

Behavior Of Velocity Of Circulation Of Money In India.

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Abstract:

The objectives of the present project are of three folds first, to present a long run behavior of velocity of circulation of money in India second, to calculate annual volatility (in terms of coefficient of variation) of the velocity of circulation of money and thirdly, to find out the seasonal variation in velocity. Simple statistical estimates like coefficient of variation, seasonal index and simple charts and diagrams are used to this end. The Velocity behaviour is studied in light of Bordo and Junang's seminal analysis. Our findings reveal that Indian financial sector, despite various advancements is yet to reach the second phase of financial development. It also makes known that velocity in India is quite stable. Lastly the seasonal pattern of the quarterly data depicts that velocity is relatively higher during the third quarter.

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I. Introduction:

Monetary authorities, all over the world, try to control supply of money to control inflation through steering the flow of spending in an economy. Conventional understanding, in this regard, suggests that stock of money has one to one correspondence with price level. That is, increase in money supply will be followed by a proportionate increase in price level and vice versa. However, this may not be the case unless the velocity of circulation of money is constant. Accordingly, the functioning of the monetary policy in a desired or predictable manner requires the velocity of money to be constant. Thus the velocity of circulation of money occupies a central place in monetary theory and practice. Quite naturally, economists of the highest repute have contributed in the development of the theoretical ideas of velocity of circulation of money. Aside from the theoretical writings, there are several empirical research papers as well, which has equally contributed to the advancement of the discipline. Bordo and Junang's (1987, 1990) contribution is regarded as one of the path breaking ones. It focuses on the secular behaviour of velocity of money. The stylized pattern of the behaviour of velocity of money, as documented in the papers, follows a U-shaped pattern and has been classified in three different phases. Their findings would be elaborated in the next section of the present paper, as the present study is immensely connected to their contribution. The most interesting aspect of it is that one could easily recognize the level of advancement of an economy or financial sector of the economy in particular, after studying the pattern of velocity behaviour.

In the present paper primarily our humble effort is to study the pattern of velocity of money for both narrow and broad money in Indian context for the period 2004-05 to 2018-19 and thereby try to spot the phase of Indian financial development in light of Bordo and Junang,s(1987, 1990), using Annual data.

Secondly, we would try to estimate annual volatility of velocity of money and intended to see how the velocity of money does fluctuate in India for the same period, i.e. 2004-05 to 2018-

19. Velocity of circulation of money, as asserted by the Monetarists, contrary to the Keynesians, remains reasonably stable and does not fluctuate frequently. Therefore, the Monetarists, unlike the Keynesians, believe that the money demand function is predictable and thus the velocity plays a pivotal role in the determination of monetary policy for the economy. By estimating volatility of velocity of money we would attempt to observe how far the claim made by the monetarists is applicable in Indian framework, acknowledging the fact that our endeavour in this direction is inadequate enough to infer anything conclusively.

Thirdly, we try to estimate seasonal variation of velocity regarding to both narrow and broad money. Thus we try to see whether there is any seasonal increase or decrease of velocity of money. We use quarterly data (2004-05 to 2018-19) for this purpose. Such a study could be useful in the formulation of the monetary policy.

Thus, the objectives of the current dissertation are

- i. to present long run (1951-52 to 2018-19) behaviour of the velocity of circulation of money and comparing it with the global pattern and thus drawing some pertinent inferences.
- ii. to calculate annual volatility (in terms of coefficient of variation) of the velocity of circulation of money and

thereby check the nature of volatility in different years.(2004-05 to2018-19).
iii. to find out the seasonal variation in velocity (for the period:2004-05 to 2018-19), which could have important policy implication.

The present dissertation is designed in the following manner. In section II, a theoretical backdrop of the concept of velocity and its secular behaviour has been presented. Section III presents a brief survey of literature. Section IV discusses the data and methodology of the present project. Section V, the concluding section, summarizes our findings and try to focus some policy issues. We would also like to discuss, in this section, limitations of our study and the scope of further research.

II. A Theoretical Backdrop

The velocity of circulation of money is a measurement of the rate at which money is exchanged in economy. It is the number of times money moves from one agent to another. It also refers to how much a unit of currency is used in a given period of time. The velocity (V) is measured as the ratio of nominal income (PY) to the stock of money (M), i.e.

