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**FINANCIAL SECTOR REFORMS IN PAKISTAN AND A TEST
FOR MCKINNON AND SHAW'S TRANSMISSION
MECHANISM: 'LESSONS FROM THE LAST DECADE'**

Dawood Mamoon

May 2004

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ABSTRACT

The study tests McKinnon & Shaw's financial liberalisation paradigm by capturing the reform process of Pakistani financial sector in the last decade. The study showed that Pakistan witnessed significant financial development especially in the banking sector after 1990s. However, as the last decade was associated with one the poorest performance of the country on macro economic front, the study tries to find out the possible reasons for the failure of objective of the reform process. This is done by first establishing two legs of 'McKinnon & Shaw's transmission mechanism', through which financial development is conduit to real economic activity. As a next step we employed Vector Autoregressive (VAR) analysis in order to regress these two legs and then we ran multiple causality tests on subsequent Vector Error Correction Mechanism (VECM) equations. Such an approach not only allowed us to take on the critiques of McKinnon and Shaw in a debonair manner but also enabled us to pin point the shortcomings of the reform process itself.

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ABSTRACT

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1 INTRODUCTION

In 1973, Edward Shaw and Ronald McKinnon presented a new neo-liberal perspective on the role of money in economic development. The economies of the developing countries, as seen by McKinnon and Shaw, are ‘financially repressed’ (see for example: Galbis 1977; Mathieson 1979 and 1980; Kapur 1983; Fry 1989, 1995 and 1998; McKinnon 1989). McKinnon and Shaw presented a strong case against financial repression policies such as nominal interest rate ceilings, controlled credit allocation, and high reserve requirements. To them, administrative resource allocation was not only inefficient but also the source of macroeconomic instability that reduced the volume of financial savings, the rate of real economic growth and the real size of the financial system relative to non-financial magnitudes in LDCs. This is because, according to McKinnon, capital accumulation is the most critical element of economic growth, while Shaw emphasizes the ability of the banking system to intermediate adequate amounts of credit to finance higher economic growth. Both argue that removing interest rate and credit allocation controls will ease the repression of financial system, which would improve the rate of economic growth through increased efficiency in financial intermediation subject to a better financial discipline. They emphasize the salutary effects of higher interest rates on economic growth and thereby interpret the existence of too low a rate of interest as a problem: this view is opposite to both, Classical and Keynesians (see e.g.: Keynes 1936; Tobin 1965; and Chick 1988).

On the basis of this financial liberalization paradigm, and also due to the poor development record in many LDCs in the 1960s and 1970s, resulting mostly from misguided interventionist policies, an increasing number of developing countries have instituted financial sector reforms. Pakistan was no exception to this phenomenon.

Before the initiation of reforms, Pakistani financial markets were significantly repressed, the brunt of which was being born by the banking sector: State Bank of Pakistan (SBP) was increasingly facing eroding monetary control and banks were generally facing disintermediation. The imposition of global as well as sectoral credit ceilings, the creation of a number of non-bank financial institutions, the Central Directorate of National Savings (CDNS), and the continuously high borrowing requirements of the government were all contributory factors to this repression.

To eliminate this repression in financial sector and to realize its macroeconomic plans, Pakistan undertook ambitious financial reforms in the early 1990s, which aimed to move the government away from its predominantly direct monetary control regime and increase the dynamism of the banking system. The measures implemented included: a) debt management reform so as to promote primary and secondary securities markets, b) efforts to enhance the health of, and competition within, the banking sector. The latter included large scale privatization of nationalized banks, as well as, the advent of new scheduled commercial and investment banks, c) exchange and payment reforms which alleviated portfolio restrictions by allowing domestic residents to hold foreign currency accounts, d) a paring down of concessional and direct credit schemes and the setting up of a 'Credit Commission' to review the viability of the existing schemes and, e) the establishment of a prudential supervisory framework to foster sounder credit decisions. This included the imposition of prudential regulations on banks and NBFIs, as well as, wide spread changes in the central banks structure and method of operations.

But the years to come after these reforms were to witness the ever deteriorating situation of Pakistani economy in nearly all fronts. The liberalised financial sector was not able to achieve the objective policy makers had in their mind.¹ The economy continued to be trapped in a vicious circle of poverty, low growth, low savings, and low investment, which further hampered growth and poverty alleviation.

This paper tries to find out the rationale, which apparently lead McKinnon and Shaw's (MS) thesis of financial liberalisation to fail in Pakistani case. This is primarily done by addressing two fundamental questions which shall enable us to discern where the MS thesis lapsed:

- (i) Did financial liberalization lead to financial development in Pakistan?
- (ii) If it did, whether this established financial development led to an increased real economic activity as proposed in MS thesis?

OR

¹ Whereas, the objective of liberalization was to enable the Pakistani economy grow faster and perform better as being proposed by McKinnon and Shaw thesis.

What is the degree and nature of contribution of financial liberalization in real sector activity?

2 FINANCIAL LIBERALISATION AND FINANCIAL DEVELOPMENT

Here we shall try to answer the first question whether financial liberalisation lead to financial development or not. To answer this question, we first need to identify the measures which capture the financial activity in a best possible manner from banking sector as well as secondary financial markets.

Generally, monetary aggregates (e.g. M1², M2³, and M3⁴) provide a set of variables to measure the extent of financial development in the banking sector. A number of empirical studies have used a wide variety of monetary aggregates to analyze the correlation between financial intermediation and economic growth. In particular, as noted by King and Levine (1993), different definitions of monetary aggregates may act as proxies for different roles of financial intermediation.

In the literature, the most commonly used measure of financial development is a ratio of some broad measure of the money stock, usually M2, to the level of nominal income (King and Levine, 1993a and 1993b; Wood 1993; Murinde and Eng 1994; Lyons and Murinde 1994; Berthelemy and Varoudakis 1995; Arestis and Demetriades 1997; and Agung and Ford 1998). This simple indicator measures the degree of monetization in the economy. The monetisation variable is designed to show the real size of the financial sector of a growing economy in which money provides valuable payment and saving services. The ‘narrow money’ stock best reflects the former – payment services – and ‘broad money’ the latter, savings function. Narrow money balance should rise in line with economic transactions, but broad money should rise at a faster pace if financial deepening is occurring (Lynch 1996).

In some cases, monetary aggregates – especially narrow money aggregates – may be very poor indicators of the extent of financial development. For example, De Gregorio and Guidotti (1995) criticize the use of narrow money to income ratio as a proxy for financial development on the grounds that a high level of monetization

² M1= currency in circulation + demand deposits with scheduled banks + other deposits with the State Bank of Pakistan.

³ M2= M1 + time deposits with scheduled banks and Resident foreign currency deposits.

⁴ M3= M2 + NDFC Bearer Certificates + Deposits in NSSs + Deposits of federal Bank for Co-operatives.

(M1/GDP) is most likely the result of financial underdevelopment. De Gregorio and Guidotti (1995) suggest the use of a less liquid monetary aggregate (M3 or M2/GDP) as a proxy for financial development.

However, there are alternates to these broad money ratios as quality proxies of financial development. One such measure is ratio of bank deposit liabilities to income (Demetriade and Hussein 1996; Luintel and Khan 1999). In developing countries, a large component of the broad money stock is currency held outside the banking system. In principle a rising ratio of broad money to income may reflect the more extensive use of currency rather than an increase in the volume of bank deposits. Therefore, in order to obtain a more representative measure of financial development, currency in circulation should be excluded from the broad money stock.

The ratio of domestic credit to income (DC/GDP) can be used as another proxy for financial development (Odedokun 1989). This represents the domestic assets of the financial sector. This is the major item on the asset side of the consolidated balance sheet of the financial sector. It is expected to increase in response to improved price signalling, represented primarily by the establishment of positive real interest rates.

In order to obtain a more direct measure of financial intermediation, the private sector credit ratio (PC/GDP) can be considered (De Gregorio and Guidotti 1995). The main advantage of Private sector credit ratio to other monetary aggregates is that because it excludes the credit to the public sector, it represents more accurately the role of financial intermediaries in channelling funds to private market participants. Thus this is the definition of financial intermediation that should be more closely related to the level and efficiency of investment, and hence to economic growth.

Another proxy for financial development is the share of private sector credit in the domestic credit. This indicator may capture the aspect of domestic asset distribution of an economy. A financial system that simply funnels credit to government or state owned enterprises may not be evaluating managers, selecting investment projects, pooling risk and providing financial services to the same degree as a financial system that allocates credit to private sector. Lynch (1996) argues that government credit from banks in countries with a highly regulated financial system is frequently captive and that banks have no control over its use. Consequently, their

lending to the private sector best represents the important credit allocation role of banks.

Much of the evidence on the relationship between finance and growth utilizes bank-based measures of financial development e.g. the ratio of bank deposits or M2 to GDP. However, more recently the emphasis has increasingly shifted to stock market indicators. World stock market capitalization grew from \$4.7 to \$15.2 trillion between the mid 1980s and mid-1990s (Demirguc-Kunt and Levine 1996: 223). The total value of shares traded on developing countries' stock markets rose over twenty five fold between 1983 and 1992 (Singh 1997) and that on emerging markets jumped from less than 3% of the \$1.6 trillion world total in 1985 to 17% of the \$9.6 trillion world total in 1994 (Demirguc-Kunt and Levine 1996: 223). Levine and Zervos (1996) argue that well-developed stock markets may be able to offer different kinds of financial services than banking systems and may, therefore, provide different kind of impetus to investment and growth than the development of the banking system. Specifically, increased stock market capitalization, measured either by the ratio of the stock market value to GDP or by the number of the listed companies, may improve an economy's ability to mobilize capital and diversify risk. Liquidity is another important indicator of stock market development in that it may be inversely related to transaction costs, which impede the efficient functioning of stock markets. Liquidity may be measured by the total value of shares traded relative to either GDP or total market capitalization. The later is known as the turn over ratio and may be an indicator of the level of transaction costs. Finally, other aspects of stock market performance may be captured by the presence or absence of excess volatility of market returns, excessive concentration and asset pricing efficiency. Measures of the latter are inversely related to the degree of risk-miss-pricing between domestic and world capital market stocks and may, therefore, indicate the degree of integration of national stock markets into world capital markets (Arestis and Demetriades 1997: 787).

Levine and Zervos (1996) demonstrate that various measures of equity market activity are positively correlated with measures of real activity, across different countries, and that the association is particularly strong for developing countries. Using cross country regressions and data for 41 countries covering the period 1976-93, Levine and Zervos (1996) evaluate the extent to which these measures are robustly correlated with current and future rates of economic growth, capital

accumulation and productivity improvement. They also examine whether these effects are additional to those of banking system development by including both stock market and bank based financial indicators in the same regressions. They conclude that stock market development explains current and future economic growth. Atje and Jovanovic (1993), using a similar approach, also find a significant correlation between economic growth and the value of stock market trading relative to GDP for 40 countries over the period 1980-88 (also see Minsky 1986; Federer 1993; Grabel 1995; Leveine 1996; and Singh 1997).

The above debate has enabled us to analyse Pakistan's primary and secondary market performance by choosing the most commonly used proxies for financial development.

