NOTRE DAME UNIVERSITY

Faculty of Business Administration

and Economics

MONETARY POLICY IN LEBANON

Master's Thesis

under the supervision of

Dr. Viviane Naimy

by

Nassar Daher

Submitted in partial fulfillment of the requirements for the

Master's Degree in Business Administration

MBA

October 2003

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MASTER'S THESIS

MONETARY POLICY IN LEBANON

NASSAR DAHER

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ABSTRACT

This study is focused on the application of the monetary policy instruments in Lebanon throughout the 1993-2002 period and their impact on the Lebanese economy, namely the business cycle.

Theoretically, we survey the techniques of monetary control and identify the process whereby these techniques might affect the macroeconomic behavior. Theories of how to conduct the monetary policy view the latter as an economic instrument which uses money supply and interest rates as intermediate objectives to help achieve a healthy business cycle – growth in output, low unemployment and low inflation.

Empirically, we identify the techniques of the monetary policy applied in Lebanon during the years 1993-2002 and analyze their impact on the macroeconomic situation. We provide evidence that neither economic growth nor unemployment reduction were considered as ultimate targets for the monetary authority in Lebanon. Since 1993, the Lebanese monetary policy has been targeted at maintaining strength and stability in the exchange rate, controlling the inflation rate, and most importantly, financing the current expenses of the public sector. Moreover, interest rates that are supposed to be consequences of the application of the monetary policy instruments were artificially manipulated by the Lebanese Government to achieve its targets.

High interest rates on treasury bills discouraged private investment in the productive sectors of the Lebanese economy. Most foreign and local capital was invested in high-yield government bonds rather than in high-value economic growth and employment-promoting activities. This was the major contributor to the decline in lending opportunities to the productive sectors and to the allocation of larger national resources to bondholders – the majority from wealthy and high-income classes.

Monetary policy in Lebanon constituted a major obstacle to productive investment and consequently to economic growth and unemployment reduction. This study provides evidence in favor of this argument confirming that the recent economic crisis in Lebanon is the result of the bad application of the monetary policy instruments throughout the 1993-2002 period.

INTRODUCTION

I. General background

The major economic features that characterize Lebanon are the private and liberal aspect of the economy, and the openness to abroad with perfect capital and labor mobility. The Lebanese economy is a private sector economy. The private sector contributes to around 80% of aggregate demand, a well diversified sector that covers the totality of economic sectors and is the major pillar for growth and recovery[1].

Before the onset of the civil war, Lebanon was a prosperous middle income country, and its economy was considered as one of the most dynamic and stable in the Middle East region. It was characterized by a low inflation rate, high rates of economic growth, large balance-of-payments surpluses, stable domestic currency, and a healthy functional financial circuit. Lebanon owed its strength to a long established tradition of an open, deregulated economy and to its high level educational system in comparison with the neighboring countries.

The 17-year war period has resulted in massive human and material damages, especially since the Israeli invasion in 1982. The following disturbances were actually observed throughout the 1982-1990 period: a 50% drop in GDP at the end of 1990 with respect to the output level in 1982, a fall in the minimum monthly wage from US$ 200 to US$ 90,

[1] Ministry of Finance, country profile (2001)

an average inflation rate of 88.3% per year and an average depreciation rate of 96.4%, a drop of the coverage ratio of public expenditures by public revenues to 16%, a 76% drop in Central Bank foreign exchange reserves, a cumulative deficit in the balance of payments of US$ 1.7 billion, massive capital outflows which led to a 62% fall in bank deposits, and massive conversions to foreign currencies which raised the dollarisation ratio from 29% to 74%[2].

Since such a deterioration of the macroeconomic conditions requires urgent recovery efforts, and since the private sector in Lebanon is the major pillar for growth and recovery, it would be adequate to assess the prospects for the Lebanese economic recovery from the private sector's standpoint. In other words, monetary and fiscal policy must be targeted at increasing financial resources available to the private sector to constitute an incentive for productive investment and consequently for economic growth.

This study determines the conduct of the Lebanese monetary policy throughout the 1993-2002 period. A large focus is devoted to check whether the techniques of monetary control used were adequate to reach a healthy business cycle – the ultimate target of the monetary policy and the major indicator of the macroeconomic development.

II. Need for the study

The need for the study of the Lebanese Government's monetary policy arises from the high contribution of the latter in the deterioration of the macroeconomic conditions witnessed during the years 1993-2002.

[2] Consultation and Research Institute, report about the Lebanese economic and social status (June 1999)

A study made by the Ministry of Social Services in collaboration with UNFPA[3] (United Nations Fund for Population Affairs) and published in August 2001, showed that the Lebanese people are facing major difficulties in paying bills and meeting their basic needs. Lebanese youth is unemployed and is immigrating. Children are leaving schools to work; many people have health problems related to stress and constant pressure, etc... Given the direct inter-relationship between the macroeconomic status and social conditions and living standards of the population, the above presentation of the macroeconomic situation from a social perspective could highlight the deterioration of the economic conditions.

Moreover, since 1993 the economic situation has gradually worsened to become highly damaged at the end of 2002. It suffices to examine the public debt to GDP ratio (183.8%) to show that Lebanon is on the edge of economic bankruptcy.

Monetary and fiscal policies have all fostered increased external borrowing in Lebanon. As a result, the years 1993-2002 witnessed large capital inflows. The latter represented an opportunity which it could seize for the sake of productive investment and consequently of economic growth and unemployment reduction. However, based on the deterioration of the economic activities and the evolution of key indicators of the macroeconomic development during the years 1993-2002, one would argue that the capital inflows were not reflected in an increase in financial resources available to the private sector and, thus, did not stimulate productive investment.

[3] Ministry of social affairs, 2001, p. 6

The damaged economic situation in Lebanon constitutes a threatening problem that requires urgent recovery efforts. However, the knowledge of the factors that are responsible for the deterioration of the macroeconomic conditions is a prerequisite for solving the economic problem. On this basis, the need for surveying the conduct of the Lebanese monetary policy and for analyzing its impact on the macroeconomy is overwhelming.

III. Purpose of the study

Since the business cycle constitutes the ultimate objective of the monetary policy, we greatly expect to observe this latter to be the major contributor to the deterioration of the economic activities, and hence the current economic crisis. Accordingly, the main purpose of this study is to analyze the techniques of monetary control applied in Lebanon during the years 1993-2002 and to highlight their impact on the macroeconomic evolution witnessed throughout the same period. Moreover, we will be studying the exchange-rate system in Lebanon and its interaction with the Lebanese monetary policy.

IV. Limitations

Economic data for Lebanon – trade figures, price indices and some budgetary information – is collected by the Central Bank, the Central Administration of Statistics, and the Ministry of Finance. However, the figures are inconsistent and in some instances not reproducible. The inconsistency in the data is due to a lack of clarity and errors in defining certain economic variables. For instance, the balance of payments is often confused with balance of accounts, and the GDP deflator with the consumer price index.

In addition, no official GDP calculations have been made since 1977. The CAS has calculated the GDP for 1994 and 1995 and is in the process of calculating GDP for 1996 and 1997. Prospective readers should be aware that actual amounts may differ from current estimates included in this study.

Credible economic analysis requires sufficient and reliable data. Accordingly, the credibility of this study depends upon the consistency in the official data and estimates provided by the BDL and the Ministry of Finance.

Moreover, due to time and cost limitations, we will not be able to derive the private demand for money viewed from households and investors' needs perspective rather than from the money supply perspective. Consequently, we will not be able to accurately identify the impact of the monetary policy instruments on interest rates. This constitutes a major limitation on which a closer look is set in chapter 5 (section 5.2.3).

As for the transmission mechanism between the monetary policy and income, namely the quantity theory of money, many economists would consider the velocity as closer to being a constant rather than being perfectly stable, even when dealing with broad money and with short periods. Due to the difficulty of measuring the velocity of money in Lebanon, our analysis will proceed based on the assumption that the velocity of M3 (broad money) is constant in the short run (on yearly basis). Consequently, our results will not be used to draw a firm conclusion, but they will be considered as indicators of the monetary policy impact on income (for more details see chapter 6 section 6.2.1).

V. Overview of the study's contents

Part I introduces the theoretical framework. The information needed for this part was obtained through a review of available books and articles in financial magazines related to the subject of the study.

In **Chapter One**, we start by going over the techniques of monetary control. The monetary policy instruments as well as the intermediate targets are detailed. A closer look is then set on the impact of the monetary tools on the intermediate targets.

Chapter Two illuminates the process whereby the monetary policy might affect the business cycle. In this context, the IS–LM model (an indirect transmission mechanism of monetary policy), as well as the quantity theory of money (a direct transmission mechanism from money to income) are discussed. Several scholars' arguments and views are then introduced and discussed.

In **Chapter Three**, the exchange-rate systems and their interaction with the monetary policy constitute the main focus. First, the determination of exchange rates and the impact of monetary policy on the latter are discussed. Flexible and fixed exchange-rate systems are then detailed in order to show how each of these might influence the monetary decisions.

Part II is devoted to studying the Lebanese case. It represents an empirical analysis of the applications of the monetary tools in Lebanon and their impact on the intermediate

and ultimate targets. The data needed for this part was obtained from available documentation provided by the Lebanese Central Bank, the Ministry of Finance, and the Central Administration of Statistics (CAS). Information related to commercial banks and to the financial policies was mainly obtained from the annual reports of the Association of Banks in Lebanon (ABL). Moreover, we reviewed books and studies related to the Lebanese economy, decrees and circulars issued by the Central Bank of Lebanon, as well as its monthly, quarterly and yearly bulletin. Data collected is coded using the SPSS program (Statistical Package for Social Science). Descriptives, bivariate Pearson correlation, and linear regression models are the main statistical techniques used throughout the analytical part.

Chapter Four surveys the techniques of monetary control applied in Lebanon mainly throughout the 1993-2002 period. In this chapter we start by going over the BDL's rules and restrictions imposed on commercial banks operating in Lebanon, such as reserve requirements on Lebanese Pound deposits, liquidity requirements on US Dollar deposits, required subscription in Treasury bills, and required capital adequacy ratio. A closer look is then set on the Treasury bill and the international bond markets, where the open-market operations and the objectives of their applications are identified.

Chapter Five identifies the impact of the applied monetary tools on the intermediate targets in Lebanon. First, the effect on the money supply is discussed. A large focus is then devoted to the evolution of the interest rates, given their major role in the development of the economic activities. In this context, we identify the major

determinants of the interest rate in Lebanon, derive and analyze the evolution of the private sector demand, and finally determine the impact of the government intervention.

Chapter Six focuses on the impact of the Lebanese monetary policy on the business cycle (the ultimate target of the monetary policy). The first part of this chapter represents an empirical description of the macroeconomic situation that the country has witnessed over the 1993-2002 period. The IS–LM model and the quantity theory of money are then used to show how the techniques of monetary control applied in Lebanon during the years 1993-2002 have affected the macroeconomic status. Moreover, this chapter discusses the exchange-rate system in Lebanon and its interaction with the monetary policy. Finally, to wrap up this study, a conclusion is made.

PART I

THEORETICAL FRAMEWORK

CHAPTER 1

TECHNIQUES OF MONETARY CONTROL

CHAPTER 2

EFFECT OF MONETARY POLICY ON THE BUSINESS CYCLE

CHAPTER 3

EXCHANGE RATES AND THEIR INTERACTION WITH THE MONETARY POLICY

Chapter 1

Techniques of Monetary Control

Monetary policy – the government's decisions about how much money to supply to the economy – is the primary function of modern day central banks. It is one of the two principal tools available for affecting macroeconomic behavior. Monetary policy is conducted by the nation's Central Bank, which has at its disposal a number of policy instruments for this purpose. These instruments can affect certain intermediate targets (such as reserves, money supply and interest rates) in order to help achieve the ultimate objectives of a healthy economy – growth in output, low unemployment, low inflation and a satisfactory balance of payments. This chapter is devoted to studying the monetary policy instruments and their impact on the intermediate targets.

1.1 Monetary policy instruments

The major instruments of monetary policy are open-market operations, reserve requirements, discount rate and cedit control.

a. Open-Market Operations (OMO): the buying or selling of government securities in the open market by the Central Bank is referred to as open-market operations. The open market includes dealers in government bonds, commercial banks, other financial institutions, big corporations and individuals. A purchase of assets by the Central Bank is called an open-market purchase. A sale of assets to the public by the Central Bank is called an open-market sale. In setting policy, the Central Bank decides whether to pump more reserves into the banking system by buying Treasury bills and longer term government bonds or whether to tighten monetary policy by selling

government securities. In developed countries, open-market operations are considered as the most effective and important of all instruments of monetary policy for they are flexible, precise[1] and they can achieve the same results but in a less disruptive way than the other instruments.

b. Legal Reserve Requirements: Central Banks impose compulsory reserve requirements, which mandate how much banks should keep at the Central Bank in the form of non-interest-bearing reserves balances, for them to deal with unexpected surges of liquidity in the money markets[2]. It is a percentage of reserve imposed on Bank's liabilities, which consist of demand deposits, time deposits and saving deposits. Banks failing to keep such reserves will be obliged to call for and liquidate part of their loans and credits in order to attain the required reserve. Previous experiences in many different countries warn that this tool of changing reserve requirements has to be used with great caution because it is a very powerful[3] tool that could cause a lot of disruption in the money market. In recent years, Central Banks in many countries have been reducing[4] (e.g. USA and Canada) or even eliminating their reserve requirements entirely (e.g. Switzerland, New Zealand and Australia).

c. Discount Rate: The discount rate is the interest rate at which commercial banks can borrow reserves from the Central Bank. In the early years, the discount rate was the primary vehicle for providing reserves to the banking system in most developed

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[1] Michkin (1995). "Money, Banking and Financial Markets." USA: Harper Collins College Publisher. pp. 478

[2] Fama (1980). "Banking in the Theory of Finance." *Journal of Monetary Economics*, Vol. 6 (January), pp. 39–57

[3] Samuelson and Nordhaus (1996). "Economics." Seventeenth edition. USA: McGraw-Hill Irwin Company. pp. 549-50

[4] Bental and Eden (2002). "Reserve Requirements and Output Fluctuations." *Journal of Monetary Economics*, Vol. 49, pp.1597–1620

countries. Today, the discount rate is relatively minor instrument of monetary policy: Central Banks have turned to open-market operations as the primary tool for adjusting the overall level of reserves. Mostly, the discount rate simply follows market interest rates to prevent banks from making windfall[5] profits by borrowing at a low discount rate and lending at a higher rate on the open market.

d. Credit Control: the Central Bank can affect the volume of credit granted by banks through the credit control[6] tool. It has been almost commonly assumed that the distribution of credit, under existing economic organizations in most countries, should be subjected to some form of control entrusted to the Central Bank with special privileges and powers. The main reason for this was that credit came to play a predominant part in the settlement of monetary and business transactions of all kinds, and, thereby, to represent an effective force in all cases. In fact, countries of all economic structures have, to a greater or lesser extent, come to base their transactions on a credit economy rather that on a money cash economy.

The Central Bank can affect the volume of credits granted by banks through[7]:

- Limiting loans to a certain ratio or portion of banks' deposits
- Imposing regulations to organize the uses of loans granted by banks
- Changing guarantee margins against loans; the Central Bank would increase the margin of guarantee to decrease loans, and vice versa.
- Lowering or raising the discount and interest rates thereby encouraging the expansion or contraction of credits

[5]Samuelson and Nordhaus (1996). pp. 547-8
[6] Franklin (1996). "The New Finance." USA: AEI Press, C/O Publisher Resources, INC. pp. 163
[7] Barre (1980). "Economie Politique." 9e Edition. Presses Universitaires de France. pp. 386-402

- Buying or selling securities or bills of exchange in the open market with a view to putting additional funds into the market or withdrawing funds there from, and hence expanding or contracting credits.
- Regulating the terms and conditions under which credits are granted

1.2 Intermediate targets

In conducting monetary policy, the Central Bank has certain ultimate targets, such as stable economic growth, low unemployment and low inflation. In trying to reach these targets, the central Bank can use the monetary policy instruments that we have discussed. Because there are several steps between these instruments and the ultimate policy goals, and because these steps can't be predicted accurately, the Central Bank uses intermediate targets to guide monetary policy. These are macroeconomic variables that the Central Bank cannot control directly but can influence[8] fairly predictably, and that in turn are related to the goals the Central Bank is trying to achieve. The most important and frequently used intermediate targets (as shown in table A1 in the appendix) are bank reserves, money supply and interest rates.

a. Bank reserves: bank reserves are liquid assets held by banks to meet the demands for withdrawals by depositors or to pay the checks drawn on depositors' accounts. Bank reserves comprise currency held by private banks in their vaults and deposits held by private banks at the Central Bank in the form of non-interest-bearing reserves balances. In general, private banks keep just the minimum required reserve-deposit ratio because, instead of sitting the vault earning no interest for them, the remaining

[8] Abel and Bernanke (1995). "Macroeconomics." Second edition. USA: Addison-Wesley Publishing Company. pp. 544-5

portion of the funds received from depositors can be used to make interest-earning loans.

b. Money supply: the money supply is the total stock of money in a given period. The quantitative measures of money are the monetary aggregates known as M_1, M_2, M_3 and sometimes M_4. The definitions of monetary aggregates vary from country to country. In general, the narrowest measure of money in all countries is called M_1 and includes only highly liquid assets that typically can be used to make transactions, such as currency and demand deposits. Other measures of money, often called broad money, include assets that are less liquid than the previous measure, such as savings deposits, money market mutual fund and other measures[9].

c. Interest rates: interest is the payment made for the use of money. The interest rate is the amount of interest paid per unit of time expressed as a percentage of the amount borrowed. Interest rates differ mainly in terms of the characteristics of the loan or of the borrower. Loans differ in their term or maturity – the length of time until they must be paid off. The shortest loans are overnight. Short-term securities are for periods up to one year. Longer-term securities generally command a higher interest rate than do short-term issues because lenders are willing to sacrifice quick access to their funds only if they can increase their yield.

Loans also vary in term of risk. Some loans are virtually riskless, while others are highly speculative. Investors require that a premium be paid when they invest in risky ventures. In general, the safest assets relatively are the securities of the government. These bonds and bills are backed by the faith, credit, and taxings powers of the

[9] Champ and Freeman (1994). "Modeling Monetary Economies." New York: John Wiley and Sons, INC. pp. 126-7

government. Intermediate in risk are borrowings of creditworthy corporations. Risky investments, which bear a significant chance of default or nonpayment, include those of companies close to bankruptcy, countries with shrinking tax bases, or countries with large external debts and unstable political systems.

Assets vary in their liquidity. An asset is said to be liquid if it can be converted into cash quickly and with little loss in value. Most marketable securities, including common stocks and corporate and government bonds, can be turned into cash quickly for close to their current value. Illiquid assets include unique assets for which no well-established market exists. Because of the higher risk and the difficulty of realizing the asset values quickly, illiquid assets or loans usually require higher interest rates than do liquid, riskless ones.

When all these above factors (along with other considerations) are considered, one would expect to see so many different financial instruments and so many different interest rates that rise and fall in step with each others.

1.3 Effect of monetary policy instruments on intermediate targets

By using its instruments, the Central Bank can either directly or indirectly (through reserves) control the level of money supply, which in turn affects interest rate. So this latter is a consequence and is determined by fluctuations in the money supply[10]. Reserves are intermediate objectives through which the Central Bank can control the money supply. Thus, the way in which the money supply changes can show the role

[10] Abel and Bernanke (1995). pp. 544-5

and impact of each of the monetary policy instruments, and hence, best explain the effect of the latter on all intermediate targets.

Most generally, three groups affect the money supply: the Central Bank, privately owned banks and the public. In almost all countries, the Central Bank is the governmental institution responsible for monetary policy. Privately owned banks, or banks for short, receive deposits from and make loans directly to the public. The public, which is called also the non-bank private sector, includes every person or firm (except banks) that holds money, either as currency and coin or as deposits in banks.

1.3.1 Multiplier approach

The Central Bank determines the quantity of reserves of the banking system. Using those reserves as an input, the banking system transforms them into a much larger amount of bank money. The currency plus this bank money is the money supply.

To explain this money creation process we assume first a banking system in which banks hold only a fraction of their deposits in reserve, so that the reserve-deposit ratio is less than 1 (the case of most banking systems in the world), and that no currency is hold by the public. When a bank receives a new deposit in cash, it holds a fraction of this deposit in reserve. It can lend a borrower the residual amount, which mostly will be redeposited in either the same bank or another one. This process continues until the size of the change in deposits in the banking sector as a whole, is equal to the original injection of cash times the reciprocal of the reserve ratio. No further expansion of

loans and deposits can occur after this point because the ratio of reserves to deposits is at its minimum acceptable level[11].

Accordingly, the money supply under fractional reserve banking with no public holdings of currency will be as follows:

- With no currency being held by the public, the money supply equals the quantity of banks deposits: M = DEP.
- For any level of deposits, the amount of reserves (or RES) that banks want to hold is reserve-deposit ratio (or res, percentage rate) times deposits (RES = res x DEP).
- At the end of the multiple-expansion process, bank reserves must equal the amount of currency distributed by the Central Bank, which is called the monetary base (or BASE): (res)(DEP) = BASE[12]. (Note: the monetray base represents the liabilities of the Central Bank that are used as money. With no currency being held by the public – as we assumed at this stage of our discussion – the amount of banks' reserves became the only liability of the Central bank that can be used as money[13], and hence represents the monetary base).
- Solving last equation for deposits: DEP = BASE / res. Therefore:
- M = DEP = (1 / res) x BASE

The multiple expansion of loans and deposits allows the economy to create a money supply that is much larger than the monetary base. Each unit of monetary base allows

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[11] Gowland (1991). "Money, Inflation and Unemployment." The Role of Money in the Economy. Second Edition. UK: Harvester Wheatsheaf. pp. 228-30

[12] Romer (1985). "Financial Intermediation, Reserve Requirements, and Inside Money." *Journal of Monetary Economics*, Vol. 16 (September), pp. 175–194

[13] Abel and Bernanke (1995). pp. 529

1/res units of money to be created, leading to a money supply that is a multiple of the monetary base.

However, in most economies the public holds some currency. In this case, the money supply will be equal to the quantity of banks deposits and to the quantity of currency in circulation (CU). In this situation, some of the monetary base is held as currency by the public, and the rest is held as reserves by banks. Therefore the monetary base equals the sum of the two. The Central Bank then controls the amount of monetary base but doesn't control the money supply directly[14].

The following equation shows the new relationship between the money supply and the monetary base:

M / BASE = (CU + DEP) / (CU + RES)

By dividing both the numerator and the denominator on the right-hand side of the equation by DEP we obtain:

$$\frac{M}{Base} = \frac{(CU / DEP) + 1}{(CU / DEP) + (RES / DEP)} = \frac{cu + 1}{cu + res}$$

- The currency-deposit ratio (CU / DEP, or cu) is the ratio of the currency held by the public to the public's deposits in banks.

$$M = \left(\frac{cu + 1}{cu + res}\right) BASE$$[15]

The last equation states that the money supply is a multiple of the monetary base. The relation of the money supply to the monetary base depends on the currency-deposit

[14] Champ and Freeman (1994). pp. 145–9
[15] Abel and Bernanke (1995). pp. 532-5

ratio chosen by the public and the reserve-deposit ratio chosen basically by the Central Bank. The factor (cu +1) / (cu + res), which is the number of dollars of money supply that can be created from each dollar of monetary base, is called the money multiplier. The money multiplier will be greater than 1 as long as *res* is less than 1. It can be shown that the money multiplier decreases when either the currency-deposit ratio *cu* or the reserve-deposit ratio *res* increases. When the currency-deposit ratio rises, the public puts a smaller fraction of its money in banks, which means that banks have less money to loans. When the reserve-deposit ratio rises, banks lend a smaller fraction of each dollar of deposits, creating less money for the same amount of monetary base.

1.3.2 Effect of monetary policy instruments on money supply

The money supply multiplier discussed relates Central Bank's applications of its monetary policy instruments to the money supply.

1. Impact of Legal Reserve requirements: the Central Bank sets the minimum fraction of each type of deposit that banks must hold as reserves. An increase in reserve requirements forces banks to hold more reserves and increases the reserve-deposit ratio. A higher reserve-deposit ratio reduces the money multiplier discussed earlier ($(cu + 1)/(cu + res)$), so an increase in reserve requirements reduces the money supply for any level of the monetary base.

2. Impact of Open-market operations: as we have discussed, a purchase of assets by the Central Bank is called an open-market purchase. A sale of assets is called an open-market sale. Both operations affect the monetary base. Considering a sale of assets by the Central Bank, the purchasers buy the bonds either by their currency holdings or by

writing checks to the Central Bank. If paid by currency holdings, the monetary base (BASE = CU + RES) decreases by the same purchase amount. If paid by check, this latter will be drawn from an account in a bank, which reduces the balance of this latter with the Central Bank by the purchase amount. The entire banking system then loses this amount in reserves at the Central Bank, which in turn reduces the monetary base. Thus, the money supply will fall by the purchase amount times the money multiplier.

3. Impact of Discount rate: when banks are short of reserves, they are allowed to borrow from the Central Bank. When the discount rate or the interest rate charged on borrowed reserves increases, banks are discouraged to borrow from the Central Bank and prefer to borrow reserves from other banks that have extra reserves. If banks reduce their borrowings from the Central Bank in response to the higher discount rate, their reserves will decline and the monetary base will decrease. The money supply will decrease by the amount of reserves reduced times the money multiplier. Loans from one bank to another does not affect the reserve balance at the Central Bank, thus, they have no effect on the monetary base and the money supply.

4. Impact of credit control: the effect of the credit control tool on the money supply is similar to the effect of the reserve requirements. With a constant amount of deposits in the banking system, any attempt to reduce the volume of loans granted by banks leads to higher reserve-deposit ratio and reduces the money multiplier, which causes a contraction in the money supply for any level of the monetary base. This would happen in case the private banks had no choice to deal with the resulted excess reserves.

However, the Central Bank might reduce the volume of credits expanded to a specific sector in order to encourage loans in another sector. This would have no impact on the money supply because in this case no excess reserves are to be held, and hence the money creation process would not be affected.

Additionally, the Central Bank might need to borrow from private banks in order to finance the government's budget deficit. Such a public sector borrowing requirement makes the Central Bank sell securities or bills of exchange in the open market in order to withdraw funds there from, which leads the volume of credits expanded to the non-bank private sector to contract. The public sector borrowing requirement is the difference between the government's outlays and its receipts. Its outlays are its expenditure on goods and services, its expenditure on transfer payments, including interest payments, its purchase of assets, and its loans. Thus, as far as the influence on money creation and on money supply is concerned, the public sector borrowings are reinjected in the market, thus they have no effect in the short run. However, there are three cases whereby the public sector borrowings affect the money creation process and the money supply:

a. Excess borrowings: the Central Bank might borrow more than the government needs and keep the excess amount in a public sector account. This money is not reinjected in the market, and hence becomes a lost amount of credits that would have been expanded to the non-bank private sector.

b. High interest rates on government securities: in an attempt to attract more funds, the Central bank might increase the interest rates on government securities leading private banks, who look forward profit maximizing, to buy such assets rather than

expanding loans to the non-bank private sector. With everything else kept constant, one would argue that such an internal debt has no effect since it is owed by a nation to its own citizens. In fact such a statement is oversimplified. The higher the interest rates set on government securities, the more the private banks are making profits, or abnormal profits. This leads the private banks to invest more in government securities preventing the non-bank private sector from the major source of funds to finance productive investment.

c. Corruption: corruption is the misuse of office for unofficial ends. It may take the form of bribery, extortion, influence-peddling, nepotism, fraud, speed money, embezzlement, and more. The following statement by economic development specialist Robert Klitgaard explains the great impact of corruption: "the killer is systematic corruption that destroys the rules of the game – for example, the justice system or property rights or *banking and credit*". Then he said: "although we tend to think of corruption as a sin of government, of course it also exists in the private sector. Indeed, the private sector is involved in most government corruption.....the corruption is one of the principal reasons why the most under-developed parts of our planets stay that way".

As far as the influence on money supply is concerned, both the increase in the public debt and the misallocations of money caused by corruption might lead to an expansion in the money supply without a corresponding growth in output, especially in a country where corruption becomes the norm. This leads the "public debt to output" ratio to rise, which makes the debt service become the primary task of the economic activities.

1.3.3 Effect of monetary policy instruments on interest rates

Interest rates are determined in money markets, which are the markets where short-term funds are lent and borrowed.

The supply of and demand for money jointly determine the market interest rates as shown in the graph below:

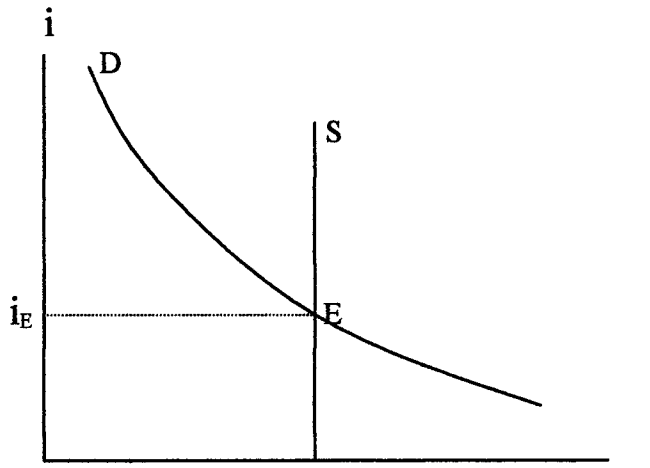

Figure 1.1

We can notice from the above figure that the interaction of the demand for and supply of money determines the equilibrium interest rate. Only at this rate is the level of the money supply that the Central Bank has targeted consistent with the desired money holdings of the public. At a higher interest rate, there would be excessive money balances. People would get rid of their excessive money holdings by buying bonds and other financial instruments, thereby lowering market interest rates towards the equilibrium rate[16].

[16] Samuelson and Nordhaus (1996). pp. 553-4

Figure 1.2 below shows how changes in the money supply affect interest rates:

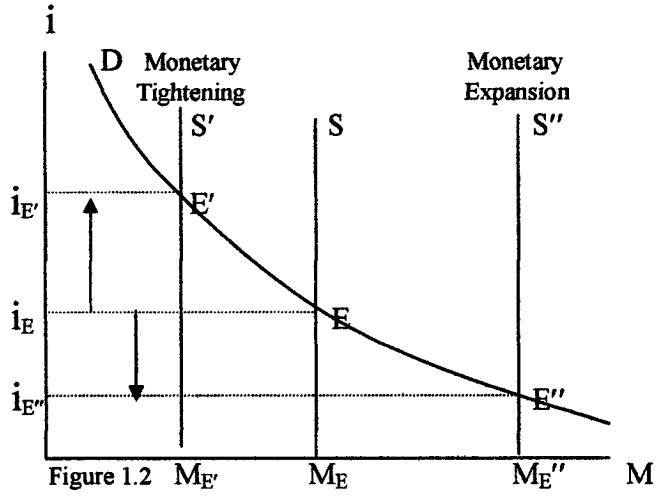

Figure 1.2

With an unchanged demand for money, a tightening monetary policy shifts the money supply curve to the left, raising market interest rates. An expansion of the money supply has the opposite effect[17].

Based on the discussion above, we can realize that the effect of monetary policy instruments on interest rates is an indirect effect and is transmitted through the money supply. If the Central Bank decides to increase interest rates, it has to manipulate its instruments in a way that would reduce the money supply. This can be done through an open-market sale, a higher reserve-requirement ratio, a higher discount rate, and through a higher guarantee margins against loans. The desired level of interest rates determines the correspondent target level of money supply, which in turn determines how to manipulate the available instruments based on the measured effect of the latter on the money supply.

[17] Gowland (1991). pp. 72-5

Conclusion

As a conclusion, monetary policy is conducted by the nation's Central Bank. This latter often focuses on intermediate targets such as the money supply and the interest rates to guide monetary policy. The interest rate is a consequence and is determined by fluctuations in the money supply. This latter is determined by three groups: the Central Bank, private banks, and the general public. The Central Bank sets the monetary base, which is the quantity of Central Bank's liabilities that can be used as money. Private banks and the general public, along with the Central Bank, interact to determine the money multiplier, which is the ratio of the money supply to the monetary base and equal to (cu + 1) / (cu + res), where *cu* is the public's desired ratio of currency to deposits, and *res* is the ratio of reserve to deposits. The Central Bank can affect the size of the money supply through open-market operations, changes in the legal reserve requirements, discount rate and credit control. Those are the major tools that the Central Bank has at its disposal to control the monetary policy. An open-market sale (in which the Central Bank assets are sold for currency or bank reserves) reduces the monetary base and thus the money supply. An open-market purchase (in which the Central Bank uses money to buy assets from the public) increases the monetary base and the money supply. An increase in reserve requirements raises the reserve-deposit ratio, lowering the money multiplier and thus the money supply. A decrease in discount rate increases discount window lending (banks' lending from Central Bank), raising the monetary base and the money supply. And finally, The Central Bank can affect the volume of credit granted by banks through the credit control tool. A decrease in the volume of loans granted by banks leads to higher reserve-deposit ratio. This leads the money multiplier to decrease causing a contraction in the money supply for any level of the monetary base. In the case of

public borrowings, the resulted contraction in the volume of credits expanded to the non-bank private sector has no effect on the money supply unless there is excess borrowings, debt-service burden on external debt, high interest rates on government securities, and corruption. In such cases one might not observe a contraction in the money supply, but will realize an absence of the major role of money as an incentive for productive investment.

Chapter 2

Effect of Monetary Policy on the Business Cycle

Everyone would agree that one of the most crucial tasks faced by economists is to explain the determination of income; that is, the level of prices and output, and so of unemployment. Economists have disagreed for centuries about the relative importance of monetary forces in the determination of income. Some have argued that the money supply is largely responsible for determining prices and output, whereas others have argued that it is largely irrelevant and that money does not matter. In the 1960s this controversy became widely publicized as the "monetarist–Keynesian debate"[1]. Both these groups were represented as holding the extreme positions "only money matters" and "money does not matter at all". Keynesians proposition is that income causes money. However, Monetarists proposition is, as Philip Cagan[2] put it: "the quantity of money has a major influence on economic activity and the price level, and the objectives of monetary policy are best achieved by targeting the rate of growth of the money supply".

We will try to explore this debate. In the previous chapter we have seen how money is created and how government can control the money supply using the monetary policy instruments that are at its disposal. In this chapter we will illuminate the processes whereby money might influence income.

