

## **Income Velocity and per Capita Income in Pakistan: 1974-75 to 1991-92**

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### **I. INTRODUCTION**

The purpose of this paper is to bring to light the effects of velocity on monetary policy during the process of development. The stated hypothesis is that if velocity declines as per-capita income increases, the monetary authorities can issue more money to finance economic growth with low rates of inflation. This short paper attempts to test the hypothesis in the post 1974 period for the present Pakistan over the period 1974-75 to 1991-92. This period corresponds to the official division of all the financial and other statistics between East and West Pakistan. The financial developments and the trends in overall economic development over the period is expected to yield results different from the studies done in the earlier period.

### **II. STATISTICAL EVIDENCE**

Empirical evidence on the trends in income velocity in advanced countries is adequate and quite clear. For less developed countries it is not only inadequate but difficult to compare because of different time periods taken and the data used. In Pakistan four studies [UNECAFE (1967); Soligo (1967); Porter (1961) and Khan (1974)], using four different time periods, show divergent results on the relationship between velocity and per-capita income. However it is obvious that these results may be affected by the patterns of development; the changing economic and institutional factors; the time period covered; and the combined data set of East and West Pakistan which was affected by the extreme values. Keeping in view the considerable financial reforms undertaken, the increased rate of growth of the economy over time and the availability of a rather more homogenous data set for

the present Pakistan only, this paper attempts to study the determinants of velocity of income over the period 1974-75 to 1991-92.

The relevant economic theory is clear. It is generally hypothesised by most writers that variations in velocity can be explained by factors like per-capita income, interest rates, inflation, institutional and payment mechanisms, transport and communications, spending habits etc. Like the others we also hypothesise that the same variables exert considerable influence on the income velocity in Pakistan. However besides these purely economic factors our study includes an important variable, namely drug money, to assess the extent of its influence on our dependent variables. The importance of drug money can be gauged from the fact that while it is not accounted for in the national accounts it has the capacity to upset the entire planned financial mechanism.

### III. THE MODEL AND ADDITIONAL VARIABLES

The income version of the quantity theory of money is that

$$M = kY \quad \dots \dots \dots (1)$$

$$k = I/V = M/Y \quad \dots \dots \dots (2)$$

$$V = Y/M \quad \dots \dots \dots (3)$$

$$M_s = M_d \quad \dots \dots \dots (4)$$

$$= L(Y, i, p, \text{ etc. } ) \quad \dots \dots \dots (5)$$

substituting 5 in 3 we get

$$V = Y/L (Y, i, p, \text{ etc. } ) \quad \dots \dots \dots (6)$$

Equation (6) suggests that velocity (*V*) depends on income, (*Y*) interest rate (*i*) inflation (*p*) and other institutional factors like the number of bank branches.

#### Dependent Variable

*Income Velocity* ( $V_1$  and  $V_2$ ): The velocity measures used in this paper are estimated with Gross Domestic Expenditure (GDE) in the numerator. The GDE includes only final transactions, and accounts only for the transactions on which the domestic supply of money is used. The denominator money supply (*M*) comprises of *M2*.

## Independent Variables

*Per-capita Income (Y)*: is represented by per capita real gross domestic product. The way changes in per-capita income affect velocity depends on the assumption about the income elasticity of the demand for money. If it exceeds unity it has a negative impact on per-capita income and *vice versa*. In the case of Pakistan, the studies pertaining to the earlier periods show that as per-capita income increases demand for money increases by more than proportionate i.e. income elasticity of money demand is significantly greater than one [Khan and Raza (1989) and Akhtar (1994)]. However over time the income elasticity of demand is found to be declining around one [Khan (1994) and Akhtar (1994)].

*Interest Rate (i)*: Since the interest rates on bank deposits have largely remained under control we use the average interest rate on all time deposits. An increase in interest rates leads to a reduction in the demand for money. Therefore velocity increases. It is more so in times of inflation as nominal interest rates increase in times of increasing prices. Interest rates represent the opportunity cost of holding money and when this cost increases, money holders wish to lend it to be turned over more often.

