Bank of Israel

Monetary Department

MONETARY POLICY IN ISRAEL

IN AN ERA OF INFLATION TARGETS:

PRINCIPLES AND IMPLEMENTATION

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CONTENTS

FOREWORD•

The purpose of this booklet is to describe the principles behind the Bank of Israel's monetary policy in an era of inflation targets—from 1992 onwards—and thereby to help make that policy more transparent. This should serve *inter alia* to explain and provide a context for the Bank of Israel's publications on monetary policy.

In the course of the disinflationary process Israel underwent many changes in monetary and fiscal policy, openness to international capital flows, the exchange-rate regime, etc., and we found it advisable to explain what led up to this.

The transparency of monetary policy is important for policymakers in economic and other areas. The policy should also be understood by the public at large, as this influences its expectations and decisions. The more transparent the policy, the greater its credibility and effect on expectations, and the better the chances of attaining the inflation target. More transparent monetary policy also assumes special significance in an era of globalization, as it helps to improve the country's reputation in the international financial markets, which have begun to display growing interest in Israel. Increased transparency is also reflected in the *Inflation Reports* that are submitted twice a year to the government and the public.

The booklet is divided into two sections. The first part deals with the role and underlying philosophy of monetary policy in general. We attempt to show what the aims of economic policy are, and what part is played by fiscal and monetary policy in attaining them. We aspire to answer various questions, such as: Why is inflation bad for economic activity? Why should a country set an inflation target? How does price stability stimulate growth? What is the effect of Israel's economic policy on its economic relations with other countries? What is the link between the exchange rate and monetary policy? What is the cost of disinflation?

The second part deals with the implementation of monetary policy, i.e., the economic variables according to which the Bank of Israel determines the interest rate each month, the process of making interest-rate decisions, and other aspects of economic policy management.

This booklet is intended for the general public as well as economists, so that some economic terms will be explained. This also means that we will try to 'keep to the straight and narrow,' and not allow ourselves to be sidetracked by extraneous subjects. At times, for the sake of simplicity, the exposition ignores side issues. Nonetheless, we have not quite abandoned the attempt to discuss special topics that have arisen in the course of the disinflationary process.

Similar studies have been produced in other countries, such as the US, the UK, Germany, Switzerland, Belgium, and New Zealand, and some of them are listed in the bibliography at the end of this volume.

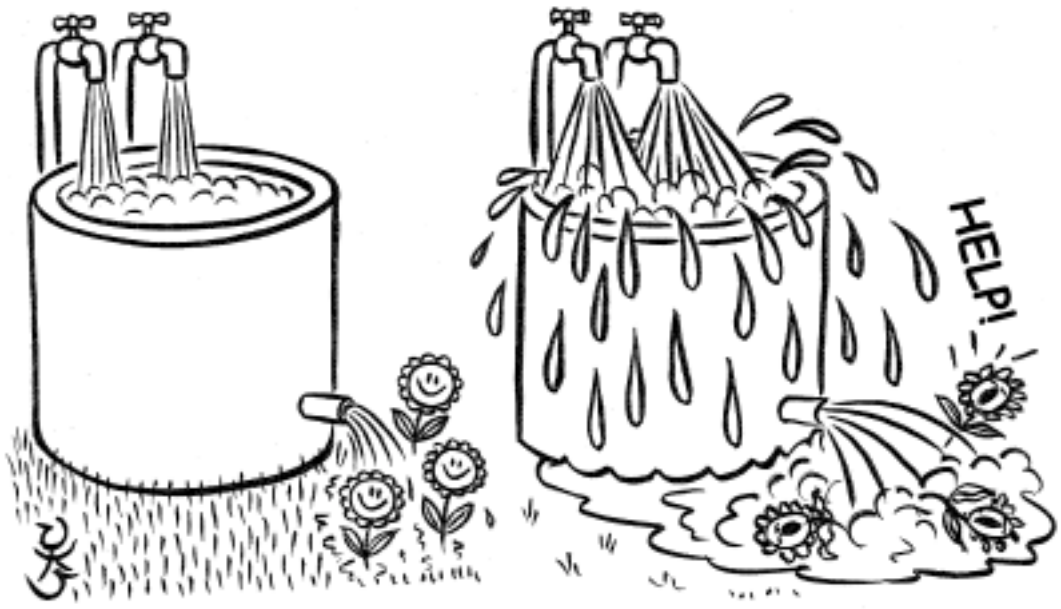
• I am grateful to David Klein for his valuable comments, to Akiva (Edward) Offenbacher for his helpful remarks and advice, to my colleagues in the Monetary Department and Karnit Flug of the Research Department for their comments, and to Ruth Zakovitch for editing the Hebrew text.

PART A

THE PRINCIPLES

1. INTRODUCTION

The principles behind economic policy can be illustrated by the following example. Two pipes bring water into a swimming pool, while the water leaving it irrigates the garden around it. Since both over- and under-watering will harm the flowers in the garden, the swimming pool has to be kept full but care must be taken to ensure that it does not overflow. If the pool gets too full, the garden will be flooded and the flowers will rot and die, while if it gets too empty the flowers will dry up and die. Hence, from the moment the pool first fills up, the amount of water entering it from the pipes must not exceed the amount the flowers need, and if one pipe brings in too much, the flow must be adjusted so that the other one brings in less. What happens if one of the taps controlling the flow of water into the pool breaks? In order to prevent the garden from being flooded (and water wasted) it is possible to build a temporary pool that is connected to the main one and can absorb the excess water. A solution of this kind is appropriate only if the broken tap is fixed at an early stage, and it is possible to continue regulating the amount of water entering the pool. If this is not done we will need another temporary pool, and we will find ourselves expending ever more resources on building temporary pools. The local residents can see the temporary pools, which are the result of the problem, but they cannot see the cause behind them. The solution lies in the reason for the problem, namely, how to fix the taps.



Thus, the flowers in the garden, representing the economy's ability to produce, depend on obtaining the correct amount of water. Both over- and under-watering will cause damage. The two taps which regulate the entry of water to the pool represent monetary and fiscal policy. The extent to which either one is open determines the interest rate and the size of the budget deficit respectively. If the taps are too far open the interest rate will be too low and the budget deficit too large. The temporary pools—inflation, a balance-of-payments deficit, and devaluation—are transitory solutions which delay flooding, but cannot ward it off indefinitely. When the temporary pools are full the garden and the surrounding area will be flooded, creating a swamp—galloping inflation and an enormous foreign and domestic debt, i.e., an economic crisis.

Naturally, the economy is far more complex. Opening a tap does not bring water in via the main pipe only, but also from a whole network of pipes. Consequently, it takes a long time for the water to reach the pool, and a great deal of water accumulates in the system, but the damage becomes apparent only much later, and it is sometimes difficult to identify its cause (the 'network of pipes' is described in Part B of this booklet).

If there is rapid inflation, with prices changing frequently and sometimes even on a daily basis, the public tends to index prices and contracts to a stable foreign currency, because the local currency loses value each day. This is the situation that existed in Israel before the Economic Stabilization Program (ESP) of 1985. That program fixed the exchange rate (at 1.5 shekels per dollar), thereby stabilizing the prices of goods and services in Israel. To put it in economic terms, the exchange rate served as a 'nominal anchor' for prices. The main components of the program were budgetary restraint, supervision of prices, and a wage freeze. These elements took care of the main pipe, and their task was to prevent 'excess water' from entering the 'pool.' The role of monetary policy in this program was to use the interest rate to keep the exchange rate at the level that had been decided on; thus, the interest rate was raised when there were deflationary pressures, and lowered when they eased. To go back to our example, monetary policy built temporary pools to prevent flooding, and emptied them into the main one when the water in it was too low.

