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Contents

ARTICLES

Inflation: Multivariate Causality in Consumer Price Index

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Abstract: This paper sheds light on some problems of using Consumer Price Index (CPI) as the official measure of inflation in Pakistan. It is observed that CPI has not only an upward bias but also has methodological deficiencies. Further, the paper investigates the direction of causation between CPI, money supply, exchange rate, interest rate, oil prices and fiscal deficit. Annual time series data of these variables for the period 1972-2007 and modified Granger Causality Test are used for determining the causation. The paper concludes that there exists bidirectional causality between CPI, broad money supply growth, market exchange rate, real GDP and fiscal deficit. This study shows for the first time in the case of Pakistan that the impact of real variables and shocks on CPI is significant.

1. Introduction

Inflation is commonly understood as "too much money chasing too few goods." Money is merely one of the possible causative explanations. Inflation can be generated from various sources, like increase in aggregate demand, adjustment in wages and exchange rate, increasing fiscal deficit, expectations, consumption habits, monopoly profits and imported prices. It is the most talked about issue even without fully comprehending its source because the end result is the same, *i.e.* prices increase. This universal outcome of 'price hike' is not uniform in its impact. There are various puzzling outcomes in the economy which not only fascinated the academia to come out with controversial theories but also gathered the maximum attention of policy makers.

Inflation affects different strata differently and, therefore, imposes uneven burdens. Theoretically speaking, it can be considered as a zero sum game in perfectly functioning markets because someone's loss is someone else's gain. In this simple world, inflation increases all prices in the same proportion. This is an environment in which it is possible to imagine that inflation has no impact or very little impact on real output. It is, however, not a true reflection of the actual behaviour of the events. Due to disproportionate taxes, asymmetric information and less integrated markets, inflation invariably affects output. In this real world environment, if interest rates are stable, then the decision between investment and speculation depends on the inflation rate. There is a general notion that inflation adversely affects the real GDP growth. It has direct implications for investment decisions. Usually it is assumed that inflation can generate positive effects for investors in the form of capital gains and interest rate effect. It has a worse outcome if inflation increases at a moderately high rate: efforts of households and business firms to offset its effect generate an unending inflationary spiral. Decision making processes are rendered dubious and complex. High inflation rate makes output more volatile. Whenever inflation takes place, urgent actions are generally taken to control prices, which are nearly always short-lived.

Increase in prices can be measured in various ways. The most commonly used indicators in Pakistan are Consumer Price Index (CPI), the Wholesale Price Index (WPI) and Sensitive Price Indicator (SPI). Each of these measures faces practical complications in compiling averages of prices. Consumer Price Index is most widely used in Pakistan and elsewhere for the measurement of inflation rate. It has an upward bias due to quality effect, substitution effect, new goods effect and outlet effect. In addition, there is an urban bias and coverage (items) bias.

With all these problems associated with the impact of inflation and issues related to measurement, controlling inflation assumes top priority in economic decision making in all countries of the world and in all types of economies. We have to identify the sources of inflation in the first instance if effectiveness of economic policies to control inflation is to be ensured. An implicit consensus has somehow emerged that sound monetary policy is more effective in influencing economic growth via price stability in a developing country, where markets have not yet completely developed.

Accordingly, the question has to be posed as to what causes inflation in a developing economy like Pakistan and how it can be controlled. There is a need to know the causation between inflation and its possible sources. Understanding causation between inflation and its auxiliary variables is all the more important because of recent high inflation in Pakistan. Decision-making in public and private sectors depends on announced inflation rate prevailing in the economy.

This paper sheds light on the problems of using CPI as a measure of inflation. It further investigates the direction of causation between CPI, money supply, exchange rate, interest rate, oil prices and fiscal deficit in Pakistan. Annual time series data related to these variables during 1972-2007 have been used. This will enable us to comment on the short run determinants of inflation in Pakistan.

The paper is divided into six sections. Section 2 reviews the literature related to the causation in inflation and empirical findings on the subject. Section 3 sets out the theoretical framework on the subject and spells out the data sources. In Section 4 are highlighted the issues related to the use of CPI as a measure of inflation in Pakistan. Empirical results are presented in Section 5. The final Section puts together the findings and conclusions, besides bringing out the policy implications.

2. Review of Literature

The contemporary debate on inflation started with the Monetarists' belief that money supply is the source of inflation, in contrast to the Keynesians' emphasis on structural factors. Post-Keynesians are agreed on the findings of Monetarists but maintain that increased money supply is a necessary but not a sufficient condition of inflation. Post-Keynesians consider increased money supply as "Insufficient but Non-redundant part of an Unnecessary but Sufficient condition (INUS)"(Hammond, 1986; Moore, 1979). Thus a debate started in macroeconomics on what causes inflation. Pursuing this idea further, various authors have furnished empirical evidence on the subject.

Ram (1984) used Granger Causality Test for finding the causal link between inflation and productivity change for the United States covering the period

1953:I-1982: IV. Two different productivity variables and two measures of inflation were employed. The results indicate a unidirectional flow of Granger-causality from inflation to productivity change with little feedback, particularly in tests that use the CPI-based inflation measure.

Monetization of the fiscal deficit also contributes to inflation, though Fischer et al. (2002) find a strong relationship between fiscal deficits and inflation only for high inflation countries or during high inflation episodes. In open economies, inflation can result from movements in the nominal exchange rates. Finally, inflationary expectations and their formation can impact inflation through price-wage spirals or sheer inertia.

Based on empirical research many economists have argued that the presence of unorganized financial institutions, a lack of direct relationship between interest rates and investment, and poor governance render monetary policy ineffective in influencing economic growth and price level in a developing country (Edwards and Tabellini, 1991; Fry, 1988)

Jones and Khilji (1988) used monthly data for narrow money (M1) and broad money (M2) in Pakistan, and prices data for the period 1973-1985 to apply Granger Causality Test and concluded that money supply with significant lag impacts CPI and WPI without any feedback. Khan and Siddiqui (1990) used the Sims Approach on quarterly data for 1972-1981. They concluded that bidirectional causality exists for broad money supply and CPI. Bengali, et al. (1997) confirms the results of earlier studies and concluded that bidirectional causality exists for money supply to CPI.

Hussain and Tariq (1997) revised the earlier methodology [with the exception of Bengali et al. (1997)] and used co-integration method for establishing the long run causation between money supply and CPI and Error Correction Method (ECM) for determining the short run relation between money supply and CPI. They concluded that uni-diretional causality exists in Pakistan.

Madhavi and Schimmelpfennig (2005), Mubarik (2005), Qayyum, et al. (2003), and Tahir (2003) attempted to delineate the determinants of inflation in Pakistan and identify its nature. Khan and Qasim (1996) find food inflation to be driven by money supply, value-added in manufacturing,

and the wheat support price. Choudhri and Khan (2004) do not find evidence of exchange rate pass-through in a small VAR, while Hyder and Shah (2004) find some evidence of exchange rate pass-through in a larger VAR.

In Pakistan, various authors have made attempts to round off the debate whether or not money supply causes prices to rise. There is no study, however, which includes all other possible structural variables to confirm that either money supply alone is responsible for increase in prices or it is INUS. Previous studies either employed the Granger or Sims methodology which has not passed the time series properties test or they employed ECM for establishing causality. In this paper M-Wald technique has been used which is reliable in determining the causality between inflation rate, money supply, exchange rate, interest rate, oil prices and fiscal deficit in Pakistan. The constraint has been to use annual data due to the non-availability of quarterly or monthly data series for GDP growth rate and fiscal deficit in Pakistan.

3. Theoretical Framework

3.1 Causation

Causality tests are often used for determining the order of relationship between dynamic variables. This test became popular after the seminal work of Granger (1969) that regression never implies causation and the issue of finding out the direction of causality between two economic variables is also important. Ever since, the use of causality has become a common practice in empirical work. The direction of causality has generally been tested using either the Granger (1969) or Sims tests (1990).

3.1.1 Granger Causality Test

Granger (1969) formulated a statistic to test whether movements in one variable systematically precede movements in another variable. Granger causality is determined by discovering whether including the past values of a variable in the information set can improve the forecast of another variable. The Granger approach to the question of whether 'x' causes 'y' is to see how much of the current 'y' can be explained by past values of 'y' and then to see whether adding lagged values of 'x' can improve the

explanation. 'y' is said to be Granger-caused by 'x' if it helps in the prediction of 'y'. It involves VAR estimation as a first step of model.

$$Y_t = \alpha_1 + \Sigma \beta i \, X_{t-i} + \Sigma \gamma_j \, Y_{t-j} + \mu_{1t}$$

$$X_t = \alpha_2 + \Sigma \theta_i \, X_{t-i} + \Sigma \delta_j \, Y_{t-j} + \mu_{2t}$$

It assumes that μ_{1t}, μ_{2t} are both uncorrelated white noise error terms.

There is a criticism that Granger causality test spotlights time preference rather than causality in the usual sense. It is, therefore, weak in establishing the relation between forward-looking variables. Another criticism is that causality test provides unstable results in integrated time series.

3.1.2 Multivariate Granger Causality Test

If two time series are integrated then Granger Causality test is not suitable for determining the direction of relationship between the variables. Toda and Yamamoto (1995) have developed modified Wald (MWALD) test procedure for determining the causality, irrespective of unit root problem in the data. It uses Augmented VAR settings irrespective of the order of integration.

The Toda-Yamamoto procedure is based on a lag(s) augmentation of the VAR model. Consider the following VAR (p) process: When variables are not exogenously determined, Yt and Xt are affected by current value and past values of Yt and Xt simultaneously, where we assume Yt and Xt are stationary and error terms are uncorrelated. This constitutes the first order VAR.

$$\begin{bmatrix} Y_{1t} \\ Y_{2t} \end{bmatrix} = \begin{bmatrix} U_1 \\ U_2 \end{bmatrix} + \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} Y_{1t-1} \\ Y_{2t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix}$$
$$Y \quad = \quad \mu \quad + \quad A \qquad Y_{t-1} \quad + \quad \varepsilon_t$$

Written as

$$Yt = \mu + AY_{t-1} + \varepsilon_t$$

where $\mu = (U_1, U_2)$ is a vector of constants and usually known as drifts, and εt $(\varepsilon_{1t} + \varepsilon_{2t})$ are innovations relative to the information set

$$Y'_{t-1} = \begin{pmatrix} Y_{1t-1} & Y_{2t-1} \end{pmatrix}$$

A pth order VAR in K variables is given by

$$Y_t = \mu + A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots\ldots\ldots + A_p Y_{t-p} + \varepsilon_t$$

where

$$Y'_t = (Y_{1t}, Y_{2t}, \ldots\ldots\ldots, Y_{kt}) \quad \varepsilon'_t = (\varepsilon_{1t}, \varepsilon_{2t}, \ldots\ldots\varepsilon_{kt})$$

$$A_j = \begin{bmatrix} A_{11.j} & A_{12.j} & \ldots & A_{1k.j} \\ A_{21,j} & A_{22,j} & \ldots & A_{2k,j} \\ & & & \\ Ak_{1,j} & A_{K2,j} & \ldots & A_{KK,j} \end{bmatrix}$$

VARs are particularly easy to estimate. Since lagged variables appear on the right hand side of each equation, there is no issue of simultaneity.

Toda and Yamamoto (1995) suggested the augmented VAR($p+d$) model that can be used for tests of causality between integrated variables: order p of the process is assumed to be known and d is equal to the maximum order of integration of the variables. The kth element of yt does not Granger-cause the jth element of yt if the following hypothesis is not rejected. After conducting the Granger Causality Test and M Wald test, we will compare the results.

3.2 Data Sources and Methodology

Data are obtained from the World Development Indicators (WDI) CD Rom (2005), International Financial Statistics (IFS) CD ROM (2005), various issues of Pakistan Economic Survey published by Ministry of Finance. The data related to the budget deficit (bdt) and bank lending rate (inr) was taken

from Global Insight country report, while the source of oil prices data series was United States: Energy Information Administration (1972-2007).

4. Issues Related to CPI

Measuring prices is important for realistic reflection of economic activity and inflation rate. But it is not easy to have exact calculation of general price level. In 2001, ILO published the report on the standards of price measurements. In 1996, Boskin *et al.* report was published and a debate started on the measurement issues of price indices. Consumer Price Index has an upward bias in estimating prices. In Pakistan, the official measure of cost of living is CPI. Monetary policy formulation for controlling inflation requires an accurate price index. The choice of price index guides the quality of central bank response to inflation.

