Chapter 121
A Study on the Macro Economic Antecedents and Trends of Mobile Banking Services in Bangladesh

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Abstract Safe and reliable money transaction through regular banking system is not available for most people of Bangladesh as only 13 % of the 160 million people have banks accounts. People with no bank account used to send money through the slow and unreliable postal money transfer systems and by middlemen. One dramatic change in the life style of Bangladeshi people in recent time is the use of mobile phone. With the availability of cheap mobile phone sets manufactured locally and low call rates offered by the mobile operators, about 70 % people of the country use mobile phones. With this backdrop the mobile banking started in 2012 by Dutch Bangla Bank, but the full fledge operation took another couple of years. Currently about 18 mobile banks are providing mobile banking services to the people who are mostly out of the traditional banking service. The role of banking service on the economy is well researched. Past research shows that services provided by banks trough mobilizing savings, providing capital for business, and facilitating transactions are essential for economic development of a country. Though past studies shows that the traditional banking has a positive impact on economies apart from few notable exceptions there, is dearth of studies on the effect of mobile banking on the economy of a country. Especially in Bangladesh which started its full fledge mobile banking in 2014, there is few notable study that investigated the effect of mobile banking on economy of the country. Using twenty five months data, from January 2014 to January 2016 this paper investigates the macro-economic antecedents and trends in mobile banking services in Bangladesh. This study finds that the number of clients, number mobile banking agents and amount of transactions are increasing gradually. The result of the study shows that mobile banking cash-in and cash-out transactions are highly cointegrated which indicates a long run equilibrium relationship between cash-in and cash-out transactions in Bangladesh. One of the important finding of the study is that though most mobile banking service is improving gradually, inward foreign remittance are

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not increasing during the study period and is volatile compared to other mobile banking services. Two factors were identified in the study as the antecedents of the mobile banking service i.e. growing economic need with the growth of the economy of the country and availability of mobile banking facility for mobile banking service. The contribution of the paper lies in the fact most people in Bangladesh is outside the traditional banking service and these people are now using banking service through mobile banking; however this area of research untapped yet. This expected that the finding of the study will bridge the gap in mobile banking literature and will help policy makers in formulating policy related to mobile banking.

Keywords Mobile banking · Economic development · Traditional banking · Electronic banking

121.1 Introduction

There are around 160 million people in Bangladesh with only 13 % of these people have bank accounts. Safe and reliable money transaction through regular banking system is not available for most people of Bangladesh. People with no bank account used to send money through the slow and unreliable postal money transfer systems and through by middlemen. One dramatic change in recent decade of the life style of Bangladeshi people is the use of mobile phones. With the availability of cheap phone sets and low call rates offered by the mobile operators, about 95 % use people of the country use mobile phone. With this backdrop mobile banking started in Bangladesh in 2012 by Dutch Bangla Bank with the full fledge operation from 2014. Currently about 18 mobile banks are providing mobile banking service to the people who are out of the traditional banking service. The role of banks in the economic development is well researched and agreed by past research. Past research shows that banks the services provided by banks trough mobilizing savings, providing capital for business, and facilitating transactions are essential for economic development of a country [1–6]. For example, Emmanuel and Adegboyega [3] study seeks to establish among others, the relationship between banking sector development in Nigeria and economic growth; the impact of regulation of banks on economic growth; the applicability of the financial repression hypothesis to Nigeria; and the direction of causality between banks and economic growth over a period of forty-one years. The results show that banks have significant positive impacts on growth in Nigeria under all the regulatory regimes.

