Assessing the nexus between mobile financial service usage and inflation – evidence from Bangladesh

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Abstract - This paper set out to uncover the nexus between the propensity of mobile financial service (MFS) usage and inflation in Bangladesh, if any. This paper hypothesizes that the usage of MFS will lead to an increase in the velocity of money, i.e., the ease of using MFS in lieu of cash will lead to money transferring ownership quicker. All things constant, this will lead to inflation—as stipulated by the quantity theory of money. To this end, monthly data pertaining to the general price index, number of MFS agents, number of average daily MFS transactions, number of MFS clients and number of banks supporting MFS transactions have been used ranging from FY16 to FY20, subject to availability. The objective of the paper was to understand the relationship between usage of MFS and inflation, if any. To this end, two models were developed and subsequently tested. Upon undertaking a Johannsen co-integration test, it was found that there is indeed one long run equilibrium relationship between the variables used as per the second model. The use of the Vector Auto Regression (VAR) on model 1 failed to upholster the hypothesis of the paper. The subsequent use of a Vector-Error Correction model (VECM) on model 2 to capture the nexus between the propensity of MFS usage and inflation in Bangladesh also failed to diagnose a statistically significant relationship between MFS velocity and inflation in Bangladesh.

Keywords –**Inflation**, **MFS**, **VAR**, **VECM**

I. INTRODUCTION

In the age of mass digitization, consumers around the world are prioritizing their convenience as the days unfold. Rampant improvements in communication technologies, especially the prolific integration of technology in the financial realm, has opened scope for bringing the entire virtual marketplace onto the palm of consumers. For more than a decade, Bangladesh has made advancements in the integration of technology in various sectors and streamlines good governance practices and affairs. One key tool being used to propel digital developments is through the country's 171 million cellphone subscribers, among whom 112 million internet subscribers. The advent of COVID-19 pandemic has sparked the mobile financial service (MFS) usage in Bangladesh; from March 2020 to November 2020 alone, around 10 million clients were added, taking the number of registered clients now to 96.4 million. Additionally, from February to November 2020, utility bill payments nearly doubled from Tk 4.41 billion to Tk 8.31 billion. It can be seen how as the days unfold, the integration of MFS usage into the daily lives of Bangladeshi's will become even more profound. Studies have uncovered that the ease with which MFS transactions can be made increases the velocity of money in circulation in the economy (Khavul et al., 2019).

In its crudest interpretation, the quantity theory of money (QTM) states that changes in the general level of prices are determined primarily by changes in the quantity of money in circulation. When the quantity of money that is in circulation is abundant, the value/purchasing power of the currency falls, subsequently increasing the average prices in the economy; the opposite holds true as well. All things remaining constant, an increase in the velocity of money in the economy will lead to an increase in the general price level. This is what the paper will set out to test, for the case of Bangladesh. The paper focuses on the period FY16-FY20, taking into consideration monthly data pertaining to consumer price index (CPI), MFS indicators, and the broad money supply in the economy. After going over relevant literature on modelling inflation and testing the QTM, the paper proposes two models to test for the impact of velocity of MFS usage on CPI in Bangladesh. Upon performing stationarity checks, the paper attempts to capture the impact of MFS velocity on CPI using a Vector Auto Regression (VAR) and a Vector Error Correction model (VECM) respectively for the two models selected.

II. LITERATURE REVIEW

The quantity theory of money (QTM) has been under the meticulous lens of economists, where its viability in real world scenarios have been tested. Some of the earlier works conducting an empirical testing of the quantity theory of money include those of Friedman and Schwartz (1982), Sims (1972), Bhattacharya (1972), and Brahmananda (1977). The bulk of the studies focusing on inflation were centered around understanding the strength of money supply's impact on inflation, as had been postulated through the QTM. Researchers in this regard used national income, prices of crude oil, money supply growth, exchange rate etc.

Brahmananda (1977) used a single equation econometric method where he analyzed the nexus between real national income and price level in India. He reached the conclusion that the QTM explains the developments in the price level.

Upon testing the effect money growth has on inflation using an ARDL approach on annual observations, Adjei (2018) found a strong positive relationship between Ghana's inflation and money growth. This finding holds true for both in the long and short run. The variables he used were inflation, broad money M2, imports of goods

and services, domestic credit (to private sector), broad money to GDP ratio, and GDP per capita.

