.3. Summary Statistics

This section describes data from the MoP and the PD collected from a random proportionate sample of 928 individuals for the MoP, and the sub-sample of 403 individuals who participated in the PD.<sup>8</sup>

<sup>8</sup> The break ups of the location-wise distribution of the sample are as follows:

Gender	Income Group (INR, Monthly Income)				
	<15k	15-30k	30-50k	50k	
<i>Kalyan Dombivli</i>					
Female		170	455	100	175
Male		110	115	220	55
<i>Mira Bhayandar</i>					
Female		320	350	245	230
Male		185	140	230	200
<i>Mumbai</i>					
Female		1,090	1,850	2,145	1,415
Male		1,605	1,350	1,365	1,330
<i>Navi Mumbai</i>					
Female		30	50	160	140

Table 3 contains the summary statistics of the basic sample characteristics from the PD and the MoP. Figure 1 displays the income distribution for the full sample (MoP). The study sample contained approximately 48 per cent females, and 64 per cent of the members of the sample were married. There were, on an average, 4.6 members in a household, of whom 1.73 were earning members. A large majority of the sample was Hindu (86 per cent), and there was a mix of castes in the sample, with the majority belonging to the upper castes (43 per cent). Nearly 86 per cent of the sample reported owning a smartphone, and 88 per cent of the respondents to the MoP reported owning a bank account. Although debit card ownership was high (71 per cent), only a small fraction had credit cards (12 per cent) and electronic wallets (23 per cent). As per the sampling strategy, 28 per cent of the individuals in the sample reported earning a monthly income below ₹15,000.

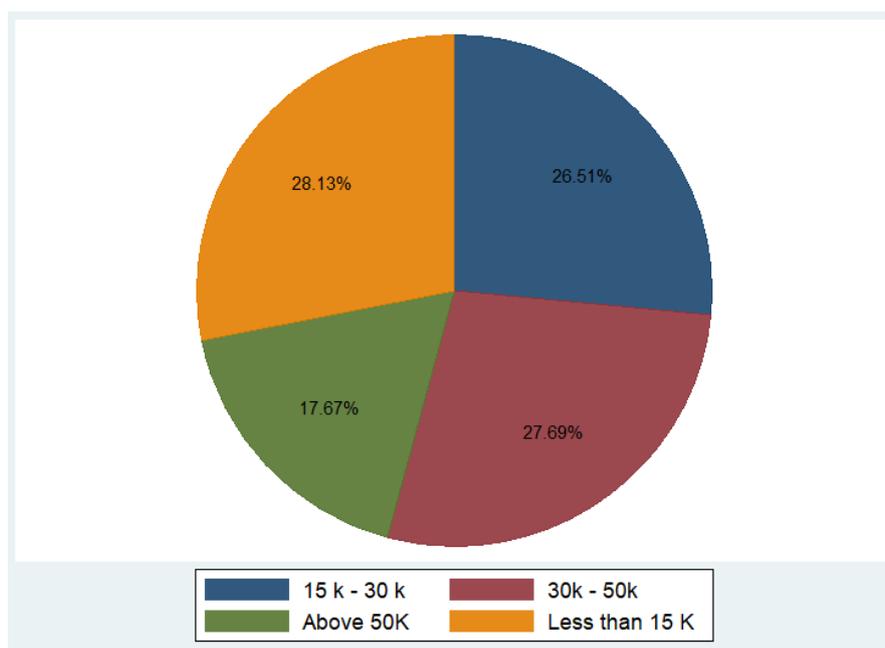
**Table 3: Summary Statistics of Socio-demographic Variables (MoP)**

Variable	Mean/Proportion	SD	Minimum	Maximum
Age	35.29	10.99	18	74
Female	0.48	0.50		
Married	0.64	0.48		
Household size	4.61	1.70	1	12
Number of years of education completed	18.21	5.35	3	25
Number of earning members	1.73	0.93	1	10
Hindus	0.86	0.35		
OBCs	0.13	0.34		
Upper Castes	0.43	0.49		
<i>Thane</i>				
Male	55	70	150	195
Female	270	245	410	255
Male	170	150	225	70
<i>Ulhasnagar</i>				
Female	285	190	415	270
Male	340	185	300	175

Scheduled Castes	0.18	0.38
Scheduled Tribes	0.26	0.44
Salaried workers	0.52	0.50
Self-employed	0.23	0.42
Own a smartphone	0.86	0.35
Have a bank account	0.88	0.32
Own a debit card	0.71	0.45
Own a credit card	0.12	0.33
Have an e-wallet	0.23	0.42
Own house/property	0.66	0.47
Observations	928	

Source: CPSI 2019.

**Figure 1: Distribution of Sample by Monthly Income for MoP**

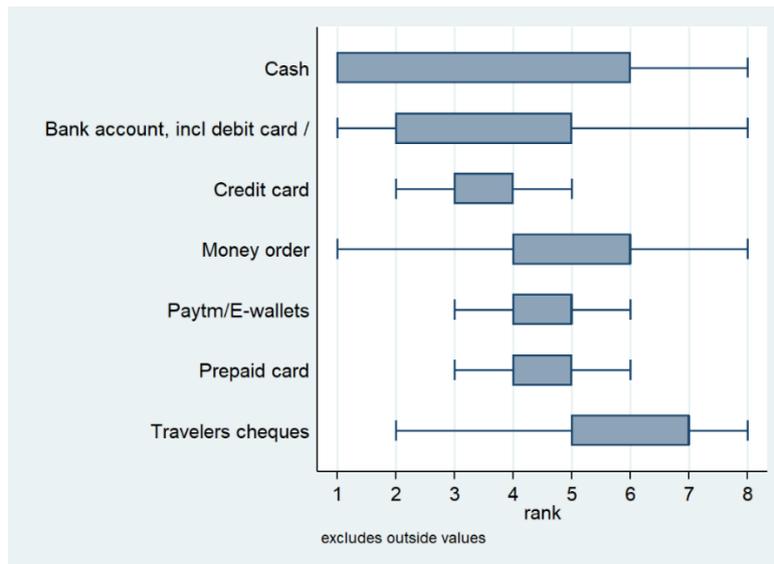


Source: CPSI 2019.

Figure 2 contains boxplots of the key payment instruments reported in the sample. The data reveals that cash remains the most frequently used option reported, with a median rank of 1, followed by debit cards/cheques at median rank 2, and thereafter credit cards. E-wallets had a

median rank of 5, suggesting a lower preference relative to the use of cash and card-based payment mechanisms. Approximately 50.4 per cent of the sample ranked cash as the most preferred option for transactions, which was followed by bank account (cheques, debit cards, or transfers) at 18.66 per cent, and 12 per cent reported “Other”.

**Figure 2: Payment Instruments Preference Ranking (Payments Diary)**



Source: CPSI 2019.

Note: “Other” instrument ranking excluded.

Figure 3 provides an initial overview of the assessment of various payment instruments used in India. The higher the average score, the more the number of respondents who agreed with the statement presented to them. A score closer to 3 implies ‘neither agree nor disagree’. It was found that respondents rated cash as a very secure, widely accepted, easy-to-set up, and convenient means of payment. Cheques and debit cards were closest in assessment of payment characteristics to cash, but were rated as costlier to use, on an average.

**Figure 3: Assessment of Characteristics of Payment Instruments (MoP)**

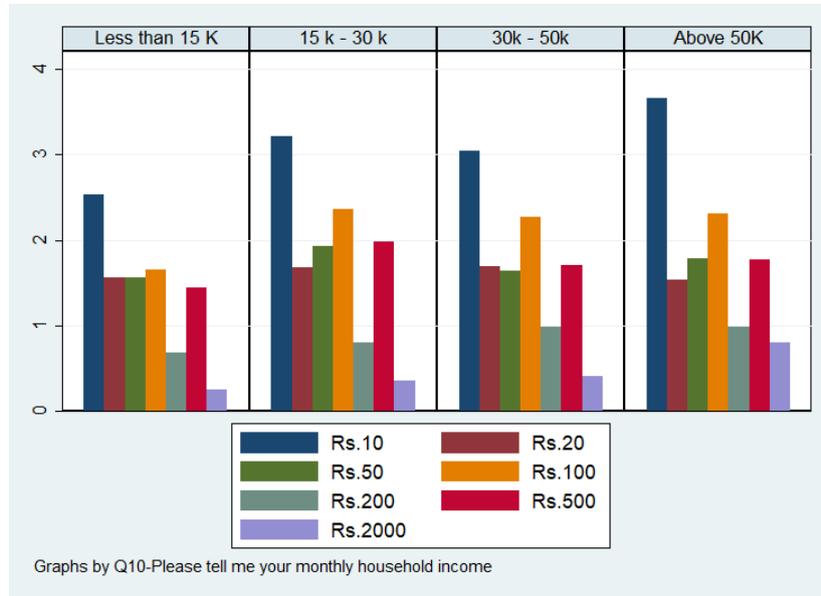


Source: Authors' calculations from CPSI 2019.

Data on denomination-wise cash holdings (prior to the start of the PD) are presented in Figure 4. The data shows that as income increases, there are higher cash holdings, in particular of the highest value bank note, that is, the INR 2000 note. However, holdings of the second largest-value bank note of INR 500 were stable across income groups, suggesting that this might be the more commonly held high-denomination bank note as compared to that of INR 2000. The relative ranking in use remained the same across income groups broadly, but at the highest

denominations, there was a substitution effect in use, potentially on account of the consumption of a larger diversity of goods/services.

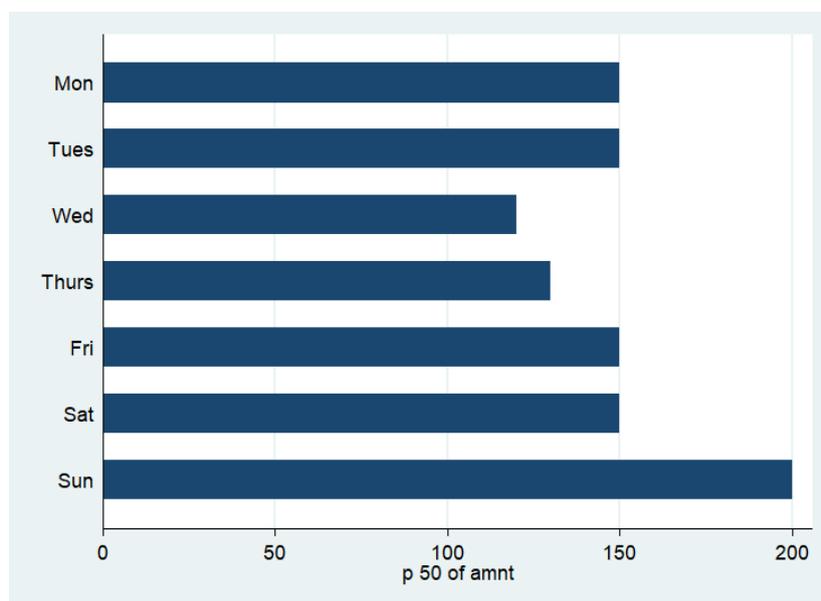
**Figure 4: Denomination-wise Cash Holdings by Income Groups (MoP)**



*Source:* Authors' calculations from CPSI 2019.

Figure 5 uses the PD data to show variations across days of the week for all transactions recorded. The median amount on Sunday was the highest, at INR 200, with the smallest median values of transactions being reported in the middle of the week (Wednesday and Thursday). This is likely to be a result of time available for transactions since much of our sample included earning members of the household.

**Figure 5: Median Transaction Amounts by Day of the Week (PD)**



*Source:* Authors' calculations from CPSI 2019.