The concept of velocity of circulation of money was first used by Irving Fisher. He viewed the demand for money in terms of velocity. The identity between nominal value of aggregate income and expenditure, as shown by Fisher may be summarized in the following form:

$$MV = PY$$

Fisher asserted V as a numerical constant in short run or medium run. Velocity, according to Fisher, depends on factors like mode of payments, customs and culture etc. which hardly fluctuates in regular basis. In fact, the early classical theory exponents used the quantity theory equation as equilibrium condition for general price level.

The Cambridge Cash Balance Approach, pioneered by Marshall, Pigou, attempts to analyze demand and supply of money. The Cambridge version views the demand for money in relation to the store of value function -- Community desires to hold a part of its income in the form of money.

Past studies on the behavior of velocity of money hinged upon the relationship of velocity of money and money demand function. The relationship can be expressed as follows

Given a money demand function;

$$\ln \left(\frac{M}{P} \right) = A + \beta \ln(YR) - \gamma(R) \quad (2)$$

Where, (M/P) = real money balances

YR = real income

R = interest rate

And the parameters β and γ are all positive.

Velocity of Money (V), by definition,

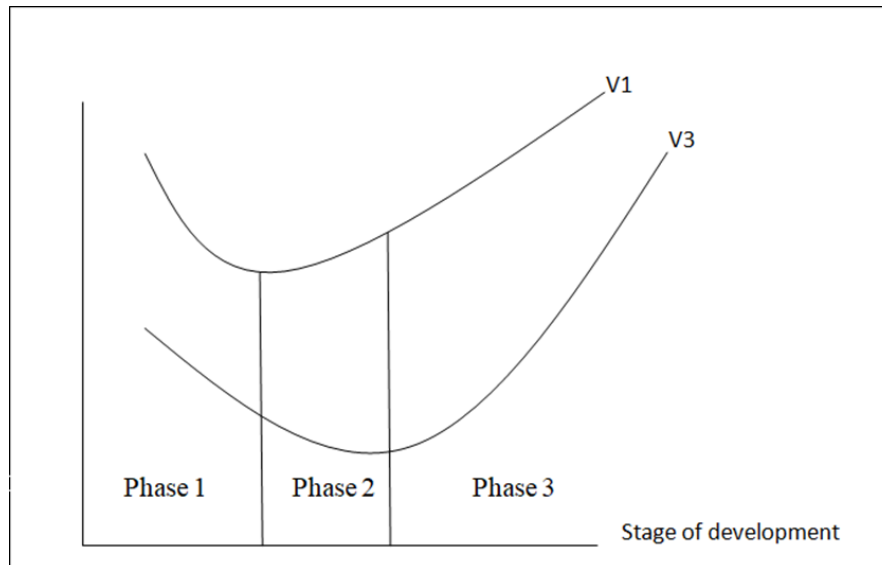
1. If the real income elasticity of money demand¹ (β) exceeds unity, the real income elasticity of velocity is negative; and
2. If the interest elasticity of the money demand (γ) is negative, the corresponding elasticity of velocity of money is positive.

The first systematic study on the trend of velocity of circulation of money was made by Friedman and Schwartz (1963). Their seminal contribution was conducted in the context of the United States for the period, 1867-1960. Here they observed a downward trend until 1945. As conjectured in the paper, the income elasticity of money demand is more than unity, which is the fundamental cause of declining velocity. To explain the trend's later turnaround, which just begun when they wrote the paper, Friedman and Schwartz argued that greater expected economic stability induced people to decrease the demand for money as a secure liquid asset and hence would be a temporary phenomenon.

To explain the rising trend in velocity, a Swedish economist, Knut Wicksell, emphasized the role of 'institutional factors'. The first comprehensive study on velocity based on institutional factors as proposed by Wicksell, was done by Bordo and Jonung in 1987. Bordo and Jonung study covered as many as 84 countries, but detailed country wise investigation is confined to only five industrial countries, namely, US, Canada, UK, Sweden and Norway. Their study established that the long run behavior of velocity generally follows a U-shaped pattern, with an initial declining segment, an intermediate flat segment, followed eventually by a rising segment. The shape of the velocity curve can be explained based on the institutional factors, like the falling velocity corresponds to growing monetization of the economy while the rising part is reflection of the financial

innovations and resultant financial sophistication.