Alnefaee (2018) employed Johansen and Julius cointegration tests and found a cointegration among inflation, money supply, domestic demand, exchange rate, and oil prices in Saudi Arabia for the period of 1987-2017. The study found that inflation was positively affected by money supply, domestic demand, and oil prices, but it was negatively determined by the exchange rate in the long-run.

Mansor (2000) analyzed the relationship between the consumer price index, effective exchange rates, money supply M1, income (industrial production Index), and interest rate (3-month Treasury bill rate. The results of Johansen multivariate cointegration tests showed that the underlying variables were cointegrated over a period, from 1975 to 1997. The estimated long-run coefficients were in income, and positive for money supply M1, and interest rate, respectively.

Shahidan et al. (2012) undertook a study to ascertain the relationship between CPI, crude oil price, and the exchange rate using monthly observations between 2005 and 2012. The study used a VECM approach and found that the prices of oil affect inflation, in the short run.

While the aforementioned studies have been focused on ascertaining the rigidity of the QTM, there is a dearth of literature that focus on the impact financial innovation has/will have on the general price level in the economy. The advent of credit cards has allowed consumers to spend money they do not necessarily possess, multiplying the velocity of money circulation. A study by Wong (2019) aimed to explore the behaviour of inflation in Malaysia by further considering the effect of credit cards usage as suggested by Yilmazkuday (2010). This study found that credit card usage had increased Malaysia's inflation rate in the long- run. It was based on the long-run estimates of the Autoregressive Distributed Lag (ARDL) approach for monthly data between 1997 and 2017. Wong (2019) found that credit cards usage, and bank lending rather than money supply generated higher price level of goods and services in Malaysia in the long-run. This was labelled as 'credit inflation'.
Akhtaruzzaman (2008) studied the impact of money supply on inflation in Bangladesh. The study used a VAR technique by fitting the money multiplier and the velocity of money. The study found that growth of real GDP and the proxy indicator of stages of financial development, jointly account for the lion's share of the variance of speed of velocity (around 75 percent) irrespective of the definition of velocity, followed by price expectations. The inflation expectation of the households creates a reasonably strong influence on the variance of velocity.

Although there have been studies trying to ascertain the relationship between evolving financial technologies— credit card usage— and its subsequent impact on inflation,

there have been no studies that focused on the impact of mobile financial service usage in Bangladesh. Furthermore, studies were centered around to understand what drove the velocity of money.

Based on this gap in literature, especially in the context of Bangladesh, this paper sets out to model the impact mobile financial services have had (if any) on the price level in Bangladesh. The paper starts off with the equation of quantity theory of money, in terms of real output, and then brings in modifications for analysis. The study uses number of MFS agents, number of MFS accounts, average daily number of MFS transactions, number of MFS clients and broad money (M3) as independent variables.

The study follows the Bangladesh Bank's definition of MFS—

— *"MFS refers to E-money services provided against a particular mobile/cell phone number of a client (termed as Mobile Account), where the record of funds is stored on the electronic general ledger. These services can be draw-down through specific payment instructions to be issued from the bearer's mobile phone or through alternative digital process or device by ensuring authenticity of the transaction. However unlike e-money products, 'cash-in' and 'cash-out' and other services as permitted by BB at agent locations are allowed for MFS accounts"*.

III. METHODOLOGY

Theoretical Framework

In its crudest interpretation, the quantity theory of money states that changes in the general level of prices are determined primarily by changes in the quantity of money in circulation. When the quantity of money that is in circulation is abundant, the value/purchasing power of the currency falls, subsequently increasing the average prices in the economy; the opposite holds true as well. A salient assumption of the theory is the proportionality assumption, where prices, *P,* is said to vary in exact proportion to changes in the quantity of money supply in the economy, *M* —a 5% change in the stock of money in the economy will lead to a 5% change in the price level.
Irving Fisher's equation of exchange, upon which this paper is based, is as follows—

$$MV = PT \qquad (1)$$

—where M is the stock of money, V is velocity of circulation, P is the price level, and T is the physical volume of market transactions. However, in this equation, Fisher assumed V and T to be regarded as constants. According to Keynes, in actuality, velocity of money in circulation is extremely unstable. Therefore, this might passively impact the other independent variables in the

equation of exchange. For the purpose of this paper, it is being hypothesized that with increased usage of MFS, rapid increases in velocity are having a significant impact on the price level in the economy.

$$M \uparrow V = \uparrow PT \qquad (2)$$

Data

This paper employs monthly data for the period 2016-2020 obtained from the Bangladesh Bank and Ministry of Finance Statistics. This is to ensure that the long–run cointegrating relationship can be estimated as well as ensure that information that would otherwise be lost when using annual data is captured.