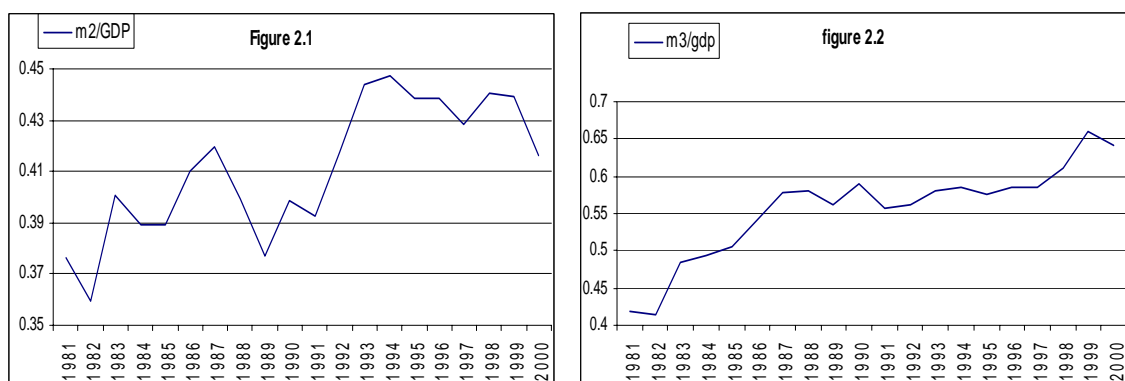
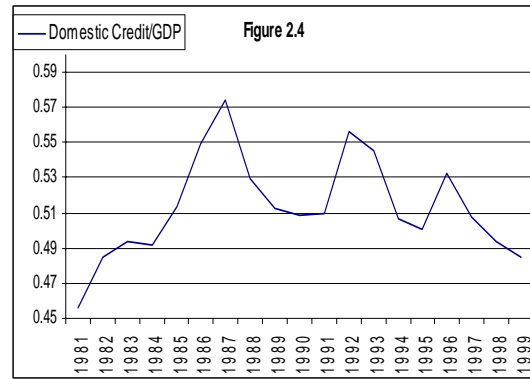
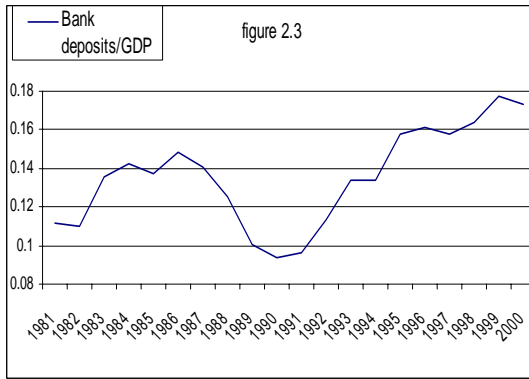


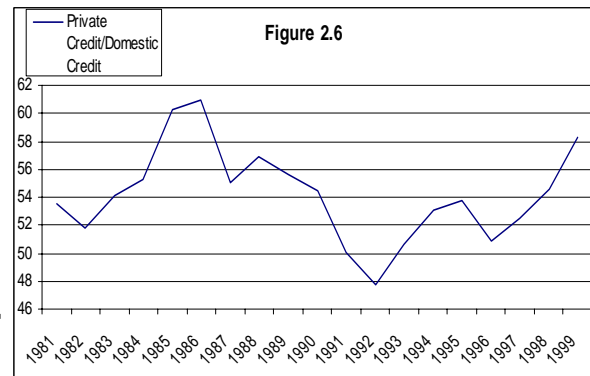
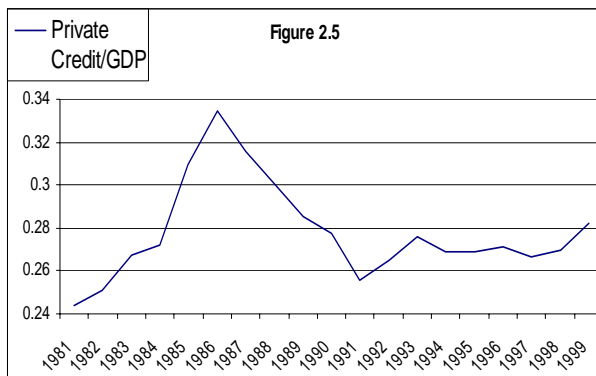
Figure 2.1 and 2.2 show that both the ratios, M2/GDP and M3/GDP have improved after liberalisation. The first half of the 1990s show that the rate of increase in M2/GDP is more than that of M3/GDP. This implies that right after liberalisation the banking sector witness more activity than non banking sector. But after 1995 M2/GDP witnessed a decreasing trend. Since M2/GDP has many components and this decrease might be attributable to any one of them, we cannot conclude that it was good or bad for the financial sector.⁵ Nevertheless, the persistent improvement in M3/GDP indicates a good performance of NBFIs, especially the securities markets. To know why M2/GDP declined, we excluded currency in circulation from the broad money stock. Figure 2.3 point to a rise in BD/GDP after 1990s showing a significant improvement of banking sector activity: Addendum in banking deposits tells us that the decline in M2/GDP in the later half of 1990s is attributable to the fall in narrow

⁵ M2= currency in circulation + demand deposits + time deposits (this implies that if CC falls it indicates a greater monetary control in the hand of the authorities and is good for financial development. But if M2 has fallen because of the other two components, the public savings to the banking sector has fallen).



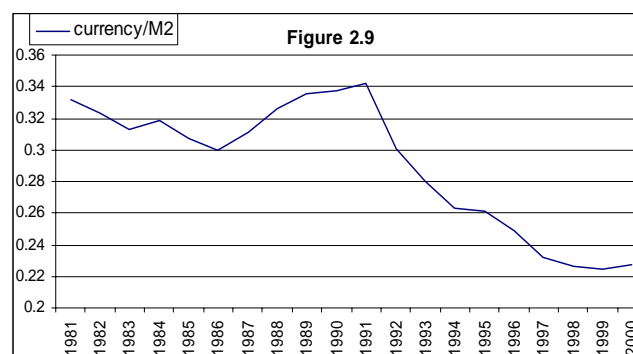
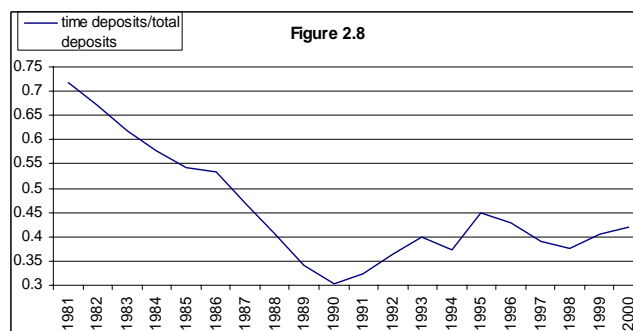
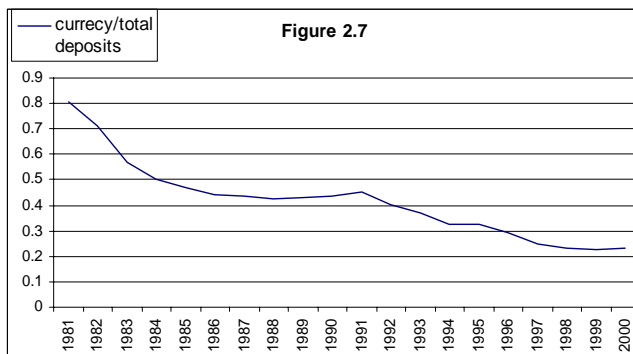
money aggregate namely currency in circulation. To make out whether the higher level of deposits, in post reform period, were channelled efficiently to productive investments, a glance at the ratio of domestic credit to income (DC/GDP), is useful. Figure (2.4) says that the domestic credit has experienced an average decline after 1990s, though we do not know whether the decline could be due to either a decline of credit to public sector or to the private sector or both. In case the domestic credit fell because of public sector credit decline by banks—the financial sector has shown maturity and independence. However, if the decline in overall domestic credit is accredited to the squeeze in credit to private sector—financial development has failed to sublime into productive investments.

Figure (2.5) and figure (2.6) throw light on our qualms. The former graph shows that right after liberalisation, banks did channel more resources to private ventures. However, as the decade proceeded, the improved lending trends towards private sector showed stagnancy. The later graph captures a better picture regarding private sector vis-à-vis public sector in obtaining bank loans. Graph (2.6) shows that the share of private sector credit in overall domestic credit has experienced a steep rise in post reform period. The graph also indicates a period of severe repression before reform when more and more credit had been allocated to the public sector.



Looking at the last two graphs, we conclude that, by lending more money to the private sector, financial reforms enabled the banking sector to improve its credit allocations. However, the over all credit facility of the banking sector has declined because public sector lending squeezed at a higher rate than the augmentation in private sector lending—resulting in an over all plunge of domestic credit by banking institutions.

Above observations draws attention towards the nature of financial development in Pakistan: As far as monetary aggregates (Demand deposits/GDP, M3/GDP etc) are concerned, liberalisation of financial markets has improved the working of financial institutions, and as far as the aggregates nearer to the real economic activity (e.g. private credit/GDP and Domestic credit/GDP) are concerned, liberalisation has a positive but insignificant impact on financial markets. The



explanation might be that Pakistani economic and socio-political situation is witnessing all time lows in the 1990s, and there is always a risk of two way causality between finance and growth (see Patrick 1966; Rubini and Salai Martin 1992; Demetriades and Hussein 1996 and Levine 1997). If such is the case, we can say that any positive impacts of financial liberalisation on the financial variables, which are closer to real sector, have been offset by the low economic activity and socio-political uncertainty experienced by Pakistan in 1990s. Nevertheless, to reach a conclusion, we further our probe of Pakistani financial sector by choosing certain non traditional monetary measurements of financial activity.

Figure 2.7, 2.8 and 2.9 shows the over time changing ratios of currency/total deposits; time deposits/total deposits and currency/M2 respectively. It is evident from the three graphs that after the liberalisation public confidence over banking sector has improved significantly because increasing number of people went for long term saving deposits and simultaneously decreased their currency holdings. We can further conclude that more and more money was being put in banks after 1990s and thus, excess liquidity problem facing by the economy in financially repressed set up was being solved a great deal. Declining ratio of M1/M2 in figure 2.10 reveals the same story.

As we know from graph 2.2 that M3/GDP improved significantly, it is useful to directly look into the post liberalisation performance of Pakistan's secondary markets.

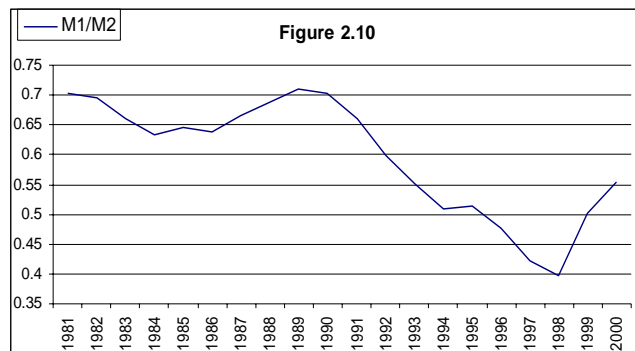
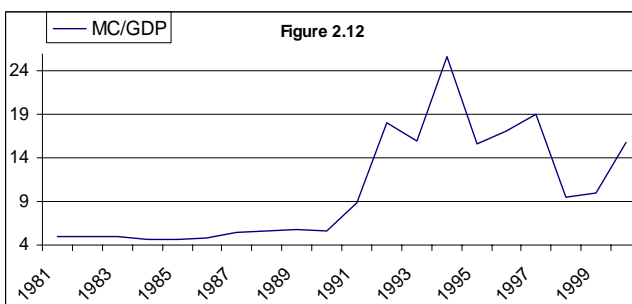
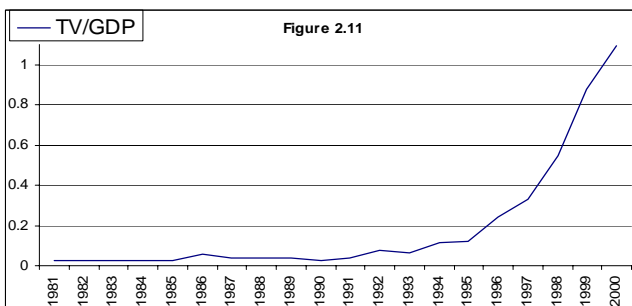


Figure 2.11 shows that stock market turn over at KSE as a percentage of GDP (TV/GDP), a measure of stock market liquidity, has witnessed unprecedented increase. Such positive movements in liquidity demonstrate that after the 1990s, the investors have been progressively diversifying their portfolios by obtaining more liquid assets in order to carry out efficient investments. Market Capitalization (MC/GDP) (figure 2.12) shows that after liberalisation there were some improvements. However, after 1994, there is a sharp declining trend hinting towards the problems faced by the real sector of the economy. It is not a surprise that Stock Market being the barometer of the performance of country's real sector shows a declining trend in this indicator of secondary market development. In fact, this observation allows us to argue that the declining performance of



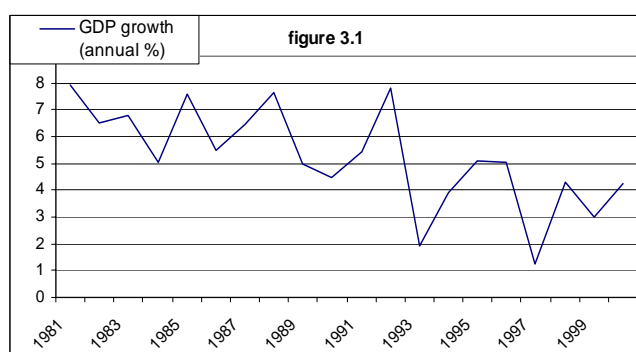
Pakistani economy offset the positive effects of financial liberalisation on the financial variables closer to the real sector of the economy.