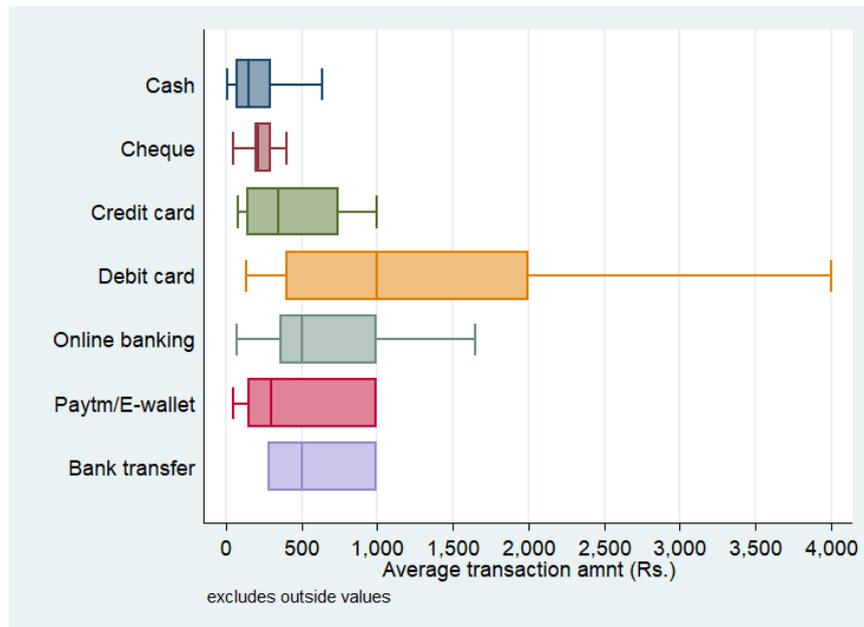
Figure 6 shows the variation in average transaction sizes across payment instruments. Indeed, as can be seen from past literature on the effect of payment mechanisms on spending (for example, Soman, 2001), the use of credit cards can induce over-spending.<sup>9</sup> Results from the CPSI suggest that the debit card is the payment instrument of choice for large transactions (the median of the average transaction size across three days was INR 1000). This figure also shows that cash is predominantly used for smaller value transactions (most of the transactions fall at or below the INR 250 mark). As only transactions-based demand for currency is being measured here, it is evident that the payment mechanism has much to do with the amount being spent. We deal with this empirically by estimating a model of payment choice in line with

---

<sup>9</sup> It can be counter-argued that the additional utility gained from the security provided by having a banking intermediary when purchasing expensive goods, both in terms of receipt of goods or dispute resolution (by reversing credit card payments), can induce the use of credit cards for higher value transactions. However, this is likely to vary by trust placed in the payment instrument (Figure 3).

Bounie and François (2006), accounting for the effects of transaction characteristics on the choice between cash and non-cash alternatives.

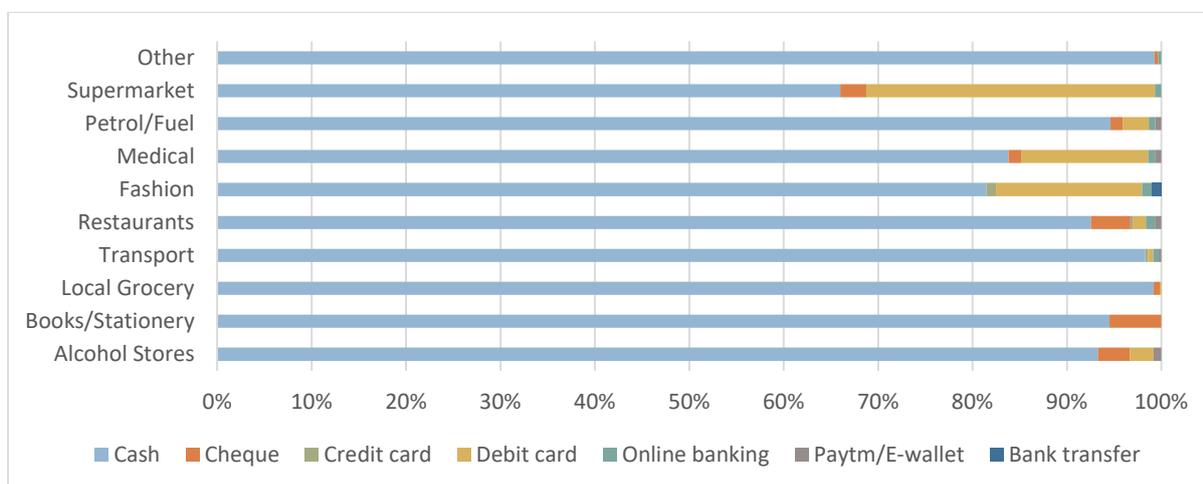
**Figure 6: Average Transaction Amounts by Payment Instrument (PD)**



Source: Authors' calculations from CPSI 2019.

Figure 7 shows the distribution of payment methods across purposes of payments. Cash was the predominant mode of payment across purposes (>65 per cent share), with supermarket shopping, medical expenses, and fashion/clothing shopping showing the most diverse modes of payments. In the case of both transportation (for example, paying for taxis, auto-rickshaws) and local grocery stores, non-cash alternatives were nearly never utilised. This could be on account of non-acceptance of other modes of payment in these heads of expenditure, especially since past evidence shows reluctance among small merchants in adopting and using newer payment technologies, even after demonetisation (Trachtman *et al.*, 2019).

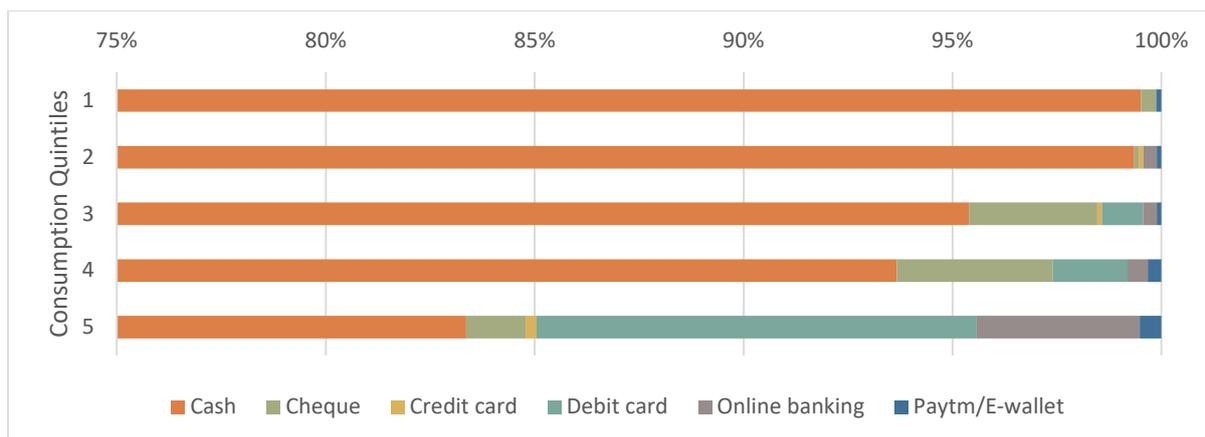
**Figure 7: Distribution of Use of Payment Instrument by Purpose of Payment**



Source: Authors' calculations from CPSI 2019.

Figure 8 shows a similar break-up of the modes of payment across transaction quintiles. Cash was again used in more than 75 per cent of all transactions across quintiles, and therefore the figure reflects the variation in payment modes in 25 per cent of all the transactions. As can be seen from Figure 6, cash is predominantly used in smaller transaction amounts, but as the transaction amount increases, a greater diversity of non-cash alternatives is observed. Nearly 12 per cent of all transactions in the fifth quintile were carried out in debit card, and another 3.5 per cent were carried out using Internet banking. As compared to the first two quintiles of transaction amounts, this represents the most variation in payment modes in the sample for this study.

**Figure 8: Distribution of Use of Payment Methods by Transaction Amount Quintile (>75%)**



Source: Authors' calculations from CPSI 2019.

## 4. EMPIRICAL STRATEGY

This section describes the empirical methods used to assess the preference for payment methods in India using CPSI. Data from both the MoP as well as the PD have been utilised to address this.

### 4.1. Cash Held

In order to assess the factors affecting cash balances in India, a model along the lines of the cash management theories cited in Arango-Arango et al. (2017) has been proposed. This includes a dynamic model of optimal cash holdings, where agents have the option of paying in either cash or credit (Alvarez and Lippi, 2017). The stock of cash held is then a function of the cost of accessing cash (in terms of either time or surcharges on withdrawals). The findings from this strand of literature suggest that payment choice is closely connected with cash held (a “cash first” heuristic), and it, therefore, becomes important to study the underlying factors affecting the cash held.

Following is a description of an empirical model corresponding to this theory of cash held as a function of socio-demographics, contextual factors (ATM availability) and ownership of other payment instruments, and behavioural parameters. These are estimated by ordinary least

squares regression (OLS), and are run in a hierarchical manner, with the full model presenting the results of all the factors hypothesised to be associated with cash held.

The socio-demographics included are age, squared age, the number of years of education completed, religion, caste grouping, household size, marital status, income group, and primary occupation. The second set of factors entering the model are related to contextual factors. This includes the distance (measured in time taken to access it) to the nearest ATM and the nearest bank branch. Literature has proposed that the cash held could also be a function of other instruments held, particularly if interest-receiving bank accounts are owned. To this end, other factors have been considered, including whether the individual owned a bank account that paid interest, credit card(s), debit card(s), electronic wallets, mobile banking applications, or Internet banking facilities. Finally, a range of behavioural factors has been included that could explain the precautionary motives for holding cash as well. These include whether the individual believes tax evasion to be justifiable (on a 10 point-scale, a higher value implying higher justification), trust (a dummy variable indicating if the individual believes that others can generally be trusted), patience and risk aversion (responses to Global Preferences Survey questions), subjective well-being, and favourable view of cash use in society (social norms).

Specifically, the reduced form model has been estimated as follows:

$$Cash_i = \alpha + \beta_1 X_i + \beta_2 Context_i + \beta_3 Payment_i + \beta_4 Behav_i + \epsilon_i \quad (1)$$

where,  $Cash_i$  is the cash held at the time of the survey (that is, Day 0 of PD), and is measured in rupees.  $X_i$  is the vector of socio-demographic variables outlined before;  $Context_i$  is the vector of two contextual variables of distance to ATM and bank branch;  $Payment_i$  is a vector of dummy variables, all taking the value 1 if a payment instrument was held (listed above), and zero otherwise; and  $Behav_i$  is a vector of behavioural variables consisting of time preference,

risk aversion, justifiability of tax evasion, social norms, and subjective well-being. To check for robustness, the log form of  $Cash_i$  has also been used.

Behavioural measures are derived from measures adapted from the Global Preferences Survey (Falk et al., 2018) and the World Values Survey (Inglehart et al., 2014). Since it was not feasible to implement incentivised games or lottery tasks to measure these factors, qualitative measures that are found to be highly correlated with the empirical ones have been employed. Time preference is measured by the response to Question D.1 (a higher score implying more patience or less present bias; see Appendix), the risk aversion measure was derived from C.1 (a higher score meaning lower risk aversion), and trust was measured from responses to B.1 (re-coded to take a value of zero if the response was “Need to be careful”).

The econometric model estimating Equation (1) is potentially well-identified, and the estimation provides a first look at assessing the magnitude and direction of the associations between specific variables and cash held within the sample. For a true causal estimate, one would also need to take into account the cash held at the end of the payment diary period of three days, which may be influenced by other factors, including the number of transactions during the PD period, among others. This also necessarily restricts our sample to only a subset of the MoP respondents, who were also invited to participate in the PD ( $n = 403$ ). We leave this for a future exercise as the purpose of this analysis is to examine the factors associated with cash held in India.

## **4.2. Payment Choice**

This section focuses on understanding the choice of payment instrument when making a transaction. Data from the PD have been used to address the question of what affects cash usage in India in terms of the transactions demand. It is proposed to estimate a logistic regression for the use of cash versus non-cash alternatives for each transaction (Bagnall et al., 2014):

$$U_j^* = \mathbf{X}_j\beta + \epsilon_j \quad ; \text{ where } j = \text{Cash; Non-cash} \quad (2)$$

where,  $U_j^*$  is the utility of choice  $j$  as a function of a vector of observables  $\mathbf{X}_j$  and a random error  $\epsilon_j$ . The variables contained in  $\mathbf{X}_j$  are: (a) transaction size (five quantiles); (b) existing cash balances; (c) socio-demographic characteristics (same as those in Equation 1); and (d) consumer perceptions of the use of credit/debit cards and their acceptance by merchants. This approach would help quantify the role of each of these factors in determining the demand for cash in India.

Given that the model outlined in Bagnall et al. (2014) may have limited explanatory power in determining the store of value function of cash, mainly due to the respondents' unwillingness to share information related to the cash stored at home, office, or at a place other than their wallet. However, a function similar to (1) can be estimated by accounting for behavioural factors captured in the MoP in explaining the cash held in the wallet at the time of the survey. Finally, the same contextual factors (distance to the ATM and bank branch) depicted in Equation (1) have also been added to complete the model. Similar to Equation (1), Equation (2) has also been estimated as a logistic regression in a hierarchical manner, with the full model containing all the explanatory variables in the model.

So far, the model assumes that the variables in  $\mathbf{X}$  or other vectors explaining the choice of payment instrument are not correlated with the error term  $\epsilon_j$ . There may be aspects of transactions that we are not accounting for since we have not measured them (for example, features of debit cards such as cash-back or mental accounting). In line with Arango et al. (2015), we account for this potential endogeneity by introducing additional attitudinal variables on the perception of cash use in India. Specifically, we construct a composite index of cash acceptance that consists of the total of the scores assigned to questions related to cash acceptance, ease of setting up, keeping track of payments, convenience, security associated

with cash use, and the cost of using cash. The second source of endogeneity is the initial cash balances held by the respondent—we correct for this by using the contextual factors (time to the nearest ATM), behavioural factors, and income to instrument for cash balances (as in Equation 1) at the start of the diary period (C.A. Arango et al., 2015). The instrumental probit method is done as a robustness check and the results are reported in the Appendix.