Bordo and jonung study also confirms that the U shaped pattern of velocity is true both for narrow money (V1) and broad money (V3), which is typically the global pattern, as shownbelow.



It was found that velocity of narrow money has an earlier turning point than that of broad money. Accordingly three distinct phases can be differentiated: In phase 1, the velocity of both narrow and broad money falls, in phase 2, the velocity of broad money continues to fall but velocity for narrow money rises. In phase 3, both velocity for broad and narrow money rises.

Bordo and jonung further said that the phase 1 typically corresponds to low income countries, phase 2 corresponds to middle income countries and high income countries lies in phase 3.

Narendra Jadhav studied the behavior of the velocity for both broad and narrow money in India for the period 1951-25 to 1989-90, basing on the findings of Bordo and jonung's institutional approach. He concluded that:

1. Velocity of broad money is consistently lower than that of narrow money, the gap between the two; however seems to have been widened over time.
2. The velocity of narrow money is consistently more stable than that of broad money.
3. There is a positive trend for (V1) and a negative trend for (v3). So the Indian case conforms to the phase 2 of the global pattern, though according to World Bank data India is classified among the low income country. thus the financial development in India outpacing the economic development

Survey Of Literature:

In Indian context, there have been a number of studies on Velocity of Circulation of Money. Iyer (1970) observed a declining trend in velocity of both narrow as well as broad money during the period 1955 through 1969. Saravane (1971) in his sectoral approach estimated velocity of money for the household sector ranges between 5.44 and 6.91 during 1950-51 to 1962-63, with trivial annual fluctuation. Vasudevan (1975), however, found instability in the behaviour of velocity of money in India during 1951-52 to 1973-74.

Probably, Venkatachalam and Anjaneyulu (1970) were the first who attempted to find an econometric function of velocity in Indian context. Kamaiah and Paul (1979) attempted to fit a velocity function for India using annual data up to the year 1974-75. He used variables like real income, interest rates and price expectations. Singh, Shetty and Venkatachalam (1982) pointed out that the velocity of narrow money displayed a sharper decline after 1975-76, which is attributed to the monetization of the economy and many other factors other than monetization of the economy.

In another important paper Kamiah, Paul et al. (1987) confirms that velocity behaviour of narrow money does not follow the random walk hypothesis in India. The paper used Autoregressive Integrated Moving Average [ARIMA] method on quarterly data for the period 1970-71 to 1981-82. Their finding happens to be very significant from theoretical point of view. It provides an empirical justification, at least in Indian context, in favour of the Monetarists' argument that accentuate the predictability of the money demand function, derived from stable velocity of money. Jadhav Narendra (1994) discussed about different factors that influence the velocity of money and also estimated the velocity function in case of India. He introduced 'financial sophistication' as a factor, unlike the earlier analysis. His paper, like that of Kamiah, Paul et al. (1987), has

shown that velocity of money in India does not follow random walk hypothesis and thereby emphasised the stability of money demand function and the legitimacy of the Monetarist conjecture.

Chakrabarty and Varghese (1989) estimated velocity of narrow and broad money for the period 1950-51 to 1984-85. The study of Omkarnath G and Parida Srutikantha (2006) using annual data from 1950-51 to 2001-02 tried to explain the declining pattern of velocity of money in Indian context. In a relatively new study, Rami (2011) found 'population per bank office' a significant factor, while degree of monetization as a less significant.

Though the literature in this area happens to be very rich, we found some scope to contribute. Our modest effort would be to identify the phase of Indian financial development in light of Bordo and Junang's (1987, 1990) analysis, which is absent in the existing literature.

Another limitation that is identified is that no study as yet has tried to focus on the seasonal fluctuation of velocity, which could be very relevant from the policy point of view. Hopefully the present project would be supportive enough to fill up these gaps and thus enrich the existing literature.

III. Methodology:

The quarterly data of GDP at current and constant price at base year 2011-12, along with the money stock for both narrow money M1 (which includes) and M3 (which includes) at the end of each quarter is taken for the period 2004-05 to 2018-19.

From this the velocity of money, V1 corresponding to M1 and V3 corresponding to M3 is calculated for each quarter using the relationship:

$$\text{Velocity} = \text{Nominal GDP} / \text{Money Stock}$$

A simple line diagram showing V1 and V3 for the period calculated is plotted on the same graph. The same method is applied for the period 1951-52 to 2018-19.