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[1] In the 60s and 70s, there was a monetarist-Keynesian debate, over whether monetary or fiscal policy was more effective in influencing aggregate demand in the economy

[2] Cagan (1965). "Determinants and Effect of Changes in the Stock of Money 1875-1960." NBER Studies in Business Cycles, No.13

2.1 IS–LM Model

Since its invention, the IS–LM model has become the most widely taught macroeconomic model in the Western world and the starting point for much of the more sophisticated monetary analysis. The model is not without its critics or its limitations (to be discussed later), but it is still very important for its power to focus on crucial features of monetary analysis. At least in its basic form, an essential feature of the model is an *indirect transmission mechanism* of monetary policy. A change in the money supply leads to a change in interest rates, which in turn leads to a change in income[3]. In other words, the monetary authorities can administer a shock to the monetary sector by changing the money supply. This will lead to a change in interest rates, which will influence the real sector. The impact of such a change in the money supply on income will depend upon:

1. How large a change in interest rates is generated by a given change in the money supply
2. How large a change in the level of aggregate expenditure (demand) is generated by this change in interest rates, that is, how large is the interest elasticity of expenditure[4].

The effect of a change of the money supply upon aggregate demand and income will be combined results of these. Whenever a change in the money supply has only a small effect on interest rates, or a change in interest rates has only a small effect on income (output), monetary policy will be relatively ineffective.

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[3] Hicks (1937). "Mr Keynes and the Classics." *Econometrica,* Vol. 5 (April), pp. 147–159

[4] Liu (2000). "Seasonal Cycles, Business Cycles, and Monetary Policy." *Journal of Monetary Economics*, Vol. 46, pp. 441–464

It is possible to analyze the factors that determine the size of these responses. The first – the effect of a change in the money supply on interest rates – depends upon the working of the monetary sector, that is its applications of the monetary policy instruments[5]. The equilibrium condition is that the demand for money should be equal to the supply of it. The supply of money is assumed to be determined basically by the Central Bank, which can change it through its monetary policy instruments, as discussed. The demand for money depends upon the rate of interest – the price of holding money.

The response of interest rate to a shift of an inelastic supply curve (vertical curve) always depends upon the elasticity of demand. When demand is inelastic (Fig 2.1(a)) the change in interest rate is relatively large, whereas when it is elastic (Fig 2.1(b)) the effect is small[6].

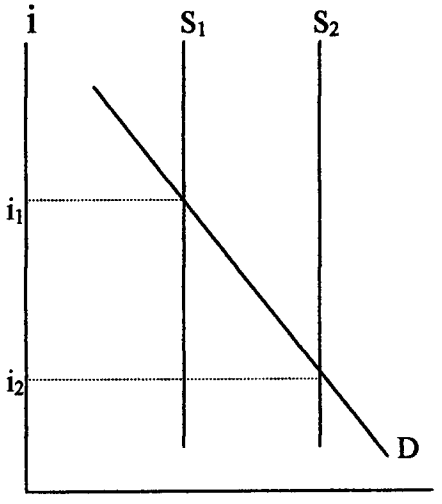

Figure 2.1(a) Money supply (M)

Greater reduction in interest rates
Demand for money is inelastic

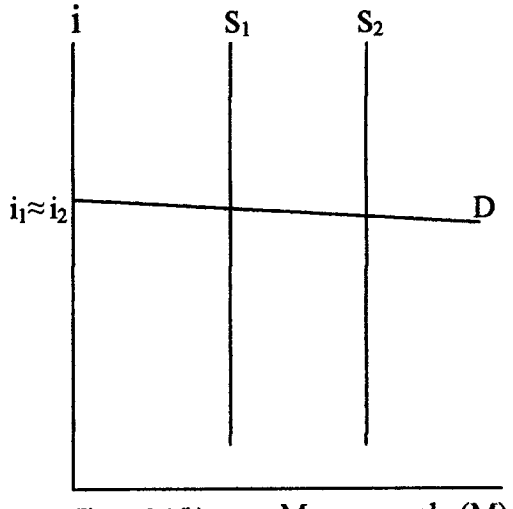

Figure 2.1(b) Money supply (M)

Slight reduction in interest rates
Demand for money is elastic

[5] Refer to chapter 1 section 1.3.3

[6] Cole and Ohanian (2002). "Shrinking Money: the Demand for Money and the Nonneutrality of Money." *Journal of Monetary Economics*, Vo. 49, pp. 653–686

Thus, the more elastic is the demand for money, the smaller is the change in interest rates for a given change in the money supply. Hence, the more elastic is the demand for money, the less is the effectiveness of monetary policy, and vice versa[7].

The IS–LM model is a three-market model developed in 1937 by John Hicks. The three markets are: the labor market, the goods market, and the asset market. Possible equilibrium is calculated for each market separately. The three markets are then combined to produce the overall equilibrium for the system as whole.

The FE Line: equilibrium in the labor market

We begin with the labor market and the concepts of the full-employment level of employment and full-employment output. The full-employment level of employment $\bar{N}$ is the equilibrium level of employment reached after wages and prices have fully adjusted so that the quantity of labor supplied equals the quantity of labor demanded. Full-employment output $\bar{Y}$ is the amount of output produced when employment is at its full-employment level, given the current level of the capital stock and the production function. Algebraically, $\bar{Y} = AF(K, \bar{N})$, where K is the capital stock, A is productivity, and F is the production function[8].

The goal is a diagram that has the interest rate on the vertical axis and output on the horizontal axis. In such a diagram equilibrium in the labor market is represented by the full-employment line, FE, as shown in figure 2.2 below.

[7] Keynes (1971). "The Collected Writings of John Maynard Keynes". Vol. 14. London: Macmillan – for the Royal Economic Society
[8] Abel and Bernanke (1995). pp. 317-8

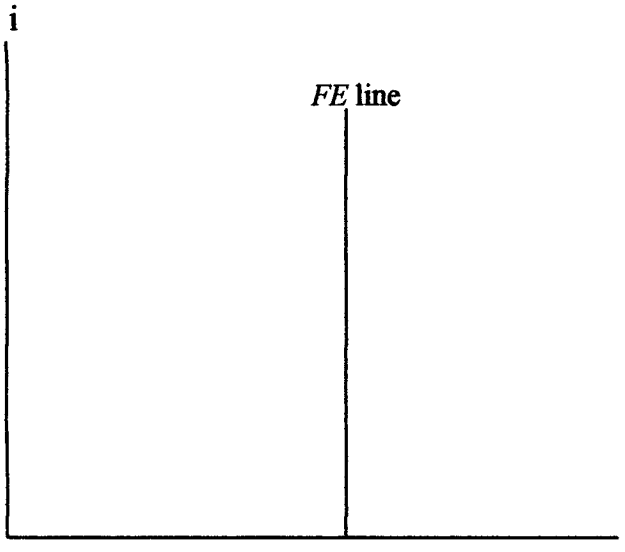

Figure 2.2

The FE line is vertical at $Y = \bar{Y}$ because, when the labor market is in equilibrium, output equals its full-employment level, regardless of the interest rate[9]. Any change that affects the full-employment output will cause the *FE* line to shift. Full-employment output increases – and thus the *FE* line shifts to the right – when the labor supply increases or when more output can be produced for the same amount of capital and labor (beneficial supply shock). Similarly, a drop in the labor supply or an adverse supply shock lowers full-employment output and shifts the *FE* line to the left.

The IS Curve: equilibrium in the goods market

The equilibrium condition for the goods sector is that the supply of goods should equal the demand for them; that is, planned output should equal planned expenditures, or planned injections (investments, exports and government expenditure) equal planned withdrawals (imports, taxation and savings).

[9] The interest rate affects investment and thus the amount of capital that firms will have in the future, but it doesn't affect the current capital stock, and hence does not affect current output. (Abel and Bernanke (1995) pp. 317)

The equilibrium in the goods market is described by a curve called *IS* curve. Specifically, for any level of output *Y*, the *IS* curve shows the interest rate *i* for which the goods market is in equilibrium. At all points on the *IS* curve desired investment, *I*, equals desired national savings, *S*. Figure 2.3 shows the derivation of the *IS* curve.

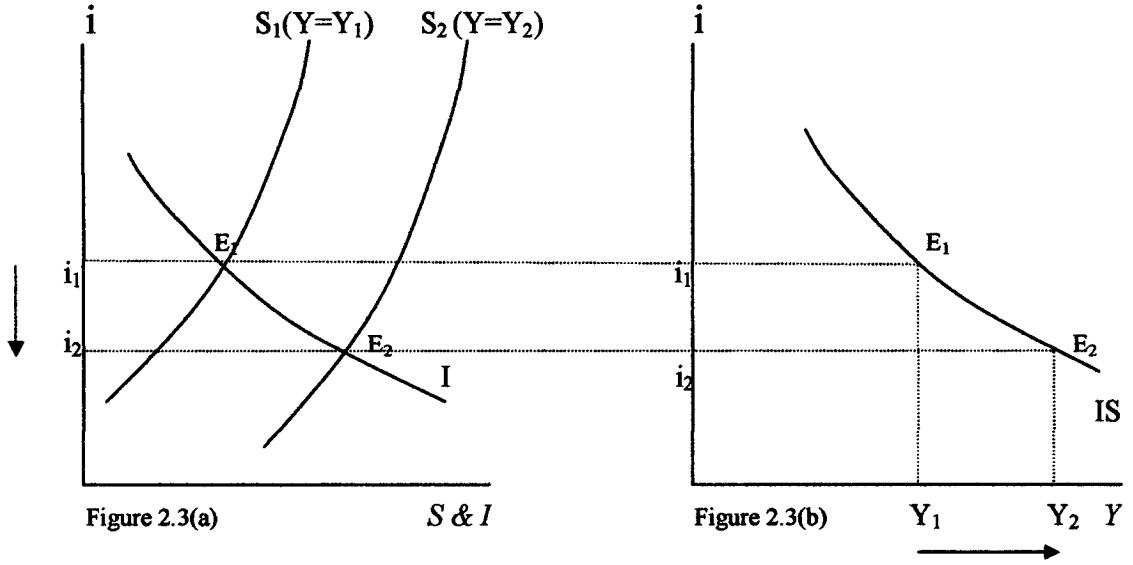

Figure 2.3(a) Figure 2.3(b)

In figure 2.3 (a), the investment curve slopes downward because an increase in the interest rate increases the user cost of capital, which reduces the desired capital stock and hence desired investment[10]. Desired investment isn't affected by current output, so the investment curve is the same whether Y equals Y_1 or Y_2. Concerning the saving curve, it slopes upward because any increase in the interest rate causes households to increase their desired level of saving. An increase in current output leads to more desired saving at any level of interest rate, so the saving curve S_2 for Y_2 lies to the right of the saving curve S_1 for Y_1. Figure 2.3 (b) shows the *IS* curve with output on the horizontal axis and interest rate on the vertical axis. Because a rise in output

[10] Samuelson and Nordhaus (1996). pp. 468–70

increases national desired saving corresponding to a reduction in interest rate, the *IS* curve slopes downward.

Some factors, such as an expected future output, an increase in wealth or an increase in government purchases, lead the desired saving to fall (because desired consumption or demand for goods rises), raising the interest rate that clears the goods market. Any factor that raises the interest rate that clears the goods market at a constant level of output shifts the IS curve up, and vice versa.

The LM Curve: asset market equilibrium

The equilibrium condition for the monetary sector is that the demand for money should equal the supply of it. The equilibrium in the money market is described by a curve called *LM* curve. Specifically, for any level of output *Y*, the *LM* curve shows the interest rate *i* for which the money market is in equilibrium. At all points on the *LM* curve money demand, *MD*, equals money supply, *MS*. Figure 2.4 shows the derivation of the *LM* curve.

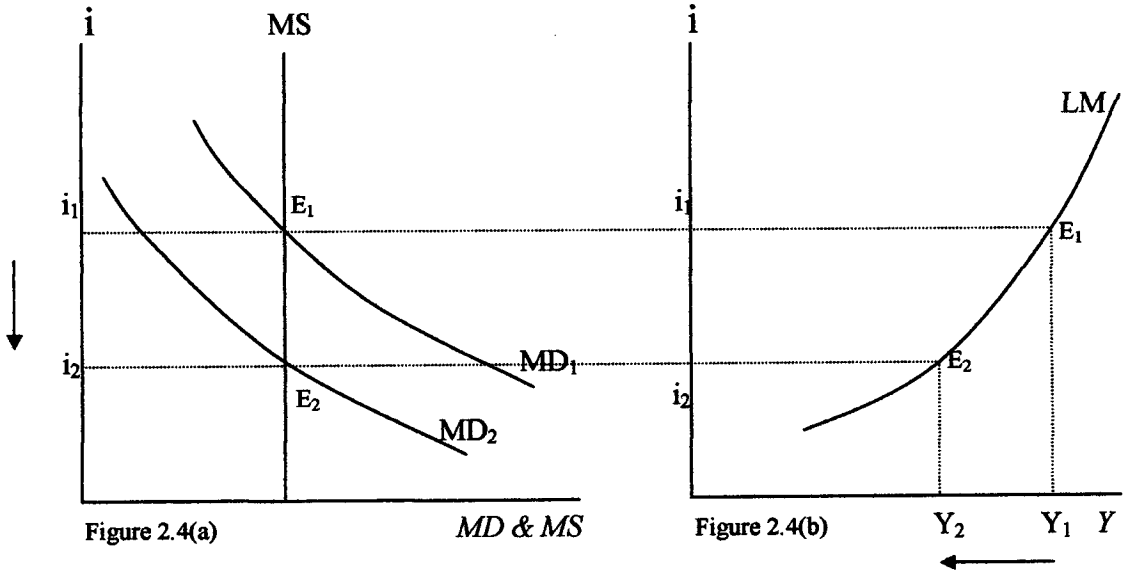

Figure 2.4(a)

Figure 2.4(b)

In figure 2.4 (a), the money demand curve slopes downward because an increase in the interest rate causes holders of wealth to demand less money. The money supply curve remains fix because the money supply is set by the Central Bank. Figure 2.4 (b) shows the *LM* curve with output on the horizontal axis and interest rate on the vertical axis. Because higher output raises money demand, and thus raises the interest rate, The *LM* curve slopes upward from left to right[11].

For constant output, any change that reduces money supply relative to money demand, such as a contraction in the nominal money supply or an increase in price level, will increase the interest rate that clears the asset market and cause the LM curve to shift up, and vice versa. In addition, for constant output, any factor that increases money demand raises the interest rate that clears the asset market and shifts the LM curve up, and vice versa. Factors that increase money demand include an increase in wealth, an increase in the risk of alternative assets relative to the risk of holding money, and a decline in the liquidity of alternative assets.

General equilibrium

The labor market, the goods market, and the asset market can be put together in order to examine the equilibrium of the economy as a whole. The three markets are linked by the rate of interest. Any shock to either market causes the rate of interest to change and so affects the other sector and initiates an interactive process until equilibrium is reattained[12].

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[11] Cole and Ohanian (2002). "Shrinking Money: the Demand for Money and the Nonneutrality of Money." *Journal of Monetary Economics*, Vo. 49, pp. 653–686

[12] Modigliani (1963). "The Monetary Mechanism and its Interaction with Real Phenomena." *Review of Economics and Statistics*, Vol. 45, pp. 79–107

Equilibrium values are calculated for two variables: nominal income (output) and the interest rate. Such a situation is called a general equilibrium. Figure 2.5 illustrates how the general equilibrium of the economy is determined.

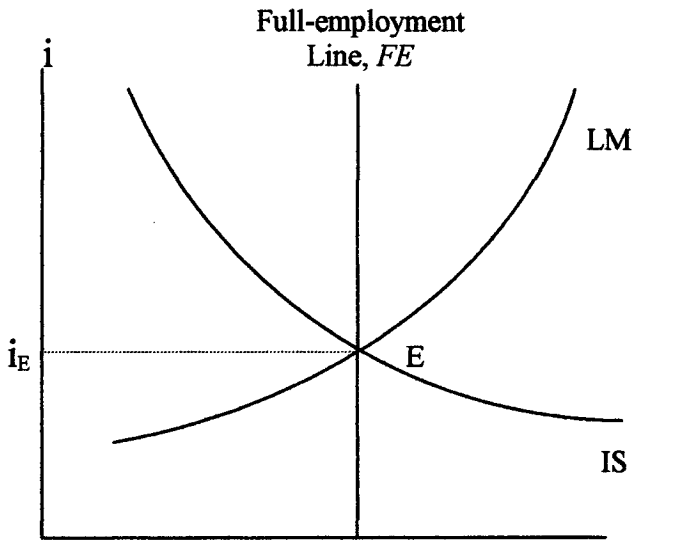


Figure 2.5

The interaction of the *IS*, *LM*, and *FE* curves represents the only point of equilibrium for the system as whole, since the three markets are in equilibrium at this point and only at this point.

The IS–LM model is most useful when used to calculate a new equilibrium level of income and interest in response to a change in an exogenous variable produced by an act of government policy. Considering monetary policy, the Central Bank used its tools to affect the money supply. When the money supply changes, the effect is to shift the LM curve.

The reasoning is straightforward. A decrease in the money supply does not shift the IS curve because, with output and interest rate held constant, a change in the money supply doesn't affect desired national saving and desired investment. However, a decrease in the money supply does shift the LM curve up, which is shown in figure 2.6 as a shift from LM to LM_1. The LM curve shifts up because, at any level of output, a decrease in the money supply raises the interest rate needed for reattaining equilibrium in the money market as shown earlier and illustrated in figure 2.1.

A higher interest rate is a movement along the IS curve and corresponding for a lower income as shown in figure 2.5. Hence, for a higher interest rate and a lower income, each point along the LM curve will have to shift in an upward direction.

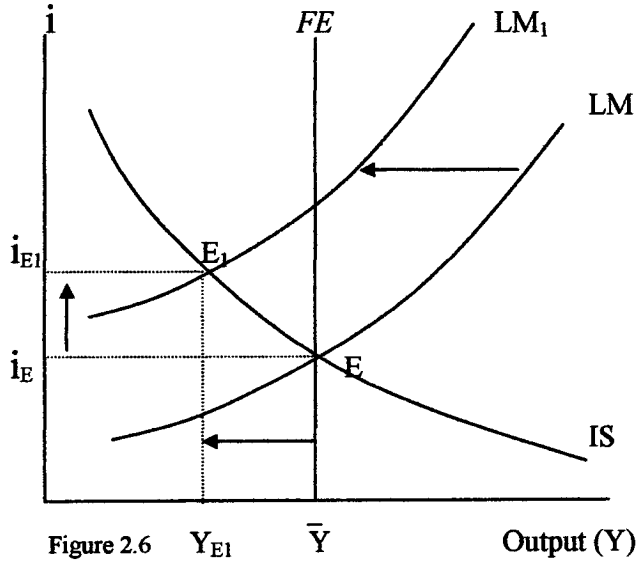


Figure 2.6

Based on this analysis, a monetary tightening increases the interest rate and decreases income. The sequence of events[13] that might explain this transmission mechanism can be described as follows: after the decrease in the money supply, holders of wealth are holding less money in their portfolios than they desire at the initial values of income and the interest rate. To bring their portfolios back to balance, they try to sell their nonmonetary assets to get money. Consequently, as holders of wealth decrease their demand for nonmonetary assets, they put downward pressure on the price of those assets, which raises their interest rate.

The higher interest rate decreases the demand by households for consumption. With higher interest rate and lower spending on goods, firms will respond by decreasing their production and hence their demand for investment. Therefore, the aggregate demand for goods falls. The decrease in aggregate demand causes a leftward shift of the AD curve as drawn in figure 2.7 below.

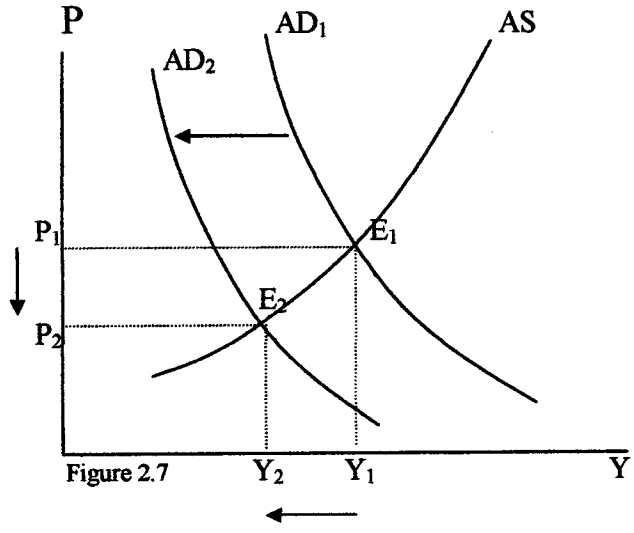


Figure 2.7

[13] Bental and Eden (2002). "Reserve Requirements and Output Fluctuations." *Journal of Monetary Economics*, Vol. 49, pp.1597–1620

This *AD–AS* framework illustrates the last step in the monetary transmission mechanism. It shows how output decreases in response to a lower aggregate demand resulted by the tightening monetary policy.

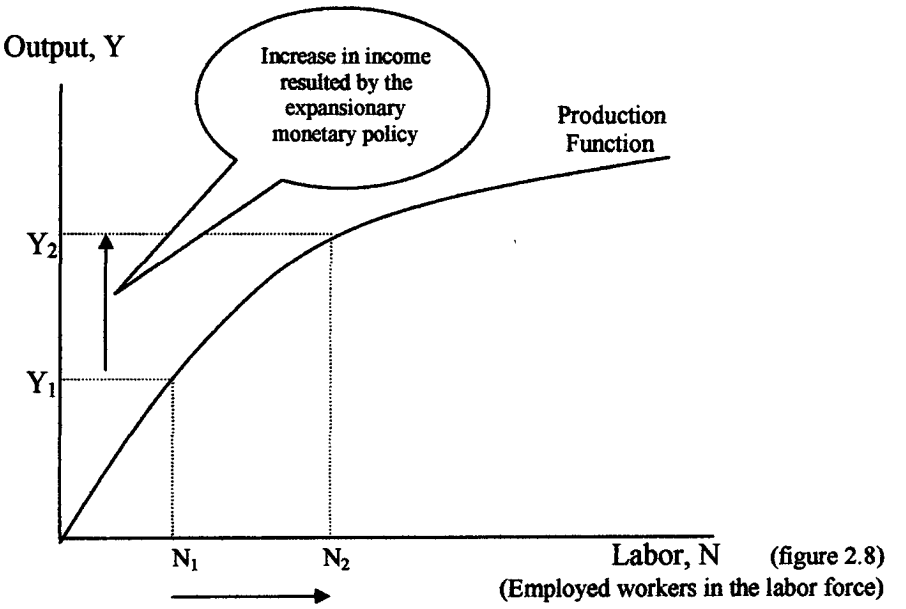
In addition to the output, the price level, which is another ultimate objective of monetary policy, has appeared in this stage. The decrease in the money supply that leads to a negative economic growth leads also to a decrease in prices.

The reason behind this is the relatively quick decrease in aggregate demand resulted by the decrease in the money supply, and which is not offset by a decrease in the aggregate supply, at least in the short run. This puts downward pressure on prices and reduces inflation.

To this point, we have described the indirect transmission mechanism and the effect of a tightening monetary policy on two different ultimate objectives (output and price) based on the IS–LM model. Thus, we still have to identify the effect of this decrease in the money supply on the labor market status or the employment level – the last ultimate objective of monetary policy.

Employment and output are interrelated. Of the various inputs to production, the most important is labor. The following production function shows how labor input is related to output: $Y = AF(K,N)$ or $Y = Ak^{n}N^{n-1}$ (where A represents productivity, K, the capital stock, F, a function relating output to capital and labor, and N the number of workers employed).

The shape of the production function is illustrated in the figure below:



(figure 2.8)

This production function shows how much output an economy could produce at each level of employment (labor input), holding productivity and the capital stock constant. It demonstrates that for any decrease in output, less labors are needed to be employed. Thus, a monetary policy that decreases output, a tightening one, decreases the employment level also.

In addition to the production function, the relationship between output and employment can be identified through Okun's Law[14]. Okun's Law states that for every 2.5 percent that output falls relative to potential output, the unemployment rate rises 1 percentage point.

[14] Abel and Bernanke (1995). pp. 97–9

Okun's Law is expressed algebraically as:

$$(\bar{Y} - Y) / \bar{Y} = 2.5 (U - \bar{U})$$

Where:

- $\bar{U}$ is the natural unemployment rate
- U is the actual unemployment rate.
- $\bar{Y}$ is the full-employment output or the potential output.
- Y is the actual level of output

Accordingly, any change in output in response to an act of government monetary policy allows to measure the relative change in the labor market status, and hence the effect on employment.

In summary, the IS–LM model has provided an indirect transmission mechanism through which monetary policy affects the business cycle. It showed how the effect of any change in the money supply, in response to the Central Bank's acts using monetary policy instruments, can be transmitted to influence its ultimate targets. However, as mentioned earlier, this model is not without its critics or its limitations. We will discuss those issues later after introducing the "quantity theory of money", a *direct* transmission mechanism from money to income.

2.2 Quantity Theory of Money

The quantity theory of money is a hypothesis that money determines income. It contains the simplest and clearest example of a *direct transmission mechanism* from money to income.

The quantity theory asserts that a proportionate relationship exists between money and income[15] and is expressed algebraically as: $MV = PQ$

Where:

- M is the money stock.
- V is the velocity of money. It measures how often the money stock turns over each period.
- Q is the quantity of final goods and services newly produced during a fixed period of time.
- P is the price levels at which the final goods and services are sold.

The quantity theory states that the money stock times its velocity must be equal to income. In the short run, the velocity is assumed to be constant. so,

$$\Delta M / M = \Delta Q / Q + \Delta P / P$$ [16]

Accordingly, an increase in the money supply will necessarily lead to an increase either in the price levels or in the quantity of products and services.

Different "quantity theorists" have different opinions about which of price or output changes in response to a change in the money supply. Some believe that it is always price that changes, whereas others tend to emphasize that it is output which changes. Some believe that output changes in the short term and price in the longer term, where the inflation rate will be equal to the money growth rate[17].

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[15] Flodén (2000). "Endogenous Monetary Policy and the Business Cycle." *European Economic Review*, Vol. 44, pp. 1409–1429

[16] Naimy (2003). "Marchés Emergents, Financement des PME et Croissance Economique – Etude du Cas Libanais."

[17] Christensen (2001). "Real Supply Shocks and the Money Growth–Inflation Relationship." *Economics Letters*, Vol. 72, pp. 67–72

In addition, some results point out an asymmetric response of prices to monetary shocks, increasing when money supply increases but not decreasing when money supply is contracted[18].

Although it provides the simplest and clearest example of a *direct transmission mechanism* from money to income, the quantity theory of money is not without its critics or its limitations. The assumptions that the velocity of money is constant and that the effect of a change in money supply on the economy is independent from interest rate would be denied by many economists. Follows different opinions about discussed issues covering both, the IS–LM model and the quantity theory of money.

2.3 Counter-arguments, critics and empirical evidences

In the IS–LM model there is no difference between a policy whose target is expressed in terms of money and one expressed in terms of interest rates[19]. In order to increase income, the authorities increase the money supply and so shift the LM curve in a rightward direction. This achieves their objective and leads the interest rate to fall. However, some believe that instead authorities might reduce the interest rate first, which causes a move along the IS curve in a rightward direction[20]. This also would increase income. The monetary policy instruments that are responsible to achieve this would necessarily shift the LM curve in a rightward direction. Otherwise the money

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[18] Darbha (2000). "Dynamics of Money, Output and Price Interaction – Some Indian Evidence." *Economic Modelling*, Vol. 17, pp. 559–588

[19] Flaschel and Gong (2001), Friedman (1982), and Swank (1999). "A Keynesian Macroeconometric Framework for the Analysis of Monetary Policy Rules." *Journal of Economic Behavior & Organization*, Vol. 46, pp. 101–136

[20] Sims (1972). "Money, Income, and Causality." *American Economic Review*, Vol. 62 (September), pp. 540-552

market would not be in equilibrium. This discussion is central to many debates concerning the application of the IS–LM model.

In addition, he IS–LM model as well as the quantity theory of money are based on the assumption that the authorities determine the money supply. This assumes that it is both independent of income and controllable. This would be denied by many economists who believe that the changes in the money supply linked to output changes might take the form of changes in the deposit-to-currency ratio[21], which is that part of the money stock that the government does not control. This pattern suggests that not all output fluctuations are caused by the parts of the money stock that are under the control of the monetary authority, for example, the monetary base[22].

In the quantity theory of money the velocity of money is assumed to be constant. This great assumption made changes in output dependent only upon changes in the money supply, omitting the interest rate. However, some empirical evidences suggest that velocity of money might change, especially when dealing with narrow money (M_1). Although some economists suggest that the effect of monetary policy on interest rates and the business cycle is not affected by changes (if any) in velocity of money[23], it has been commonly recognized that interest rates should decrease in response to a positive velocity change, as does in response to an expansionary monetary policy.

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[21] Bali (2000). "U.S. Money Demand and the Welfare Cost of Inflation in a Currency–Deposit Model." *Journal of Economics and Business*, Vol. 52, pp. 233–258

[22] King and Plosser (1984). "Money, Credit, and Prices in a Real Business Cycle." *American Economic Review*, Vol. 74 (June), pp. 363-380

[23] Cole and Ohanian (2002). "Shrinking Money: the Demand for Money and the Nonneutrality of Money." *Journal of Monetary Economics*, Vo. 49, pp. 653–686

Moreover, new evidences come to suggest that changes in velocity of money and changes in monetary policy might even lead to opposite effects in the financial market[24]. The reasoning behind this is that when money supply increases, the greater liquidity leads to a decrease in interest rates. Firms are willing then to accept this excess liquidity from financial intermediaries only if the cost of borrowing is lower. On the other hand, when a velocity change hits the goods market, consumers will find themselves with more money than necessary and will increase spending. As a consequence, prices rise. This will lead to an increase in the value of the marginal product of labor, which causes a shift in labor demand from the firms. Since firms have to borrow in order to finance labor costs, the process will ultimately lead to higher interest rates[25].

Some economists suggest that the effect of monetary policy on the economy may depend on the financial structure of banks. For example, bigger effects of monetary policy on output are to be expected if banks have low levels of liquid assets. According to the lending view and the money creation process discussed, monetary policy affects output at least in part through its impact on the supply of bank loans to firms. Two conditions are necessary for a distinct bank-lending channel to be operative. First, firms do not have perfect substitutes for bank loans available as a means of financing their activities. Second, by changing the quantity of reserves available to the banking system through the legal reserve requirements for example, monetary policy can affect the supply of bank loans. This requires that banks do not insulate their loan supply from shocks to their reserves.

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[24] Borda and Jonung (1990). "The Long-Run Behavior of Velocity." *Journal of Policy Modeling,* Vol. 12, pp. 165–197

[25] Padrini (2002). "Velocity Innovations, Financial Markets, and the Real Economy." *Journal of Monetary Economics*, Vol. 49, pp. 521–532

However, some argue that bank loan supply is effectively insulated from reserve shocks because banks can switch to alternative forms of finance by issuing CDs or other securities. In this case, then, banks with a low stock of liquid assets should cut back their lending more in response to a monetary tightening. The reason is that banks that have large amounts of very liquid securities have the option of selling those, rather than incurring the cost of issuing uninsured CDs, in order to maintain lending[26]. Based upon this reasoning, when a country's banking sector has a low capital-asset ratio, its output growth is more sensitive to manipulations in monetary policy instruments than the output growth in a country which banking sector has a high capital-asset ratio.

After discussing different opinions from different scholars, we will see in the next chapter how the exchange rate might interact with the monetary policy and discuss the role it might play in the transmission mechanisms discussed above.

Conclusion

As a conclusion, the IS–LM model has provided an indirect transmission mechanism through which monetary policy affects the business cycle. It showed how the effect of any change in the money supply, in response to the Central Bank's acts using monetary policy instruments, can be transmitted to influence its ultimate targets.

It states that an increase in the money supply leads the interest rates to fall, which in turn leads income, prices and employment to rise (illustration of Okun's Law); and

[26] Kashyap and Stein (2000). "What Do a Million Observations on Banks Say about the Transmission of Monetary Policy?" *American Economic Review*, (June), pp. 407-428

vice versa. It states also that the impact of any change in the money supply depends on how large a change in interest rates is generated by a given change in the money supply. Then how large a change in the level of aggregate demand is generated by the change in interest rates, that is, how large is the interest elasticity of expenditure.

The quantity theory of money, which is a hypothesis that money determines income, has provided a simpler example of the impact of monetary policy on the economy. It is based upon a direct transmission mechanism through which monetary policy affects the business cycle. The quantity theory asserts that a proportionate relationship exists between money and income ant that the money stock times its velocity must be equal to income. The velocity, which measures how often the money stock turns over each period, is assumed to be constant in the short run. Accordingly, the quantity theory asserts that in the short run, an x percent increase in the money supply will necessarily cause an x percent increase in nominal income.

The IS–LM model and the quantity theory of money are not without their critics or their limitations. Some believe that there should be a difference between a policy whose target is expressed in terms of money and one expressed in terms of interest rates. This is not the case in the IS–LM model. Others deny the assumption that the money supply is both independent of income and controllable – as considered in both transmission mechanisms – and argue that the changes in the money supply linked to output changes might take the form of changes in the deposit-to-currency ratio, which is that part of the money stock that the government does not control.

Some empirical evidences suggest that velocity of money might change, especially when dealing with narrow money (M_1). This argument would contradict with the quantity theory of money where the velocity is assumed to be constant in the short run; the assumption that makes changes in output dependent only upon changes in the money supply, omitting other factors.

Finally, some argue that the effect of monetary policy on the economy may depend on the financial structure of banks. For example, bigger effects of monetary policy on output are to be expected if banks have low levels of liquid assets and vice versa.

Chapter 3

Exchange Rates and their Interaction with the Monetary Policy

Exchange rates have become major issues that must be included in every study when discussing macroeconomic policy, because today, more than ever, we live in a highly interdependent world economic system. There are two primary aspects of the interdependence of the world's economies. The first is the increasing international trade in goods and services. The second is the worldwide integration of financial markets, which allows borrowers to obtain funds and savers to look for best lending opportunities almost anywhere in the world, not just in their own countries.

According to their major role that they play in the economy, we will try to identify how exchange rates might interact with monetary policy. To do so, we will follow different steps. First, we will identify how exchange rates are determined. Second, we will try to find out the role of monetary policy in the determination of exchange rates. And finally, we will discuss major exchange-rate systems, and observe how each of these might influence monetary decisions, and hence monetary targets.