## **5. RESULTS**

### **5.1. Cash Use**

Table 4 contains the results of the estimation of Equation (1) by OLS at the level of the individual. Each column from 1–3 represents a step in the estimation with a partial set of explanatory variables, and Columns 4 and 5 contain the full model, with the latter including location controls. All coefficients are marginal effects. In discussing the results, we focus on Column 5, contrasting where the effects change in magnitude or statistical significance with regard to other models.<sup>10</sup>

We find that the number of years of education completed has a positive association with the cash held, with each year of education increasing the cash held, on an average, by INR 43.64. Other socio-demographic variables do not appear to have a significant effect on the cash held, potentially due to co-variations being captured by the other explanatory variables. Relative to being unemployed, those employed in any profession were more likely to hold cash, with those who do wage labour or salaried work in urban areas having a higher level of association with

---

<sup>10</sup> The results of the model using Log (cash) as the dependent variable are similar to the results presented in Table 3, except that education and trust are no longer statistically significant in the full model. We also test a version of the model accounting for smartphone use, but its association was not statistically significant. These results are available on request.

cash held. Interestingly, the effect of income grouping (as a proxy for wealth as well) was non-linear in the cash held. Relative to the lowest income group (<INR 15,000 earned per month), those earning a monthly income of INR 15-30,000 hold nearly INR 510 more on an average, but the effect of being in the middle income group (INR 30-50,000 per month earned) on cash holdings was positive but not statistically significant. Unlike the results in other developed countries, being in the top income bracket was positively associated with the cash held, likely to represent wealth effects.

Having a bank account was negatively associated with the cash held, but the effect was not statistically significant. The contextual factors (time to the nearest ATM and bank branch) were both not statistically significant, though the coefficients had negative signs in line with theory. We now turn our attention to the behavioural factors, some of which showed strong associations with cash held. For example, a one unit increase in the belief of tax evasion being justifiable was associated with an INR 575 increase in cash holding, on an average. Interestingly, those who believed that others can be trusted held less cash on an average (by INR 1187)—this may be explained by the fact that individuals who identify as trusting do not find cash to be a secure instrument, and may prefer other methods of transacting or storing value (for example, a bank account deposit). A higher score on the life satisfaction index (subjective well-being) is associated with a slightly larger cash holding on an average. Other behavioural variables that are not statistically significant include risk-taking, time preference, and favourable social norms toward cash use.

**Table 4: Estimation Results of the Cash Held**

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Cash Held (INR)				
<i><b>Socio-demographics</b></i>					
Number of Years of Education Completed	24.39	37.93*	39.57*	54.23**	43.64**
	(20.58)	(22.19)	(20.26)	(21.99)	(21.30)
Age	-117.5	-126.3	-95.11	-98.31	-95.22

	(95.67)	(102.6)	(98.15)	(103.4)	(101.7)
Squared-age	1.872	2.192	1.587	1.829	1.662
	(1.303)	(1.394)	(1.348)	(1.417)	(1.391)
Household Size	-28.19	-26.26	-37.47	-10.22	-25.31
	(64.49)	(67.50)	(65.37)	(65.93)	(66.93)
Female	212.0	237.9	42.34	152.2	113.7
	(216.9)	(249.3)	(226.8)	(251.1)	(253.4)
Married	335.1	406.4	319.1	445.9	523.7
	(331.7)	(341.3)	(343.2)	(342.9)	(333.4)
Self-employed	1,358***	1,081**	1,337***	1,090**	1,344***
	(348.3)	(440.2)	(360.2)	(519.3)	(502.9)
Regular Wage/Salary Earning (Urban Areas)	2,394***	2,235***	2,713***	2,540***	2,499***
	(495.1)	(556.0)	(578.6)	(687.5)	(671.2)
Regular Wage/Salary Earning (Rural Areas)	1,608***	1,275***	1,576***	1,370***	1,500***
	(314.7)	(382.8)	(347.4)	(501.3)	(494.7)
<b>Monthly Income</b>					
Income Group 2: INR 15-30k	548.9*	466.5	473.0*	417.7	509.6*
	(280.9)	(306.2)	(269.7)	(298.9)	(293.2)
Income Group 3: INR 30-50k	449.1	334.0	348.3	186.7	291.2
	(283.2)	(310.9)	(281.1)	(307.1)	(292.3)
Income Group 4: > INR 50k	1,041**	903.3**	789.2*	613.7	807.7*
	(436.2)	(449.0)	(430.3)	(452.8)	(461.8)
<b>Alternate Payment Instruments</b>					
Bank Account (Savings/Current) Owned?		-2,274		-1,704	-2,348
		(2,125)		(1,899)	(1,593)
Credit Card		480.6		400.2	206.9
		(345.6)		(328.0)	(343.1)
Debit/ATM Card		24.69		175.0	366.9
		(355.0)		(379.1)	(395.2)
Paytm / E-wallet		9.774		54.66	-141.5
		(371.7)		(390.2)	(400.4)
Internet Banking		1,146		1,327*	1,246
		(753.8)		(746.4)	(759.8)
Mobile Banking		-200.6		-143.5	-141.9
		(482.6)		(464.9)	(483.5)
<b>Contextual Factors</b>					
Time to the Nearest ATM		-9.855		-8.387	-0.576
		(27.27)		(24.91)	(23.70)
Time to the Nearest Bank Branch		-6.894		-5.006	-5.140
		(5.221)		(5.114)	(5.105)
<b>Behavioural Factors</b>					
Justification of Tax Evasion			414.5**	420.4**	575.4***
			(170.1)	(174.4)	(188.3)
Trust in Others			-1,465***	-1,424***	-1,187**
			(436.6)	(478.5)	(525.6)
Patience			42.72	44.86	-3.959
			(46.94)	(50.66)	(53.57)

Risk			-0.559 (47.43)	-66.18 (43.04)	-72.25 (44.13)
Cash Usage as a Social Norm			102.1 (98.15)	157.1 (98.15)	127.0 (94.96)
Life Satisfaction			145.8*** (54.67)	163.5*** (57.36)	125.9** (59.30)
Constant	377.9 (1,617)	3,270 (4,667)	-2,366 (1,811)	-1,657 (4,539)	-632.1 (3,944)
Location Controls	No	No	No	No	Yes
Observations	333	313	327	307	307
R-squared	0.149	0.195	0.213	0.265	0.307

*Source:* Authors' calculations from CPSI 2019.

*Note:* Robust standard errors in parentheses; the sample includes only those who reported a non-zero cash balance prior to commencement of the payment diary. All regressions include controls for religion and social grouping, but coefficients are not reported here. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

## 5.2. Payment Choice

What are the factors affecting choice between the cash and non-cash methods of payment?

Here, we define non-cash as debit, credit card, Internet banking, cheques, mobile banking, and electronic wallets, or other means of payment. We discuss the results of the logistic regression in Table 5, with two specifications tested: Column 1 contains the estimates without accounting for the perceived preference for cash use and the Column 2 results include this variable. As with the previous set of results, we focus on the coefficients in Column 2, noting any changes over the specification in Column 1. Column 3 contains the probit coefficients of the robustness check of endogenous cash balances using an IV-probit model.

The higher the transaction size (relative to the median transaction size), the lower was the usage of cash – in line with cross-country studies (Bagnall et al., 2014), we found that transactions in the top quintiles were associated with a strong preference for non-cash payment methods. However, in contrast to other countries, transactions in the second quintile (as compared to the middle quintile) were more likely to be made in cash. In line with Bounie and Francois (2006), we found no significant effect of the day of the week (taking the middle of the week as the reference day, since it has the fewest transactions), save for a small positive effect for Sunday

consistent with median transaction values being higher on this day (Figure 5). Relative to the base category of payments made at alcohol stores, there was an increase in the odds of using cash when books/stationery were purchased as well as at local grocery stores, consistent in the IV-probit model as well. It may be noted that the preference for cash methods of payment did not occur in the case of purchase of groceries at supermarkets, again suggesting that the availability and acceptance of cash by merchants could play a role in determining the payment mechanism.

As shown in other countries (Bagnall et al., 2014), greater literacy was associated with lowered preference for cash: with an additional year of education, we found a 0.65 percentage point reduction in the odds of using cash. Females were more likely to make payments in cash in the diary period, suggesting a gendered preference for cash that could be on account of a variety of factors related to financial literacy, access to non-cash alternatives, and gender norms on expenditures. As compared to individuals who were unemployed, self-employed individuals and wage workers in rural areas (but not urban areas) were more likely to make payments in cash. The effects of employment type were not evident when we accounted for the potential endogeneity of cash balances, suggesting non-robustness of these effects in the first model.

We found no statistically significant effect of prior cash balances (before the PD period) on the odds of a transaction executed in cash in the logistic regression models. However, when we accounted for endogenous cash balances, we found a small positive effect similar to studies in other countries. The small effect suggests that preference for cash for transactions purpose may not be easily distinguished by the use of cash as a store of value (Bagnall et al., 2014). Finally, if another means of payment (credit/debit card, electronic wallets) was accepted by the merchant where the transaction was being made, individuals sharply reduced their odds of making the payment in cash. This large sign is again in line with studies from other countries such as Netherlands and Canada, where card acceptance was seen to reduce the likelihood of

cash payments. Finally, when we included a variable that proxied for the perceived preference for cash (in terms of acceptability, ease of use, convenience, ease of setting up and keeping track of payments, and cost), we found that a positive perception of cash use increased the odds of using cash in a payment by 7.9 per cent. This was similar to the case of cash preference in Canada (C.A. Arango et al., 2015), as well as in other countries, where a favourable perception of cash use was linked with higher cash usage in transactions.

**Table 5: Estimation Results of the Payment Method**

VARIABLES	Logit (Exogenous)		IV-Probit (Endogenous Cash Balances)
	Cash payment		
	(1)	(2)	(3)
<b><i>Transaction Amount</i></b>			
1 <sup>st</sup> Quintile of Transaction Amount	3.686 (3.342)	4.002 (3.582)	0.481 (0.310)
2 <sup>nd</sup> Quintile of Transaction Amount	3.507** (2.059)	3.437** (2.004)	0.530** (0.256)
4 <sup>th</sup> Quintile of Transaction Amount	0.577 (0.209)	0.588 (0.211)	-0.304* (0.161)
5 <sup>th</sup> Quintile of Transaction Amount	0.200*** (0.0791)	0.195*** (0.0781)	-0.807*** (0.168)
<b><i>Day of the Week</i></b>			
Monday	0.451 (0.227)	0.517 (0.289)	-0.293 (0.247)
Tuesday	0.702 (0.335)	0.811 (0.436)	-0.00342 (0.227)
Wednesday	0.857 (0.440)	0.989 (0.510)	0.0254 (0.226)
Friday	1.010 (0.416)	1.141 (0.477)	-0.0518 (0.198)
Saturday	1.408 (0.482)	1.626 (0.545)	0.289 (0.175)
Sunday	1.529 (0.567)	1.744 (0.654)	0.330* (0.190)
<b><i>Transaction Purpose</i></b>			
Books/Stationery	8.271* (9.283)	7.762* (8.709)	0.675 (0.438)
Local Grocery Store	7.471** (5.970)	6.664** (5.329)	0.643** (0.316)
Transport	1.884 (1.722)	1.680 (1.536)	0.199 (0.399)
Restaurant/Café	1.353	1.224	0.0244

	(0.957)	(0.862)	(0.306)
Fashion/Luxury	0.444	0.419	-0.471
	(0.326)	(0.311)	(0.337)
Medical/Health	0.797	0.733	-0.188
	(0.574)	(0.537)	(0.320)
Petrol/Fuel	1.574	1.440	0.172
	(1.111)	(1.017)	(0.314)
Supermarket	0.443	0.427	-0.546*
	(0.297)	(0.287)	(0.310)
Other	0.922	0.883	-0.176
	(0.611)	(0.589)	(0.296)
<b><i>Socio-demographic Factors</i></b>			
Age	1.148	1.120	0.0766
	(0.103)	(0.106)	(0.0471)
Squared-age	0.999	0.999	-0.000867
	(0.00114)	(0.00119)	(0.000619)
Number of Years of Education Completed	0.941	0.935*	-0.0344**
	(0.0356)	(0.0341)	(0.0143)
Female	2.363***	2.400***	0.338**
	(0.719)	(0.708)	(0.154)
Married	0.656	0.649	-0.334*
	(0.230)	(0.235)	(0.171)
Household Size	0.995	1.025	0.0158
	(0.0712)	(0.0761)	(0.0386)
Self-employed (Urban Areas)	3.866*	4.685**	0.277
	(3.072)	(3.555)	(0.321)
Regular Wage/Salary Earning (Urban Areas)	1.834	2.234	-0.0522
	(1.529)	(1.782)	(0.361)
Regular Wage/Salary Earning (Rural Areas)	6.533**	7.144**	0.457
	(5.354)	(5.620)	(0.339)
<b><i>Cash Use</i></b>			
Cash Balances Held	1.000	1.000	0.000148*
	(4.83e-05)	(4.54e-05)	(7.86e-05)
Whether Card Is Accepted	0.0868***	0.0872***	-1.081***
	(0.0267)	(0.0274)	(0.138)
Perceived Preference for Cash Use		1.079**	0.0445**
		(0.0374)	(0.0179)
Constant	3.859	1.262	-0.350
	(8.973)	(3.193)	(1.012)
Observations	14,630	14,630	14,950
Chi-squared	385.7	429.9	334.2***
Chi-squared (Wald Test of Exogeneity)	-	-	2.885*

Source: Authors' calculations from CPSI 2019.