The gap between velocity V1 and V3 for narrow money and broad money respectively in each year is calculated by taking the difference between mean of quarterly V1 and V3 in each year.

The coefficient of variation (C.V) for the whole period is calculated both for V1 and V3, using the formulae

$$C.V = (\text{Standard deviation of velocity} / \text{Mean of velocity}) * 100$$
$$\text{Standard deviation} = \left[\frac{\sum (V_i - \text{Mean velocity})^2}{60} \right]^{1/2}, \text{ where } i=1(1)60$$
$$\text{Mean} = \text{Sum of velocity} / 60$$

Also the same method is applied to find quarterly coefficient of variation for each year during the period 2004-05 to 2018-19.

Bar graphs representing this quarterly variation in velocity for both V1 and V3 are constructed.

The gap between coefficients of variation of V1 and V3 in each year is also taken as the difference between the two.

Further the seasonal indices are calculated using the method of quarterly averages (multiplicative method) where Seasonal Index of VT in QI = Average of VT in QI (2004-05) / Grand Average * 100

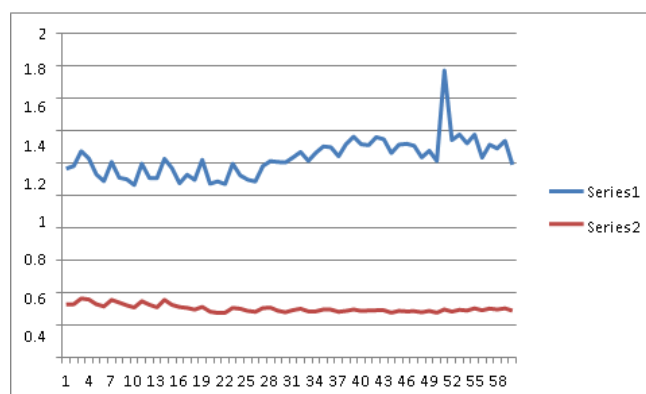
$$\text{Grand Average} = \text{Sum of averages of QI} / 4$$

The seasonal indices thus found are graphed in the form of bar diagram.

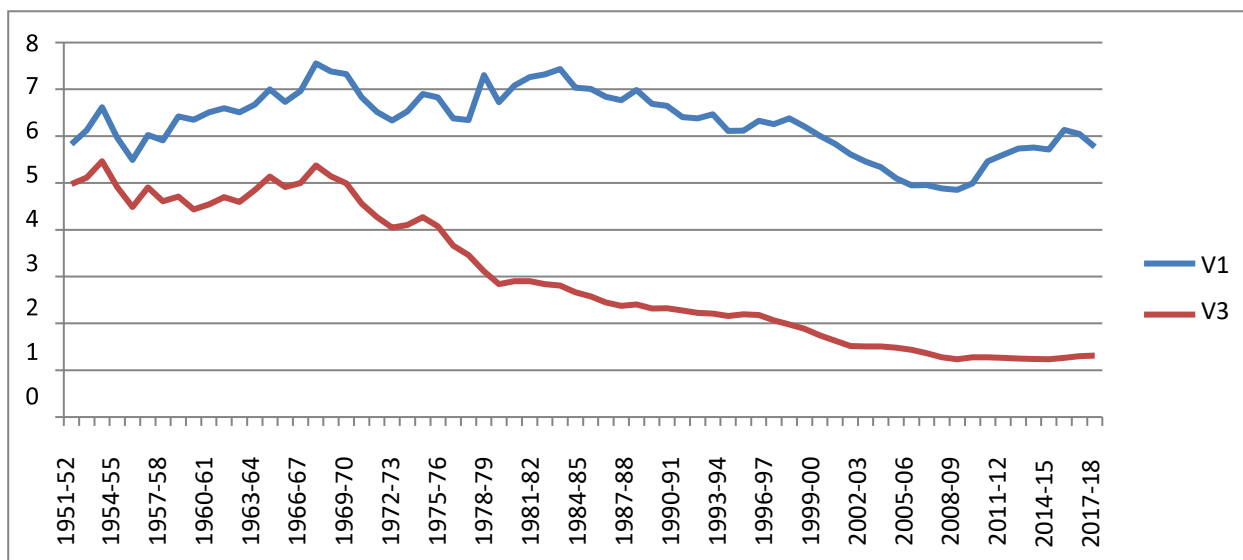
For taking into account the unnatural event of demonetization in 2016-17, where an unexpected rise in V1 and V3 can be seen for the quarters 3 and 4. To nullify this effect from causing changes in our result, simple interpolation is done for the quarters, where the value of quarter 3 and 4 is taken as simple average of the previous and following year's quarter 3 and 4 respectively. And from that data the quarterly coefficient of variation in each year and also these seasonal indices are calculated like before.

