ESSAYS ON TRANSACTION TECHNOLOGY AND PAYMENT SYSTEM

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The present thesis investigates several aspects of the digital transaction, the transaction without the involvement of currency notes and coins. Since digital payment systems enjoy two clear advantages over cash-based or paper-based non-cash payment systems. First, since most electronic payments cost only around one-third to one-half as much as paper-based non-cash payments (such as cheque payments), shifting to electronic modes should considerably reduce the economic cost of the payment system. Secondly, under cashless transactions, the documentation of each transaction is complete and accurate compared to cash transactions, reducing the possibility of creating black money and increasing transparency and tax compliance. Starting from 2016, the promotion of cashless transactions has been one of the policy priorities of the Government of India. The present thesis focuses on three broad issues that either have not been addressed in the existing literature or have been investigated only to a limited extent using different methodology. Three distinct empirical as well as theoretical models have been developed to address three research questions that to the best of our knowledge, are not examined before: first, the thesis measures the extent of cashless transactions in the Indian economy over time (from 2012 – 2023), the main focus on assessing the impact of two major policy interventions (PMJDY and demonetization) on the growth of both the volume and value of different types of cashless transactions of the Indian economy. Additionally, the aim is to understand the current state of cashless transactions in the Indian economy post COVID-19 pandemic and determine whether there has been a significant shift towards a cashless economy after the outbreak of COVID-19 pandemic. Second objective of the thesis is to find out that how the socio-economic conditions mainly education level and income level of the buyer impact the selection of cashless payment methods. For this purpose a theoretical framework is developed focused on modelling the transaction costs of both cash and cashless transactions (debit card) separately from the buyer's perspective corresponding to the different education level and income level. By comparing the transaction cost structures the

main objective is to find out the combination of education and income levels where the cashless transaction will be used, in an environment where debit cards and currency (legal tender) are competing payment channels. The last objective of the thesis is to find empirical validation for the theory developed in the thesis mentioned above. In the process we also investigate the socio economic determinants of use of the cashless transaction through a comprehensive statistical analysis of data, taking into account the intricate interplay between various socio economic variables in influencing cashless transaction usage. Especially interaction term between different socio economic variable has been implemented to unveil the joint effect of the variables on the likelihood of possessing cashless transaction, such that the effect of level of education behind the selection of cashless mode of payment is depend on the level of income the household holds or not and weather the effect of level of income behind the selection of cashless mode of payment is depend on the level of education the household holds or not. Besides the education and income level the analysis also consider the other five socio economics variables in the analysis those are age, household status, financial inclusion status, computer knowledge and access and economic class, to find out the effects of these variables behind the selection of cashless mode of payment. The analysis has been done for the two time period one is for 2011-12 and another is for 2004-05. The thesis concludes that both demonetization and the COVID-19 pandemic have a positive effect on the per capita value index of the cashless transactions for the Indian economy. The per capita volume index experienced a positive trend break post-demonetization period, but this trend persisted till before the COVID-19 pandemic. However, the COVID-19 pandemic hurt the trend of the per capita volume index, as a result, the trend reverted to the pre-demonetization stage. This reveals the fact that during the COVID-19 pandemic, people are using cashless modes of payment for higher-valued transactions than before, but it is possibly not the case more people have started using cashless transactions than before. The government should emphasize more on the

