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DISSERTATION

**INSTITUTIONAL CHANGES, MONEY DEMAND, AND MONETARY
POLICY: THE CASE OF SAUDI ARABIA**

Submitted by

Fahad K. A. Al-Badi

Department of Economics

In partial fulfillment of the requirements

For the Degree of Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Spring 2002

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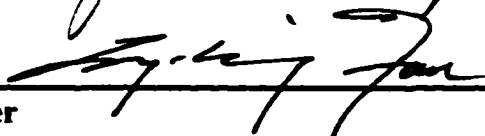
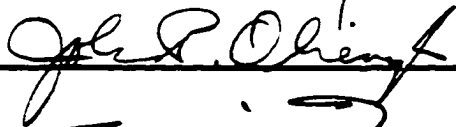
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**INSTITUTIONAL CHANGES, MONEY DEMAND, AND MONETARY
POLICY: THE CASE OF SAUDI ARABIA** BE ACCEPTED AS FULFILLING IN
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Abstract of Dissertation

INSTITUTIONAL CHANGES, MONEY DEMAND, AND MONETARY POLICY: THE CASE OF SAUDI ARABIA

The main purpose of this study is to examine the role of institutional developments on the behavior of the demand for money and velocity of money. The ability of policy makers in Saudi Arabia to conduct effective monetary policy has been discussed. This study has investigated the effect of institutional and structural changes on the behavior and stability the demand for money and velocity of money in Saudi Arabia from 1969 to 1999. The study has also surveyed the financial sector's development and structural changes. Further, the functional relationships between the demand for money and the velocity of money and their determinants, including financial institutional development, has been also investigated and tested.

The historical review of the developments of the financial system in Saudi Arabia has shown that economic growth has resulted in a rapid expansion of the financial system, thus increasing the demand for more banking services. It has also shown that the Saudi Arabia Monetary Agency (SAMA) has played a major role in the development of the Saudi financial system. The descriptive analysis of the data on real demand for money and velocity of money in Chapter Five provides strong evidence of a change in the pattern of money supply behavior. The statistical results strongly indicate that the level of

income and the degree of financial development determine the real demand for money and velocity of money behavior.

The major innovation of the study is the inclusion of the degree of financial development in the examination. The results indicate that significant is played by financial development. The study also shows that the interest rate does not play a significant role. From our discussion in Chapter Four. SAMA plays many roles in Saudi Arabia's financial sector. These roles could have contradictory objectives. An important topic for future research may be "Should SAMA be left to concentrate on sound monetary policy and effective exchange rate policy by giving up other functions?"

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

Unlike most other developing economies, Saudi Arabia's economy is oil-based. Government spending, financed primarily by oil revenue, has played a very influential role in creating economic growth in the country since 1973. Such growth has resulted in increased demand for financial services and the rapid expansion of the financial system.

Saudi Arabia is experiencing drastic institutional adjustment because of severe government budget deficits in the last several years, since 1985. In 1999, the government established the Higher Economic Council to increase the private sector's share in economic activities. Saudi Arabia is also currently negotiating for accession to the World Trade Organization (WTO). Accession to the WTO will open the Saudi financial sector to more competition, thus requiring the Saudi government to make significant structural changes in economic sectors, including the financial sector, in order to establish a sound and competitive economy. The use of macroeconomic policies, fiscal policy and monetary policy for economic development and stabilization is essential; the monetary authority has increased the frequency of its implementation of monetary policy in recent years.

1.2 Statement of the Problem

This study will examine the Saudi Arabian Monetary Agency's (SAMA) ability to implement an effective monetary policy in a changing domestic and global environment. Successful implementation of an effective monetary policy for any country depends upon the ability to predict and influence the demand for money. Not only is a stable demand for money crucial, but also the prediction of this demand also depends upon a correct specification of the demand for money function. Further, the velocity of money represents a very powerful macroeconomic relationship between nominal output levels and the quantity of money. In order to predict the impact of changes in the quantity of money on output levels accurately, the velocity of money must be predictable with some degree of accuracy. Because institutional and structural changes influence the demand for money, ignoring the role of institutional changes would result in mis-specification in the demand for money function.

Some of Saudi Arabia's institutional and structural changes that have occurred over the last three decades are likely to have influenced the nature and the stability of the demand for money function. These changes include the development of the stock market in 1986, the monetary authority's sale of government bonds to finance the budget deficit, and the use of electronic banking devices such as ATMs and credit cards. Further, because of renewed adherence to traditional religious beliefs and laws, many people have started to reject the use of interest rate. This is a drastic reversal of the trend.

Before 1980, the nature of the demand for money function was ignored. In the last two decades, no study has investigated the nature of the velocity of money function and behavior, and few have examined the nature of the demand for money function. The

studies that have done so are Darrat (1984), Nagadi (1985), Ghamdi (1989), Metwally and Abdelrahman (1990), and Alkswani and Al-Towaijari (1999). However, all of these studies ignored the role of institutional factors and structural changes as determinants of the behavior and stability of the demand for money. They also used the conventional specification of the demand for money.

1.3 The Purpose of the Study

In order to examine the ability of policy makers in Saudi Arabia to conduct effective monetary policy, this study will investigate the effect of institutional and structural changes on the behavior and stability of the demand for money and the velocity of money. Further, the functional relationships between the demand for money and the velocity of money and their determinants, including financial institutional development, will be investigated and tested.

First, the study will survey the financial sector's structural changes and developments between 1969 and 1998. Second, it will examine the demand for and velocity of money, using econometric analysis to determine the influential factors. Moreover, the study will examine the stability of the demand for money, testing for the effect of structural changes. The optimal intermediate target variable from the various monetary aggregates, monetary base (M0), M1, M2, and M3, will also be determined. The study of financial sector development and the empirical results and analysis will be utilized to draw implications for monetary policy in Saudi Arabia.

1.4 Hypotheses

In order to examine the ability of Saudi monetary policy-makers to conduct an effective monetary policy, the following questions will be tested and answered using empirical and descriptive analysis of the information and data for a thirty-year period.

1. Did the demand for money structurally shift in Saudi Arabia? When did the demand for money shift?
2. What are the determinants of the demand for money and velocity of money in Saudi Arabia?
3. Have financial development and institutional changes played a significant role in determining the long-term behavior of demand for and velocity of money in Saudi Arabia?
4. Do interest rates play a significant role in the demand for money function in Saudi Arabia? Do they influence the velocity of money?
5. Can the monetary aggregates, M0, M1, M2, and M3, be used as intermediate targets? What is the optimal intermediate target for monetary policy?
6. Can the Monetary Authority in Saudi Arabia influence the monetary aggregates, M0, M1, M2, and M3?

Using appropriate econometric methods, the study will investigate the relationship between the demand for money and its determinants in questions 1, 2, 3 and 4. Question 5 will involve an examination of the long-term relationship between income and the intermediate targets, monetary aggregates, using the co-integration

methods. Finally, the study will investigate the ability of the Monetary Agency's effect on the monetary aggregates, M0, M1, M2, and M3, by examining the tools available to SAMA.

1.5 Importance of the Study

This study will provide a clear view of the role of financial developments, structural changes, and the introduction of new technologies and arrangements on economic variables such as economic growth and money aggregates. Structural changes in the financial sector affect the way monetary policy is conducted and implemented. Therefore, understanding the financial structure will help SAMA identify the effect of financial development on the economy, including the behavior of money aggregates and their determinants in the future. The study will also contribute to future research on the demand for money and monetary policy by accounting for institutional factors in the demand for money function.

1.6 Sources of Data

The study will cover the period from 1969 to 1998, examining the role of financial development in shaping the demand for and velocity of money. It will also investigate the stability of these factors. The data and information relevant to the analysis of Saudi Arabia's financial sector will be limited to published sources. These sources include the International Monetary Fund (IMF) financial statistics yearbook and the SAMA annual and quarterly reports. The empirical results and analysis will depend on the quality and availability of data.

1.7 Organization of the Study

Following this introductory chapter, the study will be structured as follows: the “Literature Review,” Chapter Two, will briefly review the evolution of the conventional theory of money demand. It will also review some empirical studies on the breakdown of the Conventional Theory. Moreover, this chapter will discuss the institutional hypothesis of long-run money demand behavior. The chapter will also discuss the empirical literature on the determinants of the demand for money. The concept of intermediate targets will be briefly discussed. Finally, the existing literature on money demand in Saudi Arabia will be reviewed. Understanding the literature will enable us to determine the relevant variables and the appropriate specification for the functional relationship between money demand and its determinants in Saudi Arabia.

Chapter Three, “Methodology of the Study,” will focus on the various econometric methods used to examine the functional relationship between the demand for money and the velocity of money and their determinants. It will briefly review the different econometric methods that will be used to test the hypotheses: Structural break test, Unit Root tests, Autoregressive Distributed Lags (ARDL) approach to co-integration, and Causality Tests. Finally, the different proxies suggested in the literature as indicators for financial development and structural changes will be presented.

Chapter Four, “Saudi Arabia’s Financial System,” will study the magnitude and role of financial development in Saudi Arabia, providing an overview of current economic conditions and the structure of Saudi Arabia’s financial system. It will also examine the structure of the financial sector in Saudi Arabia. Moreover, the chapter will analyze the role of SAMA and its ability to influence the demand for money.

Chapter Five. "Money Demand and Velocity of Money in Saudi Arabia". will analyze the demand for money and velocity of money behavior and stability during the study period. Moreover, SAMA's financial position will be examined through the analysis of its balance sheet for selected years. Finally, the consolidated balance sheet of commercial banks will be analyzed to determine the role of commercial banks in the financial system in Saudi Arabia.

Chapter Six. "Model, Data, and Empirical Analysis," will introduce the model, analyze the data, and present the empirical results and analysis of those results. The chapter will empirically investigate the role of financial development, financial deepening, and structural changes in the demand for money and the velocity of money. It will examine the factors that determine the behavior of the real demand for money and the velocity of money in Saudi Arabia.

Chapter Seven. "Summary, Conclusion and Policy Implications," will summarize the findings of the study. It will also develop implications for monetary policy in Saudi Arabia. It will suggest some directions for future research in the field.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Even though the empirical specifications of the demand for money function are what matter for the conduct monetary policy, it is widely accepted that the appropriate specification of the functional relationship between demand for money and its determinants depends on the appropriate theory of demand for moneys. Differing theories of demand for money have evolved since the middle of the nineteenth century. Both demand for money and the velocity of money have been extensively scrutinized in both the theoretical and empirical literature during the twentieth century. They have been the most controversial subjects of monetary economics.

Before the mid 1970s, the conventional specification of demand for money did well in predicting the behavior of demand for money and was stable. The conventional theory of demand for money suggests that only a few macroeconomic variables, mainly income and interest rate, influence the behavior of demand for money. This situation changed dramatically in the mid 1970s, when predictions of demand for money were increasingly off-target. Two major breakdowns of the conventional theory of demand for money, known as the “*Case of the Missing Money*” during the mid 1970s (Goldfeld,

1976) and the “*Great Velocity Decline*” during the early 1980s (Judd and Motley, 1984), have led many economists to look for explanations of what took place. A large number of studies have attempted to find an alternative explanatory variable to account for the shift in the demand for money (Hafer and Hein, 1982). Many economists have suggested a wide range of institutional changes and technological developments as the causes of the breakdown of the conventional specifications of demand for money.

This chapter will briefly review the evolution of the conventional theory of demand for money. It will also review some empirical studies on the breakdown of the Conventional Theory. This chapter will moreover discuss the institutional hypothesis of long-run demand for money behavior. The chapter will also discuss the empirical literature on the determinants of the demand for money. The concept of intermediate targets will be briefly discussed. Finally, the existing literature on the demand for money in Saudi Arabia will be reviewed.

2.2 The Theory of Demand for money

The development of the Theory of Demand for money began as early as the middle of the nineteenth century (Laidler, 1993). Since that time, various theories of demand for money have evolved to explain why people demand money. The majority of demand for money theories are based on specific views of the functions of money and why people demand money.

Money has two main functions: as the medium of exchange and as a store of value*. The classical theories of demand for money, namely the Quantity of Money

* One other important function is as a unit of account (see Mishkin , 2000).

theories and the Keynesian approach, are based on their understanding of the functions of money. These two approaches are the basis of the various theories, which evolved in the last century. In the 1980s and 1990s, a new view of the demand for money has developed. This view can be termed the institutional approach to demand for money (Bordo and Jonung 1981, 1987, and 1990).

2.2.1 Quantity Theory of Money Demand

This theory is based on the ideas of the classical economists of the nineteenth century. It seeks to explain the link between nominal money stocks and aggregate income (Mishkin, 2000). There are two versions of the quantity theory of money: Fisher's Quantity Theory of Money and the Cambridge Approach to Demand for money.

2.2.1.1 Fisher's Quantity Theory of Money

Irving Fisher, in his influential writing "*Purchasing Power of Money*" (1911), developed the idea of the equation of exchange. Fisher was trying to determine the quantity of money required to perform a given number of transactions (Laidler, 1993, p. 49). The equation of exchange relates nominal money stock to the level of transactions in an economy. It can be written as follows:

$$M \cdot V \equiv P \cdot T. \quad (2.1)$$

where M is nominal money stock, V is velocity of transactions, P is the price level, and T is the level of transactions.

Money has one fundamental function: it serves as a medium of exchange. Fisher assumes T and V to be constant in the short run. Therefore, an increase in money supply

would result in an increase in the price level. Demand for money, according to the equation of exchange, is proportional to the level of transactions.

$$M = \left(\frac{1}{V}\right)P \cdot T \quad (2.2)$$

If we replace T by Y, then we can write the income version of the demand for money as follows:

$$M = \left(\frac{1}{V}\right)P \cdot Y. \quad (2.3)$$

Three factors influence the demand for money: price level, income level, and velocity of money. Interest rate has no effect on demand for money. Velocity of money is defined as the number of times that a unit of money is spent on the total value of goods and services produced per year (Mishkin, 2000, p. 538).

Fisher argued that velocity of money is constant in the short-run and is determined institutionally by consumers' behavior and the process of the economy. In the long run, velocity is not constant and is determined by institutional factors such as people's habits, changes in the payment system, and technological changes (Fisher, 1911). Laidler (1993) suggests that the quantity theory of money is a theory of price level determination.

2.2.1.2 The Cambridge Approach to the Quantity Theory of Money

A group of classical English economists, including Alfred Marshal and A. C. Pigou, developed the Cambridge approach (Mishkin, 1995). According to this approach, money has two important functions: it is a medium of exchange and a store of wealth.

This approach tries to determine the amount of money an individual wishes to hold (Laidler, 1993). Demand for money can be represented as follows:

$$M = k \cdot PY \quad (2.4)$$

where k , ($k = \frac{1}{v}$) is the proportion of nominal income that individuals want to hold as money. Velocity of money is assumed to be constant if other things are equal (Laidler, 1993). Since velocity of money is assumed to be constant, demand for money is determined by income level. The interest rate has not been included in the equation, but it can be assumed that changes in interest rates would affect the velocity of money leading to change in demand for money.

2.2.2 The Keynesian Theory of Money Demand

In "*The General Theory*", Keynes (1936) further extended the Cambridge approach to demand for money. He suggested three motives for the demand for money:

1. the Transactional Motive
2. the Precautionary Motive
3. the Speculative Motive.

The transactional motive is similar to the Fisher and Cambridge views of money as a medium of exchange. The precautionary motive is based on the idea of uncertainty about the future. Both the transaction and precautionary motives are similar to the Cambridge approach, since both depend on income level. The third motive, the speculative motive, is the most important one in the Keynesian analysis. Keynes regarded demand for money as a demand for a good. The interest rate is the price of money (Keynes, 1936, p. 167). The higher the interest rate, the less money is demanded.

The theory suggests that people may hold two types of financial assets, money and bonds. A change in interest rate would affect whether people preferred to hold money or bonds.

According to the Keynesian Theory of demand for money, the demand function can be written in the following general form:

$$M^d = \frac{M}{P} = f(Y, i)$$

where Y is level of income, i is the rate of interest, M^d is the real demand for money, M is nominal money stock, and P is the price level. Income is positively correlated with demand for money and the interest rate is negatively correlated to demand for money. The interest rate is an important variable in the demand for money function. Changes in interest rate would cause changes in demand for money and velocity of money (Friedman, 1970).

2.2.3 The Modern Quantity Theory of Money Demand

Milton Friedman (1956), in defense of the quantity theory of money, restated the quantity theory of demand for money. He was trying to challenge Keynes' analysis of the demand for money. According to Friedman, money is one form of wealth-holding. Individuals can hold their wealth in money, bonds, equity, real goods, or human capital. People hold money because of the services it provides to them. Money itself can yield earnings; for example interest on demand deposits. The cost of holding money would be the income that can be earned by holding other types of assets (Laidler, 1993). The demand for money function can be written in the following general form (Mishkin, 2000, p. 552):

$$\frac{M}{P} = f(Y^p, r_b - r_m, r_e - r_m, \pi^e - r_m) , \quad (2.6)$$

where real demand for money, $\frac{M}{P}$. are positively related to permanent income (Y^p).

negatively related to the difference between the expected interest rate on bonds (r_b), the expected rate of return on equity (r_e), the expected rate of inflation (π^e), and the rate of return on money (r_m) . Friedman believes that demand for money is less sensitive to interest and not highly stable. Velocity of money can be assumed constant (Friedman, 1963).

2.2.4 The Transactions Demand For Money

The theory of the transactions demand for money was developed independently by Baumol (1952) and Tobin (1956). Using two different models, they both came to the same conclusion about what determines an individual's demand for money. According to this theory, individuals can hold money or invest it in interest-earning assets. According to Tobin (1956), individuals will spend (y) income over a given period (T). Money can be obtained by borrowing or withdrawing from an investment account. Both actions involve two types of cost: lost interest from holding money and the non-interest cost of borrowing or withdrawing. Individuals are assumed to be rational; they will try to minimize the cost of holding money. The number of transactions will depend on two important factors: interest rates (i) and the cost of each transaction (b).

The number of transactions will determine the demand for money, the demand for money function can be written as follows:

$$M^d = \sqrt{\frac{2by}{i}} \quad (2.7)$$

Equation (2.7) suggests that level of income, cost of the transaction, and level of interest rate determine the optimum quantity of money demanded. This theory shows that interest rate, in addition to income level, does matter in the transaction demand for money (Mishkin, 2000).

The different theories of demand for money suggest that income level, price level and the rate of interest do influence the demand for money. There is disagreement about the role and magnitude of the interest rate's effect on demand for money. Classical economists, both old and new, believe that demand for money is stable, predictable, and not very sensitive to interest rate fluctuations. Consequently, velocity of money is stable and predictable. On the other hand, Keynesian economists believe that the demand for money is unstable, not accurately predictable, and very sensitive to interest rates. Consequently, velocity of money is unstable and unpredictable.

Based on the theoretical review of demand for money theories, the standard specification of demand for money, on which most empirical investigation is based, can be written in general form as follows:

$$(M/P) = f(Y, i, p^*). \quad (2.8)$$

where:

M/P =real demand for money.

Y =income level, scale variable.

i =interest rate.

p^* =expected rate of inflation.

2.3 The Breakdown of the Conventional Theory of Money Demand

Before the mid 1970s the conventional specification of the money demand did well in predicting the behavior of demand for money and it was considered stable. The conventional theory of demand for money suggests that only few macroeconomic variables, mainly income and interest rates, influence the behavior of demand for money (Friedman, 1959; Fan and Liu, 1971; Goldfeld, 1973 and 1976; Roley, 1985; Laidler 1993; and Breuer and Lippert, 1996).

During the mid 1970s and early 1980s, two major breakdowns in the conventional specification of demand for money occurred. These two failures have represented strong challenges to the validity of the Conventional Theory of demand for money. Goldfeld and Sichel (1990) describe the two major failures as follows:

“As has been widely documented, especially for the United States but elsewhere as well, matters have been considerably less satisfactory since the mid-1970s. First, there was the episode of the “missing money” when conventional money demand equation systematically over-predicted actual money balances. Moreover, attempts to fit conventional demand functions to a sample that included the missing money period invariably produced parameter estimates with some quite unreasonable properties. Second, in the 1980s U.S. money demand functions, whether or not fixed up to explain the 1970s, generally exhibited extended periods of under-prediction as observed velocity fell markedly. (P. 300)”

2.3.1 The Case of “Missing Money”

Stephen Goldfeld (1976) examined the demand for money, demand for demand deposits and M1. He used the following logarithmic model.

$$\ln (M_t/P_t) = c_1 + c_2 \ln (Y_t) + c_3 \ln (i_t) + c_4 \ln (M_{t-1}/P_t), \quad (2.9)$$

where:

M_t/P_t = real demand for money stock

Y_t = real GNP

i_t = interest rate

M_{t-1}/P_t = lagged money stock

The empirical results showed that the model sharply over-predicted the actual demand for money. There was a shift in the demand for money. Between the fourth quarter of 1974 and the first quarter of 1976, the conventional model had over-predicted the actual demand for money by about 6% per quarter (Enzler *et al.*, 1976). Goldfeld called this situation "*The Case of Missing Money.*" In trying to explain the puzzle, Goldfeld suggested that important factors, such as institutional changes and financial innovations, had been ignored from the above specification. Institutional changes include changes in regulation and financial developments. Financial innovation includes the introduction of negotiable order of withdrawal (NOW), Money Market Mutual Funds (MMMF's), and telephone transfers between savings and checking accounts. The use of these new methods would affect the demand by affecting transaction costs. These institutional changes reduced the demand for demand deposits.

2.3.2 The Great Velocity Decline

During the period from the first quarter of 1982 to the first quarter of 1983, the conventional model, which did well in the prediction of demand for money before that period, underestimated the demand for money by an average of between 6 and 6 ½ % compared to the actual demand for money (Axilord, 1983). The velocity of money declined 6.9% during the same period (Balles, 1983). Judd and Motley (1984) called the sharp decline in velocity of money the "*Great Velocity Decline.*" Different explanations were suggested in the literature for this great velocity decline, including erratic monetary

policy, interest rate changes, structural changes, and financial developments (Tatom, 1983).

2.4 Institutional Approach of Demand for Money

There is an extensive literature on the causes and explanations of the breakdowns of the conventional theory of demand for money. The majority of the literature suggests that institutional changes have played a major role in the failure of the conventional model of demand for money (Goldfeld, 1976; Tatom, 1983; Judd and Scadding, 1982; Porter, *et al.*, 1979; Arrau, *et al.*, 1995).

In the 1970s and 1980s, there were a large number of changes in the structure of economies around the world. Most economists agree that institutional factors play a very important role in affecting economic activities by influencing economic variables. Many economists also believe that institutional factors play an important role in explaining the behavior of demand for money. Arrau, *et al.*, (1995) argued that important permanent components in the demand for money have not been captured by the conventional specification. They believe that this phenomenon can be explained by financial innovations. These financial innovations could reflect changes in the payment system and government regulations.

Bordo and Jonung (1981, 1987, and 1990) introduced the Institutional Approach to Demand for money. They studied the long-run behavior of velocity of money in many countries. They found that the velocity of money demonstrated a consistent secular behavior, consistently exhibiting a U-shaped pattern over the last one hundred years. They attribute this pattern to institutional changes, financial developments and structural

changes of the financial system. They list two sets of factors: monetary factors and institutional factors.

Monetary Factors: These factors are the increase in the use of money for settling transactions and the expansion of the commercial banking system. These two factors increase the demand for money over time, causing the velocity of money to decrease. Bordo and Jonung suggest that this explains the downward trend in velocity.

Institutional Factors: The growth of the financial system has produced many substitutes for money. Moreover, many new methods have been introduced for settling transactions, such as the use of credit cards, transfers of funds by telephone, and electronic transactions. According to Bordo and Jonung, this reduces the transaction demand for money. An increase in economic stability and security has resulted from various types of welfare programs and public insurance schemes. Bordo and Jonung believe that this increase in economic stability reduces the return from holding money, causing the demand for money to fall.

Bordo and Jonung concluded that both sets of variables influence the velocity of money. The first set influences the velocity more strongly in the earlier stages of development, causing velocity to decrease because of the increase in demand for money. The second set influences velocity after the first set, causing velocity to increase due to the decrease of demand for money.

2.5 Determinants of Demand for Money: Empirical Literature

It is clear from the discussion of the literature on the theory of demand for money that velocity of money is what matters. Velocity of money is the flip side of demand for money (Miller, 1989). A stable velocity of money means a stable demand for money.

Velocity of money and its determinants have been the subject of a large number of studies. Most of those studies have focused on the advanced countries, mainly the United States. However, for developing countries, there is a limited number of studies concerning demand for money and the velocity of money and their determinants.

Different factors are suggested in the literature as determinants of the velocity of money through their influence on the demand for money. Thomas (1997) listed six categories of determinants of velocity of money. These categories are:

1. Economic growth: The effect of an increase in income level on velocity of money depends on the size of the income elasticity of demand for money. If income elasticity of demand for money is equal to one, a change in the income level will have no effect on velocity of money. If income elasticity of demand for money is greater than unity, the demand for money will increase at a more rapid rate than income, causing the velocity of money to fall over time. If the income elasticity of demand for money is less than one, the demand for money will increase at a slower rate than income, causing the velocity of money to increase over time.

2. Institutional Factors: These factors, such as use of credit cards, frequency of paydays, and other credit arrangements, affect the demand for money. For example, an increase in the use of credit cards reduces the demand for money, causing velocity to increase.

3. Financial Innovations: Many substitutes for money have been produced by the growth of financial technology. These substitutes increase the opportunity cost of holding cash balances. Money market mutual funds (MMMFs), overnight repurchase agreements (RPs), and automatic teller machines (ATMs) are examples of financial innovations. They are expected to have a negative impact on the demand for money. Therefore, financial innovations are positively correlated with velocity. Over time, velocity rises as financial innovations occur.

4. Interest Rates: the interest rate is considered an opportunity cost of holding money. The higher the rate of interest, the less money is demanded. Therefore, velocity of money is positively correlated with interest rates.

5. Expected Rate of Inflation: The rate of inflation is also an opportunity cost of holding money. It reduces the real value of money balances. When people expect a higher rate of inflation, they reduce their demand for money. The higher the expected rate of inflation, the higher the velocity is.

6. Economic Uncertainty: When individuals become uncertain about the future, they will try to reduce their risk by avoiding risky assets. Holding money is assumed to be the safest way to do this. As uncertainty increases, individuals demand more money, causing velocity to fall.

The exchange rate is also suggested in the literature as a factor influencing the demand for money behavior and the conduct of monetary policy. Mundell (1963) suggested that demand for money is influenced by exchange rate movements, in addition to the income level and interest rates. Arize (1989) has argued that an increase in exchange rates can have a positive or negative effect on the demand for money based on

a study of the demand for money in four Asian countries: Pakistan, the Philippines, South Korea, and Thailand. Arize and Shwiff (1998) concluded that the effect exchange rates on the demand for money is an empirical issue, and cannot be explained by the theory.

The choice of exchange rate regime, whether fixed or flexible, is a highly debated issue for developing countries. Rother (1998) studied the demand for money in the West African Economic and Monetary Union (WAEMU) countries for the period from 1973 to 1996. The WAEMC countries have a fixed exchange rate with the French currency. The empirical results suggested that demand for money is stable. Rother concluded that those countries could conduct an effective monetary policy with a fixed exchange rate regime if they can maintain public confidence and a stable financial system.