Though past studies shows that the traditional banking has positive impacts on the economy of a country through mobilizing savings, creating capital, and facilitating transactions which improve the economy of a country, there is dearth of studies that investigated mobile banking effect the economy of a country. Especially the literature on Bangladeshi mobile banking is not tapped yet except few notable exception [7]. Khan et al. [7], however investigated the research questions related to the individual level factors (such as age, education and so on) that influence the adoption of mobile

banking services in Bangladesh. Mobile banking services such as, cash in, cash out, money transfer, business to individual money transfer, bill payments among others have been helping the unbanked people of Bangladesh in getting the banking services for the last few years. How the mobile banking services have been used in the past years in Bangladesh? Is there any change in the usage of the banking services over the past years? What are the economic factors that influence the usages of the different mobile banking services in Bangladesh? These research questions are not studied and therefore unanswered in literature. This study will fill-up the gap in literature by shedding light on the above research questions. It is expected that this will help policy makers in formulating policy on mobile banking service.

121.2 Mobile Banking Service in Bangladesh

Mobile banking in Bangladesh started by Dutch Bangla Bank Limited (DBBL) in 2012 but the full fledge operation of mobile banking took another two years. Right now 28 banks have the license of doing mobile banking by their branches and many banks are waiting for authorization. Even though 28 banks have license but 18 banks are providing mobile banking services. The services which are provided by these mobile banks are as follows:

Cash-in The process for cash-in service starts with visiting a mobile banking agent by a mobile bank customer and then informing the agent the amount someone wants to cash in. The customer has to write down his/her account number and cash-in amount in the agent's register. Then she has to give the money to the agent. The agent will cash-in into the customer's account. Both the customer and the agent will get confirmation messages from the mobile bank in their mobile phones.

Cash-out Like cash-in customer has to visit a agent shop for cash-out service. The customer has to write down his/her account number and cash-out amount in the agent's register. Customer has to dial the cash-out number and need to enter all necessary information including the cash-out amount, agent number and code number. Then both the customer and the agent will get messages regarding the cash out. After that the agent will give the cash-out money to the customer.

Money Transfer Customers do not need to visit an agent for money transfer service. Customers can transfer money from their account to any other mobile bank account from anywhere. A customer has to dial a number and then enter the desired amount, receiver mobile banking account number, secret pin number among others. After this money will be sent; and both the sender and the receiver will receive a message regarding the money transfer. Receiver of the money can cash-out the money by visiting a agent shop.

Shopping The payment for shopping is very similar to money transfer. In this case the shoppers have to pay the merchants mobile bank accounts.

International Remittance Bangladeshis expatriates can remit through mobile banks agents overseas. For foreign remittance expatriates have to go to a mobile banks' enlisted exchange house or a partner bank. Customers need to fill out the

remittance request form available at the enlisted exchange house or in the bank. The exchange house/bank will then send the money to receiver mobile bank account. The receiver can cash-out the foreign remittance by visiting an agent.

Other Mobile Banks Services Apart from cash-in, cash-out, international remittance, mobile banking customers can buy mobile phone talk time, pay utility bills, buy bus ticket and so on.

121.3 Methodology

To answer the research question of the study data were collected from Bangladesh Bank, the central bank of Bangladesh. As already mentioned in the earlier section of the paper, full fledge mobile banking in Bangladesh started from 2014. Therefore, data were collected for the last twenty five months, January 2014 till January 2016. For getting insight about the first few research questions, data were then analyzed by plotting these data in time series. To investigate the research question related to the macro-economic factors that affect the mobile service usage, Factor Analysis technique was used.

Factor analysis is one of the most popular multivariate statistical techniques. One of the primary goals of factor analysis is to identify latent factors. The relationship with observed variables and latent factors are expressed as "Factor Loading" in Factor Analysis. The mathematics of factor loading is as follows:

$$X_1 = \lambda_1 F + \varepsilon_1, \tag{121.1}$$

$$X_2 = \lambda_2 F + \varepsilon_2, \tag{121.2}$$

$$\cdots \tag{121.3}$$

$$X_m = \lambda_m F + \varepsilon_m. \tag{121.4}$$

Here, λ represents the Factor Loading, F is the latent factor and ε are the error terms.