The above discussion provides us enough information to conclude this section. We can say that the reforms initiated in the financial sector in early 1990s had lead to considerable improvement in financial markets. The public confidence on the banking sector improved a great deal. Augmented financial deepening was witnessed. From the graphical analysis it appears that the most suitable indicator of banking sector development in Pakistan is the ratio M2/GDP. This is because at one hand the ratio of time deposits/ total deposits has increased in Pakistan after liberalisation and on the other hand the ratio currency in circulation/ M2 has decreased very sharply for the same period. Thus, M2/GDP (see figure 3.1) which improved for the first five years of 1990s and then faced a decline actually means enhanced public confidence over banking system of Pakistan because we found out that the decline is attributed to a very sharp fall in currency spending by the public while at the same time they were saving more in long term deposits. In short, both the improvement and decline of M2/GDP points towards an addendum of financial deepening in Pakistan.

We can now proceed to our second question regarding whether this pragmatic financial development supplemented real macroeconomic activity as proposed by MS thesis.

3 FINANCIAL LIBERALISATION AND REAL ECONOMIC ACTIVITY: A SIMPLE DATA ANALYSIS

The previous section shows a considerable financial deepening was witnessed after the 1990s through improved banking mechanism. Now we come to our next question: what was the contribution of liberalisation in the real sector of the economy?



To give a comprehensive answer, let us first have a bird's eye view regarding the performance of the real sector of Pakistan after 1990s.

As the graph 3.1 shows, the country's growth performance

has deteriorated in the 1990s. Against an average growth rate of 6.1% in the 1980s, the real GDP growth slowed to an average of 5.1% in the first half and 4.1% in the second half of the 1990s. Large scale manufacturing and services sector were the main contributors in this decline (see table 3.1). Table 3.1 also shows that the gross fixed capital formation for the private sector in the first half of 1990s showed little improvement and declined sharply in the second half of the same decade when compared to 1980s. Whereas the contribution of the most important sectors of the economy i.e. agriculture and manufacturing in private gross fixed capital, experienced a sharp declining trend in 1990s. Investment is considered to be essential for sustaining higher economic growth. It has also registered a decline in the 1990s. Total investment and fixed investment averaged 18.6 percent and 16.8 percent of the GDP in the 1980s respectively, which actually increased in the first half of the 1990s to 22.2% and 18.0% despite the fact that economic growth slowed to an average of 5.0 percent. In the second half of the 1990s, the total and fixed investment rate declined sharply to 17.1% and 15.3% of GDP, culminating in a steep fall in 1999-2000 to about 15% and 13.4%, respectively (see table 3.1). Declining investment rate has contributed to the deceleration of growth in the 1990s. National saving rate also witnessed a sharp decline from 14.7% in the 1980s to 4.2% and further to 11.1% in

TABLE 3.1
Growth performance of the real sector

Item	Unit	1980's	1990-1995	1995-2000	1999-2000
A. GDP GROWTH RATE	%	6.1	5.1	4.1	4.5
a. Agriculture	%	4.1	4.2	4.6	5.5
b. Manufacturing	%	8.2	5.7	4.0	1.6
c. Large-scale Manufacturing	%	8.2	4.7	2.3	0.04
d. Services	%	6.6	5.1	4.1	4.5
B. Private Gross Fixed Capital Formation (growth rates)	%	14	15	8	8
a. Agriculture	%	11	10	8	14
b. Manufacturing	%	18	14	8	21
c. large-scale manufacturing	%	20	13	6	26
d. services	%	11	17	15	9
C. TOTAL INVESTMENT	as% of GDP	18.6	22.2	17.1	15.0
a. Fixed Investment	-do-	16.8	18.0	15.3	13.4
b. Public Investment	-do-	9.1	8.6	6.1	5.3
c. Private Investment	-do-	7.8		8.8	8.1
D. NATIONAL SAVING	-do-	14.7	14.2	11.1	12.2
a. Domestic Saving	-do-	7.7	13.4	14.6	14.0

Source: Economic Survey of Pakistan 1990/91, 1997/98.

the first and second half of the 1990s, respectively. In short, the real sector of the economy performed poorly when the government was liberalising the financial sector. The question then arises: why did financial liberalisation failed to put any positive effects on the real sector as being predicted by MS thesis; or at least sustains the levels of activity of the real sector in the 1990s, when compared with that of 1980s? As we know, the thesis suggests that market determined high interest rates after liberalisation will reduce the rate of inflation, increase private savings, investment, and economic growth through an increased level of efficiency and accumulated savings in the financial system of the country.(see for example: Corbo and de Melo 1986; Diaz Alejandro 1985; Fry 1995, 1998, and Levine 1997).

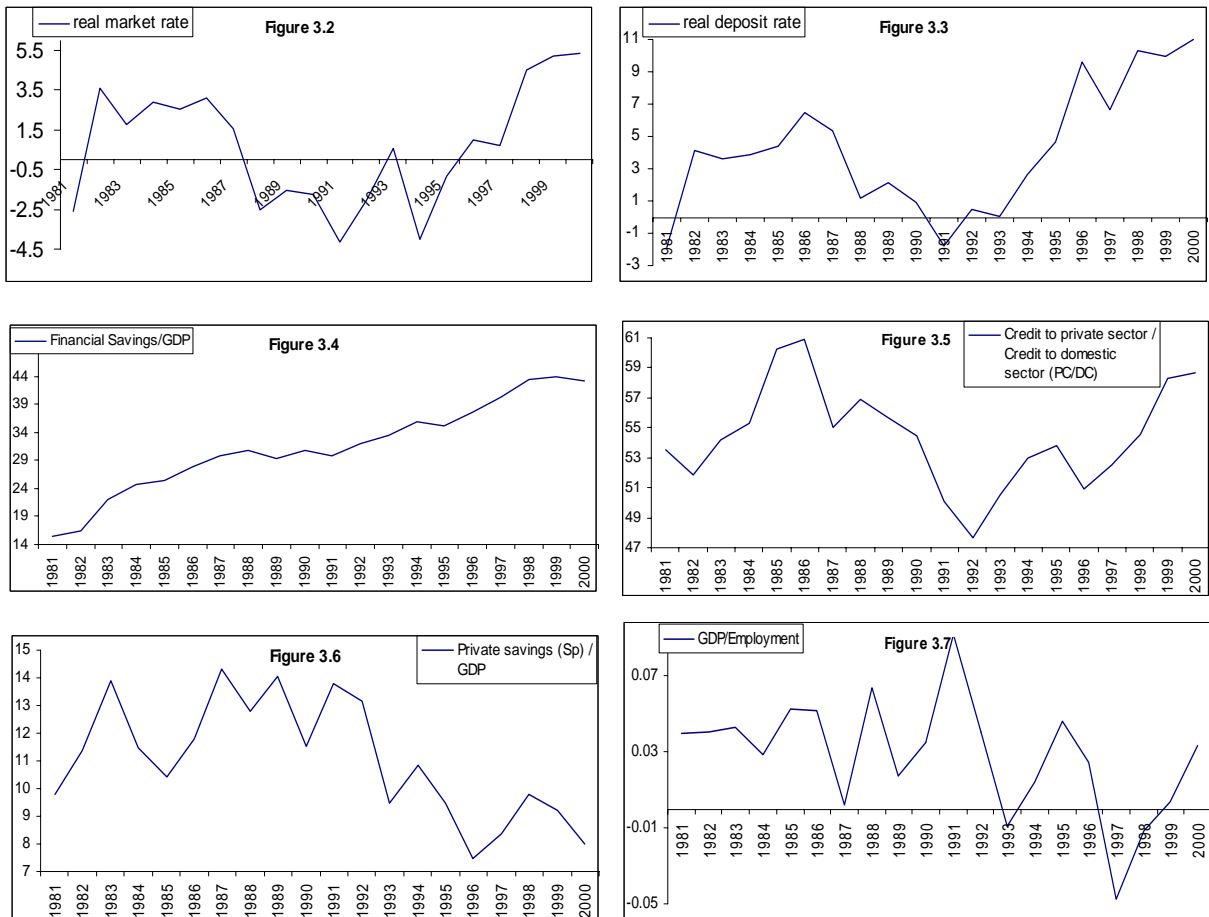


Figure 3.2 and 3.3 show that the real interest rates have increased after liberalisation. Moreover, graphs 3.4 and 3.5 show that as predicted by McKinnon and

Shaw, the rise in interest rates has rightly improved savings⁶ and the allocative efficiency of the financial system.⁷ However MS thesis also suggests that these improvements should perk up aggregate private savings and productive efficiency.⁸ Whereas the figures 3.6 and 3.7 show that the opposite has happened and point towards the structuralists' fear that interest rates have actually played a negative role in relation to the real economic activity after liberalisation.⁹ They regard curb markets in LDCs deep-rooted and more efficient in financial intermediation than the official banking system (see for example: Taylor 1983, 1988; van Wijnbergen 1983a, 1983b; Owen and Solis-Falls 1989).¹⁰ In structuralist models, working capital for productive firms is supplied by both curb market and banking system. The structuralists believe that when the interest rate moves upwards, households tend to move from curb market loans to bank deposits. This process of substitution from curb market loans to bank deposits hampers the equilibrium in credit supply and demand in curb market, and eventually, the curb market rate adjusts upwards to restore the equilibrium.¹¹ The new equilibrium level is going to be obviously at a higher interest rate with reduced level of credit supply, when compared with the period before the interest rate liberalization. On one hand, high cost of finance to productive firms raises the level of prices because in the structuralist models price is determined as a fixed mark up over operating costs. On the other hand, the credit squeeze in the curb market deters

6 Here we are talking about financial savings (FS) which are different from Private savings (Sp). Whereas FS= M3-M1 (see footnote for definition of Sp).

7 Allocative efficiency implies that more resources are being allocated to the efficient private sector than to the less efficient public sector, by the financial system. Here allocative efficiency is measured by taking the ratio of credit to the private sector by domestic sector.

8 Aggregate Private savings (Sp) are calculated by National Income accounting methods (see Heemst 2000 for more detail). Here $Sp = GNS - Sg$, where as $Sg = Rg - (Cg + Ct)$.

Where as, **GNS**=gross national savings, **Sg**= Government savings, **Rg** =current government revenue, **(Cg+Ct)** = the sum of government final consumption expenditure and current transfer payments by government.

9 Productive efficiency is measured by taking the ratio of GDP and employment in Pakistan.

10 According to the structuralists, the unofficial money markets can provide one-to-one resource intermediation whereas a commercial banking system is able to provide only one-to-(1-k) resource intermediation, where k is the official reserve requirement (see for example, Mathieson, 1980; Kapur, 1983; Fry, 1995). According to the structuralists, the official reserve requirement is a leakage in the process of financial intermediation when channelled through the official banking system. Thus, curb markets are characterised by a larger credit multiplier than the official banking system. In this sense the unofficial money markets are more efficient than the regulated official banking systems in terms of resource intermediation.

11 This is because Structuralists believe that curb markets are highly competitive and agile (Taylor 1983).

investment, depressing real economic growth. (see: Daniel and Kim 1996; Chan and Hu 1997).

Another justification for interest rates to hamper economic activity after liberalisation comes from the fact that market rate of interest after liberalisation do not function properly because the market framework tends to collapse as a result of information asymmetries. Under incomplete information, liberalized interest rates cannot perform the role expected in the McKinnon-Shaw theory, and hence the demand for and supply of credit will not be in equilibrium. (see: Grossman and Stiglitz 1980; Stiglitz and Weiss 1981; Stiglitz 1985, 1994, 1998). Table 3.2, which comprises of correlation coefficients between interest rates and some proxy variables of real economic activity, indicates a significant negative relationship in most of the cases reinforcing negative impacts of real interest rates.

TABLE 3.2
Correlation coefficients

Correlations	Real dr	Real mr
Aggregate savings (as a %age of GDP)	0.0707 (1.29)	-0.3116 (-1.49)
Private savings (-----)	-0.5429 (-2.07)*	-0.376 (-1.99)**
Private investment (-----)	0.487 (1.44)	0.3038 (1.77)
Credit to private sector (as a share of domestic sector)	0.432 (1.69)	0.5010 (3.52)*
Productivity efficiency (GDP/employment)	-0.386 (-1.92)**	-0.034 (-0.51)

*-significant at 5% level, **-significant at 10% level

The above discussion carries enough information to show that in Pakistani case the MS thesis did not work. Financial liberalization in Pakistan, like many other developing countries, has failed to generate its predicted chain reaction.¹² Though, we have veiled that the rationale of MS failure might be an increase in the interest rates, an observed improvement in financial resource intermediation calls for further probe in order to know whether the liberalization process went off beam or there are certain other exogenous factors under-work which can explain why the predictions of MS paradigm did not hold for Pakistan.

¹² Positive real rate of interest, increased savings, increased investment, increased efficiency in financial resource intermediation and higher economic growth.