CPI is a weighted index which measures price change at retail level, and in aggregate form provides estimates of general price level. There are certain measurement issues here. First, it measures price change in private consumption expenditure only. If inflation in a country is due to public spending or budget deficit then any measure of inflation should incorporate changes in prices for public consumption. Secondly, CPI in Pakistan is measured on the basis of monthly prices and the base is revised after 10 years. It is a long time to compare two baskets of goods. In UK, CPI base is changed every year. It makes price changes in one month comparable with the succeeding and preceding months more realistic. It also provides a remedy for substitution bias. Government of Pakistan has decided to change the base time period from 10 years to 5 years but it has not yet been implemented.[1] Thirdly, CPI in Pakistan has market selection bias. Markets have been selected in urban areas on the basis of volume of sales. It further assumes that majority of the consumers make their purchases from these markets. Fourthly, weights for CPI items have been developed from Family Budget Survey to represent the percentage expenditure share of a specified item in the total expenditure of the household on all CPI goods and services. There are four income groups: the lowest income group has income level up

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[1] The "CPI covers the retail prices of 374 items in 35 major cities and reflects roughly the changes in the cost of living of urban areas, 71 markets and 10 commodity groups and covers 92 commodities. It took price quotations from 106216 retail shops" (Federal Bureau of Statistics, 2008).

to Rs 3000 and highest income group is Rs 12,000 and above. The highest weight of 40 percent is assigned to food. With minimum wage at Rs 6000 and the official poverty line for the average family size also higher, the low income category of Rs 3000 does not reflect reality. Prices for CPI are collected directly from the retail shops according to a predetermined time table. Finally, the food and beverages group prices are collected on 11-14 of each month. For Apparel, Textile, etc. prices are collected on 1-3 of every month. The collection of unit price data on specific dates is arbitrary and may be a source of bias[2].

With these types of inadequacies, one cannot measure inflation with reliability. Therefore, there is need to revamp the methodology for estimating inflation in the economy. In a high inflationary situation these methodological issues may not have strong implications for the monetary policy authorities but it can have a drastic impact in the low inflation environment.[3]

5. Causality of Factors

For finding out the short run causation between a set of variables, the test is conducted with one lag and with two lags. Results are in Appendix I, which show that one way causation exists from CPI to real GDP, from CPI to broad money supply, from broad money supply to real GDP. An interesting result is that interest rate and market exchange rate both affect Inflation rate. In the short run, wheat prices also affect the CPI. Bilateral causation exists between CPI and broad money supply, between inflation rate and GDP growth, between market exchange rate and real GDP. It also exists between oil prices and broad money supply.

When the same test is applied with two lags, it confirms that CPI causes real GDP, interest rate and growth in broad money supply. Budget deficit causes real GDP and broad money supply and market exchange rates. Interest rate also causes inflation rate in our economy. Oil prices and GDP growth enjoy

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[2] There are some issues related to the measurement of quality changes in CPI also. Rebasing after 10 years makes it even more difficult to measure changes in tastes and quality.
[3] As inflation is used to adjust real changes in standard of living, an overestimation may result in distorting policy targeting.

bilateral causation. There is bilateral causation also between broad money supply and market exchange rate.

The results in Table 1 confirm that inflation has an impact on the monetary variable and real GDP growth affects the broad money supply. There exist one lag between inflation and broad money supply, and two lags between broad money supply and real output growth. The adverse effect of inflation on financial sector is one mechanism by which inflation can hurt growth. In Pakistan, periods of low inflation can be associated with high growth rates and vice versa.

Table 1: Results of Granger Causality Test

Consumer Price Index	→	GDP growth	Market exchange rate	→	Consumer Price Index
Consumer Price Index	→	(M2) Broad money	Wheat prices	→	Consumer Price Index
Broad money	→	Real GDP	GDP growth	→	Interest rate
Interest rate	→	Inflation rate	GDP growth	→	Broad money growth
Market exchange rate	→	Broad money	Market exchange rate	→	Broad Money Growth

5.1 Unit Root Test

The findings of the Granger Causality Test cannot be implemented if the data series is not stationary. We applied the unit root test. All the variables are non-stationary at the level so there is unit root. We take the first difference which confirms that all the variables are integrated of order 1. Thus the max order of integration (d=1) is found as 1. (See Appendix II)

5.1.1 Vector Auto Regressive model

We estimated the VAR on the level data and include the Consumer Price Index (CPI), real GDP (gdpr), broad money supply (M2), interest rate (inr) and market exchange rate (mxr). Lag length was selected on the basis of Schwarz Information Criterion, which is 1. The choice of lag length as '1' is because we are dealing with the annual data of monetary aggregates which require short lag length as compared to long lag length. (See Appendix III)

5.2 M-Wald Test

We estimated the following model in which we used the two lags (d+max (p)) criterion, which is (1+1)=2

$$CPI = f (CPI(-1) \ CPI(-2) \ INR(-1) \ INR(-2) \ M2G(-1) \ M2G(-2) \ MXR(-1) \ MXR(-2))$$

Then we test the model that causality runs from INR to CPI. We imposed the restriction on all the lagged variables (CPI, M2G, MXR) appearing in the equation. We do not reject the null hypothesis that INR does not cause CPI. It is concluded that interest rate has no impact on CPI in Pakistan for the time period (1972-2007). [See Appendix IV: Table (1a)]

After confirming that no causality exists from interest rate to CPI, we checked the model for causality from M2G to CPI. We reject the hypothesis that M2G does not Granger cause CPI. Thus the causation exists from growth in broad money supply to increase in prices. [See Appendix IV: Table (1b)]

We further test the model that causality runs from MXR to CPI. Imposing the restriction on all the lagged variables the equation except MXR, we reject the null hypothesis that MXR does not cause CPI and hence conclude that that market exchange rate impacts on CPI in Pakistan for the time period (1972-2007). [See Appendix IV: Table (1c)]

From the above mentioned results we can conclude that causality runs from MXR and M2G to CPI.

Using two lags (d+max (p)) criterion, the following model was estimated.

CPI =f (CPI(-1) CPI(-2) DFCT(-1) DFCT(-2) GDPR(-1) GDPR(-2) OP(-1) OP(-2) WHP(-1) WHP(-2))

The model was tested for real GDP causing CPI. We imposed the restriction on all the lagged variables (CPI, DFCT, OP, WHP) in the equation except RGDP. We reject the null hypothesis that GDPR does not cause CPI and therefore conclude that real GDP causes CPI in Pakistan for the time period (1972-2007). [See Appendix V: Table (1a)]

After confirming that there is causality from GDPR to CPI, we checked the model for causality from budget deficit to CPI. We reject that DECT does not Granger cause CPI. Thus there is causation existing from fiscal deficit to increase in CPI. [See Appendix V: Table (1b)]

Continuing, we further test the model that OP causes CPI. We imposed the restrictions on all the lagged variables (CPI, GDPR, DFCT, WHP) appearing in the equation except OP. The null hypothesis that OP does not cause CPI is rejected. Hence the conclusion that causation exists from oil prices to CPI in Pakistan for the time period (1972-2007). [See Appendix V: Table (1c)]

Again, we test the model that WhP causes CPI. We imposed the restrictions on all the lagged variables (CPI, GDPR, DFCT, OP) in the equation except WhP. We reject the null hypothesis that WhP does not cause CPI and conclude that causation exists from wheat prices to CPI in Pakistan for the time period (1972-2007). [See Appendix V: Table(1c)]

From the above discussed results we can conclude that unidirectional causality exists. Broad money supply, market exchange rate, real GDP, fiscal deficit, oil prices, and wheat prices can all cause CPI. In the case of Pakistan interest rate does not cause CPI. We further assume that inflation in Pakistan can be started from monetary side variables, supply shocks and real side variables, at least, in the short run.

CPI, market exchange rate, and broad money supply growth cause interest rate. Interest rate and CPI both cause broad money supply growth but market exchange rate is not a significant factor to cause growth in broad money supply. We can conclude that no causality exists from interest rate to CPI, but it is not true in case of CPI. CPI causes interest rate. There exists

uni-directional causality from CPI to interest rate. It seems to be a theoretically inconsistent finding. There are two important reasons which one can advance to understand this phenomenon. First, interest rates were controlled in Pakistan before 1990 and the objective of price stability was usually achieved through quantitative controls. Financial sector was not developed and often policy makers suggested controlling interest rate for creating investor friendly environment. Secondly, the State Bank of Pakistan got its autonomy in January 1997. It is only in recent times that interest rates are determined on the basis of market indicators.

CPI, interest rate and market exchange rate all cause M2G. CPI, M2G and interest rate all cause market exchange rate. CPI causes broad money supply growth and vice versa is also true. The same is the case with market exchange rate and CPI; therefore, we can conclude that there exists bidirectional causality between CPI and broad money supply growth and market exchange rate. [See Appendix VI: Table 1 & 2)]

The same test when applied to confirm the causality between real GDP and CPI shows that CPI also causes real GDP in the short run. Furthermore, CPI causes fiscal deficit, suggesting the existence of bidirectional causality between CPI, real GDP and fiscal deficit, oil prices and wheat prices.

6. Conclusions

This paper aimed to provide a better understanding of the phenomena of inflation in Pakistan. It has pointed out methodological inadequacies in measuring inflation. More importantly, it has looked at the direction of causation and contributed fresh insights. As a result, the conduct of monetary policy is likely to be more effective.

Although Pakistan's measurement of inflation is relatively better than India and many other developing countries, there is room for further improvement in the methodology, especially in regard to its upward and urban biases.

Inflation in Pakistan is structural in nature, at least in the short run. It is not only the monetary variables which are causative in explaining inflation but also the real variables and supply shocks responsible for originating it. There exists bidirectional causality between broad money supply growth, exchange rate, real GDP, oil prices, wheat prices and budget deficit. These

are the short run determinants of inflation in Pakistan. There is a need to look at the movement of these variables in order to control inflation. An interesting finding is that interest rate does not cause CPI but vice versa is true. This implies that unidirectional causality exists in the case of inflation. These findings are in accordance with earlier studies. In addition, this paper measures the impact of real variables and shocks on the CPI for the first time.

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<div align="right">Appendix-I</div>

Granger Causality Test (with two lags)

Pairwise Granger Causality Tests			
Date: 05/11/08 Time: 12:22			
Sample: 1970 2007			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Probability
DFT does not Granger Cause CPI	36	3.93888	0.02990
CPI does not Granger Cause DFT		2.57438	0.09240
GDP does not Granger Cause CPI	36	1.52582	0.23333
CPI does not Granger Cause GDP		0.16348	0.84991
GDPR does not Granger Cause CPI	36	1.10256	0.34469
CPI does not Granger Cause GDPR		9.29815	0.00069
INF does not Granger Cause CPI	34	3.55393	0.04164
CPI does not Granger Cause INF		4.98381	0.01379
INR does not Granger Cause CPI	36	3.31894	0.04942
CPI does not Granger Cause INR		10.9430	0.00025
M2 does not Granger Cause CPI	36	3.67809	0.03687
CPI does not Granger Cause M2		3.03406	0.06260
M2G does not Granger Cause CPI	36	2.67098	0.08507
CPI does not Granger Cause M2G		6.71191	0.00378
MXR does not Granger Cause CPI	36	2.28077	0.11910
CPI does not Granger Cause MXR		2.21072	0.12661
NM does not Granger Cause CPI	35	0.31560	0.73174
CPI does not Granger Cause NM		0.86311	0.43206
OP does not Granger Cause CPI	36	2.62532	0.08845
CPI does not Granger Cause OP		0.71632	0.49646
UMR does not Granger Cause CPI	34	0.00275	0.99726
CPI does not Granger Cause UMR		0.15221	0.85949
WHP does not Granger Cause CPI	36	0.89478	0.41899
CPI does not Granger Cause WHP		1.38292	0.26589
GDP does not Granger Cause DFT	36	0.63609	0.53613
DFT does not Granger Cause GDP		1.00255	0.37853
GDPR does not Granger Cause DFT	36	1.81758	0.17930
DFT does not Granger Cause GDPR		7.40926	0.00234
INF does not Granger Cause DFT	34	0.56137	0.57650