Note: Robust standard errors of odds ratios in parentheses. All estimations include location and income controls and controls for religion and social grouping. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. First stage results are reported in the Appendix.

## 6. CONCLUSIONS AND IMPLICATIONS FOR POLICY

Our study provides a starting point for discussions on the factors affecting the preference for cash in India using novel individual and transactions-level data. Concurrent with macroeconomic indicators such as the currency-to-GDP ratio, more than 90 per cent of the transactions recorded in the payment diary were executed in cash, with some variations by transaction size and purpose of payment. On the other hand, cash held for payments and store of value purpose appeared to be largely associated with wealth and incomes, as well as some behavioural factors, the role of which has not previously been explored in this context. In analysing transactions-level data, we found that card acceptance at merchants, perceived preference for cash use, gender, purpose of payment, and transaction size were all strongly associated with the choice of cash as a method of payment in India.

This has several implications for payment systems policy in India, particularly in the light of recent policy reforms targeted at transitioning India to a less-cash economy, and curbing its use in transactions outside the formal economy. The RBI's 'Vision for Payments 2018' spells out the need to conduct customer surveys on specific aspects of payment systems, highlighting that it will help guide policy and raise awareness on digital means of payments. For policies such as demonetisation to prove successful, it is important to first understand the drivers of cash usage, particularly behavioural factors, so that intervention can be planned keeping this context in mind.

Despite the strength of the results and the novelty of the method, there are certain drawbacks, particularly in the Indian context. First, our sample was restricted largely to urban locations in western India, and may not have fully captured the dynamics of cash use in India. However, it serves as a useful proof of the concept for collecting transactions-level data using payment diaries. This is particularly important since the demand for currency could vary within India by socio-demographics as well as the penetration of digital payments technologies at merchants. Furthermore, given the diversity of economic systems in India, the demand for cash

and preference for payment methods could also vary by differences in market structures and pricing policies of retail payments.

In terms of future work, we propose to check for heterogeneity by income, age, sex, and rural–urban samples, contingent on adequate sample size. Although the diversity of payment methods used in our sample was limited (more than 90 per cent of all the transactions were cash payments), the preference for non-cash alternatives (relative to cash) can be examined in a disaggregated manner. This will contribute to a greater understanding of the factors that could potentially enable greater use of digital payments. We propose to use the MoP and PD as starting points to expand the sample of the survey to other cities in India, and also allow for more data on contextual factors related to cash access and use in India.

## References

- Agarwal, S., P. Ghosh, J. Li, and T. Ruan. (2019). "Digital Payments Induce Over-Spending: Evidence from the 2016 Demonetization in India." *Unpublished manuscript*. Retrieved from [http://abfer.org/media/abfer-events-2019/annual-conference/economic-transformation-of-asia/AC19P4028\\_Digital\\_Payments\\_Induce\\_Excessive\\_Spending\\_Evidence\\_from\\_Demonetization\\_in\\_India.pdf](http://abfer.org/media/abfer-events-2019/annual-conference/economic-transformation-of-asia/AC19P4028_Digital_Payments_Induce_Excessive_Spending_Evidence_from_Demonetization_in_India.pdf)
- Alvarez, F. and F. Lippi (2009). "Financial Innovation and the Transactions Demand for Cash." *Econometrica*, 77(2): 363–402. <https://doi.org/10.3982/ECTA7451>
- (2017). "Cash Burns: An Inventory Model with a Cash-Credit Choice." *Journal of Monetary Economics*, 90: 99–112. <https://doi.org/10.1016/j.jmoneco.2017.07.001>
- Arango-Arango, C.A., Y. Bouhdaoui, D. Bounie, M. Eschelbach, and L. Hernandez (2017). "Cash Remains Top-of-wallet! International Evidence from Payment Diaries." *Economic Modelling*, (January), 1–3. <https://doi.org/10.1016/j.econmod.2017.09.002>
- Arango, C.A., D. Hogg, D., A, Lee. (2015). "Why Is Cash (Still) So Entrenched? Insights from Canadian Shopping Diaries." *Contemporary Economic Policy*, 33(1): 141–158. <https://doi.org/10.1111/coep.12066>
- Arango, C., K.P. Huynh, and L. Sabetti. (2015). "Consumer Payment Choice: Merchant Card Acceptance versus Pricing Incentives." *Journal of Banking and Finance*, 55(C): 130–141. <https://doi.org/10.1016/j.jbankfin.2015.02.005>
- Attanasio, O.P., L. Guiso, and T. Jappelli. (2002). "The Demand for Money, Financial Innovation, and the Welfare Cost of Inflation: An Analysis with Household Data." *Journal of Political Economy*, 110(2): 317–351. <https://doi.org/10.1086/338743>

- Bagnall, J., D. Bounie, K.P. Huynh, T. Schmidt, and S. Schuh. (2014). "Consumer Cash Usage and Management: A Cross-Country Comparison with Diary Survey Data", *European Central Bank (ECB) Working Paper Series No. 1685*. Frankfurt. Retrieved from <http://hdl.handle.net/10419/154118>
- Bajaj, A. and N. Damodaran. (2018). "Digitization and Demonetization in a Shadow Economy Model." *Unpublished manuscript*. Retrieved from <https://www.suomenpankki.fi/globalassets/en/research/seminars-and-conferences/conferences-and-workshops/documents/cepr2018/d2-s5-p2-a-bajaj-paper.pdf>
- Baumol, W.J. (1952). "The Transactions Demand for Cash: An Inventory Theoretic Approach." *The Quarterly Journal of Economics*, 66(4): 545–556. Retrieved from <https://www.jstor.org/stable/1882104>
- Bech, M., F. Ougaard, U. Faruqui, and C. Picillo. (2018). "Payments Are A-changing' but Cash Still Rules." *BIS Quarterly Review*, March, 67–80.
- Boeschoten, W.C. and M.M.G. Fase. (1992). "The Demand for Large Bank Notes." *Journal of Money, Credit and Banking*, 24(3): 319–337. Retrieved from <http://www.jstor.org/stable/1992720>
- Borzekowski, R., K.E. Kiser, and S. Ahmed. (2008). "Consumers' Use of Debit Cards: Patterns, Preferences, and Price Response." *Journal of Money, Credit and Banking*, 40(1): 149–172. <https://doi.org/10.1111/j.1538-4616.2008.00107.x>
- Bounie, D. and A. François. (2006). "Cash, Check or Bank Card? The Effects of Transaction Characteristics on the Use of Payment Instruments." *Telecom Paris Economics and Social Sciences Working Paper No. ESS-06-05*. Paris. <https://doi.org/10.2139/ssrn.891791>
- Briglevics, T. and S. Schuh. (2014). "U.S. Consumer Demand for Cash in the Era of Low Interest Rates and Electronic Payments." *Working Paper Series No. 1660*, March, European Central Bank.
- Chatterjee, P. and R.L. Rose. (2012). "Do Payment Mechanisms Change the Way Consumers Perceive Products?" *Journal of Consumer Research*, 38(6): 1129–1139. <https://doi.org/10.1086/661730>
- Chodorow-Reich, G., G. Gopinath, P. Mishra, and A. Narayanan. (2018). "Cash and the Economy: Evidence from India's Demonetization." *Working Paper*, Cambridge, MA. <https://doi.org/10.3386/w25370>
- Chong, S., J. Bagnall, and K. Smith. (2011). "Australian Consumer Payment Behaviour and Preferences." *The Finsia Journal of Applied Finance*, 4: 20–30.
- Falk, A., A. Becker, T. Dohmen, B. Enke, D. Huffman, and U. Sunde. (2018). "Global Evidence on Economic Preferences." *The Quarterly Journal of Economics*, 133(4): 1645–1692. <https://doi.org/10.1093/qje/qjy013>
- Inglehart, R., C. Haerpfer, A. Moreno, C. Welzel, K. Kizilova, J. Diez-Medrano, ... B. Puranen. (2014). "World Values Survey: Round Six-Country-Pooled Datafile 2010-2014." JD Systems Institute, Madrid.
- Jonker, N. and A. Kosse. (2009). "The Impact of Survey Design on Research Outcomes: A Case Study of Seven Pilots Measuring Cash Usage in the Netherlands." *DNB Working*

*Paper No. 221*. Amsterdam. Retrieved from [https://search.proquest.com/docview/1698342590?accountid=13042%5Cnhttp://oxfordfx.hosted.exlibrisgroup.com/oxford?url\\_ver=Z39.88-2004&rft\\_val\\_fmt=info:ofi/fmt:kev:mtx:journal&genre=preprint&sid=ProQ:ProQ%3Aa-biglobal&atitle=The+impact+of+survey+design+on+](https://search.proquest.com/docview/1698342590?accountid=13042%5Cnhttp://oxfordfx.hosted.exlibrisgroup.com/oxford?url_ver=Z39.88-2004&rft_val_fmt=info:ofi/fmt:kev:mtx:journal&genre=preprint&sid=ProQ:ProQ%3Aa-biglobal&atitle=The+impact+of+survey+design+on+)

- Kenny, L.W. (1991). "Cross-country Estimates of the Demand for Money and Its Components." *Economic Inquiry*, 29(4): 696–705. <https://doi.org/10.1111/j.1465-7295.1991.tb00855.x>
- Klee, E. (2008). "How People Pay: Evidence from Grocery Store Data." *Journal of Monetary Economics*, 55(3): 526–541. <https://doi.org/10.1016/j.jmoneco.2008.01.009>
- Lippi, F. and A. Secchi. (2009). "Technological Change and the Households' Demand for Currency." *Journal of Monetary Economics*, 56(2): 222–230. <https://doi.org/10.1016/j.jmoneco.2008.11.001>
- Mazzotta, B., B. Chakravorti, R. Bijapurkar, R. Shukla, D. Ramesha, D. Bapat, and D. Roy. (2014). *The Cost of Cash in India*. Medford, MA. Retrieved from <http://www.ifm.eng.cam.ac.uk/aboutifm/>
- Nachane, D.M., A.B.Chakraborty, A.K. Mitra, and S. Bordoloi. (2013). "Modelling Currency Demand in India: An Empirical Study." *Development Research Group Studies No. 39*, Mumbai. Retrieved from <https://www.rbi.org.in/scripts/PublicationsView.aspx?id=14932>
- Raghubir, P. and J. Srivastava. (2008). "Monopoly Money: The Effect of Payment Coupling and Form on Spending Behavior." *Journal of Experimental Psychology: Applied*, 14(3): 213–225. <https://doi.org/10.1037/1076-898X.14.3.213>
- Reserve Bank of India. (2018a). *Annual Report 2017: Currency Management*. Mumbai.
- (2018b). *Payment and Settlement Systems in India*. Mumbai.
- Rogoff, K. (1998). "Blessing or Curse? Foreign and Underground Demand for Euro Notes." *Economic Policy*, 13(26); 261–303.
- Schmidt, T. (2011). "Fatigue in Payment Diaries—Empirical Evidence from Germany." *Discussion Paper Series 1: Economic Studies No 11/2011*, Frankfurt.
- Schreft, S.L. and B.D. Smith. (2000). "The Evolution of Cash Transactions: Some Implications for Monetary Policy." *Journal of Monetary Economics*, 46(1): 97–120. [https://doi.org/10.1016/S0304-3932\(00\)00021-0](https://doi.org/10.1016/S0304-3932(00)00021-0)
- Schuh, S. and J. Stavins. (2010). "Why Are (Some) Consumers (Finally) Writing Fewer Checks? The Role of Payment Characteristics." *Journal of Banking and Finance*, 34(8): 1745–1758. <https://doi.org/10.1016/j.jbankfin.2009.09.018>
- Soman, D. (2001). "Effects of Payment Mechanism on Spending Behavior: The Role of Rehearsal and Immediacy of Payments." *Journal of Consumer Research*, Vol. 27: 460–471.
- Sprenkle, C.M. (1993). "The Case of the Missing Currency." *The Journal of Economic Perspectives*, 7(4): 175–184. <https://doi.org/10.2307/2138507>
- Tagat, A. and P.L. Trivedi. (2020). Demand for cash: an econometric model of currency

demand in India. *Macroeconomics and Finance in Emerging Market Economies*, forthcoming. <https://doi.org/10.1080/17520843.2020.1722193>

Tobin, J.M. (1956). "The Interest-Elasticity of Transactions Demand for Cash." *The Review of Economics and Statistics*, 38(3): 241–247. Retrieved from <https://www.jstor.org/stable/1925776>

Trachtman, C., E. Ligon, K. Sheth, and B. Malik. (2019). "What Explains Low Adoption of Digital Payment Technologies? Evidence from Small-scale Merchants in Jaipur, India." *CEGA Working Paper Series No. 071*. Vol. 55,. Berkeley.