*Inflation (P)*: The inflation rate is measured by the consumer price index at the 1980-81 prices. The effects of expected inflation can be interpreted in two ways, (1) If there is a one time rise in the price level the demand for money may remain unchanged. (2) However if continuous price increases are expected the public in general will try to reduce their demand for money and instead hold assets whose value is not adversely affected by inflation. In other words money is spent as soon as it is received. Even firms may want to pay their workers more often. Thus in times of rising prices, velocity of circulation increases as the payment patterns and shopping habits change. Such an adjustment in the demand for money due to inflation is similar to the adjustments made due to rising interest rates. Both inflation and interest rates represent the increasing opportunity cost of holding money.

*Bank Branches (BB)*: The institutional arrangements and the means of communication are important in determining the velocity of money, for example, widely spread bank branches, credit card systems and the transfer of funds by telephone or telegraph mean less cash is carried by the people for a given business transaction. It is generally believed that since changes in the institutional set-up are rather slow therefore velocity may remain more or less stable. However in growing economies like Pakistan where institutional changes are rapid we could expect any relationship between Bank Branches and velocity.

*Drug Money (DD)*: The present study includes a very important socio-economic variable—drug money. This is not reflected in any accounts but its undesirable effects on inflation and other economic parameters are quite obvious. Furthermore, the social and economic loss of human resources due to the use of drugs is colossal. Since it is difficult to measure the importance of drug money in influencing velocity due to the nonavailability of data therefore a dummy variable is used to represent drug money. It is very difficult to estimate the annual extent of drug money. However it is a widely held view in Pakistan that drug money is substantial; it is estimated to be over \$ 1 billion annually. In order to legalise this money, recipients of drug money spend it more rapidly.

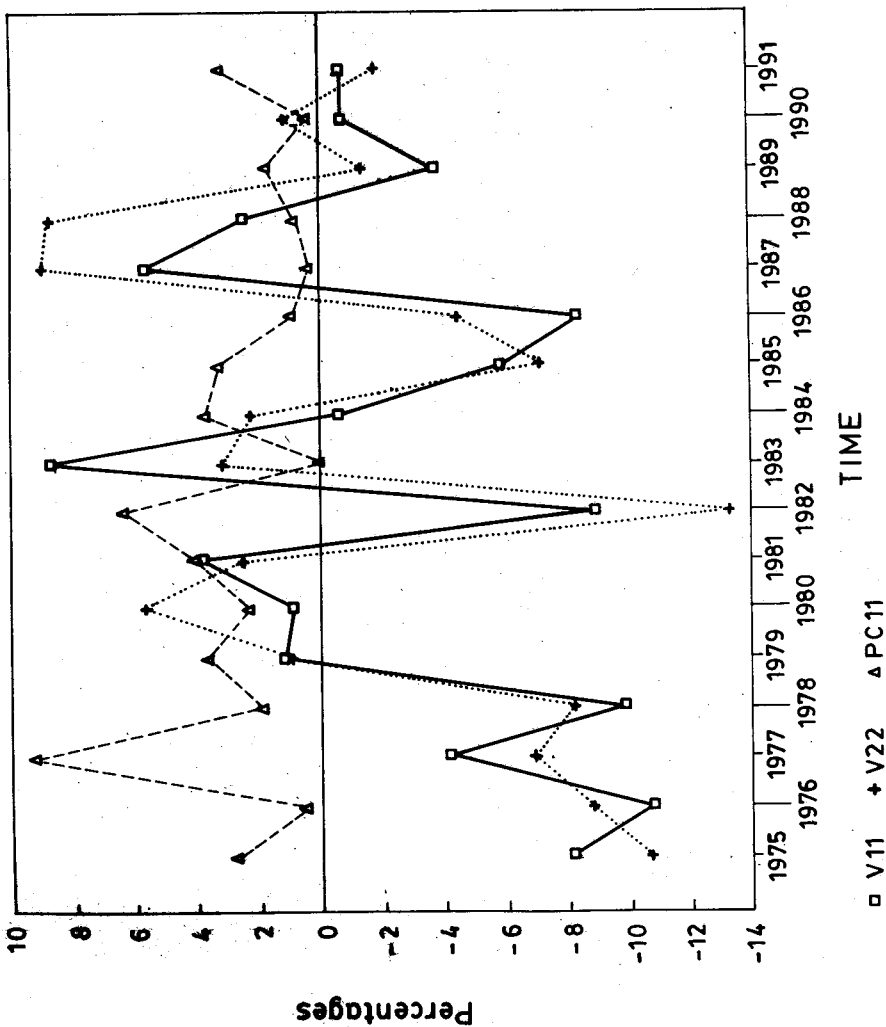
#### IV. TRENDS IN VELOCITY AND PER CAPITA INCOME

Trends in the two measures of velocity ( $V_1$  and  $V_2$ ) and per capita income are shown in Table 1 and Figure 1.