Model specification

To uncover the relationship between mobile financial service usage and inflation, this study used two models.

Model 1

Model 1 is based on the works of Emerson (2006) and Akhtaruzzaman (2008), where the quantity theory of money identity is written as —

$$MV = PY \qquad (3)$$

—where M is the broad money supply in the economy, V is the velocity of mobile financial services, P is the price level and Y is the real output. Since Bangladesh does not provide monthly estimates of output, it is being proxied by Industrial Production Index (IMF, 2020).

$$ln(MV) = ln(PY) \qquad (4)$$

To estimate Equation 3, natural logarithms are taken.

Rearranging Equation 4 we arrive at the equation as stated below-

$$log(P) = log(M) + log(V) - log(Y) \qquad (5)$$

where the velocity of MFS is assumed to follow the following functional form—

$$V = \alpha + \beta avgdaily\_mfs \qquad (6)$$
$$+ \delta num\_agents$$
$$+ +\zeta num\_accounts$$
$$+ \eta num\_banks + \varepsilon$$

—where *avgdaily_mfs* is the average number of daily transactions, *num_agents* is the number of MFS agents,

num_accounts is the number of active accounts (in millions), and *num_clients* is the number of MFS clients (in millions). Determination of using the aforementioned variables were based on a simple correlation test and a VAR model of its own— it was tested to see which variables affected the total value of MFS transactions in Bangladesh. For the sake of brevity, results of this have not been displayed.

Model 2

Model 2 starts off with the same base of QTM, replacing transactions with real output, due to the difficulty in quantifying the total number of transactions in the economy.

Making P, general price index, the subject of the equation, we arrive at the following-

$$P = \frac{MV}{Y} \qquad (7)$$

V, here is assumed to follow Equation 7 as stated above. M is the broad money supply in the economy, M3. Y is the Industrial production index.

$$P = \qquad (8)$$
$$(\frac{M3}{Industrial\ production\ index}) \times (avgdaily\_mfs$$
$$+ num\_agents$$
$$+ +num\_accounts$$
$$+ num\_bank)$$

This is multiplied out to arrive at the money-weighted velocity as below-

$$P = \alpha + \beta avgdaily\_mfs \qquad (9)$$
$$+ \delta num\_agents$$
$$+ +\zeta num\_accounts$$
$$+ \eta num\_banks + \varepsilon$$

Therefore, equations 5 and 9 are the two equations that are being estimated for the purpose of our analysis in this paper.

Table 1: Descriptive Statistics

| Variable	Mean	Std. Dev	Skewness	Kurtosis
Average number of daily MFS Transactions	5859762	1372225	0.131	2.04
Value of MFS Transactions **(BDT crore)**	29518.88	7888.6	0.117	2.29
CPI **(index)**	243.0	17.84	0.134	1.87
Number of banks supporting MFS	17.11	1.1	-0.469	2.06
Number of MFS agents	805629.4	134728.2	-0.26	1.93
Number of clients **(millions)**	59.18	16.15	-0.113	2.00
Number of accounts **(millions)**	25.35	8.04	-0.26	1.70
Broad Money Supply M3 **(BDT crore)**	1201671	319535.6	.155	1.36
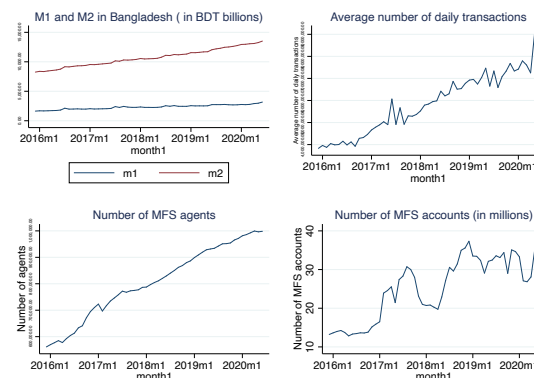
Figure 1: Summary of data used

The variables used in this study are described in Table 1. The observations covered monthly data between 2015m12 and 2020m6, given their data availability. Figure 1 above shows the variables in its absolute form.