DFT does not Granger Cause INF		0.51177	0.60475
INR does not Granger Cause DFT	36	1.95404	0.15876
DFT does not Granger Cause INR		0.54029	0.58797
M2 does not Granger Cause DFT	36	0.16543	0.84827
DFT does not Granger Cause M2		6.63654	0.00399
M2G does not Granger Cause DFT	36	0.12608	0.88199
DFT does not Granger Cause M2G		2.85730	0.07263
MXR does not Granger Cause DFT	36	0.09416	0.91039
DFT does not Granger Cause MXR		8.43662	0.00119
NM does not Granger Cause DFT	35	1.43421	0.25418
DFT does not Granger Cause MXR		8.43662	0.00119
OP does not Granger Cause DFT	36	0.03238	0.96817
DFT does not Granger Cause OP		0.42728	0.65607
UMR does not Granger Cause DFT	34	0.74929	0.48163
DFT does not Granger Cause UMR		0.13526	0.87404
WHP does not Granger Cause DFT	36	0.88546	0.42270
DFT does not Granger Cause WHP		0.83555	0.44317
GDPR does not Granger Cause GDP	36	0.43053	0.65399
GDP does not Granger Cause GDPR		1.55058	0.22813
INF does not Granger Cause GDP	34	2.37085	0.11126
GDP does not Granger Cause INF		2.03309	0.14918
INR does not Granger Cause GDP	36	2.07277	0.14293
GDP does not Granger Cause INR		3.83331	0.03254
M2 does not Granger Cause GDP	36	0.30992	0.73575
GDP does not Granger Cause M2		3.24038	0.05273
M2G does not Granger Cause GDP	36	1.56865	0.22442
GDP does not Granger Cause M2G		2.09385	0.14030
MXR does not Granger Cause GDP	36	0.15285	0.85890
GDP does not Granger Cause MXR		0.12419	0.88365
NM does not Granger Cause GDP	35	1.21981	0.30952
GDP does not Granger Cause NM		1.08979	0.34923
OP does not Granger Cause GDP	36	4.24430	0.02349
GDP does not Granger Cause OP		4.87888	0.01438
UMR does not Granger Cause GDP	34	0.86432	0.43191
GDP does not Granger Cause UMR		0.36791	0.69536
WHP does not Granger Cause GDP	36	0.47801	0.62451
GDP does not Granger Cause WHP		2.88663	0.07085

INF does not Granger Cause GDPR	34	1.29770	0.28855
GDPR does not Granger Cause INF		1.92754	0.16369
INR does not Granger Cause GDPR	36	1.66593	0.20549
GDPR does not Granger Cause INR		1.40967	0.25944
M2 does not Granger Cause GDPR	36	10.7452	0.00029
GDPR does not Granger Cause M2		1.78876	0.18399
M2G does not Granger Cause GDPR	36	1.22041	0.30890
GDPR does not Granger Cause M2G		14.1000	4.4E-05
MXR does not Granger Cause GDPR	36	6.09949	0.00584
GDPR does not Granger Cause MXR		6.51957	0.00433
NM does not Granger Cause GDPR	35	2.79834	0.07686
GDPR does not Granger Cause NM		0.37847	0.68813
OP does not Granger Cause GDPR	36	0.40866	0.66807
GDPR does not Granger Cause OP		1.76875	0.18733
UMR does not Granger Cause GDPR	34	0.04975	0.95155
GDPR does not Granger Cause UMR		0.02819	0.97223
WHP does not Granger Cause GDPR	36	1.06099	0.35835
GDPR does not Granger Cause WHP		0.75795	0.47711
INR does not Granger Cause INF	34	4.90297	0.01465
INF does not Granger Cause INR		1.27991	0.29330
M2 does not Granger Cause INF	34	0.27454	0.76187
INF does not Granger Cause M2		1.23878	0.30462
M2G does not Granger Cause INF	34	0.79257	0.46224
INF does not Granger Cause M2G		0.89720	0.41872
MXR does not Granger Cause INF	34	0.54747	0.58427
INF does not Granger Cause MXR		1.88434	0.17007
NM does not Granger Cause INF	33	1.26171	0.29878
INF does not Granger Cause NM		2.14761	0.13561
OP does not Granger Cause INF	34	0.41412	0.66477
INF does not Granger Cause OP		1.34808	0.27553
UMR does not Granger Cause INF	34	0.01890	0.98129
INF does not Granger Cause UMR		0.97260	0.39009
WHP does not Granger Cause INF	34	2.33717	0.11453
INF does not Granger Cause WHP		0.04476	0.95629
M2 does not Granger Cause INR	36	0.55291	0.58084
INR does not Granger Cause M2		0.80888	0.45453
M2G does not Granger Cause INR	36	0.57520	0.56849

INR does not Granger Cause M2G		0.70347	0.50260
MXR does not Granger Cause INR	36	0.96523	0.39205
INR does not Granger Cause MXR		0.50037	0.61112
NM does not Granger Cause INR	35	2.20693	0.12759
INR does not Granger Cause NM		4.64969	0.01742
OP does not Granger Cause INR	36	0.24355	0.78533
INR does not Granger Cause OP		1.02286	0.37138
UMR does not Granger Cause INR	34	0.21665	0.80650
INR does not Granger Cause UMR		0.66964	0.51963
WHP does not Granger Cause INR	36	1.97222	0.15622
INR does not Granger Cause WHP		0.28514	0.75386
M2G does not Granger Cause M2	36	0.16054	0.85239
M2 does not Granger Cause M2G		11.7775	0.00016
MXR does not Granger Cause M2	36	5.18065	0.01145
M2 does not Granger Cause MXR		0.79196	0.46191
NM does not Granger Cause M2	35	1.39919	0.26244
M2 does not Granger Cause NM		1.83493	0.17709
OP does not Granger Cause M2	36	2.04872	0.14599
M2 does not Granger Cause OP		2.80383	0.07599
UMR does not Granger Cause M2	34	0.05075	0.95060
M2 does not Granger Cause UMR		0.03384	0.96676
WHP does not Granger Cause M2	36	0.12259	0.88505
M2 does not Granger Cause WHP		0.68184	0.51311
MXR does not Granger Cause M2G	36	5.07099	0.01244
M2G does not Granger Cause MXR		0.52120	0.59892
NM does not Granger Cause M2G	35	2.22047	0.12609
M2G does not Granger Cause NM		0.28150	0.75662
OP does not Granger Cause M2G	36	0.49919	0.61182
M2G does not Granger Cause OP		2.60085	0.09033
UMR does not Granger Cause M2G	34	0.27020	0.76513
M2G does not Granger Cause UMR		4.64458	0.01779
WHP does not Granger Cause M2G	36	1.34255	0.27594
M2G does not Granger Cause WHP		1.27250	0.29436
NM does not Granger Cause MXR	35	2.45282	0.10313
MXR does not Granger Cause NM		2.22559	0.12553
OP does not Granger Cause MXR	36	1.47092	0.24531
MXR does not Granger Cause OP		2.12379	0.13665

UMR does not Granger Cause MXR	34	0.81302	0.45337
MXR does not Granger Cause UMR		0.48955	0.61788
WHP does not Granger Cause MXR	36	0.08655	0.91731
MXR does not Granger Cause WHP		0.38811	0.68159
OP does not Granger Cause NM	35	1.28624	0.29111
NM does not Granger Cause OP		0.86657	0.43065
UMR does not Granger Cause NM	33	0.61067	0.55006
NM does not Granger Cause UMR		0.04111	0.95978
WHP does not Granger Cause NM	35	0.00413	0.99588
NM does not Granger Cause WHP		0.35306	0.70541
UMR does not Granger Cause OP	34	1.70493	0.19950
OP does not Granger Cause UMR		1.16024	0.32754
WHP does not Granger Cause OP	36	2.00342	0.15196
OP does not Granger Cause WHP		0.53567	0.59060
WHP does not Granger Cause UMR	34	1.57572	0.22406
UMR does not Granger Cause WHP		0.11328	0.89330

Appendix- II

Null Hypothesis: CPI has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		3.403258	1.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

Null Hypothesis: D(CPI,1) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.181845	0.0001
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: GDPR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.844600	0.9935
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

Null Hypothesis: D(GDPR) has a unit root
Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.870807	0.0000
Test critical values: 1% level	-3.626784	
5% level	-2.945842	
10% level	-2.611531	

Null Hypothesis: M2G has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.687969	0.0005
Test critical values: 1% level	-3.621023	
5% level	-2.943427	
10% level	-2.610263	

Null Hypothesis: D(M2G) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.513892	0.0000
Test critical values: 1% level	-3.632900	
5% level	-2.948404	
10% level	-2.612874	

Null Hypothesis: INR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.295850	0.1786
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.994101	0.0000
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	

Null Hypothesis: MXR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	1.789803	0.9996
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(MXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.576168	0.0114
Test critical values:	1% level	-3.626784	

5% level	-2.945842
10% level	-2.611531

Null Hypothesis: WHP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	0.612729	0.9882
Test critical values: 1% level	-3.621023	
5% level	-2.943427	
10% level	-2.610263	

Null Hypothesis: D(WHP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.602548	0.0007
Test critical values: 1% level	-3.626784	
5% level	-2.945842	
10% level	-2.611531	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: OP has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.171806	0.6759
Test critical values: 1% level	-3.626784	
5% level	-2.945842	
10% level	-2.611531	

Null Hypothesis: D(OP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.580260	0.0008
Test critical values:	1% level	-3.626784	
	5% level	-2.945842	
	10% level	-2.611531	

*MacKinnon (1996) one-sided p-values.
Null Hypothesis: DFT has a unit root
Exogenous: Constant
Lag Length: 9 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.245019	0.9976
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

Null Hypothesis: D(DFT) has a unit root
Exogenous: Constant
Lag Length: 8 (Automatic based on SIC, MAXLAG=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.821368	0.0073
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

Vector Auto Regression Estimates
Standard errors in ( ) & t-statistics in [ ]

	CPI	INR	M2G	MXR
CPI(-1)	1.744069	0.599080	-0.239302	-0.061226
	(0.18847)	(0.17539)	(0.78794)	(0.22623)
	[9.25401]	[3.41575]	[-0.30371]	[-0.27063]
CPI(-2)	-0.661721	-0.625460	0.211021	0.344457
	(0.22436)	(0.20879)	(0.93801)	(0.26932)
	[-2.94937]	[-2.99563]	[0.22497]	[1.27898]
INR(-1)	-0.184574	0.331704	2.355336	0.329380
	(0.21575)	(0.20078)	(0.90201)	(0.25899)
	[-0.85550]	[1.65209]	[2.61120]	[1.27180]
INR(-2)	-0.124609	0.179964	-1.474165	-0.196194
	(0.18473)	(0.17191)	(0.77231)	(0.22175)
	[-0.67456]	[1.04686]	[-1.90878]	[-0.88477]
M2G(-1)	0.017463	0.022792	0.392669	-0.025564
	(0.04055)	(0.03774)	(0.16955)	(0.04868)
	[0.43059]	[0.60390]	[2.31592]	[-0.52511]
M2G(-2)	0.040831	0.026093	-0.513925	-0.080776
	(0.04006)	(0.03728)	(0.16749)	(0.04809)
	[1.01921]	[0.69989]	[-3.06844]	[-1.67972]
MXR(-1)	-0.058859	0.089418	-1.238911	0.844288
	(0.14751)	(0.13727)	(0.61670)	(0.17707)
	[-0.39903]	[0.65140]	[-2.00894]	[4.76817]
MXR(-2)	-0.071949	-0.127887	1.402215	-0.359533
	(0.14329)	(0.13335)	(0.59907)	(0.17200)
	[-0.50212]	[-0.95906]	[2.34067]	[-2.09025]
C	2.255504	3.208414	10.48749	2.049533
	(1.37724)	(1.28167)	(5.75799)	(1.65324)
	[1.63769]	[2.50331]	[1.82138]	[1.23971]
R-squared	0.999143	0.772064	0.399700	0.994593
Adj. R-squared	0.998889	0.704527	0.221834	0.992991
Sum sq. resides	51.18490	44.32745	894.6660	73.75495
S.E. equation	1.376858	1.281311	5.756369	1.652775

F-statistic	3936.236	11.43176	2.247192	620.7968
Log likelihood	-57.41645	-54.82732	-108.9146	-63.99191
Akaike AIC	3.689803	3.545962	6.550809	4.055106
Schwarz SC	4.085682	3.941842	6.946688	4.450986
Mean dependent	56.30333	8.105556	15.82504	28.72507
S.D. dependent	41.31680	2.357195	6.525479	19.74135

Lag Length model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-446.8906	NA	3880734.	26.52298	26.70255	26.58421
1	-283.6904	278.4004	679.4090	17.86414	18.76200*	18.17033
2	-256.8217	39.51277*	374.2585	17.22480	18.84095	17.77596
3	-238.2659	22.92180	360.1916	17.07447	19.40890	17.87058
4	-212.4630	25.80298	254.8722*	16.49782*	19.55054	17.53889*

Vector Auto Regression Estimates
Standard errors in ( ) & t-statistics in [ ]