3.1 Determination of the exchange rates

As a definition, the exchange rate (or foreign exchange rate), *e*, is the price of a currency. More precisely, the exchange rate between two currencies is the number of units of foreign currency that can be purchased with one unit of the domestic currency, say DC. It is determined by the supply and demand in the foreign exchange

market where different currencies are traded[1]. Figure 3.1 below aids in understanding the forces that determine the value of the domestic currency:

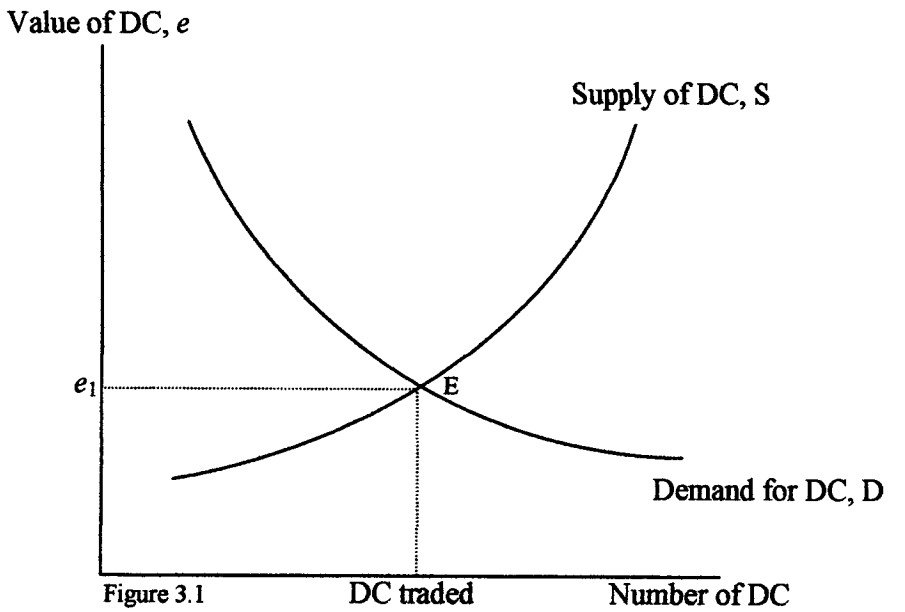

Figure 3.1

The horizontal axis of the diagram measures the quantity of the domestic currency (Cur) supplied or demanded, and the vertical axis measures the value of DC in terms of other currencies *e*. The supply curve for DC, S, shows the number of DC that people want to supply to the foreign exchange market at each price or value of the currency. The demand curve for the domestic currency, D, shows the quantity of DC that people want to buy in the foreign exchange market at each value of DC. The equilibrium value of the DC at point E is e_1, the exchange rate at which the quantity of DC supplied and the quantity of DC demanded are equal. Foreign individuals or firms demand the DC of country X in the foreign exchange market for two reasons:

1. To be able to buy X's goods and services (X exports)
2. To be able to buy X's real and financial assets (X capital inflows)

[1] Samuelson and Nordhaus (1996). pp. 618–630

Similarly, individuals or firms in country X supply DC in the foreign exchange market, thereby acquiring foreign currencies, for two reasons:

1. To be able to buy foreign goods and services (X imports)
2. To be able to buy real and financial assets in foreign countries (X capital outflows)

Thus factors that increase foreigners' demand for the domestic country "X" exports and assets will also increase the foreign exchange market demand for DC, raising its exchange rate. Likewise, the value of the DC will rise if the demand of individuals or firms in the domestic country "X" for foreign goods and services declines, for they will have to supply fewer DC to the foreign exchange market.

3.2 Effect of monetary policy on the exchange rates

In the IS–LM model analysis discussed, we have seen how the model is used to calculate a new equilibrium level of income and interest in response to a change in an exogenous variable produced by an act of government monetary policy. We now consider how changes in output and interest rates might affect the exchange rate.

1. Effects of changes in output: it is commonly recognized that spending by consumers depends in part on their current incomes. When domestic income rises, consumers will spend more on all goods and services, including imports. In order to increase their purchases of imports, domestic residents must obtain foreign currencies. Thus domestic residents must supply more domestic currency to the foreign exchange market[2].

[2] Michaelides Kalyvitis (2001). "New Evidence on the Effects of US Monetary Policy on Exchange Rates." *Economics Letters*, Vol. 71, pp. 255–263

As discussed earlier, an increased supply of domestic currency causes its value to fall and, thus, the exchange rate to depreciate. A decrease in the domestic income leads to opposite effects. Also, the increase in spending as a result of the higher domestic income will cause an increase in prices. Holding constant other factors, the increase in domestic prices induces both foreigners and domestic residents to consume less domestic production and more goods and services produced abroad, which lowers exports. Lower exports reduce the demand for domestic currency, and hence lead the exchange rate to depreciate.

2. Effects of changes in interest rates[3]*:* when a domestic country's interest rates rise, the country's real and financial assets will become more attractive to foreign savers seeking the highest return on their funds. Because domestic currency can be used to buy assets, a rise in the domestic interest rates also increases the demand for domestic currency, which in turns leads to exchange rate appreciation. A decrease in the domestic interest rates leads to opposite effects.

Based on the above discussion, a tightening monetary policy or a decrease in the money supply that increases the interest rates and reduces domestic income (as discussed in the IS–LM model), leads to exchange rate appreciation[4] as illustrated in figure 3.2. Similarly, an expansionary monetary policy or an increase in the money supply that reduces the interest rates and raises domestic income, leads to exchange rate depreciation.

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[3] Kollmann (2001). "Explaining International Comovements of Output and Asset Returns: The Role of Money and Nominal Rigidities." *Journal of Economic Dynamics &Control*, Vol. 25, pp. 1547–1583

[4] Eichenbaum (1995). "Some Empirical Evidence on the Effects of Shocks to Monetary Policy on Exchange Rates." *Quarterly Journal of Economics*, Vol. 110, pp. 975–1009.

Tightening monetary policy

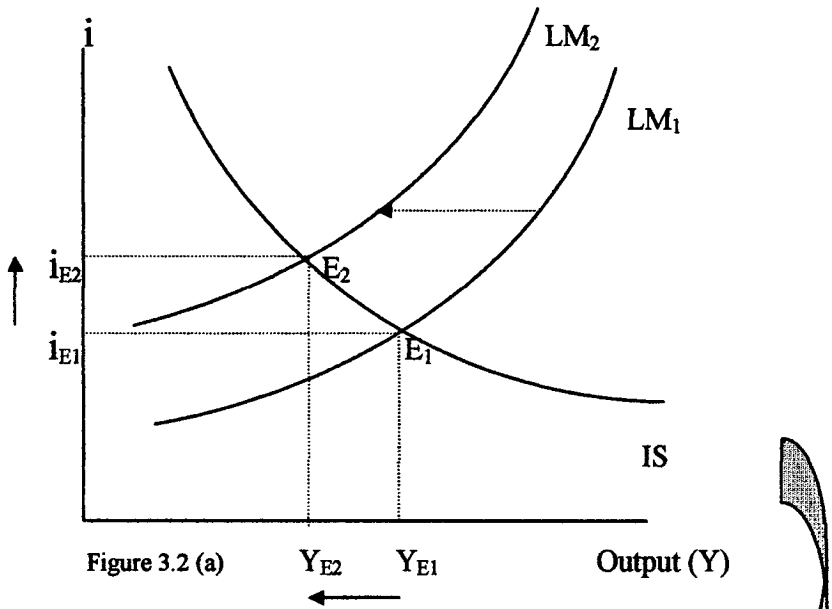

Figure 3.2 (a)

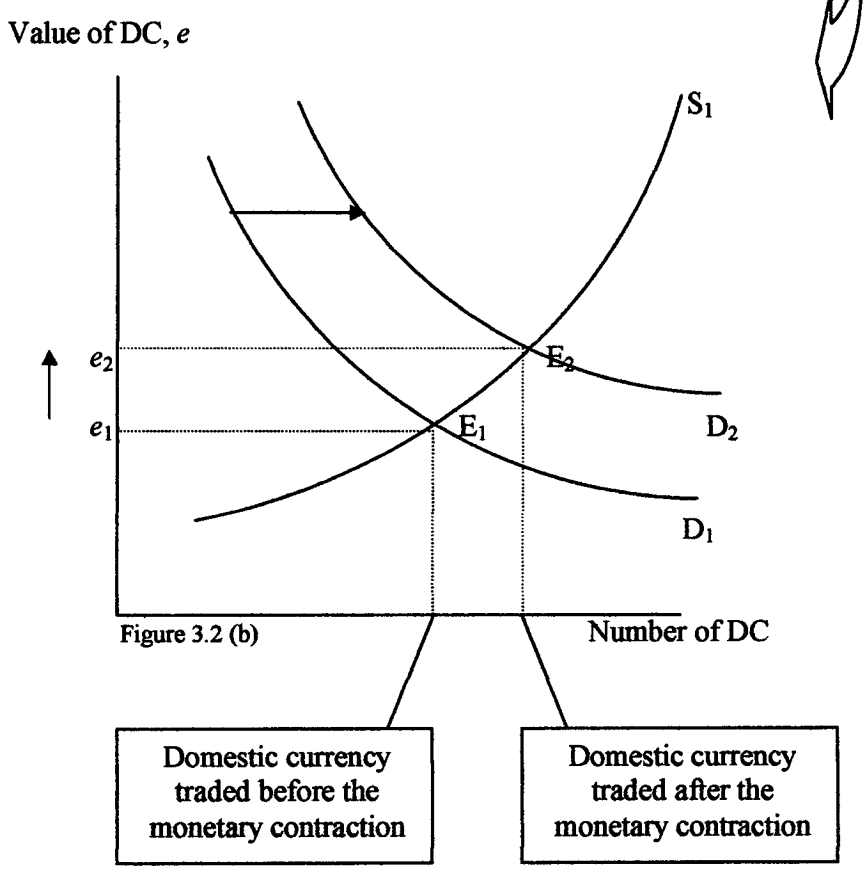

Figure 3.2 (b)

Domestic currency traded before the monetary contraction

Domestic currency traded after the monetary contraction

3.3 Exchange-rate systems and their interaction with monetary policy

In the previous section, we have shown how monetary policy might affect the exchange rates, and hence observed this latter as a consequence. However, when discussing the exchange rates, one should go further. The exchange rates would play different roles when setting monetary policy. The importance of these roles depends primarily on the exchange-rate system adopted[5]. In the next section we will discuss the two major exchange-rate systems – flexible and fix systems – and observe how each of these might influence monetary decisions, and hence monetary targets.

A. Flexible exchange-rate system

A country has flexible exchange rates when exchange rates move purely under the influence of supply and demand. In such a system, the government neither announces an exchange rate nor takes steps to enforce one. Accordingly, in a flexible exchange-rate system the conduct of monetary policy is not influenced by the exchange rates fluctuations.

If this were the case in such a system, one would argue that the exchange rates would keep depreciating as long as the government is conducting an expansionary monetary policy for example. This is based on the previous discussion showing that an expansionary monetary policy or an increase in the money supply reduces the interest rates and raises output and prices, and hence leads to exchange rate depreciation.

[5] Barth and Wong (1992). "Approaches to Exchange Rate Policy." Papers presented at the seminar on exchange rate policies in developing and transition economies, IMF institute, International Monetary Fund, Washington, D.C. pp. 15–20

However, this is not the case. As a first reaction, the exchange rate will actually depreciate in response to the increase in money supply. But then, an automatic adjustment mechanism[6] will take place making the exchange rate reattain its original value.

More specifically, we consider for example the increase in prices resulted by an increase in the money supply. As discussed, an increase in domestic prices will lower exports, reduce the demand for domestic currency, and hence lead the exchange rate to depreciate. The increase in domestic prices induces both foreigners and domestic residents to consume less domestic production and more goods and services produced abroad. Thus, exports of foreign countries will increase resulting in a higher demand for foreign currencies, and hence leading the exchange rates of foreign countries to appreciate. Consequently, foreign prices will rise leaving domestic prices with a competitive advantage.

The new competitive domestic prices induce both foreigners and domestic residents to consume more domestic production and less goods and services produced abroad. Thus, exports will increase resulting in a higher demand for domestic currencies, and hence leading the exchange rate to reappreciate; and the cycle continues. Based on this analysis, in a flexible exchange-rate system, where the automatic adjustment mechanism is responsible for dealing with exchange rates fluctuations, monetary decisions are free from exchange rate's influence[7]. However, this is not the case when a fixed exchange-rate system is concerned as will be shown in the next section.

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[6] Kollmann (2001). "Explaining International Comovements of Output and Asset Returns: The Role of Money and Nominal Rigidities." *Journal of Economic Dynamics & Control*, Vol. 25, pp. 1547–1583

[7] Mundell (1963). "Capital Mobility and Stabilization Under Fixed and Flexible Exchange Rates." *Canadian Journal of Economics and Political Science*, Vol. 29, pp. 475–485

B. Fixed exchange-rate system

In contrast to the flexible exchange-rate system where exchange rates are determined by supply and demand in foreign exchange markets, in a fixed exchange-rate system the value of the exchange rate is officially set by the government. In such a system, the government announces an exchange rate or takes steps to enforce one.

With fixed exchange-rate system, the value of the exchange rate set by the government may not be the one determined by the supply and demand for currency. In such a situation, most of the times the exchange rate is overvalued; that is, the official exchange rate is higher than the fundamental value of the exchange rate, or the value that would be determined by free market forces without government intervention. To deal with such a situation, that is to maintain the overvalued exchange rate, the government has three possible strategies.

First, the government could restrict international transactions by limiting or taxing imports or any other kind of capital outflows[8]. Such actions reduce the supply of the domestic currency to the foreign exchange market, thus raising the fundamental value of the exchange rate toward its fixed value. However, this kind of government intervention in international transactions is rarely used because it has many economic costs, including reduced access to foreign goods and credit.

Second, the government may become a demander of its currency in the foreign exchange market. When the exchange rate is overvalued as shown in figure 3.3, the

[8] Barth and Wong (1992). "Approaches to Exchange Rate Policy." Papers presented at the seminar on exchange rate policies in developing and transition economies, IMF institute, International Monetary Fund, Washington, D.C. pp. 57–60

supply of the country's currency to the foreign exchange market (point B) exceeds private demand for the currency (point A) at the official exchange rate.

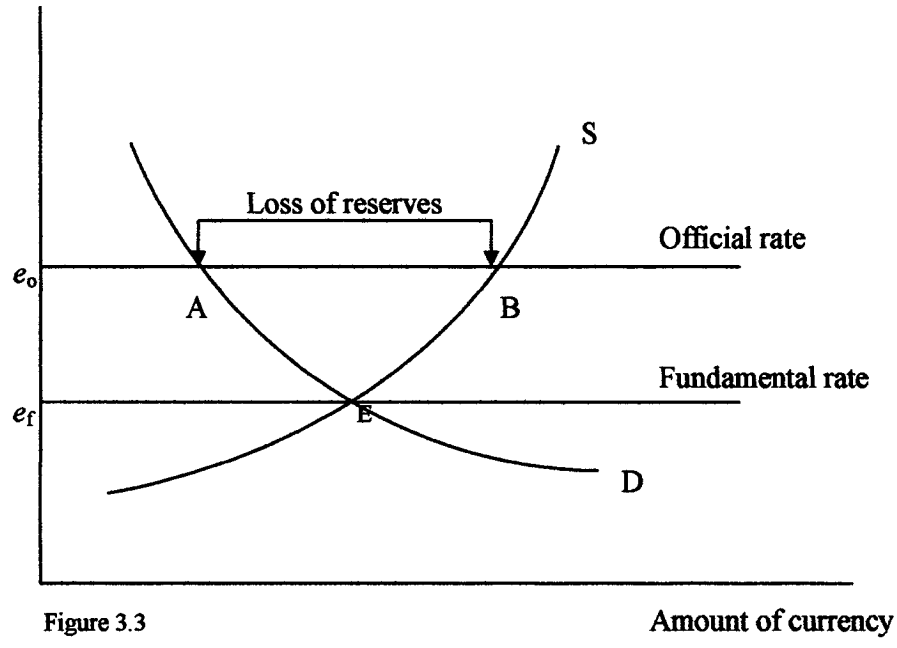

Figure 3.3

To maintain the value of the currency at the official rate, the government could buy back its own currency in the amount of AB in each period. These currency purchases are made by the nation's Central Bank using official reserve assets. Thus, amount AB measures the reserves the Central Bank must use in each period to support the currency in order to equalize the quantities of its currency supplied and demanded at the official exchange rate e_o. The resulted decline or loss of reserves during a particular year represents also the country's balance of payments deficit.

A Central Bank attempt to support an overvalued currency can be ended quickly and dramatically. The reason behind this is that financial investors begin to fear that an overvalued currency may soon be devalued, reducing the value of assets denominated in that currency relative to assets denominated in other currencies[9].

To avoid losses, financial investors sell their assets denominated in the overvalued currency in a panicky way, increasing the supply for that currency, and hence the gap between its quantities supplied and demanded. This widening gap increases the rate at which the Central Bank has to spend its official reserve assets to maintain the overvalued exchange rate. Accordingly, one can conclude that such a strategy isn't sustainable for long.

Finally, it has been commonly recognized that the best way to deal with such a situation, unless there is an intention to devaluate the currency, is to eliminate currency overvaluation by raising the fundamental value of its exchange rate until equals the fixed value. The best way for a country to do so is through contraction of its money supply.

In our earlier discussion of the effect of monetary policy on the exchange rates, we have seen how a tightening monetary policy would increase the demand for a domestic currency, shifting the demand curve in an upward direction. Figure 3.4 shows how this shift leads to a new equilibrium that equalizes the quantities of currency supplied and demanded at the official exchange rate e_o, thus eliminating currency overvaluation.

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[9] Wu (2001). "Exchange Rates, Stock Prices, and Money Markets: Evidence from Singapore." *Journal of Asian Economics*, Vol. 12, pp. 445–458

Contraction of money supply

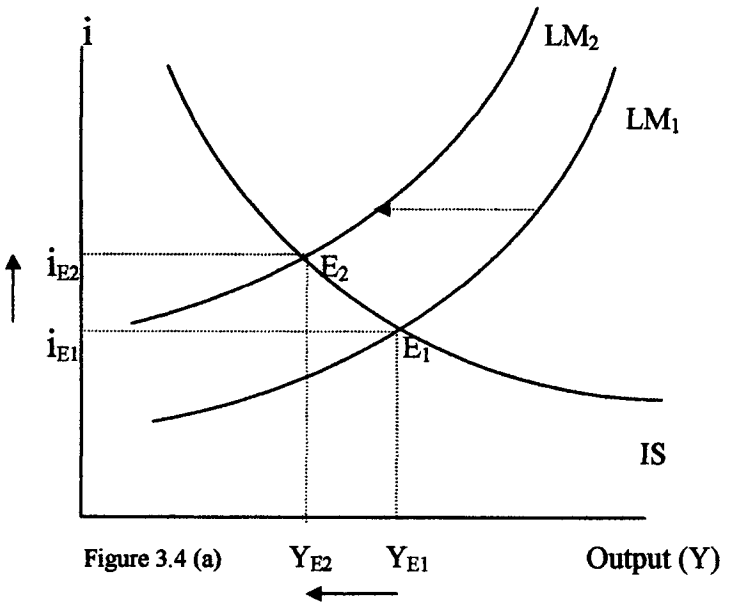

Figure 3.4 (a)

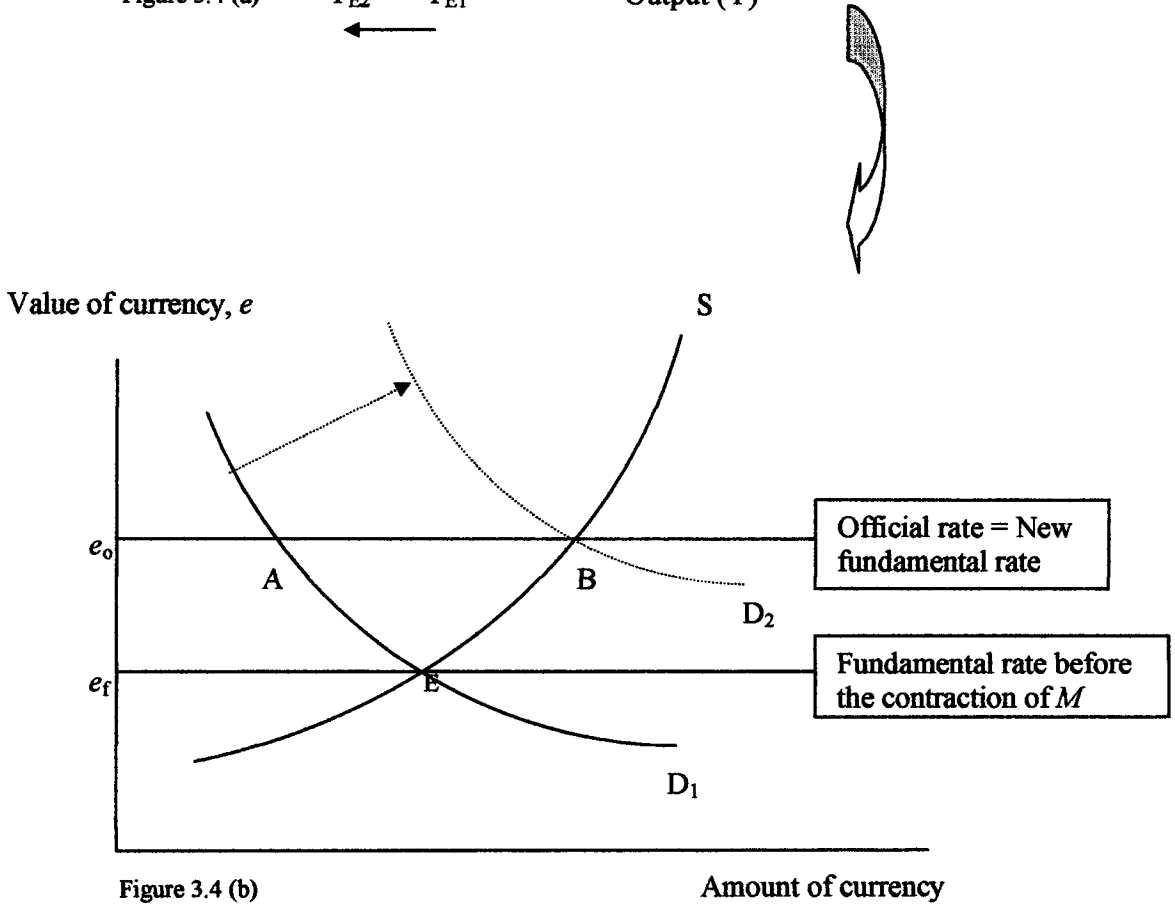

Figure 3.4 (b)

According to this analysis, one can realize the great influence of the fix exchange-rate system on monetary decisions and targets. Recall that the ultimate targets of monetary policy are growth in output, low unemployment and low inflation. The tightening monetary policy needed to eliminate currency overvaluation leads output and employment to fall. Also, when a country suffers from an economic recession, government then needs an expansionary monetary policy to enhance economic growth. Such a policy leads the exchange rate to depreciate reducing the value of the fundamental exchange rate, and hence increasing the gap between this latter and the official one as shown in the figure below.

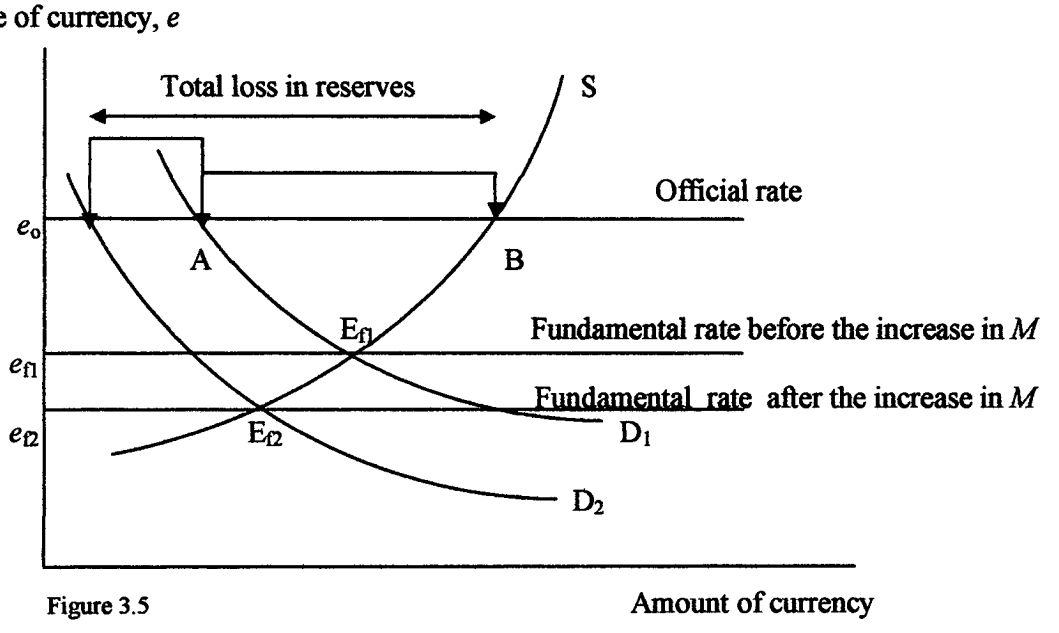

Figure 3.5

The above figure suggests that, in a fixed exchange-rate system, countries are not free to expand their money supplies in order to try to raise output and employment. Instead, the money supply is influenced by the condition that the official and fundamental values of the exchange rate be the same. As shown in figure 3.5, if the country wanted to expand its money supply to fight a recession – unless it decides to

devaluate the currency – it could do so only by creating an overvaluation problem, and hence additional loss of reserves and balance of payments deficit. Thus, under a fixed exchange-rate system a Central Bank cannot independently use monetary policy to pursue ultimate goals[10].

Conclusion

As a conclusion, the exchange rate, which is the price of a currency, is determined by the supply and demand in the foreign exchange market where different currencies are traded. Changes in output and interest rates affect the exchange rates. A decrease in interest rates leads the exchange rates to depreciate as does also an increase in output. Thus, an expansionary monetary policy or an increase in the money supply that reduces the interest rates and raises domestic income, leads to exchange rate depreciation.

In a flexible exchange-rate system, where the government neither announces an exchange rate nor takes steps to enforce one, the conduct of monetary policy is not influenced by the exchange rates fluctuations. In such a system an automatic adjustment mechanism is responsible to deal with changes in exchange rates. In a fixed exchange-rate system, the value of the exchange rate is officially set by the government. In such a system, most of the times the exchange rate is overvalued.

Without strong restrictions on international trade and finance (themselves economically costly), and with no ability for the Central Bank to deal with an overvalued exchange rate for a long time (loss in reserve assets), the best way to keep

[10] Mundell (1963). "Capital Mobility and Stabilization Under Fixed and Flexible Exchange Rates." *Canadian Journal of Economics and Political Science,* Vol. 29, pp. 475–485

a desired fixed exchange rate value is to eliminate currency overvaluation by raising the fundamental value until it equals the fixed value. The best way for a country to do so is through contraction of its money supply. However, a contraction in the money supply has a negative effect on the business cycle – the ultimate objective of monetary policy.

Thus, under a fixed exchange-rate system, unless there is an intention to devaluate the currency, a Central Bank cannot independently use monetary policy to pursue ultimate goals.

PART II

APPLICATION ON THE LEBANESE CASE

CHAPTER 4

TECHNIQUES OF MONETARY CONTROL APPLIED IN LEBANON

CHAPTER 5

EFFECT OF APPLIED MONETARY TOOLS ON INTERMEDIATE TARGETS IN LEBANON

CHAPTER 6

EFFECT OF LEBANESE MONETARY POLICY ON THE BUSINESS CYCLE

Chapter 4
Techniques of Monetary Control Applied in Lebanon

In the theoretical framework, we saw how the nation's Central Bank can affect the business cycle through its applications of the monetary policy instruments that are at its disposal, and how it uses some intermediate targets to be able to predict the several steps between these instruments and the ultimate objectives of the monetary policy. In this chapter, we will survey the applications of the monetary policy instruments in Lebanon throughout the 1990-2002 period.

Monetary policy in Lebanon is conducted by the Lebanese Central Bank (Banque du Liban, or BDL). BDL is the sole custodian of public funds, supervises and regulates the banking system and is vested by law with the exclusive authority of issuing the national currency. The Governor and four Vice Governors are appointed by decree from the Council of Ministers, acting on a proposal from the Minister of Finance.

BDL's primary role is to safeguard the currency and promote monetary stability, thereby creating a favorable environment for economic and social progress. The Central Bank also advises the government on various economic and financial matters. In conducting its monetary policy, the Central Bank uses a wide range of instruments, including reserve requirements on Lebanese Pound deposits with commercial banks, liquidity requirements on US Dollar deposits with commercial banks, Treasury bill

repurchase and swap agreements with commercial banks, as well as Lebanese Pound denominated certificates of deposits issued by Banque du Liban[1].

Since October 1992, monetary policy has been targeted at stabilizing the Lebanese Pound exchange rate and controlling the inflation rate and the money growth rate. Banque du Liban's exchange rate policy, which has been and still is BDL's primary policy objective, has been to anchor the Lebanese Pound nominal exchange rate to the US Dollar.

Monetary tools used to achieve the government's objectives can be identified through some of the BDL's rules and restrictions imposed on Commercial banks (discussed in the next section) and through the Treasury bill and bond markets where we can observe the applications of open-market operations and discount rates.

4.1 Central Bank's rules and restrictions imposed on commercial banks

The Central Bank of Lebanon was given wide authorities and powers to regulate and supervise the banking industry. We are concerned about monetary and financial regulations that would influence the credit conditions, such as:

1) Reserve requirements on Lebanese Pound deposits

2) Liquidity requirements on US Dollar deposits

3) Required subscription in Treasury bills

4) Required capital adequacy ratio (Cooke ratio)

[1] Ministry of Finance, country profile (2001)

4.1.1 Required reserves on Lebanese Pound deposits

Until September 2001, banks operating in Lebanon and accepting deposits has been required to form required reserves of 13% of deposits in Lebanese Pound as follows:

- A minimum of 3% of deposits in the form of special Treasury bills at a rate of 6%
- A minimum of 10% as a non-interest bearing current account[2]

In June 2001, BDL increased the required reserve-ratio from 13% to 15% for long-term deposits and to 25% for sight deposits[3]. Banks failing to keep such reserves will be obliged to call for and liquidate part of their loans and credits in order to attain the required reserves. Otherwise, they will be charged a penalty (300% per anum) set by the Central Bank of the value of the shortfall in the required reserves.

Some credits to productive economic sectors entitle the bank to some reserve exemptions. A circular issued by BDL (1999) allows banks to lower reserves requirements by 60% of the value of housing loans granted in Lebanese Pound, in accordance with a protocol concluded between the Association of Lebanese banks and the Public Cooperation for Housing[4].

Another circular issued by BDL (1999) authorizes banks extending loans in Lebanese Pound to small and medium-sized enterprises (SME) to lower reserve requirements by 60% of the value of such loans, when these are guaranteed by "Kafalat" – the newly established financial institution whose purpose is to guarantee SME financing[5].

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[2] The Central Bank Circulars, circular 1680 dated Nov. 10, 1998
[3] The Central Bank Circulars, circular 1918 dated June 02, 2001
[4] The Central Bank Circulars, circular 1770 dated Nov. 02, 1999
[5] The Central Bank Circulars, circular 1785 dated Dec. 24, 1999

4.1.2 Liquidity requirements on US Dollar deposits

Lending limits are imposed on foreign currency credits, with a ceiling of 70% of foreign currency deposits. The liquidity ratio is calculated as liquid assets (cash, deposits in the Central Bank, net deposits in banks, Treasury bills, accrued interest receivable) divided by deposits and other obligations (deposits to clients, public sector and related parties, transfers, engagement by acceptance, accrued interest payable, and other different credit accounts[6]). Since September 2001, banks have been required to keep 15% of their foreign currency deposits as obligatory interest bearing deposits[7] with the central Bank[8].

4.1.3 Required subscription in Treasury bills

Banks operating in Lebanon were expected to carry out subscription in Treasury bills as a minimum requirement of 60% of their deposits in Lebanese Pound. Yet, this rate was amended in 1994 to become 40%, and then in 1997 banks were exempted from mandatory subscription[9]. The actual banks' holdings of Treasury bills and further issues concerning the Treasury bill market will be developed later in this chapter.

4.1.4 Capital adequacy or solvency ratio

From March 1995, all commercial banks were required to meet a minimum risk adjusted capital to assets ratio of 8% in line with the guidelines of the Committee on Banking Regulation and Supervisory Practices of the Bank for International Settlements. A circular issued by Bank of Lebanon (1999) raises the ratio to 12% in

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[6] The Central Bank Circulars, circular 1709 dated Mar. 18, 1999
[7] The interest rate on these obligatory deposits is equivalent to the interest rate on long term US Dollar deposits with BDL, that is 2.23% at the end of 2001 and 2.14% at the end of 2002
[8] The Central Bank Circulars, circular 1949 dated Sep. 20, 2001
[9] The Central Bank Circulars, circular 1516 dated Apr. 24, 1997

two steps (10% at year-end 2000 and 12% at year-end 2001). The aim is to push under-capitalized banks to merge with other banks.

The capital adequacy ratio is computed as the ratio of private funds – the 10% of banks' net annual profits held in reserves – over assets plus off balance sheet items subject to risk weights and conversion factors according to specific proportions as shown in table A2 in the appendix. In an attempt to induce banks to meet the required solvency ratio, the Central Bank set it as a primary condition that banks are supposed to abide by if they are to revalue their assets and generate a revaluation gain, especially when the book value of the bank's fixed assets, such as real estate, is below their current market value.

4.2 Open-market operations

Throughout the 1990-2002 period, the open-market sale of Treasury bills has been the major policy instrument used by the Central bank. In addition, the Republic of Lebanon has been an active issuer on the international capital markets, introducing foreign investors to Lebanese risk, and acting as a benchmark for Lebanese institutions, mainly banks that have frequently tapped the international bond market thereafter. This section surveys the Treasury bill and the international bond markets, identifying the open-market operations and the objectives of their applications.

4.2.1 Treasury bill market

Lebanese Treasury bills (Tbs.) are Lebanese Pound-denominated Treasury fixed income securities issued by the Ministry of Finance and auctioned by the Central Bank for the account of the issuer. They are short-term instruments (two years and

less) and are auctioned on a weekly basis. Lebanese Treasuries are the direct, general and unconditional obligations of Lebanon. The issuance of Lebanese Treasuries is governed by decree 1348, dated May 26, 1978, which implemented Law no. 16/78 dated May 2, 1978. The decree authorized the Minister of Finance to issue Treasury bills, notes and similar obligations. The Minister of Finance subsequently appointed the Central Bank to act, on his behalf, with respect to the issuance of Lebanese Treasuries.

For each fiscal year, the actual amount of Lebanese Treasuries authorized to be issued is fixed pursuant to the budget adopted by the Lebanese Parliament for that fiscal year. They are divided into two categories: three, six and twelve-month bills which are zero-coupon instruments, issued at a discount from face value, and redeemed at par; 2-year notes which are issued at par, and pay semi-annual coupons.