Table 2: Source and frequency of variables used

Variable	Frequency	Time Period	Source
Average number of daily MFS Transactions	Monthly	2015M12 : 2020M6	Bangladesh Bank Publications
Value of MFS Transactions **(BDT crore)**	Monthly	2015M12 : 2020M6	Bangladesh Bank Publications
CPI **(index)**	Monthly	2015M12 : 2020M6	IMF Financial Statistics
Number of banks supporting MFS	Monthly	2015M12 : 2020M6	Bangladesh Bank Publications
Number of MFS agents	Monthly	2015M12 : 2020M6	Bangladesh Bank Publications
Number of clients **(millions)**	Monthly	2015M12 : 2020M6	Bangladesh Bank Publications
Number of accounts **(millions)**	Monthly	2015M12 : 2020M6	Bangladesh Bank Publications
Broad Money Supply M3 **(BDT crore)**	Monthly	2015M12 : 2020M6	Bangladesh Bank Publications
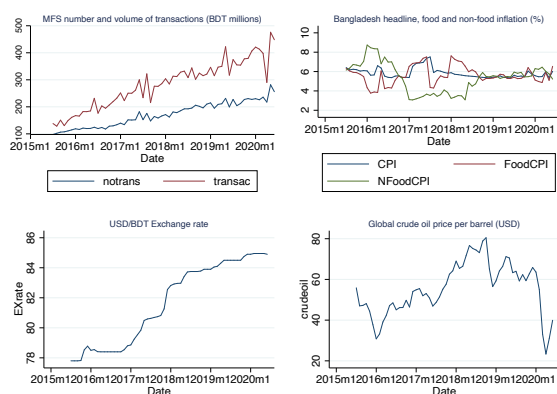
IV. RESULTS & DISCUSSION

Table 1 summarises the statistics of the underlying variables that are presented in their raw values. More importantly, Table 3 reports the results of the unit root tests, namely the Augmented Dicky-Fuller (ADF) (Dickey & Fuller 1979) in order to determine the degree of integration, $I(d)$ of the underlying variables. A $I(0)$ time series indicates that a variable is stationary at level form whereas a $I(1)$ variable is one that is stationary in its first difference form. This study found that all the variables—CPI, average daily MFS transactions, value of MFS transactions, number of banks supporting MFS, number of MFS agents, number of MFS clients, number of MFS accounts and broad money—were I(1) according to the ADF tests.

Stationarity Check—Augmented Dickey-Fuller

Table 3: Stationarity checks for variables used

	I (0)	I (1)
	t-stat	t-stat
Average number of daily MFS transactions (millions)	-0.919 (-2.927)	-15.186** (-2.928)
Value of MFS Transactions (BDT crore)	-1.915 (-2.923)	-16.428** (-2.924)
CPI (index)	-0.039 (-2.924)	-8.296** (-2.924)
Number of banks supporting MFS	-0.800 (-2.927)	-7.280** (-2.928)
Number of MFS agents (millions)	-1.721 (-2.927)	-6.850 ** (-2.928)
Number of MFS clients (millions)	0.207 (-2.927)	-6.917** (-2.928)
Number of MFS accounts (millions)	-1.203 (-2.927)	-6.738** (-2.928)
Broad money supply (M3)	-0.502 (-2.927)	-10.228** (-2.927)

Notes: ***, **, * denote significant level at 1%, 5% and 10% based on MacKinnon's critical value (MacKinnon, 1996) respectively. The reported value is t-statistic, (.) for p-value. The null hypothesis is that that the series has a unit root.

Empirical Results

Based on the stationarity tests, it was decided to run the conventional cointegration tests on Model 1, using the conventional cointegration methods (Engle & Granger 1987; Johansen & Juselius 1990).

Lag- Selection

The paper set out to assess whether there exists any relationship between MFS velocity and inflation in Bangladesh, both in the short and long run. To test for cointegration or fit cointegrating VECMs, we must specify how many lags to include. Building on the work of Tsay (1984) and Paulsen (1984), Nielsen (2001), this section is dedicated to uncover the optimal lag selection for both models being used.