With the introduction of the inflation-target regime in 1992, Israel's monetary policy changed, and this later turned out to have been a substantive change. The role of monetary policy in an inflation-target regime is to attain the targets rather than to stabilize the exchange rate, and in terms of our example this means regulating the flow of water entering the pool, i.e., the money supply in the hands of the public. This takes the place of building another temporary pool to take the excess water from the main pool, as in the other regime. In other words, it involves dealing with the cause instead of the consequence.

What led to the change? Given the annual 15–20 percent inflation rate that had prevailed since the ESP, it was impossible to maintain a fixed exchange rate over time without eroding the foreign exchange reserves, as this led to speculative foreign-currency purchases in anticipation of an imminent exchange-rate shift. This harmed economic policy and hence the economic planning of individuals and firms. At the end of 1991

there was a wave of such purchases, and the interest rate was raised in order to moderate it. Once the wave had abated an inflation target was set, and this innovation was presented as part of a change in the exchange-rate regime: the horizontal exchange-rate band (see section 2 in Appendix A) was replaced by a diagonal (crawling) one in order to better express the ongoing adjustment of the exchange rate and moderate the speculative attacks. The slope of the band was set as the difference between the inflation rate in Israel and abroad. For this purpose it was necessary to determine the former, and this was defined as the inflation target.[1]

Hence, the inflation target 'sneaked in through the back door,' and its importance was not realized at first. As the discrepancy between adhering to the diagonal band and attaining the inflation target began to emerge, it transpired that monetary policy had changed significantly. The inflation target became the guideline for monetary policy, and the interest rate became the means for attaining the inflation target directly, while the exchange rate was allowed to fluctuate. A shift in the exchange rate is not *per se* a reason to change the interest rate, unless it impedes attainment of the inflation target set by the government.

The task of the central bank—to ensure that prices are stable—is common to many countries. This does not mean that economic growth and full employment are not the concern of the central bank; on the contrary, price stability is a necessary (though not sufficient) precondition for growth and low unemployment. Monetary policy controls the money supply, and thus regulates demand—as well as the public's inflation expectations—via several channels. Expectations are important because the public makes its decisions on the basis of its expectations of future developments, so that they tend to become self-fulfilling (if people believe that prices of goods will go up tomorrow, they will rush out to buy them today, and so prices will rise today). One way of attaining the goals of monetary policy is to influence these expectations. Thus, for example, in a country like Israel, which has a tradition of inflation, if an external shock such as higher oil prices pushes the price level up, the potential is created for a rise in the inflation rate—reflected in expectations of its acceleration—if monetary policy does not act to restrain it. A determined monetary response in such cases accords credibility, thereby preventing the creation of expectations of higher inflation.[2]

[1] See Sokoler (2001), Bufman, Leiderman and Sokoler (1995).

[2] A one-off price rise is defined as a 'price shock' and affects only the inflation measured in the current calendar year, not the inflationary process. Monetary policy will act to prevent this shock from becoming a change in the inflationary process, i.e., an ongoing rise in the inflation rate. It may be assumed that the longer the term for which the inflation target is set, the weaker will be the policy response to the price shock.

2. MACROECONOMIC POLICY AND ITS SPHERES OF ACTIVITY

Macroeconomics is concerned with the development and conduct of the economy as a whole, i.e., GDP growth, employment, prevention of unemployment, inflation, exchange-rate developments, the balance of payments, business cycles, etc. Whereas microeconomics deals with the behavior of economic agents—households or firms—macroeconomics refers to the aggregate of the activities of the various elements that comprise the economy (income, consumption, savings, investment, etc.).

The main objective of macroeconomic policy is to achieve sustainable growth and full employment, thereby ensuring a constant improvement in the standard of living and welfare. The macroeconomic policy adopted affects the decisions of individuals at the microeconomic level, and the aggregate result of the decisions is expressed at the macroeconomic level. The policy adopted—expressed *inter alia* in the tax rates paid by individuals, the subsidies given to firms, pensions (known as 'transfer payments') to households, import quotas and tax rates on imports (which also reflect the economy's openness)—affects a wide range of factors: private consumption, saving, investment, exchange rates, the money supply, short-term interest rates, long-term interest rates (e.g., on mortgages), inflation, etc. All these influence the economy's efficiency, the allocation and utilization of resources, and hence growth and employment.

Economic policy is generally divided into three areas: fiscal policy, monetary policy, and the exchange-rate regime.

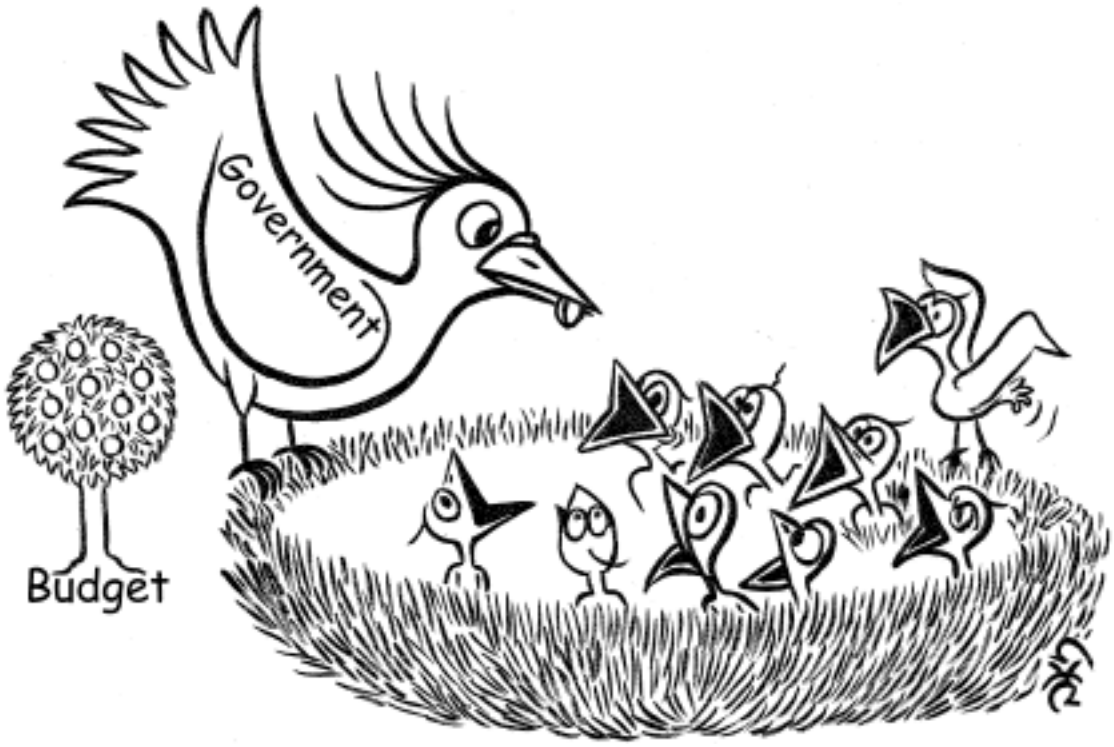
a. Fiscal policy

On the basis of a set of economic and social considerations, the government decides what the tax rate on individuals and firms should be, and at the same time divides up its resources—derived to a great extent from taxes—among various destinations, whether social (e.g., subsidies and other transfers), economic (e.g., investment in the roads infrastructure), or for other purposes in which the government has an advantage over the private sector (e.g., defense). The allocation of resources is expressed in the national budget, which has to be approved by the Knesset (parliament). In this way, in a democratic regime, the preferences of the government—and indirectly of the electorate—are reflected. Hence, fiscal policy is customarily the realm of the government.

b. Monetary policy

The object of monetary policy is to attain price stability—which is a (necessary but not sufficient) condition for sustainable growth and full employment—by influencing short-term interest rates, the money supply, and sometimes also the exchange rate.