The auction

Resident banks and financial institutions bid for Treasury bills through the BDL on a competitive basis. Once bids are submitted, the BDL sets a high discount rate and all bidders within this range are allocated a certain percentage of their requested amounts[10]. Lebanese Treasuries sold in a competitive auction are awarded to winning bidders at their individual discounts.

The Central Bank awards Lebanese Treasuries to bidders in the order of their bids, starting with the lowest yielding bids (highest price) and moving to higher yielding bids, until the total offering has been placed. In the competitive form of auction, every

[10] Most of the time bidders were allocated their total requested amounts

successful bidder is granted Lebanese Treasuries at its requested price and yield. The official published yield for the auction is the weighted average of all successful bids as calculated by the Central Bank.

Resident banks and selected financial companies are the only agents allowed to subscribe through auction. They participate in the auction as competitive bidders. Subscriptions by individuals and non-resident institutions (non-competitive bidders) must be effected through resident banks and selected financial institutions.

The auction for the three and six-month bills is held on Saturdays, while that for the twelve and twenty four-month bills and notes is held on Mondays. All bills and notes are settled and issued on the following Thursday and their maturities are always on a Thursday, so that their terms are 91, 182, 364 and 728 days respectively. The accrued interest rate basis for the three, six and twelve months is actual/365 and for the two years is actual/364.

Constitution of the primary market

The primary market is open to the following:

1. Resident commercial banks and financial institutions
2. Lebanese as well as foreign individuals
3. Lebanese as well as foreign non-financial institutions
4. Non-resident banks and financial institutions provided the initial deal originates with a foreign currency conversion into Lebanese Pounds

The secondary market

Lebanese Treasuries of any existing maturity can be sold on the secondary market. There is however no assurance that Lebanese Treasuries can be traded on this market at any particular time or at any particular price. Liquidity and price competitiveness (price discrepancies between primary and secondary market for same maturity dates) depend on market conditions. Transactions on the secondary market are either conducted directly between local banks or financial institutions or through the Société Financière du Liban (SOFIL). Settlements can be for any value date and changes in ownership must be notified to the Central Bank, which makes the necessary book-entry modifications.

Secondary market activity had been limited for various reasons: discount rates and yields were high and predictable, auctions were frequent, allocations were high, and mainly, Central Bank's swap activities, where short-term maturity bills are swapped for longer-term bills, were frequent.

Treasury bills outstanding

As at the end of 2002, the distribution of total bills outstanding by maturity which total amounted to LL 25,133.5 billion, shows a concentration in the longer term bonds. The two-year Tbs. accounted for 88.6% of the total, while one year, six months and three months accounted for 6%, 4.1% and 1.3% respectively[11]. The figure below shows the distribution of total bills outstanding by maturity throughout the 1993-2002 period.

[11] Refer to table 4.1

Distribution of total Treasury bills outstanding by maturity (in billions of L.L.)

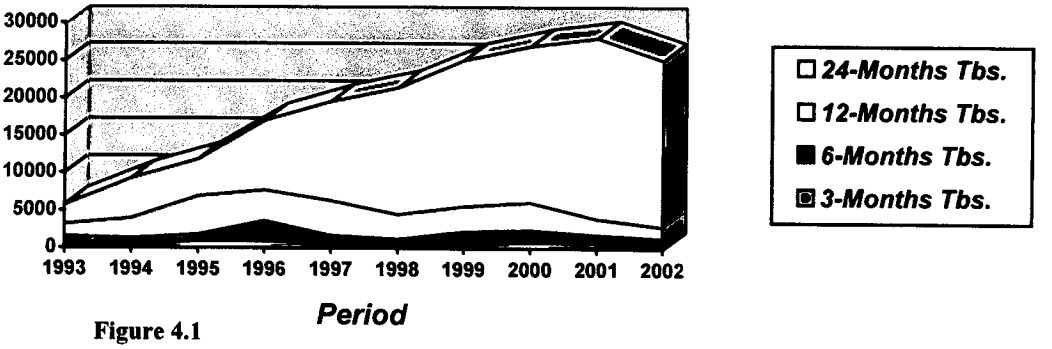

Figure 4.1

Source: Central Bank / Ministry of Finance

The skewness of the maturity distribution towards the long run observed in the above figure is enforced by the Central Bank's swap activities, where short-term maturity bills are swapped for longer-term bills to change the structure of the growing public debt and to reduce early outflows of capital.

Treasury bills and public debt

Throughout the 1992-2002 period, the Lebanese Government has seen its expenses rise tremendously due to massive reconstruction efforts undertaken since the end of the war in 1992, along with the prerequisites of currency stabilization policies and the resulted increase in current expenditures, which consist primarily of debt service[12] in respect of public debt and personnel costs, including salaries, wages and end of service indemnities and other retirement benefits. These expenses were financed to a large extent by internal debt, namely Treasury bills which account for 99% of domestic debt outstanding as shown in table 4.1, which sets out the Republic's outstanding domestic debt by type of instrument for the periods from the end of 1993 until the end of 2002.

[12] Debt servicing rose gradually to account for nearly half of government spending as at the end of 2002

OUTSTANDING DOMESTIC DEBT BY TYPE OF INSTRUMENT
(1993–2002)

Period	*3-Month Tbs. (in billions of LBP) (A)*	*6-Month Tbs. (in billions of LBP) (B)*	*12-Month Tbs. (in billions of LBP) (C)*	*24-Month Tbs. (in billions of LBP) (D)*	*Loans[13] (in billions of LBP) (E)*	*Total Republic's outstanding domestic debt (in billions of LBP) F=∑(A,E)*	*Total Tbs. outstanding (in billions of LBP) G=∑(A,D)*	*Total Tbs. outstanding / Total Republic's outstanding domestic debt =G/F*
Dec-93	583.1	963.9	1600.2	2591.7	64.9	5803.8	5738.9	0.99
Dec-94	262.1	1024.4	2687.0	5292.3	81.7	9347.5	9265.8	0.99
Dec-95	849.8	986.5	5128.7	4873.0	159.2	11997.2	11838	0.99
Dec-96	893.3	2762.3	4103.2	9263.5	206.5	17228.8	17022.3	0.99
Dec-97	419.0	1269.8	4618.2	13270.7	209.4	19787.1	19577.7	0.99
Dec-98	331.2	852.4	3295.7	16956.7	249.7	21685.7	21436	0.99
Dec-99	556.8	1649.6	3354.8	19552.5	269.1	25382.8	25113.7	0.99
Dec-00	770.5	1642.5	3690.3	20861.0	196.9	27161.2	26964.3	0.99
Dec-01	676.9	1110.5	2186.2	24068.5	171.7	28213.8	28042.1	0.99
Dec-02	316.7	1027.6	1521.5	22267.7	168.8	25302.3	25133.5	0.99

Source: Central Bank / Ministry of Finance
Table 4.1

[13] These represent the direct loans extended by commercial banks and other financial institutions to the public sector.

Commercial banks operating in Lebanon soon became the largest subscribers in the Tbs. market – especially that they had the cash to do that. The table below shows the distribution of Treasury bills outstanding by type of holder at December 31 for the years 1993-2002.

Period	*Treasury bills held by the Central Bank (in billions of LBP) (A)*	*Treasury bills held by Commercial banks (in billions of LBP) (B)*	*Treasury bills held by non-banking system (in billions of LBP) (C)*	*Treasury bills held by Commercial banks / total Treasury bills outstanding = (B) / (A+B+C)*
Dec-93	392.1	4242.1	1104.7	0.74
Dec-94	26.9	7341.0	1897.9	0.79
Dec-95	0.0	8488.6	3349.4	0.72
Dec-96	0.0	12555.8	4466.5	0.74
Dec-97	274.0	13423.6	5880.1	0.69
Dec-98	13.5	16151.0	5271.5	0.75
Dec-99	3.1	18808.2	6302.4	0.75
Dec-00	1597.8	18667.6	6698.9	0.69
Dec-01	6111.0	15797.7	6133.4	0.56
Dec-02	601.4	17163.9	7368.2	0.68

Source: Central Bank / Ministry of Finance
Table 4.2

As shown in the above table, more than 70% of Tbs. outstanding have been in the hands of commercial banks that provided the public sector with a steady source of funds to finance the budget deficit. The fact that most of the Treasury bills holders are commercial banks is due to both, the required subscription in Treasury bills imposed by the Central bank prior to 1997 (as discussed), and most importantly, the high discount rates and yields on government securities, as shown in table 4.3, which lead commercial banks to see Treasury bills as higher and less risky profit making alternatives than loans to the private sector.

TREASURY BILLS DISCOUNT RATES AND YIELDS (1993-2002)

Period	3-Month Tbs. (%)		6-Month Tbs. (%)		12-Month Tbs. (%)		24-Month Tbs. (%)		Weighted average (%)	
	Discount	Yield	Discount	Yield	Discount	Yield	Discount	Yield	Discount	Yield
Mar-92	22.50	23.84	22.50	25.34	22.50	29.01	20.60	30.50	21.85	27.71
Jun-92	22.50	23.84	22.50	24.34	22.50	29.01	20.60	30.50	21.85	27.57
Sep-92	31.50	34.18	30.00	35.28	25.50	34.20	22.00	33.59	26.44	34.14
Dec-92	12.59	13.00	13.96	15.00	17.36	20.99	24.50	26.00	18.12	19.86
Jun-93	17.67	18.48	18.25	20.08	18.04	22.00	24.50	26.00	20.96	23.13
Dec-93	16.51	17.22	17.90	19.65	17.41	21.07	22.70	23.99	19.79	21.76
Jun-94	14.74	15.30	16.07	17.47	16.19	19.31	19.15	20.07	17.74	19.34
Dec-94	13.05	13.49	13.81	14.83	12.84	14.73	15.26	15.84	14.34	15.34
Mar-95	15.89	16.55	16.52	18.00	16.44	19.66	18.00	18.81	17.33	18.82
Jun-95	19.00	19.94	19.58	21.70	20.93	26.45	22.76	24.06	21.59	23.92
Sep-95	23.80	25.30	24.50	27.91	27.48	37.85	27.20	29.05	26.65	30.98
Dec-95	15.40	16.01	15.85	17.21	15.45	18.26	22.16	23.39	18.24	20.12
Jun-96	14.98	15.56	15.66	16.99	15.23	17.96	21.88	23.08	17.53	19.38
Dec-96	13.80	14.29	14.95	16.15	14.55	17.02	19.58	20.54	17.31	18.65
Jun-97	12.97	13.40	13.27	14.21	13.20	15.20	16.08	16.73	14.91	15.93
Dec-97	12.68	13.09	13.06	13.97	13.20	15.20	16.08	16.73	15.13	16.11
Jun-98	12.42	12.82	13.06	13.97	13.20	15.20	16.08	16.73	15.32	16.23
Dec-98	11.43	11.77	12.39	13.21	12.93	14.84	16.02	16.66	15.33	16.17
Jun-99	11.40	11.73	12.21	13.00	12.93	14.84	15.74	16.36	15.09	15.89
Dec-99	10.88	11.18	11.43	12.12	11.84	13.43	14.14	14.64	13.58	14.24
Jun-00	10.88	11.18	11.43	12.12	11.84	13.43	14.14	14.64	13.60	14.25
Dec-00	10.88	11.18	11.43	12.12	11.84	13.43	14.14	14.64	13.57	14.22
Jun-01	10.88	11.18	11.43	12.12	11.84	13.43	14.14	14.64	13.63	14.27
Dec-01	10.88	11.18	11.43	12.12	11.84	13.43	14.14	14.64	13.77	14.36
Jun-02	10.88	11.18	11.43	12.12	11.84	13.43	14.14	14.64	13.83	14.41
Dec-02	7.62	7.77	8.75	9.15	8.37	9.13	9.20	9.41	9.11	9.36

Source: Central Bank / Ministry of Finance (*Table 4.3*)

Market development

Prior to 1993, interest rates on Treasury bills were fixed by the Ministry of Finance in consultation with Banque du Liban. Interest rates on Treasury bills increased significantly in 1992, reflecting the monetary authorities' objective of increasing domestic and external demand for Lebanese Pound assets.

In May 1993, the Central Bank began selling 3-month Treasury Bills in a multiple price auction. The authorities subsequently extended this system to 6 and 12-month Treasury Bills in June and September 1993 respectively. In October 1994, the auction system was extended to 24-Month Treasury Notes. Interest rates declined significantly in 1993 and 1994 in response to increased domestic and external demand for Lebanese Pound assets. However, the first three quarters of 1995 witnessed an increase in interest rates, due mainly to the policy objective of maintaining stability in the foreign exchange market in the face of political uncertainties with the approach of the end of the President's term in office. In the last quarter of 1995, interest rates accelerated downwards as the political tensions eased.

Throughout 1996, interest rates were relatively stable, declining by a few basis points at every auction. At the end of 1996, rates dropped on all Tbs. categories. In the fall of 1997, the BDL proposed to local institutions to swap their short-term paper against twelve and twenty four-month bills at appealing rates. Since the beginning of 1998, secondary market rates related to these swap operations or to the sale of Tbs. to the public declined sharply, losing more than 200 basis points on the twelve and twenty four-month bills. In November 1998, the primary market and BDL secondary market converged again, putting an end to the swap operations. The Central Bank in parallel

issued a circular, whereby it restricted the purchase of foreign currencies from the Central Bank by banks and financial institutions for the purpose of buying Treasury bills on the secondary market for non-resident banks and institutions.

The year 1999 started with Treasuries being subject to important subscriptions. This trend continued throughout the year allowing for possible interest rate cuts. Since the beginning of June 1999 for ten consecutive weeks, the yield on the two-year paper was falling on a weekly basis while all other categories' yields were unchanged. By the beginning of September, the rates were dropping, every week, on all maturities continuously and finally stabilized since October 1999.

Until October 2002, the discount rates and yields on all maturities of bills were constant. However, the last two months of 2002 witnessed a decrease in such rates, where on average, interest rates on all maturities of bills declined by 398 basis points in December 2002. The yield on the two-year bill moved from 14.64% at October 2002 to 9.41% at December 2002 declining by 523 basis points. During the same period, interest rates on the 12, 6 and 3-month bills declined from 13.43%, 12.12% and 11.18% to 9.13%, 9.15% and 7.77% losing respectively 430, 297 and 341 basis points.

Furthermore, through the consecutive Tbs. surpluses recorded since 1990 and also through the Eurobond issues starting in 1994, a significant increase has been reported in the State's creditor account at the BDL, which moved from LL 201 billion in December 1990 to LL 2373 billion in December 2002. The following table sets out the public sector account at the BDL at December 31 for the years 1990-2002,

showing the yearly excess amounts borrowed by the government throughout this period.

Period	*Public sector account (in billions of LBP)* *(A)*	*Yearly excess borrowings (in billions of LBP)* *(B)* $= A_n - A_{n-1}$
Dec-90	200.6	
		95.6
Dec-91	289.4	
		88.7
Dec-92	927.4	
		638.0
Dec-93	1226.5	
		299.2
Dec-94	2383.5	
		1157.0
Dec-95	2440.5	
		56.9
Dec-96	3585.5	
		1145.1
Dec-97	1189.3	
		-2396.2
Dec-98	1795.7	
		606.4
Dec-99	3304.4	
		1508.6
Dec-00	1910.2	
		-1394.2
Dec-01	1401.9	
		-508.3
Dec-02	2373.2	
		971.3

Source: Central Bank / Ministry of Finance
Table 4.4

In 1999, the Central Bank applied a very strict partial allocation system on the Treasury bills market to avoid further increases in the State's creditor account, which started to witness declines in 2000. In addition, to smoothen its portfolio of maturing Tbs., by mid September, the Central Bank announced that starting with its September 23, 1999 auction, a two-week deferred value date would be applied on each week's auction. Thus, banks were settling their subscriptions two weeks after the auction

date. This policy continued accompanied by the partial allocation system till around the first quarter of the year 2000.

Commercial banks were mainly unpleased because only a fraction of their demand was being satisfied. The supply to demand ratio reached a low of 1.92% on average for all categories. In addition, the Tbs. secondary market entered an idle phase and became non-existent over the last few months of 1999.

Within this context, banks found themselves with an excess of LL liquidity and were increasingly resorting to the money market and to BDL's certificates of deposits (CDs) to invest their surpluses. Actually, banks purchased a significant LL 1,241 billion of CDs during the second half of 1999, accounting for 90% of the full year's sale. Up to mid October 1999, the only available CDs had a 45-day and 60-day maturity with a 9.5% and 10.25% interest rate and absorbed LL 703 billion during the June-October 1999 period. However, banks were still compelled to search for other LL placement opportunities to invest LL liquidity. With LL lending still costly and no long-term Tbs. existent, the BDL issued, in October 1999, two new categories of CDs to absorb the high liquidity created from Tbs.' partial allocations.

The new 6 and 12-month maturity CDs failed to attract the banks' LL funds, at first, because they paid 0.62% and 1.53% less than Tbs. of equivalent maturities i.e. 11.5% for the 6-month CD and 11.9% for the 12-month CD. In addition, they are considered less liquid than Tbs. since there is no secondary inter-bank market for them and their discounting procedure is very complex.

The following table sets out the BDL CDs rates at the end of each quarter of the years 1999-2002.

Period	*45-day CDs Rate (%)*	*60-day CDs Rate (%)*	*182-day CDs Rate (%)*	*364-day CDs Rate (%)*
Mar-99	10.0	10.75	na	na
Jun-99	10.0	10.75	na	na
Sep-99	9.5	10.25	na	na
Dec-99	9.5	10.25	11.5	11.9
Mar-00	9.5	10.25	11.5	11.9
Jun-00	9.5	10.25	11.5	11.9
Sep-00	9.5	10.25	11.5	11.9
Dec-00	9.5	10.25	11.5	11.9
Mar-01	9.5	10.25	11.5	11.9
Jun-01	9.5	10.25	11.5	11.9
Sep-01	9.5	10.25	11.5	11.9
Dec-01	9.5	10.25	11.5	11.9
Mar-02	9.5	10.25	11.5	11.9
Jun-02	9.5	10.25	11.5	11.9
Sep-02	9.5	10.25	11.5	11.9
Dec-02	6.75	7.50	8.75	9.15

Source: Central Bank / Ministry of Finance
Table 4.5

By applying the partial allocation system, the BDL drove banks to invest LL money in lower interest bearing CDs. Six-month and one-year CDs' sales amounted to LL 208 billion from October 1999 till the end of the year while total investment in all categories for this period amounted to LL 545 billion. Over the first half of the year 2000, the cumulative subscriptions in CDs amounted to LL 1,378 billion, 99.4% of the 1999's total subscriptions.

4.2.2 International bond market

Commencing in 1994, the Republic became a frequent issuer on the international capital markets as it sought to finance its budget deficit and to convert its high interest domestic debt into lower interest external debt. The following table shows the Republic's outstanding Eurobond issuances throughout the 1997-2002 period.

Year of issue	*Maturity*	*Principal Amount*	*Coupon (%)*
1997	2002	DEM 250 Million	6.50
1997	2007	USD 100 Million	7.50
1997	2007	USD 400 Million	8.63
1998	2001	USD 500 Million	8.13
1998	2003	USD 500 Million	9.63
1998	2005	Million 350 USD	8.75
1998	2005	USD 100 Million	8.75
1999	2004	USD 200 Million	8.50
1999	2004	EURO 300 Million	7.25
1999	2006	EURO 300 Million	8.88
1999	2009	USD 400 Million	10.25
2000	2005	USD 500 Million	9.38
2000	2009	USD 250 Million	10.25
2000	2003	USD 225 Million	4.38
2000	2003	USD 225 Million	9.13
2000	2004	EURO 250 Million	7.25
2000	2004	USD 400 Million	9.50
2001	2004	USD 200 Million	9.50
2001	2006	USD 1150 Million	9.88
2001	2006	USD 400 Million	11.63
2001	2008	USD 750 Million	10.13
2001	2005	USD 350 Million	9.38
2001	2004	USD 250 Million	9.50
2002	2005	USD 1000 Million	10.25
2002	2006	USD 350 Million	10.50
2002	2006	USD 1150 Million	10.50
2002	2006	USD 750 Million	na
2002	2017	USD 1800 Million	4.00

Source: Central Bank / Ministry of Finance
Table 4.6

The first Republic of Lebanon issue (October 1994) was priced at a relatively low spread of 325 basis points over the US equivalent Treasury bond and with a three-year maturity. Since then, issue spreads started decreasing and maturities started increasing. Several issues followed, with the one with the most favorable terms being a Eurobond, issued in 1997, whose principal was guaranteed by the World Bank and which recorded 100 basis points only above US Treasury. In March 1998, the Republic of Lebanon raised US$ 1 billion in debt on foreign markets with acceptable issue spreads of 246 basis points for a 3-year tranche and 286 basis points for a 5-year tranche.

During 1999, the Republic of Lebanon issued another US$ 1.2 billion in foreign debt denominated in US Dollar and Euro yet with higher spreads at the three-year US Dollar tranche, Republic of Lebanon 2004, carried a 355 basis points issue spread. As for the Euro denominated papers, the Republic of Lebanon 2004 had an issue spread of 393 basis points while the other Euro paper, the Republic of Lebanon 2006, had a 400 basis points issue spread. The longest term paper issued during the year, the US Dollar, Republic of Lebanon 2009, was put out with an issue spread of 440 basis points.

The outstanding public external debt as at the end of 1999 became $5529 million, accounting for 24.7% of total public debt. Furthermore, the consecutive Eurobonds issues recorded throughout the 2000-2002 period – $1843 million in 2000, $3100 million in 2001, and $5050 million in 2002 – lead the weight of the external debt to move from 24.7% of the total, at the end of 1999, to 46.4% at the end of 2002. The following table shows the structure of the public debt at December 31 for the years 1993-2002, as well as the contribution of commercial banks in financing this debt throughout this period.

STRUCTURE OF THE PUBLIC DEBT AND CONTRIBUTION OF COMMERCIAL BANKS

(End of period – Billion of LBP)

Period	*Total Public debt*		*Domestic debt*		*External debt*		*Contribution of commercial banks in the domestic debt*		*Contribution of commercial banks in the external debt*		*Total Contribution of commercial banks in the public debt*		*Total Contribution of Central Bank in the public debt*		*Total Contribution of non-bank private sector in the public debt*	
	Value (A)	*%*	*Value (B)*	*% =B/A*	*Value (C)*	*% =C/A*	*Value (D)*	*% =D/B*	*Value (E)*	*% =E/C*	*Value F= D+E*	*% =F/A*	*Value (G)*	*% =G/A*	*Value (H)*	*% =H/A*
Dec-93	6363.2	100	5803.7	91.2	559.5	8.8	4242.1	73.1	0.0	0.0	4242.1	66.7	1011.1	15.9	1110.0	17.4
Dec-94	10618.6	100	9347.5	88.0	1271.1	12.0	7341.0	78.5	0.0	0.0	7341.0	69.1	1379.7	13.0	1897.9	17.9
Dec-95	14140.6	100	11997.2	84.8	2143.4	15.2	8488.6	70.8	250.9	11.7	8739.5	61.8	2051.7	14.5	3349.4	23.7
Dec-96	20189.3	100	17228.8	85.3	2960.5	14.7	12555.8	72.9	474.0	16.0	13029.8	64.5	2693.0	13.3	4466.5	22.1
Dec-97	23500.7	100	19787.1	84.2	3713.6	15.8	13423.6	67.8	916.9	24.7	14340.5	61.0	3280.1	14.0	5880.1	25.0
Dec-98	27983.5	100	21685.7	77.5	6297.8	22.5	16151.0	74.5	3008.0	47.8	19159.0	68.5	3553.0	12.7	5271.5	18.8
Dec-99	33718.0	100	25382.8	75.3	8335.2	24.7	18808.2	74.1	4205.0	50.4	23013.2	68.3	4402.4	13.1	6302.4	18.7
Dec-00	37640.4	100	27161.2	72.2	10479.2	27.8	18667.6	68.7	5675.0	54.2	24342.6	64.7	6598.9	17.5	6698.9	17.8
Dec-01	42615.8	100	28213.8	66.2	14402.0	33.8	15797.7	56.0	8246.0	57.3	24043.7	56.4	12438.7	29.2	6133.4	14.4
Dec-02	47220.9	100	25302.3	53.6	21918.6	46.4	17163.9	67.8	10426.0	47.6	27589.9	58.4	12262.8	26.0	7368.2	15.6

Source: Central Bank / Ministry of Finance
Table 4.7

Since 1997, commercial banks operating in Lebanon have been major subscribers in the Republic's international bond market, and hence provided the public sector with a steady source of funds to finance the external debt. At the end of 2002, the contribution of commercial banks reached ten times their contribution in 1997 in term of volume, moving from LL 916.9 billion to LL 10426 billion, representing respectively 24.7% and 47.6% of total external debt.

During the same period, the total contribution of commercial banks in the market operations (Treasury bill and international bond markets), and hence in financing the public debt (internal and external), has practically doubled in volume, moving from LL 14340.5 billion at the end of 1997, to LL 27589.9 billion at the end of 2002, representing respectively 61% and 58.4% of total public debt.

Furthermore, at the end of 2002 the authorities have agreed with commercial banks on a scheme to reduce interest payments during the next two years, which has already started to be implemented. Under this scheme, commercial banks will purchase zero-interest, two-year government securities in an amount equal to 10 percent of their deposit base as of 31 October 2002 ($3.8 billion, after some exemptions).

Finally, in this chapter we discussed the applications of the monetary policy instruments in Lebanon, mainly from 1993 until 2002, and identified the objectives of their usage. The survey shows how most of the banking sector's resources were used to finance the public debt accumulated throughout this period. In the next chapter, we will measure the effect of these instruments on certain intermediate targets, in an attempt to analyze later their impact on the economy as a whole.

Chapter 5

Effect of Applied Monetary Tools on Intermediate Targets in Lebanon

Intermediate targets are macroeconomic variables that the Central Bank can influence predictably through the monetary policy instruments at its disposal, and that in turn are related to the goals the Central Bank is trying to achieve. The previous chapter surveyed the applications of the monetary policy instruments in Lebanon mainly throughout the 1993–2002 period. This chapter identifies the effect of the applied monetary tools on the intermediate targets, namely money supply and interest rates.

5.1 Effect of applied monetary tools on the money supply

The money supply is the total stock of money in a given period. In Lebanon, two groups affect the money supply: the Central Bank and commercial banks. The Central Bank is the governmental institution responsible for the monetary policy. BDL was given wide authorities and powers to regulate and supervise commercial banks.

Since the beginning of 1993, BDL's applications of the monetary tools were targeted at leading the commercial banks operating in Lebanon to become the source of funds for the government to finance the public debt. In other words, the main role of commercial banks was to receive deposits and make loans to the public sector.

Accordingly, with the high budget deficits levels recorded throughout the 1993-2002 period and the resulted increase in the volume of loans provided to the public sector, and hence in the amount of money created, we expect to observe a wide expansion in the money supply.

Section 5.1.1 below identifies the quantitative measures of money in Lebanon and their evolution throughout the 1993-2002 period. Then, section 5.1.2 measures the effect of BDL's applied monetary tools on the money creation process and the lending conditions through which commercial banks transformed the monetary base into a much larger amount of liquidity, determining the total stock of money at any given period.

5.1.1 Evolution of the monetary aggregates

The quantitative measures of money in Lebanon are the monetary aggregates M_1, M_2, M_3 and M_4. M1 is made up of the currency in circulation in LBP and the sight LBP deposits of residents. M2 includes M1 and long term LBP deposits of residents. M3 is the sum of M2 and foreign currency deposits (mainly in USD) of residents. M4 is made up of M3 and Treasury bills held by the public.

Due to the high dollarization of deposits in the economy that reached 93% in 1987, M3, which includes foreign currency deposits, becomes the quantitative measure of the money supply in Lebanon. The following table sets out the monetary aggregates and their counterparts at December 31 for the years 1993–2002.

MONEY SUPPLY AND COUNTERPARTS
(End of Period – Billion LBP)

Period	Dec-93	Dec-94	Dec-95	Dec-96	Dec-97	Dec-98	Dec-99	Dec-00	Dec-01	Dec-02
Currency in Circulation in LL	714.7	938.8	1046.2	1160.7	1210.1	1241.3	1369.3	1423.4	1381.6	1375.3
+ Sight Deposits in LBP	428.7	498.1	514.4	592.7	719.3	810.2	891.4	965.9	983.6	1169.1
= M1	**1143.4**	**1436.9**	**1560.6**	**1753.4**	**1929.4**	**2051.5**	**2260.7**	**2389.3**	**2365.2**	**2544.4**
+ Other Deposits in LBP	4165.4	7149.8	8102.6	12248.3	12600.5	14502.7	17978.9	17103.2	14917.6	17859.4
= M2	**5308.8**	**8586.7**	**9663.2**	**14001.7**	**14529.9**	**16554.3**	**20239.6**	**19492.5**	**17282.8**	**20403.8**
+ Deposits in Foreign Currencies	10369.7	11064.6	13220.1	14913.4	20039.7	23584.5	24585.3	29742.2	35627.4	36391.1
+ Other Financial Liabilities (Bonds)	0.0	0.0	0.0	325.9	327.9	370.6	167.6	59.7	8.0	157.1
= M3	***15678.5***	***19651.3***	***22883.3***	***29241.0***	***34897.5***	***40509.4***	***44992.5***	***49294.4***	***52918.2***	***56952.0***
+ Treasury Bills Held by the Public	1110.0	1897.9	3349.4	4466.5	5880.1	5271.5	6302.4	6698.9	6133.4	7368.2
= M4	**16788.5**	**21549.2**	**26232.7**	**33707.5**	**40777.6**	**45780.9**	**51294.9**	**55993.3**	**59051.6**	**64320.2**
Counterparts of the Money Supply										
Net Foreign Assets	**14930.9**	**15756.6**	**15788.0**	**16405.4**	**15680.7**	**14623.3**	**14723.1**	**13944.5**	**12178.2**	**15549.3**
Gold	6165.8	5821.3	5700.6	5292.3	4077.6	3997.7	4037.1	3805.9	3860.8	4848.6
Net Claims on the Public Sector	**3096.7**	**4347.4**	**5350.2**	**8296.3**	**12222.6**	**15954.0**	**18022.3**	**22739.0**	**28011.9**	**27481.8**
Valuation Adjustment	**-6630.3**	**-6094.0**	**-5912.1**	**-5222.7**	**-3616.3**	**-3046.4**	**-2918.3**	**-2521.6**	**-2742.2**	**-102.5**
Claims on the Private Sector	**5992.2**	**7908.3**	**10440.0**	**13025.7**	**16038.9**	**19321.8**	**21573.0**	**22872.0**	**22888.1**	**23672.1**
Central Bank	*44.4*	*73.1*	*105.5*	*96.2*	*121.7*	*220.0*	*216.1*	*244.7*	*201.0*	*205.3*
Commercial Banks	*5897.9*	*7799.8*	*10320.0*	*12687.0*	*15451.2*	*18681.5*	*20994.3*	*22243.2*	*22192.0*	*22757.8*
Claims in LBP	631.5	1018.0	1278.3	1622.6	1987.1	2073.5	2473.7	2889.5	3207.2	4055.3
Claims in FC	5266.4	6781.8	9041.7	11064.4	13464.1	16608.0	18520.6	19353.7	18984.8	18702.5
Financial institutions	*49.9*	*35.4*	*14.5*	*242.5*	*466.0*	*420.3*	*362.6*	*384.1*	*495.1*	*709.0*
Other Items (Net)	**-1711.0**	**-2267.0**	**-2782.6**	**-3263.6**	**-5428.5**	**-6343.4**	**-6407.5**	**-7739.4**	**-7417.7**	**-9648.7**
TOTAL	***15678.5***	***19651.3***	***22883.3***	***29241.0***	***34897.5***	***40509.4***	***44992.5***	***49294.4***	***52918.2***	***56952.0***

Source: Central Bank[1] / Ministry of Finance (Table 5.1)

[1] Banque du Liban Economic and financial Data. Yearly reports. "http://www.bdl.gov.lb/edata/index.asp"

According to the above table, the stock of money (M3) amounted to LBP 56952 billion at the end of December 2002 compared to LBP 15678.5 billion at the end of December 1993. The increase in M3 throughout this period amounting to LBP 41273.5 billion was distributed among its components as follows:

- An increase in the currency in circulation in L.L. equivalent to LBP 660.6 billion.
- An increase in sight LL deposits in the amount of LBP 740.4 billion.
- An increase in long term LL deposits amounting to LBP 13694 billion.
- An increase in foreign currency deposits equivalent to LBP 26021.4 billion.
- An increase in other financial liabilities (Bonds) in the amount of LBP 157.1 billion.

The increase in M3 throughout the 1993-2002 period was the result of:

- An increase in net foreign assets equivalent to LBP 618.4 billion.
- An increase in the net claims on the public sector in the amount of LBP 24385.1 billion.
- An increase in the valuation adjustment amounting to LBP 6527.8 billion.
- An increase in the claims on the private sector equivalent to LBP 17679.9 billion.
- A decrease in the net other items in the amount of LBP 7937.7 billion.

Table 5.2 measures the weight with respect to the yearly change in M3 of the fluctuations in the components and the counterparts of the money supply, on yearly basis throughout the 1993-2002 period.