Table 4: Lag selection

	(1)			(2)		
Lag	AIC	HQIC	SBIC	AIC	HQIC	SBIC
0	-9.79	-9.74	-9.65	134.9	135.0	135.2
1	-14.9	-14.7*	-14.23*	129*	129*	130.3*
2	-15.2*	-14.68	-13.84			

Lag order selections have been made according to the Akaike Information Criteria for both models. As the output in the table above shows, we will incorporate 2 lags in the first model, and 1 in the second.

Cointegrating Rank

Given that we have uncovered the optimal lag lengths for our models, we can move onto understanding whether there exists any long run cointegrating relationship with the variables being used in our models. In this regard, this paper incorporates the Johansen co-integration test. This uses the maximum-likelihood estimation technique and establishes the number of distinct cointegrating vectors in a multivariate setting. The null hypothesis is that there are no cointegrating relationships amongst the variables used.

Table 5: Cointegrating Ranks

Maximum Rank	(1)		(2)	
	Trace Statistic	5% Critical Value	Trace Statistic	5% Critical Value
0	42.05*	47.21	126.9509	68.52
1			40.0496*	47.21

In the output above, for model 2, we strongly reject the null hypothesis of no cointegration and fail to reject the null hypothesis of at most one cointegrating equation. Thus we accept the null hypothesis that there is one cointegrating equation in the model 2. However, for model 1, we fail to

reject the null hypothesis that there are no cointegrating relationships amongst the variables used.

Based on these findings, a **VAR model** is fitted onto *model 1* with 2 lags and a **VECM model** is fitted onto *model 2* with 1 lag.

Short run estimates (VAR)— Model 1

Table 6 below reports the short-run (static) component of equation (5), that shows the short-run elasticities captured by their first-differenced variable.

The estimates show that in the short-run, MFS velocity, and money supply M3 growth are statistically insignificant in explaining the Bangladeshi inflation (lnCPIt), except for real output. It still acknowledged the role of money supply in explaining the country's inflation, but in the short run, there does not appear to be a statistically significant impact on inflation. Velocity of MFS transactions do appear to have positive elasticity, i.e., a 1% increase in the use of MFS would increase inflation by approximately 2%. However, this is statistically insignificant. Unexpectedly, money supply growth is negative for the period (t-1), which could be explained by the intuition that inflation was because of too much money in the long-run, but remained ambiguous in the short-run. The overall net impact of lagged values of inflation were positive (1.26-.403= .857). Furthermore, the Breusch-Godfrey serial correlation LM test revealed that the model was free from autocorrelation. The plot of the CUSUM test, Figure 2, also suggest that the test statistics were well within the 95% bands that the estimated parameters were stable over the sample period assessed.

Table 6: Short run estimate— Model 1

Variable	Coefficient
$LnCPI_{t-1}$	1.26***
	(.143)
$LnCPI_{t-2}$	-.403***
	(.141)
$LnMFSVelocity_{t-1}$	.022
	(.021)
$LnMFSVelocity_{t-2}$	.021
	(.023)
$LnM3_{t-1}$	-.017
	(.021)
$LnM3_{t-2}$	.021
	(.021)
$Lnoutput_{t-1}$	.023**
	(.011)
$Lnoutput_{t-2}$	-.022
	(.015)

Variable	Coefficient
Constant	.083
	(.123)
LM test— F statistic 1 lag	13.44
	(0.640)
2 lag	10.07
	(0.863)

*Notes: ***, **, * denote significant level at 1%, 5% and 10% based on MacKinnon's critical value (MacKinnon, 1996) respectively. The reported value is t-statistic, (.) for standard error. The reported value for the LM-test is the chi-squared statistic., (.) for p-value.*

Granger-Causality Test—Model 1

Subsequent to fitting a VAR, this paper sought out to know whether one variable from model 1, "Granger-causes" inflation in Bangladesh (Granger 1969). A variable x is said to Granger-cause a variable y if, given the past values of y, past values of x are useful for predicting y — we want to know whether the independent variables are useful in predicting the future values of inflation in Bangladesh. The results are reported in Table 7.