121.4 Findings

This section of the paper details the result of the study. First it shows the different descriptive statistic related to mobile banking service providers and other information related to the mobile banking services in Bangladesh. After that it unveils how the mobile banking service changed over the years in Bangladesh. It then explores the economic factors that influence the mobile banking services in Bangladesh.

Table 121.1 presents the number of clients, active clients, number mobile banking agents and amount of transactions from January 14 to January 16. It shows that number of active clients during this time exceeded 13.6 million and it is growing days by day (see also Fig. 121.1) through the active and inactive clients are about

Table 121.1 Descriptive statistics of mobile service providers (January 2014 to January 2016)

Variable	Observation	Mean	SD	Min	Max
No of client	25	23700000	6078582	14000000	33100000
No of active Clients	25	9988520	2431727	5766000	13600000
Transaction per month*	25	11106.96	2927.096	6534.45	16745.27
No agents	25	478222.6	103437	208806	569656

*The amount is in crore Bangladeshi Taka (1 crore = 10 million)

Fig. 121.1 Number of mobile banking clients from January 2014 to January 2016
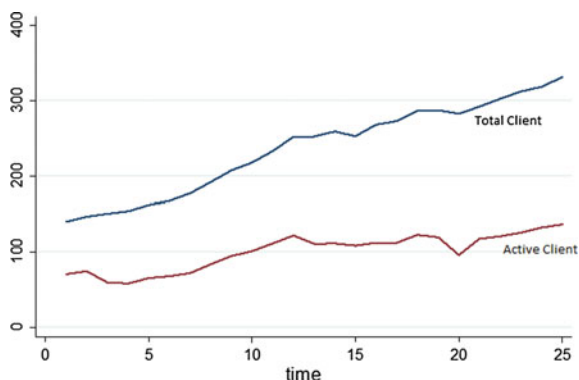
double the number. Table 121.1 also shows that maximum transaction per month during these period exceeds 167.45 billion Taka (1 USD = 78 Taka) and growing gradually (see Fig. 121.2). These amounts of money are transacted through different ways: cash in, cash out, money transfer, business to individual money transfer, bill payments, foreign remittance, and so on. Table 121.2 shows the detail break-up of these transactions and Figs. 121.2 and 121.3 show the trend of these transactions.

The analysis of the data shows that the mobile banking cash-in and cash-out transactions are highly cointegrated (see Fig. 121.4). Johansen cointegration test was done and result shows evidence for this. This means that there is a long run equilibrium relationship between cash-in and cash-out transactions in Bangladesh. One of the important finding of the study is that though most mobile banking service is improving gradually sending foreign remittance are not increasing and is volatile compared to other services (see Fig. 121.5) (Table 121.1).

To investigate the economic factors that influence the mobile banking services in Bangladesh Exploratory Factor Analysis was done. Eigenvalue is used to determine how many factors are there in a Factor analysis. According to Kaiser criterion the number of factors to be retained in a Factor Analysis is factors which have Eigenvalue of equal or more than one. Therefore, based on the Kaiser criterion there are two factors in the data set of mobile banking service in Bangladesh. A scree Plot represents Eigen value on the Y axis and number of factors in the X axis. The scree plot of is presented in Fig. 121.6. The two factors of the study explain about 87.90 % variation

Table 121.2 Descriptive statistics related to mobile banking services in Bangladesh

Usage type	Observation	Mean	SD	Min	Max
Inward remittance	25	3.1928	0.5781185	2.54	4.58
Cash-in	25	4699.167	1226.057	2752.9	6969.25
Cash-out	25	4098.37	1036.983	2533.38	6128.01
p2p	25	1949.514	502.6262	1135.86	2862.69
b2p	25	81.6312	41.24904	28.94	157.79
Bill payment	25	108.528	37.49339	24.2	168.21
Others	25	165.5444	126.4041	22.4	509.07