YEARLY CHANGES IN COMPONENTS OF M3 AND ITS COUNTERPARTS / TOTAL YEARLY CHANGE IN M3
(End of Period)

Period	Dec-93	Dec-94	Dec-95	Dec-96	Dec-97	Dec-98	Dec-99	Dec-00	Dec-01	Dec-02	*AVERAGE*
Currency in Circulation in L.L.	**-0.02**	**0.06**	**0.03**	**0.02**	**0.01**	**0.01**	**0.03**	**0.01**	**-0.01**	**0.00**	***0.01***
+ Sight Deposits in LBP	**0.01**	**0.02**	**0.01**	**0.01**	**0.02**	**0.02**	**0.02**	**0.02**	**0.00**	**0.05**	***0.02***
= M1	-0.01	0.07	0.04	0.03	0.03	0.02	0.05	0.03	-0.01	0.04	*0.03*
+ Other Deposits in LBP	**0.26**	**0.75**	**0.29**	**0.65**	**0.06**	**0.34**	**0.78**	**-0.20**	**-0.60**	**0.73**	***0.31***
= M2	0.24	0.83	0.33	0.68	0.09	0.36	0.82	-0.17	-0.61	0.77	*0.33*
+ Deposits in Foreign Currencies	**0.76**	**0.17**	**0.67**	**0.27**	**0.91**	**0.63**	**0.22**	**1.20**	**1.62**	**0.19**	***0.66***
+ Other Financial Liabilities (Bonds)	**0.00**	**0.00**	**0.00**	**0.05**	**0.00**	**0.01**	**-0.05**	**-0.03**	**-0.01**	**0.04**	***0.00***
= *M3*	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***
Counterparts of the Money Supply											
Net Foreign Assets	**0.67**	**0.21**	**0.01**	**0.10**	**-0.13**	**-0.19**	**0.02**	**-0.18**	**-0.49**	**0.84**	***0.09***
Gold	0.14	-0.09	-0.04	-0.06	-0.21	-0.01	0.01	-0.05	0.02	0.24	*-0.01*
Net Claims on the Public Sector	**0.20**	**0.31**	**0.31**	**0.46**	**0.69**	**0.66**	**0.46**	**1.10**	**1.46**	**-0.13**	***0.55***
Valuation Adjustment	**-0.10**	**0.14**	**0.06**	**0.11**	**0.28**	**0.10**	**0.03**	**0.09**	**-0.06**	**0.65**	***0.13***
Claims on the Private Sector	**0.30**	**0.48**	**0.78**	**0.41**	**0.53**	**0.58**	**0.50**	**0.30**	**0.00**	**0.19**	***0.41***
Central Bank	0.00	0.01	0.01	0.00	0.00	0.02	0.00	0.01	-0.01	0.00	*0.00*
Commercial Banks	*0.29*	*0.48*	*0.78*	*0.37*	*0.49*	*0.58*	*0.52*	*0.29*	*-0.01*	*0.14*	*0.39*
Claims in LBP	0.05	0.10	0.08	0.05	0.06	0.02	0.09	0.10	0.09	0.21	*0.08*
Claims in FC	0.24	0.38	0.70	0.32	0.42	0.56	0.43	0.19	-0.10	-0.07	*0.31*
Financial institutions	0.01	0.00	-0.01	0.04	0.04	-0.01	-0.01	0.00	0.03	0.05	*0.01*
Other Items (Net)	**-0.07**	**-0.14**	**-0.16**	**-0.08**	**-0.38**	**-0.16**	**-0.01**	**-0.31**	**0.09**	**-0.55**	***-0.18***
TOTAL	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***	***1.00***

Source: Central Bank[2] / Ministry of Finance (Table 5.2)

[2] Banque du Liban Economic and financial Data. Yearly reports. "http://www.bdl.gov.lb/edata/index.asp"

According to the above table, the increase in foreign currency deposits accounted for 66%, on average, of the total increase in the money supply throughout the 1993-2002 period. During the same period, the increase in total deposits in LBP and in the currency in circulation accounted for 33% and 1% respectively.

As for the counterparts of the money supply, the increase in net claims on the public sector was the major contributor to the total increase of the money supply, accounting for 55%, on average, of the increase in M3, compared to 41% for claims on the private sector, 13% for valuation adjustment, 9% for net foreign assets, and -18% for other items.

The increase in total claims, accounting for 96%, on average, of the total increase in the money supply during the years 1993-2002, as well as the distribution of credits between the public and the private sectors, were the result of the applied monetary tools discussed. Concerning the distribution of credits and the higher share of claims on the public sector with respect to total claims, it is mainly due the required subscriptions in Treasury Bills imposed on commercial banks as well as to the high interest rates set by the Central Bank on government's securities. This allowed commercial banks to make high profits and, thus, to stay the major source of funds to finance the public debt.

Concerning the money supply growth associated with the money creation process conducted by commercial banks, it was controlled by the Central Bank through the reserve and liquidity requirements used by the BDL, through which it was able to set the money multiplier that would fulfill their targeted money supply growth.

The next section discusses the monetary base and the money multiplier (or multiplier of the monetary base), identifying the effect of BDL's rules and regulations on commercial banks' credit multiplication process.

5.1.2 Monetary base and its multiplier

The monetary base for the LBP (or B_0) is defined as the sum of currency in circulation in LL outside the Central Bank[3] and commercial banks' LL deposits with the Central Bank. The money multiplier determines how many units of money can be created for each unit of monetary base. The sum of money created and the monetary base determines the stock of money (M2) at the end of any given period. Thus, M2 is a multiple of the monetary base, and hence the money multiplier is equivalent to M2 / B_0 at the end of a given period[4].

However, M2 is not representative to be the quantitative measure of the money supply in Lebanon, hence the monetary base for the LBP and its correspondent multiplier would not be sufficient to identify the money creation process that determines the money supply (M3), when on average, 66% of its increase during the years 1993-2002 was due to foreign currency deposits (mainly USD deposits). Therefore, we will consider the monetary base that includes both, domestic and foreign currencies, in order to identify the accurate money creation process and the lending conditions throughout the 1993-2002 period.

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[3] As defined by the BDL, currency in circulation **outside BDL** is the sum of currency in circulation and the vault cash of commercial banks. Banks reserves (sum of the required reserves on LBP deposits and the liquidity requirements on US Dollar deposits) are made up of vault cash and banks' deposits with the Central Bank. Therefore, the sum of currency in circulation **outside BDL** and banks' deposits with the BDL is equivalent to the sum of currency in circulation and total banks reserves.

[4] Abel and Bernanke (1995). pp. 532-5

The monetary base for all currencies (or B_1) can be defined as the sum of the currency in circulation in LL outside the Central Bank and commercial banks' total deposits with the Central Bank (in LL and in foreign currencies). It is noticeable that foreign currencies in circulation are not included in B_1. This is due to the fact that the former are not part of the money supply given the difficulty of measuring them.

The money multiplier that determines how many units of money can be created for each unit of B_1, is equivalent to M3 / B_1 at the end of a given period. The following table sets out the currency in circulation in LL outside BDL, banks' deposits with the Central Bank, the monetary base B_1 and its multiplier at December 31 for the years

THE MONETARY BASE (B_1) AND ITS MULTIPLIER
(End of Period – Billion LBP)

Period	*Currency in Circulation in LL outside BDL (A)*	*Banks' Deposits with BDL (Sum of LBP and USD Obligatory Deposits) (B)*	*Monetary Base B_1 (C) =A+B*	*Stock of Money M3 (D)*	*Multiplier of the Monetary Base B_1 (E) = D/C*
Dec-93	763.65	1385.91	2149.56	15678.46	7.29
Dec-94	1005.93	2719.19	3725.12	19651.32	5.28
Dec-95	1127.82	3459.86	4587.68	22883.34	4.99
Dec-96	1257.11	4281.50	5538.61	29241.02	5.28
Dec-97	1324.85	6109.81	7434.66	34897.45	4.69
Dec-98	1352.64	6402.04	7754.67	40509.37	5.22
Dec-99	1515.41	6680.46	8195.87	44992.54	5.49
Dec-00	1621.80	7132.42	8754.22	49294.35	5.63
Dec-01	1527.17	10510.37	12037.54	52918.20	4.40
Dec-02	1541.52	11793.59	13335.11	56952.00	4.27
Average Value of the Money Multiplier					*5.25*

Source: Central Bank / Ministry of Finance
Table 5.3

According to the above table, the average value of the money multiplier was 5.25 during the years 1993-2002. In other words, each unit of monetary base was on average transformed into 5.25 units of bank money, determining the money supply at

the end of each period. However, the money multiplier was not constant during the years 1993-2002. This took place in spite of the fact that the reserve and liquidity requirements were fixed during this period. In the next section, we will shed the light on the factors that were responsible for the instability of the money multiplier.

In order to explain the fluctuations in the money multiplier, we will refer to the relationship between the money supply and the monetary base discussed earlier in the theoretical framework, which identifies the determinants of the money multiplier, and hence the factors that would lead this latter to fluctuate.

As we have seen in chapter 1 (section 1.3.1), in an economy where the public holds some currency, the relation of the money supply to the monetary base depends on the currency-deposit ratio chosen by the public and the reserve-deposit ratio chosen basically by the Central Bank.

The following equation showed the relationship between the money supply and the monetary base:

$$M = \left(\frac{cu+1}{cu+res}\right) BASE$$

Where,

- M: is the money supply
- cu: is the currency-deposit ratio (cu = currency in circulation in LBP and in USD / sum of LBP and USD deposits)
- res: is the reserve-deposit ratio (where reserves are equal to the sum of LBP and USD banks' deposits with the Central Bank and the vault cash)

Based on such a relationship between the money supply and the monetary base, and with the constant required-reserve and liquidity ratios set by the BDL (for LL and USD respectively), at least during the years 1992-2000, we would expect the change in the currency-deposit ratio to be the major contributor to the observed fluctuations in the money multiplier.

However, this was not the case. The next discussion shows that the observed fluctuations in the money multiplier were, to a high extent, the results of changes in the reserve-deposit ratio.

The following table measures the correlation between the percentage change in the money multiplier and the percentage change in the reserve-deposit ratio for 120 observations[5] since January 1993 until December 2002.

Correlations

		% Change in the Reserve-Deposit Ratio (Monthly Data 1993-2002)	% Change in the Money Multiplier (Monthly Data 1993-2002)
% Change in the Reserve-Deposit Ratio (Monthly Data 1993-2002)	Pearson Correlation	1	-.906**
	Sig. (2-tailed)	.	.000
	N	120	120
% Change in the Money Multiplier (Monthly Data 1993-2002)	Pearson Correlation	-.906**	1
	Sig. (2-tailed)	.000	.
	N	120	120

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.4

Such a strong correlation between the percentage change in the money multiplier and the percentage change in the reserve-deposit ratio (as shown in the above table)

[5] We coded monthly data, that is 120 observations (1993-2002), provided by the BDL, under the SPSS Software Package (Version 11.0)

confirms that this latter was the major contributor to the fluctuations in the money multiplier observed earlier in table 5.3. Moreover, based on such a relationship we can establish a regression model that relates these two variables in order to measure the effect of each percentage change in the reserve-deposit ratio on the money multiplier.

The model includes the following:

- Dependent variable: % change in the money multiplier
- Independent variable: % change in the reserve-deposit ratio

SPSS gave the following model summary:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.906[a]	.822	.820	2.32907

a. Predictors: (Constant), % Change in the Reserve-Deposit Ratio (Monthly Data 1993-2002)

Table 5.5

The fluctuations in the reserve-deposit ratio explained 82 percent of the changes in the money multiplier during the years 1993-2002. The regression equation will be written based on the coefficients shown in the table below:

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.374	.215		1.741	.084
	% Change in the Reserve-Deposit Ratio (Monthly Data 1993-2002	-.500	.021	-.906	-23.320	.000

a. Dependent Variable: % Change in the Money Multiplier (Monthly Data 1993-2002)

Table 5.6

$$M = 0.374 - 0.5\,R \quad (1)$$

The estimated regression line is shown in the figure below:

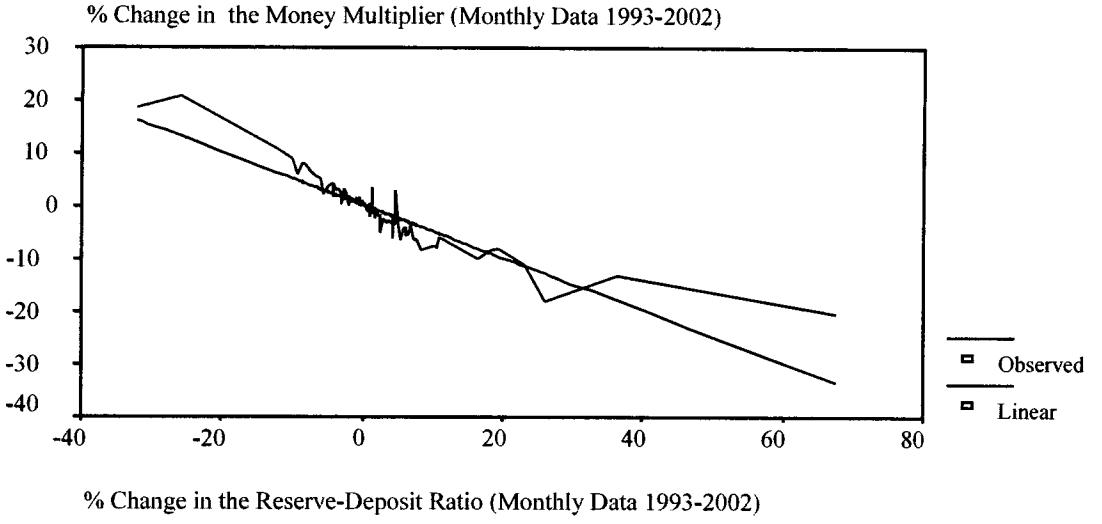

Figure 5.1

As shown in the above figure, positive percentage changes in the reserve-deposit ratio have lead to negative percentage changes in the money multiplier. Moreover, the regression equation (1) states that for each unit percent increase in the reserve-deposit ratio, the money multiplier has decreased by 0.5 percent.

The fluctuations in the reserve-deposit ratio are mainly caused by changes in banks' foreign currency deposits with the Central Bank, although the liquidity ratio on these deposits was fixed since 1992 until the last quarter of the year 2001.

In fact, until August 2001, banks were free to choose among several liquid assets alternatives to hold – other than deposits with the Central Bank – to meet their liquidity requirement. It is only since September 2001 that banks have been required to keep 15% of their foreign currency deposits as obligatory deposits with the central Bank.

Moreover, in September 2001, BDL increased the required reserve-ratio from 13% to 15% for long-term deposits and to 25% for sight deposits in Lebanese Pound. This lead the reserve-deposit ratio to increase by 35 percent in 2001 and 4.4 percent in 2002, compared to a decrease by 10.2 percent in 1998, 6 percent in 1999, and 2.3 percent in 2000. Consequently, the money multiplier decreased at the end of 2001 and 2002 by 21.9 percent and 2.9 percent respectively, compared to an increase of 11.3 percent in 1998, 5.1 percent in 1999, and 2.6 percent in 2000[6].

Such a decrease in the money multiplier would slow down the growth of the money supply by the product of the change in the money multiplier times the given monetary base at the end of a given period.

In order to measure the effect of the BDL's decision (September 2001) to change banks requirements concerning the obligatory foreign currency deposits and the required reserves in LBP discussed, we refer to the regression equation 1 extracted earlier. The latter states that each percentage increase in the reserve-deposit ratio leads the money multiplier to decrease by 0.5 percent, explaining 82 percent of the total change in the money multiplier at any given period.

Accordingly, 82 percent of the money multiplier's negative growth witnessed in 2001 and 2002, that is 17.96 percent (21.9 x 0.82) and 19.8 percent (24.15 x 0.82) respectively (compared to the value of the money multiplier in 2000), was the result of the BDL's policy targeted at limiting the volume of credits expanded by

[6] Refer to table 5.3

commercial banks. The money multiplier would have been 1.01 (5.63[7] x 0.1796) and 1.11 (5.63 x 0.198) more than its actual values in 2001 and 2002 respectively.

Thus, for the given amounts of the monetary base at the end of these two years – LBP 12037.54 billion and LBP 13335.11 billion at the end of 2001 and 2002 respectively – the money supply would have been more by LBP 12157.91 billion at the end of 2001 (1.01 x 12037.54) and LBP 14801.97 billion at the end of 2002 (1.11 x 13335.11). In other words, the Central Bank intervention in September 2001 caused a slowdown in the money supply growth by 24.66 percent in 2001 (12157.91 / 49294.35[8]) and 27.97 percent in 2002 (14801.97 / 52918.2).

Keeping everything else constant, without such restrictions imposed on commercial banks to tighten their credit multiplication process, the private sector would have been provided with additional loans amounting to LBP 12157.91 billion in 2001 and to LBP 14801.97 billion in 2002 (equivalent to losses in the money supply during these two years). This would have lead the share of credits to the private sector with respect to total outstanding credits to move from 44.97 to 55.58 percent in 2001, and from 46.28 to 58.33 percent in 2002.

After discussing the effect of the Central Bank's restrictions imposed on commercial banks on the money multiplier and the resulted impact on the money supply, we will discuss another governmental intervention, namely the sustainable excess public borrowings discussed in the previous chapter, which caused additional losses in the

[7] As shown in table 5.3, the money multiplier at the end of 2000 was 5.63

[8] The value of M3 at the end of 2000 is LBP 49294.35 billion. The ratio of the decrease in the money supply resulted by the BDL's policy in 2001 to the value of M3 at the end of 2000 measures the slowdown in the growth of the money supply during that year

money supply. The public sector's account at the BDL at the end of a given period reflects the accumulated excess amounts that have been borrowed by the government.

Recall that a significant increase has been reported in the State's creditor account at the BDL, which moved from LBP 1226.5 billion in December 1993 to peak at LBP 3586 billion in December 1996. The account recorded a level of LBP 3304 billion in December 1999 and reached to LBP 2373 billion in December 2002.

If there was no excess borrowings, or if such amounts of money were injected in the market, they would have soon been transformed into bank deposits, leading the monetary base to increase based on the given reserve-deposit ratio of each period. Such an increase would have lead the money supply to rise by the product of the increase in the monetary base and its multiplier.

Accordingly, with an average money multiplier equivalent to 5.25 during the years 1993-2002 (as shown in table 5.3), if during the same period public sector's deposits with the Central Bank amounting to LBP 1146.7 billion were put in circulation, commercial banks would have transformed this money into a larger amount of bank deposits equivalent to LBP 6020.18 billion (5.25 x 1146.7) by granting additional loans to the private sector in the amount of LBP 4873.48 billion (6020.18 – 1146.7).

Thus, the money supply would have increased by the sum of the increase in the monetary base and the additional claims on the private sector, which is equivalent to LBP 6020.18 billion.

As a summary, since 1993 the Lebanese economy witnessed an increase in the money supply, in spite of some recorded slowdown in its growth caused by some monetary policy instruments applied by the Central Bank for this purpose.

Claims on the public sector were the major contributors in the increase in the money supply. This was mainly due to the government's policy objective targeted at enhancing the banking sector in order to keep it the major source of funds to finance the increasing public debt. Nothing is wrong with such a policy if the increase in debt is paralleled with an increase in income – that stems out of the financing of the productive sectors.

However, this was not the case. The increasing public debt to GDP ratio that reached 183.8 percent at the end of 2002, confirms that the borrowed money were not used in financing productive expenditures, but other activities that will be discussed in the next chapter, where we will identify the effect of the monetary policy conducted throughout the 1993-2002 period on the Lebanese economy.

Meanwhile, by having a general overview on the consolidated assets of commercial banks throughout the same period, we can realize how most of banks' money has been circulated between the Central Bank and the banking sector, leaving the private sector with a small share of funds to finance its activities. The following table sets out the consolidated assets of commercial banks at the end of December 31 of the years 1993-2002.

COMBINED ASSETS OF COMMERCIAL BANKS
(End of Period – Billion LBP)

Period		Deposits with BDL	Claims on the Private Sector	Claims on the Private Sector in LL	Claims on the Private Sector in FC	Claims on the Public Sector	Foreign Assets	Other Assets	Total Assets of commercial Banks
Dec-93	*Value*	1385.91	5897.89	*631.48*	*5266.41*	4013.28	7040.58	471.21	*18808.87*
	%	7.37	31.36	*3.36*	*28.00*	21.34	37.43	2.51	*100.00*
Dec-94	*Value*	2719.19	7799.81	*1017.99*	*6781.82*	6908.58	6269.32	588.10	*24285.00*
	%	11.20	32.12	*4.19*	*27.93*	28.45	25.82	2.42	*100.00*
Dec-95	*Value*	3459.86	10319.99	*1278.32*	*9041.67*	7948.85	6337.30	988.93	*29054.93*
	%	11.91	35.52	*4.40*	*31.12*	27.36	21.81	3.40	*100.00*
Dec-96	*Value*	4281.50	12687.02	*1622.58*	*11064.43*	12060.30	6718.88	1435.38	*37183.06*
	%	11.51	34.12	*4.36*	*29.76*	32.43	18.07	3.86	*100.00*
Dec-97	*Value*	6109.81	15451.25	*1987.14*	*13464.12*	13234.17	9184.01	1653.48	*45632.72*
	%	13.39	33.86	*4.35*	*29.51*	29.00	20.13	3.62	*100.00*
Dec-98	*Value*	6402.04	18681.52	*2073.50*	*16608.02*	17942.08	9984.18	2020.93	*55030.75*
	%	11.63	33.95	*3.77*	*30.18*	32.60	18.14	3.67	*100.00*
Dec-99	*Value*	6680.46	20994.34	*2473.70*	*18520.64*	21840.83	8910.43	2544.61	*60970.66*
	%	10.96	34.43	*4.06*	*30.38*	35.82	14.61	4.17	*100.00*
Dec-00	*Value*	7132.42	22243.18	*2889.46*	*19353.72*	23271.25	12300.24	2941.08	*67888.17*
	%	10.51	32.76	*4.26*	*28.51*	34.28	18.12	4.33	*100.00*
Dec-01	*Value*	10510.37	22191.96	*3207.13*	*18984.83*	23066.76	12988.23	3097.27	*71854.59*
	%	14.63	30.88	*4.46*	*26.42*	32.10	18.08	4.31	*100.00*
Dec-02	*Value*	11793.59	22757.75	*4055.27*	*18702.48*	26577.43	14326.03	3610.85	*79065.66*
	%	14.92	28.78	*5.13*	*23.65*	33.61	18.12	4.57	*100.00*

Source: Central Bank / Ministry of Finance (Table 5.7)

According to the above table, Banks' assets amounted to LBP 79065.66 billion at the end of December 2002 compared to LBP 18808.87 billion at the end of December 1993. The increase in total assets throughout this period amounting to LBP 60256.79 billion was the result of:

- An increase in the deposits with BDL equivalent to LBP 10407.68 billion accounting for 17.27 percent of the total increase.
- An increase in claims on the private sector in the amount of LBP 16859.86 billion accounting for 27.98 percent of the total increase.
- An increase in claims on the public sector amounting to LBP 22564.16 billion accounting for 37.45 percent of the total increase.
- An increase in foreign assets equivalent to LBP 7285.45 billion accounting for 12.09 percent of the total increase.
- An increase in other assets in the amount of LBP 3139.64 billion accounting for 5.21 percent of the total increase.

The main activity of commercial banks worldwide is the provision of short-term credit to the private sector to finance productive investment. If this was the case in Lebanon, then the increase in commercial banks' assets during the years 1993-2002, amounting to LBP 60256.79 billion (or 320 percent), would have been the result of a corresponding increase in productive investment. This would have lead the Lebanese economy to grow in parallel with the increase in banks' assets.

However, as shown in table 5.7, the sum of the increase in commercial banks' deposits with the Central Bank and the increase in claims on the public sector, which

amounted to LBP 32971.84 billion during the years 1993-2002, accounted for 54.72 percent of the total increase in banks' assets during this period.

On the other hand, total loans granted to the private sector accounted for just 27.98 percent of the total increase in banks' assets during the years 1993-2002. This would indicate to what extent commercial banks were restricted from playing their major role in financing the productive sectors' needs. The figure below compares the share of the private sector in total banks' assets to the assets held by the public sector throughout the 1993-2002 period.

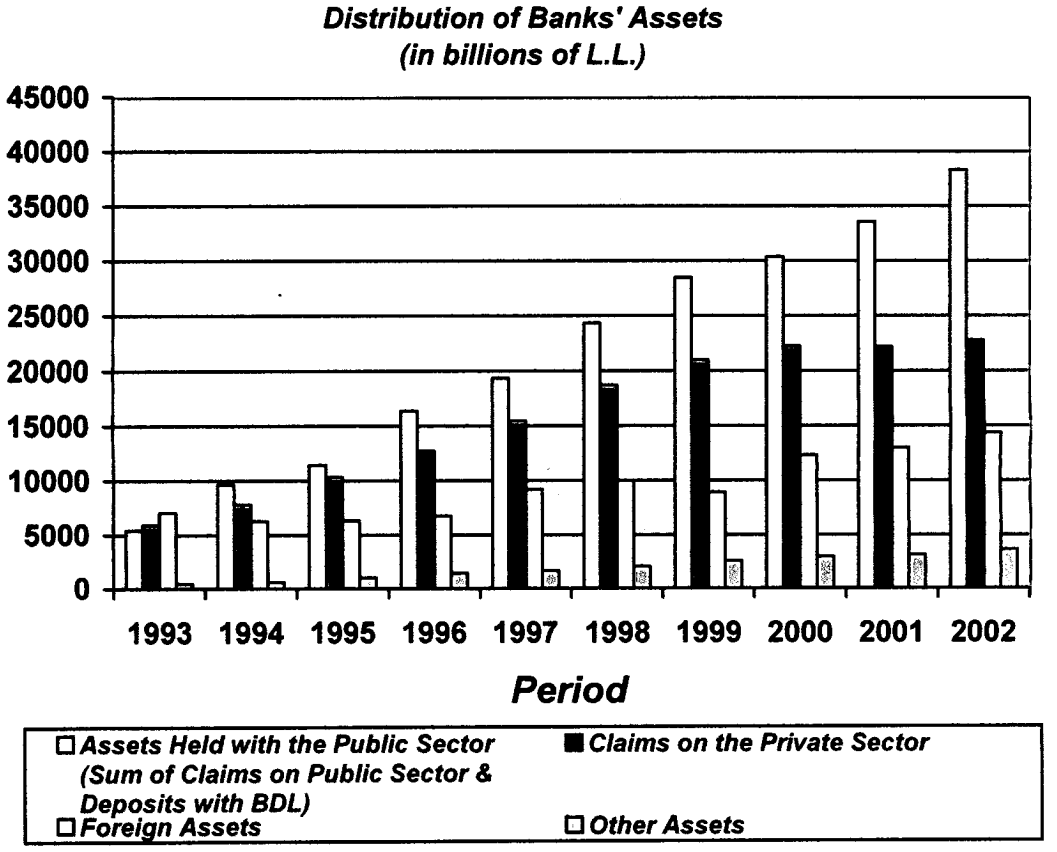

Figure 5.2

The skewness of the banks' assets distribution towards the public sector, especially during the years 2000-2002 as highlighted in the above figure, was enforced by the

Central Bank's policies. The latter were targeted at keeping commercial banks the major source of funds to finance the public debt neglecting the private sector's needs. This would lower our expectation of an economic growth that corresponds to the growing financial strength of the banking sector.

To summarize, this section surveyed the evolution of the money supply and identified the impact of the applied monetary tools. In the next section, we will identify the effect of these tools on interest rates, in an attempt to see if the fluctuations in the latter corresponded to the money supply growth recorded throughout the 1993-2002 period.

5.2 Effect of applied monetary tools on the interest rates

Until this stage of our analysis, we have identified the evolution of the money supply, which was controlled by the government intervention through the BDL's applications of its monetary policy instruments. If the evolution of the money supply is necessary to measure the performance of the monetary sector, it is not sufficient to identify the interaction of the latter and the real sector (or the goods sector).

The asset and the goods markets are linked by the interest rate. Any shock to the first market causes the rate of interest to change and so affects the second market and initiates an interactive process until equilibrium is reattained[9].

[9] Modigliani (1963). "The Monetary Mechanism and its Interaction with Real Phenomena." *Review of economics and Statistics*, Vol. 45, pp. 79–107

In addition, the impact of change in the money supply on income depends upon:

1. How large a change in interest rates is generated by a given change in the money supply
2. How large a change in the level of aggregate expenditure is generated by this change in interest rates, that is, how large is the interest elasticity of expenditure[10].

Such facts would highlight the necessity of analyzing the evolution of the interest rates in order to be able to predict and explain the development of the economic situation and the impact of the monetary policy[11]. Within this context, the main objective of this section is to analyze the fluctuations in interest rates and to show how they were related to the increase in the money supply discussed in the previous section.

Among several interest rates (shown in table A3 in the appendix), we will analyze the lending and deposit rates of commercial banks. Such interest rates are of major importance in term of their direct effect on saving and investment (as will be shown later in this chapter), and, thus, on the productive sectors' performance.

The following table sets out the USD and LBP deposit and lending rates of commercial banks at the end of each period in the years 1993-2002. The change in the aggregates M2 and M3 are also represented in this table in order to show how the interest rates responded to the fluctuations in the money supply.

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[10] Liu (2000). "Seasonal Cycles, Business Cycles, and Monetary Policy." *Journal of Monetary Economics*, Vol. 46, pp. 441–464

[11] The effect of the monetary policy on income will be identified in the next chapter. However, it is worthwhile illuminating the process whereby the targeted money supply might affect income, and hence explaining the results that we will face in the next chapter.

EVOLUTION OF THE LENDING AND DEPOSIT RATES OF COMMERCIAL BANKS
(End of period – Percentage)

Period	*Dec-93*	*Dec-94*	*Dec-95*	*Dec-96*	*Dec-97*	*Dec-98*	*Dec-99*	*Dec-00*	*Dec-01*	*Dec-02*
*C.B[12]-LBP: Lending Rate**	29.29	21.28	28.99	24.68	20.28	20.04	18.38	17.94	16.76	16.10
*C.B-LBP: Average Deposit Rate***	13.18	12.79	17.12	14.69	12.97	12.61	11.30	10.44	10.15	9.83
Gap Between LBP Lending and Deposit Rates	16.11	8.49	11.87	9.99	7.31	7.43	7.08	7.50	6.61	6.27
Percentage Change in M2	20.85	61.74	12.54	44.90	3.77	13.93	22.26	-3.69	-11.34	18.06
*C.B-US$: Lending Rate**	na	na	12.19	11.74	11.69	11.30	10.87	11.15	10.14	9.62
*C.B-US$: Average Deposit Rate***	na	na	5.46	5.62	5.90	5.67	5.63	6.03	4.21	4.00
Gap Between USD Lending and deposit Rates	na	na	6.73	6.12	5.79	5.63	5.24	5.12	5.93	5.62
Percentage Change in M3	32.09	25.34	16.45	27.78	19.34	16.08	11.07	9.56	7.35	7.62

Source: Central Bank / Ministry of Finance
Table 5.8

[12] C.B. stands for "Commercial Banks"

* The LBP and USD lending rates reflect the figures given by the Central Bank. They represent the weighted-average interest rate on all maturity loans with respect to their circulation.

**The LBP and USD average deposit rates reflect the figures given by the Central Bank. They represent the weighted-average interest rate on sight and term deposits with respect to their share in total deposits.

In 1994, the LBP lending rate moved from 29.29% at the end of 1993 to 21.28% losing 798 basis points. Such a decline was accompanied by a decrease in the deposit rate, which moved from 13.18% at the end of 1992 to 12.79% at the end of 1993 losing 39 basis points. Also, we can realize that during the same period the gap between the lending rate and the rate on deposits (in LBP) declined by 762 basis points.

We should note that the lending rate, the rate on deposits in LBP as well as the decrease in the gap between them, all declined in parallel with a 61.74% increase in the stock of money in LBP (or M2). Although the decrease in the interest rates discussed can be considered as a normal movement in response to the increase in M2, we cannot argue yet whether such a decrease corresponds to the increase in M2, and hence whether it is the optimal increase or not. This is also the case for the 1996-2002 period that witnessed a steady decrease in the lending and deposit rates in parallel with a steady increase in M2.

In 1995 the lending rate increased by 771 basis points (from 21.28% at the end of 1994 to 28.99% at the end of 1995), when M2 increased by 12.54%. Based on the economic principles learned from the theoretical framework, such a change in the interest rates cannot be considered as a normal movement in response to the increase in the stock of money. A similar case is observed in the year 2000 with the lending rate and the rate on deposits in USD. During the year 2000, the stock of money in USD (or the USD deposits) increased by 20.98%. However, during the same year, the lending rate moved from 10.87% at the end of 1999 to 11.15% at the end of 2000 increasing by 28 basis points (after a steady decrease since 1995).

The deposit rate moved from 5.63% at the end of 1999 to 6.03% at the end of 2000 increasing by 40 basis points (after a steady decrease since 1995).

In addition, we can notice that the spread between USD and LBP lending and deposit rates has decreased. The spread between the deposit rates narrowed from 11.66% in December 1995 to 4.41% in December 2000, before rising again to 5.94% in December 2001, and then declining to 5.83% in December 2002. The spread between lending rates in LBP and in USD narrowed from 16.8% in December 1995 to 6.79% in December 2000, 6.62% in December 2001 and 6.48% in December 2002.

After discussing the fluctuations in the lending and deposit rates of commercial banks, we will move to identify the major factors lying behind these changes. Within this context, we will proceed starting with the relationship between the interest rates (deposit and lending rates) and the desired levels of saving and investment.

5.2.1 Relationship between interest rates, saving and investment

In general, the relationship between the desired levels of saving, investment, the lending rate and the rate on deposits can be identified through the following process:

- The rate on deposits of commercial banks affects the desired level of saving. As shown in chapter 2 (section 2.1), the saving curve slopes upward because any increase in the interest rate causes households to increase their desired level of saving (ceteris paribus).
- At a higher level of saving or deposits, the monetary base will rise, and hence commercial banks will be able to expand more credits and create additional funds. With a higher supply of credits, the access to money becomes easier for

households and investors, leading the cost of money or the lending rate of commercial banks to fall.

- The decrease in the lending rate leads the gap between this latter and the rate on deposits to decrease to a certain level at which commercial banks will be obliged to lower their rate on deposits for them to keep making profits.

Accordingly, the effectiveness of such a process can be identified through its effect on the lending rate, which depends on:

1. The money creation process which determines how much larger amount of bank money can be created in response to an increase in the monetary base, and which is identified by the growth of the money supply as discussed.
2. The weight of investment with respect to the total change in the money supply. In other words, the fluctuations in the lending rate depend on how much easier the access to money becomes as a result of the increase in the money supply.

Based on the above discussion, the actual levels of the lending rates shown in table 5.8 were combined results of these two factors. In the previous section we showed that throughout the 1993-2002 period, 55% (on average) of the total increase in the money supply were the result of an increase in claims on the public sector[13]. In addition, we mentioned that most of government's borrowings were used to finance the public debt (mostly constituted of current expenses). Accordingly, we believe that the observed decrease in either the lending rates or the rates on deposits does not correspond to the increase in the money supply.

[13] Refer to section 5.1.1

Following this argument, the remainder of this chapter provides evidence that the actual growth of the money supply should have lead the interest rate levels to be much less than the actual figures shown in table 5.8. In the discussions that follow, when we speak of "the money supply" and "the interest rate," we are referring to M3 and the weighted average lending rate[14] of commercial banks respectively. The next section identifies the determination of the interest rate in Lebanon.

5.2.2 Determination of the interest rate in Lebanon

As learned from the theoretical framework, the equilibrium level of the interest rate is determined by the interaction of the demand for and the supply of money, where any shock to either determinant causes the rate of interest to change. Accordingly, the Lebanese Government intervention should necessarily be reflected in the demand and/or the supply of money in order to produce a change in the interest rate. Figure 5.3 illustrates an adverse shock to the money supplied to the private sector.

Figure 5.3 assumes that D_P is the private sector's demand curve. M3 represents the total stock of money at the end of the given period and M_P the quantity of money supplied to the private sector during the same period, where MS_T^* and MS_P^* represent their correspondent supply curves. During the years 1993-2002 the increase in the claims on the private sector accounted for 41%, on average, of the total increase in the money supply registered during these years.