Table 1  
*Growth Rates of  $V_1$ ,  $V_2$  and PCI*

| Year    | $V_1$<br>(CC+DD) | $V_2$<br>(CC+DD+TD) | Real per Capita<br>Income (PCI) |
|---------|------------------|---------------------|---------------------------------|
| 1974-75 | 4.66             | 3.19                | 2631                            |
| 1975-76 | 4.28             | 2.85                | 2706                            |
| 1976-77 | 3.82             | 2.60                | 2720                            |
| 1977-78 | 3.66             | 2.42                | 2978                            |
| 1978-79 | 3.30             | 2.22                | 3032                            |
| 1979-80 | 3.34             | 2.24                | 3145                            |
| 1980-81 | 3.37             | 2.37                | 3217                            |
| 1981-82 | 3.50             | 2.43                | 3349                            |
| 1982-83 | 3.19             | 2.11                | 3564                            |
| 1983-84 | 3.47             | 2.18                | 3566                            |
| 1984-85 | 3.45             | 2.23                | 3701                            |
| 1985-86 | 3.25             | 2.07                | 3824                            |
| 1986-87 | 2.98             | 1.98                | 3860                            |
| 1987-88 | 3.15             | 2.16                | 3877                            |
| 1988-89 | 3.23             | 2.35                | 3913                            |
| 1989-90 | 3.11             | 2.32                | 3984                            |
| 1990-91 | 3.09             | 2.35                | 4003                            |
| 1991-92 | 3.11             | 2.31                | 4136                            |

Fig. 1 % Changes in V1 V2 and per-Capita Income



It will be seen from Table 1 and Figure 1 that (a) velocity is not stable which raises doubts about the assumption that velocity is constant and stable. Clearly, there are significant changes in velocity even over short time intervals. For example there are considerable fluctuations on an annual basis over the period 1978-79 to 1991-92.  $V_1$  increased at the rate of 4, 9 and 3 percent in 1981-82, 1983-84 and 1988-89 respectively. Similarly,  $V_2$  registered a positive growth rate during 1980-81, 1981-82, 1983-84 and 1984-85. However, it will be seen from Figure 1 that except for 1981-82 when per-capita income and  $V_1$  and  $V_2$  increased simultaneously, the increase in  $V_1$  and  $V_2$  corresponds to a slow down in the rate of growth of per-capita income to less than 1 percent; (b) over all it is observed that velocity follows a declining trend; (c) undoubtedly per-capita income has increased.

## V. RESULTS

The results of the study estimated through step-wise regression are reported in Tables 2, 3 and 4. Results reported in Table 2 pertain to the dependent variable  $V_1$  and exclude the bank branches variable.

Table 2  
*Regression Results with  $V_1$  as Dependent Variables*

| Log $V_1$ | a              | Log PCI          | Log P          | Log i            | D               | $R^2$ | $\bar{R}^2$ | D. W. |
|-----------|----------------|------------------|----------------|------------------|-----------------|-------|-------------|-------|
| 1.        | 6.69<br>(8.14) | -0.67<br>(-6.64) |                |                  |                 | 0.733 | 0.717       | 0.898 |
| 2.        | 5.59<br>(6.17) | -0.55<br>(-5.18) | 0.07<br>(2.13) |                  |                 | 0.795 | 0.768       | 0.820 |
| 3.        | 4.42<br>(3.40) | -0.38<br>(-2.15) | 0.08<br>(2.38) | -0.14<br>(1.24)  |                 | 0.815 | 0.776       | 0.869 |
| 4.        | 7.77<br>(5.18) | -0.78<br>(-3.89) | -              | -0.14<br>(1.13)  | 0.09<br>(1.807) | 0.790 | 0.745       | 1.304 |
| 5.        | 6.08<br>(4.24) | -0.57<br>(-3.08) | 0.07<br>(2.54) | -0.19<br>(-1.82) | 0.09<br>(2.03)  | 0.860 | -0.817      | 1.483 |

PCI = per-capita real income.

P = Inflation rate.

i = Average interest rates.

D = Dummy for drug money.