The null hypothesis of this test is that each of the variables of model 1 do not Granger-cause CPI in Bangladesh. From the table below, we indeed the velocity of MFS does not Granger-cause changes in inflation. Only real output is found to have a significant effect. However, all variables as a whole have a statistically significant impact on inflation in Bangladesh.

Table 7: Granger-Causality test—Model 1

Variable	χ^2
MFS velocity	1.1472
	(0.284)
Broad money, M3	.569
	(0.451)
Output	2.8179*
	(0.093)
All	11.887***
	(0.008)

*Notes: ***, **, * denote significant level at 1%, 5% and 10% based on MacKinnon's critical value (MacKinnon, 1996) respectively. The reported value is t-statistic, (.) for p-value.*

This paper set out to test whether increasing use of mobile financial services in Bangladesh have an impact on CPI. Based on our first model, as postulated by Equation 5, we find insufficient evidence to assert that the velocity of money has any impact on CPI. With this backdrop, we move on to our second model, to see whether it bears any significance to the paper's agenda.

Short-run estimates—Model 2

Unable to find concrete evidence of a relationship between MFS usage and inflation, this paper moves onto the second methodology followed, that is being modelled by Equation 9.

Model 2 uses a more granular approach for assessing any linkage between CPI and MFS usage in Bangladesh. It dissects velocity of MFS into variables that are being hypothesized to influence MFS usage. As opposed to model 1, here we can see individual effects of MFS velocity determinants.

Table 8: Short run estimates Model 2

Variable	Coefficient
CPI_{t-1}	-.0074
	(0.291)
$mNum\_banks_{t-1}$	-.0000107**
	(4.86)
$mNum\_dailytrans_{t-1}$	-3.47*
	(1.98)
$mNum\_agents_{t-1}$	-3.00
	(1.59)
$mNum\_clients_{t-1}$	4.41**
	(1.92)
Constant	-.040
	(0.0149)
LM test— F statistic 1 lag	18.93
	0.800
2 lag	12.96
	(0.769)

Notes: ***, **, * denote significant level at 1%, 5% and 10% based on MacKinnon's critical value (MacKinnon, 1996) respectively. The reported value is t-statistic, (.) for standard error. The reported value for the LM-test is the chi-squared statistic., (.) for p-value.

Table 8 shows the short-run static component of the error-correction model. As per intuition being stipulated in this paper, it is being expected that all the components of velocity of MFS will have a positive impact on CPI. The number of banks supporting MFS transactions, average number of daily MFS transactions and number of MFS clients are the only ones that are statistically significant in explaining short-run movement in CPI in Bangladesh. However, contrary to the premise of this paper, the average number of MFS transactions is found to have a negative impact on CPI, at the 90% level of significance. On the other hand, the number of MFS clients do follow the hypothesis postulated in this paper. Another reason why such findings are surprising is that model 2 is derived by weighting the velocity variables as a ratio of the broad money and real output in the economy. Intuition guided by

literature would have asserted there to be positive findings in this regard.

The estimated error correction term, shown in Table 9 below, is statistically significant at 1% level with a negative sign that reaffirmed a cointegrating relation of equations. The number of MFS agents and average number of daily transactions are found to have a statistically significant impact on CPI in the long run. However, once the deposit rate and exchange rate are controlled for, the number of MFS transaction appear to have a positive impact on CPI, whilst the deposit rate has the opposite. This suggests that model 2 has potential for further robustness, by adding more relevant variables.

Lastly, the Breusch-Godfrey serial correlation LM test revealed that the model was free from autocorrelation. The plot of the CUSUM test, Figure 3, show that the test statistics are outside the 95% bands. This implies that the estimated parameters were not stable over the sample period assessed. There seems to be a structural break around 2018. This finding of a structural break complement the wayward sample estimates of model 2.