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[14] The weighted average lending rate of commercial banks is based on the distribution of loans (claims on the private sector) between the LBP and the US Dollar at the end of each period.

* MS_T represents the vertival supply curve of total stock of money (or M3) at period T.

* MS_P represents the vertival supply curve of money supplied to the private sector at period T.

The figure below shows how the relatively low contribution from the side of the private sector (resulted by the governmental restrictions) would relatively slowdown the decrease in interest rate level, compared to the decrease that should correspond to the total money growth.

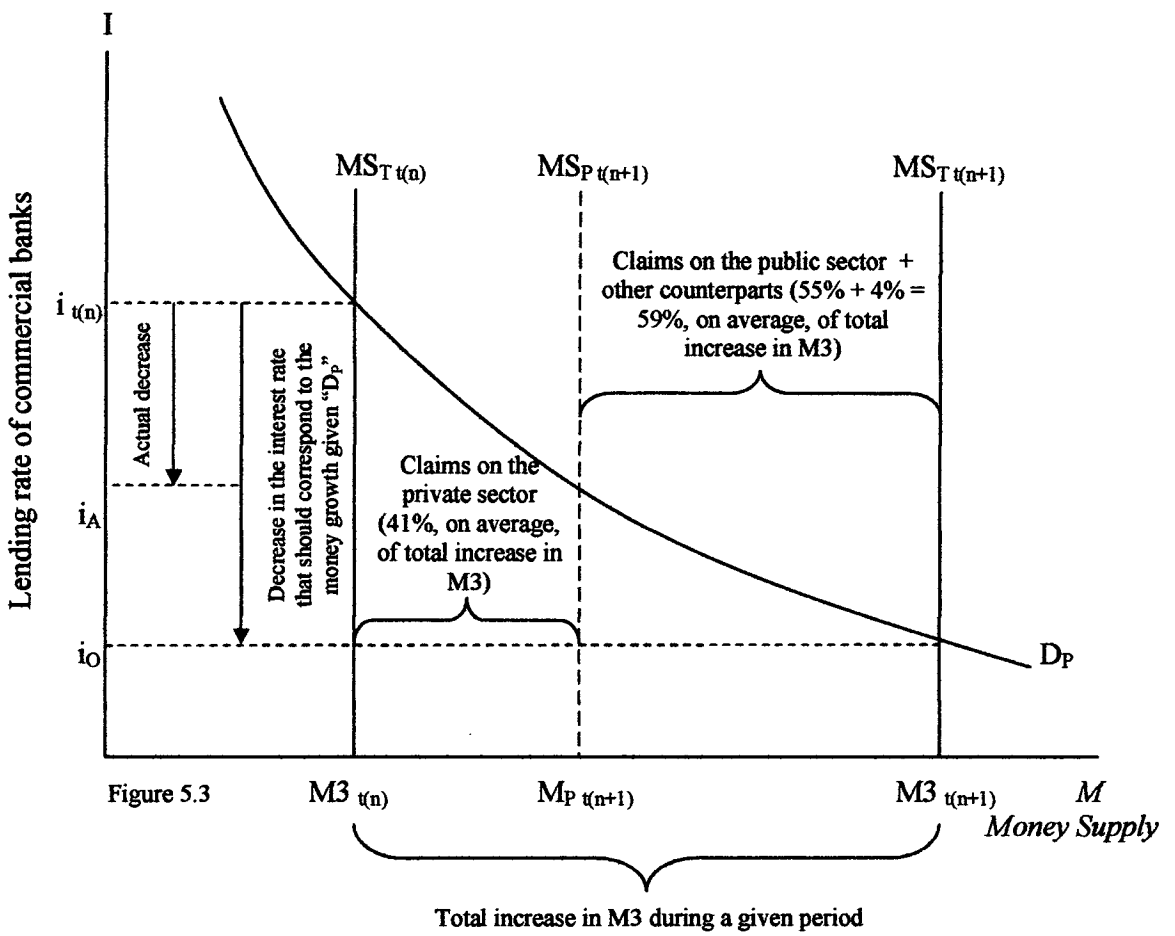

Figure 5.3

However, the effect of the government intervention on the interest rate does not end here. Throughout the above discussion we assumed that the demand curve was stable just to show how the tightening quantity of money supplied to the private sector would lead to a leftward move along a given demand curve and, thus, slowdown the

decrease of the interest rate. Two things made us believe that the government intervention has affected the demand of the private sector:

1. The needs of the private sector outweigh the quantity of money supplied to it. This pushed investors and households to yield and accept any – even if unfair – bargain just to get a hold of liquidity to cover their basic needs.
2. The artificial high interest rates set on Treasury bills to increase the demand for such government securities. Although this policy was indirectly the major contributor for the lack in financial resources that the private sector suffered from, it also had a direct effect on the demand of the private sector. As we know, any increase in the interest rate on Treasury bills will be directly followed by an increase in the interest rates of all financial instruments, including the lending rate of commercial banks. Accordingly, when everything is kept constant, such an artificial increase in the interest rate would leave the private with no choice but to pay a higher price to get the same quantity of money.

The above discussion leads us to argue that the actual demand of the private sector is a forced demand that does not reflect the natural behavior or desire of this sector. It is the result of the governmental sustainable attempt to keep commercial banks a source of funds to finance the public sector's needs, leaving the private sector with far less liquidity than needed to finance its activities.

Recall that the equilibrium condition is that the demand for money should be equal to the supply of it. Accordingly, the interest rate levels recorded during the 1993-2002 period do not reflect the equilibrium rates that should correspond to the growth of the

money supply. This is based on the fact that the private sector's demand outweighed the quantity of money supplied to it during that period.

If the facts discussed so far are necessary to illuminate the process whereby the government intervention affected the interest rate, they are not sufficient to identify the evolution of the private sector demand, and hence measure the impact of the applied monetary tools on the interest rate. With the given evolution of the total money supply and its counterparts, we need to identify the private sector demand viewed from households and investors' needs perspective rather than from a supply perspective.

Such a demand would reflect the real preference of the private sector, and hence identify the *desired* quantity of money that this sector would demand at any level of the interest rate. Thus, the interaction of such a demand for and the present annual supply of money would determine the equilibrium levels of the interest rate that should correspond to the total money growth. These equilibrium rate levels would then be compared to their correspondent actual levels in order to measure the impact of the government intervention. Follows determination of the private sector demand.

5.2.3 Private sector demand and the impact of the government intervention

We begin this section by referring to the theoretical approach[15] to identify the determinant(s) of the money demand, and hence show how the demand function might be derived.

[15] Bourgain and Lelièvre (1996). "Macroéconomie – Equilibres et Déséquilibres." Tome 3. Paris I Panthéon-Sorbonne: Bréal. pp. 90-129

a. Demand for money in the analysis of Keynes: according to Keynes, the total demand for money is the sum of the demand necessary for transaction, precaution and speculation purposes. The demand function of Keynes is expressed algebraically as follows: $M_d = L_1(Y) + L_2(i)$

- Y and i represent the national revenue and the interest rate respectively, and L_1 and L_2 their correspondent coefficients.
- $L_1(Y) > 0$ (the demand for transaction and precaution purposes is positively correlated to the revenue)
- $L_2(i) < 0$ (the demand for speculation purpose is negatively correlated to the rate of interest)

Keynes argues that at a certain interest rate level, which is considered the minimum level, the demand for securities will tend to be zero, where the economy will face a liquidity trap.

b. Demand for money in the analysis of Fisher and Pigou: the latter represent the demand for money as a function of the revenue. Their demand function is expressed algebraically as follows: $M = (Y.K) / P$

- Y represents the real revenue
- P represents the purchasing power of money (inverse of the total price level)
- K represents the coefficient of money held in the form of cash in hands

c. Demand for money in the analysis of Friedman: Friedman represents the determinants of the money demand as shown in the following demand function:

$M / P = f\{r_b, r_e, (dP/Pdt), (Y/P), w, u\}$

- P is the price level

- M/P is the real money demand
- r_b and r_e represent the rate of return of obligations and actions
- dP/Pdt is the inflation rate
- Y/P is the permanent real revenue
- w is the ratio of the human capital to the non-human capital
- u reflects people's preference

d. Demand for money in the analysis of Tobin and Boumol: these relate the optimal level of money holdings to the revenue and the interest rate as expressed in the following function: $C/2 = \sqrt{(bY/2i)}$

- Y represents the revenue
- i represents the interest rate
- b represents a function relating the average optimal money holdings level to output and interest rate.

Now that we identified the main determinants of the demand for money, as expressed by major economic schools, we will show the limitations of this research vis-à-vis the application of the above approaches.

Limitations

Recall that, the same schools that provided the demand approaches discussed above, state also that the ultimate target of the monetary policy is a healthy business cycle, and that the monetary authority uses the money supply and the interest rate as intermediate targets to achieve this ultimate goal. This means that the economic growth and the interest rate presented above as determinants of the money demand,

are supposed to be consequences of the applications of the monetary policy instruments.

In Lebanon, neither the economic growth was considered as an ultimate target for the monetary authority, nor the interest rate was free from the government direct influence. During the years 1993-2002, the applications of the monetary policy instruments were mainly targeted at financing the public sector needs, and the interest rate on Treasury bills was the main instrument used to achieve this target.

Accordingly, the monetary policy conducted in Lebanon throughout the 1993-2002 period did not respect the principle rules of such a policy. Thus, the determination process of the money demand as expressed by the demand functions discussed above, could not be applied on the Lebanese case, because these functions are based on the assumption that the basic monetary policy rules are respected.

For example, according to Keynes' demand curve, the less the response of interest rate to a shift of the inelastic supply curve means that the demand curve is becoming flatter or more elastic. In addition, the demand curve of Keynes states that if an increase in the money supply does not lead the interest rate to fall, then this curve is taking an horizontal shape. This means that the economy is facing a liquidity trap and the interest rate is at its minimum level. If this was the case in Lebanon, then we can argue that the Lebanese economy is close to face a liquidity trap and the interest rate is so close to its minimum level, given the very low impact of the money growth on the interest rate.

However, the case is completely different. The slight effect of the money supply on the interest rate is due primarily to the high interest rates set on Treasury bills to attract subscribers in government securities, leaving the private sector with the minor quantity of the total money supply and the interest rate at a high level.

The applications of the demand functions provided by the theoretical framework must be preceded by a large field survey. This latter would be targeted at identifying the *desired* quantity of money that the private sector would demand at any level of the interest rate and the national revenue, when this sector's preference or behavior is free from governmental influence. This would allow us to determine the minimum interest rate level at which the demand curve would start to take an horizontal shape, indicating the beginning of the liquidity trap zone.

However, due to time and cost limitations, we will not be able to derive the demand for money viewed from households and investors' needs perspective. Consequently, we will not be able to identify the decrease in the interest rate that should correspond to the growth of the money supply.

Nevertheless, throughout the remainder of this chapter, we will try to show how the present demand (or forced demand[16]) of the private sector *tends* to be, and then compare it with the public sector demand[17], in an attempt to have some indications or

[16] The forced private sector demand for money (or simply the forced demand) corresponds to the present private sector demand lying under the governmental restrictions. This forced demand is viewed only from a supply perspective and, thus, does not reflect *the desired* quantity of money that this sector would demand at any level of the interest rate.

[17] The public sector demand or needs for money were the main target of the monetary policy during the years 1993-2002. Accordingly, the needs of this sector are supposed to have been satisfied during this period. This demand will be compared to the forced and unsatisfied demand of the private sector.

insights about the effect of the government intervention on the equilibrium level of the interest rate. Our analysis will be divided into three major parts through which we will:

1. Identify the relationship between the money supplied to the private sector and the interest rate (using the linear regression model) and derive the estimated private sector's demand function (forced demand function).
2. Identify the relationship between the money supplied to the public sector and the interest rate on Treasury bills (using the linear regression model) and derive the public sector's demand function (estimated function).
3. Compare the public sector demand to the forced demand of the private sector. The demand of the public sector is supposed to be satisfied given the government sustainable intervention targeted at this purpose. Nevertheless, the private sector's access to money was lying under governmental restrictions.

Relationship between money supplied to the private sector and the interest rate

As long as we are studying the lending rate of commercial banks (or the interest rate on credits provided to the private sector), the claims on the private sector would be the representative quantity of money supplied to this sector. The following table sets out the weighted average lending rate of commercial banks, total net claims on the private sector, and the stock of money M3 at the end of each quarter of the years 1995-2002[18].

[18] Our analysis does not cover the years 1993 and 1994 because we were not able to find any official data concerning the USD lending rates of commercial banks during this period. Nevertheless, the covered period (1995-2002) includes 96 observations, which still can provide us with reliable estimates.

INTEREST RATE AND THE MONEY SUPPLY (Quarterly – Billion LBP)

Period	*Weighted Average Lending Rate of Commercial Banks (%)*	*Claims on the Private Sector*	*Stock of Money M3*
Mar-95	13.11	8725.03	20571.37
Jun-95	13.21	9344.19	21545.87
Sep-95	14.04	9760.24	22338.10
Dec-95	14.27	10439.95	22883.34
Mar-96	13.71	11079.71	23843.09
Jun-96	13.65	11647.01	25015.56
Sep-96	13.36	12051.22	26523.49
Dec-96	13.39	13025.69	29241.02
Mar-97	12.95	13491.59	30371.94
Jun-97	12.90	14287.55	31508.21
Sep-97	12.79	15027.43	32972.56
Dec-97	12.79	16038.90	34897.45
Mar-98	12.86	16790.39	35522.30
Jun-98	12.64	17826.84	37402.85
Sep-98	12.53	18489.89	38947.02
Dec-98	12.27	19321.84	40509.37
Mar-99	12.15	19902.93	41223.77
Jun-99	11.95	20749.78	42010.33
Sep-99	12.01	21287.17	43330.43
Dec-99	11.75	21573.02	44992.54
Mar-00	11.90	22135.04	46117.39
Jun-00	12.26	22490.65	47076.98
Sep-00	12.25	22773.87	48057.15
Dec-00	12.03	22871.97	49294.35
Mar-01	11.85	22894.33	49951.94
Jun-01	11.49	23241.07	50976.65
Sep-01	11.48	23375.43	51762.40
Dec-01	11.10	22888.06	52918.20
Mar-02	11.24	22805.61	52660.39
Jun-02	11.18	23303.59	52929.41
Sep-02	11.01	23568.12	54399.19
Dec-02	10.77	23672.13	56952.00

Source: Central Bank / Ministry of Finance (Table 5.9)

The above table states that in general, the interest rate has decreased in response to the increase in the money supplied to the private sector. Moreover, based on monthly data for the years 1995-2002 provided by the BDL, that is 96 observations, the relationship between the money supplied to the private sector and the interest can be identified through the regression model joining these two variables.

The model includes the following:

- Weighted average lending rate of commercial banks (or I)
- Claims on the private sector (M_P)

SPSS gave the following model summary:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.928[a]	.861	.859	.34096

a. Predictors: (Constant), Claims on the Private sector (In Billions of LBP)

Table 5.10

According to the above table, the fluctuations in the claims on the private sector explained 85.9 percent of the changes in the interest rate. The regression equation will be written based on the coefficients shown in the table below:

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	15.390	.129		119.512	.000
	Claims on the Private sector (In Billions of LBP)	-1.66E-04	.000	-.928	-23.983	.000

a. Dependent Variable: Weighted Average Lending Rate of Commercial Banks (%)

Table 5.11

$$I = 15.39 - 0.000166\, M_P \quad (2)$$

According to the above equation, each LBP 1 billion increase in the claims on the private sector was accompanied by a decrease in the interest rate equivalent to 0.0166 basis points. Based on this relationship, the figure below identifies the equilibrium levels of the interest rate corresponding to the money supplied to the private sector at the end of each period in the years 1993-2002.

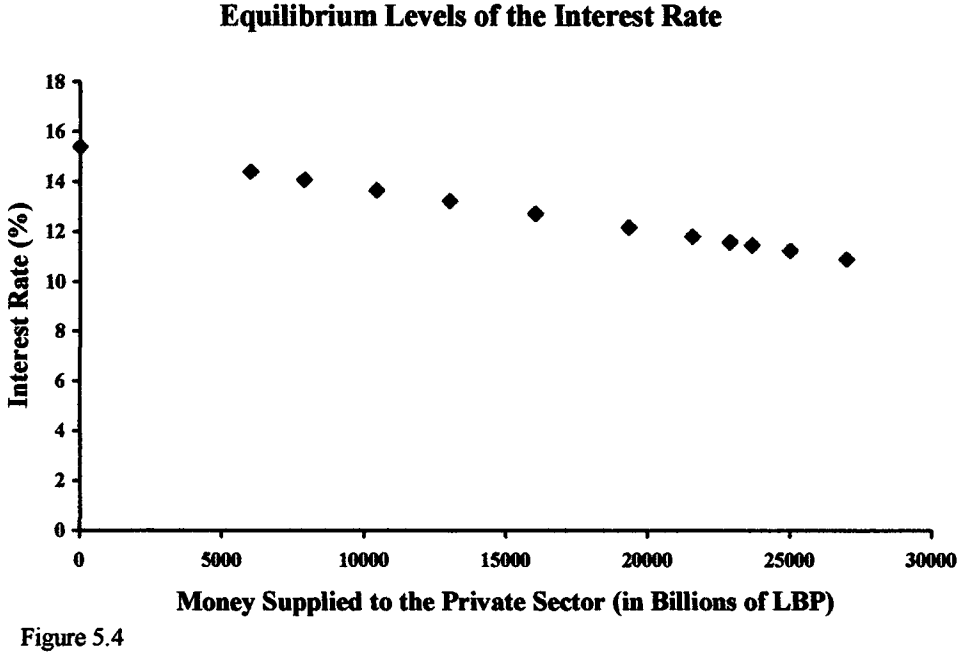

Figure 5.4

The equilibrium level of the interest rate is determined by the interaction of the supply of and demand for money. Accordingly, each point shown in the above figure, which represents the equilibrium level of the interest rate, is determined by the intersection of the inelastic supply curve and the demand curve. Thus, the line that joins these scatter points would indicate how a part of the private sector demand curve tends to be.

The figure below shows the movements of the vertical supply curves reflecting the expansion of money supplied to the private sector, and then identifies their points of

intersections with the derived demand curve, determining the equilibrium level of the interest rate at the end of each period in the years 1993-2002.

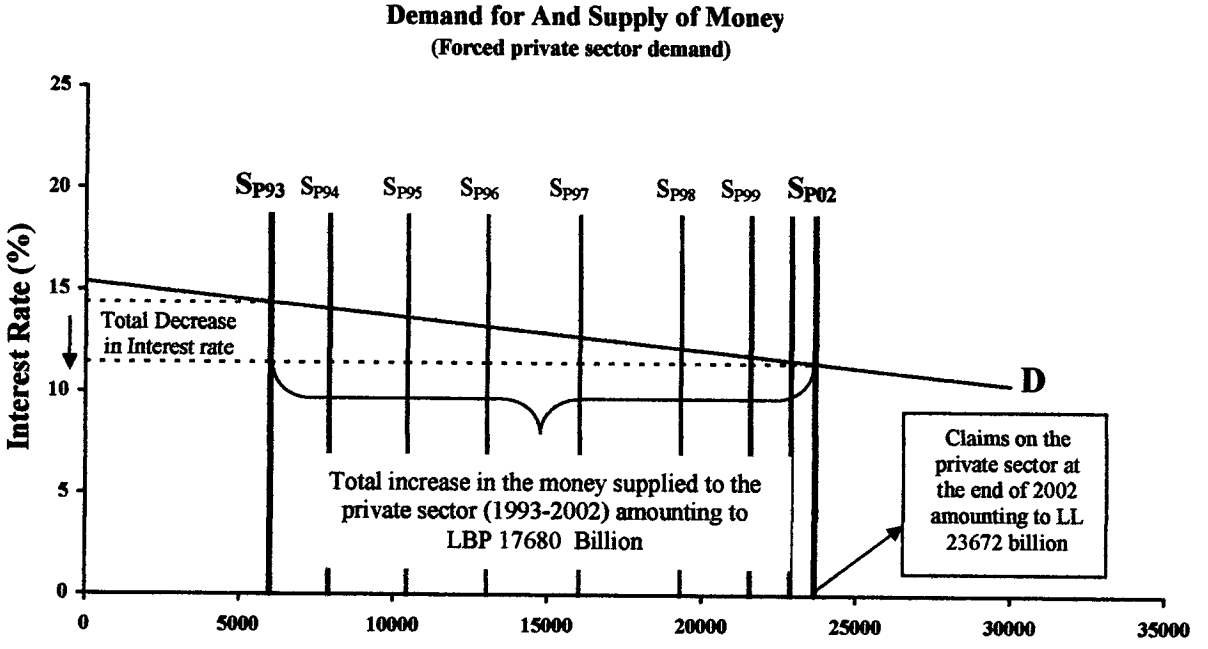

Figure 5.5

In addition to the graphical derivation of this part of the private sector's demand curve shown above, this latter can be derived algebraically as follows:

- In order to indicate how the demand responds to the fluctuations in the interest rate, we assume that the above demand function is of the form $D_p = a + bI$
- The equilibrium levels of the interest rate extracted earlier based on equation 2 above, represent the points where the private sector's forced demand (or just demand) for money or credits is equal to the quantity of money or credits supplied to this sector.

- By substituting "D" with the quantity of money where the demand is equal to the supply, and "I" with their correspondent equilibrium levels of interest rate, we could then solve for "a" and "b", and hence derive the demand function.

The following table sets the quantity of money where the demand for it equals its supply, and then shows the equilibrium level of the interest rate that corresponds to such a quantity of money.

Period	*Money supplied to the private sector*	*Equilibrium levels of interest rate based on the regression equation 2*	*At the equilibrium level of interest rate Demand = supply*
Dec-93	5992.23	14.3953	5992.23
Dec-94	7908.29	14.0772	7908.29
Dec-95	10439.95	13.6570	10439.95
Dec-96	13025.69	13.2277	13025.69
Dec-97	16038.90	12.7275	16038.90
Dec-98	19321.84	12.1826	19321.84
Dec-99	21573.02	11.8089	21573.02
Dec-00	22871.97	11.5933	22871.97
Dec-01	22888.06	11.5906	22888.06
Dec-02	23672.13	11.4604	23672.13

Table 5.12

Based on the above table, the demand function D_P[19] can be written as follows:

$$\mathbf{D_P} = 92710.84 - 6024.1\,\mathbf{I} \qquad (3)$$

The above function identifies the private sector's demand for money at each level of the interest rate. It states that each percentage increase in the interest rate was accompanied by a decrease in the private sector demand equivalent to LBP 6024.1

[19] D_P stands for the demand function of the private sector

billion. Such a private sector demand will be compared to the demand of the public sector that will be derived in the next section.

Relationship between money supplied to the public sector and the interest rate on Treasury bills

Table 5.13 states that in general, the interest rate on Tbs. has decreased in response to the increase in the money supplied to the public sector. Moreover, based on monthly data for the years 1993-2002 provided by the BDL, that is 120 observations, the relationship between the money supplied to the public sector and the interest on Tbs. can be identified through the regression model joining these two variables. The model includes the following variables:

- Weighted average interest rate on Tbs. (I_{pub})
- Claims on the public sector (M_{Pub})

SPSS gave the following model summary:

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.911[a]	.842	.840	.74334

a. Predictors: (Constant), Claims on the Public sector (In Billions of LBP)

Table 5.13

According to the above table, the fluctuations in the claims on the private sector explained 84 percent of the changes in the interest rate on Tbs.

INTEREST RATE AND THE MONEY SUPPLY
(Quarterly – Billion LBP)

Period	*Weighted Average Interest Rate on Tbs. (%)*	*Claims on the Public Sector*
Mar-92	27.71	1619.33
Jun-92	27.57	1766.09
Sep-92	34.14	1978.86
Dec-92	19.86	2348.53
Jun-93	23.13	2723.65
Dec-93	21.76	3096.68
Jun-94	19.34	3489.70
Dec-94	15.34	4347.43
Mar-95	18.82	5003.83
Jun-95	23.92	5855.80
Sep-95	30.98	6007.61
Dec-95	20.12	5350.18
Jun-96	19.38	6701.13
Dec-96	18.65	8296.27
Jun-97	15.93	8459.30
Dec-97	16.11	12222.62
Jun-98	16.23	13641.00
Dec-98	16.17	15954.00
Jun-99	15.89	16714.63
Dec-99	14.24	18022.25
Jun-00	14.25	20193.51
Dec-00	14.22	22738.97
Jun-01	14.27	24713.19
Dec-01	14.36	28011.88
Jun-02	14.41	29618.63
Dec-02	9.36	27481.77

Source: Central Bank / Ministry of Finance
Table 5.14

The regression equation will be written based on the coefficients shown in the table below:

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	24.652	.336		73.355	.000
	Claims on the Public sector (In Billions of LBP)	-5.00E-04	.000	-.911	-20.954	.000

a. Dependent Variable: Weigthed Average Interset Rate on Treasury Bills (%)

Table 5.15

$$I_{Pub} = 24.652 - 5E^{-04} M_{Pub} \quad (4)$$

According to the above equation, each LBP 1 billion increase in the claims on the public sector was accompanied by a decrease in the interest rate on Tbs. equivalent to 0.05 basis points.

More importantly, the above equation states that with no claims on the public sector the interest rate on Tbs. is equal to 24.65%. Recall that such an interest rate is totally under the control of the government. This finding alone suffices to confirm that the major target (if not the only target) of the Lebanese Government is to finance the public sector's needs.

Based on equation (4), the figure below identifies the equilibrium levels of the interest rate on Tbs. corresponding to the money supplied to the public sector at the end of each period in the years 1993-2002.

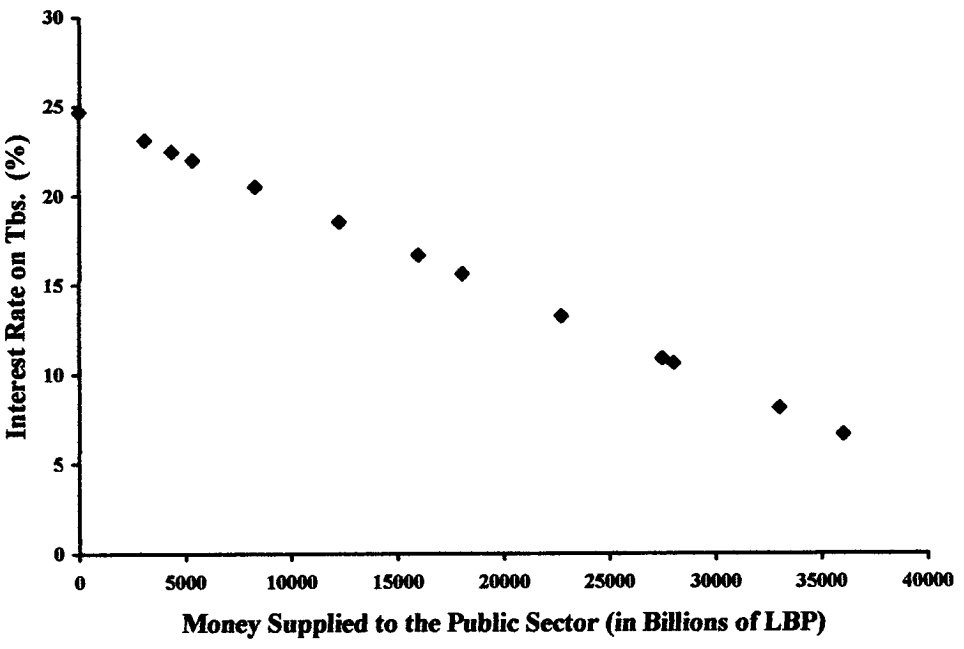

Figure 5.6

Each point shown in the above figure, which represents the equilibrium level of the interest rate on Tbs., is determined by the intersection of the inelastic supply curve of the public sector and its demand curve. Thus, the line that joins these scatter points would represent the public sector's demand curve.

The figure below shows the movements of the vertical supply curves reflecting the expansion of money supplied to the public sector, and then identifies their points of intersections with the derived demand curve, determining the equilibrium level of the interest rate on Tbs. at the end of each period in the years 1993-2002.

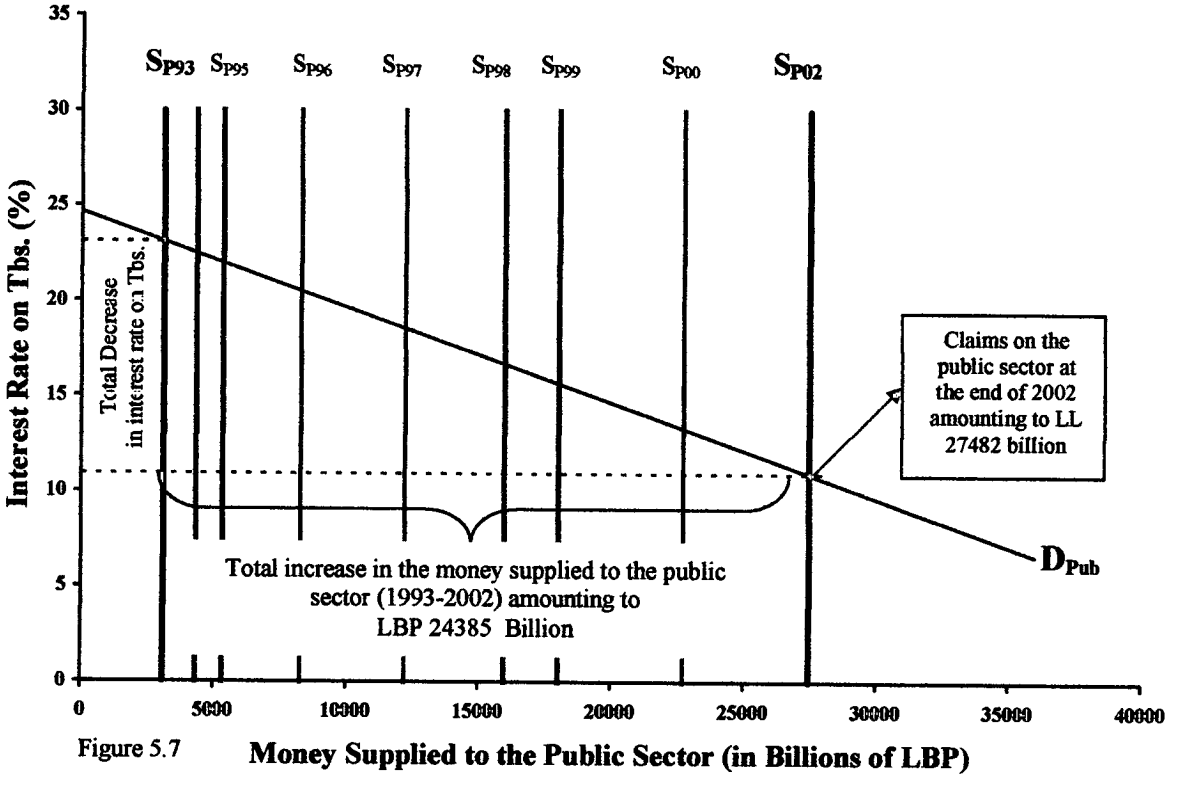

Figure 5.7

In addition to the graphical derivation of the public sector's demand curve shown above, this latter can be derived algebraically as follows:

- In order to indicate how the demand responds to the fluctuations in the interest rate, we assume that the above demand function is of the form $D_{pub} = a + bI_{pub}$
- The equilibrium levels of the interest rate on Tbs. extracted earlier based on equation 4, represent the points where the public sector's demand for money is equal to the quantity of money supplied to this sector.
- By substituting "D_{pub}" with the quantity of money where the demand is equal to the supply, and "I_{pub}" with their correspondent equilibrium levels of the interest rate on Tbs., we could solve for "a" and "b" and derive the demand function.

The following table sets the quantity of money where the demand for it equals its supply, and then shows the equilibrium level of the interest rate on Tbs. that corresponds to such a quantity of money.

Period	*Money supplied to the public sector*	*Equilibrium levels of the interest rate on Tbs. based on the regression equation 4*	*At the equilibrium level of interest rate on Tbs. Demand = supply*
Dec-93	3096.68	23.1037	3096.68
Dec-94	4347.43	22.4783	4347.43
Dec-95	5350.18	21.9769	5350.18
Dec-96	8296.27	20.5039	8296.27
Dec-97	12222.62	18.5407	12222.62
Dec-98	15954.00	16.6750	15954.00
Dec-99	18022.25	15.6409	18022.25
Dec-00	22738.97	13.2825	22738.97
Dec-01	28011.88	10.6461	28011.88
Dec-02	27481.77	10.9111	27481.77

Table 5.16

Based on the above table, the demand function D_P can be written as follows:

$$\mathbf{D_{Pub}} = 49304 - 2000\ \mathbf{I_{Pub}} \qquad (5)$$

The above function identifies the public sector's demand for money at each level of the interest rate. It states that for each percentage increase in the interest rate on Tbs. the demand of the public sector would increase by LBP 2000 billion. The following section compares the public sector's demand to the demand of the private sector.

Comparing the public sector demand to the forced demand of the private sector

When we discussed the government's applications of the monetary policy instruments (mainly the high interest rate set on Tbs.) during the years 1993-2002 (in the previous chapter), we realized that these tools were targeted at keeping commercial banks the

major source of funds for the public sector to finance the public debt and current expenditures (including debt servicing).

Such a policy objective to satisfy the public sector needs has prevented commercial banks from playing their major role in financing the private sector's activities, and hence from meeting the private sector's needs.

In order to identify the effect of such a policy on the interest rate of the private sector (or the lending rate of commercial banks) we will first compare the demand of both sectors which are expressed algebraically as follows:

- $\mathbf{D_P} = 92710.84 - 6024.1\,\mathbf{I}$ (3)
- $\mathbf{D_{Pub}} = 49304 - 2000\,\mathbf{I_{Pub}}$ (5)

Based on the above demand functions, the following figure compares the price of money that each sector was willing to pay to receive the same amount of money, say the stock of the money supply at the end of each period in the years 1993-2002.