policies, which promote financial inclusion rather than the policies which increase the value of cashless transactions. Demonetization doesn't have any impact on the value-GDP index. The COVID-19 pandemic has had a temporary negative effect on the value-GDP index, which is possibly a result of the economic downturn due to the pandemic. But the negative effect didn't persist, it came back to the previous trend by the end of 2022, indicating economic recovery as well as an increment in the overall value of the cashless mode of transaction. The types of cashless transactions where both demonetization and the COVID-19 pandemic have positive effect are the Per capita volume of IMPS, Per capita value of IMPS and Value of IMPS/ GDP transactions. In the case of all three measures of POS transactions, demonetization has a positive impact, but after the outbreak of COVID-19 that positive shift turned into a negative effect, which implies that after the outbreak of the COVID-19 pandemic and lockdown measures buyers didn't prefer to use debit and credit cards to make payments. The types of cashless transactions where demonetization has no impact are No. Of Cards per 1000 Adults, Per Capita volume of NEFT, the value of NEFT/GDP, Per Capita Value of RTGS, the value of RTGS/ GDP, the value of ECS+NACH/ GDP. The types of cashless transactions where only the COVID-19 pandemic has a positive impact are per capita volume as well as the value of IMPS, Value of IMPS/ GDP, per capita volume of NEFT and per capita volume of RTGS. This indicates an increase in total volume of online transfer of funds. The type of cashless transaction where the COVID-19 pandemic has a negative impact is No. Of Cards/ 1000 Adults, per capita volume and value of POS, percapita volume of ECS+NACH, per capita value of NEFT, per capita value of RTGS, POS/GDP, NEFT/ GDP and Value of RTGS/ GDP. This may indicate that there has been a shift in the preference across different forms of online fund transfers. More specifically ease of IMPS transactions may have resulted in a substitution of NEFT and RTGS transactions by IMPS transactions. The decline in per capita volume and value of POS may also indicate a substitution of card transaction by UPI based transactions , which we could

not investigate due to paucity of time series data. The theoretical analysis in the thesis also concludes that in the absence of income tax, a critical threshold of education level exists, beyond which buyers prefer cashless transactions, conditional upon the representative buyer already having a threshold level of income or beyond. On the other hand, a critical threshold level of income exists beyond which representative buyer will prefer cashless transactions but again conditional upon the buyer already having a threshold level of education or beyond. This underlines the joint influence of education and income behind the selection of a particular payment mode. However, when income tax is introduced, the study identifies the combination of a threshold level of income and threshold tax rate that determine the advantageous choice between maintaining all of the income of the representative individual either in white money form and doing the cashless transaction using debit cards or in black money form and doing the cash transaction. The combination of a tax rate and income exceeding a certain threshold prompts a shift towards maintaining all of the representative buyer's income in black money form for cash transactions. On the other side, a combination of higher levels of income and lower tax rates, favour cashless transactions with 100% white money. The research also identifies an optimal proportion of income understatement that maximizes the net benefit from transactions. This optimal proportion is influenced by factors such as income level, tax rates, probability of detection, and penalty charges. A significantly positive value of the coefficients of the interaction terms in all the regression results (except for 2004-05) highlights the joint effect of income and education level on cashless transaction usage within a household. This complex relationship suggests that the effect of changes in income depends on the educational attainment of the household members, and the effect of changes in education level on the likelihood of selecting the cashless mode of payment, depends on the existing income level of the household, Very high level of income but zero education level doesn't have any effect on the likelihood of selecting the cashless mode of payment. In summary, these findings support

the theoretical analysis of Chapter 4. Furthermore, logistics regression analysis for the years 2011-12 explores the effects of income, education, age, computer knowledge, financial inclusiveness, economic classes, and household statuses on cashless transaction usage. The result emphasizes the importance of age, computer knowledge, financial inclusiveness, and economic class in shaping the likelihood of engaging in cashless transactions. The logistic regression results for the year 2004-05 all the socio-economic coefficients are statistically insignificant in the year 2004-05. This could be the result of a lack of awareness about the digital transactions in the year of 2004-05. Given the significant impact of education on transaction costs, policymakers may consider educational initiatives to improve financial literacy and promote the benefits of cashless transactions, contributing to a more informed and efficient payment landscape. Furthermore, logistics regression analysis for the years 2011-12 explores the significant effects of age, computer knowledge, financial inclusiveness, economic classes, and household statuses on cashless transaction usage The nuanced understanding derived from this study provides actionable guidance for policymakers aiming to optimize economic outcomes and foster a transition towards a more efficient, cashless economy.