	CPI	DFCT	GDPR	OP
CPI(-1)	1.719946	-547.8785	-170677.2	-0.205343
	(0.16644)	(2232.01)	(43230.2)	(1.31357)
	[10.3337]	[-0.24546]	[-3.94810]	[-0.15632]
CPI(-2)	-0.530210	3219.335	204829.5	0.575747
	(0.19653)	(2635.56)	(51046.3)	(1.55107)
	[-2.69783]	[1.22150]	[4.01262]	[0.37119]
DFCT(-1)	-2.93E-05	0.202132	-8.408098	-8.03E-05
	(1.7E-05)	(0.22538)	(4.36528)	(0.00013)
	[-1.74436]	[0.89684]	[-1.92613]	[-0.60570]
DFCT(-2)	-2.59E-05	0.056268	2.886030	-0.000184
	(1.8E-05)	(0.23601)	(4.57107)	(0.00014)
	[-1.47139]	[0.23842]	[0.63137]	[-1.32689]
GDPR(-1)	-2.10E-07	-0.025062	0.334349	4.01E-06
	(6.4E-07)	(0.00858)	(0.16624)	(5.1E-06)
	[-0.32848]	[-2.91994]	[2.01122]	[0.79341]
GDPR(-2)	-4.66E-07	-0.004553	-0.193347	-5.66E-06
	(5.8E-07)	(0.00772)	(0.14959)	(4.5E-06)
	[-0.80886]	[-0.58947]	[-1.29252]	[-1.24508]
OP(-1)	0.060736	323.1547	-11747.75	0.668398
	(0.02598)	(348.406)	(6748.02)	(0.20504)
	[2.33776]	[0.92752]	[-1.74092]	[3.25981]
OP(-2)	-0.071157	-513.6274	797.8639	-0.022268
	(0.02384)	(319.711)	(6192.26)	(0.18815)
	[-2.98468]	[-1.60654]	[0.12885]	[-0.11835]
WHP(-1)	-0.017760	-236.2148	8772.086	0.185653
	(0.00922)	(123.603)	(2393.98)	(0.07274)
	[-1.92682]	[-1.91108]	[3.66423]	[2.55221]
WHP(-2)	-0.004501	113.1382	-515.3271	-0.125818
	(0.01141)	(153.036)	(2964.04)	(0.09006)
	[-0.39438]	[0.73929]	[-0.17386]	[-1.39698]
C	1.517195	-2454.844	-796582.7	3.711899
	(0.81188)	(10887.5)	(210872.)	(6.40746)
	[1.86875]	[-0.22547]	[-3.77756]	[0.57931]

R-squared

	0.999450	0.962660	0.980099	0.827358
Adj. R-squared	0.999230	0.947724	0.972139	0.758302
Sum sq. resides	32.84759	5.91E+09	2.22E+12	2045.958
S.E. equation	1.146256	15371.66	297722.8	9.046453
F-statistic	4544.846	64.45261	123.1241	11.98087
Log likelihood	-49.43225	-391.5683	-498.2593	-123.8036
Akaike AIC	3.357347	22.36491	28.29218	7.489091
Schwarz SC	3.841200	22.84876	28.77603	7.972944
Mean dependent	56.30333	81001.36	1308746.	34.23167
S.D. dependent	41.31680	67231.14	1783670.	18.40101

Determinant resid covariance (dof adj.)	9.59E+23
Determinant resid covariance	1.55E+23
Log likelihood	-1216.547
Akaike information criterion	70.64151
Schwarz criterion	73.06077

VAR Lag Order Selection Criteria

Endogenous variables: CPI DFCT GDPR OP WHP

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1367.591	NA	8.00e+28	80.74062	80.96508	80.81717
1	-1180.219	308.6126	5.79e+24	71.18933	72.53612*	71.64862
2	-1146.512	45.60269	3.84e+24	70.67719	73.14630	71.51923
3	-1106.413	42.45852*	2.10e+24*	69.78897	73.38041	71.01375
4	-1070.736	27.28174	2.11e+24	69.16096*	73.87472	70.76849*

Appendix -IV

CPI =f(C CPI(-1) CPI(-2) INR(-1) INR(-2) M2G(-1) M2G(-2) MXR(-1) MXR(-2))

Dependent Variable: CPI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.255504	1.377244	1.637693	0.1131
CPI(-1)	1.744069	0.188466	9.254006	0.0000
CPI(-2)	-0.661721	0.224360	-2.949369	0.0065
INR(-1)	-0.184574	0.215751	-0.855498	0.3998
INR(-2)	-0.124609	0.184727	-0.674558	0.5057
M2G(-1)	0.017463	0.040555	0.430593	0.6702
M2G(-2)	0.040831	0.040061	1.019209	0.3171
MXR(-1)	-0.058859	0.147508	-0.399026	0.6930
MXR(-2)	-0.071949	0.143290	-0.502122	0.6197

R-squared	0.999143	Mean dependent var	56.30333
Adjusted R-squared	0.998889	S.D. dependent var	41.31680
S.E. of regression	1.376858	Akaike info criterion	3.689803
Sum squared resid	51.18490	Schwarz criterion	4.085683
Log likelihood	-57.41645	F-statistic	3936.236
Durbin-Watson stat	2.123069	Prob(F-statistic)	0.000000

Table 1a

Restrictions imposed mxr m2g inr

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	1.720961	(6, 27)	0.1544
Chi-square	10.32577	6	0.1116

Table 1b
restrictions imposed on cpi inr and mxr

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	5241.503	(6, 27)	0.0000
Chi-square	31449.02	6	0.0000

Table 1c

restrictions imposed on lagged variables (cpi inr and m2g)

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	188.9099	(6, 27)	0.0000
Chi-square	1133.459	6	0.0000

Appendix -V

cpi =(c cpi(-1) cpi(-2) dfct(-1) dfct(-2) gdpr(-1) gdpr(-2) op(-1) op(-2) whp(-1) whp(-2))

Dependent Variable: CPI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.517195	0.811875	1.868753	0.0734
CPI(-1)	1.719946	0.166440	10.33374	0.0000
CPI(-2)	-0.530210	0.196532	-2.697825	0.0123
DFCT(-1)	-2.93E-05	1.68E-05	-1.744363	0.0934
DFCT(-2)	-2.59E-05	1.76E-05	-1.471394	0.1537
GDPR(-1)	-2.10E-07	6.40E-07	-0.328480	0.7453
GDPR(-2)	-4.66E-07	5.76E-07	-0.808860	0.4262
OP(-1)	0.060736	0.025980	2.337758	0.0277
OP(-2)	-0.071157	0.023841	-2.984679	0.0063
WHP(-1)	-0.017760	0.009217	-1.926823	0.0654
WHP(-2)	-0.004501	0.011412	-0.394379	0.6966

R-squared	0.999450	Mean dependent var	56.30333
Adjusted R-squared	0.999230	S.D. dependent var	41.31680
S.E. of regression	1.146256	Akaike info criterion	3.357347
Sum squared resid	32.84759	Schwarz criterion	3.841201
Log likelihood	-49.43225	F-statistic	4544.846
Durbin-Watson stat	2.131775	Prob(F-statistic)	0.000000

Table 2a Wald test

Restrictions imposed on the lagged terms of CPI, OP,Whp,DFCT

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	1246.383	(8, 25)	0.0000
Chi-square	9971.067	8	0.0000

Table 2b

Restrictions imposed on lagged terms of CPI, GDPR, OP, WHP

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	301.0136	(7, 25)	0.0000
Chi-square	2107.095	7	0.0000

Table 2c

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	5385.915	(8, 25)	0.0000
Chi-square	43087.32	8	0.0000

Restrictions are linear in coefficients.

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	934.8541	(8, 25)	0.0000
Chi-square	7478.833	8	0.0000

Appendix -VI

Table 1

Dependent Variable: M2G

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.48749	5.757985	1.821383	0.0796
CPI(-1)	-0.239302	0.787940	-0.303706	0.7637
CPI(-2)	0.211021	0.938006	0.224968	0.8237
INR(-1)	2.355336	0.902012	2.611203	0.0146
INR(-2)	-1.474165	0.772307	-1.908780	0.0670
M2G(-1)	0.392669	0.169552	2.315920	0.0284
M2G(-2)	-0.513925	0.167487	-3.068444	0.0049
MXR(-1)	-1.238911	0.616700	-2.008935	0.0546
MXR(-2)	1.402215	0.599067	2.340666	0.0269
R-squared	0.399700	Mean dependent var		15.82504
Adjusted R-squared	0.221834	S.D. dependent var		6.525479
S.E. of regression	5.756369	Akaike info criterion		6.550809
Sum squared resid	894.6660	Schwarz criterion		6.946688
Log likelihood	-108.9146	F-statistic		2.247192
Durbin-Watson stat	2.604998	Prob(F-statistic)		0.055330

Dependent Variable: MXR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.049533	1.653239	1.239708	0.2258
CPI(-1)	-0.061226	0.226234	-0.270633	0.7887
CPI(-2)	0.344457	0.269321	1.278982	0.2118
INR(-1)	0.329380	0.258987	1.271803	0.2143
INR(-2)	-0.196194	0.221746	-0.884771	0.3841
M2G(-1)	-0.025564	0.048682	-0.525114	0.6038
M2G(-2)	-0.080776	0.048089	-1.679717	0.1045
MXR(-1)	0.844288	0.177068	4.768166	0.0001

MXR(-2)	-0.359533	0.172005	-2.090249	0.0461

R-squared	0.994593	Mean dependent var	28.72507
Adjusted R-squared	0.992991	S.D. dependent var	19.74135
S.E. of regression	1.652775	Akaike info criterion	4.055106
Sum squared resid	73.75495	Schwarz criterion	4.450986
Log likelihood	-63.99191	F-statistic	620.7968
Durbin-Watson stat	2.080137	Prob(F-statistic)	0.000000

Dependent Variable: INR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.208414	1.281671	2.503306	0.0187
CPI(-1)	0.599080	0.175388	3.415749	0.0020
CPI(-2)	-0.625460	0.208791	-2.995632	0.0058
INR(-1)	0.331704	0.200779	1.652087	0.1101
INR(-2)	0.179964	0.171908	1.046860	0.3044
M2G(-1)	0.022792	0.037741	0.603904	0.5509
M2G(-2)	0.026093	0.037281	0.699894	0.4900
MXR(-1)	0.089418	0.137271	0.651397	0.5203
MXR(-2)	-0.127887	0.133346	-0.959055	0.3460

R-squared	0.772064	Mean dependent var	8.105556
Adjusted R-squared	0.704527	S.D. dependent var	2.357195
S.E. of regression	1.281311	Akaike info criterion	3.545962
Sum squared resid	44.32745	Schwarz criterion	3.941842
Log likelihood	-54.82732	F-statistic	11.43176
Durbin-Watson stat	2.171948	Prob(F-statistic)	0.000001

Dependent Variable: GDPR

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-796582.7	210872.4	-3.777558	0.0009
CPI(-1)	-170677.2	43230.23	-3.948099	0.0006
CPI(-2)	204829.5	51046.29	4.012623	0.0005
DFCT(-1)	-8.408098	4.365278	-1.926131	0.0655

DFCT(-2)	2.886030	4.571072	0.631368	0.5335
GDPR(-1)	0.334349	0.166242	2.011223	0.0552
GDPR(-2)	-0.193347	0.149590	-1.292517	0.2080
OP(-1)	-11747.75	6748.022	-1.740917	0.0940
OP(-2)	797.8639	6192.257	0.128849	0.8985
WHP(-1)	8772.086	2393.977	3.664231	0.0012
WHP(-2)	-515.3271	2964.041	-0.173860	0.8634

R-squared	0.980099	Mean dependent var	1308746.
Adjusted R-squared	0.972139	S.D. dependent var	1783670.
S.E. of regression	297722.8	Akaike info criterion	28.29218
Sum squared resid	2.22E+12	Schwarz criterion	28.77603
Log likelihood	-498.2593	F-statistic	123.1241
Durbin-Watson stat	2.378730	Prob(F-statistic)	0.000000

Dependent Variable: DFCT

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2454.844	10887.51	-0.225473	0.8234
CPI(-1)	-547.8785	2232.011	-0.245464	0.8081
CPI(-2)	3219.335	2635.560	1.221499	0.2333
DFCT(-1)	0.202132	0.225383	0.896840	0.3784
DFCT(-2)	0.056268	0.236008	0.238415	0.8135
GDPR(-1)	-0.025062	0.008583	-2.919939	0.0073
GDPR(-2)	-0.004553	0.007723	-0.589473	0.5608
OP(-1)	323.1547	348.4056	0.927524	0.3625
OP(-2)	-513.6274	319.7111	-1.606536	0.1207
WHP(-1)	-236.2148	123.6029	-1.911078	0.0675
WHP(-2)	113.1382	153.0358	0.739292	0.4666

R-squared	0.962660	Mean dependent var	81001.36
Adjusted R-squared	0.947724	S.D. dependent var	67231.14
S.E. of regression	15371.66	Akaike info criterion	22.36491
Sum squared resid	5.91E+09	Schwarz criterion	22.84876

| Log likelihood | -391.5683 | F-statistic | 64.45261 |
| Durbin-Watson stat | 2.087542 | Prob(F-statistic) | 0.000000 |