In order to find such factors, one critique of MS thesis calls for a special attention here: It is by no means universal that financial development can contribute to economic growth because there is a two way casual relationship between them (Demetriades and Hussein 1996). The observation of Demetriades et al. was supplemented by Luintel and Khan (1999), who showed a negative contemporaneous correlation between the level of financial development (depth) and growth in income. The two way causation is not a new idea. Robinson (1952: 52) argues, ‘by and large, it seems to be the case that where enterprise leads finance follows’. Lewis (1955), one of the ‘pioneers’ of development economics, postulates a two way relationship between financial development and economic growth—financial markets develop as a consequence of economic growth which in turn feed back as a stimulant to real growth. This view is supported by Patrick (1966). Likewise, a number of endogenous growth models (Greenwood and Jovanovic 1990; Berthelemy and Varoudakis 1997; Greenwood and Bruce 1997) show a two-way relationship between financial development and economic growth. Thus the failure of MS thesis in Pakistani case might also be attributed to this two way relationship between financial development and economic growth. Such possibilities of two way causality calls for an intricate econometric scrutiny since the simple correlations or linear regression analysis shall be prone to spurious conclusions.

4 LIBERALISATION AND GROWTH: AN ECONOMETRIC TEST FOR THE VALIDITY OF MS THESIS

The above discussion shows that that MS thesis did not work. However it is yet to be determined what really caused this failure. On the one hand, there is a possibility that the sudden rise in interest rates not only hampered any positive gains from observed developments in financial system after 1990s in Pakistan, but they have also negatively influenced the real economic activity, as being anticipated by the structuralists. On the other hand, the failure of MS thesis could be due to an existent two way relationship between financial development and economic growth. Such two way causality might elucidate the observed anomaly in MS transmission mechanism by revealing why Pakistani real sector could not accrue any gains, despite significant improvements in financial sector after 1990s.

In order to discern the source for the failure of MS transmission mechanism, we proceed first by identifying two legs through which interest rates and financial development improves real economic activity as suggested in classical MS thesis.

The first leg implies that after liberalization, the financial markets offer higher returns on the saving instruments (e.g. deposits) and thus attracts higher levels of savings from the household. Additionally, financial development also takes place with the abolishing of restrictions (i.e., credit ceilings) prevailing in the system. In response to liberalised/improved financial system, financial savings would increase and so does the private savings which are then utilized by investors, resulting in an outright expansion of investment and growth. The second leg concentrates on the allocative efficiency of the financial sector. The liberalized financial system allocates resources to more competent investors. One indicator of such efficiency is that the financial sector conduit more and more loans to the private sector which is generally considered to be more proficient than the public sector. Though, the second leg only captures the allocative efficiency part because MS transmission is completed when the financial sector gives loans or credit to the most competent users. However we can imply that more loans to the private sector also means an improvement in the productive efficiency of a country because of the addendum in capital intensive projects accrued by competent private investors.¹³ An enhanced productive efficiency in turn also assures for higher growth.

Please note that the MS transmission effects real economic activity by influencing the savings or allocative efficiency variables. The implication of financial liberalisation on economic growth, investment or productive efficiency variables is thus through these two key variables.

The two legs of MS transmission, explained above, can be written in an equation form:

$$S_p = \alpha_1 + \alpha_2 RDR + \alpha_3 M_2 + \alpha_4 TV + \alpha_4 MC + \varepsilon_1 \quad (4.1)$$

$$PC/DC = \beta_1 + \beta_2 RDR + \beta_3 M_2 + \beta_4 TV + \beta_4 MC + \varepsilon_2 \quad (4.2)$$

¹³ The capital intensive projects need more resources. Thus according to McKinnon and Shaw, the increased private savings (first leg of the transmission) enables the investors to go for more capital intensive projects.

where,

S_p = Private savings/GDP, PC = Credit to Private Sector, DC = Credit to Domestic Sector, RDR = real deposit rate, $M2$ = Broad definition of Money/GDP, TV = Stock Market turn over/GDP, and MC = Stock Market Capitalisation/GDP.

Here, eq.1 is the first leg, which indicates that private savings depend upon interest rates and different indicators of financial development as proposed by classical MS thesis.¹⁴ Whereas, real deposit rate (RDR) is a proxy for the real interest rates. ($M2/GDP$) is a measure for financial deepening in the banking sector. The development in the stock markets is captured by market turnover (TV) and Market Capitalization (MC). TV indicates the liquidity in the secondary markets¹⁵ and MC shows its size.¹⁶ Model 4.2 shows the second leg of MS transmission mechanism where allocative efficiency (PC/DC) is the function of same set of exogenous variables as in model 4.1.¹⁷ Please note that two variables for stock market activity have been inducted in above equations namely trading volume and market capitalization, whereas only one variable for banking activity has appeared. The rationale behind this is that our analysis in section 2 enabled us to identify that banking sector in Pakistan witness significant financial development, whereas the stock market (KSE) which is closer to real economic activity has shown mixed results—so that could only identify the best measure of banking sector activity ($m2/gdp$), but no consensus could be reached regarding the same best for stock market.

We propose two additional equations since we know that finance-growth nexus is an indirect implication of MS thesis and is not captured in the MS transmission mechanism. This will help us to know the nature of relationship between allocative efficiency and private savings with economic growth.¹⁸

¹⁴ These different selected indicators of financial development are discussed in section.2. They indicate activity in the banking sector as well as stock markets. The stock market indicators are being taken because of the active role these markets play in the financial system of a country.

¹⁵ Liquidity allows investors to alter their portfolios quickly and cheaply, thereby, facilitating long-term as well as more profitable investments. Liquidity is an important attribute of stock market because liquid markets improve the allocation of capital and enhance prospects of long-term growth.

¹⁶ Market capitalization equals the value of listed shares.

¹⁷ (PC/DC) captures the allocative efficiency of the financial system because it captures the importance given to private sector compared to the public one. A rise in this variable over time shows that financial sector is allocating more resources to efficient private sector.

¹⁸ Such an exercise will enable us to know with more detail the role finance has played in the overall economic situation of Pakistan.

$$\delta_1 \ln GDP = \delta_2 S_p + \delta_3 E + \delta_4 (PC / DC) + \varepsilon_3 \quad (4.3)$$

$$\gamma_1 E = \gamma_2 (PC / DC) + \varepsilon_4 \quad (4.4)$$

Where \mathbf{E} = productive efficiency = GDP/Employment.

Here model (4.3) tells us the relationship between GDP growth with private savings, productive efficiency and allocative efficiency. Whereas, establishing a relationship between E and (PC/DC) in model 4.4 will enable us to analyse more precisely the role later variable has played in GDP growth rate.¹⁹

As discussed in previous section, there is possibility of a two-way causation between financial development and economic growth. Under such a possibility, we cannot explicitly assume the endogeneity of financial indicators in relation to real economic variables. Since above equations implicitly assumed that the relationship goes from finance to real activity, they have to be re written because in case of two way causality, our regression analysis shall lead to spurious results. One way to address this issue is to employ co-integration technique to test the validity of MS thesis. In fact, current empirical studies have examined causality/direction of relationship between financial development and economic growth, as well as MS transmission mechanism in a multivariate vector auto regression (VAR) (see e.g.: Arestis and Demetriades 1997; Luintel and Khan 1999; Kar and Pentecost 2000; Aluthge 2001). The increasing popularity for the usage of VAR in the issue underhand is its dynamism. Through VAR, in a multivariate system of co-integrated variables, the framework of Johanson (1988) allows one to address the issue of long run causality in a more formal and complete way (Hall and Milne 1994, Luintel and Khan 1999). Toda and Philips (1993) recommended the Johansen framework as the efficient way of implementing Granger causality tests. In addition to this, multivariate co-integration and vector error correction methodology (VECM) solves for the problem of simultaneous equation bias faced in testing MS transmission mechanism in a simple OLS regression analysis (see e.g.: Kar and Pentecost 2000; Aluthge

¹⁹ Since allocative efficiency carry out improvements in GDP growth through improving productive efficiency, it is necessary to know the relationship between E and PC/DC.

2000).²⁰ Another advantage of using VAR is that it can be run on the variables which are non stationary. Thus, VAR also solves the problem of stationary most of the time series variables suffer from and gives robust results.

4.1 Co-integration-analysis

Co-integration analysis allows us to relax the assumption of that financial development causes economic growth and to taken up the criticism of two-way causality. We can rewrite the equations, 4.1, 4.2, 4.3, 4.4 as follows:

$$\alpha_1 S_p + \alpha_2 RDR + \alpha_3 M_2 + \alpha_4 TV + \alpha_4 MC = \varepsilon_1 \quad (4.5)$$

$$\beta_1 (PC/DC) + \beta_2 RDR + \beta_3 M_2 + \beta_4 TV + \beta_4 MC = \varepsilon_2 \quad (4.6)$$

$$\delta_1 \ln GDP + \delta_2 S_p + \delta_3 E + \delta_4 (PC/DC) = \varepsilon_3 \quad (4.7)$$

$$\gamma_1 E + \gamma_2 (PC/DC) = \varepsilon_4 \quad (4.8)$$

The new sets of equations 4.5, 4.6, 4.7, 4.8 are basically typical VAR models with more than one endogenous variables.²¹ In short, estimating these models not only allow us to test for the both legs of MS transmission mechanism and then the finance and growth link, but the usage of VAR models and co-integration analysis shall evade time series econometric problems like, autocorrelation or multi-co-linearity.²²

The data used here is pure time series one, as we take monthly values for the variables specified in our models from 1980 to 2000. In general, macroeconomic theory assumes a long run stable relationship between the levels of certain economic variables. That means a set of macro economic variables cannot move too far from each other. However, it is a well known fact that most macroeconomic time series in a growing economy are non stationary (see i.e.: Perman 1991; Dicky, Jansen and

²⁰ The methodology of multivariate cointegration and vector error correction models (VECM) is established by Johansen (1988) and Johansen and Juselius (1990).

²¹ In a VAR model we can estimate the long run relationship among the variables even if they are interdependent with each other as in case of models 4.5 and 4.6 (where Sp, PC/DC, RDR, M2, TV and MC are all endogenous variables).

²² It can be argued with the help of theory that equations 4.1, 4.2, 4.3, and 4.4 were facing both the problems.

Thorton 1994); therefore, when such data series are regressed together, spurious correlation is likely to occur due to the strong trends involved in time series in question. Since, the study also deals with time series data; a test for stationary is a very important precondition before proceeding further. In this regard we first employ unit root test, aiming to establish the order of each variable and then the co-integration test to determine the number of co-integrated vectors in our models.

4.1.1 *The test for order of integration*

The Augmented Dickey Fuller (ADF) test is used to establish the degree of integration of each variable.²³ Normally this test involves the running of a regression of the first difference of the series, on the series itself, lagged once; one or more lagged difference terms, a constant and a time trend.²⁴ The most general form of the regression that is the base of ADF test therefore would look like $\Delta X_t = c_1 + c_2 t + c_3 X_{t-1} + \dots + c_p \Delta X_{t-p} + \varepsilon_t$, where X denotes the variable in question, Δ the difference operator, and $c_1, c_2, c_3, c_4, \dots, c_p$ are parameters to be estimated, while ε_t is the random error term.

Table 4.1 summarizes the results of the ADF test with an intercept, with intercept and time trend, and without intercept and time trend for all the variables in our model.²⁵ The null hypothesis (H_0) is that X_t (the variable in question) is $I(1)$.²⁶ If the calculated t-ratio provided by the ADF test is less than the critical value given in the table, then we cannot reject the null hypothesis that X_t has a unit root.²⁷ That means X_t is a non-stationary time series. According to the ADF test results in table 4.1, the null hypothesis of a unit root at levels of all the variables, except E, cannot be

²³ According to the existing literature on time series econometric analysis, the ADF test is one of the most widely used tests to assess the integrating properties of a time series by contemporary researchers.

²⁴ It is a known fact that the results of the unit root test are sensitive to the number of lags included in it. To identify the optimal lag structure, Campbell and Peron (1991) have suggested the general to specific elimination procedure. In line with the procedure, we started estimation of each equation

²⁵ This procedure was followed to avoid the danger of over differencing, i.e. a possibility of applying a difference operator too many times.

²⁶ This is the order of integration. For example, say, a variable is integrated of order d (written as $I(d)$) if it should be differenced once to become stationary is said to be integrated of order one (written as $I(1)$) and so on. Thus, a stationary variable (without differencing) is supposed to be integrated of order zero (written as $I(0)$).

²⁷ In this case, McKinnon's t-table of critical values given in E-views has been used.

rejected at 5% level. In other words, it means that all series are non stationary at levels except E, which is stationary at 5%. The results further suggest that all series are stationary at first difference; thereby, we could conclude that all series under investigation are integrated of order one, I (1). Since all variables in our model are integrated to the same order, we can now perform the test of co-integration to understand the number of co-integrated relationship(s) in the model.