All numbers are in crore Bangladeshi Taka (1 crore = 10 million)

Fig. 121.2 Mobile banking transactions from the January 2014 to January 2016
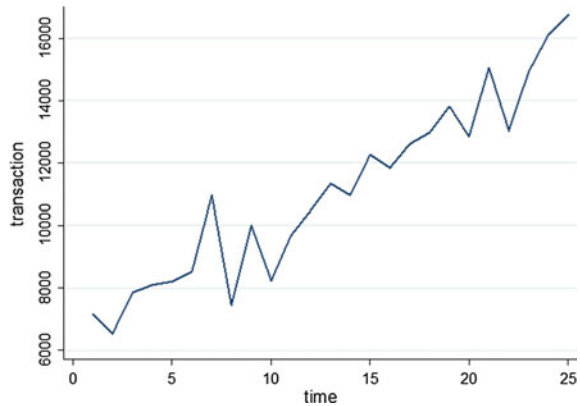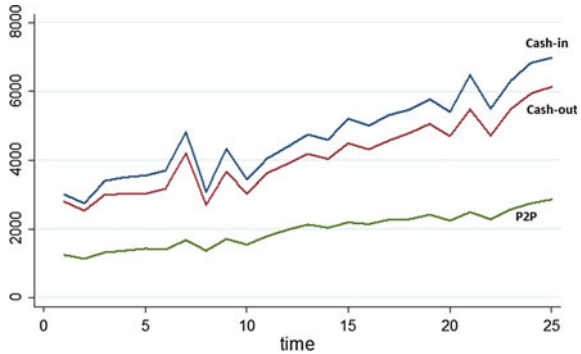

Fig. 121.3 Cash-in, Cash-out and P2P transactions from January 2014 to January 2016 (*the amount is in crore Bangladeshi Taka (1 crore = 10 million))

of the data. Table 121.4 presents the factor loading of the different mobile banking service in Bangladesh. It can be seen that most services are loaded with factor 1 except inward remittance and bill payment. These two are loaded with factor 2. The researchers identifies factor 1 as the growing economy of the country. As the

Fig. 121.4 b2p, bill payment, foreign remittance and other transactions from Jan 2014 to Jan 2016 (*the amount is in crore Bangladeshi Taka (1 crore = 10 million))
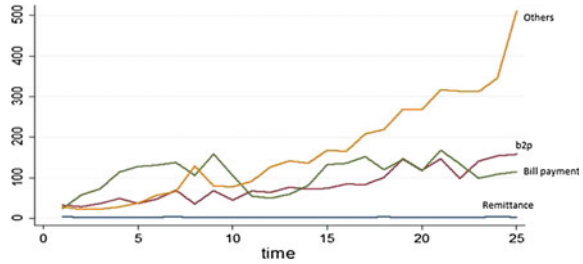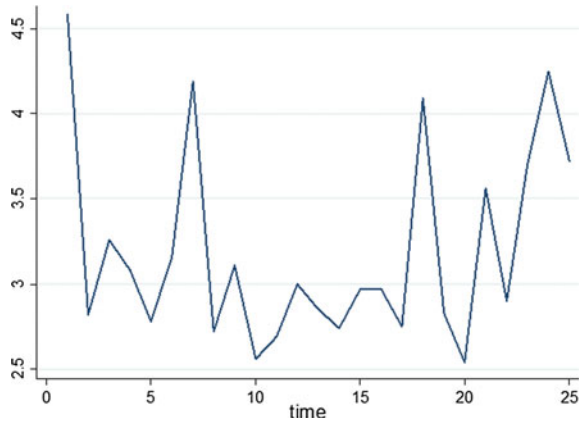

Fig. 121.5 Mobile remittance transactions from Jan 2014 to Jan 2016 (*the amount is in crore Bangladeshi Taka (1 crore = 10 million))

economy is growing the cash-in, cash-out, b2p and other mobile banking services are increasing.