2.5.1 Economic Growth and Velocity of Money

Economic growth is defined as the rate of increase in the sum of real incomes received by the residents of a country. It is usually measured by the rate of increase in per capita real national income. From equation number (2.1), velocity of money is obtained by dividing GDP by the quantity of money. It is assumed that when the money supply is equal to the demand for money, the money market is in equilibrium.

Many studies have sought to investigate the impact of long-term economic growth on the behavior of velocity of money. Friedman (1956) studied the demand for money in the United States for the period from 1870 to 1954. He concluded that money is a luxury good, meaning that the income elasticity of the demand for money is greater than one. He found that a positive relationship exists between real per capita income and the real stock of money:

“A one percent increase in real income per capita has therefore, on the average, been associated with 1.8 percent increase in real cash balances per capita and hence a 0.8 percent decrease in income velocity. (P. 329)”

This implies that there is an inverse relationship between the level of a nation's income and the velocity of money.

Ezekiel and Adekunle (1969) examined the relationship between economic development and velocity of money. By using cross-section data from 37 countries for the postwar period, they studied the link between the level of per capita income and the level of money velocity for M1, M2, and M3. They found that there was a negative relationship between velocity and level of income. Furthermore, the strength of this effect diminished as the level of income increased.

“It was found that the higher the level of per capita income, the smaller the rate of decrease in income velocity that was associated with a given rise in per capita income. (P. 237)”

Santoni (1987) studied the behavior of velocity in the early 1980's in the United States. He concluded that the decline in velocity from 1982 to 1985 resulted from an increase in people's wealth.

“The portfolio theory implies that, when wealth of people increases relative to the current income, income velocity falls, other things equal. (P. 25)”

As the wealth of people increases, they increase their demand for money. Santoni concludes that there is a negative relationship between the wealth of people and the velocity of money.

Palivos and Wang (1995) used a structural vector autoregressive (VAR) model to examine the effect of three types of shocks -- institutional, monetary, and technological -- on output and velocity fluctuations. They found that there is a positive link between the output level and the velocity if the source of the output change is a monetary or

institutional shock. However, there is an inverse relationship if the source of economic growth is a technological shock.

2.5.2 Institutional Development, Financial Innovations, and Velocity of Money

2.5.2.1 Institutional Changes and Velocity

Siklos (1993) extended the work of Bordo and Jonung by developing the following model to examine the effect of institutional changes on velocity.

The model is:

$$V_t = B_o + B_j \phi^*_t + B_k \Omega^*_t + U_t \quad (2.10)$$

where:

B_o, B_j, B_k are parameters

$\phi^*_t = [y^p, i]$

y^p = permanent per capita income

i = interest rate

$\Omega^* = [\alpha_t, CM_t]$

where:

α_t = (total nonbank financial assets/total financial assets)

CM = (Currency / Money) ratio

By using annual data for the period from 1870-1986 for five advanced countries (the United States, the United Kingdom, Canada, Sweden, and Norway), Siklos found that interest rate elasticities are higher than income elasticities. He concluded that institutional factors are very important in explaining the long-run behavior of velocity.

Arrau, *et al.*, (1995), investigated the role of financial development in explaining the demand for money for ten developing countries. They suggested that the standard

demand for money function is mis-specified because it does not account for the role of institutional factors. They concluded that financial innovations and institutional changes play a very significant role in the demand for money function.

2.5.2.2 Financial Innovations and Velocity

During the 1960s and 1970s a large number of financial innovations occurred.

Yumoto, *et al.*, (1986) believe that in the 1970s the scope of financial innovation became broader. They attribute this to several factors, including:

1. High nominal interest rates
2. High volatility of interest rates
3. Economic integration
4. High budget deficits, increasing the need for new methods for financing the deficits
5. Development in computer and communications facilities, lowering the cost of transactions

According to Yumoto, *et al.*, these developments helped in providing a large number of money substitutes, such as credit cards, negotiable order of withdrawal (NOW) accounts, etc.

Daniels and Murphy (1994) examined the impact of the increase in use of automatic teller machines (ATMs) by households on their demand for money. They used data from two surveys, which were conducted in 1984 and 1986. They found that the increasing use of ATMs led to lower household demand for money. This means that the use of ATMs and velocity of money move in the same direction.

Tatom (1983) tried to explain the decline of the U.S. velocity of money during 1982-1983. By examining data from 1948 to 1983, Tatom suggests that the increase in

the use of other checkable deposits (interest-paying deposits) increased the demand for money.

According to Hamburger (1984) financial innovations reduce transactions costs, leading to less demand for money. He noted that:

“Consequently, if transaction costs are not taken into account, one would find that for given levels of short-term interest rates investors would hold more securities and less money than they did before. (P. 114)”

In his study, Hamburger examined velocity of M1 in the US. He found that increase in financial innovations lowered the velocity of M1. Hamburger suggests using long-term interest rates and common stock yields as a measurement of opportunity cost to obtain a more precise explanation of the causes of the behavior of velocity:

“Long-term interest rates and common stock yields appear to have been less affected by financial innovations than short-term rates. (P. 117)”

2.5.3 Expected Rate of Inflation, Interest Rates and Velocity of Money

2.5.3.1 Expected Rate of Inflation and Velocity

When people expect a high rate of inflation, they know that their real income and interest rates will be affected. They will adjust their demand for money in order to avoid the impact of high inflation, i. e., to reduce it as much as they can.

Many studies suggest that the expected rate of inflation plays a very important role in influencing individuals' demand for money. Bordo and Jonung (1987) suggest that the expected rate of inflation can be assumed to be an opportunity cost of holding money. They believe that the velocity function must contain the expected rate of inflation as an independent variable.

According to Campbell (1970), people hold smaller cash balances relative to other types of assets when prices are expected to rise. In his study, Campbell examined the impact of inflation on money velocity in Brazil and South Korea. Both countries experienced periods of rapid inflation, during which individuals reduced their demand for money, causing velocity to be higher in both countries.

Judd and Motley (1984) attempted to explain the great U.S. velocity decline of 1982-1983. They studied M1 and M2 velocities, and found that both velocities were influenced by the large decline in inflation and interest rates, although M2 velocity was more stable than M1 velocity. The conclusion of Judd and Motley was that velocity and inflation move in the same direction.

2.5.3.2 Interest rates and velocity of money

Interest rate is an important variable. It influences most economic variables and economic activities. There is disagreement among economists about how sensitive the demand for money is to interest rates. Friedman and Schwartz (1963) argue that interest rates have no important role in determining the behavior of velocity.

According to Friedman and Schwartz:

“The postwar rise in interest rates could account at most for something like a 6 to 8 percent increase in the velocity of money. There is no persuasive evidence of a decided increase in the sensitivity of the velocity of money to interest rates. In consequence, the post war rise in interest rates can account for only a small part of the 45 percent rise in velocity from 1946 to 1960. (P. 657)”

In two studies, Latane (1960 and 1970) attempted to examine the relationship between the rate of interest and velocity. In his first study, Latane used annual data from 1909 to 1958 to determine the relationship between long-term interest rate and income

velocity of money. He concluded that a constant relationship exists between velocity and long-term interest rate. A high level of interest rate leads to high velocity of money because people reduce their demand for money as interest rates increase. Later, in 1970, Latane contradicted the Friedman and Schwartz findings concerning the relationship between interest rates and velocity. He believed that Friedman ignored the effect of interest rate on velocity, saying,

“In his defense of the effectiveness of monetary policy Friedman tends to ignore the effect of interest rate on income velocity. (P. 330)”

2.6 Velocity of Money in Developing Countries: the Literature

Velocity of money and its determinants have been the subject of a large number of studies. Most of those studies have considered velocity in advanced countries, mainly the United States. However, for developing countries, there is a limited number of studies concerning the velocity of money and its determinants. According to Melvin and Shiau (1990):

“There is a voluminous literature on the behavior of velocity in developed countries, particularly with regard to the United States. (P. 821)”

Melvin and Shiau also found big differences in velocity values among developing countries:

“Developing countries differ substantially in terms of the income velocity of money. The velocity of M2 in 1982 ranges from 9.53 in Brazil to a low of 0.85 in Malta... The African developing countries have an average velocity of 4.07... the African velocity average in 1982 was three times the average velocity of 1.32 in the lowest region, the Middle East. (P. 821)”

Besides the determinants we mentioned earlier in this chapter -- economic growth, institutional changes, financial innovation, expected rate of inflation, and interest rates --

some studies suggest that other factors also play an important role in determining the velocity in developing countries.

Melvin and Shiau (1990) argue that political instability has a negative influence on the demand for domestic assets. They believe that the greater the political instability the less money demanded, causing velocity to increase. Melvin and Shiau believe that political instability increases the probability of losing private properties.

In many developing countries, the agricultural sector is the dominant sector in the economy. Driscoll and Lahiri (1983) found that for developing economies the demand for money in the agricultural sectors is lower than the demand for money in non-agricultural sectors. This means that the demand for money in agricultural developing countries is lower than in the non-agricultural developing countries. Consequently, velocity would be higher in agricultural developing countries. This may explain some of the differences in velocity among developing countries.

2.7 Velocity of Money in Some Developing Countries

2.7.1 Pakistan

Khan (1974) studied the velocity of money in Pakistan for the period from 1960 to 1973. During the study period, there was a downward trend in velocity of money. Khan used the following model to estimate the influence of several factors on the velocity of money in Pakistan:

$$V = f(Y_r, (1-k_p), P_{t-1}, TG, B), \quad (2.11)$$

where:

Y_r = real per capita income

$(1-k_p)$ = the share of monetized sector in the national income

(P_{t-1}) = expected rate of inflation

TG = share of trading and manufacturing sectors in national income

B = number of bank offices

Khan concludes that per capita income is positively correlated with the velocity of money. The expected rate of inflation is positively correlated with velocity. Khan also found that there is a positive relationship between the number of bank branches and velocity. The share of the monetary sector and the share of trading and manufacturing sectors are also positively correlated with velocity of money.

Bilquees and Rauf (1994) examined the velocity of money in Pakistan for the period from 1974-75 to 1991-92. They studied the effect of four factors: per capita income, interest rates, rate of inflation, and the number of bank branches on the velocity of M1 (V_{m1}) and velocity of M2 (V_{m2}). They found that per capita income, the number of bank branches, and the interest rate have a positive impact on the demand for M1 and M2. Thus, velocity is negatively related to these variables. On the other hand, the expected rate of inflation has a positive impact on the velocity of money because higher inflation reduces individuals' demand for money.

2.7.2 Velocity of Money in Malaysia and Singapore

Short (1973) investigated the velocity of money in Malaysia and Singapore for the period from 1951 to 1966. In this study, he considered three variables that may influence the velocity of money. These factors were the number of bank offices, real per capita income, and the interest rate. He found that for the study period, the number of bank offices and the interest rate have a positive effect on the velocity of M1 and the velocity of M2. The real per capita income was negatively correlated with both velocities.

2.7.3 Velocity of Money in Bangladesh

Hassan, *et al.* (1993), examined the determinants of velocity of money in Bangladesh by using quarterly data for the period from 1974 I to 1989 IV. They tested three factors that determine the velocity: real income, the expected rate of inflation, and financial development. They suggest different possible financial ratios as proxies for financial development:

“The ratio of currency to money supply (C/M) and currency to demand deposits (C/DD) or time deposits (C/TD) have been used in the literature as proxies for financial development. (P. 19)”

Hassan, *et al.*, used the following model:

$$V = f(Y, I, FINDEV) \quad (2.13)$$

where:

Y = real per capita income

I = expected rate of inflation

$FINDEV = (DD/TD)$ as a proxy for financial development

They conclude that inflation, real income, and velocity of money move in the same direction. Financial development was found to be negatively correlated with the velocity of money in Bangladesh.

2.8 Monetary Targeting

The existence of a stable demand for money function is important for monetary policy. It is also widely accepted that money does influence nominal output level. A stable and well-specified demand for money function is crucial to the ability to forecast demand for money in the future. It is also important for the use of monetary aggregates as an intermediate target for monetary policy (Bruggeman, 2000).

The concept of intermediate targets of monetary policy is not new. It was discussed by Saving (1967). It is based on the assumption that policy makers do not have the knowledge to predict the final goals of monetary policy, so they need to search for an optimal intermediate target variable; that is, a variable that can be controlled in order to achieve the final goals of monetary policy (Thomas, 1997). According to Saving, clear goals, such as an employment level, income level, and price stability, are required for the use of intermediate targets. Thomas (1997) suggested that good intermediate target variables must have certain important characteristics.

“In order for a particular variable to be a good intermediate target of Federal Reserve policy, it must be measurable. That is, accurate data on the variable must be available on a timely basis. In addition, the Fed must be capable of accurately controlling or at least strongly influencing the intermediate target variable. Finally, the variable must be strongly linked in a causal way to such variables as aggregate expenditures, nominal GDP, unemployment, and price level behavior. In other words, the variable should be an important determinant of aggregate expenditures and the final goals of monetary policy. (P. 443)”

2.9 Empirical Works on Intermediate Targeting

Issing (1997) surveyed the German experience with monetary targeting. For more than twenty years, the Deutsche Bundesbank has been targeting the growth rate of broad money, mainly M3. The survey suggested that a stable policy environment has contributed to the stability of demand for money and led to the success of the policy of monetary aggregates targeting.

Feldstein and Stock (1994) investigated the possibility of using M2 as a target for monetary policy. They used a vector autoregressive (VAR) model to determine the relationship between M2 and nominal GDP in the U.S.. They suggest that clear goals of monetary policy and the controllability of M2 are important factors. Their empirical

results indicated that M2 could be a good intermediate target and indicator for predicting nominal GDP.

Recently, Bruggeman (2000) studied the possibility of using various monetary aggregates as intermediate targets or indicators of a single monetary policy of the European Community (EC). By examining the stability of the demand for money, Bruggeman attempted to determine the optimal monetary aggregate to be used as a possible intermediate target or indicator. He used a vector error correction (VEC) model, a single equation method, to estimate the demand for money functions for the period from the first quarter of 1980 to the fourth quarter of 1994. The empirical analysis suggests that M3H, a harmonized broad monetary aggregate which includes all short run financial assets of the residents of the EC, can play a significant role in targeting money and inflation.

2.10 Demand for Money in Saudi Arabia in the Literature

Before 1980, the nature of the demand for money function of Saudi Arabia was largely ignored. During the last two decades, no study has investigated the nature of the velocity of money function and its behavior, and few have examined the nature of the demand for money function in Saudi Arabia. The studies that have investigated demand for money are Darrat (1984), Nagadi (1985), Ghamdi (1989), Metwally and Abdelrahman (1990), and Alkswani and Al-Towaijari (1999). However, all of these studies, with the exception of Alkaswani and Al-Towaijri (1999), covered periods before 1990. Furthermore, all of these studies ignored the role of institutional factors and structural

changes as determinants of the behavior and stability of the demand for money. They simply used the conventional specification of the demand for money.

Darrat (1984) estimated a demand for money function for Saudi Arabia for the period from 1962 to 1982 using quarterly data. He used the following variables as determinants of the demand for money: permanent income, expected rate of inflation, expected foreign interest rate, and expected exchange rate. The empirical results suggest that all four variables play a significant role in the demand for money function in Saudi Arabia. The study concluded that the demand for money was stable.

Nagadi (1985) hypothesizes that the demand for money in Saudi Arabia is a function of real income, foreign interest rate, and expected rate of inflation. He used the non-oil gross domestic product as a measure of transactions volume. The Eurodollar rate, which is a foreign interest rate, was used by Nagadi as a proxy of the opportunity cost for holding money. He concludes that real income has a positive relationship to the demand for money, while inflation rates and foreign interest rates are negatively correlated to the demand for money.

Ghamdi (1989) studied the demand for money in Saudi Arabia for the period from 1965 to 1988. He used both the narrow definition of money (M1) and the broad definition of money (M2) functions. He found that the income elasticity of demand for money is greater than unity for both M1 and M2.

Metwally and Abdelrahman (1990) estimated the demand for money function for the period from 1967 to 1982. For both M1 and M2, they found that the income elasticity of the demand for money is greater than unity and positive. The interest elasticity of the demand for money was found to be negative and very close to zero.

Recently, Alkswani and Al-Towaijari (1999) studied the demand for narrow money for the period from 1977-1997 using quarterly data. They used an Error Correction Model (ECM) to estimate the demand for money function. The demand for M1 was found to be stable, and significantly influenced by real income, expected rate of inflation, interest rate, and real exchange rate. The effect of interest rate was found to be very low.

CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1 Introduction

The main objective of the study is to determine the ability of the monetary authority in Saudi Arabia to implement effective monetary policy. In order to achieve this goal, the research questions that were mentioned in Chapter One will be answered.

The study will use some modern econometric techniques. First, the factors that influence the demand for money in Saudi Arabia will be determined by estimating a demand for money function for the different monetary aggregates. Then the stability of the demand for money and velocity of money will be examined to determine whether the demand for money and velocity of money are stable. The long run relationship between money and income will then be tested using the Granger Causality Test to determine the magnitude and directions of causality. Finally, the ability of SAMA to influence the monetary aggregate will be investigated by looking into the financial structure of the Saudi economy and the role and tools of SAMA.

In this chapter, the appropriate specification of money demand will be determined. Various modern econometric techniques will be briefly discussed. Finally,

the different proxies that can be used to measure financial development and structural changes will be briefly discussed.

3.2 Empirical Specification

Based on the review of the literature and the background of the studies of the demand for money in Saudi Arabia, we can specify the following general form:

$$DV = f(Y, FD, Fi, p^*, rex, D), \quad (3.1)$$

where DV is the dependent variable; Y is the real income; FD is a proxy to measure the effect of financial development; Fi , foreign interest rate, is an opportunity cost of holding money; p^* is the expected rate of inflation; ex is a proxy for the real exchange rate; and D is a dummy variable to represent the shift in demand for money.

3.3 Econometric Methodology

Nelson and Plosser (1982) found that most of macroeconomic time series are non-stationary; they concluded that 13 out of 14 time series are non-stationary. The stationarity assumption is crucial to the use of conventional econometric methods. The Nelson and Plosser finding has led to the development of various modern techniques of estimation based on the concept of co-integration.

In modeling money demand, the single-equation method was found to be more efficient than the use of macroeconomic systems for estimating demand for money.

Cuthbertson (1991) concluded the following:

“We conclude that the DL-ECM approach in a single-equation context has proved most useful in advancing our knowledge of the behavior of the demand for narrow money for a number of industrialized countries. (P. 46)”

Recently, Pesaran and Pesaran (1997) and Pesaran and Shin (1998) developed a single-equation method within the context of cointegration, the autogressive distributed lags (ARDL) approach to cointegration.

In this study, to determine if there have been shifts in the demand for money in Saudi Arabia, we will use the test developed by Bai and Perron (1998). This test is used to determine structural changes in the behavior of a set of data. The ARDL approach will be used to determine the relationship between the money demand and its determinants. To determine whether the variables used are stationary or non-stationary, we will apply unit root tests introduced by Dickey (1976) and extended by Dickey and Fuller (1979 and 1981) and Said and Dickey (1984). The causality between money and income will be determined using the Granger Causality Test, which was proposed by Granger in (1969).

3.3.1 Bai-Perron Test

Bai and Perron (1998) developed a methodology to test for the presence of structural change and the timing of the structural change. The test will allow us to determine the number of breaks and the dates of those breaks. Carlson , *et al.* (2000) describe the Bai-Perron procedure as follow:

“the Bai and Perron procedure allows us to test for multiple breaks at unknown dates. It is well known that the effects of financial innovation and deregulation on money are difficult to model. Thus, simple frameworks for velocity--like the velocity--opportunity cost relation--typically do not incorporate explanatory variables to control for such factors. The Bai-Perron test thus allows us to examine whether the omission of such relevant factors has frequent implications for the stability of velocity. (P. 103)”

Bai and Perron considered the following general model:

$$y_t = x_t\beta + z_t\delta + u_t \quad (3.2)$$

where y_t is the dependent variable at time t : $t = 1, 2, \dots, T$; $j = 1, 2, \dots, m+1$; i

$= 1, 2, \dots, m$; $x_t = (p \times 1)$ and $z_t = (q \times 1)$ are vectors of covariates: β and δ are

the corresponding vectors of coefficients: u_t is the disturbance; and m is the number of structural breaks.

The first step in the test is to estimate β , δ , and T (the timing of the structural shift). The second step is to test the null hypotheses of ℓ changes against the alternative hypotheses of $\ell + 1$ changes. The results will allow us to determine the significant number of structural changes and the dates of the structural changes. Swaine (2000) explains the Bai and Perron methodology as follow:

“The Bai and Perron procedure is a Sup-F test – the maximum of a sequence of Wald F-statistics – determining both the break date and the break-point estimator simultaneously. To find the first break, the Wald F-statistic (using a consistent estimate of the unconstrained residual variance) is computed for every data point in the series. The date that achieves the maximum of the sequence of F-statistics determines the date of the candidate break-point. If the Sup-F statistic exceeds the stipulated critical value, then a break in the relationship occurs at this date. With this break point, the procedure is repeated, searching through each of the sub-samples for additional breaks. If additional breaks are found, then these break-points divide the data into additional sub-samples, each of which is searched for breaks until no additional breaks-points are found. (P. 42)”

3.3.2 The ARDL Approach

According to Green (2000), the autoregressive distributed lags (ARDL) approach is considered as the “workhorse of modern literature on time series analysis” (Green 2000, p.733). Pesaran (1997) and Pesaran and Shin (1998) introduced the ARDL approach to co-integration. They considered the following general model:

$$\phi(L, p)y_t = \sum_{i=1}^k \beta_i(L, q)x_{it} + \delta'w_t + u_t \quad (3.3)$$

where:

$$\phi(L, p) = 1 - \phi_1(L, p) - \phi_2L^2 - \dots - \phi_pL^p$$

$$\beta_i(L, q_i) = \beta_{i0} + \beta_{i1}L + \dots + \beta_{iq_i}L^{q_i} \quad i = 1, 2, \dots, k$$

where L is a lag operator: y_t is the dependent variable: x_t is a $(k \times 1)$ vector of non-stationary exogenous variables: w_t is a $(1 \times s)$ vector of deterministic variables such as intercept, dummies, time trend, or exogenous variables with fixed lag. (stationary variables): p and q represent the maximum lags of dependent and non-stationary regressors respectively; u_t is an error term; and ϕ , β , and δ are the coefficient estimates. Estimating equation 3.3 will give us the short-run and long-run coefficients. It can be also used to estimate the error correction model.

Given the following:

1. $y_t = \Delta y_t + y_{t-1}$
2. $w_t = \Delta w_t + w_{t-1}$
3. $x_t = \Delta x_t + x_{t-1}$

Substituting 1, 2, and 3 in equation (3.1), we would have:

$$\Delta y_t = -\phi(1, p) EC_{t-1} + \sum_{i=1}^k \beta_i(L, q) \Delta x_{it} + \delta' \Delta w_t - \sum_{j=1}^{p-1} \phi_j^* \Delta y_{t-j} - \sum_{i=1}^k \sum_{j=1}^{q_i-1} \beta_{ij}^* \Delta x_{i,t-j} + u_t \quad (3.4)$$

where EC is the error correction term and can be written as follows:

$$EC_t = y_t - \sum_{i=1}^k \theta_i x_{it} - \psi' w_t \quad (3.5)$$

The ARDL approach is estimated in two stages. In the first stage, the long-run relationship between variables is established. In the second stage, if the long-run relationship exists, the long-run and short-run parameters are estimated. The associated Error Connection model can be estimated to capture the short run effects. This procedure has been utilized by various researchers: (see Lewis (1998), Siddiki (2000), and Vieira (2000)).

The ARDL approach to co-integration has important properties and gains over the other main approaches to cointegration. This approach allows us to use I(0) and I(1) regressors, stationary and non-stationary variables. Siddiki (2000) describes the ARDL approach as follows:

~The ARDL method of cointegration analysis has some advantages against the single equation cointegration analysis of Engle and Grange (1987) – EG

hereafter. For example, the ARDL method does not generally require a knowledge of the order of integration of variables, which is necessary in the EG cointegration analysis. The EG method may also suffer from problems of endogeneity while the ARDL method can distinguish dependent and explanatory variables. The ARDL method also estimates the long- and short-run components of the model simultaneously, removing problems associated with omitted variables and autocorrelation. Thus, estimates obtained from the ARDL method of cointegration analysis are unbiased and efficient, since they avoid the problems that may arise in the presence of serial correlation and endogeneity. (P. 9)”

3.3.3 Unit Root Tests

In co-integration analysis, the first step is to determine if variables are stationary or non-stationary. The non-stationarity of a variable can be determined by applying unit root tests. The Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF), and Phillips-Perron (PP) tests are the most frequently used tests. Dickey (1976) proposed the unit root test and Dickey and Fuller (1979, 1981) extended it.

The DF test can be applied by estimating the following three different models:

1. Random walk.

$$Y_t = \rho Y_{t-1} + e_t.$$

2. Random walk with drift.

$$Y_t = \alpha + \rho Y_{t-1} + e_t.$$

3. Random walk with drift and time trend.

$$Y_t = \alpha + \beta t + \rho Y_{t-1} + e_t.$$

The aim of the estimation is to test the null hypothesis ($H_0 : \rho = 0$), which implies the presence of a unit root: the variable is stationary. The alternative hypothesis is ($H_A : \rho \neq 0$), which implies that the variable is not stationary. The test statistic is the t-

ratio associated with the estimated coefficient. It is different from the standard *t-test* statistics. The test statistics can be found in Dickey and Fuller (1981).

Said and Dickey (1984) extended the DF test to avoid the problems that arise when the dependent variable has a higher order autoregressive process, the presence of serial correlation (see Sahay and Mehta [1998], p. 77). This test is known as the ADF test. The ADF statistics is the same as for DF. This test can be applied using the following models:

1. Random walk.

$$Y_t = \rho Y_{t-1} + \sum_{j=1}^p \beta \Delta Y_{t-j} + e_t .$$

2. Random walk with drift.

$$Y_t = \alpha + \rho Y_{t-1} + \sum_{j=1}^p \beta \Delta Y_{t-j} + e_t .$$

3. Random walk with drift and time trend.

$$Y_t = \alpha + \beta t + \rho Y_{t-1} + \sum_{j=1}^p \beta \Delta Y_{t-j} + e_t .$$

The Phillips-Perron test was introduced by Philips (1987) and advanced by Phillips and Perron (1988). The PP test is based on the OLS estimate of ρ in an AR (1) process to account for serial correlation and heteroscedasticity in the disturbances. The PP uses the same distribution as the Dickey-Fuller *t* statistic. (see Hayashi [2000]).