TABLE 4.1
ADF test for unit root

Variables	Lag length ^b	With intercept	With intercept and trend ^a
Levels			
Sp	0	-1.8455	-3.1184
PC/DC	4	-1.7781	-1.0861
Lo(GDP)	0	-0.8959	-1.4029
E	0	-3.288**	-3.8654**
RDR	0	-1.4461	-1.7021
M2	0	-1.9019	-2.4255
TV	0	6.3111	-3.2525
MC	0	-1.669	-2.4406
First differences			
Variables	Lag length ^c	With intercept	With intercept and trend ^a
Sp	0	-5.2787*	-5.2999*
PC/DC	0	-3.8118**	-3.6592***
Lo(GDP)	0	-2.9586***	-2.9117
E	0	-5.2625*	-5.0928*
RDR	0	-5.7077*	-5.7714*
M2	0	-4.7398*	-4.8478*
TV	0	-5.8026*	-6.5444*
MC	0	-5.0401*	-5.4587*

*- Significance at 1% level, **-significance at 5% level, ***-significance at 10% level.

a-The Dickey-Fuller F test on c_2 and c_3 (joint null hypothesis of a unit root)

$H_0: c_2 = c_3$. The critical values for the Dickey-Fuller F test were taken from Hamilton (1994), table B.7, p.764, b- lag length is for the test statistics with intercept in the third column, c- lag length is common to both test statistics with and without intercept.²⁸

4.1.2 The test for co-integration

Given the results of the unit root test, the next step is to use the co-integration procedure in order to test for the existence of a long-run stable relationship in the four equations that have been specified.

The existence and the nature of co-integrating relationship between a set of variables, say X_{1t} to X_{kt} can be studied by two alternative approaches, namely Engle-Granger's approach and Johansen's approach. Here we shall adopt Johansen's

²⁸ Hamilton, James D. (1994), Time Series Analysis, Princeton: Princeton University Press.

approach to study co-integration and error correcting dynamics, which addresses the weaknesses in Engle-Granger procedure.²⁹ In this approach the co-integrating relationship and error correcting equations are estimated jointly in one step.³⁰ Consequently, the Johansen multivariate co-integration method is considered to produce more robust results when more variables are involved in the analysis. The test is normally carried out for two null hypotheses. The first null hypothesis is that the number of distinct co-integrating vectors does not exceed a specific integer, say r , less than the number of variables in the system, against the alternative that the number exceeds r . This is equivalent to the hypothesis the number of non-zero characteristic roots is r against the alternative that it is greater than r . The second null hypothesis is that the number of co-integrating vectors (non-zero characteristic roots) is equal to r against the alternative that it is equal to $r+1$. Suppose the characteristic roots, denoted by λ_j , are arranged such that $\lambda_1 > \lambda_2 > \dots > \lambda_k$. The two null hypotheses along with the alternative hypotheses and the test statistics are as follows.

$$H_0^A : \lambda_j = 0 \quad \text{for all } j=r+1, \dots, k$$

$$H_1^A : \lambda_j \neq 0 \quad \text{for at least one } j > r$$

$$\text{Test statistic: } \lambda_{\text{trace}}(r) = -n \sum_{j=r+1}^k \ln(1 - \lambda_j)$$

²⁹ Engle-Granger's is a two-step approach. The first step is to test the existence of long run or equilibrium relationship between the variables and the second step is to study transition phase of the variables when they are displaced from the long run equilibrium path. In the first step unit root tests, such as ADF (augmented Dickey-Fuller) or Phillips-Perron tests are applied to test the orders of integration of the variable. If all the variables are integrated of the same order, a regression equation is estimated by OLS with one of the variables set as the dependent variable. The next step is to use regression residuals obtained from the first step to form an error correction equation for each variable to study the nature of error correction process. Engle-Granger approach has a number of weaknesses. First, it does not allow more than one co-integrating relationship, despite the fact that the number of co-integrating relationships can vary from zero to as many as the number of variables minus one (see: Enders 1995). Second, in the Engle-Granger procedure one of the variables has to be set as dependent variable. In many economic problems this choice can be arbitrary. For example in testing the co-integration between stock price index and trading volume, it can be argued that both the variables actively respond to each other and setting one of the two variables as pre-determined would be an arbitrary assumption. Third, since the Engle-Granger approach is based on two-step estimation, errors of estimation at the first stage are carried over to the second stage and, therefore, estimation procedure is not efficient. (However, this can be corrected).

³⁰ See for more detail Granger (1969, 1986, and 1988) and Johansen (1988, 1990).

$$H_0^B : \lambda_j \neq 0 \quad \text{for all } j=1, \dots, r$$

$$= 0 \quad \text{for all } j=r+1, \dots, k$$

$$H_1^B : \lambda_j \neq 0 \quad \text{for all } j=1, \dots, r+1$$

$$= 0 \quad \text{for all } j=r+2, \dots, k$$

$$\text{Test statistic: } \lambda_{max}(r, r+1) = -n \ln(1 - \hat{\lambda}_2)$$

If all the characteristic roots are zero then the λ_{trace} -statistic will be equal to zero. Therefore the acceptance of null hypothesis H_0^A for $r = 0$ means that all the characteristic roots are zero, therefore the variables under consideration are stationary and no co-integrating relationship exists. The rejection of this null hypothesis means that there is at least one non-zero characteristic root. For the existence of a co-integrating relationship, however, it is also required that the number of characteristic roots is less than the number of variables. This requirement is tested by the null hypothesis H_0^A for $r = k-1$. Obviously this null hypothesis must be accepted to have a co-integrating relationship. The exact number of co-integrating relationships is determined by estimating both λ_{trace} and λ_{max} statistics for alternative values of r . For the application of the above testing procedure five alternative specifications are normally considered. These are as follows:

- Specification 1: No intercept or trend in VEC and no drift or trend in VAR
- Specification 2: Intercept but no trend in VEC and no drift or trend in VAR
- Specification 3: Intercept but no trend in VEC and drift but no trend in VAR
- Specification 4: Intercept and trend in VEC and drift but no trend in VAR
- Specification 5: Intercept and trend in VEC, drift, and trend in VAR

If the above testing procedure leads to the conclusion that there is no co-integrating relationship between the two variables, the analysis would be complete. In this case the estimated relationship does not form a long run (or equilibrium) relationship; it can however, be interpreted as a temporary relationship that can be valid for the short run only. In case the test results point to the existence of a long run

relationship, the next step would be to determine the nature of short-term dynamics in the variables under consideration as they get displaced from the equilibrium path.

The results of the multivariate co-integration analysis are reported in table 4.2. The results in 5.2 indicate that the null hypothesis of the zero co-integrating vector is rejected at 5% level for the four models at both zero period lag and one period lag. This implies that the variables specified in each VAR models are co-integrated with at least one co-integrated vector. The test detected two co-integrating vectors in all the four VAR models with no lagged first difference terms and at least one co-integrating vector in the models with one lagged first difference terms. Having identified the number of co-integrating vectors, the next task is to estimate the models incorporating the identified long-run relationships with the short run dynamics of all the variables. The technique used in this regard is the vector error correction mechanism (VEC), which is a state-of-art mechanism for each estimation. According to the VEC mechanism, when we have information on the number of co-integrating vectors in each model, for any set of such co-integrated relationships there exists a valid error correction representation of the data. This is called the error correction term in the literature, and it is capable of measuring the deviation of the dependent variable from its long-run trend through an inclusion of error correction term(s) into equation(s), depending on the number of co-integrated relationships found in the model.

TABLE 4.2
Johansen test for multiple co-integrating vectors

Specification 1: No intercept or trend in VEC and no drift or trend in VAR			Specification 2: Intercept but no trend in VEC and no drift or trend in VAR			Specification 3: Intercept but no trend in VEC and drift but no trend in VAR			Specification 4: Intercept and trend in VEC and drift but no trend in VAR			Specification 5: Intercept and trend in VEC and drift and trend in VAR		
Equation (4.5), Variables: Sp, RDR, M2, TV, MC														
P=0														
Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)
r=0	79.48*	59.46	r=0	104.53*	76.07	r=0	97.76*	68.52	r=0	132.14*	87.31	r=0	114.32*	77.74
r=1	36.11	39.89	r=1	53.47*	53.12	r=1	49.10*	47.21	r=1	78.36*	62.99	r=1	60.76*	54.64
r=2	14.2	24.31	r=2	29.08	34.91	r=2	24.81	29.68	r=2	34.34	42.44	r=2	28.11	34.55
P=1														
Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)
r=0	61.99*	59.46	r=0	77.34*	76.07	r=0	68.55*	68.52	r=0	98.30*	87.31	r=0	83.93*	77.74
r=1	37.40	39.89	r=1	52.74	53.12	r=1	44.14	47.21	r=1	53.73	62.99	r=1	47.77	54.64
r=2	19.45	24.31	r=2	30.67	34.91	r=2	22.13	29.68	r=2	31.10	42.44	r=2	25.88	34.55

Equation (4.6), Variables: PC/DC, RDR, M2, TV, MC

P=0

Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)
r=0	72.33*	59.46	r=0	96.02*	76.07	r=0	89.26*	68.52	r=0	116.02*	87.31	r=0	99.77*	77.74
r=1	33.63	39.89	r=1	50.05	53.12	r=1	45.67	47.21	r=1	68.59*	62.99	r=1	62.21*	54.64
r=2	16.55	24.31	r=2	27.96	34.91	r=2	24.60	29.68	r=2	33.91	42.44	r=2	27.59	34.55

P=1

Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)
r=0	95.09*	59.46	r=0	109.28*	76.07	r=0	102.44*	68.52	r=0	131.18*	87.31	r=0	107.88*	77.74
r=1	46.91*	39.89	r=1	61.03*	53.12	r=1	54.30*	47.21	r=1	68.53*	62.99	r=1	51.17	54.64
r=2	20.71	24.31	r=2	31.81	34.91	r=2	26.34	29.68	r=2	34.05	42.44	r=2	26.83	34.55

Equation (4.7), Variables: Log (GDP), Dp, E, PC/DC

P=0

Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)
r=0	72.75	24.31	r=0	82.28*	34.91	r=0	28.63	29.68	r=0	39.73	42.44	r=0	38.03*	34.55
r=1	15.62*	12.53	r=1	25.09*	19.96	r=1	12.09	15.41	r=1	16.89	25.32	r=1	15.27	18.17
r=2	0.66	3.84	r=2	10.03*	9.24	r=2	0.99	3.76	r=2	2.17	12.25	r=2	1.55	3.74

P=1

Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)
r=0	27.69*	24.31	r=0	38.69*	34.91	r=0	30.88*	29.68	r=0	52.63*	42.44	r=0	51.25*	34.55
r=1	8.22	12.53	r=1	18.08	19.96	r=1	11.43	15.41	r=1	20.69	25.32	r=1	19.79*	18.17
r=2	0.41	3.84	r=2	7.53	9.29	r=2	0.90	3.76	r=2	5.35	12.25	r=2	5.25*	3.74

Equation (4.8), Variables: E, PC/DC

P=0

Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)
r=0	13.48*	12.53	r=0	18.36	19.96	r=0	18.27*	15.41	r=0	28.88*	25.32	r=0	23.79*	18.17
r=1	0.02	3.84	r=1	4.76	9.24	r=1	4.69*	3.76	r=1	4.74	12.25	r=1	4.73*	3.74

P=1

Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)	Ho	M.E	C.V (5%)
r=0	8.65	12.53	r=0	14.26	19.96	r=0	16.12*	15.41	r=0	27.13*	25.32	r=0	27.10*	18.17
r=1	0.05	3.84	r=1	5.35	9.24	r=1	5.25*	3.76	r=1	6.51*	12.25	r=1	6.55*	3.74

r-the number of co-integrating vectors, p- lag length, *- significant at 5% level.

4.1.3 The nature of co-integrating relationship

We now discuss the nature of long run relationship between the variables in hand for all the three VAR models. But first, in order to understand the forthcoming notice that in the estimation of co-integration relationship the coefficient of one of the variables is normalized at one in the each equation. For example, the focus of our

analysis in model (4.5) is S_p , for convenience of analysis we have normalized the coefficient of this variable in all the co-integrating relationships for equation (4.5). Likewise, coefficients of PC/DC in model (4.6), Log (GDP) in model (4.7) and E in model (4.8) are normalized to 1 for all the co-integration relationships of their respective models.