IV. Analysis:

Firstly, it is found out that the velocity of both narrow money (V1) and broad money (V3) are both falling as represented in the line diagram below:



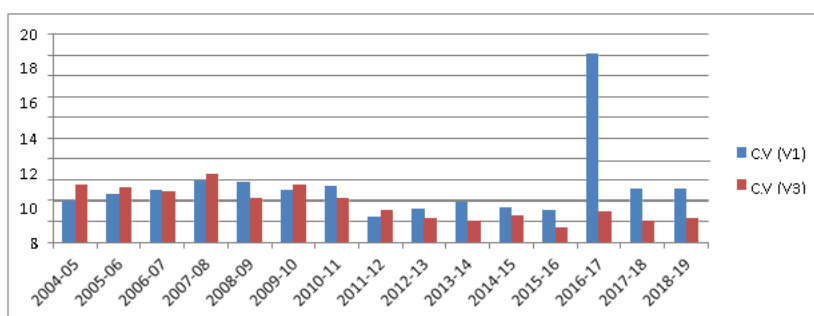
A clearer picture can be drawn when the data is considered over a longer period is considered. Below is the graph of yearly velocity of both narrow money (V1) and broad money (V3) for the period 1951-52 to 2018-19:



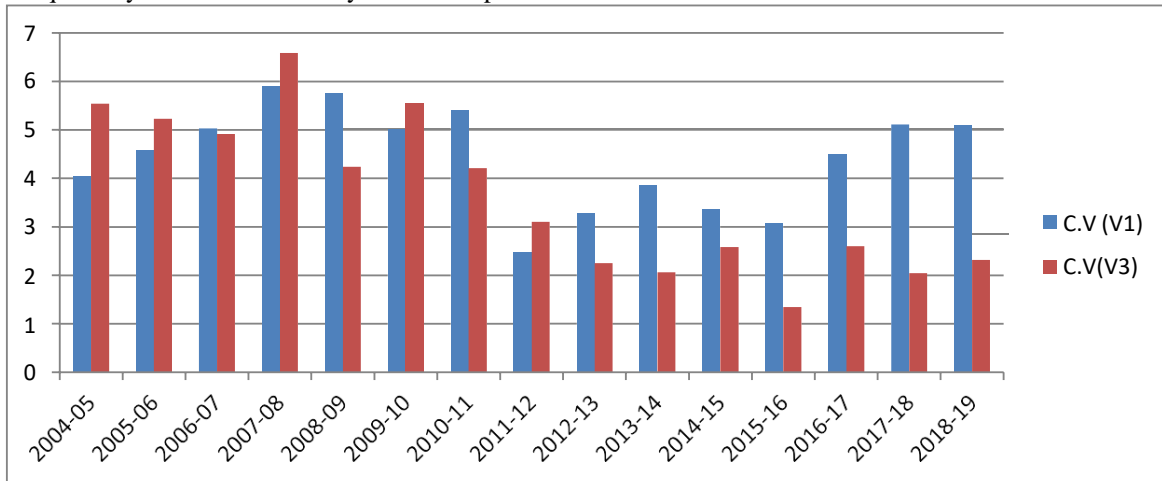
It is clear that velocity of both broad money and narrow money is falling which contradicts Narendra Jadav’s findings. Thus India seems to be in phase 1 of global velocity pattern for low income countries as suggested by Bordo and Jonung.

Secondly, as Narendra Jadhab’s study pointed out that the gap between V1 and V3 has widened over time, this seems true for the period under study 2004-05 to 2018-19. For interpolated data, too this claim is found to be true .