## Appendix A: Methods of Payment Survey Questionnaire

### Consumer Payments Survey of India

April 2019

(intro)

Thank you for agreeing to participate in this survey. We are conducting this research study on behalf of Mr Anirudh Tagat, Doctoral Candidate at the Indian Institute of Technology Bombay (IITB) and Monash University Research Academy, Mumbai. This project is supported by the National Council of Applied Economic Research (NCAER)–National Data Innovation Centre (NDIC), New Delhi, and Monash University, Australia. The project is being supervised by Professor Pushpa L. Trivedi, Dr. Mehmet Özmen, and Dr Greg Markowsky. We are studying how consumers buy goods and services using cash and other ways to pay. Before we start, please find below the statement seeking your consent to participate in this study.

At any time in this survey, feel free to check your bank account or other financial records. If you have any questions or are unclear about any specific term, please feel free to ask the enumerator at any time.

Try to answer **all** questions the best you can.

### I. Preliminaries

#### Household Details

1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11
HHID	Age (in years)	Gender (M/F/O)	Number of Years of Education Completed	Head of Household? (Y = 1; N = 2)*	Household size	Number of earning members (>18 years)	Religion (code A)	Social group (code B)	Primary activity (code C)	Secondary activity (code C)

*Note:*\* The head of the household is one who makes a majority of the consumption and expenditure decisions within the household and/or the person who contributes the most to the household's income.

Code A: Hinduism -1, Islam -2, Christianity -3, Sikhism -4, Jainism -5, Buddhism -6, Zoroastrianism -7, Others -9.

Code B: Scheduled Tribe -1, Scheduled Caste -2, Other Backward Class -3, Others -9.

Code C:

For Rural Areas: Self-employed in: Agriculture-1, Non-agriculture -2; Regular Wage/Salary Earning-3, Casual Labour in: Agriculture-4, Non-agriculture -5; Unemployed – 6; Others -9.

For Urban Areas: Self-employed -1, Regular Wage/Salary Earning -2, Casual Labour -3, No Secondary Activity - 4 Others -9.

q1.12 Do you have a **mobile phone**?

1. Yes
2. No

If cellphone = 1  
 then  
 CPADOPTER :=  
 1

(smartphone)

A **smart phone** is a mobile phone with features that enable it to easily download and use apps, access the web, and send e-mails.

□ *Examples: iPhone, Android, Samsung Galaxy, Nokia, Blackberry, and Windows Phone.*

q.1.12b Is your mobile phone a **smart phone**?

1. Yes
2. No

q.1.13 How close is the nearest automated teller machine to your residence? \_\_ kms \_\_ mins

q.1.14 In a typical week, how often do you visit the ATM to withdraw cash? \_\_\_\_\_

q.1.15 How close is the nearest bank branch where you hold an account? \_\_ kms \_\_ mins

#### Common Payment Methods

Please review these definitions of ways to pay.

##### Electronic payment instruments

Internet banking	You pay by authenticating your bank account accessed online via a facility provided by your bank. You can perform such actions as viewing account balances, making transfers between accounts, or paying bills electronically. Usually have to set up a username, password, site key, or PIN.
E-wallet	Electronic wallet (E-wallet) is an interface or application that allows you to store your money in a virtual "wallet" and can be linked to your bank (or other) accounts and make purchases through authentication.
Mobile banking	You can use your bank's smartphone application to make electronic payments from your bank account to a merchant, company, government, or private individual. To do so, you would need to download the application and authenticate your bank account on this application.

##### Card payment instruments

Debit card	Your payments are deducted from your bank account. Also, you can use a debit card to withdraw or deposit cash at ATMs.
Credit card	You pay back the credit card company later. Credit cards charge interest.
Prepaid card	These are smart cards with magnetic strips issued by banks or other institutions. For example, some membership cards may allow you to store funds and use them at retail outlets. These are also known as re-chargeable cards.

##### Paper payment instruments

Cash	Coins and paper notes.
Cheque	You write a paper cheque (issued by your bank) to a person or business.

Money order	You purchase a money order from a bank, post office, check-cashing store, or retail store. At the time of purchase, you specify the amount and the person or business to be paid.
-------------	---

In the questions that follow, please rate all payment methods, even if you do not use them.

## Q2 Assessment of Characteristics (AS)

q.2		q.2.1	q.2.2	q.2.3	q.2.4	q.2.5	q.2.6
Sr. No.	Method	Is a secure payment method	Is usually accepted	Has a very high cost	Is very convenient to use	Is easy to set up	Is easy to keep track of payments
1	Cash						
2	Cheque						
3	Money Order						
4	Debit Card						
5	Credit Card						
6	Prepaid Card						
7	Internet Banking						
8	E-Wallet						
9	Mobile Banking						
10	Money Order/Other						

Code: 1: Strongly Disagree; 2: Somewhat Disagree; 3: Neither Agree nor Disagree; 4: Somewhat Agree; 5: Strongly Agree.

## Q3 Bank Accounts and Instruments

q.3.1	q.3.2	q.3.3	q.3.4	q.3.5	q.3.6
Sr. No.	Head	Owned? 1 = Yes; 2 = No	Number	In a typical week, how many times do you use to make payments?	Do you receive cash back on transactions? 1 = Yes; 2 = No
1	Bank Account (savings/current) <sup>1</sup>				
2	Debit/ATM Card				
3	Credit Card				
4	Pre-paid Card				
5	Paytm /E-wallet <sup>2</sup>				

6	Netbanking App				
7	Mobile Banking App				

<sup>1</sup> If you are married or living with a partner, please report only your accounts. • Do **not** include accounts held:

- only by your spouse or partner;
- for business purposes only;
- at non-bank online payment services such as PayPal
- Exclude mutual funds or other investment-related accounts

<sup>2</sup> Even if you do not use this, but have money stored in an e-wallet, please report yes;

## Q4 Infrequently Adopted/Used Payment Types

If q3.1.1 == 1 & q3.1.3 == 1

then (q4.1)

A **certified cheque** is a type of personal cheque you write where the bank guarantees the payee that there is enough cash available in the payer's account.

q.4.1 In the **past 12 months**, have you used a certified cheque, even once?

1. Yes
2. No

### ## New screen

Certain types of paper payment methods are obtained ahead of time. Consider the following:

In the **past 12 months**, have you used any of the following payment methods, even once?

q4.2	Yes	No
1 Money order <input type="checkbox"/> You purchase a money order from a bank, post office, check-cashing store, or retail store. At the time of purchase, you specify the amount and the person or business to be paid.	1	2
2 Travelers cheque <input type="checkbox"/> A piece of paper that is similar to a check but works like cash and is protected against loss or theft. Traveler's checks are purchased in advance and issued for a specific amount of money.	1	2
3 Cashier's cheque <input type="checkbox"/> A type of check written by a bank and made payable to a third party payee. The bank customer purchases the check for full face value plus a small fee for the check service.	1	2
4 Remittance <input type="checkbox"/> A transfer of money to a person who lives in, or has accounts in, another country.	1	2

## Q5 Credit Accounts and Instruments

If q3.1.1 == 3 & q3.1.3 == 1 then

(q.5.1)

**Credit cards** allow you to carry a balance from month to month.

*If you are married or living with a partner, please report all cards belonging to you and all cards owned jointly with your spouse or partner.  Do not include cards held...*

- ...only by your spouse or partner
- ...for business purposes only

Do you have any of the following types of **credit cards**?

q.5.1 Sr. No	q.5.2 Type	q.5.3 Owned? (1 = Yes; 2 = No)	q.5.4 Number of credit cards with rewards	q.5.5 Number of credit cards without rewards
1	Visa credit cards			
2	MasterCard credit cards			
3	Company or store branded credit cards <ul style="list-style-type: none"> <li>• Do not have logos from Visa, MasterCard, Discover or American Express</li> <li>• Examples include Makemytrip, HPCL, Bharat Petroleum, Big Bazaar.</li> <li>• These cards can only be used at the merchant labeled on the card.</li> </ul>			
4	American Express <b>credit</b> cards <ul style="list-style-type: none"> <li>• These cards can carry a balance from one billing period to the next</li> </ul>			
5	Diners Club or other charge cards			

## Q6 Non-bank Payment Accounts

If q.3.1 == 5 & q.3.3 == 1

q.6.1

In the **past 12 months**, have you used **Paytm** to make a purchase or pay another person?

- 1 Yes
- 2 No

## New screen

IF q.6.1 = YES then

In the **past 12 months**, have you used any of the following methods to make payments with your **Paytm** account?

	Ye	N
--	----	---

(pa048_a 1) Credit		
(pa048_b 1) Debit		
(pa048_c 1) Bank		
(pa048_d1) Money stored with Paytm		
(pa048_e1) Some other method		

In the **past 12 months**, have you used any of the following features of your bank's **mobile banking app**?

	Yes	No
(pa001g1) Online banking bill payment		
(pa001g2) Pay using a person's email address or mobile phone number		
(pa001g3) Other account-to-account payment		

## Q7 Demographics (DE)

q.7.1.

Which category represents the total combined **income** of all members of your family living here during the **past 12 months**?

This includes wages/salary from jobs, net income from business, farm or rent, pensions, dividends, interest, transfers and any other money income received by members of your family who are 15 years of age or older.

1. Less than ₹1,00,000 (1 Lakh)
2. ₹1,00,000-₹2,50,000 (2.5 Lakh)
3. ₹2,50,000-₹5,00,000 (5 Lakh)
4. ₹5,00,000-₹7,50,000 (7.5 Lakh)
5. ₹7,50,000-₹10,00,000 (10 Lakh)
6. ₹10,00,000-₹20,00,000 (20 Lakh)
7. ₹20,00,000-₹25,00,000 (25 Lakh)
8. ₹25,00,000-₹50,00,000 (50 Lakh)
9. ₹50,00,000-₹100,00,000 (1 Crore)
10. More than 100,00,000

(q. 7.1a)

Please tell us your personal **income** of during the **past 12 months**?

1. Less than ₹1,00,000 (1 Lakh)
2. ₹1,00,000-₹2,50,000 (2.5 Lakh)
3. ₹2,50,000-₹5,00,000 (5 Lakh)
4. ₹5,00,000-₹7,50,000 (7.5 Lakh)
5. ₹7,50,000-₹10,00,000 (10 Lakh)

6. ₹10,00,000-₹20,00,000 (20 Lakh)
7. ₹20,00,000-₹25,00,000 (25 Lakh)
8. ₹25,00,000-₹50,00,000 (50 Lakh)
9. ₹50,00,000-₹100,00,000 (1 Crore)
10. More than 100,00,000

q.7.2

Where does **your own** personal income rank within your household?

- 1 Highest in my household
- 2 About equal to the highest (roughly the same as another household member)
- 3 2<sup>nd</sup> highest
- 4 3<sup>rd</sup> highest or lower

q.7.3

Do you and/or your spouse/partner own your **primary home**?

NOTE: Even if you have an unpaid home loan, you are considered the owner of the home.

- 1 Yes
- 2 No

if q.7.3 = 1 then

(q.8.3a)

What is the approximate market value of your **primary home**?

- ₹\_\_\_\_\_.00

(q.7.4)

Excluding the market value of your primary home, what is the approximate value of your household's **other assets**?

Include real estate assets (e.g. land) other than your primary home.

- ₹\_\_\_\_\_.00

(q.7.5)

Excluding the home loan for your primary home, what is the approximate rupee amount of your remaining **debts**?

Examples of other debts include credit card debt, educational loans, and car loans.

- ₹\_\_\_\_\_.00

q.8.1

Could you tell us how interesting or uninteresting you found the questions in this interview?

- 1 Very uninteresting
- 2 Uninteresting
- 3 Neither interesting or uninteresting
- 4 Interesting
- 5 Very interesting

q.8.2

Do you have any other comments on the interview? Please type these in the box below.

Q8.1

Would you like to participate in a more detailed survey associated with this study? If you agree, researchers will contact you at a later stage to invite you to participate separately.