We can now write estimated forms of models 4.5, 4.6, 4.7 and 4.8 as follows:

$$(1)S_p + \hat{\alpha}_2 RDR + \hat{\alpha}_3 M + \hat{\alpha}_4 TV + \hat{\alpha}_5 MC = 0 \quad (4.9)$$

$$(1)(PC/DC) + \hat{\beta}_2 RDR + \hat{\beta}_3 M + \hat{\beta}_4 TV + \hat{\beta}_5 MC = 0 \quad (4.10)$$

$$(1)\ln GDP + \hat{\delta}_2 S_p + \hat{\delta}_3 E + \hat{\delta}_4 (PC/DC) = 0 \quad (4.11)$$

$$(1)E + \hat{\gamma}_2 (PC/DC) = 0 \quad (4.12)$$

The estimated coefficients of equations (4.9, 4.10, 4.11 and 4.12) are presented in table 4.3, represent the parameters $(\hat{\alpha}_2, \hat{\alpha}_3, \hat{\alpha}_4 \text{ and } \hat{\alpha}_5)$, $(\hat{\beta}_2, \hat{\beta}_3, \hat{\beta}_4 \text{ and } \hat{\beta}_5)$, $(\hat{\delta}_2, \hat{\delta}_3 \text{ and } \hat{\delta}_4)$ and $(\hat{\gamma}_2)$ respectively. Since we cannot claim any particular variable to be dependent or independent categorically due to the very nature of Johansen's approach, the parameters of any of the four equations (i.e., $\hat{\alpha}_2, \hat{\alpha}_3, \hat{\alpha}_4 \text{ and } \hat{\alpha}_5$) could be interpreted in more than one ways, depending upon which particular variable is taken as the dependent variable. For example, if it is assumed that in equation (4.9), S_p is endogenous, while the other variables are exogenous; their respective estimated coefficients are interpretable as the negative of change in savings in the private sector due to the changes in the level of real deposit rate, financial deepening, market capitalization and financial liquidity respectively. Thus it will be a test of the first leg of MS transmission mechanism. But assume we don't know whether S_p is dependent upon these set of financial variables or is in fact interrelated. This assumption will lead us to conclude from the results only the nature of long term relationship among private savings and financial variables. Later in this section, running of the causality tests will enable us to know the direction of relationship and we can comment on MS

transmission mechanism with more authenticity. However, it also follows from the model (4.9) that a negative (positive) value of the parameter $\hat{\alpha}_2$, for example, indicates a positive (negative) relationship between the Sp and RDR. The signs of the other co-integrating coefficients for all the four equations have similar interpretation.

TABLE 4.3
Co-integration coefficients

Variables	Specification 1: No intercept or trend in VEC and no drift or trend in VAR	Specification 2: Intercept but no trend in VEC and no drift or trend in VAR	Specification 3: Intercept but no trend in VEC and drift but no trend in VAR	Specification 4: Intercept and trend in VEC and drift but no trend in VAR	Specification 5: Intercept and trend in VEC and drift and trend in VAR
Equation (4.9), Variables: Sp, RDR, M2, TV, MC					
SP	1	1	1	1	1
RDR	0.38 (4.54)*	0.401 (4.337)*	0.407 (4.59)*	1.205 (3.93)*	1.144 (4.42)*
M2	-8.23 (7.65)*	-6.632 (-2.646)*	-5.12 (-2.66)*	-3.97 (-5.53)*	-4.959 (-5.76)*
TV	-0.515 (-0.15)	-0.679 (-0.202)	-1.559 (-0.488)	-7.84 (-3.87)*	-7.809 (-4.10)*
MC	-0.423 (-3.22)*	-0.461 (-6.93)*	-0.4505 (-7.089)*	-0.525 (-3.93)*	-0.502 (-4.606)*
Equation (4.10), Variables: PC/DC, RDR, M2, TV, MC					
PC/DC	1	1	1	1	1
RDR	-0.0030 (-3.62)*	-0.0028 (-3.079)*	-0.00285 (-3.090)*	-0.0095 (-8.803)*	-0.0084 (-7.86)*
M2	-1.486 (-7.64)*	-1.599 (-9.169)*	-1.569 (-9.241)*	-0.6902 (-4.637)*	-0.8803 (-6.253)*
TV	-0.0022 (-0.073)	-0.0011 (-0.037)	-0.00109 (-0.0369)	-0.0075 (-0.2718)	-0.0189 (0.720)
MC	-0.006 (-9.29)*	-0.0063 (-9.44)*	-0.0064 (-9.54)*	-0.00497 (-9.21)*	-0.0055 (-10.86)*
Equation (4.11), Variables: Log (GDP), Sp, E, PC/DC					
Log(GDP)	1	1	1	1	1
Sp	-0.21 (-1.47)	-0.0717 (-1.78)	-0.073 (-1.82)	-0.024 (-4.08)*	-0.0240 (-3.99)*
E	-9.20 (-4.49)*	-1.022 (-8.14)*	-1.27 (-8.17)*	-1.366 (-5.916)*	-1.383 (-5.913)*
PC/DC	9.201 (3.61)*	8.260 (3.39)*	8.028 (3.303)*	0.614 (6.07)*	0.615 (6.04)*
Equation (4.12), Variables: E, PC/DC					
E	1	1	1	1	1
PC/DC	-0.0522 (-0.34)	-0.271 (-1.14)	-0.2607 (-1.110)	0.2301 (2.286)*	0.229 (2.285)*

Note: The t-statistics significant at 5% level are indicated by *.

The table above shows that there exists a negative long run relationship between Private savings and deposit rates in model (4.9). This result contradicts MS thesis, and establishes the fact interest rates carried negative effects after liberalization on real economic activity in Pakistan.³¹ This confirms our observation earlier that a

³¹ We ran co-integration tests for the period 1970 to 1990 for model 4.5. The results suggested a positive relationship between Sp and RDR. This means that for Pakistan, low interest rates in a financially repressed atmosphere were not so harmful for the real activity, then the shooting up of these rates after liberalization.

sharp rise of real rates after liberalisation have contributed negatively to real economic activity. One possible explanation for that is the one given by the structuralists. Pakistan has a very deep rooted and developed curb markets after decades of fiscal imbalances and financial repression. It seems that what happened in Pakistan was a credit squeeze in the curb markets because of a fall in private savings allocated to these markets (due to interest rate distortion). Since, the official banking sector in Pakistan could not increase the credit supply to compensate for the decline in credit flow from the curb markets to productive firms, there was a decline in investment and economic growth.³² However, even if we do take the word of structuralists, the low coefficients of interest rates for private savings show that the negative effect is somewhat limited and might as well be offset to an extent by the improvement in financial development indicators (e.g. M2 with a higher coefficient) - such that the private savings sustained at old levels if not improved. Whereas a sharp decline of private savings right after liberalization need more explanation than just a sharp rise in interest rates leading to some distortions in more efficient informal markets. In short interest rates have carried out distortions in some other variables too which are very important for private savings, and which, have been ignored by structuralists.

One such cause of fall in private savings in Pakistan after liberalisation is because retained earnings fell. There can be two very obvious reasons of retained earnings to fall in Pakistan. Firstly retained earnings move, if anything, inversely with the rate of interest³³. As the interest rates rise, the companies decrease the level of their retained earnings on the basis of assessment of future profitability. Secondly we know from our initial analysis that the overall economy was not doing very good. GDP growth rate, which represent the internal as well as external situation and fiscal as well as monetary performance of the economy, experienced deterioration in 1990s. An overall unstable economic situation of Pakistan might as well have negative

³² Money multiplier for informal financial institutions is greater than their formal counterparts because of no reserve requirement from the bank.

³³ The concept of retained earnings is not being encouraged much by the proponents of financial liberalisation or the later schools. But that cannot take away the importance of this variable in explaining saving or investment patterns of the economy. See for more detail: Howard Nicholas (2000).

impacts on the domestic business firms' revenues, profits and eventually level of retained earnings.

Coming back to model (4.9), financial deepening has a positive long run relationship with private savings and so does liquidity and capitalization of the stock markets. However the small coefficients of TV and MC and insignificant t-values of TV for three specifications suggest that stock market play a limited role in determining private savings in Pakistan. The result is expected because in Pakistan, the stock markets are still developing and investments by a common man constitute a very small part of overall stock market investment.

Model (4.10), suggests that allocative efficiency has a positive long run relationship with all the indicators of financial development except liquidity of stock market, which shows a positive but insignificant relationship. Additionally, very small coefficients of the stock market indicators show limited role the later play in relation to allocative efficiency of Pakistan. Such a sharp rise in loan defaults might contribute significantly to paralyze the productive efficiency of the country. Model (4.11) states that there is a positive long run relationship between private savings, productive efficiency and economic growth, whereas, allocative efficiency, which has been improved since liberalization (see section 3), has failed to establish any positive relation ship with economic growth. Model (4.12) shows that allocative efficiency has a negative long run relationship with productive efficiency. The results in all the three later models suggest that second leg of MS transmission mechanism has failed to transform financial development into enhanced real macroeconomic activity. The only explanation might be that, no doubt allocative efficiency has improved with financial development, but since there is a perception of two way causality, worsening economic conditions on the real front of the economy succumbed these improvements to be translated into improved investments or improved productive efficiency (i.e., high interest rates are negatively related to productive efficiency; table 3.2). What happened in Pakistan was that banks which suffered loses to their capital bases due to financial repression, were tempted to invest in riskier projects in an attempt to quickly recover their losses. The riskier the project is, the higher is the lending rate since the probability of repayment of a loan is negatively related to interest rate charged by the bank. Since Pakistan's macro economic conditions were poor, the riskier projects most of the times failed and the borrowers defaulted. As a result loan defaults of

banks and DFIs reached a level of Rs 128 billion at the end of December 1999 – nearly 21 percent of total advances – from Rs 25 billion in 1990. The evidence also strongly suggests towards such a possibility. In Pakistan, loan defaults by the private borrowers/investors to the banking sector after liberalization, have increased to a staggering figure of Rs. 128 billion in 1999 from mere Rs 25 billion in 1989—a total rise of 500 percent.

4.1.4 Error correction and short term dynamic analysis

We now move to the analysis of short term or transitional dynamics. To perform this analysis we study the size and significance of error correction coefficients. Before presenting the empirical results, it is important to note the connection between co-integration relationship and error correction mechanism. In theory, it is argued that co-integration relationship and error correction mechanism are one of the same things. That is if two variables are co-integrating with each other, there must be a corresponding legitimate error correction mechanism (see: Enders 1993). This connection however is based on asymptotic theory. In other words, co-integration relationship implies a legitimate error correction mechanism in large samples. However if the sample size is small the correspondence between co-integration and error correction can break down.

A sufficient, though not necessary, conditions for the existence of a legitimate error correction process is that the algebraic signs of error correction coefficients are opposite to the signs of corresponding co-integrating coefficients. That is the product of each error correction coefficient with the corresponding co-integrating coefficient is negative. The necessary condition, however, requires that only the sum of these products is negative. It is common to find that the necessary condition is fulfilled, while for some variables the sufficient condition fails. In such a case short run variations in the variables for which the sufficient condition is satisfied are large enough to counter balance perverse movement in the variables failing the sufficient condition to produce a net variation in the right direction required for error correction.

The estimated error correction coefficients of various variables under all the cases where co-integrating relationship is found are arranged in table 4.4. Our results confirm that necessary condition for the existence of a legitimate error correction process is satisfied in most of the cases except for real interest rates and GDP growth.