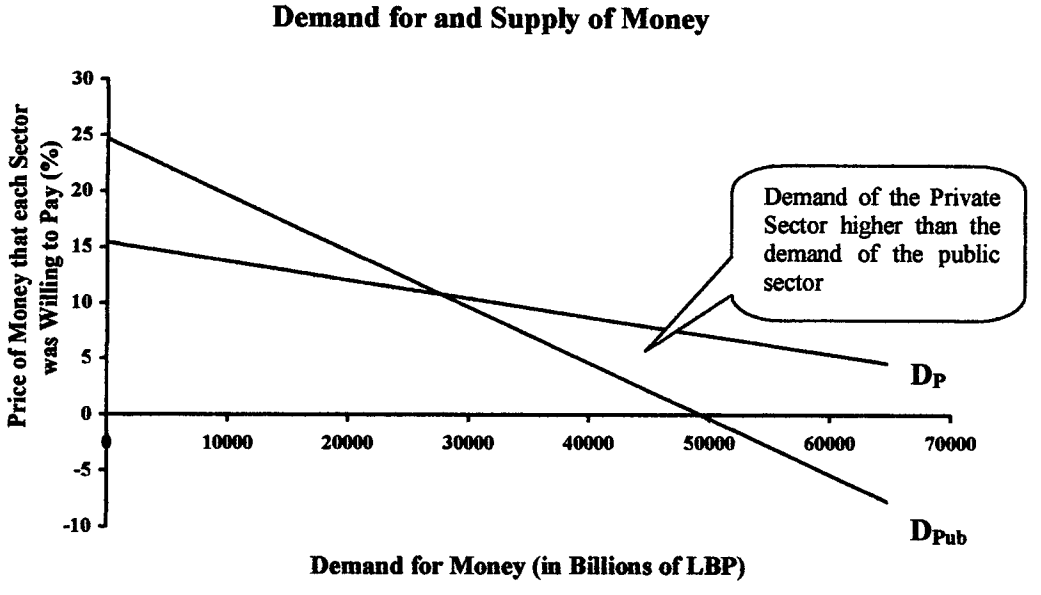

Figure 5.8

The relatively high prices that the private sector was willing to pay reveal that this sector was starving to get money. Such a fact was the result of the high demand of the private sector, as shown in the above figure, which in turn was due to the government's continuous attempt to prevent the private sector from financial resources in order to satisfy the public sector needs.

Finally, as far as the impact on the interest rate is concerned, we can realize that the government intervention has produced a double effect on the interest rate of the private sector through:

1. An upward shift of the demand curve of the private sector resulted by the artificial increase in the interest rate on Treasury bills. This lead the equilibrium levels of the interest rate to be higher at any given quantity of money supplied to the private sector.
2. The tightening quantity of money supplied to the private sector. The high discount rates and yields on government securities lead commercial banks to see Treasury bills as higher and less risky profit making alternatives than any other investment alternative. This was mainly due to the government sustainable attempts to keep commercial banks a source of funds to serve the public sector. Such a policy prevented the private sector from the major source of funds (commercial banks) to finance its activities. Consequently, the interest rate becomes higher than its optimum level that would have corresponded to a higher level of money supplied to the private sector at a given demand.

Chapter 6

Effect of Lebanese Monetary Policy on the Business Cycle

The ultimate target of monetary policy is a healthy business cycle, that is growth in output, low unemployment and low inflation. In chapter two we have discussed the processes whereby monetary policy might influence such targets based on the IS–LM model and the quantity theory of money. In this chapter, we will survey the economic situation in Lebanon during the years 1993-2002, and then refer to the mentioned models in order to measure the impact of the Lebanese monetary policy.

6.1 Macroeconomic situation (1993-2002)

Following the 17-year war that has resulted in massive human and material damages, the first cabinet that took office in Lebanon's development decade, prepared a ten-year construction and development plan (1993-2002). At the beginning of 1993, the Lebanese Government projected a 9% (per year) economic growth rate, a shift from a fiscal budget deficit to a surplus by the year 2000, and a 100% improvement in the standard of living[1]. Now that the decade is over, we can compare between the actual and the targeted results. It suffices to examine the most important indicators in accordance with the mentioned government plan itself (GDP, public debt and budget deficit) to show that the results are disappointing. The evolution of such indicators along with other selected key indicators of the macroeconomic development during the years 1993-2002 are summarized in the table below.

[1] Centre for Development Studies (MADA) (www.annd@cyberia.net.lb)

SELECTED KEY MACROECONOMIC INDICATORS
(End of Period – USD million)

Period	*Dec-92*	*Dec-93*	*Dec-94*	*Dec-95*	*Dec-96*	*Dec-97*	*Dec-98*	*Dec-99*	*Dec-00*	*Dec-01*	*Dec-02*
Nominal GDP	5545	7537	9110	11122	12996	14867	16167	16462	16462	16708	17042
Inflation Rate (%)	120	29.1	8.0	10.6	8.9	7.8	4.0	0.25	0.0	0.0	3.74
Growth of Real GDP (%)	4.5	7.0	8.0	6.5	4.0	4.0	3.0	1.0	0.0	1.5	0.25
Budget Deficit (%)	48.7	38.5	56.9	48.2	51.1	59	43.7	42.4	56.3	50.5	41.3
Debt Service / Total Expenditure (%)	23.3	26.0	28.6	32.0	36.7	36.9	42.4	42.9	40.3	43.4	48.0
Balance of Payments	54	1169	1131	256	786	420	-487	266	-289	-1170	1564
Gross Public Debt	3005	3719	6449	8860	13008	15390	18556	22366	24969	28269	31324
Net Public Debt	2385	3003	4934	7142	10481	14411	17125	19814	23240	27000	29358
External Debt	247	327	772	1343	1908	2432	4176	5529	6951	9554	14540
Gross Public Debt / GDP (%)	54.19	49.34	70.79	79.66	100.09	103.52	114.77	135.87	151.68	169.20	183.80

Source: Central Bank / Ministry of Finance
Table 6.1

Gross domestic product

In terms of domestic production, economic growth (real growth) registered 7% and 8% respectively in 1993 and 1994, a normal growth level in a post-war economy when military activity ceases and reconstruction starts. After 1994, the growth rate started a downward slope and reached 0% in 2000, 1.5% and 0.25%[2] in 2001 and 2002 respectively. Monetary and fiscal policies have all fostered increased external borrowing and rising foreign investments in Lebanon, which are considered the driving force of the domestic economy. However, capital inflows have been invested mostly in real estate or in the financial and banking sector, namely in Treasury bills that provide high yields and safe returns.

Inflation

The inflation rate moved from 120% in 1992 to 29.1% and 8% in 1993 and 1994 respectively. In 1995 it increased to 10.6%. After that, it started a downward slope and reached 0% in 2000 and 2001 and then increased to 3.74%[3] in 2002.

Budget deficit and public debt

The budget deficit was supposed to be erased and turn into a surplus in 2000. It reached 48.7% in 1992, then 38.5% in 1993. In 1994 it surged to 57%, and then reached 59% in 1997. The last year of the decade (2002) witnessed a decrease in the budget deficit, which attained 41.3% in 2002, compared to 50.5% in 2001. As for the public debt, the decade started with a total gross public debt level of USD 3,005 million (1992) accounting for 54.2% of GDP and ended with a USD 31324 million

[2] International Monetary Fund (IMF), Article IV Consultation with Lebanon, December 2002.
[3] Association des Banques du Liban (ABL). Key Indicators. Monthly report. Issue: June 2003 / July 2003

gross public debt in 2002 accounting for 183.8% of GDP. Servicing this debt, in 2002, amounted to USD 2985 million, which is 48% of total expenditures and around 82% of total revenues. Moreover, total current expenditures (including debt service) amounted to USD 5672 million in 2002, which constitute 91% of total expenditures and around 155% of total revenues.

Labor market and emigration

Certain social issues, such as (1) the labor market and (2) the emigration, cannot be separated from the general economic situation. There is an organic relation between the economic situation, job opportunities, and the emigration of the working class and educated people, which would deprive the country of its labor force. Because there is a lack of precise data regarding these issues and because there is a difficulty in undertaking such a study, we can only refer to available data despite their contradictions, as the only reference to analyze what is happening.

1. Labor market

The labor class in Lebanon is witnessing lack of work opportunities, as many private companies are closing down as a result of the deteriorated economic situation. This lead to the dismissal of many Lebanese workers thus depriving them from any revenue. Indeed, there are 4,000 work opportunities that have been lost in the year 1999, 1,300 during the year 2000, and more than 2,700 in 2001, not to mention the hundreds of job applications[4]. These figures are based on the files of individual and collective dismissals that are pending at the concerned Departments in the Labor Ministry.

[4] UNDP and Lebanese Institute for Employment, statistical report, 2001

The Lebanese working class is facing competitiveness with the foreign one, as employers prefer these foreign workers because of their lesser cost. The number of migrant workers – mainly Syrians, Egyptians, and South and Southeast Asians – peaked in 1993-95 at about 1.4 million, exceeding the Lebanese labor force. These compete with the Lebanese worker in many jobs in the service and productive sector and violate the Ministerial resolution relative to the jobs that should be restricted to Lebanese. The inflow of workers mainly affected low-skilled and blue-collar Lebanese workers. Recently, more and more medium-skilled employees have taken on low-skilled jobs. This reflects the fundamental disequilibria in the Lebanese labor market[5].

Unemployment in Lebanon was estimated by the Labor Minister to be 10.5% in 2001. Unemployment in Lebanon is mostly disguised and partial, and is under-evaluated given the high emigration rate. More than a study shows that the percentage of unemployment exceeded the 20%[6] in 2001. The impact of unemployment in Lebanon is not limited to the general revenue of families but exceeds it in the light of many developments the most important of which are: suspension of salary increase in the private sector, cutting down jobs, and salary reductions. Moreover, many employers are taking the lack of job opportunities as a pretext to retard the payment of salaries (or reducing them) to their employees. Sometimes the payment of salaries is delayed for months to compel the employee to quit his post instead of removing him. By doing that the employer would avoid the payment of indemnities according to law, while the employees do not even dare to ask for their rights by resorting to the Labor Ministry and / or to court.

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[5] The Active Population, Central Administration of Statistics, 1998

[6] An-Nahar, op.cit; Anis Abi Farah: "Lebanese Emigrants during the period 1975-2001", As-Safir, December 3, 2001.

As for the revenues, the general monthly revenue of 6% of families residing in Lebanon is below LBP 300,000, 19% below LBP 500,000, 40% below LBP 800,000, and 61% below LBP 1,200,000[7]. The latter figure constitutes the minimum required to meet vital needs of families.

With the lack of credible data and the absence of official figures concerning the state of the labor market in 2002, we will refer to our own empirical study[8] to show the Lebanese labor market status at the end of that period. The survey's results are shown in the table below:

Labor Market Status as of Dec-31 2002		
Category	*Share of Labor Force (percent)*	*Share of Adult Population (percent)*
Employed workers	68.82	48.79 (employment ratio)
Unemployed workers	31.18 (unemployment rate)	23.2
Voluntary unemployed	12.54	9.33
Non-voluntary unemployed	18.64	13.87
Males unemployed	23.39	17.4
Females unemployed	7.79	5.8
Labor force (employed + unemployed workers)	100	73.75 (participation rate)
Not in the labor force		26.25
Adult population (labor force + not in the labor force)		100
Underemployment	41% of employed	
Average unemployment spell duration	17.56 months	

Table 6.2

[7] UNDP: 2001 statistics

[8] The research paper was prepared under the supervision of Dr. Viviane Naimy. The main purpose of the study was to measure the economic and social impacts of unemployment in Lebanon by applying the Okun's law, and to study the relationship between the disposable income and the consumption behavior. The results of the study were based on a survey covering 400 citizens distributed all over the Lebanese territory based on the distribution of the Lebanese population as published by the Central Statistics Administration in 2001. The targeted sample was constituted of females and males above sixteen (intercepted in public places). Questionnaires were personally administered by three MBA students well trained.

The results of the study showed that, at the end of 2002, 31.18% of the participants in the Lebanese labor force were unemployed, where 23.39% of these were male and 7.79% were female. Voluntary and non-voluntary unemployment rates were estimated to be 12.54% and 18.64% respectively, underemployment rate 41% and the spell duration was 17.56 months on average[9].

2. Emigration

The emigration of the working class and educated people resulted by the lack of job offers in the labor market, is another major impact of the economic situation. Emigration constitutes a loss that could not be substituted. In fact, there would be no nation without the presence of its nationals. The number of emigrants exceeded 900,000 thousand people during the period 1991-2001, not to mention that 41% of the Lebanese youth dream of leaving the country for a better life abroad[10].

Statistical results of a global survey that included residents and residencies revealed that the percentage of male emigrants reached 84.9% whereas the percentage of female emigrants was 15.1% in 2001[11]. Working population, that is those aged between 20 and 60 years old, constitute 65% of emigrants. As for the level of education, the results revealed that most of the emigrants have undertaken intermediate and/or secondary studies and constitute 54.6% of the total number of emigrants.

[9] N.B. Given the relative small sample considered in our study, such results might not be representative, and hence may not reflect the real state of the labor market as at the end of 2002.
[10] UNDP: 2001 statistics
[11] Ministry of Emigrants. 2001. Central Department of Statistics: Survey of Residents and Residencies.

The emigration process in Lebanon is frightening in quality and quantity and includes all the Lebanese regions, communities and social classes. The country never witnessed throughout history such a wave of emigration. Indeed, during the first year of Lebanon's civil war (in 1975), 400,000 people emigrated. In the second year (in 1976), 300,000 left Lebanon. But afterwards, it became clear that the main reason behind emigration was the deterioration of the economic situation.

To summarize, any observer of the macroeconomic and social indicators discussed throughout this section, can acknowledge that since 1993, the economic situation has gradually worsened to become highly damaged at the end of 2002. It suffices to examine the public debt to GDP ratio (183.8%) to confirm that Lebanon is on the edge of economic bankruptcy.

Moreover, the deteriorated economic indicators discussed (which are the major contributor to the deterioration of the social situation) constitute the ultimate targets of the monetary policy. This confirms that the application of the latter in Lebanon during the years 1993-2002 was extremely bad. The next section will prove the preceding argument through revealing the effect of the applied monetary tools on the business cycle.

6.2 Impact of the monetary policy

The transmission mechanism from the applications of the monetary policy instruments to the business cycle can be identified through two different models: the quantity theory of money and the IS–LM model.

6.2.1 Quantity theory of money

The quantity theory of money is a hypothesis that money determines income. It contains the simplest and clearest example of a *direct transmission mechanism* from money to income.

The quantity theory asserts that a proportionate relationship exists between money and income and is expressed algebraically as: $MV = PQ \quad (1)$

Where:

- M is the money stock.
- V is the velocity of money. It measures how often the money stock turns over each period.
- Q is the quantity of final goods and services newly produced during a fixed period.
- P is the price levels at which the final goods and services are sold.

The quantity theory states that the money stock times its velocity must be equal to income (or nominal GDP). In the short run, the velocity is assumed constant (to be discussed in the next section). Thus, $\Delta V / V = 0$, and hence,

$$\Delta M / M = \Delta Q / Q + \Delta P / P \quad (2)$$ [12]

Accordingly, an increase in the money supply will necessarily be reflected in the nominal output through an increase either in the price levels and/or in the quantity of products and services (increase in the real GDP). Such a direct transmission from

[12] Naimy (2003). "Marchés Emergents, Financement des PME et Croissance Economique – Etude du Cas Libanais."

money to income allows us to identify whether the real and the nominal output growths corresponded to the growth of the money supply.

Limitations

Recall that the assumption that the velocity of money is constant has been contradicted by several empirical studies, especially when dealing with narrow money (or M_1 in Lebanon) and with long periods[13]. In addition, even when dealing with broad money, many economists would consider the velocity as closer to being a constant rather than being perfectly stable.

Our analysis will proceed based on the assumption that the velocity of M3 (broad money) is constant in the short run (on yearly basis). However, in order to avoid criticism for inaccuracy, we note that our results will not be used to draw a firm conclusion, but they will be considered as indicators of the monetary policy impact on income.

Moreover, it is noticeable that the quantity theory of money could be used not only to identify the relation between the change in the money supply and the nominal output, but also between the former and the change in the real output. However, in this case we would need to identify the change in the price levels or the GDP deflator. In Lebanon, the latter is confused with the consumer price index. In other words, the official figures of the real output are computed based on the inflation rate (change in the prices of consumers' products) rather than on the GDP deflator (change in the prices of all products). Despite their inaccuracy, we will refer to available data as the

[13] Borda and Jonung (1990). "The Long-Run Behavior of Velocity." *Journal of Policy Modeling*, Vol. 12, pp. 165–197

only reference to estimate the impact of the monetary policy in Lebanon on the real output.

Money supply and real output

According to the quantity theory of money (see equation 2 in page 139), the real output growth can be computed as follows:

$\Delta Q / Q = (\Delta M / M) - (\Delta P / P)$

Table 6.3 sets out the annual actual growth of each of the money supply (M3), the real output and the price level, and shows the potential growth of the real output that should correspond to the actual money growth at December 31 for the years 1996-2002. If we compare the potential annual growth of the real output to its actual growth (as estimated by the BDL and shown in table 6.3), we can identify the effect of the monetary policy instruments on the real economic growth. At the end of 1996, M3 registered a 27.78% growth. The same period witnessed an increase in the price levels equivalent to 8.9%. According to the quantity theory of money, the real output should have registered an 18.88% growth at the end of 1996. However, the actual growth of the real output registered at the end of that year was 4%. Thus, the gap between the actual real output growth and its potential growth at the end of that period was 78.81%.

During the years 1997-2000 the actual growth of the real output has been far lower than its potential growth that should correspond to the money growth recorded throughout this period. The gap between the actual and the potential growth of the real output reached it highest level in 2000 registering 100%.

MONEY SUPPLY GROWTH, INFLATION RATE, AND REAL OUTPUT GROWTH
(End of Period – Percentage)

Period	*Dec-96*	*Dec-97*	*Dec-98*	*Dec-99*	*Dec-00*	*Dec-01*	*Dec-02*
Annual Growth of the Money SupplyM3 (A)	27.78	19.34	16.08	11.07	9.56	7.35	7.62
Annual Percentage Change in the Price Level (B)	8.90	7.80	4.00	0.25	0.00	0.00	3.74
Potential Annual Growth of the Real Output that should Correspond to the Growth of M3 (C) = (A - B)	18.88	11.54	12.08	10.82	9.56	7.35	3.88
Actual Annual Growth of the real output (D)	4.00	4.00	3.00	1.00	0.00	1.50	0.25
Gap Between the Actual Real Output Growth and its Potential Growth (%) (E) = (C – D) / (C)	78.81	65.34	75.17	90.76	100.00	79.59	93.56

Source: Central Bank / Ministry of Finance
Table 6.3

At the end of the last two years (2001-2002), M3 registered 7.35% and 7.62% growth respectively, and the price level registered 0% and 3.74% increase respectively. During the same period, the real output should have grown by 7.35% in 2001 and 3.88% in 2002. However, these two years witnessed actual growths equivalent to 1.5% and 0.25% respectively.

The above findings confirm that the government's monetary policy was a failure. Moreover, such results lead one to wonder whether the monetary authority has ever considered the economic growth as a monetary policy target. In fact, after surveying the applications of the monetary policy instruments and their effect on the distribution of the money supply growth[14], we did not expect to observe the real output growing in correspondence to the money growth. How can the economic growth correspond to the growth of the money supply when the private sector, which is considered the driving force behind the economic growth, had access on just 41%, on average, of the total annual money growth[15].

Money supply and nominal output

After identifying the effect of the monetary policy on the real economic growth, we will focus on the evolution of the nominal output. When the key macroeconomic indicators represented in table 6.1 account for inflation, the nominal output became more representative than the real one, especially that such indicators are compared to the nominal level of GDP. The following table compares the present evolution of the nominal GDP to its potential evolution that should correspond to the money supply growth during the years 1992-2002.

[14] Refer to chapter 5 section 5.1.1
[15] Refer to chapter 5 section 5.1.1

EVOLUTION OF THE NOMINAL GDP AND EFFECT OF THE MONETARY POLICY INSTRUMENTS
(End of Period – Percentage)

Period	*Actual Annual Level of the Nominal GDP (in millions of USD) (A)*	*Actual Annual Growth of the Nominal GDP*	*Potential Annual Growth of the Nominal GDP that should Correspond to the Growth of M3*[16] **(B)**	*Annual Level of the Nominal GDP that should Correspond to the Growth of M3*[17] *(C)* $(C_n)=(1+B)*(C_{n-1})$	*Actual Level of the Nominal GDP / its Potential Level (D) = (A) / (C)*	*Weight of the Stock of Money Held by the Public Sector / Total Stock of Money*	*Gross Public Debt / Nominal GDP*
Dec-92	5545	49.70	114.31	7938	69.85	25.05	54.19
Dec-93	7537	35.92	32.09	10485	71.88	28.59	49.34
Dec-94	9110	20.87	25.34	13142	69.32	35.96	70.79
Dec-95	11122	22.09	16.45	15304	72.67	38.50	79.66
Dec-96	12996	16.85	27.78	19556	66.46	43.01	100.09
Dec-97	14867	14.40	19.34	23339	63.70	52.53	103.52
Dec-98	16167	8.74	16.08	27092	59.67	55.19	114.77
Dec-99	16462	1.82	11.07	30090	54.71	54.90	135.87
Dec-00	16462	0.00	9.56	32967	49.93	60.60	151.68
Dec-01	16708	1.49	7.35	35391	47.21	72.80	169.20
Dec-02	17042	2.00	7.62	38089	44.74	68.96	183.80

Source: Central Bank / Ministry of Finance (Table 6.4)

[16] According to the quantity theory of money, the growth of the **nominal GDP** should be equal to the growth of the money supply, or ΔM3 / M3.

[17] The annual level of the nominal GDP as at the end of year "n" that should correspond to the growth of the money supply M3 during the same period, is equal to one plus the computed potential growth of nominal GDP in year "n" times the extracted level of nominal GDP as at the end of year "n-1". In 1991, the nominal GDP was estimated to be USD 3,704 million, according to the BDL. Moreover, the nominal GDP growth in 1991 was estimated to be 40%, and hence corresponded (to a high extent) to the money growth recorded during the same period, which was equivalent to 43.73%. On this basis, the **actual** nominal GDP as at the end of 1991 is considered as the base level for the year 1992. Then, the **extracted** level of the nominal GDP as at the end of 1992, which should correspond to the money growth recorded during the same period, will be the base level for the next year, and the cycle continues. Such a process allows us to compare the evolution of the levels of the nominal GDP that should correspond to the growth of the money supply, to the actual levels of the nominal GDP at the end of each period in the years 1992-2002.

The above table states that during the years 1992-2002, the nominal GDP has been at way below its potential level that should correspond to the growth of the money supply registered during the same period. From 1992 until 1995, the ratio of the actual nominal output to the potential nominal output (that should correspond to the money growth) was on average 70.93%. The next four years witnessed a steady decline in such a ratio, reaching 54.71% in 1999.

During the last three years, the Lebanese economy has been operating at less than 50% of its potential output (that should correspond to the money growth). The actual nominal GDP registered USD 16462 million at the end of 2000, USD 16708 million at the end of 2001, and USD 17042 million at the end of 2002. These figures represent respectively 49.93%, 47.21% and 44.74% of the potential nominal GDP, which registered USD 32967 million, USD 35391 million, and USD 38089 million at the end of 2000, 2001 and 2002 respectively.

The above findings lead one to wonder why the money growth has not been properly reflected in economic growth as learned form the quantity theory of money. In other words, if the expansion of the money supply has not been targeted at serving the economy, then what was the driving force behind such a money growth registered throughout the 1992-2002 period?

According to the applications of the monetary policy instruments discussed, it is obvious that the monetary policy was mainly targeted at serving the government expenditures. The above table shows the weight of the stock of money held by the public sector (sum of claims on the public sector and banks' deposits with the BDL)

with respect to the total annual stock of money registered during the years 1992-2002. We can notice that since 1997, more than 50% of the total money stock was held by the public sector. Such a weight reached 60.6% at the end of 2000, 72.8% and 68.96% at the end of 2001 and 2002 respectively.

Moreover, the current expenses accounted for most of the government expenditures, reaching 88% and 91% of these expenditures in 2001 and 2002[18] respectively. Then, commercial banks, which were supposed to finance the private sector's activities, became the major source of funds to finance such unproductive government expenditures. Consequently, the private sector, which is the driving force behind the economic growth, was prevented from its main source of funds to finance its investment needs.

All the above factors combined lead the money supply and the public debt to grow without a corresponding economic growth. This lead the Lebanese economy to witness a steady increase in the public debt/GDP ratio during the years 1992-2002 (as shown in the above table), which overpassed the 100% level at the end of 1996, and then reached 169.2% and 183.8% at the end of 2001 and 2002 respectively.

After showing the impact of the monetary policy upon the price level and the economic growth, we will apply the Okun's Law to identify the effect of such a policy on the employment status, which is another major indicator of the state of the business cycle.

[18] Refer to section 6.1: Budget deficit and public debt

Output and unemployment: application of Okun's Law

Okun's Law states that for every 2.5 percent that GDP falls relative to potential GDP, the unemployment rate rises by 1 percentage point over its natural rate. The Okun's Law is expressed algebraically as:

$(\bar{Y} - Y) / \bar{Y} = 2.5 (U - \bar{U})$ Where:

- $\bar{U}$ is the natural unemployment rate
- U is the actual unemployment rate
- $\bar{Y}$ is the full-employment output or potential output
- Y is the actual level of output

The quantity theory discussed in the previous section proceeds on the assumption that the economy is operating at its full-employment capacity[19]. In other words, it identifies the change in income that should correspond to the change in the money supply when the unemployment rate is at is natural level. Accordingly, the annual potential levels of the nominal GDP that should correspond to the annual growth of the money supply, as shown in table 6.4, represent the full-employment output levels.

By measuring the percentage gap between the full-employment output and the actual level of output on yearly basis, we would be able then to identify the resulted percentage increase in the unemployment rate over its natural rate. After that, this latter will be added to the extracted results to measure the annual unemployment rate at the end of each period in the years 1992-2002.

[19] Samuelson and Nordhaus (1996). pp. 713-4

The calculation process and results are shown in the table below:

Period	*Gap Between the Potential GDP and the Actual GDP[20] (%) (A)*	*Percentage Increase in the Unemployment Rate Over its Natural Rate (Based on the Okun's Law) (%) (B) = (A) / (2.5)*	*Annual Unemployment rate (%) (U) = (B) + (7%)[21]*
Dec-92	30.15	12.06	19.06
Dec-93	28.12	11.25	18.25
Dec-94	30.68	12.27	19.27
Dec-95	27.33	10.93	17.93
Dec-96	33.54	13.42	20.42
Dec-97	36.30	14.52	21.52
Dec-98	40.33	16.13	23.13
Dec-99	45.29	18.12	25.12
Dec-00	50.07	20.03	27.03
Dec-01	52.79	21.12	28.12
Dec-02	55.26	22.10	29.10

Table 6.5

In the previous section, we showed how the applications of the monetary policy instruments lead the actual level of GDP to be far lower than its potential level on sustainable basis throughout the 1992-2002 period. By applying the Okun's Law, we were able to identify the effect of the monetary policy instruments on the employment status. The above table states that during the years 1992-2002, the unemployment rate has been at way over its natural rate. From 1992 until 1995, the unemployment rate was on average 18.63%. In 1996, the unemployment rate overpassed the 20% level and started to increase gradually reaching 27.03% in 2000, 28.12% in 2001 and 29.1% in 2002.

[20] Refer to table 6.4 in the previous section
[21] The natural unemployment rate is estimated to be 7%

In this section, we proceeded on the basis of the quantity theory of money's hypothesis, which asserts that a proportionate relationship exists between money and income. Based on such a hypothesis, we were able to determine the effect of the Lebanese monetary policy on the business cycle, and hence have showed how this policy has contributed in the highly damaged economic situation that has gradually worsened since 1992. In the next section we will try to determine the sequence of events that might explain this transmission mechanism by referring to the IS–LM model.

6.2.2 IS–LM model

An essential feature of the IS–LM model is an indirect transmission mechanism of monetary policy. A change in the money supply leads to a change in interest rates, which in turn leads to a change in income. In the previous chapter, when we discussed the effect of the monetary policy on the interest rate, we agreed that the actual equilibrium levels of the interest rate are far higher than the optimum equilibrium rates that should correspond to the money supply growth registered throughout the 1992-2002 period. Such a policy impact upon the interest rate is considered a shock to the asset market, which in turn affect the two other markets of the IS–LM model (labor and goods markets). Follows discussion about the asset market equilibrium.

The LM Curve: asset market equilibrium

As learned from the theoretical framework, the equilibrium condition for the monetary sector is that the demand for money should equal the supply of it. The equilibrium in the money market is described by the *LM* curve. Specifically, for any level of output *Y*, the *LM* curve shows the interest rate *i* for which the money market

is in equilibrium. At all points on the *LM* curve, money demand, *MD*, equals money supply, *MS*. The figure below shows the derivation of the *LM* curve.

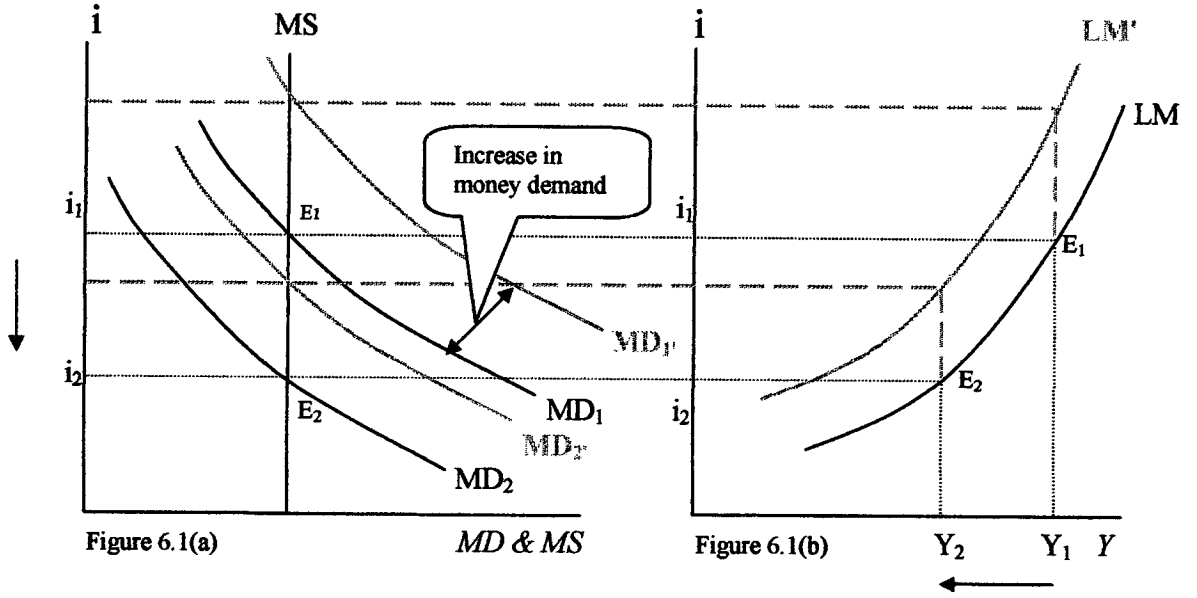

Figure 6.1(a) Figure 6.1(b)

The above figures state that, for constant output, any change that reduces money supply relative to money demand, such as a contraction in the money supply, will increase the interest rate that clears the asset market and cause the LM curve to shift up (or leftward), and vice versa. In addition, we can notice how for constant output, any factor that increases money demand raises the interest rate that clears the asset market and shifts the LM curve up, and vice versa.

General equilibrium

Based on the discussion of the previous section we conclude that an increase in the money supply that is accompanied by an increase in the money demand, would lead the LM curve to shift in both directions, and the final equilibrium level of the interest rate will depend upon the final position of the LM curve. This would allow us to explain the general equilibrium of the Lebanese economic sectors, where the labor, the goods and the asset markets are linked by the interest rate.

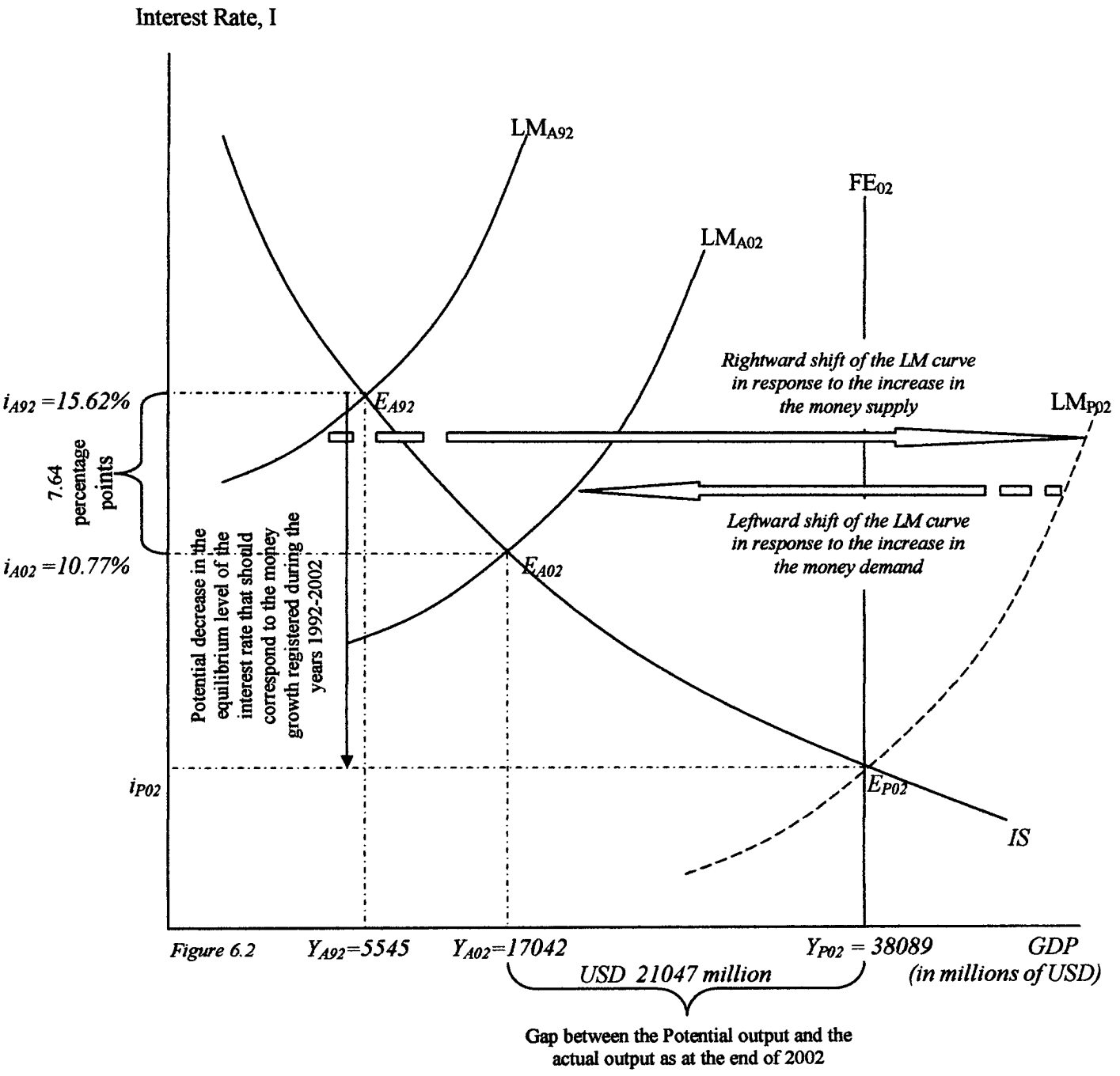

Figure 6.2

As shown in the above figure, the increase in the money supply registered during the years 1992-2002, and which amounted to LBP 45083 billion, should have lead the LM curve to move rightward from LM_{A92} to LM_{P02} (as illustrated above). Such a potential increase in the money supply would have been accompanied by an increase

in output equivalent to USD 32544 million[22] ($Y_{P02} - Y_{A92}$). Nevertheless, such a potential increase in the level of GDP should have been preceded by a decrease in the equilibrium level of the interest rate that should correspond to the money growth.