The advantage of the central bank in dealing with monetary policy (as will be shown below) lies in its ability to achieve price stability by keeping the money supply steady and consistent with the inflation target. A stable money supply is an important element in



keeping the economy on an even keel: on the one hand, there must be sufficient money in circulation for the economy's current needs, but on the other, care must be taken to ensure that the rate at which the money supply rises over time does not exceed the economy's potential growth rate, as this leads to inflation.[3] The monetary policy of an independent central bank does not have any sectoral preferences (in contrast to fiscal policy), and is the same for all the microeconomic units in the economy.

c. The exchange-rate regime

Both the government and the central bank are involved in determining Israel's exchange-rate policy. The exchange-rate regime is decided by the government, in consultation with the Governor of the Bank of Israel.[4] The daily management of the exchange rate within the band, which expresses the exchange-rate regime, is in the hands of the Bank of Israel (for Israel's exchange-rate regime, see Appendix A). As will be shown below, the

[3] This relation is also expressed in the quantity theory of money: the money supply, M, multiplied by the velocity of circulation, V, equals GDP (in real terms), Y, multiplied by the price level, P (MV = PY). If we assume that the velocity of circulation, V, is constant, a change in the money supply will give rise to a change in GDP (in nominal terms), PY. If we wish to keep the price level constant, the change in the money supply must be consistent with the change in GDP (in real terms). A change in the money supply that exceeds the change in GDP will lead to a shift in prices and the erosion of the value of the local currency.

[4] Section 41 of the Bank of Israel Law, 5714–1954 states: "The Government shall consult the Governor prior to any decision relating to the exchange rate of the currency."

exchange-rate regime is connected with both monetary and fiscal policy. Thus, for example, in some countries (e.g., Switzerland) monetary policy is executed by buying and selling foreign exchange against local currency.

Apart from these three spheres, which are traditionally associated with macroeconomic policy, several structural features are important in macroeconomic terms, since they affect the efficiency of production, sustainable growth, and employment, as well as the speed and intensity with which fiscal and monetary measures impact on the economy. These aspects include:

1. The infrastructure of domestic financial markets: the larger the number of financial entities and kinds of financial instruments, the more efficient will the financial markets be, i.e., the more efficient is the flow of capital between savers and investors and the better is the capacity to hedge against financial risks. The tax structure—e.g., its distribution between taxes on labor and on capital, as well as tax differentials between different

financial instruments—also has implications for the efficiency with which savings and investment are allocated in the economy.

2. The openness of the economy: this is expressed in the increased flow of goods and capital between Israel and the rest of the world; the more open the economy, the more efficient is the flow of goods and capital.

3. The extent of privatization: privately owned firms are more efficient than those owned by the government. Privatization also serves to increase competition (unless a monopoly exists).

4. The degree to which the economic and financial systems are regulated: when there is little competition in given economic spheres, private entities can exploit their monopolistic power; hence the importance of the authorities responsible for the proper functioning of these systems.[5] Thus, for example, the Supervisor of Banks ensures that the banks treat their customers fairly and that the banking system remains stable; the Securities Authority supervises the issuance of shares and bonds by the private sector; the Commissioner of Capital Market, Insurance and Savings in the Ministry of Finance also oversees the activities of insurance companies; and the Anti-Trust Authority prevents the emergence of monopolistic power in the private sector. When economic activity is properly regulated, the economy is more efficient, and the effect of economic policy on growth and employment is greater.

5. Levels of education and specialization: as these rise, so do creativity and technological innovation, and with them efficiency and productivity, enhancing the economy's comparative advantage vis-à-vis the rest of the world.

6. The legislative infrastructure: the existence of laws and courts which can adjudicate in disputes between parties to a transaction, and a system of law enforcement, increases confidence that business contracts will be upheld, and hence raises the number of business transactions. In countries where one party can easily evade obligations there are fewer transactions and economic growth is impaired.

Since the ESP of 1985 important reforms have been made in these spheres: the domestic financial markets have been deregulated, trade has been exposed to competing imports, restrictions on capital flows have been lifted, government companies have been privatized, and this has served to enhance competition, e.g., in communications. Changes have also been introduced in order to ensure the proper functioning of the economy and increase its efficiency.

3. WHY THE CENTRAL BANK SHOULD ADMINISTER MONETARY POLICY

It is generally accepted that monetary policy, which affects the money supply, is the realm of the central bank. The central bank has a monopoly on creating local currency (i.e.

[5] 'Proper' in the economic and legal sense is a term whose definition is incorporated in regulatory legislation (see, for example, *Proper Conduct of Banking Business Regulations*).

producing notes and coins), as it is the only entity legally allowed to do this,[6] and because it is essentially 'banker to the banks.' These two features enable it to control the monetary base, and this gives it an advantage and constitutes the source of its power in administering monetary policy. A precondition for this control (in Israel and elsewhere) is the bank's independence in using the instruments at its disposal. This independence enables it to neutralize the inflationary tendency that characterizes governments (see section 5 below). It is expressed *inter alia* by the fact that it cannot be obliged to extend credit to finance the government's expenditure—a condition that has obtained in Israel since the ESP.[7] The ability of the central bank to control the monetary base (defined as cash in circulation and banks' deposits with the central bank) increases with its independence.

The public's ability to pay for its purchases is greater than the supply of printed money because deposits in banks constitute an additional means of payment via the credit system, expressed in payment by check and credit cards (a mechanism known as the 'deposit multiplier'). In many countries monetary policy also influences this system: the banks must deposit with the central bank a certain proportion of the deposits of the public in their possession (reserve ratio)—the higher the reserve ratio, the smaller the money supply.

Regulating the money supply involves injecting liquidity into the economy when the monetary base is too low, and absorbing liquidity when it is too high. This may be done by administrative measures or by using market instruments.[8] Economic theory, as well as

[6] Section 28 of the Bank of Israel Law, 5714–1954 states: "No persons, other than the Bank, shall issue or circulate currency notes, bank notes, coins or any document or other thing which the Governor, after consultation with the Committee, has declared capable of being used as a substitute for currency."

[7] Section 45 of the law states: "The Bank shall not make a loan to the Government to finance its expenditure."

Restricting central bank credit to the government means that the financing of the budget must come from real income such as taxes, dividends from government-owned corporations, and privatization proceeds. If there is a budget deficit nonetheless, and additional finance is required, the government must raise real sources by means of taxes or borrowing from the public (by issuing bonds) in domestic markets or abroad. These sources have to be repaid with interest in the future, thereby reducing the budget for other activities. Credit from the central bank constitutes printing money, and is not a real source.

Countries in which the central bank has extended large amounts of credit to the government have experienced hyperinflation. That was the case in Israel until 1985, in Germany after the First World War, and in many Latin American countries. There was hyperinflation also in the countries of the former USSR during the period of transition from a centralized to a market economy, because those countries had formerly been characterized by extensive credit from the central bank to the government as the former was controlled by the latter.