The table shows that the error correction coefficients of real interest rates and GDP growth are statistically insignificant in all cases. This means that over a period of a year both the variables do not adjust to the long run equilibrium and they mostly follow their independent path. The theoretical explanation is that after liberalization the inactive response in interest rates are due to sticky expectations and it led to face

TABLE 4.4
Error correction coefficients

Variables	Specification 1: No intercept or trend in VEC and no drift or trend in VAR	Specification 2: Intercept but no trend in VEC and no drift or trend in VAR	Specification 3: Intercept but no trend in VEC and drift but no trend in VAR	Specification 4: Intercept and trend in VEC and drift but no trend in VAR	Specification 5: Intercept and trend in VEC and drift and trend in VAR
Equation (4.9), Variables: Sp, RDR, M2, TV, MC					
SP	-1.6017 (-4.74)*	-1.517 (-4.452)*	-1.6209 (-4.5462)*	-0.9526 (-1.8986)**	-1.3926 (-2.012)*
RDR	0.8300 (1.4603)	0.9249 (1.72)	0.9605 (1.633)	1.057 (1.975)**	1.0645 (1.359)
M2	-0.00101 (-2.2801)*	-0.000548 (-2.156)*	-0.00148 (-2.4228)*	-0.00235 (-2.716)*	0.0020 (-3.4339)*
TV	-0.0138 (-0.8698)	0.00054 (-1.036)	0.0108 (-0.7077)	0.0371 (-3.795)*	0.0258 (-1.8662)**
MC	-1.0264 (-3.7619)*	-1.1652 (-3.9001)*	-1.2459 (-3.885)*	-1.987 (-4.5864)*	-2.6608 (-4.472)*
Equation (4.10), Variables: PC/DC, RDR, M2, TV, MC					
PC/DC	-1.0259 (-3.3824)*	-1.002 (-3.3455)*	-1.0343 (-3.234)*	-0.7532 (-2.2549)*	-1.182 (-3.777)*
RDR	9.4705 (0.3069)	2.06 (0.391)	2.519 (0.386)	3.1842 (0.117)	2.052 (0.663)
M2	0.2114 (2.125)*	0.2217 (3.084)*	0.2456 (3.368)*	0.0996 (3.6257)*	0.1765 (2.862)*
TV	0.9504 (1.212)	0.8945 (1.125)	0.7827 (1.0356)	1.3802 (2.691)*	0.8308 (1.3009)
MC	5.369 (4.8114)*	9.110 (2.8672)*	8.723 (2.822)*	2.333 (3.332)*	-0.368 (-2.736)*
Equation (4.11), Variables: Log (GDP), Sp, E, PC/DC					
Log(GDP)	-0.0063 (-0.662)	-0.0238 (-1.319)	-0.012 (-0.813)	-0.3843 (-1.602)	-0.375 (-1.4728)
Sp	0.217 (0.4885)	1.2839 (1.575)	1.134 (1.318)	3.973 (2.818)*	2.297 (2.5401)*
E	0.0255 (4.458)*	0.0422 (3.064)*	0.0401 (2.7439)*	0.651 (2.584)*	0.685 (2.6111)*
PC/DC	-0.0073 (-1.215)	-0.02111 (-1.878)**	-0.0264 (-2.5034)*	-0.2204 (-1.048)	-0.228 (-1.022)
Equation (4.12), Variables: E, PC/DC					
E	-1.0025 (-2.84)*	-1.016 (-3.094)*	-1.019 (-2.976)*	-1.4481 (-3.268)*	-1.449 (-3.17)*
PC/DC	-0.246 (-0.824)	-0.076 (-0.2603)	-0.0907 (-0.298)	-0.8235 (-2.388)*	-0.8227 (-2.299)*

Note: * and ** shows significance at 5% and 10% level for the t values in parenthesis.

an unprecedented rise in their levels instead of attaining long run equilibrium. Where as GDP growth rate is too broad a concept and its rigidity towards long run equilibrium is due to the absence of the effects of some more relevant variables.

4.2 Causality tests

As mentioned above, many empirical studies in the 1990s were undertaken to resolve the controversy of two way relationship between finance and growth by running causality tests. The earlier time series studies, which employed the Granger causality tests between indicators of financial development and economic growth, reported mixed results (e.g., Odedokun 1989; Wood 1993; Arestis and Demetriades 1996; Demetriades and Hussain 1996). The problem with these time series studies was that they ran bivariate causality tests between indicators of financial development and growth variables. It is well known that bivariate tests suffer from omitted variable problems and lead to erroneous causal inferences (Carporel and Pittis 1995). The theoretical literature on finance and growth postulates financial development to be a positive function of real income and real interest rate. Hence, any causality test between financial development and economic growth which excludes the real interest rate from the system and analyses only a financial development indicator and an income variable – which is what bivariate studies do – is very likely to be misspecified.

However our model specifications enable us to run ‘multi-variate’ causality test because they include interest rates as well as other variables of financial development. This section comprises of causality tests on different sets of variables in order to understand the direction of the relationship between financial development and real economic activity. Additionally, causality tests will complete the set of information, we required for analysing the authenticity of the two legs of MS transmission.

In order to empirically test the causality issue it is common to apply Granger causality test (Granger 1969, Sims 1972). More over, the co-integration technique pioneered by Engle and Granger (1987) and Granger (1986) makes a significant contribution towards testing causality. According to this technique, Engle and Granger (1987) demonstrate that once a number of variables [say S_p , RDR, M2, TV, and MC in model (4.5)] are found to be co integrated, there always exists a

corresponding error correction representation, which implies that changes in the dependent variables are a function of the level of dis-equilibrium in the co-integration relationship (captured by the error term) as well as changes in other variable(s). A consequence of co-integration in model 4.4 is that either ΔSp or ΔRDR or $\Delta M2$ or ΔTV or ΔMC or all of them must be caused by the lagged error correction term which is itself a function of Sp_{t-1} , RDR_{t-1} , $M2_{t-1}$, TV_{t-1} and MC_{t-1} .³⁴ Formally the relationship between Sp , RDR , $M2$, TV , and MC in VAR model (4.5) can be written in vector-error correction model (VECM) form as a multiple equation solution (see annex 2 for VECM equations of model 4.6, 4.7, and 4.8 for first difference VARs):

$$\begin{aligned} \Delta Sp_t = & \alpha_1 + \sum_{i=1}^m \beta_{1i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{1i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{1i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{1i} \Delta MC_{t-i} \\ & + \sum_{i=1}^h \Psi_{1i} \Delta Sp_{t-i} + \sum_{i=1}^p \partial_{1i} ECM_{r,t-1} + \mu_t \end{aligned} \quad (4.13)$$

$$\begin{aligned} \Delta RDR_t = & \alpha_2 + \sum_{i=1}^m \beta_{2i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{2i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{2i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{2i} \Delta MC_{t-i} \\ & + \sum_{i=1}^h \Psi_{2i} \Delta Sp_{t-i} + \sum_{i=1}^p \partial_{2i} ECM_{r,t-1} + \mu_t \end{aligned} \quad (4.14)$$

$$\begin{aligned} \Delta M2_t = & \alpha_3 + \sum_{i=1}^m \beta_{3i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{3i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{3i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{3i} \Delta MC_{t-i} \\ & + \sum_{i=1}^h \Psi_{3i} \Delta Sp_{t-i} + \sum_{i=1}^p \partial_{3i} ECM_{r,t-1} + \mu_t \end{aligned} \quad (4.15)$$

³⁴ If there is no long run relationship between financial development and economic growth, the traditional causality tests should be applied. However, the studies applying the standard causality tests suffer from the two methodological deficiencies. First, these standard tests did not examine the basic time series properties of the variables. If the variables are co integrated, then these tests incorporating differenced variables will be mis specified unless the lagged error correction term is included (Granger 1988). Second, these tests turn the series stationary mechanically by differencing the variables and consequently eliminate the long run information embodied in the original level form of variables. The error correction model derived from the co integrating equations, by including the lagged error correction term reintroduces, in a statistically acceptable way, the long run information lost through differencing. This term also opens up an additional channel of Granger causality so far ignored by the standard causality tests.

$$\begin{aligned} \Delta TV_t = & \alpha_4 + \sum_{i=1}^m \beta_{4i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{4i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{4i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{4i} \Delta MC_{t-i} \\ & + \sum_{i=1}^h \Psi_{4i} \Delta Sp_{t-i} + \sum_{i=1}^p \partial_{4i} ECM_{r,t-1} + \mu_t \end{aligned} \quad (4.16)$$

$$\begin{aligned} \Delta MC_t = & \alpha_5 + \sum_{i=1}^m \beta_{5i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{5i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{5i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{5i} \Delta MC_{t-i} \\ & + \sum_{i=1}^h \Psi_{5i} \Delta Sp_{t-i} + \sum_{i=1}^p \partial_{5i} ECM_{r,t-1} + \mu_t \end{aligned} \quad (4.17)$$

Where Δ denotes the first difference of a non-stationary variable.³⁵ In this VECM, we have the opportunity to carry out a multivariate causality tests for the multiple pair of variables of interest for each equation by using Wald χ^2 test. For instance, if we are interested to find out the causality between RDR and Sp, we will carry out Wald χ^2 test on equation (4.15) and will reject the null hypothesis that real deposit rates (RDR) doesn't Granger cause private savings (Sp) if the Ψ_{2i} 's are jointly significantly different from zero. Similarly a reverse causation will be checked for the same pair of variables by carrying out Wald χ^2 test on equation (5.10) for the null hypothesis that β_{1i} 's are not jointly significantly different from zero.

Tables (4.9) and (4.10) show results of multivariate Granger causality tests for VAR models (4.5. 4.6. 4.7 and 4.8) on their levels and first differences for pair of variables of interest (i.e. we are primarily concerned about the causality between financial development and real economic activity). Since lag structure is sensitive to VAR, we have reported results based on different lag lengths. Interestingly, both tests on levels and on first difference produced similar results. However, the study places more emphasis on the results derived on the first difference because all variable pairs shown in both the tables are integrated of order one, and have co-integrating vectors between them as well. The test has detected a causal direction running from real interest rate to the private savings on first difference for equation 4.5. But on levels

³⁵ The variables without Δ will mean that VAR models and its VECM equations are estimated at levels in a similar set of equations.

there is no statistical support for the causal direction. Between both the variables the causation seems bi-directional. However, the statistical significance of bi-directional

TABLE 4.5
Multivariate Granger causality test results based on vector error correction on level VAR

Ho: No causal direction from the variable appeared first to the other variable					
Equation (4.5), Variables: Sp, RDR, M2, TV, MC					
χ^2 statistics based on Wald test					
Pairs of variables	k=1	k=2	k=3	k=4	Other observation
<i>RDR</i> → <i>Sp</i>	0.027	0.171	1.008	1.303	NRC
<i>M2</i> → <i>Sp</i>	6.563**	25.072*	28.691***	10.784***	NRC
<i>MC</i> → <i>Sp</i>	6.19**	4.546***	5.97*	2.093	NRC
<i>TV</i> → <i>Sp</i>	3.27***	1.135	0.13	0.228	NRC
<i>RDR</i> → <i>M2</i>	0.015	5.311**	4.78	3.104	RC (at 25%)
Equation (4.6), Variables: PC/DC, RDR, M2, TV, MC					
χ^2 statistics based on Wald test					
Pairs of variables	k=1	k=2	k=3	k=4	Other observation
<i>RDR</i> → <i>PC / DC</i>	8.37*	14.29*	15.706*	16.917*	NRC
<i>M2</i> → <i>PC / DC</i>	0.098	0.143	0.272	0.237	NRC
<i>MC</i> → <i>PC / DC</i>	0.008	0.306	0.245	0.153	NRC
<i>TV</i> → <i>PC / DC</i>	0.5510	0.055	0.046	0.667	NRC
<i>RDR</i> → <i>M2</i>	0.666	1.07	2.01	2.87	RC (at 10%)
Equation (4.7), Variables: Log(GDP), SP, E, PC/DC					
χ^2 statistics based on Wald test					
Pairs of variables	k=1	k=2	k=3	k=4	Other observation
<i>Sp</i> → <i>ln(GDP)</i>	0.320	0.454	0.824	1.470	RC (1%)
<i>pc</i> → <i>ln(GDP)</i>	8.939*	11.414*	22.004*	30.738*	RC (1%)
<i>E</i> → <i>ln(GDP)</i>	0.322	0.046	1.515	0.717	RC (at 10%)
<i>Sp</i> → <i>PC / DC</i>	1.494	1.139	4.077	3.72	NRC
<i>Sp</i> → <i>E</i>	12.64*	13.541*	22.744*	22.092*	NRC
<i>PC / DC</i> → <i>E</i>	1.24	0.650	0.658	0.658	NRC
Equation (4.8), Variables: E, PC/DC					
χ^2 statistics based on Wald test					
Pairs of variables	k=1	k=2	k=3	k=4	Other observation
<i>rdr</i> → <i>Sp</i>	0.07	0.82	0.95	1.10	NRC

K-lag length, → - does not Granger cause, NRC: no reverse causation, RC: reverse causation. *, **, ***, and ****- significant at 1%, 5%, 10% and 25% level.

causation is very weak. Since we know from section 4.8 that there is a negative long run relationship between this pair, we can strongly suggest that after liberalization increase in interest rates have put a negative impact on private savings. Model (4.5) supports causal influence from financial deepening, stock market liquidity and

capitalization towards private savings. This is consistent with MS thesis. Another interesting finding for model (4.5) is the two-way causation between interest rate and financial deepening. This indicates that an OLS estimation of the model shall carry the problem of multi-, thus establishing the superiority of co-integration analysis.