3.3.4 Granger Causality Test

The Granger Causality Test (GCT) is a popular method used to determine the magnitude and direction of a relationship between two variables. It is a simple econometric technique that was initiated by Granger (1969), made popular by Sims (1972) and extended by Engle and Granger (1987) within the context of cointegration. The GCT is based on a simple concept: if we have two variables, x and y , it can be said that x *Granger-Cause* y if past variations of x can help us to predict future variation of y . This concept is important for understanding the forces that determine equilibrium relationships between economic variables. According to Engle and Granger:

“An individual economic variable, viewed as time series, can wander extensively and yet some pairs of series may be expected to move so that they do not drift too far apart. Typically economic theory will propose forces, which tend to keep such series together. Examples might be short and long term interest rates, capital appropriations and expenditures, household income and expenditures, and prices of the same commodity in different markets or close substitutes in the same market. A similar idea arises from considering equilibrium relationships, where equilibrium is a stationary point characterized by forces, which tend to push the economy back toward equilibrium whenever it moves away. (P. 251)”

The test is applied using the following model:

$$y_t = \alpha_0 + \sum_{i=1}^p \alpha_i y_{t-i} + \sum_{i=1}^p \beta_i x_{t-i} + u_t .$$

The GCT uses the standard *F-test* to test the null hypothesis, $(H_0 : \beta_1 = \beta_2 = \dots = \beta_p = 0)$.

The acceptance of the H_0 implies that x does not Granger-Cause y . If H_0 is rejected then it can be said that x does Granger-Cause y .

3.4 Measuring Institutional Changes

The literature review suggests various indicators that can be used to measure the degree of financial development. Some of these indicators are currency to money ratio (C/M), total non-bank financial assets to total financial assets ratio, the share of monetized sector in the national income, and the number of bank offices. Hassan, *et al.* (1993) also suggested currency to time deposits ratio (C/TD) and demand deposits to time deposits as proxies for financial development. Siklos and Eckhold (1997) included the currency to broad money ratio ($C/M3$) to capture the role of financial developments and their effects on money demand and supply. Xu and Feldman (1999) used the ratio of liquid liabilities to the GDP ($M2/GDP$) as a measure of financial depth. This ratio shows the size of the financial sector relative to the size of the economy. Dummy variables are the most frequently used proxies to measure structural changes. According to Griffith, *et al.* (1993), dummy variables are used to capture shift associated with some qualitative factors.

CHAPTER FOUR

SAUDI ARABIA'S FINANCIAL SYSTEM

4.1 Introduction

Saudi Arabia is located in southwest Asia and occupies four-fifths of the Arabian Peninsula. The Saudi economy is considered to be a developing economy, but its nature is different from that of most developing economies. The Saudi economy is oil-based. Saudi Arabia is the world's largest oil exporter, and oil revenue is the most important source of revenue for financing government spending. The government spending of Saudi Arabia has played a very important role in creating economic growth in Saudi Arabia. According to Presley and Westaway (1989):

“Saudi Arabia has so many differences from the typical developing economy that it deserves special attention. In the 1970s, oil revenues gave it a financial surplus and an ability to create, in a short space of time, a large capital stock of buildings, roads, machinery, plant and equipment. (P. 1)”

Economic growth in Saudi Arabia has resulted in a rapid expansion of the financial system, thus increasing the demand for more banking services. The number of bank branches (BB) has increased dramatically, especially since 1978. The monetary policy of Saudi Arabia is controlled by the Saudi Arabia Monetary Agency (SAMA). SAMA has had a very important role in the development of the financial system.

The purpose of this chapter is to provide an overview of the structure of the financial sector in Saudi Arabia. The chapter will first provide an overview of the current condition of the Saudi economy. There will then be an examination of the organizational structure of the financial sector and its development, including a brief overview of the important structural changes that have influenced the financial sector in Saudi Arabia during the study period. The role of SAMA in conducting the nation's monetary policy will also be discussed.

4.2 Saudi Arabia's Economy

Saudi Arabia is a small, developing economy. It can also be considered an open economy. During the last three decades, the Saudi economy has experienced rapid economic growth and a rapid expansion of the financial system. Table 4.1 summarizes the major macroeconomic indicators for 1998 and 1999.

During 1999, the major macroeconomic indicators demonstrate substantial improvements in the economic conditions. Most major macroeconomic indicators recorded positive results. The nominal Gross Domestic Product (GDP) grew at over 8 percent. The real GDP also increased by 0.4 percent. In per capita terms, the nominal income increased from SR 23,919 to SR 26,230. (SR= Saudi Riyal), a 9.66 percent growth rate. The real per capita income grew at 1.8 percent. The price level continued to be stable. The cost of living index decreased by 1.4 percent, from 100.7 to 99.3 (1995=100).

The external sector recorded positive results. The trade balance increased from SR 23.11 billion to SR 62.41 billion. The overall balance of payments improved from a

deficit of SR 49.245 million to a deficit of SR 6,372 million. It recorded an 87 percent improvement from its position in 1998. On the monetary side, there was accelerated growth for the monetary aggregates, M1, M2, and M3. M1 grew at 11.7 percent. In 1999, M2 continued its growth by 8.18 percent compared to 2.5 percent in 1998. M3 grew at 6.8 percent. The government budget deficit decreased by 25 percent to a deficit of SR 36.300 million. The improvement of the government budget deficit is primarily due to the increased revenue of oil exports.

The Saudi Stock Market recorded positive results for 1999. The market capitalization increased by 43 percent from its value in 1998. The Stock Market Index increased from 1,413.1 in 1998 to 2028.53 in 1999 (1985=1000).

Table 4.1

Major Macroeconomic Indicators

Indicator	1998	1999	% Change
Gross Domestic Product (GDP)* (million SR)	480,773	521,988	8.6
Real GDP (1995=100) (million SR)	506,077	508,265	.4
GDP Deflator (1995=100)*	95	102.7	--
Population* (millions)	20.18	19.90	-1.4
Per Capita GDP	23,919	26,230	9.66
Real Per Capita GDP	25,078	25,541	1.8
Cost of Living Index (1995=100)*	100.7	99.3	-1.4
Inflation (from Consumer Price Index) (1995=100)*	-6	-1.4	--
Imports** (million SR)	147,680	145,540	-1.4
Exports** (million SR)	170,790	207,950	21.8
Balance of Payments Surplus (Deficit)** (million SR)	(49,245)	(6,372)	(-87)
Money Supply (M1)** (million SR)	140,272	156,665	11.7
M1 Growth Rate	-0.6	11.7	--
Money Supply (M2)** (million SR)	223,708	242,006	8.18
M2 Growth Rate	2.5	8.18	--
Money Supply (M3)** (million SR)	282,062	301,145	6.8
M3 Growth Rate	3.7	6.8	--
Budget Surplus (Deficit)** (million SR)	(48,452)	(36,300)	(-25)
% Of GDP	10.1	7.0	--
Share Price Index	1,413.1	2,028.53	43.6
Market Capitalization (million SR)	159,900	228,600	43

*IFS 1999 & 2000

**SAMA 2000

4.3 Financial System Development

Saudi Arabia has experienced a drastic expansion of its financial system in the last three decades. Economic growth in Saudi Arabia has played a major role in increasing the demand for financial services. According to Presley and Westaway (1989), the rapid economic growth in Saudi Arabia had to be matched by the rapid development of its financial system.

In the last thirty years, the Saudi financial system has experienced major structural changes. During the 1970s, major non-bank financial institutions were established, and the Saudization policy of commercial banks was started. During the 1980s, some major changes also occurred. For example, the use of electronic banking was initiated in 1986, and the government began to issue government bonds and treasury bills to finance its huge budget deficit. In the mid 1980s, the Saudi Stock Market was developed. These major shifts have influenced the behavior of money demand in Saudi Arabia.

The role of financial development in economic growth has been extensively investigated in the literature. According to Liven (1997), financial system structure and quality are influenced by non-financial factors such as economic growth, technological advancements, and non-financial institutions. Liven also suggests that there is a strong link between financial development and long-run economic growth.

There are different measures of financial development and financial deepening in the literature. Some of these measures are the ratio of liquid liabilities to the GDP ($M3/GDP$), currency-money ratio (CM), $M3$ per capita, the total deposits per capita, and the number of bank offices in existence. The most commonly used measures of financial

deepening are the ratio of liquid liabilities to GDP and the ratio of currency-money, which reflect the degree of monetization of the economy.

Table 4.2 represents some indicators of financial development and financial deepening in Saudi Arabia over the study period. These indicators are M3/NGDP, (NGDP=Non-Oil GDP), M1/M3 ratio, the number of bank offices per 100,000 people, ATMs per 100,000, M3 per capita, and total deposits per capita. All of the ratios show a considerable upward trend over the period from 1969 to 1999, except for M1/M3 ratio. However, the declining of M1/M3 ratio indicates increase of the financial system monetization.

The increase in the M3/NGDP ratio has been remarkable. It increased from 41 percent in 1969 to 89 percent in 1999. The largest increase was from 1985 to 1986, jumping from 71 percent in 1985 to 82 percent in 1986. The M1/M3 ratio reflects the degree of sophistication of the financial system monetization. As the M1/M3 ratio declines, the financial system becomes more sophisticated. The M1/M3 ratio declined from 75 percent in 1969 to 52 percent in 1986. Figure 4.1 shows the behavior of the M1/M3 ratio. The behavior of the M1/M3 ratio has been stable, about 50 percent, since 1986. This indicates that the ratio reached its equilibrium level.

The number of bank offices increased from less than one office in 1969 to more than six bank offices for every 100,000 people in 1999. The use of electronic banking was initiated in 1986. The number of ATMs increased rapidly, reaching 10 ATMs for every 100,000 people in 1999. The number of bank offices and ATMs represents the spread and expansion of banking services.

The last two indicators, M3 per capita and total deposits per capita, show that the economy became more monetized. The M3 per capita has been increasing over time; it increased from SR 520 in 1969 to SR 15,133 in 1999. The total deposits per capita increased from SR 267 in 1969 to SR 12,366 in 1999.

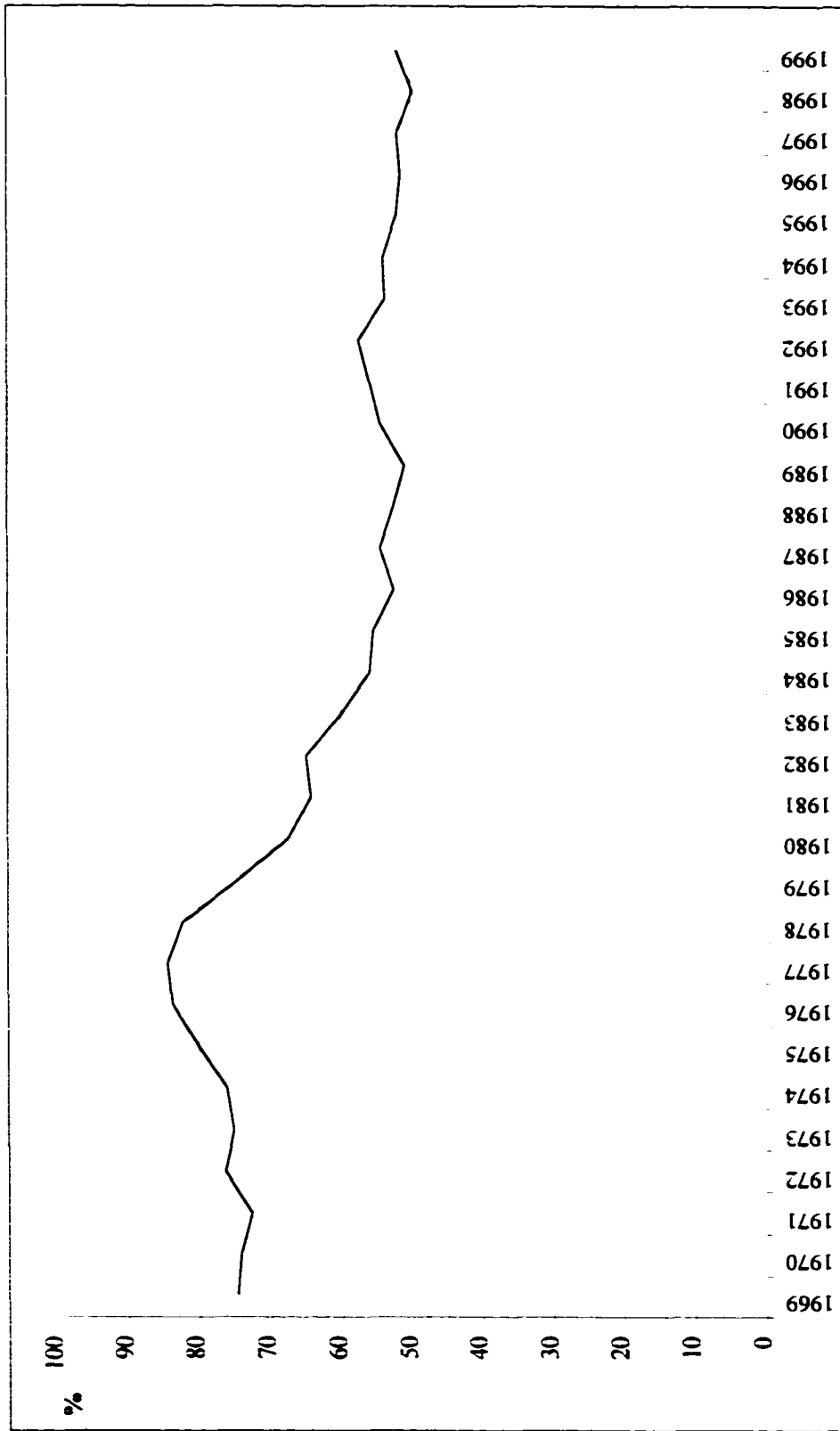


Figure 4.1: M1/M3 Ratio Behavior

Table 4.2
Financial Deepening Ratios

Year	M3/NGDP %	M1/M3 %	Bank Offices per 100000	ATMs per 100000	M3 per capita (SR)	Deposit per capita (SR)
1969	41.4	74.6	1.0	..	520	267
1970	42.6	74.2	1.0	..	567	303
1971	48.8	72.8	1.0	..	702	397
1972	54.5	76.3	1.1	..	946	568
1973	56.6	75.2	1.1	..	1,292	792
1974	50.0	76.0	1.1	..	2,017	1,292
1975	51.7	80.0	1.2	..	3,373	2,192
1976	55.2	83.6	1.2	..	4,900	3,114
1977	59.7	84.5	1.4	..	6,652	4,425
1978	57.2	82.3	1.6	..	7,230	4,755
1979	57.1	74.4	2.1	..	8,373	5,553
1980	60.0	67.2	2.8	..	10,070	7,282
1981	64.8	64.1	3.6	..	12,176	9,075
1982	65.4	64.8	4.3	..	13,112	9,670
1983	68.4	60.0	4.7	..	12,887	9,784
1984	69.3	55.8	4.8	..	12,629	9,682
1985	70.5	55.3	5.0	..	12,136	9,965
1986	81.7	52.4	4.9	na	12,673	9,685
1987	81.5	54.3	5.0	na	12,076	9,182
1988	85.9	52.5	6.6	na	12,726	10,162
1989	84.5	50.9	6.8	1.2	12,487	10,139
1990	79.0	54.3	6.9	2.5	12,672	9,661
1991	80.7	55.8	6.5	2.8	13,050	10,352
1992	82.3	57.4	6.7	3.8	12,892	10,311
1993	82.1	53.6	6.7	4.4	13,072	10,615
1994	82.1	53.9	6.8	5.1	13,133	10,601
1995	81.1	51.8	6.5	6.2	13,154	10,793
1996	84.0	51.4	6.4	7.2	13,728	11,443
1997	83.6	51.9	6.2	8.2	13,963	11,611
1998	85.4	49.7	6.1	9.0	13,977	11,746
1999	89.0	52.0	6.0	10.0	15,133	12,366

Source: calculated using data from SAMA yearly reports, population data was obtained from IFS (2000).

4.4 The Saudi Financial System

The financial system plays a crucial role in mobilizing savings, investments, and the implementation of macroeconomic policy. The level of economic development, the economic structure, and the institutional arrangements that influence economic agents influence the financial system structure and its ability to perform its job. According to Xu (1998):

“It is generally believed that the financial system has four functions. The first is to provide a medium of exchange and a store of value, or simply a payment mechanism, for the economy ... The second function of the financial system is to mobilize savings from surplus units and channel the funds to productive investment ... Thirdly there is a transformation function of the financial system whereby it matches the different maturity requirements of savers and investors ... The transformation and diversification of risks is the fourth function of the financial system ... The underlying logic is that the more developed is the financial sector, the greater its ability to channel funds efficiently. (Pp. 2-18)”

Understanding the structure of the financial system is an important step in the analysis of its ability to mobilize the financial resources. In this section, the structure of the financial sector of Saudi Arabia will be described and analyzed.

The Saudi financial system is comprised of the Saudi Arabian Monetary Agency (SAMA), which is the country's central bank; ten commercial banks; five specialized banks; foreign exchange dealers; and the capital market, which includes the stock market and securities market (bonds market). Figure 4.2 shows the organizational structure of the financial system in Saudi Arabia. SAMA is the heart of the financial sector. It is under the direct authority of the Ministry of Finance and National Economy. SAMA heads the banking system, the financial market, and oversees the foreign exchange dealers.

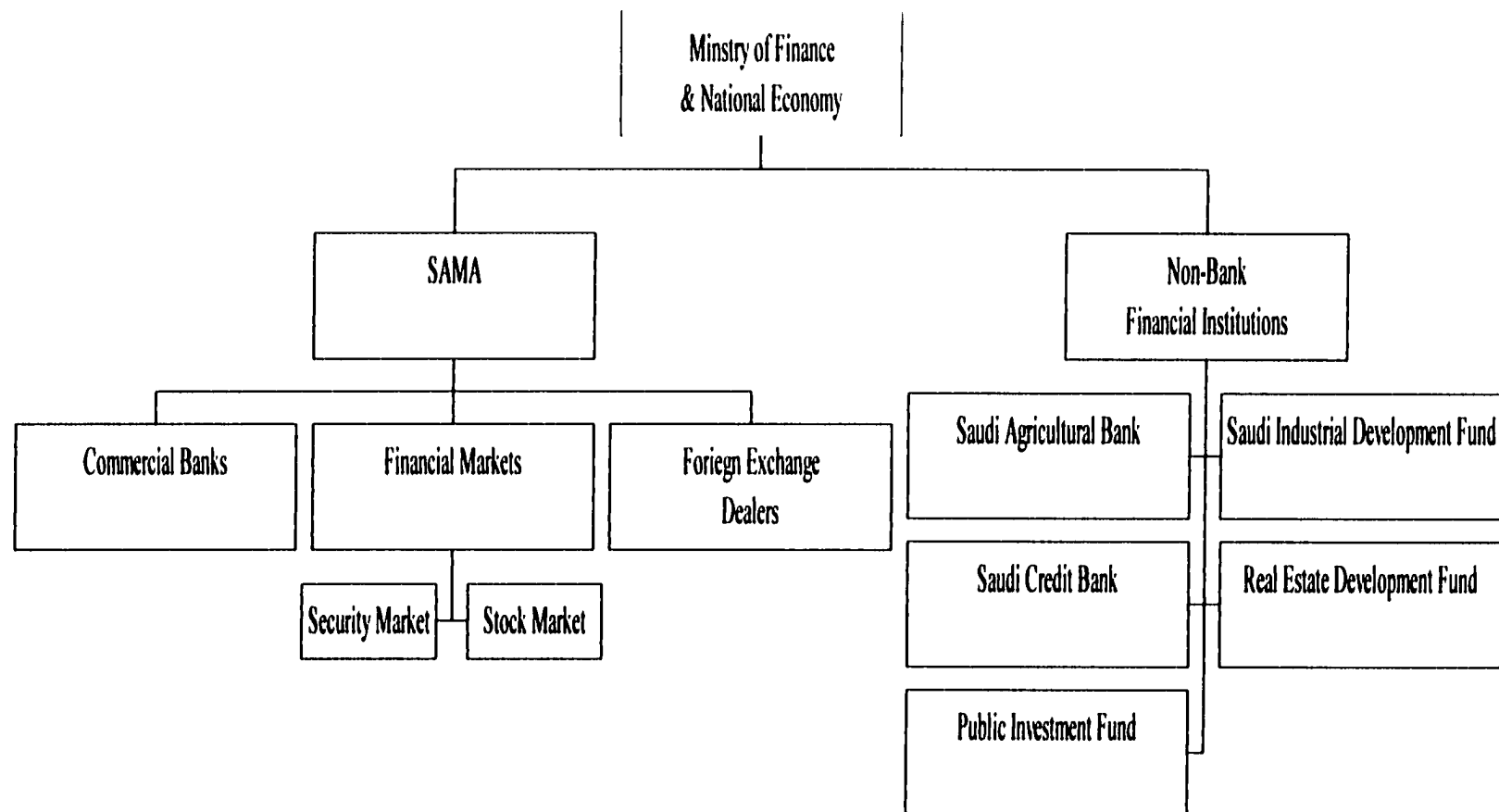


Figure 4.1: The Structure of the Financial System in Saudi Arabia*

* Constructed based on SAMA (2000)

4.4.1 SAMA

SAMA, the country's central bank, was established in 1952. According to its charter, SAMA has the following objectives and functions (El Mallakh, 1982):

1. Regulation and control of the money supply
2. Stabilization of the internal and external value of the Saudi currency, the riyal
3. Regulation and supervision of the banking activities and foreign exchange dealers
4. Acting as the government banker
5. Management of the government foreign reserves
6. Promotion of economic development
7. Undertaking financial and economic research

SAMA has played a major role in the development of the Saudi financial system. SAMA's role and power have evolved greatly over the years. SAMA, according to its charter (see Appendix 4.1), cannot act in any manner which conflicts with Islamic law. It cannot charge or pay interest, accepts private deposits, or make advances to the government or to the private sector.

During the 1960s, SAMA was given full control of the regulation of the banking industry. According to the Banking Control Law of 1966 (see Appendix 4.2), SAMA was authorized to regulate the banking industry with regard to the following issues (Abdeen and Shook, 1984):

1. The maximum limits of total loans that can be extended by a bank or banks

2. The prohibition or limitation of specified categories of loans or other transactions
3. Fixing the terms and conditions which banks should taken into consideration when carrying out certain types of transactions for their customers.
4. The cash margins to be obtained by banks against specified categories of credits or guarantees.
5. The minimum ratios to be observed between the limits for loans and the collateral for such loans.
6. Fixing the assets to be maintained by each bank within the kingdom. Such assets should not fall below a certain percentage of the banks' deposit liabilities. which shall be fixed by the agency from time to time.

The Banking Control Law gave SAMA the authority to require banks to keep 15 percent of their capital and reserves. SAMA's approval is required for making loans to foreign investors. Banks are also required to keep 25 percent of their net profit to build up their reserves. SAMA can impose a reserve requirement up to 20 percent (Abdeen and Shook, 1984). Currently, the reserve requirement is 7 percent.

In the late 1970s, SAMA started to implement the Saudization of Foreign Banks Policy. According to this policy, the majority of ownership of foreign banks had to be transferred to Saudi nationals. During the 1980s and early 1990s, SAMA played an important role in introducing the electronic banking Automated Teller Machines (ATMs), point of sale (POS), telebanking, and self-service terminals (Azzam, 1997a).

SAMA regulates and supervises the Saudi Stock Market and manages the electronic share trading system. SAMA also manages the public debt by controlling the security market, treasury bills, and government bonds. SAMA regulates the foreign exchange dealers. Foreign exchange dealers were required to divest of their banking activities and submit their records to SAMA for auditing (Albatel, 1993).

4.4.2. Banking System

As seen from Figure 4.3, there are ten commercial banks in Saudi Arabia. Five banks are owned jointly by the private sector and foreign banks. Al-Bank Al-Saudi Al-Faransi, Saudi Holandi Bank, Saudi British Banks, Bank Al-Jazira, and the Arab National Bank. Two banks, the Al-Rajhi Banking & Investment Company and the National Commercial Bank, are privately owned. The private sector, the Saudi government, and foreign banks jointly own two banks, the Saudi American Bank and Saudi Investment Banks. The private sector and the Saudi government jointly own one bank, Riyadh Bank. There are no Islamic banks operating in the kingdom. The first Saudi Bank, the National Commercial Bank was established in 1953. Riyadh Bank, the second Saudi bank, was established in 1957. During the 1950s and 1960s, most of the banks that were operating in Saudi Arabia were foreign bank offices. The number of bank offices was in 1969 was fifty-nine.

Table 4.3 summarizes the development of commercial banks in Saudi Arabia from 1969 to 1999. During the 1970s, the growth of the number of bank offices was very slow. After the completion of the policy of the Saudization of commercial banks, the commercial bank offices expanded sharply. The number of bank offices increased from

59 bank offices in 1969 to 1,196 in 1999. Table 4.3 shows the rapid expansion of the number of bank offices during the 1980s and 1990s.

During the time of the Saudization policy, there were ten foreign commercial banks and two locally owned banks. The Saudization policy was completed in 1982. In 1983, there were eleven local commercial banks. In 1988, the most recent-formed bank, the Al-Rajhi Banking and Investment Corporation, was created. It is the largest bank in Saudi Arabia, having 450 bank offices (SAMA 2000). The United Saudi Commercial Bank and the Saudi Cairo Bank merged into the new United Saudi Bank in 1997. By the end of 1999, after the Saudi American Bank acquired the Saudi United Bank, there were 10 commercial banks.

It can be said that the 1980s were the start of the modern banking era. In the mid-1980s, the use of electronic banking was introduced with the help of SAMA. In 1999, there were about 2000 ATMs and more than 4.5 million ATM cards were issued. The growth of banks' total assets and claims on the private and public sectors demonstrates the rapid expansion of the banking system (see Table 4.3). The total assets of the commercial banks increased from SR 2.724 million in 1969 to SR 415.228 million in 1999, an increase of more than 15,000 percent.

The commercial banks in Saudi Arabia are the largest part of the financial system. In addition to their traditional banking activities, banks act as brokers in the stock market. They also hold the majority of government securities, treasury bills, and government bonds. Commercial banks deal mostly with short-term credit. More than 68 percent of bank credits are short term (SAMA, 2000).