[8] An example of an administrative measure is the ceiling on credit from the central bank to the banking system (even setting a quota for each bank) at a given price. This system was introduced in Israel in the late 1970s and early 1980s. Injection and absorption via market instruments, by contrast, involves permitting the banking system to take unlimited credit from the central bank, but since interest rises with the amount of credit, the price mechanism causes correct allocation. Operating via the market also involves allocating a given amount to the highest bidder at an auction—a system that has been in use in Israel since the mid-1980s.

the experience of Israel and other countries, indicates that it is more efficient to use market instruments, i.e., the price mechanism: the demand for a commodity falls as its price rises; money is also a commodity held by individuals, and its price is the interest rate. Reducing the interest rate means printing money (monetary expansion) and increasing the public's purchasing power, while raising the interest rate means reducing the money supply and with it purchasing power. Thus, the central bank's ability to determine the interest rate expresses its control over the money supply.

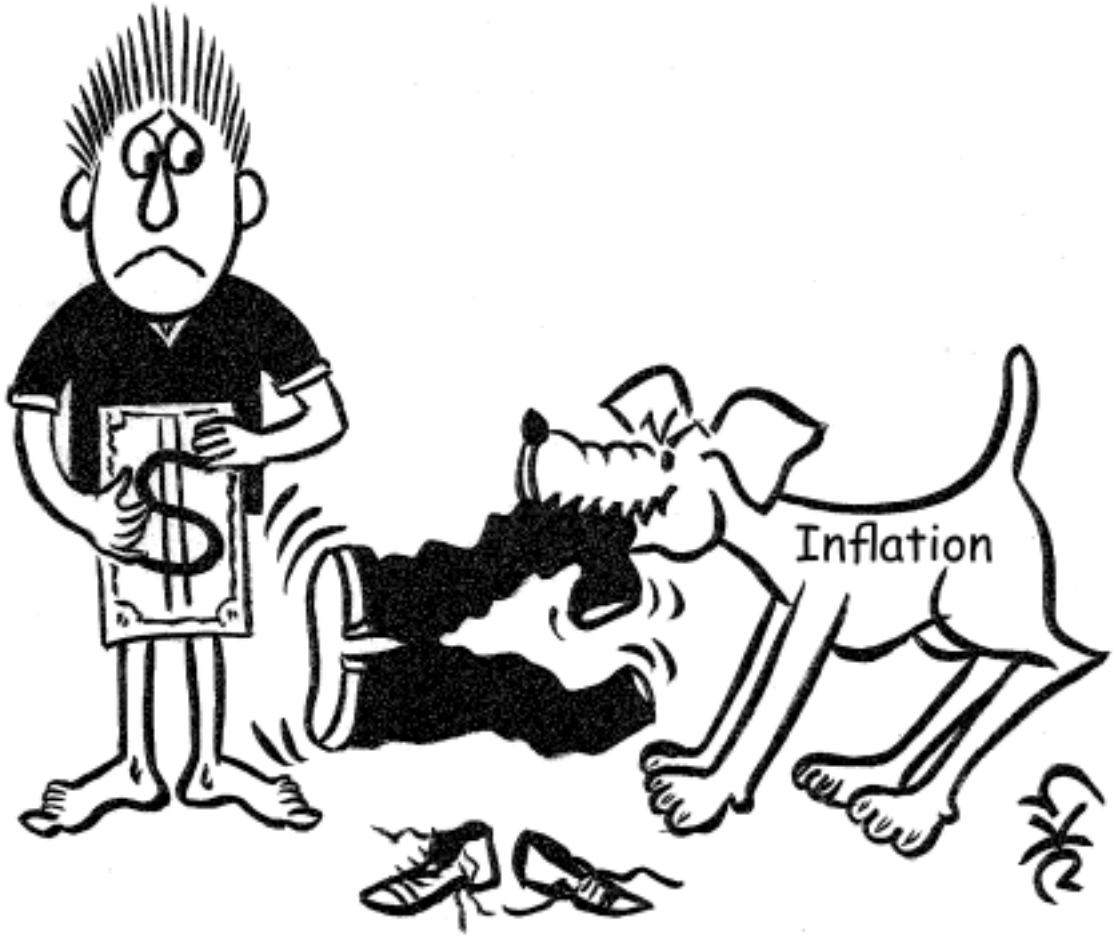
4. INFLATION AND ECONOMIC POLICY

a. The damage caused by inflation

Sustainable growth and full employment are the principal long-term goals of all macroeconomic policies, and are expressed in rising living standards. Attaining those aims depends on increasing investment, the stock of fixed and human capital, and efficiency. Inflation impairs both efficiency and the incentive to invest, thereby harming growth. How does this happen?

- The inflationary process erodes the purchasing power of money, creating uncertainty about its future value. As a result, individuals and economic agents invest time and other resources in financial activity intended to hedge against this erosion and uncertainty—activity which is of no real utility, inhibits efficiency and productivity, and detracts from the economy's ability to realize its productive potential. The need to hedge against the erosion of money also leads to the artificial expansion of banking activity, and this inevitably comes at the expense of productive activity and does not contribute to welfare.[9]
- Uncertainty about the future value of money also makes investment less worthwhile, shortens its horizon, and distorts considerations of utility. Under inflation, investments are made which would not be worthwhile in a situation of stability. These include accumulating stocks, shifting to fixed assets such as real estate and other durables, and engaging in projects with a low real return, while deferring investments that would be worthwhile in a situation of stability. Thus, the allocation of economic resources is distorted, worthwhile investment declines, and growth is impaired. Uncertainty also impels savers and investors to demand a risk premium, further reducing investment.
- Accurate information is an important element in the decision-making process of consumers and producers. Inflation distorts information about the relative prices of goods as they do not all rise uniformly, and hence it is difficult for consumers to make rational decisions about what to buy. Similarly, producers encounter problems when the relative price of their products changes because of

[9] On the part played by inflation in magnifying the banking system, see Marom (1988).



- Inflation—which should not affect the extent of their production—or as a result of a change in relative demand, which should cause them to adjust it. Thus, the distortion of information impairs the efficient allocation of resources, reduces competition, and hence hampers growth.
- Inflation intensifies the inequality of income distribution, in the following ways:
  - By creating a discriminatory tax burden on inflationary profits, for example between agents who buy stocks at different periods and sell them at the same time, because different nominal profits are recorded for an identical activity.[10]
  - By giving large economic entities an advantage over smaller ones in gaining access to the expensive resources required in order to hedge against inflation (and even to profit from it)—manpower, knowledge, and know-how. Equally, the ability of entities with few resources to compensate themselves for the erosion of their purchasing power is smaller than that of those with extensive resources.
  - By enabling borrowers to benefit from the inflationary process at the expense of savers.

[10] Under inflation, an indexed tax system is required in order to avert distortions in the tax burden. A system of this kind consumes a great many resources, and usually does not fully neutralize the distortions.

- Sellers need to constantly update prices. This incurs costs which sellers roll over onto consumers, so that prices rise even more. Marking prices on the shelf instead of on each product reduces these costs, but impairs competition, making it more difficult for the consumer to compare prices.
- Since the value of the local currency is eroded, individuals hold as little cash and money in non-interest-bearing current accounts as possible for their daily transactions. As a result, they make greater use of bank accounts (whether over the phone, by visiting their bank branch more frequently, or by using ATMs), i.e., they waste resources on unproductive activities.