Inward remittance and utility bill payment is loaded with Factor 2. Factor 2 perhaps is the availability of mobile banking services oversea. Though foreign remittance is growing over recent years in Bangladesh, remittance sending through mobile banking is not increasing. Moreover, utility bill payment does not have upward trend like most other services and is also loaded with factor 2. Therefore, these two mobile

Table 121.3 Eigen value table

Factor	Eigen value	Difference	Proportion	Cumulative
Factor 1	5.07570	3.99855	0.7251	0.7251
Factor 2	1.07714	0.40069	0.1539	0.8790
Factor 3	0.67646	0.57243	0.0966	0.9756
Factor 4	0.10403	0.04648	0.0149	0.9905
Factor 5	0.05755	0.04894	0.0082	0.9987
Factor 6	0.00861	0.00811	0.0012	0.9999
Factor 7	0.00051	–	0.0001	1.0000

Fig. 121.6 Scree plot

Scree plot of eigenvalues after factor
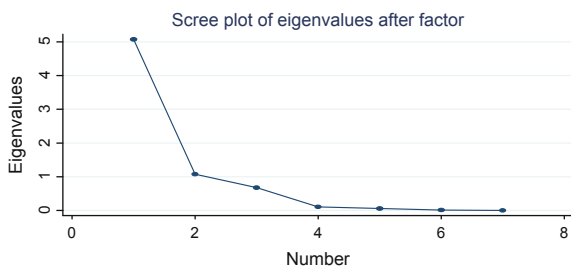
Table 121.4 Factor loading

Mobile banking service	Factor 1	Factor 2
Inward remittance	0.2995	0.8378
Cash-in	0.9940	0.0097
Cash-out	0.9928	0.0530
p2p	0.9705	−0.0324
b2p	0.9752	0.0199
Bill payment	0.4757	−0.6089
Others	0.9450	−0.0122

banking services are not loaded with factor 1, economic growth. Therefore, it may be concluded that factor 2 is availability of mobile banking service.

In an un-rotated solution of a factor analysis, the first factor describes most of variability in the data. This can be overcome with a rotated solution. The objective is to spread variability more evenly among factors. It can sometimes make sharper distinctions in the meanings of the factors. An orthogonal varimax rotation was done on the data of the study; however it did not change the factor loading result much. The rotated result is given in Table 121.5.

Table 121.5 Rotated factor loading result

Mobile banking services	Factor 1	Factor 2
Inward remittance	0.2700	0.8478
Cash-in	0.9930	0.0449
Cash-out	0.9904	0.0878
p2p	0.9710	0.0017
b2p	0.9739	0.0541
Bill payment	0.4968	−0.5919
Others	0.9449	0.0210

121.5   Conclusion

This paper investigates the macro-economic antecedents and trends in mobile banking services in Bangladesh. This study finds that the number of clients, number mobile banking agents and amount of transactions are increasing gradually. The mobile banking transactions in Bangladesh are mainly cash in, cash out, money transfer, business to individual money transfer, bill payments, and inward foreign remittance. The result of the study shows that mobile banking cash-in and cash-out transactions are highly cointegrated which indicates a long run equilibrium relationship between cash-in and cash-out transactions.

One of the important finding of the study is that though the volume of most mobile banking service is improving gradually, inward foreign remittance are not increasing during the study period and is volatile compared to other mobile banking transactions. This paper also investigates the antecedent of the mobile banking services in Bangladesh. Two factors were identified in the study as the antecedents of the mobile banking service ł growing economic need with growth of the economy of the country and availability of mobile banking facilities for mobile banking service.

The contribution of the paper lies in the fact most people in Bangladesh have been remain outside the traditional banking service and these people are now using banking service through mobile banking. But this area of research is untapped yet in Bangladesh. This expected that the finding of the study will bridge the gap in mobile banking literature and will help policy makers in formulating policy related to mobile banking.

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