1. Yes
2. No
3. Need more info to decide

If q8.1 == 3

q9.10a

In the next stage of this research, we plan to ask for day-wise information about payments made by you. You will be invited to record all your transactions over a period of three days and will be provided a token incentive for your time and effort in participating in the study.

Q8.1a Are you interested in taking part?

1. Yes
2. No

SAMPLE FOR PAYMENT DIARY DRAWN FROM q8.1 == 1 | q8.1a == 1

**A. Social Preferences and Beliefs**

A.1 *Imagine that A is a person living in your housing society. You come across information that suggests A uses cash in most of their transactions. You now accidentally meet A. How do you feel towards this person or their behaviour, respectively?*

Very angry	Somewhat angry	Neither pleased nor angry	Somewhat pleased	Very pleased
1	2	3	4	5

A.2 *Imagine that A is a person living in your housing society. You come across information that suggests A uses debit/credit cards in most of their transactions. You now accidentally meet A. How do you feel towards this person or their behaviour, respectively?*

Very angry	Somewhat angry	Neither pleased nor angry	Somewhat pleased	Very pleased
1	2	3	4	5

A.3 *Imagine that A is a person living in your housing society. You come across information that suggests A uses Paytm or other e-wallets in most of their transactions. You now accidentally meet A. How do you feel towards this person or their behaviour, respectively?*

Very angry	Somewhat angry	Neither pleased nor angry	Somewhat pleased	Very pleased
1	2	3	4	5

A.4 *Suppose that you use cash in most of your transactions. You now accidentally meet a person living in your housing society who is informed about your behaviour. What do you believe this person's feelings are towards you?*

Very angry	Somewhat angry	Neither pleased nor angry	Somewhat pleased	Very pleased
1	2	3	4	5

A.4 *Suppose that you use debit/credit cards in most of your transactions. You now accidentally meet a person living in your housing society who is informed about your behaviour. What do you believe this person's feelings are towards you?*

Very angry	Somewhat angry	Neither pleased nor angry	Somewhat pleased	Very pleased
1	2	3	4	5

A.4 *Suppose that you use Paytm or other e-wallets in most of your transactions. You now accidentally meet a person living in your housing society who is informed about your behaviour. What do you believe this person's feelings are towards you?*

Very angry	Somewhat angry	Neither pleased nor angry	Somewhat pleased	Very pleased
1	2	3	4	5

**B. Trust**

B.1 Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people? (*Code one answer*):

- 1 Most people can be trusted.
- 2 Need to be very careful.

**C. Risk Preferences**

C.1

Please tell me, in general, how willing or unwilling you are to take risks, using a scale from 0 to 10, where 0 means you are “completely unwilling to take risks” and 10 means you are “very willing to take risks.” You can also use any number between 0 and 10 to indicate where you fall on the scale, using 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10.

- 10 Very willing to take risks
- 09
- 08
- 07
- 06
- 05
- 04
- 03
- 02
- 01
- 00 Completely unwilling to take risks

**D. Time Preferences**

D.1 We now ask you for your willingness to give up something that is beneficial for you today in order to benefit more from that in the future. Please again indicate your answer on a scale from 0 to 10. A 0 means “completely unwilling to do so,” and a 10 means “very willing to do so.” You can also use any number between 0 and 10 to indicate where you fall on the scale, using 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10.

- 10 Very willing to do so
- 09
- 08
- 07
- 06
- 05
- 04
- 03
- 02
- 01
- 00 Completely unwilling to do so
- 99 (DK/NA)

D.2 How well does the following statement describe you as a person? Please indicate your answer on a scale from 0 to 10. A 0 means “does not describe me at all,” and a 10 means “describes me perfectly.” You can use any number between 0 and 10 to indicate where you fall on the scale, using 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10.

I tend to postpone tasks even if I know it would be better to do them right away

- 10 Describes me perfectly
- 09
- 08
- 07
- 06
- 05
- 04
- 03
- 02
- 01
- 00 Does not describe me at all

**E. Values**





## Appendix B – Payment Diary Questionnaire

### Day 0: Introduction

It is important that you have taken the Methods of Payments Survey (MoP) before starting this module. If you are not sure if you have taken this survey, please contact our survey manager at: (<phone number>)

Thank you for agreeing to participate in the 2019 *Consumer Payment Diary* on

[DISPLAY DIARY DAY 1 HERE, example “Saturday, April 27”] to [DISPLAY DIARY DAY 3 HERE, example “Monday, April 29”].

Today,

[DISPLAY DIARY DAY 0 HERE, example “Friday, April 26”],

You will be answering a short survey that helps us prepare for your answers during the next three days. We will ask you a few questions about purchases, payments, and cash activity. Please record all of payment behaviour, including days with zero payments or no cash activity.

Your diary responses will be used for research purposes only and you will not be identified personally with any of the data you provide. Therefore, it is in your best interest to report your activity as accurately as possible.

Q0.1: Please rank the types of instruments or accounts listed below in terms of **frequency** of their use for making payments, including bills? **1** means that you *do not use this instrument at all*, and **8** means that you use this the *most frequently*.

q0_	Instrument	Frequency of usage (typical week)
a	Cash (currency notes or coins)	
b	Bank account (cheque, debit cards, bank account number payments, online banking bill payments)	
c	Credit card	
d	Prepaid card	
e	Paytm /E-wallets	
f	Money order	
g	Travellers' cheques	
h	Other	

**Cash** here includes Indian currency notes of any denomination and excludes coins and any foreign currency notes you may have. It is important that we know how much cash you started this diary period with.

**Q0.8** On [DISPLAY DIARY DAY 0 HERE] do you have any paper cash in your wallet, purse and/or pocket?

Yes	1
No	2

If coded 1 in Q0.8 go to Q 0.9

**Q0.8.1** Please tell us why you don't have any cash.

I just ran out and I need to get more.	1
I usually do not carry cash.	2
I gave my cash to someone else, such as a family member/friend/housemate/relative.	3
My cash was stolen or lost.	4
Other (specify)	5

**Cash in wallet, purse and/or pocket**

If coded 2 in Q0.8 than go to Q0.14

**Q0.9** Please tell us the **number of currency notes** of each denomination in your **wallet, purse and/or pocket** at the end of the day on [DISPLAY DIARY DAY 0 HERE].

You can calculate the total rupee amount using a calculator and enter it.

- Do not consider coins, except ₹10 (see below).
- Do not include foreign currencies.

NUMBER OF:

	₹
_____ x ₹5 notes =	
_____ x ₹10 notes =	
_____ x ₹10 coins =	
_____ x ₹20 notes =	
_____ x ₹50 notes =	
_____ x ₹100 notes =	
_____ x ₹200 notes =	
_____ x ₹500 notes =	
_____ x ₹2000 notes =	
<b>Total rupee amount ₹ [GRAND TOTAL RUPEE AMOUNT]</b>	

### In-person purchases preferences

**Q0.10** Please tell us the payment method you prefer to use for making **in-person purchases**, depending on rupee value. For each value bracket, *choose a response between 1 to 3; 1 is least preferred, 2 is somewhat preferred, where 3 is most preferred.*

1	2	3	4	5	6	7	8	9
	Value of transaction	Cash	Cheque	Debit Card	Credit Card	Net banking	Paytm / E-wallet	Other (A = Money order; B = Travellers' cheque; C= Account-to- account transfer (NEFT/RTGS/IMPS)); D= (specify)
A	Less than ₹10							
B	Between ₹10 and 100							
C	Between ₹100 and 500							
D	Between ₹500 and 2000							
E	More than ₹2000							

Thank you for answering our questions. Please log on tomorrow to enter your purchases or cash activity, even if you have no activity tomorrow.

To get ready to enter your payment information tomorrow, **[Day 1]**, please read the diary instructions and watch the video (if you haven't already).

This is Day 1 of the *2019 Consumer Payment Diary*. Thank you for agreeing to tell us about your payments and cash activity.

We understand that not everybody makes payments or has cash activity every day. We are interested in all types of payments, including days with zero payments or no cash activity. Please enter your information for today's diary day.

#### DOs

- Remember to include each transaction that you make.
- Only include a transaction **once**.
- Please ensure that you have checked and filled out balances for the following sections before proceeding with this section:
  - Cash in wallet/on person
  -
- 
- Report the **exact** amount of the payment. Include rupees and paisa in the form xxx.xx.
- Include all other payments made today, no matter how small the amount of the payment.
- Complete the entire row for the first payment you want to enter for today, then proceed to the next row if you made any additional payments.
- Answer some additional questions about your payment, then to record additional payments, use a new row.

*DON'Ts*

- Do not enter transaction information twice.
- Do not include transactions made in foreign countries or foreign currencies.
- Do not include payments made ONLY for business purposes.

**Q0.8** On [DISPLAY DIARY DAY 0 HERE] do you have any paper cash in your wallet, purse and/or pocket?

Yes	1
No	2

If coded 1 in Q0.8 go to Q 0.9

**Q0.8.1** Please tell us why you don't have any cash.

I just ran out and I need to get more.	1
I usually do not carry cash.	2
I gave my cash to someone else, such as a family member/friend/housemate/relative.	3
My cash was stolen or lost.	4
Other (specify)	5

**Cash in wallet, purse and/or pocket**

If coded 2 in Q0.8 than go to Q0.14

**Q0.9** Please tell us the **number of currency notes** of each denomination in your **wallet, purse and/or pocket** at the end of the day on [DISPLAY DIARY DAY 0 HERE].

You can calculate the total rupee amount using a calculator and enter it.

- Do not consider coins, except ₹10 (see below).
- Do not include foreign currencies.

NUMBER OF:

	₹
_____ x ₹5 notes =	
_____ x ₹10 notes =	
_____ x ₹10 coins =	
_____ x ₹20 notes =	
_____ x ₹50 notes =	
_____ x ₹100 notes =	
_____ x ₹200 notes =	
_____ x ₹500 notes =	
_____ x ₹2000 notes =	
<b>Total rupee amount ₹ [GRAND TOTAL RUPEE AMOUNT]</b>	

### In-person purchases preferences

**Q0.10** Please tell us the payment method you prefer to use for making **in-person purchases**, depending on rupee value. For each value bracket, choose a response between 1 to 3; 1 is least preferred, 2 is somewhat preferred, where 3 is most preferred.

1	2	3	4	5	6	7	8	9
	Value of transaction	Cash	Cheque	Debit Card	Credit Card	Net banking	Paytm/ E- wallet	Other (A = Money order; B = Traveller's cheque; C= Account-to- account transfer (NEFT/RTGS/IMPS)); D= (specify)
A	Less than ₹10							
B	Between ₹10 and 100							
C	Between ₹100 and 500							
D	Between ₹500 and 2000							
E	More than ₹2000							

Thank you for answering our questions. Please log on tomorrow to enter your purchases or cash activity, even if you have no activity tomorrow.

To get ready to enter your payment information tomorrow, **[Day 1]**, please read the diary instructions and watch the video (if you haven't already)



## Day X: Diary Day X

### दिन : डायरी डे .

Q1.1 Your [X] diary day is [DISPLAY DIARY DATE HERE, example "Friday, April 26"]. Are you recording and reporting your payments and transactions for your assigned date, or are you reporting for a different date?

आपका डायरी डे [डायरी की तारीख दिखायें उदाहरण "शुक्रवार अप्रैल ."] है। क्या आप आपको असाइन की गई तारीख के लिए अपनी भुगतान और लेनदेन की रिकॉर्डिंग और रिपोर्टिंग कर रहे हैं या क्या आप किसी अलग तारीख के लिए रिपोर्टिंग कर रहे हैं? (201)

*For example, you were assigned April 23-25 but instead when you reported your payments for Day 3 you reported for April 26.*

*उदाहरण के लिए आप . अप्रैल के लिए असाइन किये गये थे लेकिन इसके बजाय जब आपने . दिन के भुगतान के लिए रिपोर्ट किया तो आपने . अप्रैल के लिए रिपोर्ट किया।*

1. Yes, I am reporting for my assigned diary date, [DAY X DATE].  
हां मैं मुझे असाइन की गई डायरी डेट के लिए रिपोर्टिंग कर रहा हूं। .दिन . तारीख.
2. No, I am reporting for another date.  
नहीं मैं किसी दूसरी तारीख के लिए रिपोर्ट कर रहा हूं।

If no, then  
यदि नहीं तो

Q1.2 Please explain why you participated on another day.  
(202-216)3\*5

कृपया समझाएं कि आपने किसी दूसरे दिन क्यों भाग लिया।

Q1.2a Tell us the date you are reporting for DD/MM/YYYY  
हमें वह तारीख बतायें जिस DD/MM/YYYY के लिए आप रिपोर्ट कर रहे हैं

DD	MM	YYYY
(217-218)	(219-220)	(221-224)

Q1.3 Did you make any payments on [DISPLAY DIARY DATE HERE, example: Friday, April 26]?  
क्या आपने [तारीख दिखायें उदाहरण "शुक्रवार अप्रैल ."] में कोई भुगतान किया?