Dependent Variable: OP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.711899	6.407461	0.579309	0.5676
CPI(-1)	-0.205343	1.313572	-0.156324	0.8770
CPI(-2)	0.575747	1.551067	0.371194	0.7136
DFCT(-1)	-8.03E-05	0.000133	-0.605699	0.5502
DFCT(-2)	-0.000184	0.000139	-1.326894	0.1965
GDPR(-1)	4.01E-06	5.05E-06	0.793406	0.4350
GDPR(-2)	-5.66E-06	4.55E-06	-1.245084	0.2246
OP(-1)	0.668398	0.205042	3.259809	0.0032
OP(-2)	-0.022268	0.188155	-0.118351	0.9067
WHP(-1)	0.185653	0.072742	2.552205	0.0172
WHP(-2)	-0.125818	0.090064	-1.396982	0.1747

R-squared	0.827358	Mean dependent var	34.23167
Adjusted R-squared	0.758302	S.D. dependent var	18.40101
S.E. of regression	9.046453	Akaike info criterion	7.489091
Sum squared resid	2045.958	Schwarz criterion	7.972944
Log likelihood	-123.8036	F-statistic	11.98087
Durbin-Watson stat	1.975854	Prob(F-statistic)	0.000000

Table 2

Null hypothesis	Test Statistic	Value	df	Probability
CPI does not cause inr	F-statistic	5.139269	(6, 27)	0.0012
	Chi-square	30.83561	6	0.0000
Mxr does not cause inr	F-statistic	9.613886	(6, 27)	0.0000
	Chi-square	57.68332	6	0.0000
M2g does not cause inr	F-statistic	13.97396	(6, 27)	0.0000
	Chi-square	83.84376	6	0.0000
CPI does not cause M2g	F-statistic	2.906428	(6, 27)	0.0256
	Chi-square	17.43857	6	0.0078
Inr does not cause M2g	F-statistic	2.780197	(6, 27)	0.0309
	Chi-square	16.68118	6	0.0105
mxr does not cause M2g	F-statistic	2.563085	(6, 27)	0.0427
	Chi-square	15.37851	6	0.0175
cpi does not causes Mxr	F-statistic	7.862860	(6, 27)	0.0001
	Chi-square	47.17716	6	0.0000
inr does not cause Mxr	F-statistic	768.6013	(6, 27)	0.0000
	Chi-square	4611.608	6	0.0000
M2g does not cause Mxr	F-statistic	820.1388	(6, 27)	0.0000
	Chi-square	4920.833	6	0.0000

CPI and real side and shocks:

	Test Statistic	Value	df	Probability
CPI does not cause GDP	F-statistic	5.162781	(7, 25)	0.0010
	Chi-square	36.13947	7	0.0000
CPI does not cause Dfct	F-statistic	13.56248	(8, 25)	0.0000
	Chi-square	108.4998	8	0.0000
	Test Statistic	Value	df	Probability
CPI dose not cause Op	F-statistic	11.78828	(7, 25)	0.0000
	Chi-square	82.51794	7	0.0000
	Test Statistic	Value	df	Probability
CPI does not cause wheat prices	F-statistic	9.157831	(8, 25)	0.0000
	Chi-square	73.26265	8	0.0000

Impact of Rural to Urban Migration on the Institution of Family in Faisalabad City

Muhammad Farooq and Jaffar Hussain[*]

Abstract: Internal migration redistributes population and workforce from rural to urban areas. This study was designed to investigate the impact of internal migration on family at destination. The study was carried out for Faisalabad city. It includes 300 interviews from eight circle areas of the city. The main objective of this study was to explore the relationship between migration and the socio-economic status, health care, parents' attitude toward children's education, parents' opinion about children's marriage and political participation in a before-and-after analysis with the application of t-test. Information was obtained from each respondent, which had covered the objectives of the study as well as social and economic background of the migrants and their families. Probit estimation technique was used to test the four hypotheses that need to be refuted and/or accepted for meaningful policy imperatives to deal with the increasing trend of the internal migration. The study shows that the migrants had significantly improved their socio-economic status and adopted the modern values in the urban areas of Pakistan.

1. Introduction

Migration is one of the most important phenomena affecting the economy and social composition of cities, their geographical organization and politics. Although attention is currently focused on the impact of migration to cities, out-migration can be equally important, particularly if the social composition of in-and out-migrant flow is very different. Differential migration can reshape the social structure of the cities in a few decades leading to economic and social problems regarding employment opportunities, health care, education, and the provision of social facilities. The urban population of Pakistan at the time of independence in 1947 was 5 million (15.4%) that had increased to 23.84 million (28%) in 1981 and further to 42.45 million (32.5%) in 1998. During 1981 to 1998, the total population increased by 55% whereas the urban and rural population

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increased by 60% and 40%, respectively. However, during 2003, the rural and urban population was estimated to be 89.7 million (61%) and 53.3 million (39%), respectively (Government of Pakistan, 2002-3). The key reason for migration to urban areas has been the limited opportunity for economic advancement and mobility in rural areas. The economic and political control that local landlords exercise in much of the countryside has led to this situation. Due to this, urban areas are growing at much faster rate than the rural areas. As a matter of fact, more than 150 million international migrants celebrated the turn of the millennium outside their countries of birth. They came to their new countries to work, study or escape persecution or violence in their home countries (IOM, 2000). In Pakistan, 10 million people, or 8% of the population, consisted of internal or international migrants (Government of Pakistan, 1998).

On the positive side, migration may help reduce pressure on agricultural land, provide opportunities for the rural unemployed and underemployed, and is associated with rising living standards and livelihood prospects at the household and community levels in the urban areas. Migration may relieve labour market pressure and generate remittances that constitute an important source of income for migrants' families. On the negative side, some of the agricultural labour population, skilled population and non-skilled population have moved to the big cities. Consequently, it has created farm labour shortages and caused delay in harvesting processes and put pressure on the civic institutions and also has generated a problem of housing, which ultimately is raising the prices of the houses and urban properties. Industrial growth of cities breeds multiple problems, including the unplanned growth. The investors from other parts of the country shift to that area and purchase suitable land area as required by them. This increases the cost of property and causes high rents in the developed areas. Consequently, those who have migrated from rural areas to cities for earning bread and butter are forced to live in slums where they face numerous problems. Resultantly a mushroom growth of slums takes place, particularly in the developing countries.

In this background, this study focuses on the Faisalabad city, known as the city of migrants, with the objective of examining the consequences of migration on the institution of family at destination and to recommend measures for migration policies in the country.

2. Materials and Methodology

The present research was conducted in urban Faisalabad which consisted of eight circle areas. In order to draw the sample from the Faisalabad city, survey lists maintained by Excise and Taxation Department were used as the sampling frame. A multi-stage sampling technique was used to draw the sample (Nachmias and Nachmias, 1992). At the first stage, Faisalabad city was selected which had already been divided into three Rating zones and thirty-eight circle areas by the Excise and Taxation Department on the basis of economic stratification. At the second stage, eight circle areas were selected i.e. Ghulam Muhammad Abad, Muslim Town, Peoples Colony No.2, Ayub Colony, Gulistan Colony and Madina Town, Katchiabadi Rajwali, Aminabad and Nasir Colony through random sampling to observe the impacts of rural-urban migration on the family as an institution. At the third stage, households were selected with the help of interviewers who had visited the research areas but the required information was collected wherever the migrants were found to have been living. Three hundred households were selected through random sampling technique. The respondents included the urban migrants who had migrated before 1990. The t-test and Probit Analysis technique were used to draw the inferences.

3. Results and Discussion

At present, no empirical evidence is available to establish the causal relationship of the impact of migration on family as an institution in order to provide meaningful information on policy imperatives. This paper focuses on the consequences of the internal (rural-urban) migration on migrants and their families at destination. For this analysis, t-test and an advanced econometric model were used.

Socio-economic variables and modern values (type of family, parents' attitude toward children's education, opinion about children's marriage) to examine the consequences of migration are given in Appendix Table 1. Socio-economic variables for the household (income, schooling of the children, types of family and housing facilities) reflect the present situation and permit the comparison before and after migration. The mean of the monthly income before migration was Rs. 2540, which went up to Rs. 9878 after migration. Statistically it was highly significant, which reflected that

migrants had availed themselves of better economic opportunities and improved their household income as compared to previous income. The t-test result showed that better economic opportunities were the major source of attraction to the rural areas that had attracted the rural people toward the act of migration, which was positively associated with the objective of poverty reduction in the family migration, settled in the urban areas. In case of human capital, the mean value was 1.80 at the time of migration which rose to 2.79 after migration; consequently, P value was significant at 0.01 level. This showed that migrants had availed themselves of better schooling facilities in the city as they enrolled their children in these schools in order to improve their human capital. The t-test result showed that people paid more attention to the education of their children in order to improve their human capital after migration. The occurrence of modern values in the migrants' families with respect to the housing facilities consisted of electricity, natural gas, piped water system/motor pump, drainage and sewerage system, telephone, television, and cable, was given the weightage "Two" if migrants possessed these facilities and otherwise "One". On the basis of this, migrants had gained the weightage 8.0100 before the migration, which increased to 12.4883 after migration. Statistically it was highly significant at 0.01 level, which reflects that migrants had improved their housing situation after migration.

The occurrence of modern values in the migrants' families with respect to the type of family (Joint+Nuclear) and parent's attitude toward children's education were significant because there was a huge difference between means before and after migration. Moreover, the parents' opinion about children's marriage was still traditional because Faisalabad city is still under the influence of the traditional values. Therefore, the means of difference of the parents' opinion about children's marriage were very close and the result was significant owing to large sample size, which showed that the exogamy trends prevailed only among the educated migrants' families but there was no relationship between migration and parents' opinion about children's marriage. The t-test result showed that migrants and their families had adopted the modern values as they were associated with the urban life.

4. Empirical Results of the Model

H-1: the poorer the economic opportunities in the rural areas of Pakistan, the greater will be rural out-migration

The likelihood estimates (Appendix Table 2) confirmed that land holding was considered as economic opportunity in the rural areas of Pakistan. The most important aspect of the rural economic opportunity hypothesis states that land deprivation, particularly total landlessness or some small land holdings, was a positive determinant of rural-urban migration from rural areas either by family or the individual. The land holdings coefficient was significant at 5% in the urban community. The negative land holdings coefficient showed that family migration was much more likely among small land holders and landless households as compared to large land holdings i.e. 13 and more acres. As the possession of land increased by one acre in case of family migration, the probability of staying at origin increased by 0.034323. This also implies that large farmers had less tendency of migration as compared to the small farmer and the marginal person. The Probit model result showed that land was the main source of income in the rural areas of Pakistan. Kuhn (1999) has concluded that land deprivation, particularly total landlessness without access to any land, is a strong determinant of family migration while households with some small land holdings are likely to practice individual migration.

H-2: the higher the rate of poverty reduction among the migrants' families in the urban areas of Pakistan, the greater will be the rural out- migration

Appendix Table 2 depicts that a large majority of the migrants' families had improved their monthly household income in the urban areas. The coefficient of monthly income after migration was significant at 1% level in the urban migrants. With the marginal effect of an additional increase in the income by one unit, the probability of poverty reduction is enhanced by 0.000552. The result showed that better economic opportunities were the major source of attraction to those in the rural areas, fascinating the rural people toward the act of migration. Probit model result showed that rural out-migration was positively associated with the objective of poverty reduction in the urban community. These findings are contrary to a micro-level wages differentiate model studies which acknowledge that migration

is more likely if an individual's expected destination-area income, the expected wage timing, the probability of employment, are higher than current origin-area income (Harris and Todaro 1970; Todaro 1969). Amjad (1989), though noting that international Asian migrants are not from the poorest strata, and that overseas employment may have an inflationary impact, still believes that migration has had an overall favourable impact on poverty alleviation in Pakistan. Thus, migration in many cases does alleviate poverty, but it can also increase inequality because remittances allow the migrants and their families to improve their assets and 'human capital'. Studies of migrants since the 1940s in Malawi area (Zambia), in South Africa and research undertaken by the International Labour Organization (Bohning, 1984) revealed that there is overwhelming evidence of the positive contribution of migration, including alleviation of rural poverty. Thus, emigration has been improving the migrants' life and their families' socio-economic status.

H-3: the higher the rate of improvement of the human capital at destination and origin, the greater will be the impact of migration on the family

Data in Appendix Table 2 reveal that the migrants' families in the urban community had concentrated on the schooling of their children in order to improve their humanl capital. Probit model showed that the coefficient was significant at 5% level in the urban migrants. As the schooling of the children increased by one unit in the urban community, the probability to improve the human capital was 0.037276. The conclusion is that migrants' families had paid maximum attention to the schooling of their children with regard to elevating the position of their families in the society. Kuhn (2006) further showed that the emigration of fathers and male siblings often resulted in improvements in the education of children left behind in some rural areas of Bangladesh.