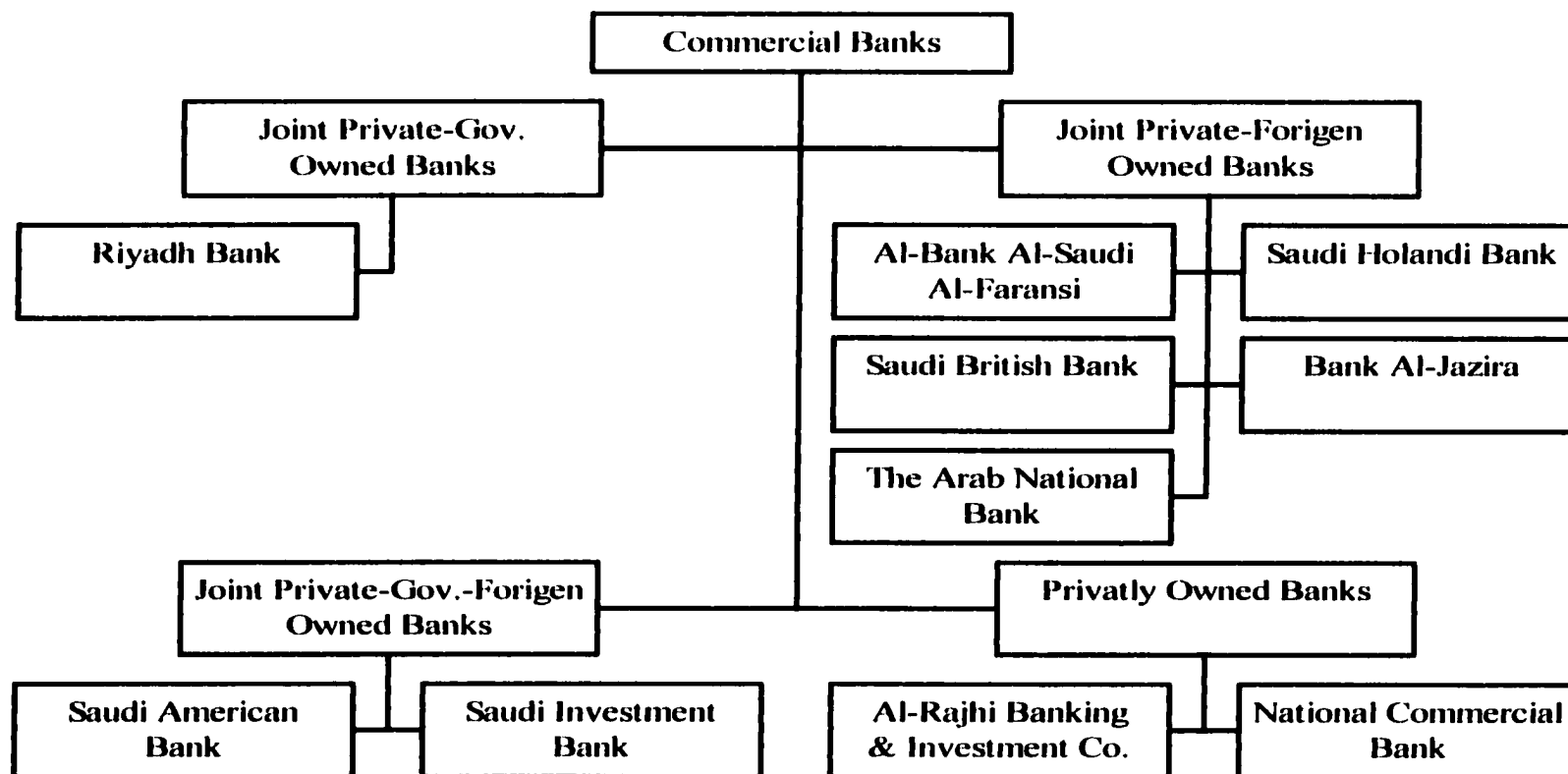


Figure 4.3: The Structure of the Saudi Banking System*

* Constructed based on SAMA (2000) and Alosaimi (1996)

Table 4.3
Commercial Banking Development

Year	Banks	Bank Offices	ATMs	ATM Cards	Total Assets (Million SR)	Total Claims on Private Sector (Million SR)	Total Claims on Public Sector (Million SR)
1969	11	59	..	..	2,724	1,624	..
1970	11	60	..	..	2,963	1,696	..
1971	13	65	..	..	3,768	1,692	..
1972	13	70	..	..	5,281	1,809	..
1973	12	74	..	..	7,570	3,202	..
1974	12	78	..	..	11,786	5,401	..
1975	12	88	..	..	21,690	8,508	..
1976	12	94	..	..	35,194	8,413	..
1977	12	110	..	..	52,514	11,218	..
1978	12	140	..	..	52,561	19,739	..
1979	12	188	..	..	65,513	29,240	..
1980	12	259	..	..	93,623	40,252	..
1981	12	352	..	..	117,721	46,572	..
1982	12	436	..	..	138,136	49,397	..
1983	11	524	..	..	145,247	56,001	..
1984	11	570	..	..	152,566	59,280	..
1985	11	617	..	..	154,529	58,081	na
1986	11	637	na	na	176,129	56,136	na
1987	11	674	na	na	188,831	61,858	na
1988	12	926	na	na	216,239	70,523	na
1989	12	985	178	230,000	233,585	73,281	na
1990	12	1,032	369	460,000	232,055	65,295	na
1991	12	1,080	462	553,079	258,330	73,616	na
1992	12	1,131	643	806,259	273,572	86,608	na
1993	12	1,160	766	1,133,183	320,754	101,932	66,063
1994	12	1,214	914	1,562,384	332,231	113,192	76,960
1995	12	1,192	1,124	1,972,759	341,158	121,153	76,734
1996	12	1,208	1,359	2,482,938	357,947	123,547	81,969
1997	11	1,201	1,591	3,052,058	381,787	133,684	104,070
1998	11	1,229	1,808	3,647,881	404,306	160,655	112,965
1999	10	1,196	1,997	4,696,342	415,228	162,190	116,613

Source: SAMA yearly reports, mainly SAMA (2000).

4.4.2 Non-Bank Financial Institutions

Saudi non-bank financial institutions, specialized credit institutions, basically serve specific financial needs not met by the banking system. There are five non-bank financial institutions, which are under government control. These institutions are Saudi Agricultural Banks, Saudi Credit Bank, Public Investment Fund, Saudi Industrial Development Fund, and Real Estate Development Fund. These institutions mobilize about SR 230 billion of total assets. During 1999, the five institutions provided SR 5.7 billion in loans. The amount of granted loans was less than 3 percent of the five non-bank financial institutions' total assets.

The ability of the specialized credit institutions to grant loans depends on the repayments of outstanding loans. During 1999, loan repayments totaled SR 5.9 billion. The following is a brief discussion of the objectives and the financial share of each institution (see El Mallakh, 1982, and SAMA, 2000).

1. Saudi Arabian Agricultural Bank (SAB)

The Saudi Arabian Agricultural Bank (SAB) was established in 1964. It provides interest-free loans to public and private agricultural projects. The bank provides short-, medium-, and long-term credit. It subsidizes 50 percent of the agricultural equipment. The bank is regulated and supervised by the Ministry of Agriculture. From 1964 to 1999, it provided over SR 26 billion in accumulative loans. In 1999, the SAB provided about SR 692 million (SAMA 2000).

2. Saudi Credit Bank (SCB)

The Saudi Credit Bank was created in 1971 to provide interest-free loans for social and economic purposes to Saudi citizens with incomes of less than SR 12,000 per year. The bank granted over SR 300 million in loans during 1999. It had outstanding loans at SR 762 million at the end of 1999 (SAMA 2000).

3. Public Investment Fund (PIF)

The Public Investment Fund was established in 1971 to provide interest-free loans to public sector industrial projects, including joint-venture projects (El Mallakh, 1982). The fund provided more than SR 58 billion in loans from 1971 to the end of 1999. In 1999 alone, the fund granted SR 1.2 billion (SAMA, 2000).

4. Saudi Industrial Development Fund (SIDF)

The SIDF was established to provide long-term loans to industrial projects. The loans are repayable in five to ten years after a grace period of one year from the start of the project production. The SIDF can also provide the required consultation for the project in technical and marketing assistance. During 1999, the SIDF provided about SR 1.2 billion in total loans. Outstanding loans totaled over SR 10 billion by the end of 1999 (SAMA, 2000).

5. Real Estate Development Fund (REDF)

The REDF was created in 1974 to provide medium and long-term interest-free loans to assist Saudi citizens in building houses. It also provides loans for the

construction of investment-oriented buildings. During its history, the REDF has provided over SR 119 billion in loans. In 1999, the REDF provided SR 2.3 billion.

4.4.3 The Financial Market

Prior to the mid-1980s, it can be said that there was no active financial market in Saudi Arabia. There were only a few enterprises in which people could invest. The market was not regulated, and the Saudi government and SAMA did not start issuing treasury bills and bonds until the mid-1980s. During the last fourteen years, the financial market has grown rapidly and become the largest in the Arab world in terms of market capitalization (Hovaguimian, 1995). In this section, the development of the Saudi financial market will be briefly discussed.

4.4.3.1 The Stock Market

Azzam (1997b) divides the history of the Saudi Stock Market into two distinct periods, the period before 1985 and the period after 1985. The market was unregulated until 1985, and there were few joint stock companies. According to Azzam (1997b):

“The Saudi government placed all stock trading under the supervision and control of SAMA in 1985 . . . the trading system underwent a number of modifications in 1986 and 1987. In 1986, SAMA allowed banks to register share transfers themselves by simply stamping the back of the share certificate, up to six times, instead of presenting the old certificate to the issuing company for a new one . . . In May 1987, SAMA established a trading floor that centralized trading under one roof with up-to-date market information . . . In 1988, floor trading was terminated and SAMA initiated a state of the art electronic share trading system....The existing stock trading system in the Kingdom is called the Electronic Securities Information System (ESIS), one of the most advanced in the world. (Pp. 141-143)

From 1985 to 1999, the Saudi Stock Market grew tremendously. Table 4.4 summarizes the Saudi Stock Market indicators. The number of listed companies

Table 4.4
Stock Market Indicators

Year	Number of Listed Companies	Number of Shares (Millions)	Value of Shares Traded (Million SR)	Market Value of Shares (Billion SR)	Share Price Index
1985	44	4	760	67	691
1986	46	5	831	63	646
1987	51	12	1.686	73	781
1988	52	15	2.037	86	892
1989	54	15	3.364	107	1.087
1990	56	17	4.403	97	980
1991	58	31	8.527	181	1.765
1992	58	35	13.699	206	1.889
1993	64	60	17.360	198	1.793
1994	66	152	24.871	145	1.283
1995	69	117	23.227	153	1.368
1996	70	138	25.397	172	1.531
1997	70	313	62.060	223	1.958
1998	74*	293	51.510	160	1.413
1999	74*	528	56.578	229	2.029

Source: SAMA (2000). number of listed companies obtained from Azzam (1997).

*Obtained from SAMA (1999) & (2000).

increased from forty-four companies to seventy-four companies in 1999. The value of traded stocks grew from SR 760 million in 1985 to SR 56.587 million 1999. During the same period, the market capitalization increased from SR 67 billion to SR 229 billion, an increase of more than 240 percent.

Currently the Saudi Stock Market is floorless and the exchange of stock is carried out through the local banks. The market itself continues to be controlled and supervised by SAMA (Hovaguimian, 1995).

4.4.3.2 The Saudi Security Market

Saudi Arabia has experienced high budget deficit since 1983. From 1984 to 1993, the budget deficit was more than 10 percent of the country's GDP annually. In 1987, the budget deficit was over 25 percent of the total GDP, or about SR 70 billion. During the last six years the budget deficit was about 6 percent on the average. Table 4.5 shows the government budget's status from 1969 to 1999.

The Saudi Security Market can be termed the government's debt market (Azzam, 1997b). The Saudi government started issuing treasury bills in 1984 to finance its budget deficit. In 1998, the government began to issue long-term bonds, known as Government Development Bonds. The maturities of these bonds are between one year and five years. According to Hovaguimian (1995):

“In 1989, SAMA allowed the National Commercial Bank (NCB) and five other banks to act as market-makers in development bonds. In June 1990, Saudi banks were permitted to sell two- to five-year bonds to banks operating in the Bahrain offshore market, to overseas branches of Saudi companies, and to any institution incorporated within or resident in the GCC. More recently, SAMA has encouraged banks to offer mutual funds in government bonds or in a mixture of bonds and Saudi shares to enable small investors to participate in the government bond market. (P. 23)”

Table 4.5
Ratio of Government Budget Deficit to GDP

Year	GDP*	Revenue*	Expenditures*	Surplus(Deficit)*	% of GDP
1969	17,399	5,668	6,079	-411	2.36
1970	22,921	7,940	6,418	1,522	6.64
1971	28,258	11,120	8,303	2,817	9.97
1972	40,603	15,368	10,148	5,220	12.86
1973	99,314	41,705	18,595	23,110	23.27
1974	139,599	100,103	32,038	68,065	48.76
1975	164,526	103,384	81,784	21,600	13.13
1976	205,056	135,957	128,273	7,684	3.75
1977	225,400	130,659	138,048	-7,389	3.28
1978	249,539	131,505	147,971	-16,466	6.60
1979	385,807	211,196	188,363	22,833	5.92
1980	520,585	348,100	236,570	111,530	21.42
1981	524,720	368,006	284,650	83,356	15.89
1982	415,234	246,182	244,912	1,270	0.31
1983	372,023	206,419	230,185	-23,766	6.39
1984	351,397	171,509	216,363	-44,854	12.76
1985	313,942	133,565	184,004	-50,439	16.07
1986	271,091	76,498	137,422	-60,924	22.47
1987	275,453	103,811	173,526	-69,715	25.31
1988	285,145	84,600	134,850	-50,250	17.62
1989	310,823	114,600	149,500	-34,900	11.23
1990	391,994	154,721	210,430	-55,709	14.21
1991	442,037	161,879	266,370	-104,491	23.64
1992	461,398	165,385	232,545	-67,160	14.56
1993	443,842	141,445	205,496	-64,051	14.43
1994	450,025	128,991	163,776	-34,785	7.73
1995	478,652	146,500	173,945	-27,445	5.73
1996	529,250	179,085	198,117	-19,032	3.60
1997	548,620	205,500	221,272	-15,772	2.87
1998	480,773	141,608	190,060	-48,452	10.08
1999	521,988	147,500	183,800	-36,300	6.95

Source: SAMA (1998), (1999), and (2000)

*Numbers in Millions of SR.

4.4.5 Foreign Exchange Dealers

Foreign exchange dealers are the oldest known financial institutions in Saudi Arabia. Foreign exchange activities were originated to serve the needs of pilgrims who came to Mecca during the Hajj season. However, prior to the mid-1980s, foreign exchange dealers had not been regulated. SAMA now regulates and supervises foreign exchange activities. Foreign exchange dealers are only allowed to exchange foreign currencies and accept demand deposits only (see Abdeen and Shook, 1984). Currently, foreign exchange dealers operate in major cities, mostly in the Western Province of Mecca.

4.5 Monetary Policy and SAMA

It is well-known that monetary policy can influence economic activities. A successful monetary policy requires that the monetary authority have the ability to predict the effect of its policy in a timely manner (Nualtaranee, 1999). In Saudi Arabia, SAMA is in charge of the planning and implementation of the country's monetary policy. The Saudi Currency, Saudi Riyal (SR), is officially pegged to the U.S. dollar at the rate of 3.75/\$1. According to Al-Jasser and Banafe (1999) the exchange rate policy has played a crucial role in price level stability and economic stability.

The legal system in Saudi Arabia is based on Islamic principles. Those principles prohibit the payments of interest. According to the SAMA charter, SAMA cannot act in any manner which conflicts with Islamic principles. It cannot charge or pay interest, nor can it accept private deposits, or make advances to the government or to the private sector. Consequently, SAMA cannot use the interest rate as an indicator of monetary policy. But

in practice, SAMA and commercial banks deal with interest rate, which is a sensitive issue in Saudi Arabia. Habib, *et al.* (1999) argued that:

“Saudi Arabia is a Muslim country with strict adherence to the faith. Paying and receiving interest are considered immoral in Saudi Arabia. Still many Saudis refuse to deposit their money even in non-interest-bearing accounts in commercial banks. Many Saudis continue to view banks with distrust and estimates indicate that more than 50 percent of the Saudis still do not have an account in any of the commercial banks (Wilson, 1985). These people think that mixing their money with a bank's money makes them sinful. The authors' observations and interviews indicate that resentment at dealing with interest (by implication, commercial banks) is indeed prevalent among Saudis. One such example is the experience of a bank manager who paid a visit to a wealthy Saudi businessman to invite him to deposit some of his money in a new branch. He was flatly told that if it were not for the traditional Arabian hospitality, he would have been thrown out immediately. Similar anecdotes are widespread especially in rural Saudi Arabia. As a result, a large amount of money in the Saudi Economy is untapped and under-utilized. Some estimates place the amount at more than one billion Saudi riyals (Banking and Finance, 1985). (Pp. 23-24)”

In a study of the obstacles of investing in the Saudi's stock market, it was shown that a reasonable percentage of the study sample, more than 21 percent, indicated that they invest in the stock market, which, in their opinion, provides the opportunity of investing in non-interest fields (see Khabab, *et al.* 1998).

Monetary policy in Saudi Arabia has short-term goals - price level stability and protecting Saudi currency exchange rate - and a long-term goal - the promotion of economic growth. SAMA has been successful in accomplishing the goals of Saudi Arabia's monetary policy. According to a publication of the U.S. Embassy, Riyadh, Saudi Arabia, (2000):

“As a result of generally sound regulatory authority by the Saudi Central Bank (SAMA), and prudent monetary policy, Saudi Arabia enjoys low inflation and interest rates close to U.S. levels. Interest rates are allowed to float freely, and capital flows freely across borders. The combination of the high domestic debt, low oil prices, and a fixed exchange rate led to the riyal coming under some speculative pressure in the first quarter of 1999. Effective interventions by SAMA and the recovery of oil prices in March 1999 eased the pressures considerably. Speculative pressure has not been significant since then. (P. 9)”

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excess liquidity can easily be executed. Foreign exchange swaps, carried out at the ruling market rates, affect system liquidity but do not generally exercise a direct influence on the exchange rate. Swaps were extensively used to provide emergency liquidity to the banking system during the Gulf crisis. Interbank foreign exchange swaps are actively traded for maturities up to one year, primarily for liquidity management and occasionally against currency speculation. (P. 214) "

Foreign exchange swaps and open market operations are the most used instruments by SAMA to influence and control money supply.

4. Government Deposits Control

SAMA acts as a banker for government agencies. It can place the government institution's deposits with commercial banks to increase their liquidity. This tool can be considered as a long-term instrument to control money supply. The placement of government deposits is a flexible instrument for controlling bank credits (see Albatel, 1993, and Al-Jasser and Banafe, 1999).

CHAPTER FIVE

DEMAND FOR MONEY AND VELOCITY OF MONEY IN SAUDI ARABIA

5.1 Introduction

In this chapter, the actual behavior of the demand for money and the nature of the demand for money function during the study period (1969 to 1999) will be discussed. The Chapter begins with a summary of selected studies, which attempted to examine the nature of the demand for money function. The actual behavior of the demand for money and the velocity of money will be analyzed. SAMA's financial status will also be examined through the analysis of its balance sheet for selected years. Finally, the consolidated balance sheet of commercial banks will be analyzed to determine the role of commercial banks in the financial system in Saudi Arabia.

5.2 Demand for Money Studies on Saudi Arabia

Table 5.1 summarizes selected studies of demand for money in Saudi Arabia. The literature review in Chapter Three reveals a limited number of demand for money studies related to Saudi Arabia. The summary of these studies yields important conclusions.

All the studies estimated the long-run demand for money function. However, it is also clear that the nature of the velocity of money function was ignored. Moreover, all the studies covered periods from the 1960s to the 1980s except for Alkswani and Al-Towaijari (1999).

The studies hypothesize that the demand for money in Saudi Arabia is a function of a scale variable, foreign interest rate, expected rate of inflation, and the exchange rate. The studies used the conventional specification of demand for money. They concluded that demand for money in Saudi Arabia was generally stable.

The most recent study, that of Alkswani and Al-Towaijri (1999), used the conventional specification of demand for money to estimate the demand function for M1. They used a different econometric approach, error correction model (ECM). However, this study has a serious problem in that it used quarterly data, even though there is no data published about the scale variable used, Real Non-Oil GDP (NOGDP). The quarterly NOGDP data was calculated using linear interpolation technique.

In conclusion, the selected studies ignored the role of financial development and structural change on the behavior of the demand for money. The nature of the velocity of money function and its behavior was also ignored.

Table 5.1
Selected Money Demand Studies concerning
Saudi Arabia

Authors	Sample	Model/ Estimation Method	Dependent Variable	Independent Variables	Main Findings
Darrat (1984)	1962 - 1982	Conventional OLS (Log)	M1	Real GNP, π^* , f_i , Ex	-All variables were significant -Money demand was stable
Nagadi (1985)	1964-1983	Conventional OLS (Log)	M1, M2	Real NOGDP, π^* , f_i , G	-All variables were significant -Money demand was stable
Ghamdi (1989)	1965 - 1988	Conventional OLS (Log)	M1, M2	Real GDP, π^* , f_i , Ex	-All variables were significant -Money demand was stable
Metwally and Abdelrahman (1990)	1967 - 1982	Conventional OLS (Log)	M1, M2	GDP, NOGDP, π^* , f_i , A/L , D	-All variables were significant except for A/L for M1 -Structural shift for M1 because of the oil embargo of 1973 -No structural shift for M2 -Money demand was generally stable
Alkswani and Al-Towaijari (1999)	1977-1997 (Quarterly)	Conventional ECM	M1	Real NOGDP, π^* , f_i , Ex	-All variables were significant -Money demand was stable - Interest elasticity of money demand was very low (-0.018)

Where: OLS= Ordinary List Square, LOG= logarithmic form, EC= error correction model, GNP= gross national product, GDP= gross domestic product, NOGDP= non-oil GDP, π^* = expected rate of inflation, f_i = foreign interest rate, Ex = exchange rate, G = government spending, A/L = assets to liabilities ratio of commercial banks, D = dummy variable.

5.3 Demand for Money in Saudi Arabia (1969-1999)

There are different definitions of monetary aggregates, used to measure money stocks. Monetary aggregates can be used as indicators for economic policy. In the case of Saudi Arabia, there are four different monetary aggregates, M0, M1, M2, and M3. The monetary base (M0), the narrowest definition of money stock, includes currency outside banks and total reserves. M1, the relatively less narrow definition of money stock, consists of currency in circulation and demand deposits. There are two broader definitions of money stock, M2 and M3. M2, the relatively broader measure of money, includes M1 plus time and saving deposits. M3, the broadest money supply definition, includes M2 plus quasi-deposits. Quasi-deposits include foreign currency deposits, letters of credit, guarantees, and outstanding remittances.

5.3.1 Demand for money Behavior

In this section, the behavior of demand for money will be discussed using the published yearly statistics of money supply. It is assumed that money market is in equilibrium, i.e., the money market establishes the equilibrium quickly, money supply equal demand for money. Table 5.2 and Figure 5.1 show the values and behaviors of the different monetary aggregates at the end of each year. Figure 5.2 shows the growth rates of monetary aggregates from 1969 to 1999.

Based on our discussion of financial development in Saudi Arabia, we can distinguish between two different stages of the evolution of money supply behavior. The first stage covered the period from 1969 to 1985.

The second stage lasted from 1986 to 1999. Figure 5.2 shows two different patterns in the growth rates of monetary aggregates, the period before 1985 and the period after 1985.

During the study period, from 1969 to 1999, the monetary base (M0) registered an average annual growth of 15.52 percent, rising from SR 1.768 million in 1969 to SR 71,605 million in 1999. M1 increased at an average annual growth of 16.78 percent, increasing from SR 2.340 million in 1969 to SR 156.665 million in 1999. The broader definition of money supply, M2 and M3, registered average growth rates of 17.46 percent and 17.84, respectively. During the first stage, from 1969 to 1985, M0 registered an average annual growth of 26.19 percent. M1, M2, and M3 increased at an average annual growth of 27.2 percent, 28.31 percent, and 28.94 percent, respectively.

For the second stage, 1986 to 1999, the data and figures suggest a more stable movement in the demand for money. The monetary base increased at an average annual growth of 3.32 percent. M1 increased from SR 85,850 million in 1986 to SR 156,665 million in 1999, an average annual growth of 4.79 percent. M2 and M3 registered an average annual growth of 5.05 and 5.16 percent, respectively.

It is very clear that all monetary stock measures registered very high growth rates in the first stage. During the second stage, it can be said that demand for money was more stable. It can be concluded that there has been a shift in the behavior of demand for money. This shift can be attributed to major structural changes which took place during the 1980s.

Table 5.2
Monetary Aggregates*

Year	M0	M1	M2	M3
1969	1.768	2.340	2.822	3.137
1970	1.981	2.610	3.175	3,518
1971	2.674	3.261	3.998	4,481
1972	4.872	4.747	5.561	6.218
1973	5.940	6.570	7.483	8.731
1974	8.582	10,684	12.223	14.060
1975	14.596	19.570	21.142	24.453
1976	25.897	31.217	33.028	37.336
1977	36.294	45.297	48.357	53.617
1978	38.308	50.486	54.651	61.380
1979	34.196	55.647	67.277	74.769
1980	34.075	63.409	83.403	94.360
1981	40.547	76.588	102.955	119.445
1982	46.137	87.043	116.093	134.398
1983	44.900	86.321	119.897	143.948
1984	45.768	83.111	119.700	148.896
1985	50.054	83.039	122.721	150.240
1986	55.329	85.850	126.939	163.736
1987	58.529	89.323	129.020	164.360
1988	43.445	93.664	134,143	178.418
1989	41.827	91.752	136.414	180.181
1990	52.477	102.265	141.546	188.438
1991	54.532	120.471	169,094	215.843
1992	53.888	125,464	171.796	218.652
1993	54.153	121.503	169.395	226.800
1994	56.613	125.645	177,062	233.247
1995	54.265	124.471	185,694	240.061
1996	54,245	132,928	204.009	258.500
1997	58.378	141.184	218.349	271.999
1998	57,592	140,272	223,708	282.062
1999	71.605	156,665	242,006	301,145

Source: SAMA 2000.

*Numbers are in millions of SR.