Yes	हां	1
No	नहीं	2
		(225)

Q1.4 If you selected 2, please tell us the reason that best describes why you didn't make any payments on [DIARY DATE 1]

यदि आपने 2 चुना है तो कृपया हमें कारण बतायें जो सबसे अच्छे से बताते हैं कि आपने [डायरी डेट 1] को कोई भी भुगतान क्यों नहीं किया

I didn't need to make any payments today. मुझे आज कोई भी भुगतान करने की जरूरत नहीं थी	1
I was too busy to make payments today. आज भुगतान करने के लिए मैं बहुत ज्यादा व्यस्त था	2
I'm trying to spend less. मैं कम खर्च करने की कोशिश कर रहा हूँ	3
Other (specify) _____. अन्य बतायें: ...	4
	(226-235)

**Blank col. (236-240)**

If you selected 1, we will now proceed to ask you about each transaction / payment that you made on [DIARY DAY X]. Please fill out each detail completely for each transaction / payment before proceeding to the next transaction / payment.

यदि आपने 1 चुना है तो अब हम उन प्रत्येक लेन-देन भुगतान के बारे में पूछना शुरू करेंगे जो आपने [डायरी डेट X] में किये हैं। कृपया अगले लेन-देन भुगतान करने से पहले प्रत्येक लेन-देन भुगतान के लिए प्रत्येक विवरण को अच्छी तरह से भरें।

QX.5

Day X(24X): Payments made on \_\_/\_\_/2019(242-249)

दिन : \_\_/\_\_/2019 पर भुगतान किया गया

a	b	c	D	E					F	g	h	i	j	h
No. सं.	Day of the week सप्ताह का दिन	Transaction Amount लेनदेन राशि	Purpose (code A) उद्देश्य (कोड A)	Medium of payment (tick as many as applicable) भुगतान का माध्यम .जितने लागू होते हैं उन्हें टिक करें.					Payment Type (code B) भुगतान प्रकार .कोड B)	Accept e-wallet / Paytm? (Code C) क्या ई-वालेट पेटीएम स्वीकार करते हैं? .कोड C)	Accept card? (Code C) क्या कार्ड स्वीकार करते हैं? .कोड C)	Surcharge? (Code C) सरचार्ज? (कोड C)	% surcharge सरचार्ज का प्रतिशत	Enough cash to make this payment in cash? (Code C) क्या इस भुगतान को नकद में करने के लिए पर्याप्त पैसा था? .कोड C.
				In person व्यक्तिगत	Internet/online at computer कंप्यूटर पर इंटरनेट ऑनलाइन	Smartphone/Tablet / Mobile app स्मार्टफोन टैबलेट मोबाइल एप्प	Telephone टेलीफोन	Mail मेल डाक						
1														

(250-274)

Code A: (1) – Bill payment; (2) – Purchases (in-person); (3) – Online/digital purchases; (4) Other non-bill payments or non-purchases; (5) – Other (specify)

कोड A: (1) – बिल भुगतान; (2) – खरीददारियां .व्यक्तिगत रूप से.; (3) – ऑनलाइन डिजिटल खरीददारियां; (4) – बिल भुगतान या खरीददारियों के अलावा; (5) – अन्य .बतायें.

Code A.1: (1.1) Regular recurring bill payment (e.g. phone, internet, gas, electricity); (1.2) One time bill payment (car servicing); (1.3) Recurring bill payment without fixed frequency; (1.4) Other (specify)

कोड A.1: .व्य. नियमित से किए जाने वाले बिल भुगतान .जैसे फोन, इंटरनेट, गैस, बिजली. .व्य. एक बार किया जाने वाला बिल भुगतान .जैसे कार सर्विसिंग. .व्य. बिना तय अंतराल पर किए जाने वाले बिल भुगतान. .व्य. अन्य .बतायें.

Code A.2: (2.1) Supermarket (e.g. Big Bazaar, More, D-Mart, etc.); (2.2) Kirana/Grocery store (local); (2.3) Electronics/furniture store (e.g. Croma, HomeTown, Durian); (2.4) Fashion/Luxury (e.g. Lifestyle, Shopper's Stop); (2.5) Restaurant/Café (e.g. Starbucks, Cream Centre); (2.6) Pub/Bar (e.g. Social, Irish House); (2.7) Alcohol store ; (2.8) Petrol pump/fuel station (e.g. HP, Bharat Petroleum); (2.9) Transport (Road Tolls; Parking charges; Bus, Auto-rickshaw/Taxi, Metro); (2.10) Leisure/Cinema/Entertainment (e.g. PVR, Snow World); (2.11) Holiday travel / vehicle hire (Kesari, Cox & Kings); (2.12) Medical and health (Doctor's consulting fees; OPD purchases of medicines/drugs); (2.13) Services (haircuts, plumber, accountant, legal services, housekeeping); (2.14) Books/Stationery ; (2.15) Other (specify)

कोड A.2: .व्य. सुपरमार्केट .जैसे बिग बाजार, मोर, डी.मार्ट आदि. .व्य. किरानाग्रोसरी स्टोर .स्थानीय. .व्य. इलेक्ट्रॉनिक्स फर्नीचर स्टोर .जैसे क्रोमा, होमटाउन, डूरियन. .व्य. फैशनलजरी .जैसे लाइफस्टाइल, शॉपर्स स्टॉप. .व्य. रेस्टोरेंट कैफे .जैसे स्टारबक्स, क्रीम सेंटर. .व्य. पबबार .जैसे सोशल, आइरिश हाउस. .व्य. एल्कोहॉल स्टोर. .व्य. पेट्रोल पम्प .फियुल स्टेशन .जैसे एचपी, भारत पेट्रोलियम. .व्य. ट्रांसपोर्ट .रोड टोल्स, पार्किंग चार्ज, बस, ऑटोःरिक्शाटैक्सी, मेट्रो. .व्य. लीशर सिनेमा मनोरंजन .जैसे पीवीआर, स्नो वर्ल्ड. .व्य. होलिडे ट्रैवल गाडी किराए पर लेना .केसरी, कॉक्स एंड किंग्स. .व्य. मेडीकल और हेल्थ .डॉक्टर्स कंसल्टिंग फीस, दवाओंड्रग्स की ओपीडी खरीददारियां. .व्य. सर्विसेज .हेयरकट्स, प्लम्बर, एकाउन्टेन्ट, लीगल सर्विसेज, हाउसकीपिंग. .व्य. बुक्स स्टेशनरी. .व्य. अन्य .बतायें.

Code A.3 (3.1) Retail purchases (Amazon, Flipkart, Snapdeal); (3.2) Grocery (Big Basket, Grofers); (3.3) Fashion/Luxury; (3.4) Travel (Makemytrip, Redbus); (3.5) Furniture (Pepperfry, Urban Ladder); (3.6) Leisure/Entertainment (BookmyShow, Insider, Netflix, Google Play, Amazon Prime); (3.7) Books/Stationery; (3.8) Electronics; (3.9) Food delivery (Zomato, UberEats); (3.10) Medicines & Health (Practo); (3.11)

कोड A.3: .व्य. रिटेल खरीददारियां .अमेजन, फ्लिपकार्ट, स्नैपडील. .व्य. ग्रोसरी .बिगबास्केट, ग्रोफर्स. .व्य. फैशन लजरी. .व्य. ट्रेवल .मेकमाइट्रिप, रेडबस. .व्य. फर्नीचर .पेप्परफ्राई, अर्बनलैडर. .व्य. लीजरएंटरटेन्मेंट .बुकमाईशो, इनसाइडर, नेटफ्लिक्स, गूगल प्ले, अमेजन प्राइम. .व्य. बुक्सस्टेशनरी. .व्य. इलेक्ट्रॉनिक्स. .व्य. फूड डिलीवरी .जोमेटो, ऊबरईट्स. .व्य. दवाएं और स्वास्थ्य .प्रैक्टो. .व्य.

Code A.4 (4.1) Transfers to family / friends / relatives / co-workers (4.2) Loan repayment; (4.3) Interest payments; (4.4) Gifts / Donations (online or offline); (4.5) Transfers between own accounts; (4.6) Fixed deposit / investment; (4.7)

कोड A.4: .व्य. परिवार दोस्तोंरिश्तेदारोंसहकर्मियों को ट्रांसफर करना .व्य. लोन का भुगतान; (4.व्य. ब्याज का भुगतान; (4.व्य. गिफ्ट्स .डोनेशन .ऑनलाइन या ऑफलाइन); (4.व्य. अपने एकाउंट्स के बीच ट्रांसफर; (4.व्य. फिक्स्ड डिपॉजिटनिवेश; (4.व्य.

Code B: 1 = Cash; 2 = Cheque; 3 = Credit card; 4 = Debit card; 5 =Prepaid/Gift/EBT card; 6 = Bank account number payment; 7=Online banking bill payment; 8 = Paytm /E- wallet; 9=Traveller's cheque; 10= Account-to-account transfer (NEFT/RTGS/IMPS)11 = Other payment method

कोड B.4: 1 = नकद; 2 = चेक; 3 = क्रेडिट कार्ड; 4 = डेबिट कार्ड; 5 = प्रीपेड गिफ्ट/ ईबीटी; 6 = बैंक एकाउंट नंबर से भुगतान; 7= ऑनलाइन बैंकिंग से बिल भुगतान; 8 = पेटीएमई:वॉलेट; 9= ट्रेवलर्स चेक; 10= एक एकाउंट से दूसरे में ट्रांसफर (NEFT/RTGS/IMPS)11 = अन्य भुगतान तरीके

Code C: 1 = Yes; 2 = No; 3 = Not sure, but think so; 4 = Not sure, but do not think so

कोड C: 1 = हां; 2 = नहीं; 3 = सुनिश्चित नहीं, लेकिन शायद; 4 = सुनिश्चित नहीं, लेकिन शायद नहीं

## Day 3: Endline

Your diary responses will be used for research purposes only and you will not be identified personally with any of the data you provide. Therefore, it is in your best interest to report your activity as accurately as possible.

Q3.0a Cash withdrawals made during diary period:

a	b	c	d	e	f	g
No.	Date	Day of the Week	Amount (₹)	Source of Withdrawal (Code A)	Location (Code B)	Fee? (code C)
1	__/__/2019					
2	__/__/2019					
3	__/__/2019					
4	__/__/2019					
5	__/__/2019					
6	__/__/2019					
7	__/__/2019					
8	__/__/2019					
9	__/__/2019					
10	__/__/2019					

**Code A:** 1 = Primary bank account; 2 = Secondary bank account; 3 = Paytm/e-wallet account; 4 = Prepaid card; 5 = Cheque/Demand Draft/Money order received; 6 = Family/Friends/relatives; 7 = Other

**Code B:** 1 = Automated Teller Machine (ATM) where bank account is held; 2 = ATM where bank account is not held; 3 = Bank branch; 4 = Store/Point of sale machine; 5 = Family/friends/relatives; 6 = Employer; 7 = Other

**Code C:** 1 = Yes; 2 = No; 3 = Not sure, but think so; 4 = Not sure, but do not think so

Q3.0b Receipts during diary period

a	b	c	d	e
No.	Date	Day of the Week	Amount (₹)	Method of receipt (Code D)
1	__/__/2019			
2	__/__/2019			
3	__/__/2019			
4	__/__/2019			
5	__/__/2019			
6	__/__/2019			
7	__/__/2019			
8	__/__/2019			
9	__/__/2019			
10	__/__/2019			

**Code D:** 1 = Direct deposit to primary bank account; 2 = Direct Deposit to secondary bank account; 3 = Cash; 4 = Cheque; 5 = PayTm/e-wallet; 6 = Prepaid card; 7 = Other

**Q3.6** At the end of the day on [DISPLAY DIARY DAY 3 HERE] do you have any paper cash in your wallet, purse and/or pocket?

Yes	1
No	2

If coded 1 in Q3.6 go to Q 3.7

If coded 2 in Q3.6, go to Q3.6.1, then Q3.8

**Q3.6.1** Please tell us why you don't have any cash.

I just ran out and I need to get more.	1
I usually do not carry cash.	2
I gave my cash to someone else, such as a family member/friend/housemate/relative.	3
My cash was stolen or lost.	4
Other (specify)	5

**Cash in wallet, purse and/or pocket**

**Q3.7** Please tell us the **number of currency notes** of each denomination in your **wallet, purse and/or pocket** at the end of the day on **[DISPLAY DIARY DAY 3 HERE]**.

You can calculate the total rupee amount using a calculator and enter it.

- Do not consider coins, except ₹10 (see below).
- Do not include foreign currencies.