H-4: the higher the rate of adaptation of the modern values at destination and origin, the greater will be the impact of migration on the family

Appendix Table 2 reflects that the consequences of migration on the traditional values, which have emerged as the modern values in the family system in the shape of the women participation in the family's decision and women empowerment in the rural and urban community in the migrant's

families. The women's empowerment coefficient was significant at 5% in the urban community. The effect of modern value increases by one unit enhanced the probability of women empowerment in the urban community in the migrant's families by 0.022954. It follows that migration can promote social mobility, economic independence and relative autonomy if the husband in the urban areas is accompanied by woman. This gives them more control over their family's matters or, at least, greater participation in family decision. The result of the urban community did not coincide with Lefebver (1985), who stated that majority of the women did not experience any change in their position in the household since their husband's departure. It is true that the head of the household gives his directions through letters about affairs, like the education of their children, the decisions to take in the agriculture, the strategy to follow in the marriage of a relative etc.

5. Conclusions

This study reveals that migration had improved the household income, quality of life and promoted the socioeconomic status of the migrants at destination and it is the positive impact of the migration. Rural out-migration was positively associated with the objective of poverty reduction in the urban communities. Further, majority of the parents had positive attitude toward their children's education after migration, whether male or female, because education and modern values had eroded the gender discrimination. Women in the decision making processes and women empowerment have improved after migration.

The occurrence of modern values in the migrants' families with respect to the type of family (Joint+Nuclear) had entirely changed because majority of the migrants' families were in a nuclear set up. Moreover, migrants put pressure on the civic institutions and these institutions were not able to cope with the demands of the masses.

6. Recommendations

The labour-class migrants are living in slums or near the industrial sites, which are more vulnerable than the original village population. Government and NGOs should provide the basic facilities in these areas to reduce the difficulties of the dwellers. Moreover, Government and NGOs should increase the number of civic institutions in the rural areas in order to meet

the demand of the people. Besides these facilities, the Government of Pakistan should, therefore, launch a scheme of Integrated Development of Small and Medium Towns, which will support to divert the rural to urban migration stream.

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Annex

Table 1: Measures of socio-economic status, modern values, health care and political participation before and after migration, with the t-test.

Economic and Social Indicators	Mean before Migration Xi	Mean after Migration Xii	t-value
Monthly income	2539.87	9878.18	16.592***
Human capital	1.80	2.79	15.130***
Housing facilities	8.0100	12.4883	42.386***
Type of family (Joint+ Nuclear)	1.06	1.71	21.466***
Parents attitude toward children's education	1.39	1.97	19.667***
Parents opinion about children's marriage	4.11	4.12	5.975**

Socio-economic status: Monthly income, human capital, husing facilities. Modern values: Type of family (Joint+ Nuclear), parents' attitude toward children's education, parents' opinion about children's marriage. Xi is the mean value before migration and Xii mean value after migration.

Model methodology

The empirical analysis employs the non-linear maximum likelihood probit estimate technique for migration and its impacts equation

$$IM_i = ą + ß_1X_{1i} + ß_2X_{2i} + ß_3X_{3i} + ß_k X_{ki} + e_i$$

IM_i = 1 if migration's impact is development; otherwise zero;

X_j is a set j^{th} explanatory variables where $j = 1$ ---k

Model's Equation

IMD = b_0 + b_1 LHOLD $_+$ b_2 MINAM + b_3 EDU + b_4 AGE + b_5 FAMSIZ + b_6 SOT + b_7 SOCAPT + b_8 SANT + b_9 WOEMP + b_{10} POLTP

Table 2: Maximum Likelihood Estimates by Probit Model in the Urban Community

Variables	Coefficient	Standard Error	Probability
LHOLD	-.48570**	.26676	.034323
MINAM (POVTR)	.62234***	.00004	.000552
EDU	.00006**	.19076	.053838
AGE	.03012***	.00932	.000614
FAMSIZ	.08569**	.04847	.038539
SOT	.01054*	.00750	.079097
HUMCAPT	.32995**	.18503	.037276
SANT	.33053*	.21482	.061945
WOEMP	.37238**	.18654	.022954

Leijonhufvud's "Wicksell Connectionn": A Missing Variation

Pervez Tahir[*]

Abstract: In his 1968 book, Leijonhufud made a distinction between Keynesian economics and the economics of Keynes, which created quite a stir at that time. Later he suggested a number of variations on Wicksellian theme in the context of Keynes' own assertion of having broken off with the Wicksell connection, but he missed the Harrod variation. The subsequent publication of Keynes' Collected Works enabled this discovery. It is shown that Leijonhufvud missed it because it is only half of his own Z-theory and more than half of Keynesian Revolution, liquidity preference being part of this variation. After all, Keynes without liquidity preference would be like Wicksell without the natural rate of interest.

1. Introduction

In his *Treatise*, Keynes (1930) had used Wicksell's hypothesis of natural rate of interest (Wicksell, 1906) but in *General Theory* he did not find it to be "promising" (Keynes, 1936, p. 243). In a major work on how Keynesian economics is different from the economics of Keynes, Leijonhufvud (1968) saw a continuing connection and presented an array of "Wicksell connection" variations. A variation, conspicuous by its absence in this array, is one due to Harrod (1969). Harrod's name does find a foot-noted mention (Leijonhufvud 1981, p. 175), but his differences with Keynes on the natural rate of interest are entirely blacked out. This is surprising in view of the fact that, unlike most exegetical writers, Leijonhufvud generally seems to be at pains in giving the credit where it is due. He frankly admits that his "Z-theory" equals half of the Keynesian Revolution plus a monetarist soup and a Cambridge dessert – the whole is equal to the sum of the parts! Whether Johnson would still persist in saying that "both Milton Friedman as the leading quantity-theoretic critic of Keynesian economics and Joan Robinson as the leading custodian of the true Keynesian tradition can with a clear conscience commend Leijonhufvud's book to their students" (Johnson, 1973, p.72) is another matter. Yet another question is how Leijonhufvud could ignore Harrod in the relevant context while we

know that he was treated with respect in his great challenger (Leijonhufvud, 1968). Indeed, the authority of Harrod as a biographer of Keynes was invoked in that book whenever direct evidence was lacking.

It is not clear to this writer whether it is a mere slip (what a slip!) or a desire to be "all chief and no injuns" (Leijonhufvud, 1981, p.195). What is clear is that Harrod's book (1969) was published after Leijonhufvud's (1968). That book is, however, not an issue because he "failed to give [Liquidity Preference Theory] its historical due" (Leijonhufvud, 1981, p.134). The issue arises as to when was it that he followed *his* sense of history to come out with the "Z-theory", the first draft of which was ready as early as in 1976 (Leijonhufvud, 1981, p.131). It will take a lot of doing before one can believe that he was unaware of Harrod's book (1969) even after seven years of its publication. Nor is there a parallel with Keynes having been unaware of Wicksell's work for quite some time[1] (Keynes, 1937) for Britain and the United States are divided only by a common language!

2. Keynes and Harrod

Harrod did not suddenly wake up to his differences with Keynes. To Harrod, natural rate of interest "clearly is of central importance, as has always been plain to me ever since I read the *General Theory,* in proof" (Harrod, 1969, p.177). Leijonjufvud ignores the entire correspondence, although it was published in full (Moggridge, 1973, pp.526-64) long before his book. Herein, though, are suggestions as to how Keynes would have responded to the author of the "Economics of Keynes".

Harrod accepted Keynes position that saving necessarily equals net investment, but rejected the view that because it is so, there is "no sense" in calling interest the price equilibrating saving and investment. He maintained that this equality had "no relevance to the sensibleness or otherwise" of the orthodox theory[2] (Moggridge, 1973, p.530). He went on to impress upon Keynes that he gives some *other* mechanism always ensuring a full

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[1] Keynes was willing to adopt "Wicksell as my great-grandparent, if I had known his works in more detail at an earlier stage in my own thought and also if I did not have the feeling that Wicksell was trying to be 'classical' " (1937, p.203, n.2).

[2] Keynes' speech at Oxford in February 1935 on interest and marginal efficiency of capital, says Harrod, "convinced no one" (Moggridge, 1973, p.531).

employment position. Yet even in these circumstances it would still be true that saving necessarily equals investment. So it isn't *that* truth which invalidates the classical position. That seems to be right. If there was and it was known that there would continue to be full employment, the classical theory would come into its own again, modified by something about liquidity preference (Moggridge, 1973, p.531).

Indeed, Harrod felt that "the matter is very important" and he "won't write more until I hear how you react to this" (Moggridge, 1973, p.532). So concerned was Harrod about the matter that he wrote another letter to Keynes the same day, advising that his work's "effectiveness is diminished if you try to eradicate very deep-rooted habits of thought *unnecessarily*". His reference was to supply and demand not determining price as well as quantity, despite independence.

> The fact that saving is only another aspect of investment makes it *worse* not *better*. If there were two separate things, saving and investment, then it is clear that the two equations will not determine both. But with one thing, then if you allow the *cet. pa.* clause which you rightly do not, it would be quite logical and sensible to approach it in the classical way (Moggridge, 1973, pp. 533-4).

Keynes' first reaction to the charge of "guerilla skirmishing" against orthodox theory (Moggridge, 1973, p.534) was

> One of disagreement. I still maintain that there is 'no sense' in the view that interest is a price which equates saving and investment; or at any rate that if one could invent a sense for it, it would be quite remote from anything intended by the classical theorists. Perhaps the clue is to be found where you allege that I am doing great violence to the accepted and the familiar when I maintain that 'two independent demand and supply functions won't jointly determine price and quantities', for my whole point is that the functions in question are *not independen.* (Moggridge, 1973, p.538)

In a subsequent letter to Harrod, Keynes did "invent a sense" for the orthodox theory:

> One can only invent a meaning for classical ideas if one assumes that income and employment *cannot change.* On this assumption the rate of interest causes the propensity to save and the inducement to invest to change in such a way relative to one another that income and employment are always the same whatever the rate of interest. In this case one can abolish the function 'propensity to save' and introduce a new one, namely, the curve which intersects the family 'of

> propensities to save' corresponding to different rates of interest at the point of each corresponding to the unchangeable volume of income. This is the classical supply curve of savings. But if income and employment are capable of changing, there is no longer any such thing (Moggridge, 1973, pp.541-2).

Though Keynes promised a detailed reaction later, Harrod continued to insist that while there was no sense in talking about saving-investment equality as one exceeding the other if interest rate were different, there was sense in viewing interest as equating investment demand and saving supply. But the saving-investment equality does not "in itself invalidate the proposition that interest is the price which makes them equal". The orthodox theory is invalid because it does not have a mechanism other than interest rate to ensure constant income. But this does not render the theory to be nonsense. As an example,

> the price of a German lesson does not ensure merely that the amount spent on such lessons is equal to the amount received by the teacher: for that would be true if the lessons were compulsorily ordained by the state and the fees were compulsory like unemployment insurance payments. No: the price of the lessons ensures that amount of lessons which people freely choose to take is equal to the amount that they freely choose to give, and this equation of supply to demand by price is possible, in spite of the fact that the amount of lessons given must necessarily be equal to the amount received (Moggridge, 1973, p.540).

Harrod reminded Keynes that saving-investment inequality was enunciated in the *Treatise,* and was not the orthodox position. He agreed with Keynes that saving and investment are necessarily equal, correspond as they do to the truism of sales equaling purchases. But the equality of sales and purchases is brought about by price, in this case interest rate. He also agreed with Keynes that increased propensity to save lowers, not the interest rate, but income by lowering multiplier. He suggested not only that new equilibrium *may* be reached at lower employment with old rate of interest, but it *must* be so if liquidity preference or quantity of money does not change. The orthodox theory errs in failing to perceive income as a dependent variable in the system and the existence of other forces which need to change if interest rate has to change. It runs into an awkward corner while dealing with the effect of interest rate on activity: the constant income assumption, necessary for pure theory, has to be dropped. However, Harrod hastens to add that "this is no excuse for attacking the general theory as inconsistent or confused on its own premises" (Moggridge, 1973, pp.544-6).

The contents of the above letter led to the following point-counterpoint (Moggridge, 1973, pp.547-55):

Keynes: You imply in passage after passage that if the schedule of marginal efficiency is known and if the propensity to save is known, the rate of interest can be deduced.

Harrod: I never suggest that it *can* be so deduced, but only that it *would* be so deducible if the level . . . . of income were constant.

Keynes: Suppose that whenever the price for German lesson went down the demand schedule also shiftted its position, the whole thing would have no meaning.