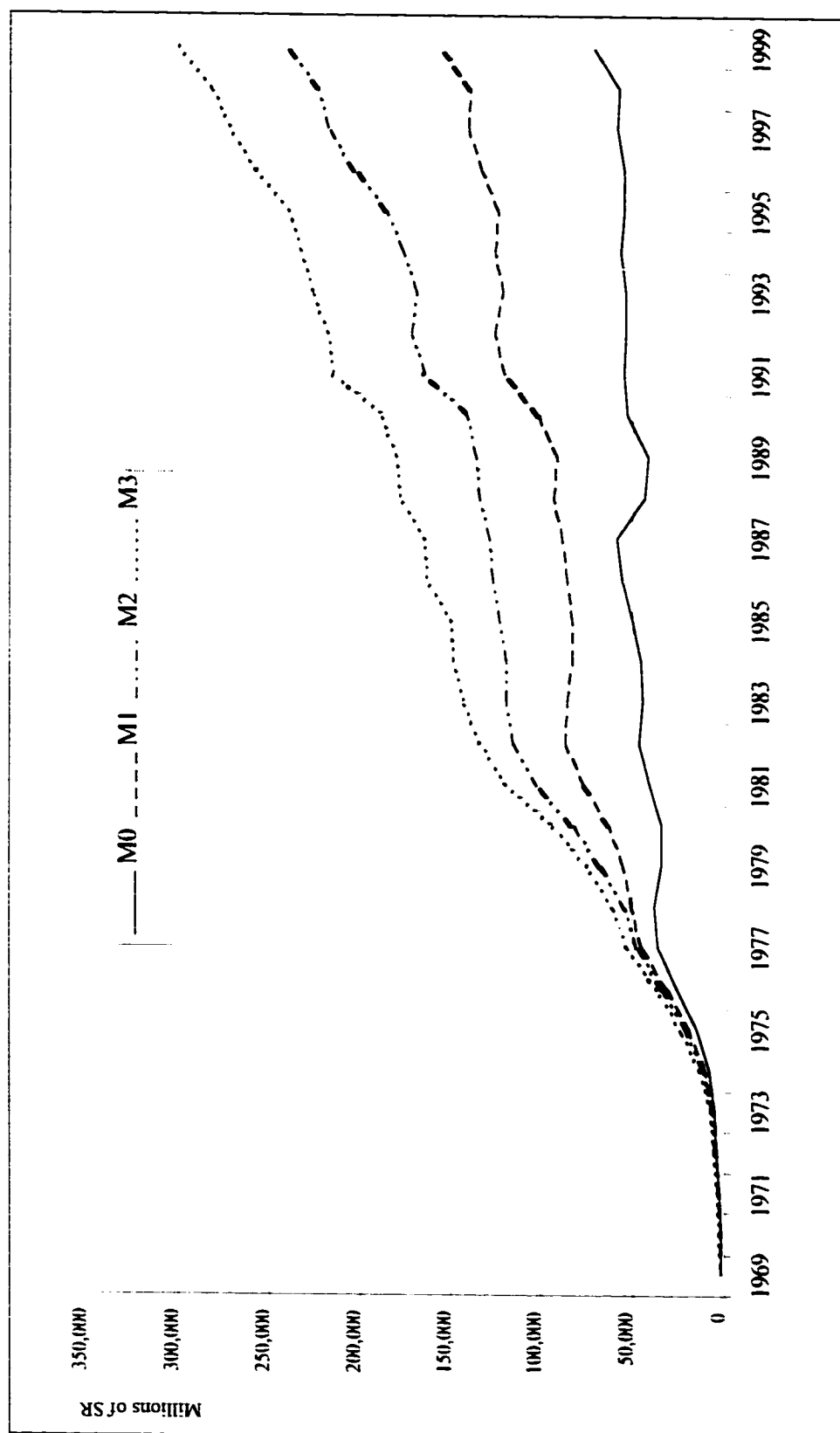


Figure 5.1: Money Supply Behavior

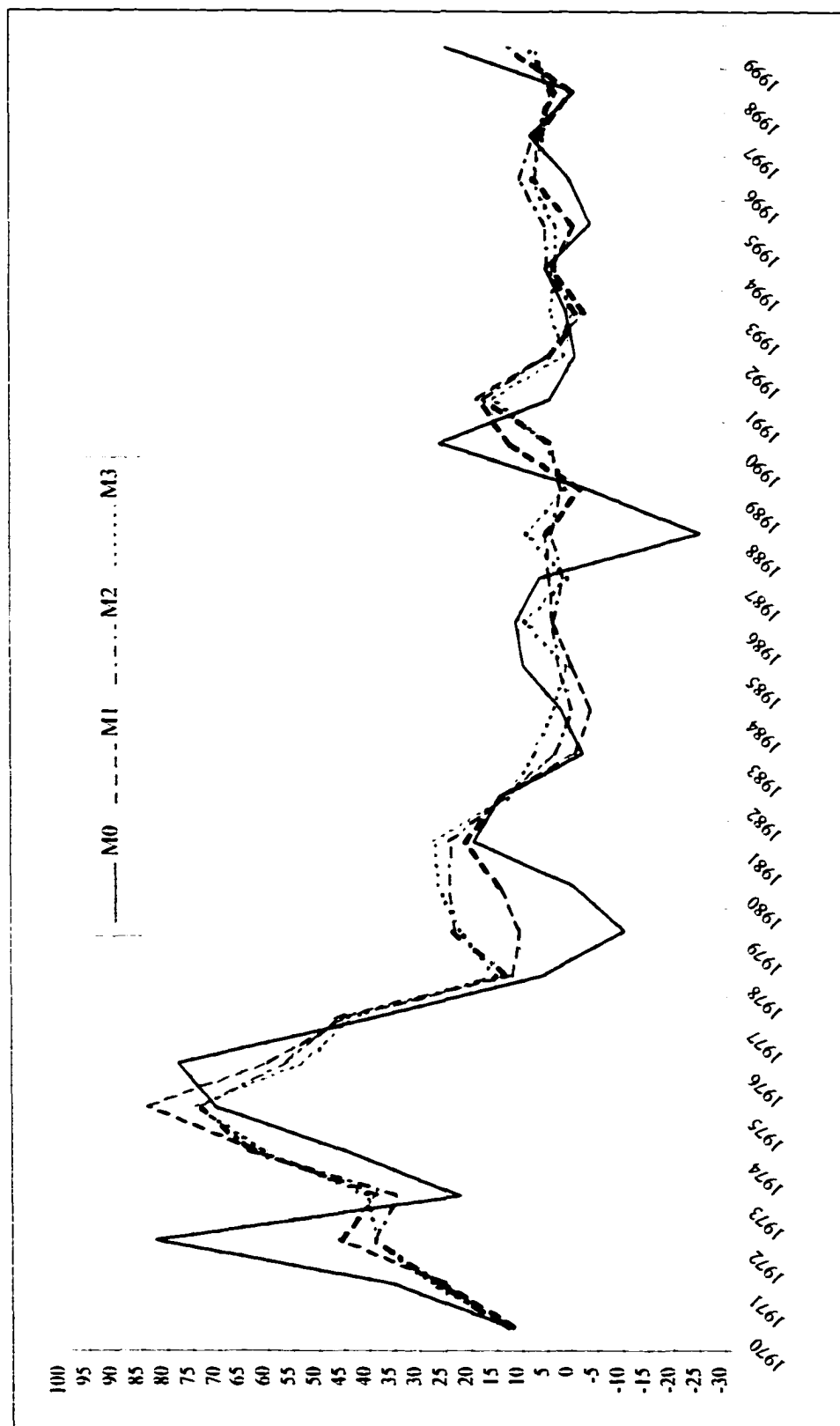


Figure 5.2: Growth Rates of M0, M1, M2, and M3

5.3.2 Velocity of Money in Saudi Arabia

Velocity of money reflects the demand for money behavior. The velocity measures used in this study are obtained using NOGDP and money supply (M1, M2, and M3), that is, $V_{m1} = \text{NOGDP}/M1$; $V_{m2} = \text{NOGDP}/M2$; $V_{m3} = \text{NOGDP}/M3$. The data on velocity of money is presented in Table 5.4 and Figure 5.3.

During the study period, 1969 to 1999, the general pattern of the velocity of money in Saudi Arabia exhibited a downward trend. For example, the velocity of M1 (V_{m1}) declined at an average annual rate of 0.89 percent, decreasing from 3.37 in 1969 to 2.38 in 1999. The velocity of M2 (V_{m2}) decreased from 2.84 in 1969 to 1.52 in 1999, declining at an average annual rate of 1.85 percent. The velocity of M3 (V_{m3}) declined at an average annual rate of 2.26 percent, from 2.56 in 1969 to 1.22 in 1999.

During the first stage, V_{m1} , V_{m2} , and V_{m3} declined at an average rate of 1.23, 2.61, and 3.20 percent, respectively. During the second stage, all velocity of money measures exhibited more stable demand trends (see Table 5.3, Table 5.4, and Figure 5.2). The velocity of M1 declined from 2.44 in 1986 to 2.38 in 1999, decreasing at an average rate of 0.50 percent. The velocity of M2 and M3 declined at an average rate of 0.98 percent and 1.18 percent, respectively.

As Figure 5.2 shows, the velocity of money is very stable in Saudi Arabia. The general downward change in velocity of money behavior can be explained by the rapid expansion of the financial system during the study period. The long-term change in the pattern of velocity of money behavior can be attributed to the major institutional changes which took place during the mid-1980s.

Table 5.3
Velocity of Money, M1, M2, and M3

Year	V _{m1}	V _{m2}	V _{m3}
1969	3.37	2.84	2.56
1970	3.51	2.86	2.59
1971	3.35	2.67	2.41
1972	3.12	2.55	2.28
1973	2.96	2.54	2.22
1974	3.58	3.10	2.65
1975	3.31	2.97	2.56
1976	2.74	2.54	2.23
1977	2.41	2.26	2.02
1978	2.25	2.08	1.88
1979	2.48	2.21	1.98
1980	2.68	2.17	1.93
1981	2.68	2.00	1.75
1982	2.55	1.88	1.62
1983	2.48	1.84	1.57
1984	2.60	1.82	1.49
1985	2.59	1.77	1.46
1986	2.44	1.65	1.35
1987	2.34	1.59	1.26
1988	2.31	1.61	1.25
1989	2.30	1.60	1.22
1990	2.45	1.72	1.32
1991	2.44	1.78	1.36
1992	2.16	1.59	1.24
1993	2.18	1.61	1.22
1994	2.31	1.67	1.27
1995	2.40	1.66	1.27
1996	2.44	1.63	1.27
1997	2.37	1.57	1.25
1998	2.37	1.53	1.23
1999	2.38	1.52	1.22

Source: SAMA 2000.

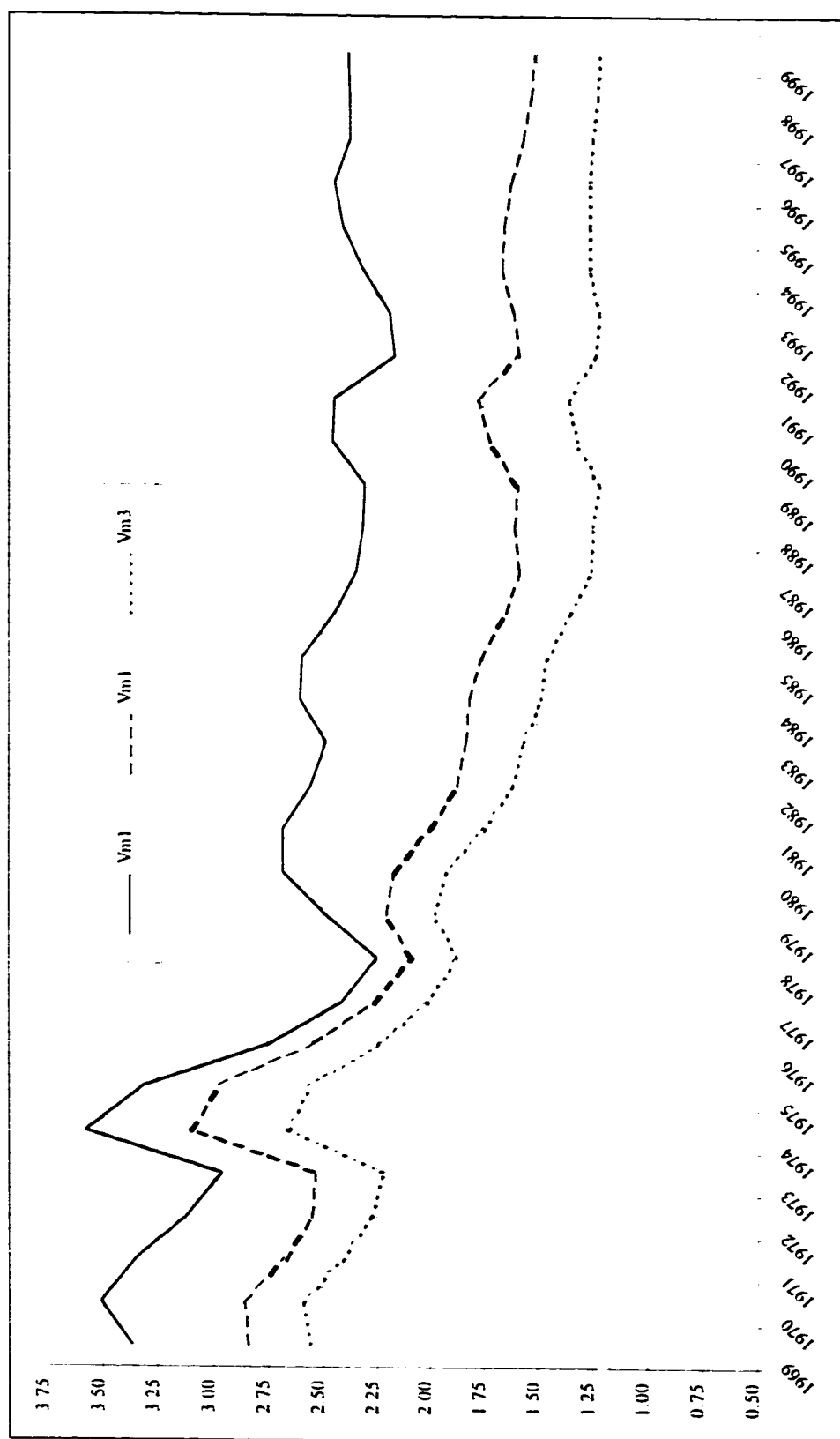


Figure 5.3: Velocity of Money Behavior

5.4 SAMA's Assets and Liabilities

A central bank's balance sheet represents the status of its assets and liabilities position. A balance sheet also suggests the means by which a central bank can influence the money supply. According to Brookes (2000), the balance sheet plays a very important role in the implementation of a successful monetary policy. Brookes argues that all central banks use the balance sheet to implement their monetary policy actions by manipulating the composition of assets and liabilities.

Table 5.4 shows the assets and liabilities of SAMA for selected years. The analysis of SAMA's balance sheet for those years would allow us to understand the changes in the size and composition of assets and liabilities. This understanding would indicate the position of SAMA with regard to its control over the money supply.

As shown in Table 5.4, SAMA's assets are divided into four major categories. These categories are reserve money, banking department items, contra accounts, and independent organizations' accounts. Reserves include gold, foreign currencies, and cash and coins on hand. The banking department items are deposits with banks abroad, investment in foreign and local securities, gold and silver, and other miscellaneous assets. These items represent SAMA's role as a banker for the government. SAMA maintains accounts for the Saudi government and its agencies and invests them in foreign and local securities (SAMA 2000). Contra accounts include government special bonds and other types of credit issued on behalf of the government.

Independent organizations' items include deposits with local and foreign banks, investment in foreign and local securities, and deposits with the banking department of SAMA. SAMA maintains and manages funds on behalf of various independent

organizations, such as Retirement Pension Agency, General Organization of Social Insurance (GOSI), development funds, and others. On the liability side of SAMA's balance sheet, there are also four major categories. These categories are currency issued, banking department items, contra accounts, and independent organizations' accounts.

Table 5.4 shows the status of the assets and liabilities of SAMA for four different years, 1970, 1980, 1990, and 2000. Total assets increased from SR 5,228 million in 1970 to SR 682,222 in 2000, a 12,949 percent increase. In 1970 and 1980, the largest parts of SAMA's assets were currency and government reserves, more than 50 percent of total assets. There were no government special bonds because SAMA had not yet started issuing government bonds. SAMA's balance sheet for 1990 and 2000 shows a different status and role. SAMA started to issue treasury bills in 1985 and government special bonds in 1987 on behalf of the government. The main reason for issuing treasury bills and bonds was to finance the government budget deficit, which began in the mid-1980s.

The current position of SAMA's assets and liabilities is shown by SAMA's balance sheet for the year of 2000 (see Table 5.4). The largest part of SAMA's assets is the government special bonds. These accounted for more than 34 percent of total assets, SR 237.712 million out of SR 682,222 million of total assets. Foreign reserves were about 9 percent of total assets, SR 65,049 million. Government reserves and investment of government deposits accounted for more than 10 percent of total assets. The management of independent organization's deposits accounted for more than 40 percent of SAMA's total assets.

On the liabilities side, the independent organizations' deposits were the largest part of SAMA's liabilities, more than 40 percent of total liabilities. The currency issue

was about 10 percent of total liabilities. It is clear that SAMA's liability structure was concentrated in deposits from independent organizations and other financial institutions.

SAMA's balance sheet indicates the major role of SAMA in the conduct of monetary policy. SAMA controls the government special bonds. It can use repurchase agreements to influence bank's liquidity. According to SAMA (1999), commercial banks prefer investment in government bonds because of their yield. SAMA can also conduct foreign exchange swap transactions using its assets of foreign reserves to stabilize the Saudi Riyal.

Table 5.4
SAMA Assets and Liabilities

Assets / Liabilities	Millions of SR			
	1970 8-Mar	1980 8-Nov	1990 30-Jun	2000 29-Jun
<u>Assets</u>				
<u>Reserves</u>				
Gold	574.19	756.28	756.28	756.28
Foreign currencies	1,306	28,621	49,033	65,049
Saudi Bank Notes on hand	211.98	2,244	7,834	18,625
Coins on hand	4.71	1.72	16.01	32.01
<u>Banking Department</u>				
Deposits With Banks Abroad	951.39	69,758	36,924	18,624
Investment In Foreign Securities	691.29	178,459	129,972	58,037
Investment In Local Securities				3,596
Gold and Silver		15.19	15.14	15.14
Other Miscellaneous Assets	577.85	4,640	30,011	18,294
<u>Contra Accounts</u>				
Government Special Bonds			76,508	235,712
Documentary Credits and Others	910.43	45,885	12,177	2,259
<u>Independent Organizations'</u>				
Deposits With Banks Abroad			20,870	5,282
Deposits With Local Banks			13,422	15,722
Investment In Foreign Securities			51,315	108,301
Investment In Local Securities			14,566	122,640
Deposits With Banking Department			17,543	9,277
Total Assets/Liabilities	5,228	330,381	460,962	682,222
<u>Liabilities</u>				
<u>Notes and Coins</u>				
Notes in Circulation	1,668	27,079	41,792	46,950
Notes in Banking Department	211.98	2,244	7,834	18,625
Coins in Circulation		52.25	147.43	198.32
Coins in Banking Department		1.72	16.01	32.01
<u>Banking Department</u>				
Government Special and Reserve Accounts	21.00	83,664	28,798	1,901
Government Current Account	283.36	54,123	4,287	2,382
Government Agencies' Accounts	242.80	28,431	14,032	26,112
Retirement Pension Agency's Account	818.64	8,719	10,09	114.01
Local Bank Deposits	187.68	9,366	6,394	10,382
Independent Organizations' Deposits			17,543	9,277
Customer Deposits in Local Currency				5,568
Other Miscellaneous Liabilities	883.81	70,817	133,708	61,487
<u>Contra Accounts</u>				
Holders of Government Special Bonds			76,508	235,712
Liabilities On Documentary Credits and Others	910.43	45,885	12,177	2,259
<u>Independent Organizations</u>				
Retirement Pension Agency			47,609	137,926
GOSI			27,601	68,409
Development Funds			30,151	42,815
Other Institutions			12,355	12,072

Source: SAMA 1971, 1981, 1990, & 2000

5.5 Commercial Banks' Assets and Liabilities

As we have seen in Chapter Four, commercial banks represent the largest part of the financial system in Saudi Arabia. They also play a major role in the stock and securities markets. The role of commercial banks' has grown significantly over the study period in terms of the size of assets, number of bank offices, services provided, and capital size.

Table 5.5 shows the development of the consolidated balance sheet of commercial banks for selected years during the study period. It demonstrates the tremendous increase in the assets and liabilities of commercial banks. From 1970 to 1980, total assets increased from SR 2,963 million to SR 93.623 million in 1980, an increase of about 3000 percent. During 1970 to 1980, the largest parts of commercial banks' assets were foreign assets and claims on the private sectors. For example, in 1980 foreign assets and claims on the private sector accounted for 44 percent and 43 percent, respectively, of commercial banks' assets. From 1980 to 1990, commercial banks' total assets increased by 149 percent, from SR 93.623 million to SR 232.055 million. In 1990, the foreign assets accounted for more than 50 percent of the total assets of commercial banks. Claims of commercial banks on the private sector were SR 65.295 million, constituting about 28 percent of total assets during the same year.

In 1999, there were major shifts in the composition of commercial banks' assets. The share of foreign assets in total assets declined from 53 percent in 1990 to 22 percent in 1999. Commercial banks' claims on the private sector increased from SR 65.295 million in 1990 to SR 162.190 million in 1999, an increase of more than 148 percent. Commercial banks' claims on the government and public enterprises accounted for 28

percent of total assets. Total claims on the government stood at SR 102,266 million. about 24 percent of total assets. According to SAMA (2000), more than 93 percent of the claims on government were accounted for by investment in government bonds. According to SAMA (2000), more than 70 percent of banks' claims on the private sector are short-term credit.

On the liabilities side, deposits constituted more than 60 percent of total liabilities in 1970, 1980, and 1990. In 1999, deposits constituted about 59 percent of total liabilities, SR 246.085 million. Foreign liabilities, foreign banks' deposits, deposits of domestic banks branches abroad, and other foreign deposits, increased from SR 148 million in 1970 to SR 51.153 million in 1999. Foreign liabilities constituted more than 12 percent of commercial banks' total liabilities in 1999. Demand deposits were the largest component of total deposits for the same year, constituting about 42 percent of total deposits.

The analysis of the historical development of commercial banks' assets and liabilities confirms the rapid expansion of the financial system in Saudi Arabia. It also indicates a change in the composition of commercial banks' total assets. Commercial banks hold a major part of the government debt.

Table 5.5
Consolidated Balance Sheet of Commercial Banks*

Assets / Liabilities	Millions of SR			
	1970	1980	1990	1999
<u>Assets</u>				
<u>Reserves</u>				
Notes and Coins	\$63	\$6,629	\$9,910	\$11,077
Deposits with SAMA	\$276	\$1,302	\$1,726	\$5,468
Foreign assets	\$624	\$41,010	\$123,467	\$91,487
Claims on government				\$102,266
Claims on public enterprises				\$14,347
Claims on private sector	\$1,696	\$40,252	\$65,295	\$162,190
Claims on non-monetary financial institutions				\$426
Other assets	\$304	\$4,430	\$31,657	\$27,967
Total assets / liabilities	\$2,963	\$93,623	\$232,055	\$415,228
<u>Liabilities</u>				
Deposits	\$1,876	\$68,237	\$143,662	\$246,085
Foreign liabilities	\$148	\$8,548	\$30,172	\$51,153
Capital and reserves	\$185	\$4,840	\$17,359	\$42,338
Other liabilities	\$754	\$11,998	\$40,862	\$75,651

Source: SAMA 2000.

* All figures are end of year statistics.

CHAPTER SIX

MODEL, DATA, AND EMPIRICAL RESULTS

6.1 Introduction

This chapter will empirically investigate the role of financial development, financial deepening, and structural changes in demand for money and velocity of money. It will examine the factors that determine the behavior of real demand for money and velocity of money in Saudi Arabia. Empirical results will be reported based on the various econometric methods discussed in Chapter Three.

In the next section, appropriate demand for money and velocity of money functions will be formulated in light of the literature review and econometric methodology. In section three, sources and properties of data will be discussed. Section 4 reports the structural break test of real demand for money and velocity of money measures. The Bai-Perron test, discussed in Chapter Three, will be performed to determine the number and time of structural breaks.

The results of the estimation of demand for money and velocity of money functions will be reported and analyzed within the ARDL methodology. Finally, in section six, the causal relationships between money, income, and prices are explained using the Granger-Causality test.

6.2 Model Specification

Based on the review of the literature on the demand for money theory and the review of the studies of the demand for money in Saudi Arabia, we can specify the following general form to be used to formulate the specific ARDL model to be estimated for both real demand for money and velocity of money:

$$DV = f(Y, FD, Fi, p^*, rex, D). \quad (3.1)$$

where DV is the dependent variable; Y is the real income; FD is a proxy to measure the effect of financial development; Fi , foreign interest rate, is an opportunity cost of holding money; p^* is the expected rate of inflation; rex is a proxy for the real exchange rate; D is a dummy variable to represent the shift in demand for money.

There are three different measures of the real demand for money: real M1 ($rM1$), real M2 ($rM2$), and real M3 ($rM3$); that is, $rM1 = (M1/P)$; $rM2 = (M2/P)$; $rM3 = (M3/P)$; P is the price level, the consumer price index (CPI).

There are also three measures of income velocity of money: velocity of M1 (V_{m1}), velocity of M2 (V_{m2}), and velocity of M3 (V_{m3}). The velocity measures used in this study are obtained using NOGDP and money supply (M1, M2, and M3); that is, $V_{m1} = \text{NOGDP}/M1$; $V_{m2} = \text{NOGDP}/M2$; $V_{m3} = \text{NOGDP}/M3$.

The three measures of real demand for money and the three measures of velocity of money are used as the dependent variables. The historical behavior of demand for money and velocity of money is discussed in Chapter Five.

6.3 Data

The variables used in this study are annual series. Monetary aggregates, income velocity of money measures, currency (C), and NOGDP are obtained from the SAMA annual report of 2000. GDP deflator, nominal exchange rate (ex), and foreign exchange rate (Fi) are obtained from the IMF International Financial Statistics report of 2000. The following is a brief discussion of the independent variables:

1. Income

Gross domestic product is usually used as proxy for the level of income in the economy. For Saudi Arabia, many researchers have used the non-oil gross domestic product as a proxy for the level of income. According to Nagadi (1985):

“For a country such as Saudi Arabia in which oil contributes more than half of its GNP and the economy reflects all changes in production levels and prices of oil, it may not be the best indicator. However, this researcher has examined real GNP, real GDP, real non-oil GDP, and real government expenditures; the results obtained have shown that the last two variables might be the best measures of transaction volume. (P. 35)”

Various studies have shown that income elasticity of demand for money is greater than unity in many developing countries (see Khan, [1974]). Consequently, an increase in RNOGDP is expected to increase the demand for money by more than the percentage increase in RNOGDP. The demand for money is therefore a positive function of real income and velocity of money is a negative function of real income. Figure 6.1 shows the rate of change in RNOGDP and the real demand for money measures during the study period. It also shows the strong link between real income and real demand for money. The RNOGDP registered an average yearly growth rate of 6.11 percent from 1971 to 1999.

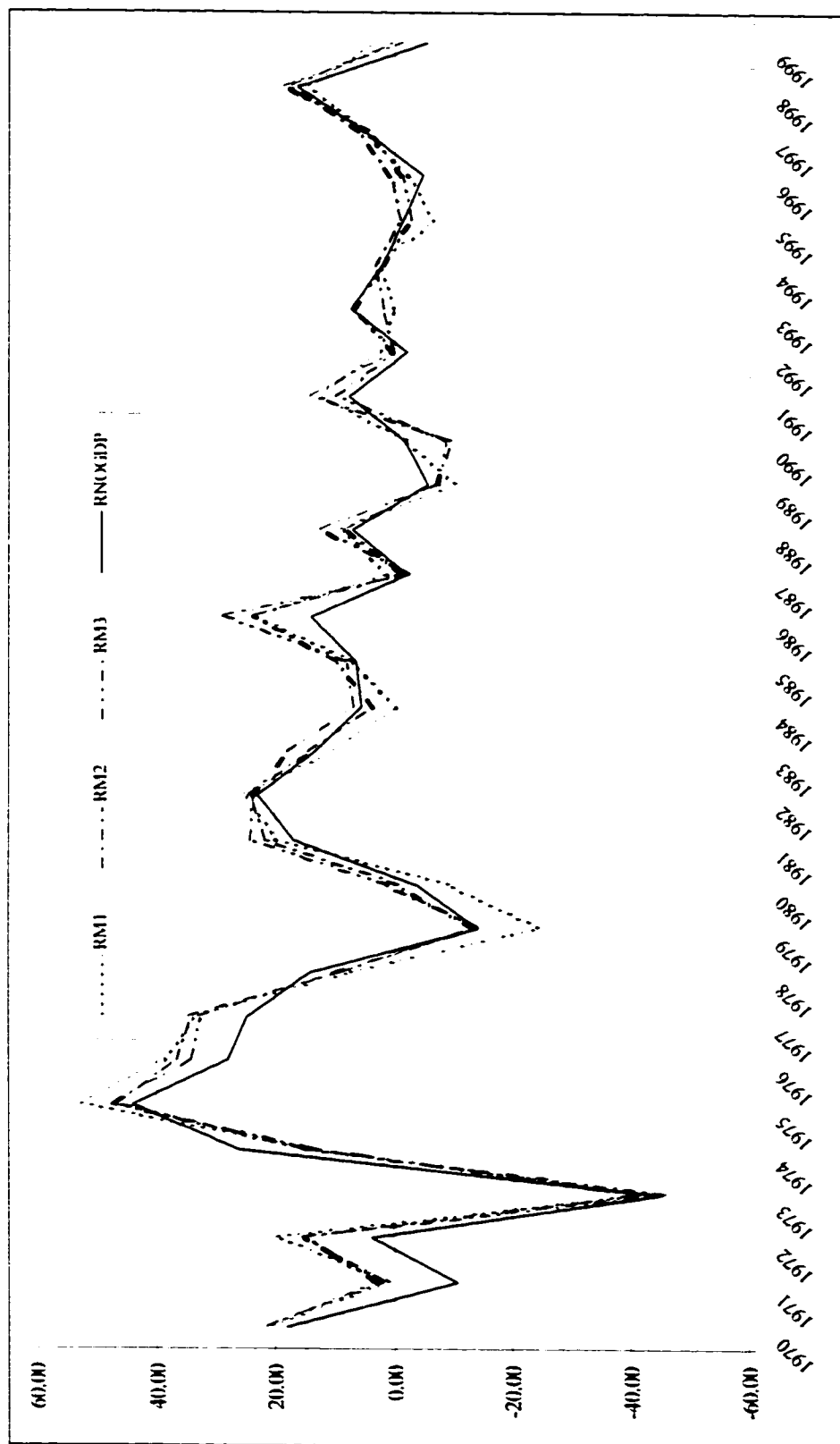


Figure 6.1: Growth Rates of RM1, RM2, RM3, and RNOGDP

2. Financial Development

It has been shown, in Chapter Two and Three, that financial development affects the demand for money. For developing countries, several variables can be used as measures for financial development. The currency-money ratio (CM) can also be used as a proxy for financial development. The effect of financial development on velocity of money is ambiguous because it could be either positively or negatively related to the demand for money. Bordo and Jonung (1981) used the currency-money ratio (CM) as a proxy to measure financial development, monetization, and financial sophistication. These researchers argue that the monetization affect will dominate during the first stage of financial development, causing the demand for money to increase. Bordo and Jonung state:

“According to the suggested institutional approach, once full monetization is approached, the influence of financial sophistication and growing economic stability should cause velocity to flatten out and eventually to rise. (P. 102)”

In Saudi Arabia, the use of money substitutes is limited, as in most developing countries. It is more likely that demand for money is a positive function of financial development. The effect of financial development on velocity of money is ambiguous because it could be either positive or negative, depending on the degree of monetization.