Hedging against the damage caused by inflation by indexing the entire system (wages, bonds, credit, savings schemes, etc.), as was the case in Israel and Brazil, makes it possible to continue functioning with inflation, but perpetuates and even accentuates it and its distortions, ultimately leading to a crisis and in its wake a painful stabilization program, like the one employed in Israel in 1985.[11]

Thus, price stability is one of the basic preconditions for permanent growth. It makes the allocation of the economy's real resources more efficient, increases productivity (as more resources are channeled to production and less to hedging against the erosion of money), and engenders greater equality of income distribution. Price stability also reduces nominal uncertainty, thereby serving to extend the horizon of business decisions and encourage real investment. In addition, low inflation influences the stability of the exchange rate (see section 6e below), and makes the economy more competitive abroad. Continuous growth is expressed in the creation of new jobs, and hence in high employment. The experience of other countries, as well as empirical studies,[12] have shown that economies with price stability expand more quickly than those with inflation. The standard of living in countries with a rapid inflation rate is lower than that in countries with low inflation (Figure A.1).

The link between inflation, GDP, and unemployment in Israel is shown in Figure A.2. When there was high inflation, GDP, per capita GDP, and unemployment fell. In the first few years after the ESP, GDP and per capita GDP growth rate rose, but this was accompanied by an increase in unemployment. When inflation targets were introduced and inflation fell to western rates, growth rates continued to rise but unemployment did not, even though the population grew markedly due to the influx of immigrants.

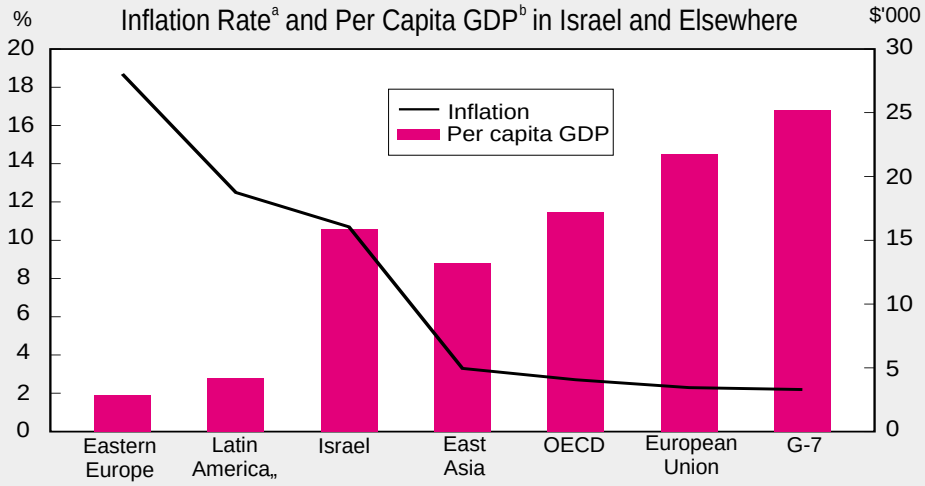
Note that price stability is a necessary—but not sufficient—condition for sustainable growth; the structural elements mentioned earlier, as well as labor-market flexibility, are also important. Consequently, countries with price stability do not always have the same permanent growth rate.

[11] These results *inter alia* were obtained by Burton and Fischer (2001), and Fischer and Summers (1989).

[12] For example, the study by Barro (1996), which uses data from 100 countries for 1960–90. He found that a 10 percentage-point rise in the average annual inflation rate reduces the growth rate of real per capita GDP by between 0.2 and 0.3 percentage points a year, and the investment/GDP ratio by between 0.4 and 0.6 percentage points thereafter.

Figure A.1

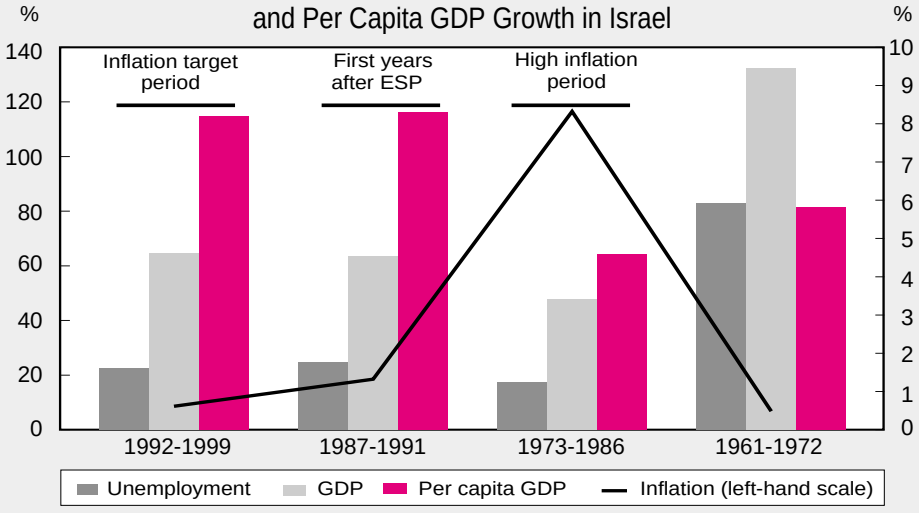
Inflation Rate[a] and Per Capita GDP[b] in Israel and Elsewhere



[a] Average for 1992-96
[b] In 1995, thousands of dollars
Source: Sokoler (2001).

Figure A.2

Rates of Inflation, Unemployment, GDP Growth, and Per Capita GDP Growth in Israel



b. The cost of disinflation

The above account of the damage caused by inflation raises the question, if it is so bad, why do not governments combat it more vigorously and effectively? The answer lies in the cost of reducing inflation, i.e., in the negative relation in the short run between inflation and unemployment which emerges from many studies (and is depicted

graphically in the Phillips curve[13]). In the short run the process of disinflation involves a rise in unemployment and fall in GDP (whose level relative to the decline in inflation is known as the sacrifice ratio), because of the supply- and demand-side responses to the policy measures introduced.

(i) On the demand side: the disinflationary process requires tight fiscal and monetary policy. Fiscal policy acts to reduce the budget deficit by reducing general government expenditure, while monetary policy reduces private-sector demand by raising the interest rate. A fall in demand reduces production—primarily of nontradable goods, but also of tradables, as it takes time before alternative export markets can take the place of domestic consumption.

(ii) On the supply side: raising the interest rate makes investment less worthwhile, so that firms whose profit margin was narrow previously have to cut and even stop production—thereby increasing unemployment. Note, however, that the investments that came to an end were not economically worthwhile from the outset, being characterized by low efficiency and productivity; they expressed the damage caused by inflation, as explained in the preceding section.

Note, too, that unemployment also derives from structural factors, such as wage inflexibility because of long-term contracts and the Minimum Wage Law, as well as from price rigidity due to weak competition. Greater wage flexibility would make it possible to reduce the cost of disinflation in terms of unemployment; increased price flexibility would facilitate a faster reduction in inflation to a given level of restraint. As will be shown below, these flexibilities depend on additional variables, which affect them via the rate at which inflation expectations adjust—the independence of the central bank, the credibility of economic policy, and the length of the inflation target horizon; the higher these are, the more rapidly will inflation expectations adjust (Frenkel, 2001; Vinales, 2001).