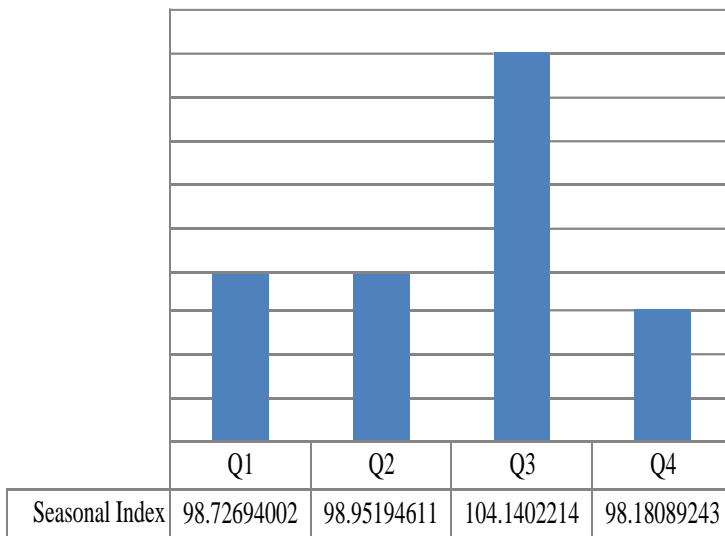
Next, it is found out that coefficient of variation in case of narrow money is greater than that of broad money, 9.5 in case of V1 compared to 7.04 of V3. Also for the quarterly variation in velocity of each year for the period 2004-05 to 2018-19, is indicated by the graph below:



The sudden increase in C.V (V1) in 2016-17 is due to the unnatural event of demonetization. The graph relating the quarterly variation in velocity of the interpolated data is shown below:



Thus, the quarterly variation in velocity is also higher in case of narrow money than broad money. This contradicts the finding of Jadhav’s study.



Clearly there is consistently a higher velocity of money in quarter 3 for both narrow and broad money. This may be due to higher spending on festive season that falls in this quarter.

V. Concluding Observations And Policy Implications

The objectives of the present project are of three folds as mentioned earlier – First, to present a long run behavior of velocity of circulation of money in India; Second, to calculate annual volatility (in terms of coefficient of variation) of the velocity of circulation of money and thirdly, to find out the seasonal variation in velocity. After analyzing the available data using simple statistical tools we have some significant findings, which might have some important policy implications.

From the long run annual data of the period 1951-52 to 2018-19, the velocity of circulation we see that the velocity of both broad and narrow money followed a downward trend since the beginning, particularly after bank nationalization in late 1960 and early 1970s. This happens due to gradual monetization of the economy after the nationalization of banks. With the expansion of the banking sector, the stock of money increases at a rate, which is higher than the rate of growth of nominal income. After 2007 there was an upward trend of V1 for a very brief period. This instigated Jadav to conclude that the Indian economy has crossed the threshold and entered into the second phase of development as per Bordo-Juang's phase division. Our analysis, however, contradicted Jadav's finding to show that the upswing that started on 2007 was a mere temporary phenomenon. The downward trend continued even further. This implies that despite plenty of measures, like introducing new monetary instruments, that were supposed to refine the financial sector the economy has not been sophisticated enough to show a downward trend of the velocity of circulation. So, our analysis clearly reveals that the Indian economy is yet to reach the second phase of development, where the V2 would start to increase and the V1 would continue to decrease.

Our estimation of coefficient of variation shows that the velocity of circulation was quite stable during our period of study, though the methods that we applied are not sophisticated enough to make such a strong conclusion. A stable velocity has serious theoretical and policy significance. A stable and predictable velocity enables us to estimate the money demand function. Friedman and other monetarists, contrary to the Keynesians, advocated stable and predictable velocity. In Indian context, with reasonably stable velocity of circulation of money, the Monetarists' tenets seemed more factual than that of the Keynesians.

While estimating the seasonal variation from quarterly data we find that the velocity of both narrow and broad money is significantly higher in the third quarter compared to the other quarters. This may be due to the fact that most of the Indian festivals concentrate in this quarter (October, November, December), and that attributed to the increase in velocity. The monetary authority may consider it while formulating the monetary policy.

The present project leaves some scope for further research. Firstly, a good research question could be to test the predictability of velocity in India i.e. whether the variable follows any random walk or not. The question of predictability of velocity is related to an old theoretical debate, as mentioned earlier. Secondly, this project could be extended to estimate the money demand function for Indian economy. For that purpose we need to introduce many related variables like real rate of interest, any proxy for monetization and financial sophistication.

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