3. Foreign Interest Rate

Interest rates are not legally or religiously recognized in Saudi Arabia, since interest is prohibited by Islamic law. According to Ghamdi (1989):

“The Islamic economic system prohibits the payment or receipt of a predetermined interest rate, which is considered usury. (P. 168)”

The Eurodollar rate, which is a foreign interest rate, will be used as a proxy of the opportunity cost for holding money. Several studies have used short-term foreign interest

rate as a proxy for the opportunity cost of holding money in Saudi Arabia. Nagadi (1985), Ghamdi (1989), Metwally and Abdelrahman (1990), and Alkswani and Al-Towaijri (1999) used the Eurodollar rate of interest as a proxy for the opportunity of holding money. According to Metwally and Abdelrahman (1990):

“The money lenders in Saudi Arabia tend to lend overseas at the Eurodollar interest rate. The (unofficial) domestic rates are, therefore, linked to the Eurodollar rates. (P. 90)”

Appendix 2A reports the Eurodollar interest rate from 1971 to 1999.

Figure 6.2 shows the rate of changes of the Eurodollar interest rate and real demand for money. It is very clear that there is no strong correlation between demand for money and interest rate. Therefore, foreign interest rate is not expected to play a very significant role in determining the behavior of demand for money in Saudi Arabia.

4. Expected Rate of Inflation

The expected rate of inflation, $p^* = p_{t-1}$ (adaptive expectation), is used as another proxy for the opportunity cost of holding money. As the expected rate of inflation increases, it is assumed that people hold less money, causing the demand for money to decrease and the velocity of money to rise.

In this study, the inflation rate was computed using the GDP deflator (1995 = 100). Appendix 2A reports the actual rate of inflation for Saudi Arabia for the period from 1971 to 1999. From 1971 to 1985, the average inflation rate was very high for Saudi Arabia: it was 14.11 percent per year. Since 1986, the inflation rate has been very low, and has even been negative for some years, at less than 2 percent a year, 1.84 percent per year.

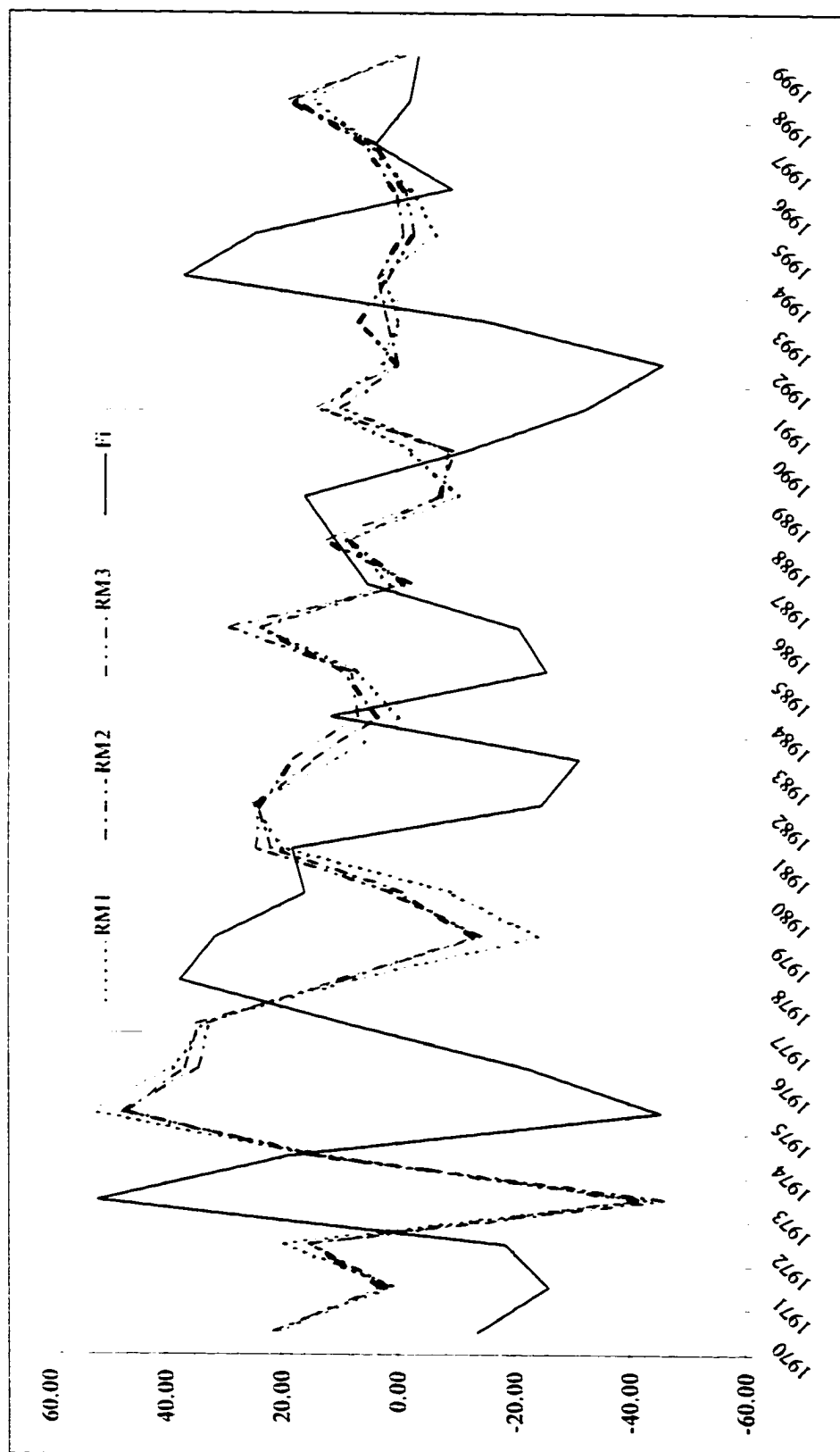


Figure 6.2: Rate of Changes for RM1, RM2, RM3, and Fi

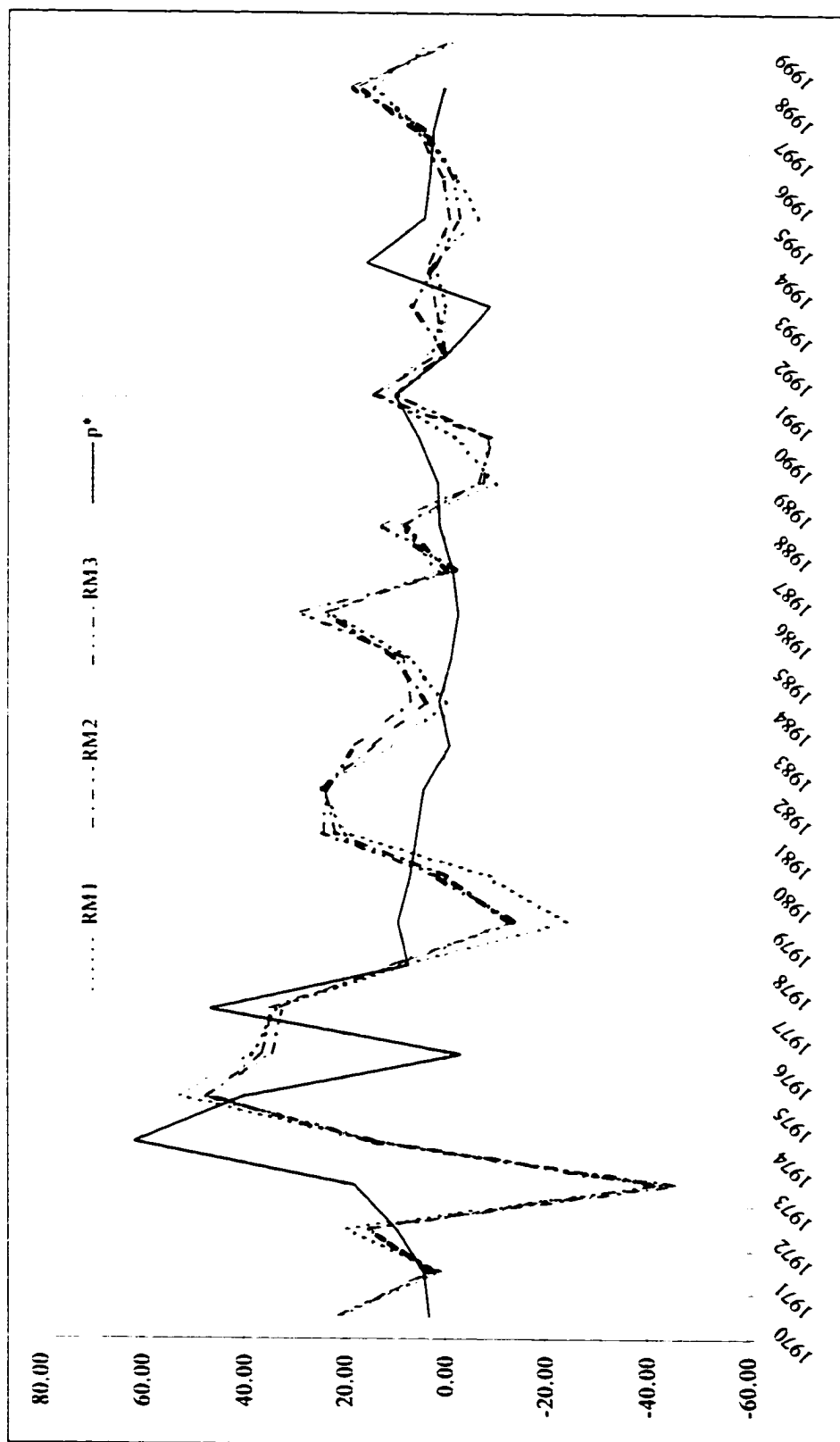


Figure 6.3: Rate of Changes for RM1, RM2, RM3, and p*

According to the theory of demand for money, demand for money is expected to be a negative function of expected rate of inflation. Figure 6.3 shows the rate of changes for the inflation rate and real demand for money in Saudi Arabia from 1971 to 1999. It shows that there is no strong correlation between demand for money and inflation rate. Consequently, the inflation rate is not expected to play a very significant role in determining the behavior of demand for money or velocity of money.

5. Real Exchange Rate

The exchange rate is suggested in the literature as a factor influencing the demand for money behavior. The effect of exchange rate on demand for money has not been determined by the theory of demand for money. Arize (1989) has argued that an increase in exchange rates can have a positive or negative effect on the demand for money based on a study of the demand for money in four Asian countries: Pakistan, the Philippines, South Korea, and Thailand. Arize and Shwiff (1998) concluded that the effect of exchange rates on the demand for money is an empirical issue and cannot be explained by the theory of demand for money. Changes in money supply cause the exchange rate to change through the effect on interest rates.

Alkswani and Al-Towaijari (1999) argued that the demand for real money holding is proportional to the real exchange rate. They concluded that real exchange rate is positively correlated with real demand for money in Saudi Arabia.

In this study, the real exchange rate is calculated by deflating the nominal exchange rate by using the GDP deflator. It should be also noted that the Saudi currency,

the Saudi Riyal (SR), has been officially pegged to the U.S. dollar at the rate of 3.75/\$1 since July, 1986. Given this fact, the real exchange rate is not expected to play a major role in real demand for money or velocity of money behavior in Saudi Arabia.

6.4 Unit-Root Tests

In the previous section, we discussed the variables that will be used in estimating real demand for money and velocity of money. This section will examine the time series properties of the data.

In the ARDL estimation and Granger causality tests, the first step is to determine if variables are stationary or non-stationary. The non-stationarity of a variable can be determined by applying unit root tests. Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests are applied to test the properties of all data series used in this study. The methodology of both ADF and PP tests was briefly discussed in Chapter Three.

Table 6.1 reports the test statistics for both tests. These unit-root tests are carried out, with constant (C) and with constant and time trend (C+T), for all variables in logged levels, natural logarithm. The null hypothesis is that there is a unit root: the variable is non-stationary, $I(1)$. As shown in Table 6.1, the null hypotheses cannot be rejected at the 5% significance level for the natural log of real M1 (LrM1); the natural log of real M2 (LrM2); the natural log of real M3 (LrM3); the natural log of velocity of M1 (LV_{m1}); the natural log of velocity of M2 (LV_{m2}); the natural log of velocity of M3 (LV_{m3}); the natural log of NOGDP (LrNOGDP); and the natural log of currency-money ratio (LCM3). Thus, the statistical results strongly suggest that all the above variables are non-stationary.

Table 6.1
Unit Root Tests

Variables	Tests							
	Augmented Dickey Fuller (ADF)				Phillip-Perron (PP)			
	C		C+T		C		C+T	
	Statistic	Result	Statistic	Result	Statistic	Result	Statistic	Result
LrM1	-1.534	I(1)	-2.222	I(1)	-1.791	I(1)	-1.663	I(1)
LrM2	-1.392	I(1)	-1.809	I(1)	-1.544	I(1)	-1.393	I(1)
LrM3	-1.428	I(1)	-1.594	I(1)	-1.605	I(1)	-1.217	I(1)
LVm1	-1.879	I(1)	-1.991	I(1)	-2.343	I(1)	-2.391	I(1)
LVm2	-1.197	I(1)	-2.375	I(1)	-1.142	I(1)	-1.822	I(1)
LVm3	-1.125	I(1)	-1.761	I(1)	-1.258	I(1)	-1.295	I(1)
LrNOGDP	-1.642	I(1)	-1.817	I(1)	-1.526	I(1)	-1.351	I(1)
LC/M3	-1.084	I(1)	-3.164	I(1)	-1.043	I(1)	-3.483	I(1)
p*	-5.950	I(0)	-3.326	I(0)**	-3.411	I(0)**	-4.451	I(0)
Fi #	-4.813	I(0)	-6.263	I(0)	-3.614	I(0)	-3.992	I(0)
Lrex	-5.157	I(0)	-4.862	I(0)	-4.116	I(0)	-3.657	I(0)

Notes:

1. The 5 and 10% critical values of ADF and PP (with constant[C]) statistic are -2.9750 and -2.6265, respectively (taken from Eviews based on MacKinnon [1991]).
 2. The 5 and 10% critical values of ADF and PP (with constant[C]) statistic are -3.5867 and -3.2279, respectively and (taken from Eviews based on MacKinnon [1991]).
 3. The t-statistic is not from the standard t-test (Eviews User's Guide [1997]).
 4. I(1) is the null hypothesis, the series is non-stationary.
 5. I(0) is the alternative hypothesis, the series is stationary.
- # The estimation includes a dummy variable to account for the shock from 1977 to 1982.
 ** Significant at the 10% level.

For the foreign interest rate (F_i) and the natural logarithm of real exchange rate (L_{rex}), the null hypotheses are rejected at 5 percent significance level. For the expected rate of inflation (p^*), the null hypothesis is rejected at the 10 percent level. Thus, the statistical results suggest that these variables, F_i , p^* , and L_{rex} , are stationary.

6.5 Structural Break Tests

The objective of this section is to provide evidence concerning the existence or non-existence of structural breaks in real demand for money and velocity of money in Saudi Arabia. Therefore, we investigate whether real money demand and velocity of money has experienced structural breaks. The Bai and Perron (1998) test will be used to determine the number and time of breaks. The methodology of the Bai-Perron technique is discussed in Chapter Three.

The Bai and Perron test is based on the least-squares method. It requires that we specify a maximum number of possible break points (h). Then, for each h , ($T_1, \dots, T_h$), the associated least squares coefficients are obtained by minimizing the sum of squared residuals. When break dates have been estimated for the different values of H , the *sup F* test of the null of no structural breaks ($H = 0$) against the alternative hypothesis is applied. The alternative hypothesis is that there are H (for $H = 1, 2, \dots, H$) breaks. The *sup F* of the null that there is $H+1$ structural breaks versus the alternative of H breaks is also applied (see Hoover and Jordá, [2001]).

Table 6.2 summarizes the statistical results of the Bai-Perron method. The statistical results strongly indicate that the null hypothesis, ($H=0$), is rejected. The

reported results show the number and time of structural breaks according to Bayesian information criterion (BIC).

Table 6.2
Structural Break Tests of Real Money Demand and Velocity of Money*

Variables	Number of Breaks	Break Dates	F-Statistic ² sup F(H 0) ³
	(BIC) ¹		
Real M1	3	1974, 1981, 1985	242.57
Real M2	3	1974, 1981, 1985	74.3
Real M3	3	1974, 1981, 1985	67.06
V _{m1}	2	1974, 1985	36.64
V _{m2}	3	1974, 1981, 1985	74.5
V _{m3}	3	1974, 1981, 1985	156.91

Notes:

1. BIC: Bayesian information criteria

2. The 5% critical value is 5.96

3. H indicates the number of breaks

* Table 6.2 shows only the F-statistic for the optimal number of breaks according to BIC

For real demand for M1, the test results suggest three break dates, 1974, 1981, and 1985. For real demand for M2 and M3, the test results suggest three break dates, 1974, 1981, and 1985. The results also indicate two structural breaks for V_{m1}, 1974 and 1985. For V_{m2} and V_{m3}, the statistical results suggest three structural break dates, 1974, 1981, and 1985.

The breaks of 1974 and 1981 can be associated with the first oil shock of the mid-1970s and the second oil shock of the early 1980s. For example, in 1974, the growth rate of NOGDP was about 26 percent. Real M1, M2, and M3 increased at 14.78, 15.21, and 13.79 percent, respectively. From 1974 to 1976, RNOGDP, rM1, rM2, and rM3 grew at

an average annual rate of 30.62, 34.84, 33.21, and 32 percent, respectively. During the same period, all velocity of money measures had experienced a sharp decline. For example, the velocity of M1 decreased substantially, from 3.58 in 1974 to 2.74 in 1976, a drop of about 30 percent. Both break dates can be considered as a temporary shift in the demand for money and velocity of money.

In the case of the 1985 break, the structural break is associated with the major structural changes that took place during the mid-1980s. The graphical and descriptive analysis of the demand for money and velocity of money, which was discussed in Chapter Five, has shown a substantial change in the pattern of demand and velocity of money behavior after 1985. The analysis has also shown that the shift is a permanent one. Therefore, the break date will be used to include a dummy variable into the demand for money and velocity of money equations.

6.6 Model Estimation and Results Analysis

Based on the model specification and the results of the unit root tests, the following model is constructed according to the ARDL procedure. The equation is estimated for all measures of real demand for money and velocity of money. The estimation results will provide us with the short-run and long-run coefficients of real demand for money and velocity of money.

$$DV_t = \beta_1 + \sum_{i=1}^k \beta_{2i} LrNOGDP_{t-i} + \sum_{i=1}^h \beta_{3i} LCM_{t-i} - \sum_{j=1}^{p-1} \phi_j DV_{t-j} + \beta_4 D + \beta_5 fi + \beta_6 Lrex + \beta_7 p^* + u_t$$

where DV is the dependent variable; $LrNOGDP$ is the natural log of real NOGDP; LCM is the natural log of currency-money ratio, a proxy to measure the effect of financial development; D is a dummy variable representing the shift in demand for money; F_i , foreign interest rate, is an opportunity cost of holding money; $Lrex$ is a proxy for the real exchange rate; p^* is the expected rate of inflation; k , h and p represent the maximum lags of dependent and non-stationary regresses, respectively; and ϕ_j , β_1 , β_2 , β_3 , β_4 , β_5 , β_6 , and β_7 are the coefficient estimates.

6.6.1 Real Demand for Money

The ARDL estimates for real money demand are reported in Tables 6.3 and 6.4. Table 6.3 reports the short-run estimated coefficients for real demand for M1, M2, and M3. Table 6.4 provides the long-run estimated coefficients for real demand for M1, M2, and M3. Based on the adjusted R^2 and F-statistic, the statistical results indicate that the overall goodness of fit of the model is excellent for all measures of real demand for money. Figures 6.4, 6.5, and 6.6 show the actual and ARDL fitted values for real M1, M2, and M3, respectively. They also show that the overall goodness of fit of the model is excellent.

The short-run results for real demand for narrow money, M1, indicate that the variables included in the model explain 99 percent of the variations in real M1 in Saudi Arabia. Real income and the degree of financial development have significant positive effects on the real demand for M1. The sign of coefficient for the currency-money ratio is negative. As the currency-money ratio decreases, it suggests that the degree of financial development is increasing. The dummy variable coefficient is significant at the 5% level.

This clearly indicates that the demand for real M1 shifted structurally after 1985. Foreign interest rate and the real exchange rate coefficients are not statistically significant in affecting the demand for M1. The coefficient of the expected rate of inflation is negative and statistically insignificant for real M1.

The results for real M2 and M3 are also shown in Table 6.3 and 6.4. As in the case of real M1, the estimated model for real M2 and real M3 also indicates that the variables included in the model explain 99 percent of the variations in real M1 in Saudi Arabia. Real income and the degree of financial development have significant positive effects on the real demand for M2 and M3.

The dummy variable coefficients are also significant and clearly indicate that the demand for real M1 shifted structurally after 1985. The foreign interest rate coefficient is not statistically significant in affecting the demand for M2 and M3. The expected rate of inflation is statistically significant for real M3. However, the expected rate of inflation does not appear to be very important in affecting demand for real M3, as its coefficient is very close to zero. The coefficients of the real exchange rate are not statistically significant for real M2 and M3.

In the long-run, real demand for M1, M2, and M3 are determined by the level of real income and the degree of financial development. The dummy variable coefficients are also significant. Foreign interest rate, the expected rates of inflation, and the real exchange rate coefficients are not statistically significant in affecting the real demand for money in Saudi Arabia.

Table 6.3
ARDL Estimated Short-Run Coefficients for Real Money Demand

Independent Variables	Dependent Variables		
	$LrM1_t$	$LrM2_t$	$LrM3_t$
Constant	-0.935 (-1.84)**	-0.408 (-0.48)	-1.473 (-1.85)**
$LrNOGDP_t$	.949 (11.70)*	.997 (12.59)*	1.097 (14.62)*
$LCM3_t$	-0.230 (-1.84)**	-0.205 (-3.22)*	-0.233 (-3.72)*
D	0.183 (2.35)*	0.088 (1.84)**	0.095 (2.17)**
Fi	-0.0009 (-0.20)	0.003 (1.14)	0.004 (1.44)
$Lrex$	-0.0003 (-0.52)	-0.008 (-0.088)	0.127 (1.40)
p^*	0.24 (-2.81)*	-0.001 (-2.52)*	-0.001 (-3.19)*
LDV_{t-1}	0.225 (2.01)**	0.206 (4.07)*	0.176 (3.68)*
LDV_{t-2}	-0.232 (-3.23)*	-0.163 (-3.11)*	-1.42 (-3.10)*
<i>Adj. R-Squared</i>	0.994	0.998	0.998
<i>F-Statistic</i>	565	1928.5	2591

Notes:

The F statistics indicate the "overall significance of the regressions".

* Significant at the 1% level.

** Significant at the 5% level.

Table 6.4
ARDL Estimated Long-Run Coefficients for Real Money Demand

Independent Variables	Dependent Variables		
	$LrM1_t$	$LrM2_t$	$LrM3_t$
Constant	-0.929 (-1.92)**	-0.426 (-0.48)	-1.525 (-1.90)**
$LrNOGDP_t$	0.943 (26.85)*	1.041 (18.26)*	1.135 (21.90)*
LCM_t	-0.229 (-2.28)**	-0.214 (-3.36)*	-.241 (-4.15)*
D	0.181 (2.60)*	0.092 (1.81)**	.097 (2.14)**
Fi	-.0009 (-0.21)	0.003 (1.17)	0.004 (1.47)
$Lrex$	0.239 (3.03)*	-0.009 (-0.08)	0.131 (1.49)
p^*	-0.0004 (-0.52)	-0.001 (-2.65)*	-.001 (-3.38)

Notes:

* Significant at the 1% level.