Harrod: I agree entirely. That is precisely your point. The supply schedule of saving, according to you, moves automatically and necessarily to the right when rate of interest goes down, and if the supply schedule (and not the supply) is a function of the price, the supply and demand analysis won't apply in that particular place. But that is no excuse for saying (as you have done) that the classical economists who assumed that the supply *schedule* could be treated as constant, *were not making sense* when they said that the rate of interest was determined by supply and demand of saving.

Keynes: Any method which endeavours to arrive at the rate of interest without bringing in liquidity preference is bound to be circular in the worst possible sense of the word.

Harrod: Yes, if income is variable, no, if income is constant. But, you say, income *is* variable. Granted. That brings us back to the whole point: they were wrong to take it as constant, but having made that mistake their argument was quite logical.

Keynes: .....although you have lately accepted the view that saving and investment are equal, you still think of them as being different things.

Harrod: No; I always thought they were equal and the same thing. I always explained to students that they appeared unequal in the *Treatise,* because of a special and peculiar definition of income.

Keynes: The demand for German lesson is a different thing from
               supply even though the two may be equal. But saving and
               investment are the same thing.

Harrod: A German lesson is a German lesson. The demand schedule
               for saving is a different thing from the propensity to save.

Keynes: . . . . . the rate of interest has nothing to do with saving.

Harrod: This does seem rather extreme and isn't necessary. . . All
               this would mean would be that the value of multiplier is a
               function of, among other things, the rate of interest.

Both Keynes and Harrod remained unconvinced, with the former insisting
that the orthodox theory was nonsense and the latter willing to concede
sense, thought not correctness. As Keynes responded again:

> The fault of the classical theory lies, not in its limiting its terrain by
> assuming constant income, but in its failing to see that, if either of its
> own variables (namely propensity to save and schedule of marginal
> efficiency of capital) change, income must also *cet. par* change; so that
> its tool breaks in its hand and it doesn't know and can't tell us what will
> happen to the rate of interest when either of its own variables changes
> (Moggridge, 1973, p. 559).

Harrod retorted by saying that income in the orthodox theory is determined
by marginal disutility of labour and marginal productivity. An increase in
propensity to save lowers interest rate, moves productivity curve to the
right, raising income. A rise in marginal efficiency of capital will have
similar effects. But the orthodox theory does not guarantee that income goes
up sufficiently to prevent a rise in interest rate for the purposes of Keyne's
theory. According to the latter, income falls to reduce saving and restore
equilibrium at the old interest rate (Keynes, 1937). Continuing with his
questioning of Keynes, Harrod asked:

> But doesn't this fall in income look at little like a miracle? With the level of
> income uniquely determined by the labour disutility and productivity fucntions it
> is not only a miracle but impossibility. By your employment theory (viz. disutility
> of labour determining only maximum level of income), you make appropriate
> variations of income a *possibility*. By your theory that interest is otherwise
> determined, viz. by liquidity preference, you make it a *necessit.* (Moggridge,
> 1973, p.560).

Keynes answered, to close the matter thus:

> I am content! If the classical theory could not be made, even by you, to make more coherent sense than that, it does not deserve very many compliments. (Moggridg, 1973, p.561).

So much so that Keynes wrote to Kahn that Harrod "has not grasped my theory of rate of interest" (Moggridge, 1973, p.634).

The above, rather extensive quotations from Keynes-Harrod correspondence indicate that Harrod stuck to his guns. So did Keynes, which incidentally would have been his response to Leijonhufvud as well. However, nowhere in the correspondence appears the name of Wicksell, though his influence on Harrod and rejection by Keynes are not hard to discern. It was not until the late sixties that Harrod's "Wicksell connection" became fully apparent[3] (Harrod, 1969). At any rate, this was a tall order for the man of Leijonhufvud's standing to sidetrack.[4] But that is the subject matter of the next section.

3. Leijonhufvud and Harrod: A Not-So-Odious Comparison

Leijonhufvud maintains "that Keynes so obfuscated the interest rate mechanism" that the role of the Wicksellian maladjustment in his theory was lost from view. The Keynes of the *Treatise* meets with his approval because it contained the concept of natural rate of interest (Leijonhufvud, 1981, pp.134-5). Harrod expresses the same sentiment equally strongly. He finds it impossible to make sense of Keynes without assuming that his scheme contains a 'natural' rate of interest. The *Treatise* contained "a natural rate *a la* Wicksell. It is to be regretted that there was an unfortunate shift in emphasis in the *General Theory*" (Harrod, 1969, pp.175-6). Interestingly, both refer to Robertson's dig at Keynes, though Leijonhufvud incorrectly attributes the "bootstrap" charge to Robertson rather than its real author, his old friend Hicks (Leijonhufvud, 1981, p.171; Harrod, 1969, p.175).

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[3] Since Harrod (1969) is a collection of his lectures at Oxford, it is likely that he was harping on the Wicksellian theme much earlier.

[4] Leijonhufvud recognizes his debt to Robertson rather eloquently. Interestingly, Keynes called Robertson "a bad snake, unapt at sloughing its old skin", while Robertson "claimed in reply to be a good glow-worm" (Robertson, 1940, p.ix).

And the source of trouble is Keynes' insistence on saving-investment equality:

> Keynes' obfuscation of interest theory . . . . . . stems from his insistence on saving-investment equality as an identity. If saving and investment are always equal, they cannot govern the rate of interest, nor can the interest rate possibly serve to coordinate saving and investment decisions (Leijonhufvud, 1981, p.135).

> What Keynes came to perceive is that one might get an equality between saving and investment (even in the *ex-ante* sense) at any level of employment, so that there would be as many "natural" rates . . . . as there are possible levels of employment (Harrod, 1969, p.176).

What are the consequences of this? To Leijonhufvud, "without the maladjustment of the interest rate, there is no story to tell" (1981, p.169). With *ex-post* saving necessarily equal to ex-post investment, banking system is just "an obedient go-between". Any excess flow demand for loanable funds is an impossibility, and the interest rate has to be governed by something else – the liquidity preference theory. Interest rate is "too high" and its lowering will promote investment and employment. The divergence between natural and market rates as "a crucial link in the causal story of how persistent unemployment state develops is almost totally obscured", and the all important "equilibrium reference mark" is thrown out of the window (Leijonhufvud, 1981, pp. 170, 172). In *General Theory*, what Keynes did was "to tear up the *Treatise*" and distort what was "central" to his case – "a derivative in relation to [Leijonhufvud's] variation on the Wicksellian theme", the so-called Z-theory:

> the interest rate is wrong, but that market "clears" (without "punishment", so to speak, of those responsible); the money wage is right, but large-scale unemployment prevails and persists and even the willingness of labour to reduce the money wage will not help. The system's "automatic" adjustment tendencies . . . . are working to change prices that are right and leaving those we need to have changed alone (Leijonhufvud, 1981, pp.167-8).

It is, therefore, important to see Wicksellian interest maladjustment in the context of

> whether the system maintains itself at full employment or not. *At full employment, there will be unrelenting pressures towards correction of any"unnatural" rate of interest – but otherwise not.* Neither can one analyze unemployment and its persistence as if it does not matter whether the market rate

equals natural rate or not. *With the interest rate at the right level, market forces should make unemployment converge on its "natural" rate – but otherwise not.* (Leijonhufvud, 1981, pp. 168-9).

The Harrod variation on Wicksell's theme is tellingly similar except that, and this is not unimportant, he would not discard liquidity preference theory, as does Leijonhufvud. According to him, Keynes "did his own cause great harm by his attacks on classical theory", which "is not only not inconsistent with Keynes' theory, but is even an essential part of it" (Harrod, 1969, pp.173-4). This "essential part" is, of course, Wicksell's natural rate or what Keynes himself called neutral rate – "the neutral rate . . . consistent with *full employment*" (Keynes, 1965, p.243). Keyne's fault, maintains Harrod, is that

> instead of stressing the central importance of the idea of *neutral* rate, Keynes seems inclined to pooh-pooh it. It clearly is of central importance, as has always been plain to me ever since I read the *General Theory* in proof. If the rate of interest is below the neutral level, aggregate demand will exceed the supply potential of the economy, and there will be an inflationary pressure; and if it is above the neutral level, there will be unemployment (Harrod, 1969, p.177).

But there is no automatic tendency for market rate to move to natural rate. This is where Keynes bids goodbye to the orthodox theory (Harrod, 1969, p.178). However,

> Keynes was under an illusion when he supposed that he had somehow divided himself from the classical school in . . . . regard (to natural rate determined by saving and investment).

> His radical departure from the classical school is at another place, namely, . . . as regards the determination of the *market* rate of interest (Harrod, 1969, pp.177-78).

This is also the point where Leijonhufvud makes a radical departure from Keynes, and Harrod departs from Leijonhufvud's Z-theory, but retains a variation on Wicksell's theme, abeit the one missing in Leijonhufvud (1981). To Leijonhufvud, natural and market rates are different values of the same variable, the former determined by the saving-investment mechanism and the latter by loanable funds.

> In a system lacking the loanable funds mechanism, there can be no tendency, however, weak or fitful in its operation, for the interest rate to converge on the

natural rate consistent with equilibrium growth path. It is an obvious but important property of our Z-theory that the market rate will track the natural rate *unless* banks or speculators intervene to "fix" it at some other level. The General Theory emphatically denies any such basic tendency – whether in the short or in the long run – for interest rate to find its FIM value. And it makes no sense, in context, to ask what the rate would be unless speculators "fixed" it (Leijonhufvud, 1981, p.171).

In contrast to Leijonhufvud, Harrod retains liquidity preference:

Thus for Keynes the market rate of interest is governed by liquidity preference and the money supply. But there is all the time in the background a natural rate of interest – he calls it 'neutral' – which equates investment demand to saving at its current level, *when there is full employment.* The determination of this natural rate is in line with classical thinking, viz. the balance between the use that can be made of savings and the savings people want to make. (In accordance with the *Treatise* we exclude share of supernormal or sub-normal savings made by businesses in *consequence* of an inflationary or deflationary process currently underway. (Harrod, 1969, p.178).

Keynes, says Harrod,

was unquestionably right in holding that the whole mass of capitalists influence the rate of interest every day, and not only the puny band of new savers. Furthermore, some writers recommending the flow approach have got themselves into hopeless confusion by supposing that bank lending can add to the aggregate of saving coming into the market. These rightly raised the ire of Keynes, and it was with reference to such writers that he made the famous analogy with the duck which dived deeply into the weeds and mud at the bottom of the pond. So far as the provision of saving is concerned, the banks are pure intermediaries. But they can alter the asset-mix by buying and selling securities, by withdrawing bonds from the non-bank pool of assets in exchange for money (bank deposits); and conversely, their lending operations may be similarly analyzed (Harrod, 1969, p.174).

Leijonhufvud "dodge[s] the issues connected with expected inflations" (1981, n.37). That this is a non-issue is brought out by Harrod (1969). In Keynes' view, expectation of inflation does not cause interest rate to rise, as cash and promises to pay cash are equally liable to inflationary erosion. What the expectations do influence are the comparative yields of bonds, on the one hand, and realities and equities, on the other. Equity yields fall relative to bond yields, but bond yields do not rise absolutely. Harrod goes on to maintain:

> This is a difference of view that needs more ventilation and discussion than it has had. Keynes throughout his life gave his most concentrated thought to security values, both in relation to theory and also in relation to practical operations, to which he devoted much time, not without success.[5] It would surely be lacking in sense of proportion to say that his considered view that the prospect of inflation did not tend to raise the rate of interest can just be ignored (Harrod, 1969, p.180).

Interest rates can only be high if money supply is "low relatively to PT", but a high natural rate "is an altogether different question". Money supply, after some time, may fall relative to PT to the extent of leaving nothing for precautionary and speculative balances. With no cash to spare, cash and bonds are no longer competitive. Anticipation of inflation requires top-grade bond yields higher than top-grade security yields. Harrod (1969) concedes that the top-grade security yields "may depend on the ratio of the growth of all non-cash assets to that of aggregated savings to date less that part of savings which the authorities permit to find a heaven in extra cash", so that interest on bonds is "slightly governed by inflation fears", but this "concession" does not in any way impair the ability of monetary authority to "quite easily make the rates of interest come tumbling down" (Harrod, 1969, pp.180-1).

Although Leijonhufvud was now telling us to forget about liquidity preference, previously we were made to believe that Keynes' real intention was an underlying theory of the term structure of interest rates (Leijonhufvud, 1968, pp.149-57; 1981, p.11). Harrod's story is similar, though with no intention of giving up liquidity preference theory:

> Keynes does not say enough in the *General Theory* about the spectrum of interest rates, of which, of course, he was well aware.[6] This may have been because short-term interest rates were so microscopic at the time of writing that they may not have seemed worth bothering about. At the time of my writing this book (1969), by contrast, they are quite exceptionally high in Britain (and elsewhere also). So high are they, that one must suppose that almost the whole of M has been drawn off into the transaction circuit. Who would hold pure cash for the precautionary or speculative motives, when such very high interest can be gained on safe short-term lending (Harrrod, 1969, p.179).