However, the high demand of money witnessed during the years 1992-2002, as a result of the government intervention discussed, forced the LM curve to move in an upward direction (or leftward from LM_{P02} to LM_{A02}) causing the equilibrium levels of the interest rate to decrease at a far lower rate than its potential decreasing rate. This in turn lead to a similar slowdown in the GDP growth, which can be noticed through the annual recorded gap between the actual level of output and its potential level, registering USD 21047 million at the end of 2002.

Finally, the above discussions identified the bad status of the Lebanese economy and illuminated the process whereby the government intervention has affected the business cycle. It showed how the monetary policy, which was implemented through high interest rates, discouraged private investment in the productive sectors of the economy, thus contributing to a slowdown in the rate of economic activity. This lead the number of job opportunities created to be relatively low and unemployment grew as most foreign and local capital was invested in high-yield government bonds rather than in high-value employment-promoting activities.

However, if such a survey was necessary to confirm the bad conduct of the monetary policy, it was not sufficient to explain the force behind the sustainable wrong

[22] Refer to table 6.4 in the previous section

monetary decisions taken by the Lebanese Government throughout the 1992-2002 period. We believe there must be another major reason behind increasing the interest rate and preventing the private sector from having access to banks money, rather than just financing the public sector's expenditures. The latter could have been financed through other sources than the commercial banks, especially that the Lebanese Government appears to have access to several alternative sources of funds[23].

By doing so, the private sector would have been able to meet its investment and hence play its major role as the driving force behind the economic growth. In this case the increase in government's debt would be paralleled with an increase in income, which keeps the country from the danger of economic bankruptcy.

Accordingly, there must be a major objective that the Lebanese Government has been trying to achieve, and which contradicts with the ultimate target of the monetary policy. The next section discusses the exchange-rate system in Lebanon and its interaction with monetary policy, showing how the government monetary decisions were influenced by the sustainable strengthening policy of the domestic currency's value.

6.3 Exchange-rate system in Lebanon and its interaction with the monetary policy

The Lebanese economy is a model of an open economy that engages in international trade. This fact, along with the important role that the exchange rate might play in

[23] The government that was able to convert its high interest domestic debt into lower interest external debt starting in 1995, was definitely able also to avoid to pay 42% (in 1992) on its Treasury bills to get funds.

term of its influence on the monetary decisions, lead the international monetary system, which denotes the institutions under which payments are made for transactions that cross national boundaries, to become a major issue to be covered in this study.

The central element of the international monetary system involves the arrangements by which exchange rates are set. In recent years, nations have used one of three major exchange-rate systems: a system of fixed, flexible, or managed exchange rates.

At one extreme is a system of fixed exchange rates, where governments specify the exact rate at which the domestic currency will be converted into foreign currencies. In a flexible exchange-rate system, governments neither announce an exchange rate nor take steps to enforce one. In between the two extremes of rigidly fixed and completely flexible is the middle ground of managed exchange-rate system. Here, exchange rates are basically determined by market forces but governments buy or sell currencies or change their money supplies to affect their exchange rates[24].

In September 1992, the Lebanese pound reached an all time low of LL 2,530 per US dollar (period average). Since the appointment of Mr. Hariri as a prime minister in October of that year, foreign exchange rate stability became the primary policy objective of the government. BDL's exchange rate policy since 1993 has been to anchor the Lebanese Pound nominal exchange rate to the US Dollar. The monetary policy was geared towards maintaining strength and stability in the exchange rate.

[24] Refer to chapter 3 section 3.3

Direct intervention in the currency markets supplements this policy when necessary to smooth excessive volatility of the exchange rate.

High interest rate on Lebanese Pound assets

The main policy instrument used to maintain strength and stability in the exchange rate was the high interest rate set on Treasury bills. In the previous discussions, we identified the destructive impact of such a policy on the business cycle. In this section, we will show the process whereby the high interest rate policy has contributed in the appreciation of the exchange rate in Lebanon.

Recall that the exchange rate is determined by the supply and demand in the foreign exchange market where different currencies are traded. Thus, the high interest rate on Lebanese Pound assets that increases the demand for this currency, leads to exchange rate appreciation. Such an appreciation would decrease the gap between the fundamental exchange rate and the official desired rate targeted at a given period[25].

Foreign exchange reserves and direct government intervention

To maintain the value of the currency at the official rate, the government could buy back its own currency in the amount that equalizes the quantities of its currency supplied and demanded at the official exchange rate. The figure below shows how the government can use the monetary policy and the foreign currency reserves to maintain an official exchange rate[26].

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[25] Mundell (1963). "Capital Mobility and Stabilization Under Fixed and Flexible Exchange Rates." *Canadian Journal of Economics and Political Science,* Vol. 29, pp. 475–485

[26] Barth and Wong (1992). "Approaches to Exchange Rate Policy." Papers presented at the seminar on exchange rate policies in developing and transition economies, IMF institute, International Monetary Fund, Washington, D.C. pp. 15–20

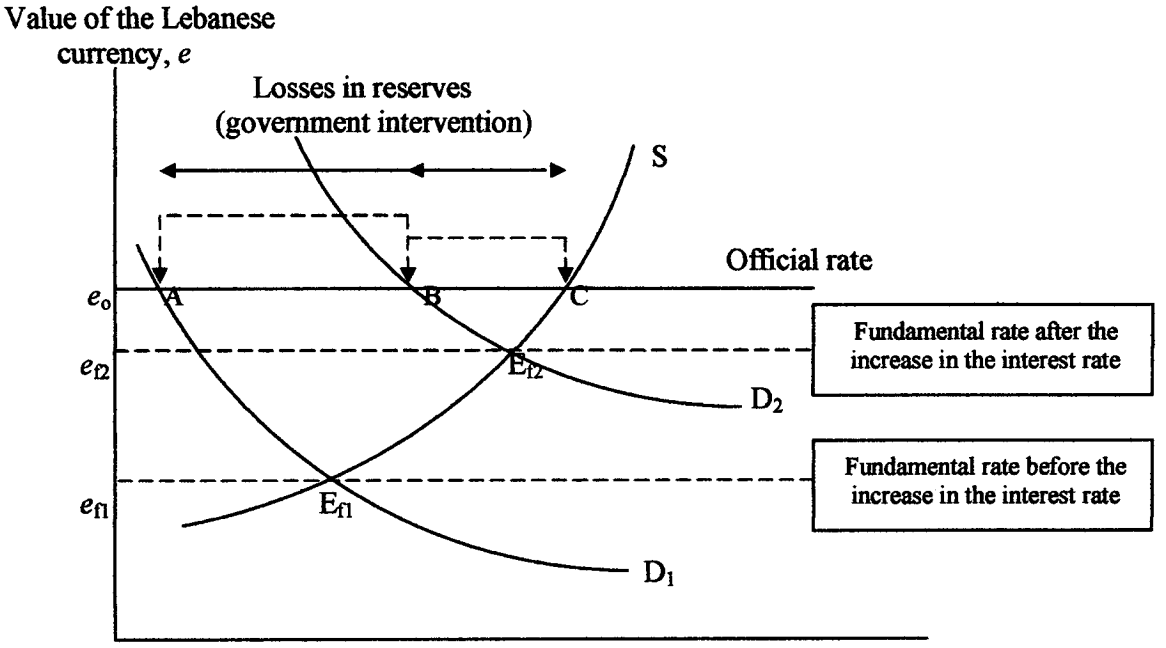

Figure 6.3

D_1 represents the demand for the Lebanese currency before any increase in the interest rate level. The interaction of the demand for the LBP (D_1) and its supply (S) determines the fundamental value of the exchange rate, which corresponds in the above figure to e_{f1}. Assuming that the official or the targeted exchange rate is e_o. In order to reach this rate, the government must either increase the fundamental rate and/or become a demander of its currency in the foreign exchange market.

If the government decides to maintain the overvalued currency without increasing the fundamental rate, it must buy back its own currency in the amount of AC in each period. These currency purchases are made by the Central Bank using official reserve assets. The latter are generally placed by the BDL outside the Republic with other central banks or with highly rated international banks. Thus, the amount of AC measures the reserves the Central Bank must use in each period to support the

currency in order to equalize the quantities of its currency supplied and demanded at the official exchange rate e_o.

An increase in the demand for the currency form D_1 to D_2 (resulted by an increase in the interest rate) would raise the fundamental rate from e_{f1} to e_{f2}. This leads the gap between the quantities of its currency supplied and demanded at the official exchange rate, e_o, to decrease. Consequently, the amount of foreign currency reserves that the Central must use to support the currency would fall from AC to BC.

The above discussion revealed that under the exchange-rate system used in Lebanon, unless there is an intention to devaluate the currency, the BDL cannot independently use monetary policy to pursue its ultimate goals. We can notice that any attempt to reduce the interest rate and enhance the economic growth without allowing the currency to devaluate, would create an overvaluation problem, and hence additional need for government intervention to support the currency.

Nevertheless, the BDL attempt to support a highly overvalued currency can be ended quickly and dramatically. A speculative run occurs when holders of domestic assets begin to fear a devaluation, which would reduce the value of their assets (measured in terms of foreign currency). Panicky sales of domestic-currency assets lead to more domestic currency being supplied to the foreign exchange market, which shifts the supply curve of the domestic currency to the right. Consequently, the Central Bank will have to purchase a higher amount of its currency and, thus, lose more reserves to maintain the exchange rate at its official level. This more rapid loss of reserves may force the Central Bank to stop supporting the overvalued currency and to devaluate it,

confirming the market's expectations. Accordingly, one can conclude that such a strategy isn't sustainable for long, and the support for monetary policy is crucial in order to maintain strength and stability in the exchange rate. Follows the evolution of the exchange rate value in Lebanon.

Evolution of the Lebanese exchange rate value

The high interest rate policy used by the Lebanese Government, along with the above brief overview of the theoretical framework lead us to argue that the Lebanese Pound must have been appreciated throughout the 1993-2002 period.

In fact, this was the case. The Lebanese pound was valued at the end of 2002 at 1507.5 to a dollar, compared to an early October 1992 low of 2,400 to a dollar. Table 6.6 sets forth the Lebanese Pound / US Dollar closing exchange rate, the value of foreign currency reserves, the value of the public external debt, and the weighted average interest rate on Treasury bills at the end of each quarter of the years 1993-2002 (including the third and last quarters of 1992).

In response to the high interest rate set on Treasury bills during the third quarter of 1992, where the weighted average rate on these assets reached 34%, the demand for Lebanese Pounds jumped immediately leading the exchange rate to move from LL 2420 per US dollar at the end of September 1992 to LL1838 per US dollar at the end of December 1992, an improvement of 24% in three months. The increase in capital inflows in response to the higher demand for Lebanese Pounds, helped raise the BDL's foreign exchange reserves by almost $888 million in the last quarter of 1992.

LEBANESE POUND EXCHANGE RATE AND ITS MAJOR DETERMINANTS

Period	*In LL per US $ (end of period)*	*Foreign Currencies (in millions of USD)*	*Public External debt (in millions of USD)*	*Interest rate on Tbs. (%)*
Sep-92	2420.00	560	0	33.92
Dec-92	1838.00	1448	0	22.85
Mar-93	1742.00	1165	0	24.25
Jun-93	1731.00	1127	0	23.91
Sep-93	1723.50	1320	0	23.01
Dec-93	1711.00	2220	327	22.38
Mar-94	1694.50	3284	326	19.76
Jun-94	1680.00	3510	329	19.32
Sep-94	1666.00	3494	357	18.28
Dec-94	1647.00	3840	772	15.29
Mar-95	1634.50	3695	900	18.81
Jun-95	1620.50	3124	957	24.22
Sep-95	1610.50	3114	1308	31.07
Dec-95	1596.00	4487	1343	20.99
Mar-96	1583.50	4757	1363	20.86
Jun-96	1571.00	4779	1579	20.68
Sep-96	1558.50	5176	1666	20.42
Dec-96	1552.00	5886	1908	18.80
Mar-97	1545.75	6321	1951	15.92
Jun-97	1539.75	6531	2206	15.88
Sep-97	1533.25	6348	2366	15.84
Dec-97	1527.00	5932	2432	15.84
Mar-98	1521.25	5633	2518	15.84
Jun-98	1516.25	6130	3597	15.82
Sep-98	1509.75	6365	4014	15.77
Dec-98	1508.00	6403	4176	15.55
Mar-99	1508.00	6509	4753	15.53
Jun-99	1508.00	6281	4738	15.35
Sep-99	1507.50	6740	4807	14.14
Dec-99	1507.50	7596	5529	13.87
Mar-00	1507.50	7254	5535	13.87
Jun-00	1507.50	6724	5868	13.87
Sep-00	1507.50	6431	6308	13.87
Dec-00	1507.50	5748	6951	13.87
Mar-01	1507.50	5627	7158	13.87
Jun-01	1507.50	4966	8107	13.87
Sep-01	1507.50	3605	9460	13.87
Dec-01	1507.50	4361	9554	13.87
Mar-02	1507.50	3638	10589	13.87
Jun-02	1507.50	3039	11437	13.87
Sep-02	1507.50	3577	12301	13.87
Dec-02	1507.50	5070	14540	9.20

Source: Central Bank / Ministry of Finance (Table 6.6)

The increased domestic and external demand for Lebanese Pound assets (resulted by the high interest rates) lead the Lebanese pound to appreciate against the US dollar during 1993 and 1994, in parallel with a decline in interest rates and an increase in the foreign currency reserves.

At the end of 1994, the exchange rate of the Lebanese pound reached LL 1647 per US dollar. By the end of the same year, foreign reserves had grown to a figure of $ 3840 million, and the interest rate on Treasury bills reached 15.29%.

In spite of political uncertainties with the approach of the end of the President's term in office in the first quarter of 1995, the exchange rate value continued to improve reaching LL 1634.5, LL 1620.5 and LL 1610.5 per US dollar at the end of the first three quarters of 1995 respectively. However, such an improvement was the result of strong government intervention. The BDL raised the interest rate to 18.81% in the first quarter of the year, and kept increasing it until it reached 31.07% at the end of September 1995.

Nevertheless, the increase in interest rates was not enough to support the currency. The foreign currency reserves, which moved from $3840 million at the end of 1994 to $3114 million at the end of the third quarter of 1995, is attributable to direct government intervention in the currency markets to supplement the monetary policy. We should note here that the decrease in foreign currency reserves registered during the first three quarters of 1995, took place in the time where public external debt was growing from $772 million at the end of 1994 to $1308 million at the end of September 1995.

With such an increase in external debt, we can argue that during the first three quarters of 1995, the government had to buy its own currency in an amount that is higher than the observed decrease in the foreign currency reserves.

In the last quarter of 1995, as the political tensions eased, interest rates accelerated downwards registering 20.99% at the end of the year. During the same period, foreign currency reserves had grown to a figure of $4487 million, and the exchange rate value reached LL 1596 per US dollar at the end of the year. Since the beginning 1996 for four consecutive years, the economy witnessed a steady decrease in the interest rate on Treasury bills, moving from 20.86% at the beginning of 1996 to of 13.87% at the end of 1999.

Despite this decrease in the interest rate, this latter was still high relative to the interest rate on US dollar. Consequently, the demand for Lebanese Pounds remained relatively high, leading the exchange rate to improve gradually and reach LL 1507.5 per US dollar at the end of 1999.

However, such an improvement has been supported by a continuous government intervention to smooth excessive volatility of the exchange rate. This can be observed through the relatively slow increase in the foreign currency reserves, which amounted to $2839 million during the years 1996-1999, compared to the increase in the public external debt that amounted to LL 4166 million during the same period.

Since October 1999 until November 2002, the weighted average interest rate on Treasury bills (3-6-12 & 24-Month Tbs.) was stabilized at a level of 13.86%. Such a rate dropped to 9.2% at December 2002. At the same time, the exchange rate value was fixed at an official rate of LL 1507.5 per US dollar. To maintain such stability in the exchange rate, the government had to intervene on sustainable basis to buy the depreciating Lebanese Pound. The decline in foreign currency reserves since the beginning of 2000 is principally attributable to such intervention.

The steep decrease in foreign currency reserves in spite of the steady increase in capital inflows recorded since the beginning of 2000, confirms that the fixed value of the Lebanese currency has been highly overvalued, and that the gap between the official exchange rate value, or LL 1507.5 per US dollar, and the fundamental value has been increasing on sustainable basis.

Finally, unless there is an intention to devaluate the official exchange rate value, the Lebanese Government will have to keep intervening in the currency market to buy the depreciating Lebanese Pound. However, such an intervention would need a steady increase of public external debt to build up foreign currency reserves. Another alternative to solve the overvaluation problem is to increase the interest rate. This would appreciate the fundamental exchange rate value and, thus, decrease the gap between the official and the fundamental currency value.

Conclusion

In this paper, we have surveyed the applications of the monetary policy instruments in Lebanon throughout the 1993-2002 period. Then we have identified their impact upon the intermediate objectives (money supply and interest rates), and the ultimate target of the monetary policy (business cycle). Following our main findings.

Since October 1992, monetary policy has been targeted at stabilizing the Lebanese Pound exchange rate, controlling the inflation rate, and most importantly, financing the public debt. Throughout the 1993-2002 period, the open-market sale of Treasury bills, along with the high interest rate policy targeted at increasing the demand for such government securities have been the major policy instruments used by the Central bank. In addition, the Republic of Lebanon has been an active issuer on the international capital markets during that period.

Other monetary tools used to achieve the government's objectives were identified through some of BDL's rules and restrictions imposed on Commercial banks such as reserve requirements on Lebanese Pound deposits, liquidity requirements on US Dollar deposits, and required capital adequacy ratio.

Commercial banks operating in Lebanon were the major source of funds for the government to finance the public debt. In other words, the main role of commercial banks

was to accept deposits and make loans to the public sector. This was mainly due to the high interest rates set by the Central Bank on government's securities.

As far as the evolution of the money supply (or M3) is concerned, the high budget deficit levels registered during the years 1993-2002 and the resulted increase in the volume of loans provided by commercial banks to the public sector, and hence in the amount of money created, lead to a wide expansion in the money supply, with an average annual growth of M3 equivalent to 17.3%. As for the counterparts of M3, the increase in net claims on the public sector was the major contributor in the total increase of the money supply, accounting for 55%, on average, of the increase in M3, compared to 41% for claims on the private sector.

The money supply growth associated with the government's sustainable borrowings from commercial banks, has been also controlled by the BDL. The reserve and the liquidity requirements, as well as the public sector's account at the BDL (excess borrowings), were the main instruments used to set the money multiplier and the monetary base that would fulfill their targeted money supply growth. In fact, with the constant required-reserve and liquidity ratios set by the BDL (for LL and USD respectively), at least during the years 1992-2000, one would expect the money multiplier to be a constant or at least closer to a constant during that period. However, this was not the case. The 1992-2002 period witnessed a considerable decrease in the money multiplier that was, to a high extent, the result of the increase in the reserve-deposit ratio.

As a consequence, the sum of the increase in commercial banks' deposits with the Central Bank and the increase in claims on the public sector (total banks' assets held with the public sector) accounted for 54.72 percent of the total increase in banks assets registered during the years 1993-2002, compared to 27.98 percent for loans granted to the private sector.

The impact of all of the above was reflected in the interest rates, especially in the lending and deposit rates of commercial banks. Although the 1993-2002 period witnessed a decrease in interest rate levels, such decrease does not correspond to the increase in the money supply registered during the same period. This was mainly due to the fact that the interest rates in Lebanon were not treated as consequences, but as instruments in the hands of the Lebanese Government. The artificial increase in the interest rate on Treasury bills registered throughout the 1993-2002 period, lead the equilibrium levels of interest rates to be higher at any given quantity of money supply.

Moreover, the low risk and high return provided by the Treasury bills lead commercial banks to see government's securities as higher and less risky profit making alternatives than loans to the private sector. Consequently, the latter has been prevented from the main source of funds to finance its activities. This lead the private sector demand to become much higher than the desired quantity of money that this sector would demand at any level of the interest rate if it was not prevented from having access to banks' money.

When we measured the impact of the monetary policy instruments on the Lebanese economy, namely economic growth and employment, we realized that the business cycle has never been considered as an ultimate target for the monetary authority in Lebanon. If the expansion of the money supply has been targeted at serving the economy, the latter would have been operating at 224% of its present output in 2002, and the unemployment rate would have been less than its present rate by 22.1 percentage points.

However, monetary policy in Lebanon was mainly targeted at serving the government's current expenses, which have been steeply growing during the years 1993-2002 to account for 91% of total expenditures and around 155% of total revenues at the end of 2002. Such an increase in unproductive expenditures, along with the government sustainable attempt to keep commercial banks the major source of funds to finance these expenditures, lead the public debt to increase at a far higher rate than the rate of economic growth. Consequently, the ratio of debt to GDP has been increasing on continuous basis, registering 183.8 percent at the end of 2002.

As a result of the high interest rates set on Treasury bills, the demand for Lebanese Pounds has been relatively high during the years 1993-2002, leading the exchange rate to improve gradually and reach LL 1507.5 Per US dollar at the end of 1999 (compared to LL 2420 Per US dollar in September 1992), and to stabilize at this rate since then. However, the value of the Lebanese currency has been always overvalued and was supported by continuous government intervention (through its foreign currency reserves), to maintain an overvalued official exchange rate and to smooth its excessive volatility.

Moreover, the steep decrease in foreign currency reserves in spite of the steady increase in the public external debt recorded since 1993, reveals that the gap between the official exchange rate value and its fundamental value has been increasing on sustainable basis, confirming a high Lebanese currency overvaluation.

Now that we have clearly observed the techniques of monetary control applied in Lebanon throughout the 1993-2002 period and identified their impact on the business cycle, we can confirm that the bad conduct of the monetary policy is the major contributor to the present damaged economic situation. The government does not deny the existence of an economic crisis but provides a strange response to the difficulties. This study reveals that the policies of the Lebanese monetary authority are not based on any needs assessment or priorities identification that suit the Lebanese economic features, difficulties and crisis. Thus, the economic problem is being treated with the same prescription that caused it in the first place. The policies that the government is using today are the same ones that caused the economic crisis. As if time were standing still.

The deterioration of the macroeconomic conditions requires urgent recovery efforts. There are no such things as miraculous solutions as the problem is a very difficult one to solve. Nevertheless, based on the findings of this study, we can suggest a series of solutions. First, a number of fiscal reforms are recommended to ensure fiscal sustainability. These reforms must be targeted at reducing public spending and increasing revenues.

On the revenue side, the proposed reforms included modernizing the tax system and developing a mechanism to effectively implement it, increasing the tax revenue base, and privatizing some public assets. Within this context, a new general progressive income tax system is recommended. Moreover, the implementation of the value-added tax (VAT) must be revised and evaluated based on its contribution to the needed fiscal stimulus.

As for the privatization of some public assets, success requires a proper legal and institutional framework. This could entail the creation of a higher committee for privatization, a law to regulate privatized sectors, or the introduction of strategic partners into the entities that are going to be privatized. Experience shows that if privatization is not accompanied by state efforts to establish a proper regulatory framework, the privatization process tends to create private monopolies from public monopolies. This would lead the Lebanese economy, in the long-run, to face market inefficiencies due to the newly created monopolies, even if the economy might initially benefit from a positive fiscal shock.

The macroeconomic conditions under which the sale of public assets occurs are also vital. The investor interested in buying state assets will be more risk-averse if there are adverse macroeconomic conditions. In other words, the failure of the state to ensure a proper and stable macroeconomic environment may well reduce the initial fiscal gain from the privatization process.

On the expenditure side, the institutional framework for debt management ought to be revised. Similarly, a ceiling must be imposed on expenditures, especially current spending, and public investment programs have to be rationalized and prioritized.

Dealing with the surplus of public-sector employees who were hired because of political intervention during the war would save much wasteful spending. In 1997, the Hariri government prepared a document – which was approved by the president and parliament – projecting a phased reduction of 50,000 employees in the public sector over a five-year period. The objective was to reduce the number of unproductive servants. Yet neither the past nor present government has acted upon this document.

Given that debt servicing is consuming a majority of public expenditures, reducing the public debt is of paramount importance. This entails a synchronization of monetary and fiscal policy. In order to escape the vicious cycle of high interest rates, increasing debt, and lower investments, the debt-management framework has to be consistent with a new interest-reducing monetary policy. The latter must be viewed as an economic instrument which uses interest rates to stimulate private-sector investment. The debt substitution strategy could save the government a considerable amount of money. However, it should not be abused, since a large foreign debt share will increase Lebanon's economic vulnerability and political dependency on foreign creditors.

Finally, it is noticeable that a proper conduct of the monetary policy constitutes the major pillar for growth and recovery. Since 1993 the monetary policy has been targeted at

reducing inflation rates and pegging the nominal exchange rate. The present economic crisis reveals the destructive impact of this policy. Unless there is an intention to devaluate the Lebanese currency, the monetary authority would not be able to independently use the monetary policy to pursue the objectives of a healthy economy. This is attributed to the sustainable need for external debt to build foreign currency reserves and for the artificial setting of high interest rates to ensure strength and stability in the exchange rate. On this basis, the exchange rate must be allowed to fluctuate, at least within a certain range.

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APPENDIX

MONETARY POLICY INSTRUMENTS AND INTERMEDIATE TARGETS

Country	*Principal Monetary Policy Instruments Used*	*Intermediate Objectives*
RFA	Discount-Rate Open-Market Operations	M3 Short-Term Interest Rate
France	Variable Interest Rate Competition	M2 Short-Term Interest Rate Exchange Rate
Canada	Open-Market Operations Transfer of Treasury Deposits between the Central Bank and Commercial Banks	Short-Term Interest Rate Exchange Rate
USA	Open-Market Operations	M2 & M3 Short-Term Interest Rate Borrowed Reserves
Italy	Open-Market Operations	M2A Credits Expanded to the Private Sector Short-Term Interest Rate
UK	Open-Market Operations	Mo Short-Term Interest Rate Exchange Rate
Japan	Discount-Rate Variable Interest Rate Competition	M2R + CDs (Prevision) Short-Term Interest Rate, Restriction

Table A1

ASSETS PLUS OFF BALANCE SHEET ITEMS SUBJECT TO RISK WEIGHTS AND CONVERSION FACTORS

Account	***Risk weight "R"***
Cash and Treasury bills	*0%*
Deposits at banks	*20%*
Loans with 200% real guaranteed	*0%*
Loans with 100% real guaranteed	*50%*
Loans guaranteed with similar currency collateral	*0%*
Loans guaranteed with 120% of different currency collateral	*50%*
Loans without guarantee	*100%*
Letter of credits with 200% real guaranteed	*0%*
Letter of credits with 100% real guaranteed	*50%*
Letter of credits guaranteed with similar currency collateral	*0%*
Letter of credits guaranteed with 120% of different currency collateral	*0%*
Letter of credits without guarantee	*100%*
Guaranteed L/G good execution	*50%*
Guaranteed L/G to enter price bids	*20%*
Solvency Ratio = Private Funds / R	

Source: Central Bank / Ministry of Finance
Table A2

INTEREST RATES IN LEBANON
(End of Period – Percent)

Period	*Dec-93*	*Dec-94*	*Dec-95*	*Dec-96*	*Dec-97*	*Dec-98*	*Dec-99*	*Dec-00*	*Dec-01*	*Dec-02*
*C.B[1]-LBP: Lending Rate**	29.29	21.28	28.99	24.68	20.28	20.04	18.38	17.94	16.76	16.1
C.B-LBP: Checking and Current Accounts	1.88	2.23	4.28	4.24	2.67	3.26	4.89	3.57	3.31	3.04
C.B-LBP: Savings at Call	10.43	8.13	11.56	10.06	9.02	9.23	9.09	7.90	7.01	6.36
*C.B-LBP: Term Savings and Deposits***	16.10	13.87	18.23	15.36	13.72	13.32	11.91	11.06	10.82	10.46
C.B-LBP: Average Rate on Deposits	13.18	12.79	17.12	14.69	12.97	12.61	11.3	10.44	10.15	9.83
C.B-LBP: Interbank Rate	6.00	13.50	13.00	15.50	12.75	36.00	8.00	8.50	7.50	7.00
*C.B-US$: Lending Rate**	na	na	12.19	11.74	11.69	11.30	10.87	11.15	10.14	9.62
C.B-US$: Checking and Current Accounts	na	na	2.35	2.32	2.48	2.25	2.05	2.01	1.01	0.74
C.B-US$: Savings at Call	na	na	3.59	3.44	3.22	3.16	3.02	3.20	1.91	1.46
C.B-US$: Term Savings and Deposits	na	na	6.10	6.25	6.40	6.16	6.11	6.56	4.63	4.51
*C.B-US$: Average Rate on Deposits***	na	na	5.46	5.62	5.90	5.67	5.63	6.03	4.21	4.00
W.A.[2] Interset Rate on 3-6-12&24-Month Tbs.	21.73	15.32	19.93	18.59	16.10	16.20	14.25	14.23	14.34	9.61

ource: Central Bank / Ministry of Finance
able A3

[1] C.B. stands for "Commercial Banks"
* The LBP and USD lending rates reflect the figures given by the Central Bank. They represent the weighted average interest rate on all maturity loans with respect to their circulation.
**The LBP and USD average deposit rates reflect the figures given by the Central Bank. They represent the weighted average interest rate on sight and term deposits with respect to their share in total deposits.
[2] W.A. stands for "Weighted Average"

BALANCE SHEET OF BANQUE DU LIBAN (1990-2002)
(End of Period – Billion of LBP)

Period	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Assets													
Gold	2992	2866	5636	6166	5821	5701	5292	4078	3998	4037	3806	3861	4848
Foreign currencies	525	1078	2661	3798	3625	7161	9135	9058	9656	11451	8665	6574	7644
Other foreign assets	0	0	0	17	17	17	17	17	17	17	17	17	0
Claims on private sector	9	19	37	44	73	105	96	122	220	216	245	201	205
Loans to banks and financial corporations	169	189	164	153	85	233	105	97	346	406	735	781	1720
Claims on public sector	612	276	284	62	78	103	100	101	104	112	114	117	114
Securities portfolio	0	0	0	491	117	97	331	760	622	729	2683	7328	4499
Fixed assets	9	8	138	134	132	145	148	159	169	178	216	221	222
Unclassified assets	31	100	82	93	204	303	329	354	559	95	696	255	286
Total assets	*4356*	*4546*	*9078*	*10952*	*12853*	*13866*	*15555*	*14745*	*15690*	*17241*	*17177*	*19338*	*19539*
Liabilities													
Currency in circulation outside BDL	349	518	842	764	1006	1128	1257	1325	1353	1516	1622	1527	1541
Deposits of banks and financial corporations	158	279	674	1418	2824	3508	4375	7075	6581	6919	7356	10829	12138
Private sector deposits	1	2	7	527	7	14	198	23	31	50	76	91	63
Public sector accounts	201	289	927	1226	2383	2440	3586	1189	1796	3304	1910	1402	2373
Valuation adjustment	3429	3228	6252	6630	6094	5912	5223	3616	3046	2918	2522	2742	102
Foreign liabilities	3	3	6	21	49	115	85	112	263	237	210	230	239
Special long-term liabilities	0	0	0	0	0	0	0	0	1068	1068	1068	1386	1419
Capital accounts	27	60	80	96	88	134	313	328	797	883	912	1049	1255
Unclassified liabilities	188	166	289	277	400	615	518	1076	756	346	1502	81	407
Total liabilities	*4356*	*4546*	*9078*	*10952*	*12853*	*13866*	*15555*	*14745*	*15690*	*17241*	*17177*	*19338*	*19539*

Source: Banque du Liban
Table A4

COMBINED BALANCE SHEET OF COMMERCIAL BANKS (1990–2002)
(End of Period – Billion of LBP)

Period	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*
Assets													
Reserves	178	283	669	1435	2786	3541	4378	6225	6513	6827	7331	10656	11960
Claims on Private Sector	1548	1971	4804	5898	7800	10320	12687	15451	18682	20994	22243	22192	22758
Claims on Private Sector in LBP	258	343	436	631	1018	1278	1623	1987	2074	2474	2889	3207	4055
Claims on Private Sector in Foreign Currencies	1290	1628	4368	5266	6782	9042	11064	13464	16608	18521	19354	18985	18702
Claims on Public Sector	688	1309	3098	4013	6909	7949	12060	13234	17942	21841	23271	23067	26577
Foreign Assets	2375	3061	5825	7041	6269	6337	6719	9184	9984	8910	12300	12988	14326
Fixed Assets	58	90	144	259	406	739	1151	1272	1638	2034	2195	2568	2884
Unclassified Assets	88	84	93	164	115	169	188	267	272	365	548	384	561
Total assets	*4935*	*6798*	*14634*	*18809*	*24285*	*29055*	*37183*	*45633*	*55031*	*60971*	*67888*	*71855*	*79066*
Liabilities													
Total Private Sector Deposits	3519	5051	11062	14409	18686	21806	27505	33307	38825	43304	47582	51234	55068
Demand Deposits in LBP	115	202	394	422	493	508	569	686	758	846	862	890	1072
Time and Saving Deposits	819	1462	3194	4165	7150	8093	12247	12592	14492	17948	17076	14904	17840
Private Sector Deposits in Foreign Currencies	2585	3387	7475	9821	11044	13205	14689	20030	23576	24510	29644	35441	36155
Public Sector Deposits	26	40	106	152	255	261	285	217	346	702	721	526	591
Deposits of Non Resident	276	468	1100	1393	1663	2078	3180	5262	7288	7856	9148	9280	9206
Deposits of Non Resident Banks	438	374	599	658	938	1215	1460	1135	1622	1781	1692	1796	1859
Other Financial Liabilities	0	0	0	0	0	0	326	328	371	168	60	8	157
Capital Accounts	104	148	264	444	676	1146	1943	2990	3620	4019	4376	4463	5023
Unclassified Liabilities	0	0	0	0	0	0	0	2394	2959	3142	4310	4548	7161
Total liabilities	*4935*	*6798*	*14634*	*18809*	*24285*	*29055*	*37183*	*45633*	*55031*	*60971*	*67888*	*71855*	*79066*

Source: Ministry of Finance/Banque du Liban (Table A5)