(iii) Inflation gives rise to hedging activities whose sole object is to limit inflation damage. Thus, for example, the banking system becomes bloated, and in Israel inflation-adjusted financial statements have become widespread—something which is unnecessary in a situation of price stability. When inflation declines these activities cease, increasing unemployment.

c. Disinflationary policy

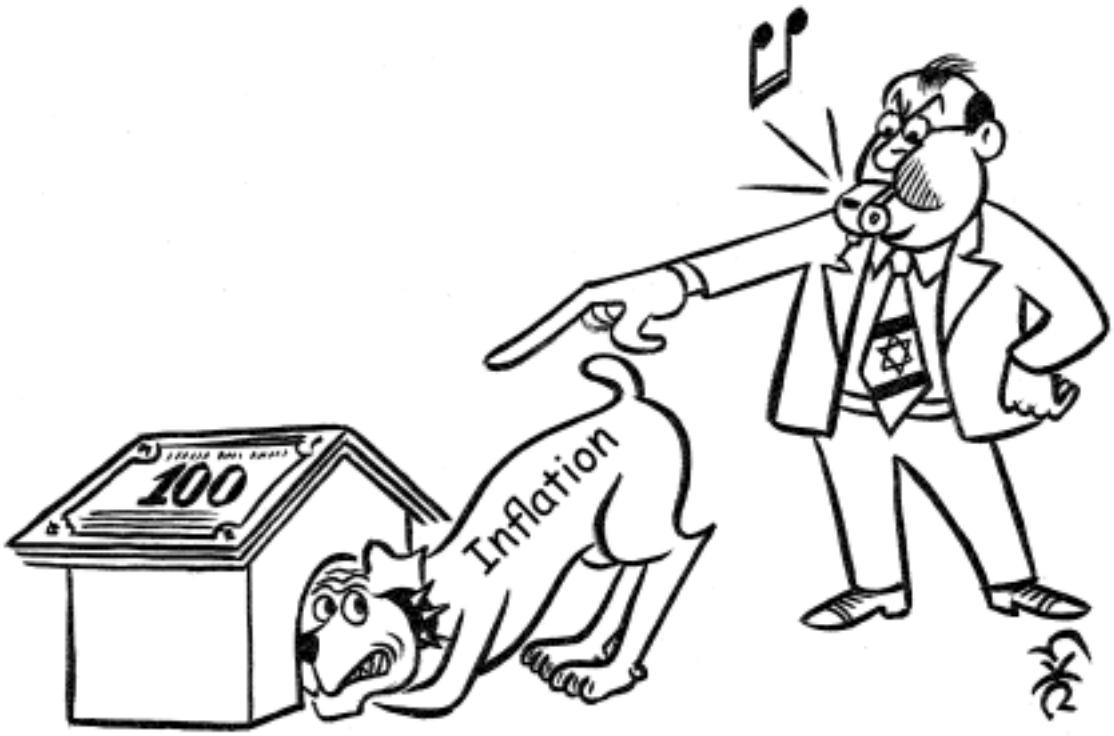
An inflationary process is essentially one in which demand (of both the private and public sectors) exceeds the sources available, i.e., the economy's ability to produce. Hence, inflation is the result of an economic policy that affects primarily the nominal aspects of supply and demand rather than the real aspects. Thus, monetary policy that expands the money held by individuals increases purchasing power, causing demand to rise. If

[13] For more on this subject, see Sussman and Lavi (2001). Their study demonstrates that in the case of Israel (as in many others) the Phillips curve obtains only in the short run. In the long run there is no such relation, so that it is not possible to reduce unemployment indefinitely by increasing inflation.

aggregate demand exceeds the economy's ability to produce, too much money is pursuing too few goods, and this pushes up the prices of domestic goods, increases imports, and creates a deficit in the balance of payments. In a regime with a fixed exchange rate, this will cause the reserves to be eroded, whereas in one with a floating exchange rate it will lead to local-currency depreciation. Equally, an expansionary fiscal policy, which gives rise to a budget deficit, expands aggregate demand, and hence also brings these developments in its wake.

Setting an inflation target determines the path of monetary policy and focuses it. Fiscal policy, which is also expressed in the budget deficit, should be consistent with the target set too, and any deviation from it indicates that policy needs to be altered. Announcing the target makes policy more transparent and makes both the government and the public more aware of the importance of keeping inflation low, thereby contributing significantly to the credibility of policy. In Israel the fact that there was an inflation target played a part in determining the slope of the exchange-rate band during the 1990s. Announcing the inflation target and introducing measures to attain it reduces uncertainty and stabilizes the path of inflation expectations around the target, in turn affecting the behavior of economic agents. Empirical research shows that countries with inflation targets have a lower rate of inflation than others (Cukierman, 1997), but this depends on their ability to adhere to their commitment, i.e., credibility.

Determining an inflation target, and introducing measures in order to attain it, are perceived throughout the world as being crucial for determining a country's international rating, thereby influencing foreign investors' decisions. Foreign sources of finance are



important both for generating new investment in Israel and enabling the successful privatization of government thereby increasing efficiency and productivity and contributing to the realization of the country's growth potential.

Determining the inflation target is particularly important at a time of globalization, when the economy is exposed to both inward and outward capital flows. The financial markets respond to changing economic conditions—whether global shocks or domestic policy—and this exposure heightens the speed and intensity of their response. At a time of globalization the financial markets 'examine' domestic economic policy, constituting a system of 'reward and punishment.' Thus, Israel's financial robustness and ability to withstand global shocks depends on its macroeconomic policy—monetary, fiscal, and exchange-rate regime—as well as on the exposure to risks of financial intermediaries, especially the banking system (for maintaining the stability of which the Supervisor of Banks is accountable). The effort to attain the inflation target requires responsible macroeconomic policy, and thus makes a crucial contribution to the country's financial stability. One such instance was its ability to cope with the global shocks that began in east Asia in mid-1997 and spread to Russia and Latin America in 1998. Throughout most of that period these shocks did not appear to have affected Israel's exchange rate, despite globalization. Although there was relatively steep local-currency depreciation in the last quarter of 1998 as a result of international events such as the aforementioned crisis in Russia in August and the near-collapse of the LTCM hedge fund in the US in September, there were no signs of crisis, in contrast with other countries.[14]

d. Inflation targets in other countries

Awareness of the damage caused by inflation and the crucial importance of price stability as a precondition for sustainable growth has led many countries to set inflation targets since the late 1980s, whether as a general commitment to price stability or as an explicit and official aim. By the nature of things, not all countries take precisely the same line; in some cases the legislation concerning the central bank makes specific mention of the inflation target, while in others it is part of the central bank's policy.

The countries which announce specific inflation targets include the UK, Canada, and New Zealand (where the quantitative target is set jointly by the governor of the central bank and the minister of finance), and Finland, Sweden, Australia, and Spain (where it is set by the central bank).[15] In New Zealand the inflation target is the only target mentioned

[14] The economic crisis that erupted in Russia in August 1998 led to the announcement by the Russian government of its default on its debts to foreign investors. This crisis followed a series that had begun in east Asia in mid-1997, exacerbated the world financial crisis, and was expressed *inter alia* in the extensive outflow of foreign currency from the emerging economies, plummeting share prices in the countries in crisis, and a steep drop in share prices all over the world. The near collapse of the LTCM hedge fund threatened the stability of the global financial system. See also the *Annual Report* of the Bank of Israel's Controller of Foreign Exchange for 1998.

[15] Finland, Spain, Germany, and Belgium are considered before they joined the European Monetary Union (EMU) in 1999.

in the central bank legislation. Although there is no explicit target in the US, low inflation is the prime consideration in determining monetary policy. German legislation specifies that the main task of the central bank is to maintain the stability of the currency; this accords the bank complete independence, and makes price stability part of the wider economic environment. Under the terms of the Maastricht Agreement, the role of the European Central Bank (ECB) is to attain price stability (and it has complete independence of the political system). In Belgium the independence of the central bank was increased through legislation in 1993, being permitted to determine the objectives of monetary policy and its implementation in the spirit of the Maastricht Agreement, taking responsibility for this out of the hands of the government.

e. Inflation targets in Israel

An inflation target was first announced in Israel at the end of 1991, when a maximum inflation rate of 14–15 percent was set for 1992. From then until 1995, as the end of each calendar year approached, the government would announce the inflation target for the coming year, which was 8–11 percent a year.