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[5] Leijonhufvud also acknowledges that Keynes put his money where his mouth was.

[6] Keynes had stated:

> For the sake of simplicity of statement, I have slurred the point that we are dealing with complexes of rates of interest and discount corresponding to the different lengths of time which will elapse before the various prospective returns from the asset are realized. But it is not difficult to restate the argument so as to cover this point (Keynes, 1936, p.137).

Leijonhufvud's affair with speculators[7] - bears *a' la Treatis* - surpassed Keynes' amatory finesse. Non-speculative demand is out, as Baumol (1952), Tobin (1956) and Patinkin (1956) reached empirical conclusions about significant interest-elasticity of transactions demand "counter to my intuition". Clower and Howitt (1978) are in for their ambiguous sign for interest elasticity of transaction demand. The old friend Hicks (1974) is in, too, with transitory changes in flexibility preference. The neoclassical Keynesian variable velocity quantity theory is out and, this is the upshot, liquidity preference is out (Leijonhufvud, 1981, pp.138-9, 161, 183, 196-8).

Before we lose track of Leijonhufvud's ins and outs, let's turn to Harrod's in-out matrix. Liquidity preference continues to be in, but it "also serves to explain the passive variations in V". Keynes, treatment of "velocity in rather a cavalier way" was "a pity." Emphatically, he states:

> It is essential to treat velocity with respect. I do not know if it was the influence of Keynes, wrongly interpreted, that caused the Radcliffe Committee to give such scant and superficial treatment of velocity (Harrod, 1969, p 169).

Velocity is plastic enough to accommodate Keynes' requirement that wage increases can raise prices without changing money supply as well as the quantity theory requirement of habit persistence in regard to transactions demand. Precautionary demand is more important than Keynes thought, and his view about its interest-insensitiveness was "wrong", Keynes, thus,

> gives too much work, in relation to the whole system, to the speculative motive. Professor J. Viner has argued that the funds held for speculative motive are not large enough to have the great influence that they are made to have in Keynes' system. In conversation, he remarked to me that it would be just as reasonable to argue that the price of cigars is regulated by the utility functions of female cigar smokers (Harrod, 1969, pp.171-3).

As noted earlier, the only time Harrod gets mentioned in Leijonhufvud is in the context of growth theory. He opines:

> Harrod also shared the LP theory of interest and thus the position that growth is not the result of the coordination of saving and investment decisions. He proposed instead the question: what rate of capital accumulation, if entrepreneurs happened

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[7] Tracy Mott, during his time at the the University of Colorado at Boulder, used to say that Leijonhufvud wanted to have his speculators and eat them, too!

> to set on it, would be sustained by the resulting aggregate demand? It will be recalled that the saving propensity enters into the formula answer. Saving, however, enters into theory, not as a demand for securities and other stores of wealth, but as "non-spending", i.e., a leakage from the aggregate demand that alone can keep animal spirits up. The Paradox of Thrift mechanism is built into the model, and it is it that makes the warranted path a knife edge (Leijonhufvud, 1981, n.70).

We have seen above the reservations with which Harrod (1969) accepted liquidity preference theory. We have also seen that Wicksellian natural rate, determined by saving and investment, is a crucial part of Harrod's system. Liquidity preference, to Harrod, determines the market rate and the classical forces determine the natural or what Keynes called neutral rate. He disputed Keynes, assertion that the neutral rate was the same thing as the optimum rate. It was the latter he employed in his growth model, defined as the dynamic version of Keynes, neutral rate or Wicksell's natural rate (1969, pp.177, 195). Saving and the required capital/output ratio are cast in terms of the normal remuneration concept of the *Treatise on Money* (1969, pp.165, 191-2), the darling of Leijonhufvud. Saving and required capital/output ratio depend on interest rate, and so does the warranted rate to some degree. There is thus some optimum rate of interest needed to check movements away from equilibrium. Resort to fiscal policy obviates the need for such. Use of monetary policy would require the optimum interest rate that ensures growth of demand consistent with optimum growth, operating mainly through cost of finance, animal spirits and expectations (1969, pp.195-202). But how is this equilibrium interest rate determined is a question Harrod regretted inability to answer:

> I have thought hard and to the best of my ability over many years, about how to name the factors that determine an equilibrium rate of interest as conjugated with 'warranted' growth. I have totally failed in my endeavour. This intellectual failure is a matter of regret to me, but it must be put on record (Harrod, 1969, p.202).

What, then, is Leijonhufvud talking about is difficult to fathom.

4. A Summing Up

Our purpose here was not to go into the merits of variations on Wicksellian themes suggested by Leijonhufvud. Nor was there any intention to X-ray the ultimate truth – the Z-theory (how else might one describe the choice of

the last letter!). It was rather a modest purpose to point out that he missed the Harrod variation. Perhaps he missed it because it is only half of Z-theory and more than half of Keynesian Revolution, liquidity preference being part of this variation. To slightly modify his own phraseology: Keynes without "liquidity preference" is like Marshall without supply and demand or Adam Smith without the division of labour. For, that is what he thought of as his main theoretical innovation.

Leijonhufvud admits that his "Economics of Keynes" was essentially a Z-theoretic presentation (1981, p.134, n.5). "Half-Keynesian" insults are added to "Keynesian" injuries. He seems to be a past master at this game. Witness what he says about Kuhn:

> my attempt at assessing Kuhn's work has to end on a plaintive note: may one not read the work in the way that gives the best value – even if the author, ex-post, won't cooperate (1981, p.314, n.33).

Then, commenting on the charge that Keynes never spent 20 minutes necessary to understand value theory, he had said:

> The assumption that Keynes lacked an adequate working knowledge of value theory grants the interpreter of the *General Theory* license to read into it practically whatever he wants. In matters of exegesis such license should not be practiced too freely (1968, p.33).

Now, we are told:

> Keynes wording of the disposal (of Wicksellian terminology) is of interest mainly because it reinforces the impression one gets from his controversy with Hayek, namely, that he had given very little thought to problems of capital and growth theory (1981, p.173).

What we have in Leijonhufvud is a T.S. Eliot of sorts. In "Milton I", written at the beginning of his career in the year General Theory was published, Eliot demolished Milton by saying:

> So far as I can perceive anything, it is a glimpse of a theology that I find in large part repellent, expressed through a mythology which would have better been left in the Book of *Genesis*, upon which Milton has not improved.

By 1947, when he himself was established as a great poet and writer, his "Milton II" had this passage:

> I do not think that any modern poet, unless in a fit of irresponsible peevishness, has ever denied Milton's consummate powers. And it must be said that Milton's diction is not a poetic diction in the sense of being a debased currency: When he violets the English language he is imitating nobody, and he is inimitable (Kermode, 1975, pp.263, 273).

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Book Review

Financing Higher Education in Pakistan. Edited by Pervez Tahir, Asif Saeed and Uzair Ahson. Papers and Proceedings of a Conference organized by the Department of Economics, GC University, Lahore and the Higher Education Commission. Lahore: GCU, 2008. pp.97. Price not indicated.

This is a collection of the papers presented at a Conference jointly organized by the Department of Economics of the GC University, Lahore and the Higher Education Commission on November 10, 2007. The Conference was well-represented with all the key stakeholders present – senior officials of Higher Education Commission, Government of Pakistan and the Government of Punjab, academics of repute and the students. There is a commendable record of the proceedings published in the book.

Besides the Foreword by the Vice Chancellor of the GCU, Professor Dr Khalid Aftab and introduction by the editors, the book includes the inaugural address by the Vice Chancellor and the keynote address by Dr Sohail H. Naqvi. There are four papers: Financing of Higher Education in Pakistan: Issues of Fiscal Sustainability by Dr Pervez Tahir and Nadia Saleem; Financing Higher Education: The Role of the Planning Agencies by Dr Shaukat Hameed Khan; and Reflections on Higher Education in a Rapidly Changing World by Professor Riaz Ud Din. Former Finance Minister Sartaj Aziz's comments as chair are also given. A whole section is devoted to stakeholders discussion from three important perspectives – policymakers, academia and students.

In the Foreword, reference has been made to strategic significance of the debate on financing of Higher Education; the obvious question is, does this really have any strategic significance? The level and standards of Higher Education attained in any country would, undoubtedly, have strategic significance - but surely not the methods of financing Higher Education for attaining such standards!

Efficiency, adequacy and equity are certainly the three criteria for judging methods of financing Higher Education. Having said this, it only confuses the issue, if judging were influenced by the respective claims of young and old Universities. It would instead be certainly more rational to consider whether developing only some relatively few Universities of larger size would yield better results in uniformity of standards than having large number of new small Universities.

Faculty Development has been referred to as the centrepiece because of its automatic linkages with access and quality. Unless infrastructure keeps pace with Faculty Development, these linkages are certainly not automatic -in fact, they could even be non-existent if the disparity were excessive.

Saying that because there are limits to what the Private Sector can do, is oversimplifying this issue. It is also illogical to suggest that all undergraduate education be financed by the Government and Postgraduate by the Private Sector. All this confusion has arisen because in the entire publication regarding Financing of Higher Education, there is no reference anywhere to the differences between General and Professional Universities. It is actually these differences which have made these issues controversial.

Three objectives have been indicated as essential for an educated society; the relevance of the objectives can only be to the extent that the method of financing development of the system would be affected by the method of financing it. However, nowhere has any indication been given about this. In any case, the terms Creation of an innovative society and fuelling of genuine innovation are obvious repetition. No society can be termed innovative unless it really fuels innovation in all segments of human endeavour.

Inferiority in quality of research has been attributed to two causes:

    i   Missing linkages between teaching and research

    ii   Between research and societal needs

However, there are no indications how -if that is at all possible - these could be corrected by proper financing.

Structure rather than financing the system of Higher Education has been indicated as the core problem. This again ignores the fact that structures of

General and Professional Universities have to be different; that essential factor has not been taken into account anywhere.

On the whole, the book is a welcome contribution to the discourse on higher education and development in Pakistan.

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Book Review

Military Inc. Inside Pakistan's Military Economy. By
Ayesha Sidddiqa. Karachi: Oxford University Press, 2007.
292. Price: Rs 595.

Military Inc. deals with the most important subject of the day – the
pervasive economic and political power enjoyed by the military in Pakistan.
The story thus far has been that the massive defence budget preempts scarce
resources that would otherwise be available for uplifting the mass of the
rural poor in the country. This study goes beyond to explore the internal
economy of the military. By using primary data placed in the public domain
for the first time to investigate the political economy of milbus, the book
makes an original and pioneering contribution to the literature on
development and security in Pakistan.

While the conventional defence budget is subject to the audit and accounts
system of the government, milbus is a private enterprise with vast fortunes
controlled by the officer class, for the officer class, in the name of the
welfare of the ordinary soldiers. The major insight of the book is that it is
this predatory accumulation of capital which enables the military to
function as the most organized political party. It has the economic as well as
the fire power to maximize its returns. No means is considered unjustified
in the relentless pursuit of this objective. Its realization does not require
direct control of the political decision-making and the public finances, and
operation as the most powerful pressure group in the arena of the state does
the trick.

But in the context of Pakistan, where a pre-capitalist structure continues to
persist, the book convincingly demonstrates why a military-authoritarian
state has been the dominant feature. A characteristic feature of this structure
is that the accumulation of capital and assets *per se* is not the objective. This
accumulation is a means to project power to extract rents and the resources
to establish and maintain a totalitarian patron-client system. Milbus, in this
sense, is both a source and the outcome of crony capitalism.

Within this framework, it is easy to understand some well-known pronouncements of the last head of the military authoritarian state, viz. "The country is more important than the constitution," "National interest has precedence over democracy", "I am no dictator", etc, etc. It is the direct result of the interrelationship between financial autonomy, economic penetration and political power exposed in analytical as well as in historical terms by the author.

The author is quick to point out that the rise of milbus has been associated, in no small measure, with the collusive behaviour of the political class. The ends of power-seeking have justified the means and the resistance to military's occupation of the political space has been minimal. What has emerged in the end is institutionalized collective overexploitation, dimming the prospects of genuine democratic development. The political and social costs have been heavy and the book ends up raising a major research question for the future by suggesting that the present social instability may well be connected with the military totalitarianism.

On the basis of its original research and its profound analysis of the critical issues of economic, social and political development of Pakistan, I have no hesitation in saying that Ayesha Siddiqa has successfully changed the terms of the discourse on the political economy of change in Pakistan.

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