Table 3  
Regression Results with  $V_1$  and  $V_2$  as Dependent Variables

|           | a              | Log BB           | Log PCI          | Log P          | Log $i$         | D               | $R^2$ | $\bar{R}^2$ | D. W. |
|-----------|----------------|------------------|------------------|----------------|-----------------|-----------------|-------|-------------|-------|
| Log $V_1$ | 8.47<br>(6.53) | -0.61<br>(-3.31) | -0.23<br>(-1.33) | 0.04<br>(1.80) | -0.05<br>(0.61) | 0.02<br>(0.70)  | 0.926 | 0.896       | 1.667 |
|           | 8.94<br>(8.68) | -0.65<br>(-4.15) | -0.24<br>(-1.44) | 0.04<br>(1.74) | -               | 0.02<br>(6.50)  | 0.924 | 0.901       | 1.662 |
| Log $V_2$ | 6.33<br>(4.57) | -0.41<br>(-2.12) | -0.27<br>(-1.45) | 0.13<br>(5.01) | 0.04<br>(0.41)  | 0.05<br>(1.35)  | 0.913 | 0.877       | 1.788 |
|           | 5.99<br>(5.50) | -0.37<br>(-2.24) | -0.26<br>(-1.46) | 0.13<br>(5.67) | -               | 0.06<br>(1.736) | 0.912 | 0.885       | 1.662 |

BB = Bank Branches.

Table 4  
Regression Results with  $V_2$  as Dependent Variables

| Log $V_2$ | a              | Log PCI          | Log P          | Log $i$          | D              | $R^2$ | $\bar{R}^2$ | D. W. |
|-----------|----------------|------------------|----------------|------------------|----------------|-------|-------------|-------|
| 1.        | 5.29<br>(4.83) | -0.55<br>(-4.06) | -              | -                | -              | 0.507 | 0.476       | 0.614 |
| 2.        | 2.85<br>(3.48) | -0.28<br>(-2.95) | 0.15<br>(5.23) | -                | -              | 0.825 | 0.802       | 1.240 |
| 3.        | 2.88<br>(2.32) | -0.29<br>(1.72)  | 0.15<br>(4.93) | -0.003<br>(0.03) | -              | 0.825 | 0.788       | 0.246 |
| 4.        | 5.02<br>(4.43) | -0.55<br>(-4.02) | 0.15<br>(5.79) | -                | 0.09<br>(2.45) | 0.878 | 0.851       | 1.593 |
| 5.        | 6.69<br>(3.63) | -0.50<br>(-2.99) | 0.15<br>(5.65) | -0.05<br>(0.56)  | 0.09<br>(2.46) | 0.880 | 0.844       | 1.578 |

In Table 2 all the explanatory variables bear the expected signs and are significant except for the rate of interest. Secondly the rate of interest is strongly correlated with per-capita income (PCI) and its inclusion lowers the significance level of PCI variable. The PCI variable bears the negative sign and is highly significant at the 0.5 percent level of significance, confirming the hypothesis that

velocity of narrow money declines as per-capita income increases over the period 1974-75 to 1991-92. The rate of inflation also bears the correct sign and is highly significant at 2.5 percent level of significance.

These two results are contrary to the findings of the earlier empirical study by Khan (1974). The earlier period was characterised by low inflation for almost the entire decade of the Sixties, therefore the inflation rate remained insignificant. The per-capita income variable in the earlier study was negatively related to velocity. However the inclusion of other explanatory variables changed its sign and it became insignificant at the 5 percent level. This outcome may be due to the financial system prevailing. Secondly, the combined data of East and West Pakistan may be affected by extreme values.

The drug money variable represented by a dummy with the value of 0 for 1974-75 to 1983-84 and 1 for 1984-85 to 1991-92 also bears a positive sign and is significant at the 5 percent level. This implies that an increase in drug money leads to the increased velocity of money. This phenomenon was nonexistent in the earlier period but has become institutionalised in the Eighties.