Alongside the benefit of having a target, the date when it is announced and its horizon are also important. Monetary policy does not affect inflation immediately, and studies show that in Israel the lag varies from 4 to 18 months (the lag is shorter when the foreign-exchange market is less regulated). Hence, it is important to set a long-term target that extends beyond a calendar year or 12-month period, so that monetary policy has a clear target to which it can relate across the time horizon to which it applies. In other words, if a target is set at the end of a year for just one year ahead, monetary policy will have an effect only in the second half of the next year, while the first half is still influenced by decisions made in the past, when the target in question was not yet known. Thus, setting a target in this way hampers its attainment.

In 1996, when the target set for 1997 was 7–10 percent (a target that was one percent lower than in previous years), it was decided that the inflation target for each year would be set no later than the middle of the preceding year (see Appendix B), and for 2001 the target set was the inflation rate prevailing in the OECD countries.[16] This expressed a declining trend from the inflation rate then prevailing to a long-term target, although the path was not made explicit. This approach gave monetary policy a longer horizon in its efforts to attain the inflation targets. In August 1997 the government decided that the inflation target for 1998 would remain the same as in 1997, 7–10 percent; it also decided that its aim would be to gradually reduce the inflation target in order to achieve the price stability 'accepted in the industrial countries.' This decision reflected a retreat from its decision of the previous year that 2001 would denote the end of the disinflationary convergence process (see Appendix B). Only in August 2000 did the government set

[16] The average inflation rate for all the OECD countries was 4–5 percent. The average inflation rate in those countries excluding the high-inflation countries (Turkey, Mexico, Hungary, and Poland) was 2.5 percent.

explicit long-term inflation targets that expressed a declining inflation path towards price stability—defined as 1–3 percent—for 2003 and thereafter. This was supported by the fact that at the time of the decision the actual inflation rate was below the targets set!

5. THE IMPORTANCE OF CENTRAL BANK INDEPENDENCE

Macroeconomic policy requires a long horizon, e.g., for long-term investments, in order to reduce the budget deficit to a level appropriate to the economy, to bring inflation down to the level elsewhere in the world, etc. Since democratic countries hold elections every few years, political entities generally have a short horizon, however; they adopt policies aimed at making them popular and gaining them re-election. This kind of policy can give rise to an inflationary bias, as decisions about the budget deficit and its financing, for example, or the way the budget should be allocated, may be geared towards achieving short-term gains (see Frenkel, 2001). In addition, by its nature a government tends to increase its expenditure, e.g., by giving larger subsidies, reducing taxes, and raising wages. To prevent an increase in the deficit it is necessary to raise taxes, but since this will not be popular and also involves legislation, the government refrains from adopting this course, preferring instead to 'finance' the increase in its expenditure by printing money, which creates inflation. This is the 'inflation tax,' which is introduced without the imprimatur of the legislature, and can be imposed even by the weakest government. This is why so much significance is attached all over the world to the independence of the central bank, i.e., to its ability to act without being hampered by political considerations in endeavoring to attain greater long-term stability and to moderate the economic fluctuations that result from the decisions made by politicians. The credibility of the central bank's policy is contingent on its independence; the more independent it is, the greater its influence on the public's behavior and decisions, so that prices, wage agreements, and contracts adjust to the inflation target more quickly. Thus, the more independent the central bank, the greater its ability to bring about price stability.[17]

The independence of the central bank is expressed in various ways, chief among them legislation. Although independence under law does not guarantee actual independence, it is a necessary condition because it creates the institutional framework that it requires (Cukierman, 1997). The extent of independence is indicated by the answers to several questions:

- Is the authority to determine monetary policy in the hands of the central bank?
- According to the law, what is the relative importance of attaining price stability among the bank's objectives (compared with such aims as employment in the short run, and financial stability)?

[17] Thus, for example, Barro (1996) and Cukierman (1997) cite extensive literature on the subject. The major changes intended to make central banks more independent were introduced in 1989.

- To what extent does the law protect the central bank from pressure to extend credit to the government?

With regard to the first two questions, it is customary to make a distinction between independence in setting the target and independence in implementing instruments for attaining it. Independence in determining the target means that the central bank rather than the government decides on the inflation target. Independence in implementing instruments means that the central bank sets interest rates. Countries in which the central bank determines the inflation target include Germany, Finland, Sweden, Australia, and Spain.[18] Under the Maastricht Agreement, the ECB is independent (since the beginning of 1999) in this respect. In some countries the quantitative target is set jointly by the central bank and the Ministry of Finance, and these include the UK, Canada, and New Zealand. In the US, where there is no explicit target, low inflation is the main aim of monetary policy. All these countries share a situation in which the central bank has complete independence in implementing instruments, i.e., in managing monetary policy and determining interest rates. In England the government that came into office in 1997 decided to grant the central bank independence in determining interest rates, after this had formerly been the province of the Treasury. Central bank independence in managing monetary policy and determining the interest rate has also been adopted by some Latin American countries and the former USSR. In Israel the inflation target is set by the government, while the central bank has independence in implementing the instruments for attaining it.[19] This gives rise to a problem because in addition to the inflation target the Bank of Israel is also committed to defending the exchange-rate band, whose limits are also set by the government. When the exchange rate is at a limit of the band, the two aims conflict (see next section).

6. MONETARY POLICY AND THE EXCHANGE-RATE REGIME

The exchange-rate regime constitutes another aspect of monetary policy. Price stability in Israel is indicated by the CPI, which expresses the purchasing power of money in relation to a basket of goods consumed in Israel and consisting of domestic and imported items. The basket can also be divided into tradables (goods and services which may be imported and exported) and nontradables (domestically-produced goods and services that are

[18] See note 15.

[19] Whereas the central bank is able to set interest rates independently, this is not the case when it comes to deploying other instruments. The reserve ratio, for example, has to be set in consultation with the Knesset's Finance Committee and requires the approval of the government (section 49 of the Bank of Israel Law, 5714–1954). As part of the process of deregulation, the reserve ratio was lowered, and this is no longer a dynamic instrument for administering monetary policy. The amount of short-term Treasury bills issued, constituting an instrument for injecting or absorbing liquidity, was also limited. Hence, the Bank of Israel uses mainly the auctions for its loans/deposits to the banking system to influence liquidity.

solely for domestic consumption, such as housing and legal services). According to the theory of purchasing power parity (PPP) the price of a tradable good in an open economy should be similar to its price in the rest of the world (excluding transportation costs and taxes). Consequently, when there is inflation PPP is eroded both domestically and vis-à-vis foreign currencies, i.e., inflation exerts pressure for local-currency depreciation.[20] Thus, a change in the exchange rate expresses the difference between inflation rates in Israel and the rest of the world.

When the exchange rate floats (i.e., it is not set by the authorities), it adjusts to inflation by means of market forces. For example, if the public expects that there will be inflation, i.e., that the purchasing power of the NIS will decline, it defends itself and switches to dollars (or some other currency). The demand for the dollar causes its price to rise relative to the NIS. This process means that there is NIS depreciation in line with expected inflation[21] (beyond its actual rate abroad). Israel has had a floating exchange rate (albeit within the confines of the band), in which adjustment is attained via market forces, since mid-1997 (except for intervention by the central bank on a few trading days at the end of 1997).