** Significant at the 5% level.

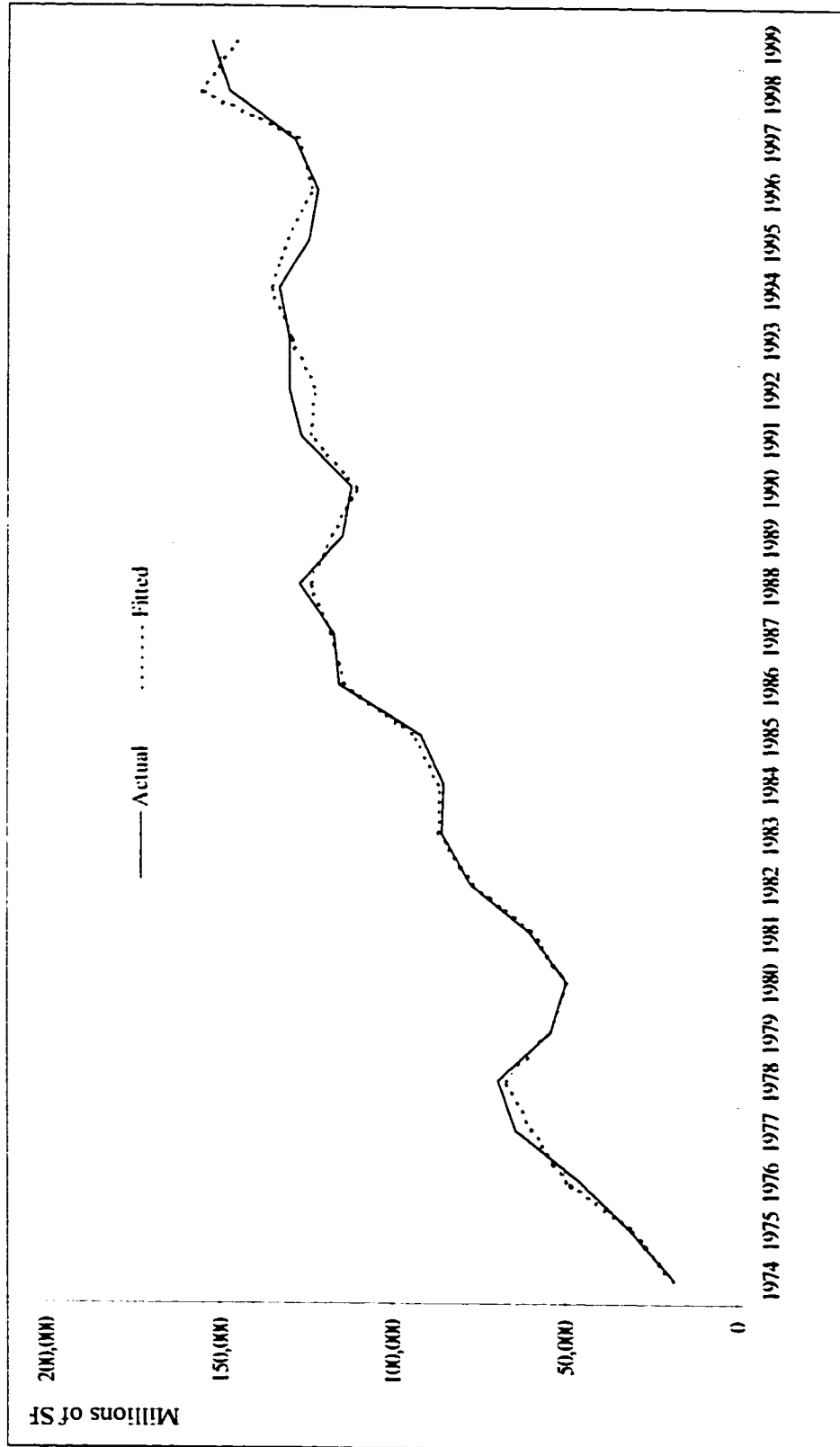


Figure 6.4: Actual and Fitted Values for Real M1

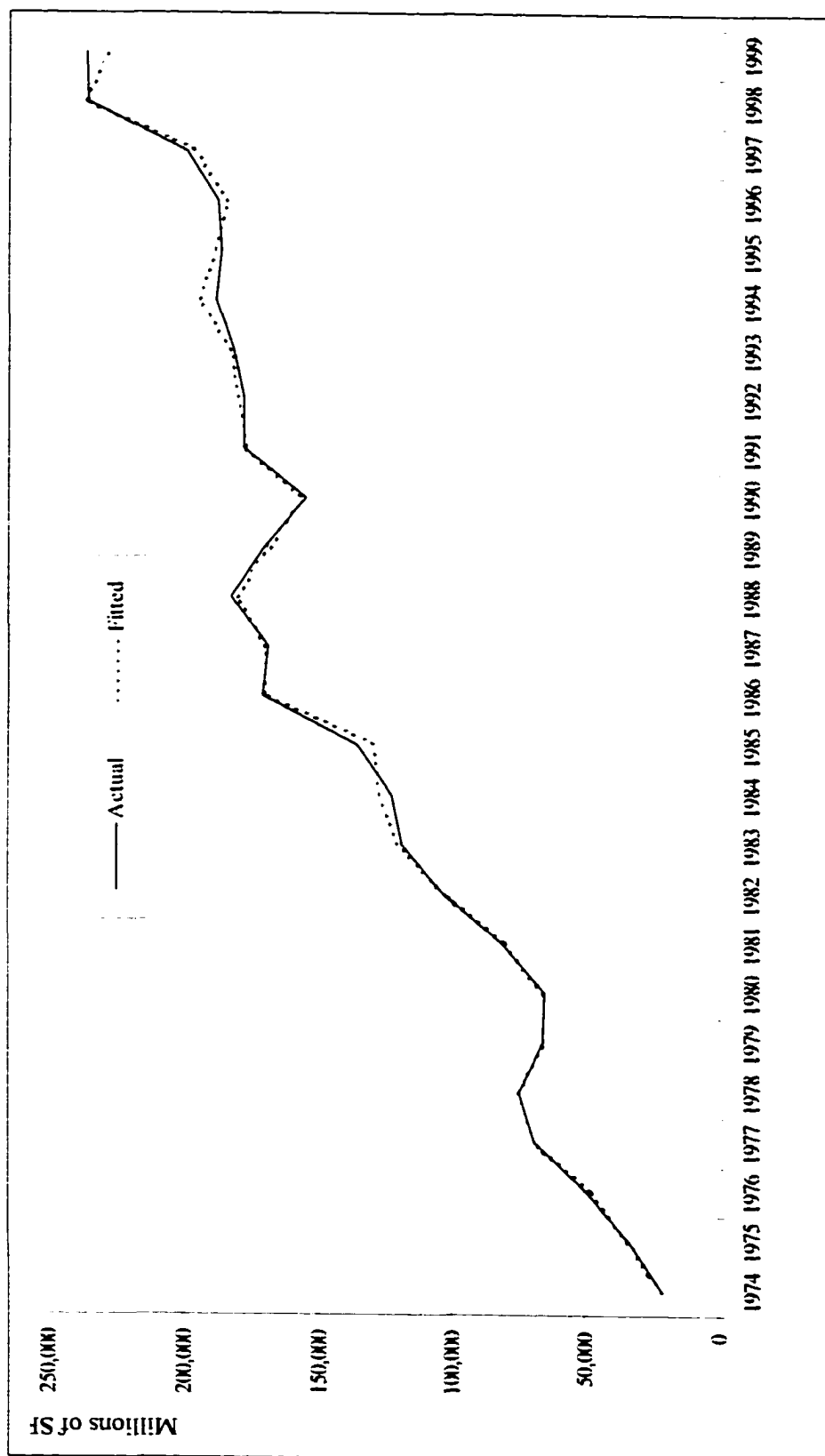


Figure 6.5: Actual and Fitted Values for Real M2

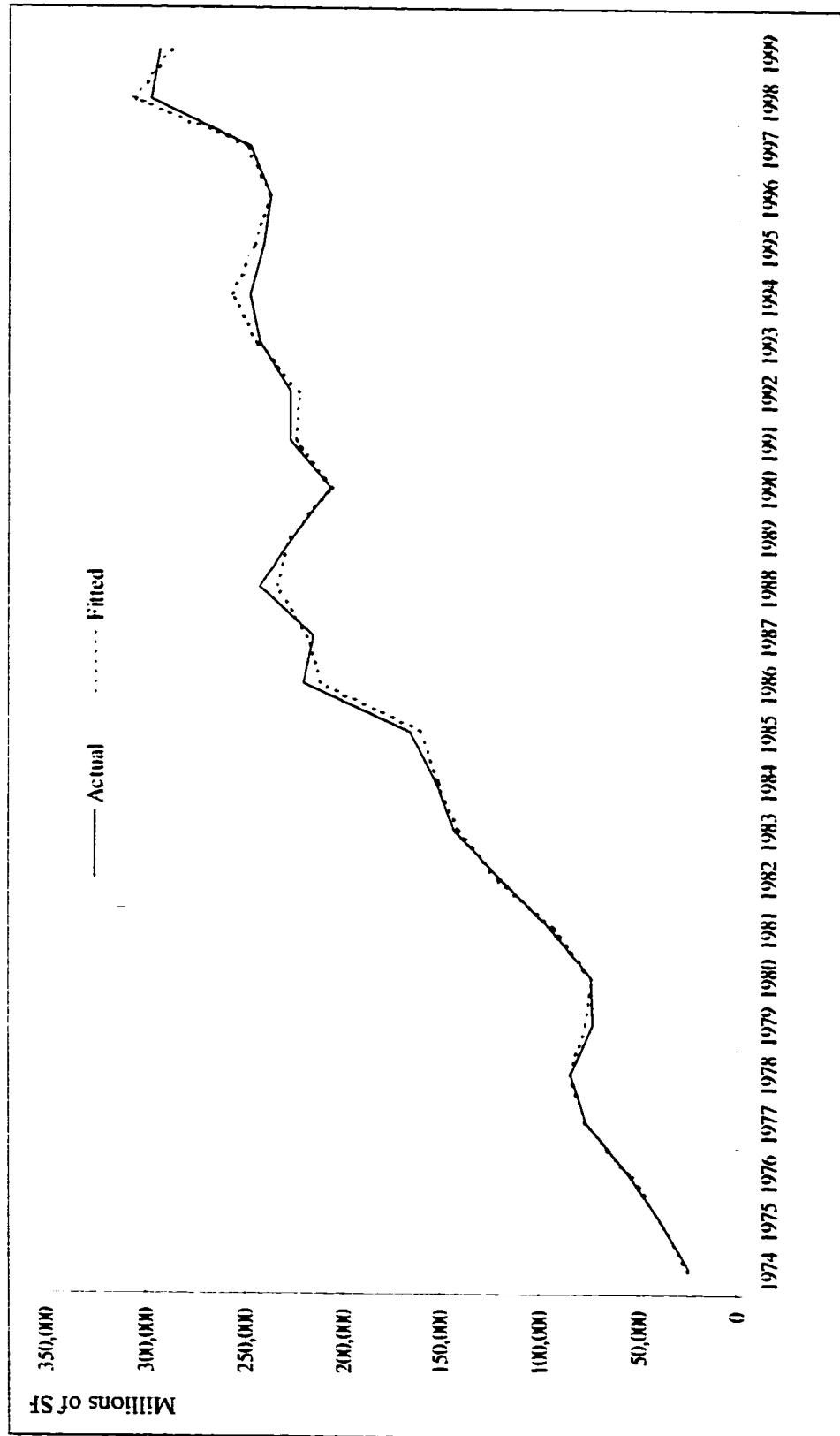


Figure 6.6: Actual and Fitted Values for Real M3

6.6.2 Velocity of Money

The ARDL estimates for velocity of money are reported in Tables 6.5 and 6.6. Table 6.5 reports the short-run estimated coefficients for the velocity of M1, M2, and M3. Table 6.4 provides the long-run estimated coefficients for the velocity of M1, M2, and M3.

The overall goodness of fit of the model is very good for all measures of velocity of money, based on the adjusted R^2 and F-statistic. Figures 6.7, 6.8, and 6.9 show the actual and ARDL fitted values for V_{m1} , V_{m2} , and V_{m3} , respectively. They also show that the overall goodness of fit of the model is very good.

The short-run results for V_{m1} indicate that the variables included in the model explain 93 percent of the variations in V_{m1} in Saudi Arabia. Real income has significant negative effects on V_{m1} . The degree of financial development has significant positive effect on velocity of M1. The dummy variable coefficient is significant at the 1% level. This clearly indicates that the velocity of M1 shifted structurally after 1985. Foreign interest rate, the expected rate of inflation, and the real exchange rate coefficients are not statistically significant in affecting the behavior of velocity of M1.

The short-run results for V_{m2} and V_{m3} are also shown in Table 6.5. As in the case for V_{m1} , the estimated model for V_{m2} and V_{m3} also indicate that the variables included in the model explain more than 97 percent of the variations in V_{m2} and V_{m3} in Saudi Arabia. Real income has significant negative effects on V_{m2} and V_{m3} . The dummy variable coefficients are also significant and clearly indicate that V_{m2} and V_{m3} shifted structurally after 1985. The foreign interest rate coefficient is not statistically significant in affecting velocity of M2 and M3. The expected rate of inflation is statistically significant for V_{m3} .

However, the expected rate of inflation does not appear to be very important in affecting V_{m2} and V_{m3} , as its coefficient is very close to zero.

In the long-run, V_{m1} , V_{m2} , and V_{m3} behavior is significantly determined by the level of real income, the degree of financial development and the dummy variable. Foreign interest rate and the real exchange rate coefficients are not statistically significant in affecting the velocity of M1, M2, and M3 in Saudi Arabia. The expected rate of inflation is statistically significant for V_{m3} . However, the expected rate of inflation does not appear to be very important in affecting V_{m3} , as its coefficient is not very different from zero.

Table 6.5
ARDL Estimated Short-Run Coefficients for Velocity of Money

Independent Variables	Dependent Variables		
	LVM_{1t}	LVM_{2t}	LVM_{3t}
Constant	7.148 (9.30)*	4.046 (3.87)*	3.511 (2.69)*
$LrNOGDP_t$	-0.139 (-3.26)*	-0.292 (-4.18)*	-0.106 (-1.74)**
$LrNOGDP_{t-1}$	-0.223 (-4.66)*	—	-0.177 (-3.65)*
$LCM3_t$	-0.158 (-1.93)**	0.121 (2.15)**	0.265 (2.66)*
$LCM3_{t-1}$	-0.352 (-4.22)*	-0.280 (-4.25)*	-0.482 (-5.12)*
$LCM3_{t-2}$	—	0.171 (2.55)**	—
D	-0.097 (-4.11)*	-0.060 (-1.43)	-0.032 (-0.91)
Fi	0.002 (0.77)	-0.005 (1.67)	0.002 (0.54)
$Lrex$	0.05 (1.45)	0.52 (0.59)	0.017 (0.25)
p^*	-0.006 (-1.35)	0.00001 (0.03)	0.001 (1.86)**
LDV_{t-1}	0.510 (5.13)*	0.406 (3.28)*	0.316 (2.69)*
LDV_{t-2}	-0.317 (-3.19)*	-0.268 (-2.91)*	—
<i>Adj. R-Squared</i>	0.932	0.979	0.987
<i>F-Statistic</i>	52.22	230.50	230.59

Notes:

The F statistics indicate the "overall significance of the regressions".

* Significant at the 1% level.

** Significant at the 5% level.

Table 6.6
ARDL Estimated Long-Run Coefficients for Velocity of Money

Independent Variables	Dependent Variables		
	LVM_{1t}	LVM_{2t}	LVM_{3t}
Constant	7.857 (9.18)*	5.568 (9.180)*	9.165 (7.65)*
$LrNOGDP_t$	-0.418 (-9.14)*	-0.36 (-9.865)*	-0.651 (-8.99)*
$LCM3_t$	-0.599 (-5.90)*	0.272 (1.97)**	0.186 (1.54)
D	-0.102 (-3.90)*	0.093 (2.14)**	0.059 (1.80)**
Fi	0.003 (0.73)	-0.003 (-0.97)	-0.00007 (-0.02)
$Lrex$	0.07 (1.34)	-0.037 (-0.32)	-.140 (-1.21)
p^*	-0.0008 (-1.30)	0.001 (1.70)	0.0001 (-2.22)**

Notes:

* Significant at the 1% level.

** Significant at the 5% level.

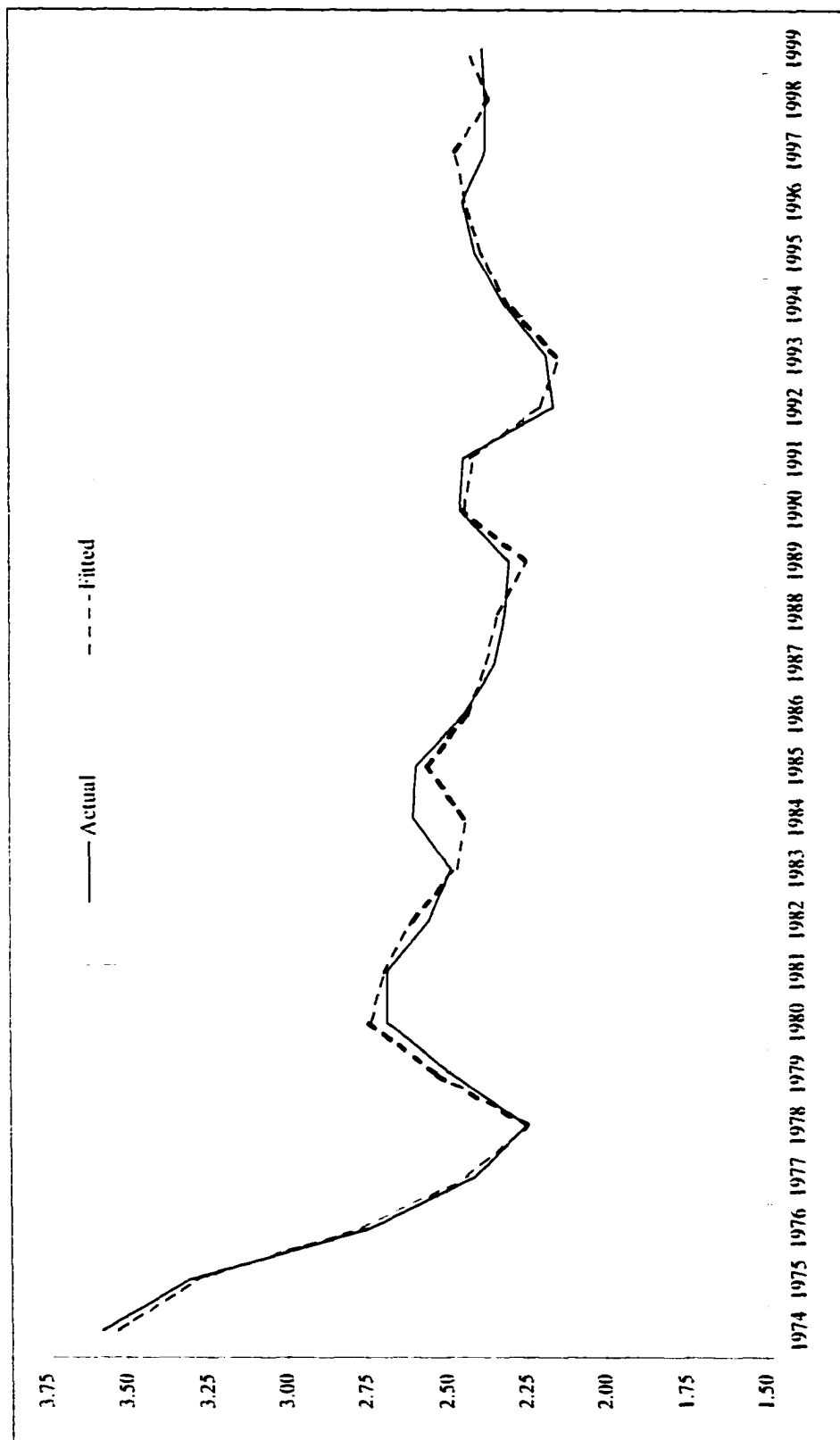


Figure 6.7: Actual and Fitted Values Velocity of M1

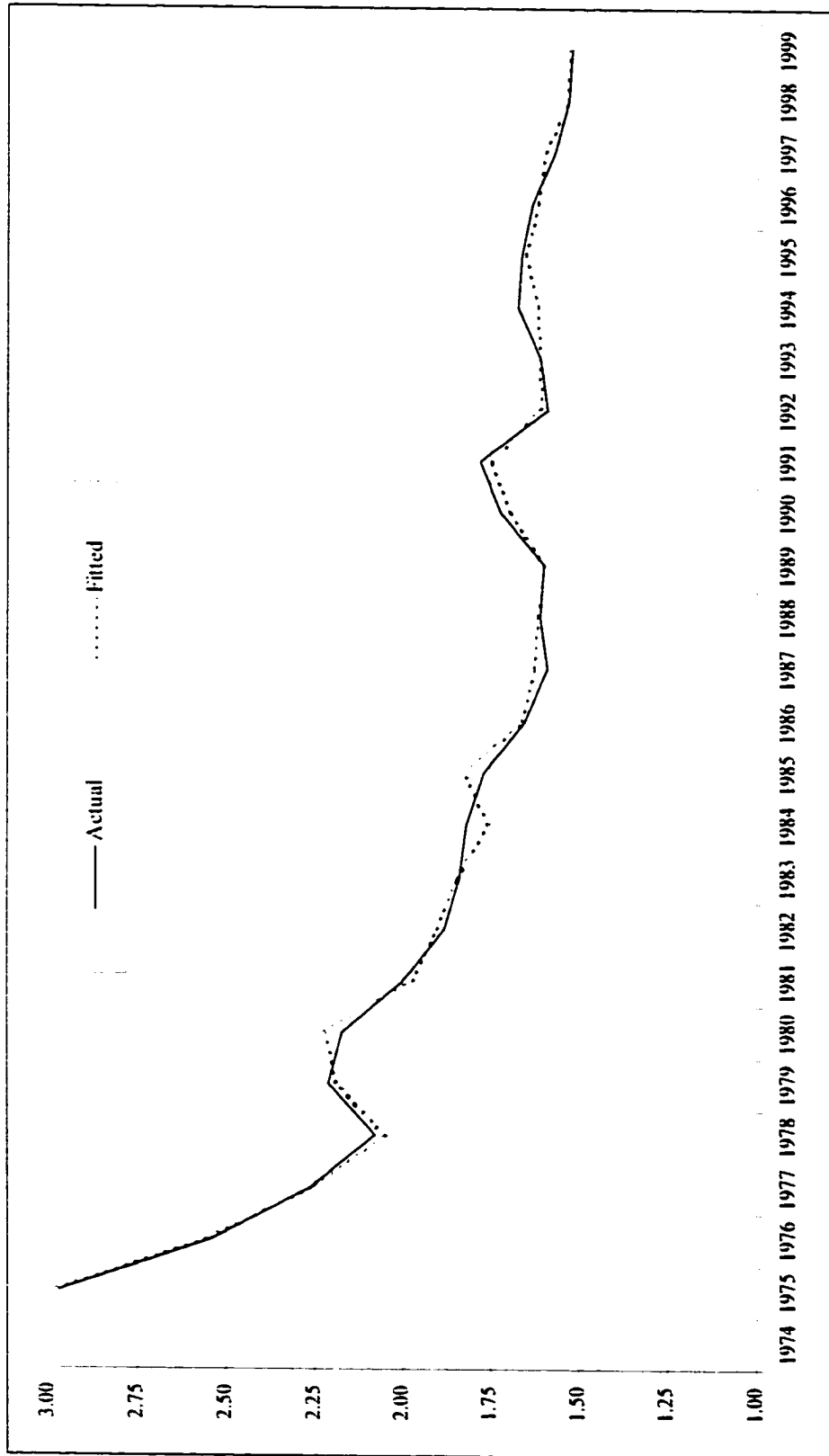


Figure 6.8: Actual and Fitted Values Velocity of M2

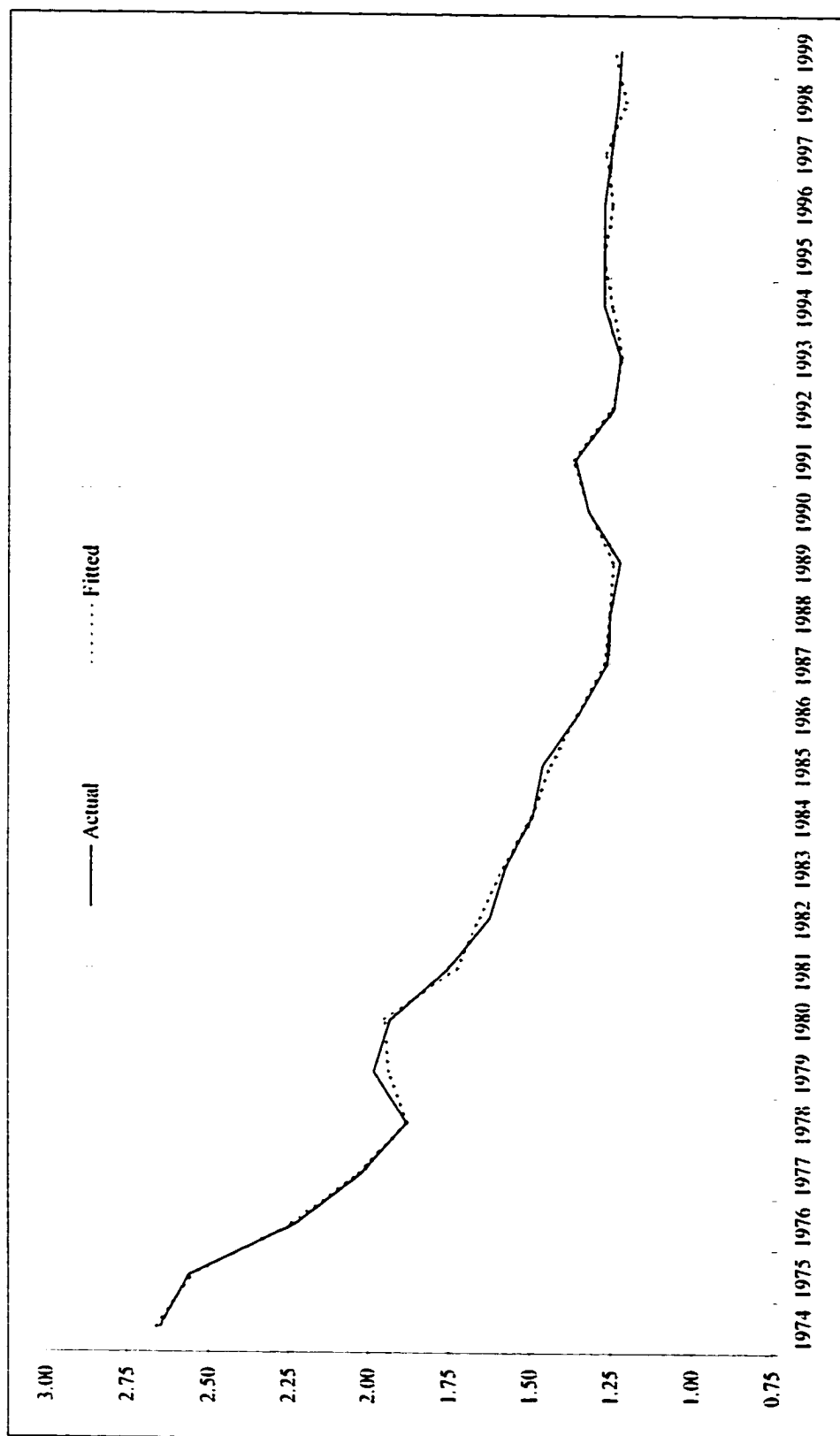


Figure 6.9: Actual and Fitted Values for Velocity of M3

6.7 Granger Causality Tests

This section will examine the money-output and money-price causal relationships in Saudi Arabia. The causal relationship between money and output is an old concept. Friedman and Schwartz (1963) suggested that fluctuations in nominal income were largely generated by fluctuations in the supply of money. Understanding whether money affects economic activity or vice versa is crucial to monetary policy makers.

The concept of intermediate targets of monetary policy is not new and is related to Friedman and Schwartz suggestion. It is based on the assumption that policy makers do not have the knowledge to predict the final goals of monetary policy. Consequently, they need to search for an optimal intermediate target variable, a variable that can be controlled in order to achieve the final goals of monetary policy.