TABLE 4.6
Multivariate Granger causality test results based on vector error correction on first difference VAR

Ho: No causal direction from the variable appeared first to the other variable				
Equation (4.5), Variables: Sp, RDR, M2, TV, MC				
Pairs of variables	k=2	k=3	k=4	Other observation
<i>RDR</i> → <i>Sp</i>	4.21	15.02**	13.76	RC (at 25%)
<i>M2</i> → <i>Sp</i>	7.34**	22.19*	28.73*	NRC
<i>MC</i> → <i>Sp</i>	4.29****	6.03***	8.48***	NRC
<i>TV</i> → <i>Sp</i>	3.94****	3.09	7.92***	NRC
<i>RDR</i> → <i>M2</i>	8.12**	5.30****	6.86****	RC (at 10%)
Equation (4.6), Variables: PC/DC, RDR, M2, TV, MC				
χ^2 statistics based on Wald test				
Pairs of variables	k=2	k=3	k=4	Other observation
<i>RDR</i> → <i>PC/DC</i>	14.17*	14.82*	11.68**	NRC
<i>M2</i> → <i>PC/DC</i>	9.36**	16.63*	20.09*	NRC
<i>MC</i> → <i>PC/DC</i>	0.52	1.08	0.74	NRC
<i>TV</i> → <i>PC/DC</i>	0.90	0.20	0.21	NRC
<i>RDR</i> → <i>M2</i>	3.48	6.07***	6.41***	RC (at 25%)
Equation (4.7), Variables: Log(GDP), SP, E, PC/DC				
χ^2 statistics based on Wald test				
Pairs of variables	k=2	k=3	k=4	Other observation
<i>Sp</i> → ln(<i>GDP</i>)	12.45*	15.88*	30.44*	RC (at 1%)
<i>pc</i> → ln(<i>GDP</i>)	6.16***	7.04***	10.61**	RC (at 25%)
<i>E</i> → ln(<i>GDP</i>)	0.917	1.476	2.240	RC (at 10%)
<i>Sp</i> → <i>PC/DC</i>	0.90	0.77	0.39	NRC
<i>Sp</i> → <i>E</i>	7.36**	16.87*	21.99*	NRC
<i>PC/DC</i> → <i>E</i>	2.04	2.81	11.68***	NRC
Equation (4.8), Variables: E, PC/DC				
χ^2 statistics based on Wald test				
Pairs of variables	k=2	k=3	k=4	Other observation
<i>rdr</i> → <i>Sp</i>	5.59****	5.26	6.53****	NRC

K-lag length, → - does not Granger cause, NRC: no reverse causation, RC: reverse causation.
*, **, ***, and ****- significant at 1%, 5%, 10% and 25% level.

Model 4.6 shows that interest rate significantly causes allocative efficiency both in levels and first difference VARs. Financial deepening has a causal influence on allocative efficiency only in first difference VAR. However no causal relationship

what so ever is found between stock market liquidity and capitalization with allocative efficiency. Once again two-way causation is obtained between financial deepening and interest rates.

Model (4.7) suggests that there is one way causation and a two-way causation between economic growth with private savings for level and first difference VAR respectively. As mentioned above we shall give more importance to the result obtained by first difference VAR. This consideration puts some additional light on the fall in private savings. As we know that economic growth fell after liberalization, mainly due to political and economic instability, it transferred these negative effects on the levels of private savings too. There might be several channels through which low growth might have affected private savings. As said before one such channel is retained earnings, which succumbed due to drop in the revenues or output of the firms. A reverse causation is found between productive efficiency and economic growth, whereas allocative efficiency has a causal influence on productive efficiency for first difference VAR. These results are consistent with the results in table 4.3 where we put some light on the reason why allocative efficiency, although improved by financial development after liberalization, failed to improve real economic activity.

5 SUMMARY AND CONCLUSION

The paper sought to test the validity of the MS thesis in the Pakistani case by identifying two distinctive parts of the MS transmission mechanism, through which financial development is argued to lead to improvements in real activity. The two components identified were private savings and allocative efficiency. These two components were combined with the financial variables in two separate models, to test the full MS transmission mechanism. Before testing the two models, we undertook extensive primary analysis to establish whether reforms in the financial sector in 1990s have lead to financial development. Obtaining graphs of various indicators of banking and security market development, we conclude that significant development in financial sector took place.

In order to check two way causality between financial and real variables, we extended our empirical study to a co-integration analysis. Besides, co-integration was also undertaken in order to address certain empirical issues faced by our basic models.

We developed four VAR models to start with. The first two models were the two legs of MS transmission mechanism. The later two models showed the relationship of the end variables of the transmission with GDP growth and productive efficiency. This is done to understand more properly the affects of transmission mechanism on the real activity. In addition to that the models were also very useful in analyzing the path of causality, if it is going to be two way. Co-integration tests on these VAR models enabled us to establish and know the nature of relationship between the financial and real variables. Where as, multi-variate causality tests on the VECM equations of each VAR model tells the direction of this established relationship.

Our results indicate that financial deepening experienced in the banking sector, liquidity and capitalization of stock market have positive impact on private savings. However, very low coefficients of secondary market development indicators show the limited role stock market play in real economic activity of the country. This result is somewhat expected because Karachi stock exchange (KSE), though opened itself to foreign investors in 1990, is still in its primary stages of development: to-date the majority of the participants in KSE are financial institutions, whereas private and individual stock holdings are limited. Estimates of the first model further showed a negative relationship between interest rates and private savings. This result is contradictory to MS thesis and refers to the criticism of structuralists, who suggest that a sudden and sharp rise in interest rates after liberalization is harmful for the real activity. Nevertheless, a small size of the coefficient of interest rate suggest that this distortion is not big enough to be the sole reason for hampering private savings to the extent that the improvements in different financial development indicators are completely offset: such that the savings had a steep decline in 1990s. It seems that there are other factors, which have played a vital role in hampering private savings. A poor economic performance must've caused a fall in profits/retained earnings of firms, and since later are a significant component of private savings, they fell in response. So in our point of view fall in retained earnings is one of the key factors which explains the fall in private savings. However, data limitations restricted us from obtaining the empirical validation for our argument.

We received no contradictory results in the estimation of second leg of MS transmission mechanism. Financial development and rise in interest rates have significantly improved the allocative efficiency of the financial sector. However, the

graphs we obtained of different indicators of real economic activity (i.e., productive efficiency, and GDP growth) showed declining trends, especially in 1990s. It appears that this leg also failed to achieve its end objective of improving real economic activity. The justification for failure of second leg of MS thesis was attained through a multi variate causality analysis which confirmed that there is a two-way causality between financial development and economic activity and any progress in financial front was offset by the worsening macro economic situation of the country.

5.1 Contribution of the study in existing literature

Our main contributions to the literature are as follows. First, there is a conspicuous lack of multivariate time series tests of causality between financial development and economic growth in the literature. This study contributes in filling this gap. In so doing it addresses the miss-specification problem inherent in the existing bivariate studies. We address the concern raised about the cross-country results by providing evidence based on time series analysis since a great deal of skepticism in relation to cross-country regressions is shared by many investigators and the sensitivity of the results is acknowledged by the users of the technique themselves (e.g. Levine and Zervos 1996; Levine and Renelt 1992). Second we identify and report the long run financial development and output vectors which reveal the strength of relationship between financial development and its determinants viz., aggregate private savings, allocative efficiency, GDP growth rate, and productive efficiency. Finally, we follow a systems approach (i.e., two legs of MS thesis) that eliminates the single equation bias that may have affected the previous studies.

5.2 Policy implications

The study appears to contradict the MS thesis for Pakistani case in many respects. In the light of our results, we have come with following imperative policy implications:

“Repressed Financial markets are not in themselves a justification for financial liberalization. Since financial repression gives birth to informal markets, policies to formalize these curb markets should be initiated before any introduction of a reform which leads to end certain distortions in the formal financial markets i.e., interest rate ceilings. Liberalizing the Financial Markets, when the real sector of the economy is

not developed enough could work against the perceptions of the policy makers. So the timings are very important in this case.³⁶ It is more important to introduce reforms in the real sector, instead of undertaking reforms in all the sectors of the economy. However when the real sector is somewhat developed enough, liberalizing capital markets can supplement the growth momentum the economy has already achieved.”

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³⁶ This point has also been realized by McKinnon in his later study of Southern Cone countries. (See McKinnon 1989).

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APPENDICES

ANNEX 1

(Subsequent VECM Equations) VAR model 4.6

$$\begin{aligned} \Delta(PC/DC)_t &= \alpha_6 + \sum_{i=1}^m \beta_{6i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{6i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{6i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{6i} \Delta MC_{t-i} \\ &+ \sum_{i=1}^h \Psi_{6i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^p \partial_{6i} ECM_{r,t-1} + \mu_t \end{aligned}$$

(4.18)

$$\begin{aligned} \Delta RDR_t &= \alpha_7 + \sum_{i=1}^m \beta_{7i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{7i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{7i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{7i} \Delta MC_{t-i} \\ &+ \sum_{i=1}^h \Psi_{7i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^p \partial_{7i} ECM_{r,t-1} + \mu_t \end{aligned}$$

(4.19)

$$\begin{aligned} \Delta M2_t &= \alpha_8 + \sum_{i=1}^m \beta_{8i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{8i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{8i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{8i} \Delta MC_{t-i} \\ &+ \sum_{i=1}^h \Psi_{8i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^p \partial_{8i} ECM_{r,t-1} + \mu_t \end{aligned}$$

(4.20)

$$\begin{aligned} \Delta TV_t &= \alpha_9 + \sum_{i=1}^m \beta_{9i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{9i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{9i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{9i} \Delta MC_{t-i} \\ &+ \sum_{i=1}^h \Psi_{9i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^p \partial_{9i} ECM_{r,t-1} + \mu_t \end{aligned}$$

(4.21)

$$\begin{aligned} \Delta MC_t &= \alpha_{10} + \sum_{i=1}^m \beta_{10i} \Delta RDR_{t-i} + \sum_{i=1}^n \delta_{10i} \Delta M2_{t-i} + \sum_{i=1}^k \gamma_{10i} \Delta TV_{t-i} + \sum_{i=1}^j \lambda_{10i} \Delta MC_{t-i} \\ &+ \sum_{i=1}^h \Psi_{10i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^p \partial_{10i} ECM_{r,t-1} + \mu_t \end{aligned}$$

(4.22)

VAR model 4.7

$$\begin{aligned} \Delta GDP_t &= \alpha_{11} + \sum_{i=1}^m \beta_{11i} \Delta Sp_{t-i} + \sum_{i=1}^n \delta_{11i} \Delta E_{t-i} + \sum_{i=1}^k \gamma_{11i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^j \lambda_{11i} \Delta GDP_{t-i} \\ &+ \sum_{i=1}^p \partial_{11i} ECM_{r,t-1} + \mu_t \end{aligned}$$

(4.23)

$$\begin{aligned} \Delta Sp_t &= \alpha_{12} + \sum_{i=1}^m \beta_{12i} \Delta Sp_{t-i} + \sum_{i=1}^n \delta_{12i} \Delta E_{t-i} + \sum_{i=1}^k \gamma_{12i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^j \lambda_{12i} \Delta GDP_{t-i} \\ &+ \sum_{i=1}^p \partial_{12i} ECM_{r,t-1} + \mu_t \end{aligned}$$

(4.24)

$$\begin{aligned} \Delta E_t &= \alpha_{13} + \sum_{i=1}^m \beta_{13i} \Delta Sp_{t-i} + \sum_{i=1}^n \delta_{13i} \Delta E_{t-i} + \sum_{i=1}^k \gamma_{13i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^j \lambda_{13i} \Delta GDP_{t-i} \\ &+ \sum_{i=1}^p \partial_{13i} ECM_{r,t-1} + \mu_t \end{aligned}$$

(4.25)

$$\begin{aligned} \Delta(PC/DC)_t &= \alpha_{14} + \sum_{i=1}^m \beta_{14i} \Delta Sp_{t-i} + \sum_{i=1}^n \delta_{14i} \Delta E_{t-i} + \sum_{i=1}^k \gamma_{14i} \Delta(PC/DC)_{t-i} \\ &+ \sum_{i=1}^j \lambda_{14i} \Delta GDP_{t-i} + \sum_{i=1}^p \partial_{14i} ECM_{r,t-1} + \mu_t \end{aligned}$$

(4.26)

VAR Model 4.8

$$\Delta E_t = \alpha_{15} + \sum_{i=1}^m \beta_{15i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^n \delta_{15i} \Delta E_{t-i} + \sum_{i=1}^p \partial_{15i} ECM_{r,t-1} + \mu_t$$

(4.27)

$$\Delta(PC/DC)_t = \alpha_{16} + \sum_{i=1}^m \beta_{16i} \Delta(PC/DC)_{t-i} + \sum_{i=1}^n \delta_{16i} \Delta E_{t-i} + \sum_{i=1}^p \partial_{16i} ECM_{r,t-1} + \mu_t$$

(4.28)