In the present study the number of bank branches bears a negative but highly significant coefficient as shown in Table 3. The following factors may be held responsible for this result. First, the negative sign cannot be justified as a positive development for the economy as explained by Khan (1974) for the earlier period. Khan relates the negative sign to the increase in bank fixed deposits which would result in a decline in the velocity. However over the period covered by the present study the rate of growth of time deposits has always remained less than that of the demand deposits except for three years i.e. 1983-84 to 1985-86. This phenomenon is the result of the very rapid spread of the National Savings Schemes (NSS) which have a substantially higher rate of return compared to the banks. Second, over the period covered in this study a number of bank branches have been closed as a policy measure to consolidate the spread of bank branches. Consequently the rate of growth in bank branches declined quite rapidly from 12 percent in 1975-76 to 1.3 percent in 1991-92. It was negative for the two consecutive years 1982-83 and 1983-84. Third, the bank branches variable is highly positively correlated with the real per-capita income and its inclusion affects the significance levels of the per-capita income.

However it is quite possible that BB is not a good representative of financial innovation that has taken place during this time period.

The results on  $V_2$  as reported in Table 4 are very similar to those of  $V_1$ . However the level of significance of the the inflation rate and the drug money

variable increases considerably. The  $R^2$  adjusted  $\bar{R}^2$  and Durbin-Watson statistic also improve with the inclusion of the drug money variable in equations of  $V_2$ .

## VI. SUMMARY AND POLICY IMPLICATIONS

To summarise, over time the behaviour of income velocity with respect to per-capita real income has changed. It may be attributed to the financial and economic developments in the post 1971 war period. However at the same time inflation and drug money bear positive signs and are highly significant over the period 1974-75 to 1991-92. These results have both positive and negative policy implications. The confirmation of the hypothesis on the relationship between the per-capita income and behaviour of velocity reflects some positive signs of development in the economic and financial system. On the other hand, the continuous rise in the inflation rate is the sore spot of the economy which needs to be cured without any further delay. Finally, there can be no two opinions about the undesirable effects of drug money on both the economic and social system. Not only does it undermine the efforts to stabilise the economy, its costs in terms of loss of human resources are tremendous. Looking at the political realities in Pakistan it is quite obvious that its solution depends entirely on the political will of the government.

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**Comments on  
“Income Velocity and per Capita Income  
in Pakistan: 1974-75 to 1991-92”**

The paper under discussion titled “Income Velocity and per Capita Income in Pakistan: 1974-75 to 1991-92” is a good attempt towards bridging the gap in the literature on income velocity in Pakistan by extending the earlier period of analysis (1950–1973) upto 1991-92.

It provides an opportunity to examine the nature of the functional relationship between velocity and its determinants for a period of approximately twenty years and compare it with the earlier findings for Pakistan. Besides studying the effect of the theoretically conventional variables like real income, interest rates and inflation, the paper also tries to investigate the influence of monetisation by the inclusion of the bank branches variable and that of an important facet of the underground economy namely the presence of drug money.

The study reveals a significantly inverse relationship between velocity and per capita real income which supports the hypothesis that velocity decreases as real income increases if the income elasticity of money demand is greater than unity. Mangla found the income elasticity of money demand to be greater than unity for the period 1958–71 and Ashfaque obtained similar evidence for the income elasticity of money demand for the period 1959-60 to 1977-78. The paper does not develop the hypothesised relationship between velocity and real income by focusing on the income elasticity of money demand. Rather, it argues that velocity changes are functionally related to saving decisions. Even though reference is made in the paper regarding the theoretical linkage between changes in velocity resulting from changes in asset demand for money, the evidence regarding the behaviour of velocity over the last two decades is not clearly linked to the theoretical proposition by which speculative expenditures affect the demand for money and consequently the income velocity of money.

Many of the factors that affect velocity can be analysed by recognising that velocity changes whenever people alter their money holdings relative to their income so that factors that cause people to increase their money holdings relative to their income reduce velocity. Perhaps the paper should give more emphasis to the specific factors that have led towards reversing the direction of the relationship

between per capita real income and velocity over the last two decades. This is important from the point of view of understanding the link between velocity and monetary policy given that the significance of the role of velocity in the conduct of monetary policy has been well established.

The empirical evidence regarding the negative sign of the bank branches variable can also be interpreted in light of earlier evidence regarding the positive relationship of the degree of monetisation represented by the bank branches variable with the demand for money in Pakistan which points towards a decline in velocity [Khan (1980)]. This could be useful in explaining a result that has been consistent with earlier work on income velocity in Pakistan.

Keeping in view the importance of the results of this study from the framing of monetary policy perspective, a more in-depth discussion of the actual and potential role of velocity in the context of variables that influence its direction would prove to be extremely beneficial to theoreticians and planners.

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