Using Granger causality tests, the direction of causality between money and output and money and price level in Saudi Arabia, will be investigated. Table 6.7 reports Granger causality test results. The null hypothesis for each test is that there is no causality from y to x , y does not Granger cause x . In this study, the null hypothesis is that money does not cause income or vice versa. We will also test the null hypothesis that money does not cause inflation.

The statistical results indicate that the null hypothesis, M1 does not Granger cause NOGDP is rejected at the 10% significant level. The null of no causality from NOGDP to M1 cannot be rejected. Therefore, fluctuations in NOGDP were generated by fluctuations in M1. But there is strong evidence that changes in NOGDP cause changes in M2 and M3, but not vice versa. The statistical results further suggest that changes in money supply, M1, M2, and M3, causes changes in price level.

The causality tests suggest that the Saudi monetary authority can use M1 as an intermediate target variable for both economic growth and price level when framing the monetary policy of Saudi Arabia. Given the fact that M1 is not sensitive to interest rate, M1 can be suggested as the optimal intermediate target variable. For example, in the US, the Federal Reserve targeted the narrow monetary aggregate (M1) between 1979 and 1982. This policy was abandoned in 1982 because M1 had become very sensitive to interest rate (see Kohn, [1996]). In Saudi Arabia, M1 can play a significant role in targeting money and inflation. We can conclude that the quantity theory of money prevails in Saudi Arabia.

Table 6.7
Granger-Causality Tests

Null Hypothesis (y,x)*	F-Statistic (Probability)
M1, NOGDP**	(2.842) 0.065
M2 , NOGDP	1.485 (0.250)
M3 , NOGDP	1.332 (0.294)
NOGDP , M1	1.485 (0.238)
NOGDP, M2**	3.533 (0.035)
NOGDP , M3**	3.761 (0.028)
M1 , P***	25.987 (0.000)
M2, P***	31.003 (0.000)
M3 , p***	26.24 (0.000)

* y does not Granger cause x

** Significant at the 10% level.

*** Significant at the 1% level.

CHAPTER SEVEN

SUMMARY, CONCLUSION, AND IMPLICATIONS

7.1 Summary and Conclusion

The review of the theory of money demand indicates that the conventional theory of money demand includes only a few macroeconomic variables, mainly income, interest rate, and expected rate of inflation, which influence the behavior of money demand. This situation changed dramatically in the mid-1970s, when most predictions of money demand increasingly were off-target. Two major breakdowns of the conventional theory of money demand, known as the "*Case of the Missing Money*" during the mid-1970s and the "*Great Velocity Decline*" during the early 1980s, have led many economists to look for explanations of what occurred.

There is an extensive literature on the causes and explanations of the breakdowns of the conventional theory of money demand. The majority of the literature suggests that institutional changes played a major role in the failure of the conventional model of money demand. A large number of studies have attempted to find an alternative explanatory variable to explain the shift in the demand for money. Many economists have suggested a wide range of institutional changes and technological development as the causes of the breakdown of the conventional specification of money demand.

The nature of the demand for money function in Saudi Arabia was largely ignored before 1980. In the last two decades, no study has investigated the nature of the velocity of money function and its behavior, and few have examined the nature of the demand for money function in Saudi Arabia. Furthermore, all of these studies ignored the role of financial development and structural changes on the behavior of the demand for money. They simply used the conventional specification of the demand for money.

The main purpose of this study is to examine the role of institutional developments on the behavior of the demand for money and velocity of money. The ability of policy makers in Saudi Arabia to conduct effective monetary policy has been discussed. This study has investigated the effect of institutional and structural changes on the behavior and stability the demand for money and velocity of money in Saudi Arabia from 1969 to 1999. The study has also surveyed the financial sector's development and structural changes. Further, the functional relationships between the demand for money and the velocity of money and their determinants, including financial institutional development, has been also investigated and tested.

The historical review of the developments of the financial system in Saudi Arabia has shown that economic growth has resulted in a rapid expansion of the financial system, thus increasing the demand for more banking services. It has also shown that the Saudi Arabia Monetary Agency (SAMA) has played a major role in the development of the Saudi financial system. SAMA regulates and supervises the Saudi Banking System, the Saudi Stock Market, and the foreign exchange dealers. Furthermore, SAMA manages the public debt by controlling the security market.

The descriptive analysis of the data on real demand for money and velocity of money in Chapter Five provides strong evidence of a change in the pattern of money supply behavior. Based on our discussion of financial development in Saudi Arabia, we can distinguish between two different stages of the evolution of the money supply behavior. All monetary stock measures registered very high growth rates in the first stage, while during the second stage, it can be said that money demand was more stable. It can therefore be concluded that there was a shift in the behavior of money demand. This shift can be attributed to major structural changes which took place during the 1980s. The velocity of money also experienced a similar pattern of shift. The long-term change in the pattern of velocity of money behavior can be attributed to the major institutional changes which took place during the mid-1980s.

The empirical analyses presented in Chapter Six investigated the functional relationships between real demand for money and velocity of money and their determinants. It also examined empirically the structural breaks in real demand for money and velocity of money. Moreover, it investigated the causal link between monetary aggregates, output, and price level.

The statistical results strongly indicate that the level of income and the degree of financial development determine the real demand for money and velocity of money behavior. The statistical results also show that the structural changes occurring in Saudi Arabia over the last three decades have significantly influenced the real demand for money behavior and velocity of money behavior. The dummy variable, which was included to account for structural changes, strongly suggests that there was a permanent shift in the real demand for money and velocity of money after 1985.

Statistically, interest rate does not play a significant role in determining the real demand for money and velocity of money in Saudi Arabia. Finally, the causality tests suggest that the size of M1 can be used by SAMA as a policy tool to control output and inflation rate.

7.2 Implications

While this study has focused on the role of institutional changes on the behavior of the real demand for money and velocity of money, it has important implications for Saudi Arabia. The first of these implications comes from the inclusion of financial development as an important and significant determinant of the behavior of the real demand for money and velocity of money. The inclusion of a proxy for financial development and structural changes is important for the stability of demand for money function. A stable function of demand for money requires the inclusion of all significant factors.

A second implication concerns the issue of the interest rate. SAMA, according to its charter, cannot act in any manner which conflicts with Islamic law. It cannot charge or pay interest. But in practice, SAMA and commercial banks deal with interest rate, which is a sensitive issue in Saudi Arabia. At the same time, SAMA has not allowed the establishment of Islamic banking in Saudi Arabia. The uncertainty of SAMA position about the issue of the interest rate has a negative effect on the stability of the banking system in Saudi Arabia. For the sake of the banking system's stability, SAMA has to address the issue of the interest rate and Islamic banking.

The final implication concerns the role of SAMA. From our discussion in Chapter Four, SAMA plays many roles in Saudi Arabia's economy. These roles could

have contradictory objectives. An important question can be raised for future research, namely “Should SAMA be left to concentrate on sound monetary policy and effective exchange rate policy by giving up other functions?”

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APPENDICES

APPENDIX 1A

CHARTER OF THE SAUDI ARABIAN MONETARY AGENCY

Royal Decree No. 23

3 Jumad Awal 1377
(15 December 1957)

With the help of God Almighty
We, Saud Ibn Abdul Aziz Al-Saud,
King of Saudi Arabia.

Having seen Decree No. 30/4/1/1047 issued on 25 Rajab, Decree No. 17/19/2/8792 issued on 17 Ramadan 1374, and Council of Ministers' Resolution No. 103 dated 20 Jumad Awal 1377, and in view of what our Minister of Finance has submitted to us, we ordain the following:

Article 1

The objective of the Saudi Arabian Monetary Agency shall be:

- (a) To issue and strengthen the Saudi currency and to stabilize its internal and external value;
- (b) To deal with the banking affairs of the Government;
- (c) To regulate commercial banks and exchange dealers.

Article 2

The Saudi Arabian Monetary Agency shall not pay nor receive interest but shall only charge certain fees on services rendered to the public and to the Government, in order to cover the Agency's expenditures. Such fees shall be charged in accordance with a regulation passed by the Board of Directors and approved by the Minister of Finance.

The Agency shall not have a capital and shall, therefore, repay to the Government its entire capital.

Article 3

The functions of the Saudi Arabian Monetary Agency in relation to circulation of currency and regulation of commercial banks, shall be:

- (a) To stabilize and strengthen the internal and external value of the currency and take measures capable of strengthening the currency's cover. (For that end the Agency may buy and sell gold and foreign exchange in the market, whenever it deems it necessary and within the limits and conditions approved by the Minister of Finance and National Economy. Such transactions should be conducted with the utmost secrecy.*

*Addition made to Article 3(a) under Royal Decree No. 10, issued on 1-7-1379.

(b) To hold and operate monetary reserve funds as separate funds earmarked for

monetary purposes only.

- (c) To mint and issue the Saudi coins and handle all matters relating thereto, in conformity with Saudi Currency Law No. 24, dated 23 Jamad Awal 1377.
- (d) To regulate commercial banks and exchange dealers as may be found appropriate.

Each commercial bank operating in Saudi Arabia shall render to the Monetary Agency a monthly statement of its financial situation in accordance with the specimen forms prepared by the Agency for this purpose. Each bank shall also make available to the Monetary Agency any information required to clarify or integrate the above-mentioned statements.

- (e) The commercial banks shall be asked to keep with the Monetary Agency permanent funds in certain proportion with what deposits the bank is holding. Such proportions shall, from time to time, be fixed to suit the prevailing circumstances, in accordance with a resolution passed by the Minister of Finance and moved by the Agency.

Each bank shall strictly adhere to the instructions issued by the Agency in this respect.

Article 4

To deal with the banking affairs of the Government in receiving all revenues and in paying out fund(s), for purposes duly approved by the Government through the Minister of Finance.

Article 5

The Agency shall establish a Research Department to collect and analyze data needed to aid the Government and the Agency in formulating and carrying out financial and economic policies.

Article 6

The Agency shall not undertake any of the following functions:

- (a) Acting in any manner with conflicts with the teachings of the Islamic Law.
The Agency shall not charge any interest on its receipts and payments.
- (b) Receiving private deposits.
- (c) Making advances to the Government or to private parties.
- (d) Engaging in trade or having an interest in any commercial, industrial, or agricultural enterprise.
- (e) Buying or holding fixed property except what the Agency reasonably needs for its operations.

Article 7

The Agency shall be under the control of a Board of Directors, which shall be generally responsible for its efficient administration and operation and shall have such powers as are necessary and appropriate to that end. The Board of Directors may make such rules and regulations as it may consider necessary; the Board of Directors shall recommend them to the Government through the Minister of Finance.

Article 8

The Agency, in the name 'Saudi Arabian Monetary Agency,' shall be a corporation with continuing succession. The Agency is authorized to take such action as may be necessary and appropriate to give effect to this charter, including, but without thereby limiting its authority to make contracts, to acquire and hold and pledge assets, and to incur such liabilities as are necessary and appropriate to the conduct of its operations.

Article 9

The Saudi Arabian Monetary Agency's Board of Directors shall consist of:

- (a) A President, who shall also be the Governor.
- (b) Deputy Governor.
- (c) Three members, non-government officials, who shall be conversant with financial and commercial affairs.

The Governor and members of the Board shall be appointed for 5 years by a Royal Decree, in accordance with the nomination of the Minister of Finance and the approval of the Council of Ministers. They shall not be removed from office except by a Royal Decree, which shall be issued the same way. The Board of Directors shall meet at the call of the President, or Vice-President in the absence of the former. Meetings shall be held at least once per month. In the event of the absence of the Governor, the Deputy Governor shall preside over the Board.

The resolutions of the Board shall be passed by a minimum majority of three votes, and in the case of an equal division of votes, the President shall have a casting vote.

Resolutions of the Board shall be transmitted to the Minister of Finance [and] immediately they shall be issued.

Article 10

The Governor shall be responsible for the efficient operation of the Agency and shall represent it before courts. The Deputy Governor shall be appointed by a Royal Decree on the nomination of the Minister of Finance and the approval of the Council of Ministers, in order to act for the Governor in the event of the latter's absence, whose powers shall then be vested in the Deputy Governor who shall also be removed from office by a Royal Decree. The remunerations of the Governor, Deputy Governor, and Members of the Board shall be fixed by a Resolution of the Council of Ministers in accordance with the recommendations of the Minister of Finance. The appointment of the remaining staff of the Agency, other than the Governor and the Deputy Governor, their promotion and dismissal, shall be dealt with by the Governor under the provisions of a regulation approved by the Board of Directors and generally based on similar rules and regulations pertaining to Saudi and Foreign government employees. The Governor shall also fix the salaries of these employees, their wages, the duration and terms of their services, their duties and responsibilities in conformity with the said regulations.

Article 11

The Agency shall render to the Government, through the Ministry of Finance, a copy of the half-monthly and annual statements published in the official bulletin, as provided by Article 11 of Royal Decree No. 24 dated 23 Jumad Awal 1377, in regard to the Saudi Arabian currency.

Article 12

Any bank or exchange dealer who fails to furnish the Agency with the information specified in Para. (d). Article 3, or fails to keep with the Agency the deposit mentioned in Para. (e) of the same article in the proportion suggested by the Minister of Finance, shall sustain a maximum punishment of SR 10,000. In the event of recidivation to such acts, the Government, in addition to the above-mentioned punishment, shall temporarily cease the operations of the bank and close it down.

Article 13

This Statute shall replace the previous statute of the Agency together with the entire amendments inserted therein and shall cancel each provision not conforming with its articles.

Article 14

The Prime Minister and the Minister of Finance shall put this Statute into effect.

APPENDIX 4.2

THE BANKING CONTROL LAW

Promulgated by Royal Decree No. M/5

22/2/1386 AH

Article 1

In this Law the following expressions shall have the definitions specified in this article:

- (a) 'Bank' means any natural or juristic person practicing basically any of the banking business in the Kingdom.
- (b) 'Banking business' means the business of receiving money on current or fixed deposit account, opening of current accounts, opening of letters of credit, issuance of letters of guarantee, payment and collection of cheques, orders, or payment orders and similar other papers of value, discounting of bills, promissory notes and other commercial papers, foreign exchange business and other banking business.
- (c) 'National Bank' means a bank, the head office and branches of which are situated in the Kingdom.
- (d) 'Foreign Bank' means a bank with branches in the Kingdom and its head office outside it.
- (e) 'Agency' means the Saudi Arabian Monetary Agency.
- (f) 'Invested capital' means the capital assigned by a foreign bank for the use of its branches in the Kingdom.

Article 2

No person, natural or juristic, unlicensed in accordance with the provisions of this Law, shall carry on basically any of the banking business. However:

- (a) Juristic persons licensed in accordance with another law or special decree to carry on banking business within the limits of their objects may practice such banking business.
- (b) Licensed money-changers may practice basically exchange of currency in the form of notes and coins, but no other banking business.

Article 3

All applications for the grant of licenses to carry on banking business in the Kingdom shall be addressed to the Agency which will study the applications after obtaining all the necessary information and submit its recommendations to the Minister of Finance and National Economy.

The licence for a National Bank shall stipulate the following:

- (1) It shall be a Saudi Joint Stock Company.
- (2) The paid-up capital shall not be less than Rls. 2.5 million, and all subscription towards share capital shall be payable in cash.
- (3) The promoters and directors shall be persons of good reputation.

- (4) The memorandum and articles of association shall be acceptable to the Minister of Finance and National Economy.

In the case of a Foreign Bank wishing to set up a branch or branches in the Kingdom, the grant of a licence shall be subject to such conditions as the Council of Ministers may stipulate upon the suggestion of the Minister of Finance and National Economy after the approval of the Council of Ministers.

Article 4

As an exception to the provisions of the previous Article, the licences or authorizations previously issued to the persons carrying on banking business in the Kingdom and effective at the time of promulgation of this Law, shall continue to be recognized.

The Agency may, however, call for such documents and information from persons as it may deem necessary. The Agency with the approval of the Council of Ministers may call upon them to comply with all or any of the provisions of Article 3 of this Law within such period as it may fix.

Article 5

Any person not authorized basically to carry on banking business in the Kingdom is not allowed to use the word 'Bank' or its synonyms, or any similar expression in any language, on his papers or printed matter, or in his commercial address or his name or in his advertisements.

Article 6

The deposit liabilities of a Bank shall not exceed fifteen times its reserves and paid-up or invested capital. If the deposit liabilities exceed this limit, the Bank must, within one month of the date of submission of the statement referred to in Para. 1 of Article 15, either increase its capital and reserves to the prescribed limit or deposit fifty percent of the excess with the Agency.

Article 7

Every bank shall maintain with the Agency at all times a statutory deposit of a sum not less than fifteen percent of its deposit liabilities. The Agency may, if it deems it to be in the public interest, vary the aforesaid percentage provided that it shall not be reduced below 10 percent nor increased to more than 17.5 percent. The Agency may, however, vary these two limits with the approval of the Minister of Finance and National Economy.

In addition to the statutory deposit provided for in the previous paragraph, every bank shall maintain a liquid reserve of not less than 15 percent of its deposit liabilities. Such reserve shall be in cash, gold, or assets, which can be converted into cash within a period not exceeding 30 days. The Agency may, if deemed necessary, increase the aforesaid percentage up to twenty percent.

Article 8

No bank shall grant a loan or extend a credit facility or give a guarantee or incur any other financial liability with respect to any natural or juristic person for amounts

aggregating more than 25 percent of the bank's reserves and paid-up or invested capital. The Agency may, in the public interest and subject to such conditions as it may impose, increase this percentage up to 50 percent.

The provisions of the above paragraph do not apply to transactions between banks or between head offices and their branches or between these branches.

Article 9

No bank shall undertake the following transactions:

- (1) Granting a loan or extending credit facilities or issuing a guarantee or incurring any other financial liability on the security of its own shares.
- (2) Granting without security a loan or credit facilities, or issuing a guarantee, or incurring any other financial liability in respect of:
 - (a) Members of its Board of Directors or its Auditors.
 - (b) Establishments not taking the form of joint-stock companies in which any of its Directors or Auditors is a partner or is a manager or has a direct financial interest.
 - (c) Persons or establishments not taking the form of joint-stock companies in cases where any of the bank's Directors or Auditors is a guarantor.
- (3) Granting without security a loan or a credit facility or giving a guarantee or incurring any other financial liability in favor of any of its officials or employees for amounts exceeding four months' salary of any such concerned person.

Any bank director or auditor or manager who contravenes paras. 2 and 3 of this Article, shall be considered as having resigned this position.

Article 10

No bank shall undertake any of the following activities:

- (1) Engage, whether for its own account or on a commission basis, in the wholesale or retail trade including the import or export trade.
- (2) Have any direct interest, whether as stock-holder, partner, owner, or otherwise, in any commercial, industrial, agricultural, or other undertaking exceeding the limits referred to in para. 4 of this Article, except when such interest results from the satisfaction of debts due to the bank, provided also that all such interest shall be disposed of within a period of two years or within any such longer period as may be determined in consultation with the Agency.

- (3) Purchase, without the approval of the Agency, stocks and shares of any bank conducting its business in the Kingdom.
- (4) Own stocks of any other joint-stock company incorporated in the Kingdom, in excess of ten percent of the paid-up capital of such a company, provided also that the nominal value of these shares shall not exceed twenty percent of the bank's paid-up capital and reserves; the above limits may, when necessary, be increased by the Agency.
- (5) Acquire or lease real estate except insofar as may be necessary for the purpose of conducting its banking business, housing of its employees or for their recreation, or in satisfaction of debts due to the bank.

In cases where a bank acquires real estate in satisfaction of debts due to it and such real estate is not necessary for the bank's own banking business or housing of its employees or for their recreation, it shall dispose of it within three years of its acquisition or, in exceptional and justifiable circumstances, within such period or periods as may be approved by the Agency and subject to such conditions as it may deem fit to prescribe.

As an exception to the provisions of para. 5 of this Article, the bank may, in special and justifiable circumstances and with the approval of the Agency, acquire real estate, the value of which shall not exceed 20 percent of its paid-up capital and reserve.

Article 11

Banks are precluded from undertaking any of the following operations except after the written approval of the Agency and according to the conditions it prescribes.

- (a) Altering the composition of their paid-up or invested capital.
- (b) Entering into any scheme of amalgamation or participation in the business of another bank or another establishment carrying on banking business.
- (c) Acquiring shares in a company established outside the Kingdom.
- (d) Ceasing to carry on banking business. In such a case, the Agency must, before agreeing to this cessation, ascertain that the bank has made necessary arrangements to safeguard the rights of the depositors.
- (e) Opening branches or other offices in the Kingdom and also opening of branches or other offices by national banks outside the Kingdom. Before granting this written licence provided for under this paragraph, the Agency should get the approval of the Minister of Finance and National Economy.

Article 12

No person shall be a director of more than one bank.

No person in the following cases shall be elected as a director or shall become manager of any bank without prior written approval of the Agency:

- (a) If he occupied a similar position in a banking concern that was wound up, even if the liquidation has been made before the promulgation of this law.

Such approval shall not be given by the Agency until it becomes clear that the person concerned was not responsible for the liquidation.

- (b) If he was removed from a similar post in any banking establishment, even if such removal was before the promulgation of this law. The approval of the Agency shall in this case be based on acceptable reasons.

Any director or manager of a bank who is adjudicated bankrupt or convicted of a moral offence shall be considered as having resigned his post.

Article 13

Every bank shall before declaring distribution of any profits, transfer a sum equal to not less than 25 percent of its net profits, to the statutory reserve, until the amount of that reserve equals as a minimum the paid-up capital.

No bank shall pay dividends or remit any part of its profits abroad, until its aggregate foundation expenditures and losses incurred have completely been written off, and after deducting not less than 10% of the value of capitalized expenditures until all these expenditures have been completely written off.*

Article 14

Every Bank shall appoint annually two auditors from amongst the approved list of auditors registered with the Ministry of Commerce and Industry. The Auditors shall submit a report on the balance sheet and profit and loss account. This report shall include whether in the auditors' opinion the Bank's balance-sheet duly and correctly represents its financial position and the extent of their satisfaction with any explanations or information they have requested from the bank's manager or other staff.

As regards banks taking the form of a company, the report referred to in the above paragraph shall be read together with the annual report of the bank management in the General Meeting which must be held within the six months following the end of the bank's financial year. The bank management should send copies of these two reports to the Agency.

The provisions of the first para. of this Article shall apply to foreign banks in respect of their branches operating in the Kingdom. They should send a copy of the Auditors' report to the Agency.

Article 15

Every bank shall furnish the Agency by the end of the following month with a consolidated monthly statement of its financial position relating to the previous month which shall be true and correct and be in the form prescribed by the Agency. Every bank shall also furnish the Monetary Agency within six months of the close of its financial year with a copy of its annual balance sheet and profit and loss account certified by its auditors in the form prescribed by the Agency.

*Amended in accordance with Royal Decree No. M/2 dated 6-1-1391.

Article 16

The Monetary Agency may, with the approval of the Minister of Finance and National Economy, issue general rules regarding the following matters:

- (1) The maximum limits of total loans that can be extended by a bank or banks.
- (2) The prohibition or limitation of specified categories of loans or other transactions.
- (3) Fixing the terms and conditions which banks should take into consideration when carrying out certain types of transactions for their customers.
- (4) The cash margins to be obtained by banks against specified categories of credits or guarantees.
- (5) The minimum ratio to be observed between the limits for loans and the collateral for such loans.
- (6) Fixing the assets to be maintained by each bank within the Kingdom. Such assets should not fall below a certain percentage of the bank's deposit liabilities which shall be fixed by the Agency from time to time.

The Agency may, from time to time, issue decisions concerning the following:

- (1) Definition of the expression 'deposit liabilities' referred to in this law.
- (2) Determination of bank holidays and business hours in banks.

Article 17

The Agency may, at any time, require any bank to supply it, within a time limit it will specify and in the manner it will prescribe, with any information that it deems necessary for ensuring the realization of the purposes of this Law.

Article 18

The Agency may, with the approval of the Minister of Finance and National Economy, cause an inspection to be made of the books and accounts of any bank, either by the Agency's own staff or by outside Auditors assigned by it. The examination of the bank's books and accounts should take place in the bank's premises. In such case the Bank staff must produce all the required books of accounts and other documents in their custody or within their authority and must furnish any information they have relating to the bank.

Article 19

Any person who comes into possession of information during the performance of his duties in the implementation of this Law, is not allowed to disclose such information or to make use of it in any manner.

Article 20

The Agency shall periodically publish combined statements of the principal data contained in the returns mentioned in Article 15.

Article 21

The Minister of Finance and National Economy, in exceptional circumstances, and with the prior approval of the Council of Ministers, may exempt any bank from any provision of this Law or from the regulations issued in execution thereof for a limited period and subject to such other conditions as may be laid down in each case.

Article 22

If the Agency finds that a bank has failed to comply with the provisions of this Law, or with the provisions of any regulations issued under this Law, or if a bank adopts a policy that might seriously affect its solvency or liquidity, it may, with the approval of the Minister of Finance and National Economy, take one or more of the following measures:

- (a) Appoint one or more advisers to advise the bank in the conduct of its business.
- (b) Order the suspension or removal of any director or officer of the bank.
- (c) Limit or suspend the granting of credits or the acceptance of deposits.
- (d) Require the bank to take such other steps as it may consider necessary.

If the Agency finds that a bank persistently contravenes the provisions of this Law or the decisions or regulations made there under, it may call upon such a bank to submit its reasons for the contravention, accompanied by its proposals to rectify the position within a stated period. If the Agency is of the opinion that such proposals are not sufficient for their purpose or if the bank fails to implement an agreed or prescribed course of action within the stated period, the Minister of Finance and National Economy may, subject to the approval of the Council of Ministers, revoke the licence of the said bank.

Article 23

- (1) Any person who contravenes the provisions of para. 1 of Article 2, Article 5, and items a, b, and c of para. 1 of Article 11, Article 12 and Article 18, shall be liable to imprisonment for a term not exceeding two years and to a fine not exceeding Rls. 5000 for every day the offence continues or to either of these penalties.
- (2) Any person who contravenes the provisions of Article 19, shall be liable to imprisonment for a term not exceeding two years and to a fine not exceeding Rls. 20,000, or to either of these penalties.
- (3) Any person who contravenes the provisions of Articles 8, 9, and 10, shall be liable to imprisonment for a term not exceeding six months and to a fine not exceeding Rls. 10,000, or to either of these penalties.
- (4) Any person who contravenes the provisions of Articles 7, 14, and 15 shall be liable to a fine not exceeding Rls. 500 for every day the contravention continues.
- (5) Any person who contravenes any other provision of this Law or the Regulations and decisions issued in execution thereof shall be liable to a fine not exceeding Rls. 5000.

(6) In the event that offences punishable according to paras. 2, 3, and 5 of this Article are committed by the same person for one purpose and provided that such offences are interrelated as to object and timing, they are to be considered as one offence punishable by one penalty.

Article 24

The Chairman, the Managing Director, the Directors, Head Office Manager, and Branch Manager shall be responsible, each within his own jurisdiction, for any contravention of this Law or the decisions and rules issued for its execution.

Article 25

The Minister of Finance and National Economy shall appoint a committee of three persons from outside the Agency and specify the conditions and measures to be observed in adjudging contraventions punishable under this Law at the request of the Agency.

Article 26

The Vice-President of the Council of Ministers and the Minister of Finance shall put this Law into effect and it shall come into force from the date of its publication.