Long-run estimates—Model 2

Table 9: Long run estimates Model 2

Variable	Coefficient
ECT_{t-1}	-.351***
	.097
$mNum\_banks_{t-1}$	5.33
	(5.10)
$mNum\_dailytrans_{t-1}$	-2.96**
	(9.54)
$mNum\_agents_{t-1}$	5.48**
	(2.61)
$mNum\_clients_{t-1}$	3.12
	(2.34)
Constant	-1.45

Notes: ***, **, * denote significant level at 1%, 5% and 10% based on MacKinnon's critical value (MacKinnon, 1996) respectively The reported value is t-statistic, (.) for standard error.
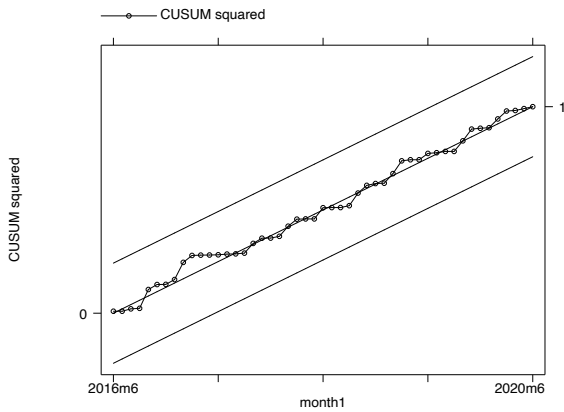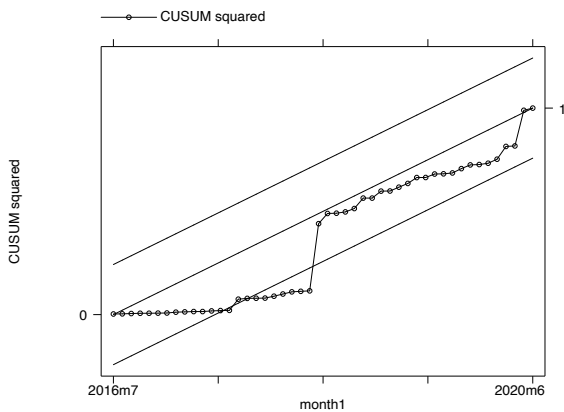
Figure 2: Stability test- Model 1

Figure 3: Stability test- Model 2

Table 10: Gregory-Hansen Test for Cointegration with Regime Shifts

	Test statistic	Breakpoint
ADF	-4.15	2018m3
Zt	-6.21*	
Zα	-45.52	2019m2

Notes: ***, **, * denote significant level at 1%, 5% and 10% based on MacKinnon's critical value (MacKinnon, 1996) respectively For the Gregory and Hansen (1996) cointegration test the critical values at 1%, 5%, and 10% significance levels are for ADF*, Zt are -6.92, -6.41 and -6.17; for Z_a* -90.35, -78.52 and -75.56, respectively. The test program is available from http//www.ssc.wisc.edu/bhansen/.

Based on our findings of instability amongst our variables for model 2, we move onto uncovering the root of the problem. Gregory and Hansen (1992) have developed residual-based cointegration tests in models of regime shifts, where the slope and intercept of the models change over time.

According to the Gregory-Hansen test, the break in 2019m2 is significant. The cointegration approach does not require the estimated coefficients to be stable Yavuz (2014). To interpret the parameters obtained from the cointegrating vector as elasticities, it is important that the long- run parameter estimates are structurally stable over time. According to Table 10, the test statistic for Zt is significant at the 10% level of significance while the ADF statistic is insignificant. The inability of $Z\alpha$ to reject the null of no cointegration with structural change can be attributed to the low power of this test. Based on this finding of a structural break, the estimations put forward by this paper can be modified to accommodate for the structural break using either a fully modified least squares (FM-OLS) regression (Phillips and Hansen, 1990) for model 1. It has been shown that FM-OLS estimates are hyper-consistent when there is no cointegrating relationship. For model 2, an FM-VAR estimation can be incorporated, since the variables used are all I(1) (Phillips, 1993). However, these fall outside the purview of this paper.

VI. CONCLUSION

This study realizes the importance MFS has on the economy, and the impact it can have on key macroeconomic variables. However, results uncovered in this paper fail to assert any significant nexus between MFS usage and inflation in Bangladesh. Inadvertently, this study disproves the proportionality postulate of the QTM for Bangladesh—money supply was found to have an insignificant impact on the price level in Bangladesh for the period assessed. Money supply in an economy is always in flux. The paper's attempt to establish a causal relationship between velocity of MFS usage and price level in Bangladesh quite possibly might have been absorbed by changes in the broad money supply. The paper's attempt in using velocity as a crux of stimulating price level in Bangladesh arrives at a quagmire. However, further studies can be made by taking into consideration the regime change in the variables considered, along with expanding the time horizon.

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