NUMBER OF:

	₹
_____ x ₹5 notes =	
_____ x ₹10 notes =	
_____ x ₹10 coins =	
_____ x ₹20 notes =	
_____ x ₹50 notes =	
_____ x ₹100 notes =	
_____ x ₹200 notes =	
_____ x ₹500 notes =	
_____ x ₹2000 notes =	
<b>Total rupee amount ₹ [GRAND TOTAL RUPEE AMOUNT]</b>	

## APPENDIX C

### MEMORY AID AND INSTRUCTIONS

Please read before you begin and retain this for the duration of your diary days.

#### *Pick up the diary at the end of every Diary day*

- Open the diary booklet, even if you did not make any payments during the day.
- Record all payments you pay yourself, not payments by other members of your household.

#### *Record all payments, no matter how small*

- Remember to include small payments for items like tea/coffee, snacks, tolls, cigarettes, convenience store purchases, fast food.
- Record rupees and round to nearest rupee, for example, record ₹45.33 as ₹45.

#### *Record all payments, including bills*

- Remember to include any bills scheduled to be paid electronically (e.g. mobile phone bill or recharge, electricity bill, rent) on all 3 of your Diary days.
- Feel free to refer to your bank or credit card records to gather information about bills and other payments.

#### *Record all deposits and withdrawals*

- Record any deposits into a bank account (savings or current), or addition to electronic wallet (e.g. Paytm)
- Record any withdrawals from ATMs or bank branches.

#### *Count your cash at the start and end of the payment diary period*

- On Day 3, record how much cash you have remaining with you with the enumerator when they arrive to pick up your payment diary.

We understand that not everybody makes payments or has cash activity every day. We are interested in all types of payments, including days with zero payments or no cash activity. Please enter your information for today's diary day.



DOs

- Remember to include each transaction that you make.
- Only include a transaction once.
- Report the **exact amount** of the payment.
- Include all other payments made today, no matter how small the amount of the payment.
- Complete the entire row for the first payment you want to enter for today, only then proceed to the next payment.
- To record additional payments, use a new row. If you need more pages, these are provided so that you are able to record up to 30 transactions in a day.



DON'Ts

- Do not enter the same transaction information twice.
- Do not include transactions made in foreign countries or foreign currencies.
- Do not include payments made ONLY for business purposes.

## APPENDIX C

### MEMORY AID AND INSTRUCTIONS

**q.1.5a:** For each unique payment or transaction, include all details. You may club transactions together if they are made using separate payment instruments. For example, two transactions for purchasing tea for ₹15 each should be recorded separately if one was paid in cash and another using Paytm.

**q.1.5b:** Enter the day of the week. Use short forms if necessary: M for Monday; T for Tuesday; W for Wednesday; Th for Thursday; F for Friday; S for Saturday; SUN for Sunday.

**q.1.5c:** Enter the transaction amount in exact rupees, rounding to the nearest rupee. For example, ₹ 100.17 is Rs. 100; ₹ 453.65 is Rs. 453. **Do not round to nearest five or ten rupees.**

**q.1.5d:** Please see the codes below and place the appropriate code in this column. Please note it must be (x.x) and not just x or (.x). For example, if you pay your mobile phone bill, the code to be used here is 1.1. If you purchased tea or coffee from a streetside vendor, the code is 2.5.

#### **(1) – Bill payment**

A bill payment is a payment for goods or services that you received in the past or that you will receive in the future that **you undertake regularly**.

#### **CODES FOR BILL PAYMENTS**

(1.1) Regular recurring bill payment (e.g. phone, internet, gas, electricity); (1.2) One time bill payment (car servicing); (1.3) Recurring bill payment without fixed frequency; (1.4) Other (specify)

#### **(2) – Purchases (in-person)**

An in-person purchase is when you visit a physical store on location and exchange money for goods or services. The payment method you use may be via the internet, but the good or service purchased is delivered (or promised to be delivered) when payment is made by you.

#### **CODES FOR IN-PERSON PURCHASES**

(2.1) Supermarket (e.g. Big Bazaar, More., D-Mart etc.); (2.2) *Kirana*/Grocery store (local); (2.3) Electronics / furniture store (e.g. Croma, HomeTown, Durian); (2.4) Fashion / Luxury (e.g. Lifestyle, Shopper’s Stop); (2.5) Restaurant / Café (e.g. Starbucks, Cream Centre); (2.6) Pub / Bar (e.g. Social, Irish House); (2.7) Alcohol store ; (2.8) Petrol pump / fuel station (e.g. HP, Bharat Petroleum); (2.9) Transport (Road Tolls; Parking charges; Bus, Auto-rickshaw/Taxi, Metro); (2.10) Leisure / Cinema /Entertainment (e.g. PVR, Snow World); (2.11) Holiday travel / vehicle hire (Kesari, Cox & Kings); (2.12) Medical and health (Doctor’s consulting fees; OPD purchases of medicines/drugs); (2.13) Services (haircuts, plumber, accountant, legal services, housekeeping); (2.14) Books / Stationery ; (2.15) Other (specify)

#### **(3) – Online/digital purchases**

An online purchase is when you visit a website that sells goods or services using the internet on your laptop or mobile phone. The payment method you use may be via the internet or cash, but the good or service purchased is done so via the internet. There may be physical delivery of goods or services at a later date, but the purchase was made online.

#### **CODES FOR ONLINE/DIGITAL PURCHASE**

(3.1) Retail purchases (Amazon, Flipkart, Snapdeal); (3.2) Grocery (BigBasket, Grofers); (3.3) Fashion/Luxury; (3.4) Travel (Makemytrip, Redbus); (3.5) Furniture (Pepperfry, Urban Ladder); (3.6) Leisure/Entertainment (Bookmyshow, Insider, Netflix, Google Play, Amazon Prime); (3.7) Books / Stationery; (3.8) Electronics; (3.9) Food delivery (Zomato, UberEats); (3.10) Medicines & Health (Practo); (3.11)

## APPENDIX C

### MEMORY AID AND INSTRUCTIONS

#### **(4) Other non-bill payments or non-purchases**

Any transfer of funds to other persons that are not related to purchase of goods or services, and that are not made in connection with a product in any way. Payment can be made using any payment instrument.

#### **CODES FOR NON-BILL PAYMENTS/PURCHASES**

(4.1) Transfers to family / friends / relatives / co-workers (4.2) Loan repayment; (4.3) Interest payments; (4.4) Gifts / Donations (online or offline); (4.5) Transfers between own accounts; (4.6) Fixed deposit / investment; (4.7)

#### **(5) – Other (specify)**

*Any payments that do not fall into 1 through 4 categories.*

**q.1.5e:** Make a tick or X mark against the medium of payment used. It can be more than one:

**In-person:** You physically were required to present your payment instrument (e.g. cash, debit card, Paytm wallet) in order to execute this transaction.

**Internet/online at computer:** You presented your payment instrument online to complete this transaction (e.g. via a website or payment portal that prompted you to enter payment details)

**Smartphone/Tablet /App:** You authenticated the payment instrument via your mobile phone.

**Telephone and Mail:** If you mailed funds physically (e.g. via mailed cheque) or through telephone (interactive voice response system, or IVRS)

#### **Code B: Payment Method**

1 = Cash; 2 = Cheque; 3 = Credit card; 4 = Debit card; 5 = Prepaid/Gift card; 6 = Bank account number payment; 7 = Online banking bill payment; 8 = Paytm/E-wallet; 9 = Traveller's cheque; 10 = Account-to-account transfer (NEFT/RTGS/IMPS); 11 = Other payment method

#### **Code C:**

1 = Yes; 2 = No; 3 = Not sure, but think so; 4 = Not sure, but do not think so

LAST DIARY DAY:

On your last diary day, remember to include information on:

**(1) Cash withdrawals during the diary period:** E.g. if you withdrew cash from an ATM, please indicate the date, the day, the amount, the source of withdrawal, and whether you incurred a fee for it.

**Code A:** 1 = Primary bank account; 2 = Secondary bank account; 3 = Paytm /e-wallet account; 4 = Prepaid card; 5 = Cheque/Demand Draft/Money order received; 6 = Family/Friends /Relatives; 7 = Other

**Code B:** 1 = Automated Teller Machine (ATM) where bank account is held; 2 = ATM where bank account is not held; 3 = Bank branch; 4 = Store/Point of sale machine; 5 = Family/friends/Relatives; 6 = Employer; 7 = Other

**(2) Receipts during the diary period:** E.g. if you received income or other funds (including refunds, cash back etc.) please indicate the date, the day, the amount received, and the method of receipt.

**Code D:** 1 = Direct deposit to primary bank account; 2 = Direct Deposit to secondary bank account; 3 = Cash; 4 = Cheque; 5 = Paytm/e-wallet; 6 = Prepaid card; 7 = Other

a	b	c	d	E					F	g	h	i	j	k
No.	Day of the week	Transaction Amount	Purpose (code A)	Medium of payment (tick as many as applicable)					Payment Type (code B)	Accept e-wallet / Paytm? (Code C)	Accept card? (Code C)	Surcharge? (Code C)	% surcharge	Enough cash to make this payment in cash? (Code C)
				In person	Internet / online at computer	Smartphone/Tablet / Mobile app	Telephone	Mail						
1	M	2000	2.4	X					3	3	1	2	0	2
2	Th	1200	4.4		X				4	2	1	2	0	2
3	S	24	2.9	X					1	2	2			1
4	SUN	439	3.2			X			8	1	1	1	1.5	3

In transaction 1 (MONDAY): Anand **buys clothes** for his younger brother **at a fashion retail outlet**. He **pays at the counter** and is billed for all the items purchased, the total comes to **₹ 2000** exactly. He pays using his **credit card**, and notes that the retailer *would have accepted Paytm* as well. Anand *does not have a surcharge* for this credit card payment.

In transaction 2 (THURSDAY): Anamika makes a **small charitable donation** of **₹ 1200** to Child Rights and You (CRY) via their **online portal**. She uses her **debit card** to complete this transaction, and notes that the donation portal **does not accept Paytm**, and *did not have a surcharge*. Anamika notes that *she does not have that much cash* to make the payment.

In transaction 3 (SATURDAY): Sadaf takes a **short auto-rickshaw journey** for which he pays **in cash**. The fare is **₹ 24** which he pays to the rickshaw driver *in person*, and notes that the rickshaw driver **would not have accepted card or Paytm**.

In transaction 4 (SUNDAY): **Using the application** on his smartphone, Samiksha places an order for **groceries** and pays **₹ 439** using her **mobile phone** via **Paytm**. The app from which she orders also *would have accepted card*, but has a *small surcharge* with she notes to be **1.5%**. Samiksha **was not sure** if she has enough cash to purchase these, but thinks she would have been able to if needed.

## Appendix D: Results of the First-Stage IV Probit Estimation

**Table D.1: First-stage coefficients of Cash balances on excluded instruments**

VARIABLES	(2) Pre-cash
<i><b>Transaction amount</b></i>	
1 <sup>st</sup> Quintile of transaction amount	134.9 (177.0)
2 <sup>nd</sup> Quintile of transaction amount	76.07 (108.7)
4 <sup>th</sup> Quintile of transaction amount	412.3* (237.9)
5 <sup>th</sup> Quintile of transaction amount	241.8* (125.8)
<i><b>Day of the week</b></i>	
Monday	-408.4 (366.9)
Tuesday	22.12 (235.1)
Wednesday	-40.35 (192.1)
Friday	-211.8 (226.2)
Saturday	-240.7 (277.8)
Sunday	-400.0 (351.4)
<i><b>Transaction purpose</b></i>	
Books/Stationery	201.4 (316.3)
Local Grocery Store	351.0 (302.1)
Transport	319.6 (305.1)
Restaurant/Café	18.87 (278.8)
Fashion/Luxury	97.56

	(494.0)
Medical/Health	155.1
	(321.4)
Petrol/Fuel	282.2
	(317.0)
Supermarket	268.3
	(306.2)
Other	288.0
	(343.4)
<b><i>Socio-demographic factors</i></b>	
Age	10.55
	(100.1)
Squared-age	0.0483
	(1.398)
Years of education completed	24.76
	(21.96)
Female	-56.20
	(243.5)
Married	390.9
	(330.7)
Household size	-59.78
	(69.02)
Self Employed (Urban Areas)	1,296***
	(464.5)
Regular wage/salary earning (Urban Areas)	2,407***
	(626.7)
Regular wage/salary earning (Rural areas)	1,330***
	(456.3)
Patience	-1.746
	(60.85)
Trust	-1,119***
	(433.2)
Justification of tax evasion	580.7***
	(181.7)
<b><i>Monthly Income</i></b>	
INR 15-30k	786.5***
	(292.3)
INR 30-50k	377.4

	(277.2)
> INR 50k	1,220***
	(408.6)
<i>Excluded instruments</i>	
Whether card is accepted	66.82
	(172.8)
Perceived preference for cash use	-13.30
	(47.02)
Nearest ATM	-10.17
	(23.00)
Constant	-2,869
	(2,090)
Observations	14,950

---