If the exchange rate is fixed, however, it does not adjust as required, as the central bank buys or sells foreign currency in return for local currency in order to stabilize it, thereby altering the money supply but not in accordance with the inflation target. In this situation, as will be explained below, the effectiveness of monetary policy in attaining a given inflation target is weakened. Without a change in the country's economic fundamentals, a policy of refraining from adjusting the exchange rate simply delays the inevitable adjustment which, when it occurs, could undermine economic stability.

Under the exchange-rate band policy which has existed in Israel since 1989, every day there is one possible minimum exchange rate and one possible maximum rate (derived from policy and known in advance) for the NIS against the currency basket, and the actual rate can vary within those two limits (see Appendix A). If as a result of real and financial activity the public sells foreign currency in exchange for local currency, the price of the latter rises, in other words it appreciates, but only up to the limit permitted by the exchange-rate regime (the band). If the exchange rate reaches its daily permitted minimum and the public continues to sell foreign currency, the Bank of Israel intervenes,

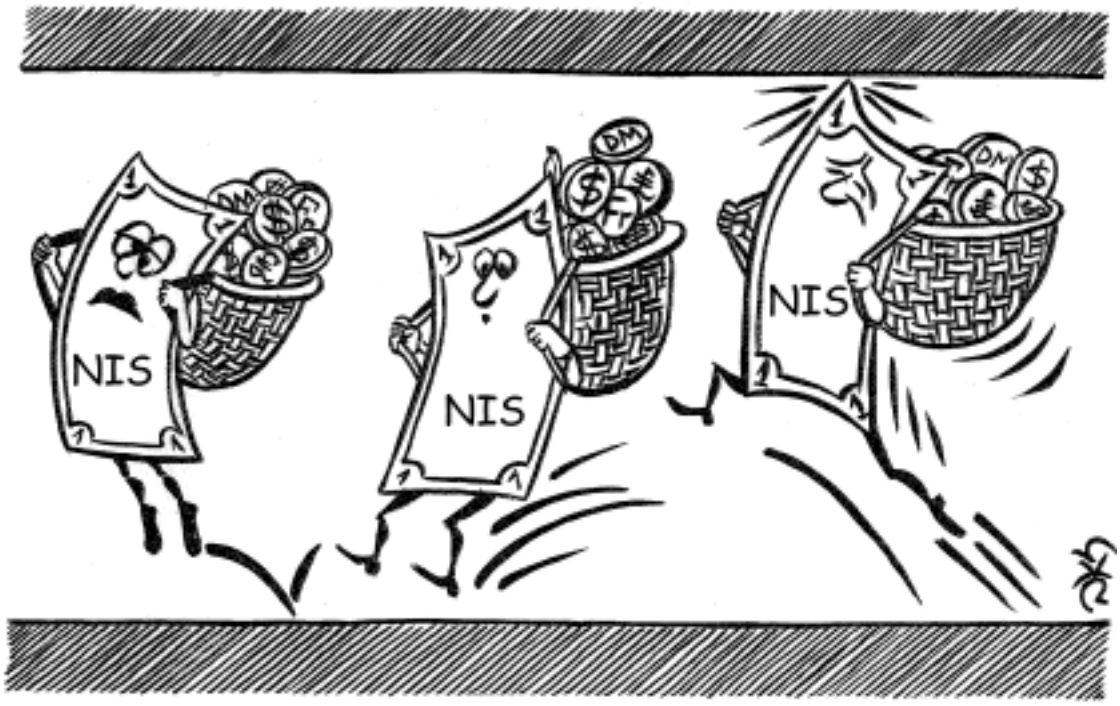
[20] Assume, for example, that the price in Israel of a product is NIS 30, or $ 10 if the exchange rate is NIS 3 to a dollar. If the price of the product goes up by 10 percent, it will cost NIS 33. If the exchange rate does not move, its price in dollar terms will now be $ 11, while its price in the rest of the world remains $ 10. In this situation, it will be worthwhile importing a similar commodity at $ 10, and it will be more profitable for exporters to sell the commodity in Israel than abroad. This means that there is less foreign-currency income and more foreign-currency expenditure. If there is a general price rise, given a fixed exchange rate it will be worthwhile to import more and export less, and this will apply to all tradables. This situation cannot endure for long, because in the final event the foreign-exchange reserves will be eroded to such an extent that it will not be possible to continue importing. If the local currency depreciated by 10 percent, this situation would not arise, as the price of the commodity in Israel and abroad would remain the same, and stability would be maintained.

[21] Although inflation exerts pressure for depreciation, not all exchange-rate shifts are caused solely by inflation.

i.e., it buys foreign currency from the public, so that the exchange rate will not drop below that point. As a result, local currency is injected into the economy, and the money supply rises beyond the desired level. This situation obtained in Israel in 1995–97.

If the money supply rises there is upward pressure on prices, as stated earlier. In order to prevent this, the Bank of Israel absorbs the money which was injected by buying foreign currency from the public—a process known as sterilization. This is implemented by means of various monetary instruments, such as banks' fixed-term deposits in the Bank of Israel, which it sells them at auction (competition for interest rate). This absorption is temporary, however, because at the end of the allotted time the deposit will be redeemed and will return to the banks; the money supply will then rise again, even exceeding its level before it was deposited, because interest will be paid in addition to the principal. The more extensive these activities, the more interest is paid, so that the money supply again exceeds the desired level, requiring sterilization once more, which leads to additional interest being paid, and so on *ad nauseam*. Thus, sterilization is only a temporary palliative, and does not cure the disease, because ultimately the money that was absorbed returns to the system and is augmented (see also Burton and Fischer, 2001).

When the Bank of Israel buys foreign currency from the public in order to defend the exchange rate, money is pumped into the economy from an additional 'pipe.' Sterilization is necessary as long as that channel exists, and the ability of monetary policy to control inflation is weakened as sterilization increases. On the other hand, if the exchange rate fluctuates freely and is not determined by administrative means, the Bank of Israel does not have to intervene directly, and its monetary control is not impaired. Exchange-rate rigidity can cause the money supply to exceed the level required in order



to attain a certain inflation target, thereby impeding its attainment. This weakens the effectiveness of monetary policy because, as described above, this injection cannot be sterilized perpetually. Experience elsewhere in the world has shown that ongoing intervention by the central bank to defend the exchange rate leads to crisis; that was the case in Israel in the second half of the 1980s, for example, when there were repeated waves of speculative purchases of foreign currency, leading to sharp local-currency depreciation (see Appendix A). In 1998 there was steep depreciation, largely because of external shocks, such as the crisis in the former USSR, but also because of the adjustment of the exchange rate following the attempt to defend the lower limit of the band in 1994–97. Additional examples are the crisis in the EU in 1992 and 1993, and the crises in Mexico (1994), Chile (1982), and other Latin American countries, as well as some in east Asia, among them Thailand, the Philippines, Malaysia, Indonesia, and Hong-Kong, in the second half of 1997.

The question arises whether—and when—intervention by the central bank in determining the exchange rate given an inflation target is justified. Foreign-currency trading sometimes causes fluctuations in the exchange rate that are not due to the basic economic situation, but rather to intensive, random currency flows and market imperfections. In such cases there is justification for central-bank intervention as the 'market-maker,' in order to prevent sharp random fluctuations in the exchange rate. Intervention of this kind is temporary and does not oppose market trends. Nevertheless, in reality it is difficult to ascertain whether a change in the exchange rate is a random shift or due to underlying factors, so that the decision to intervene in setting the exchange rate is by no means simple.

7. FISCAL POLICY

Under the Budget Law, the government undertakes not to exceed its expenditure limit during the fiscal year, and also to adhere to a deficit of a given share of GDP.[22] The

[22] International norms refer to the overall deficit, i.e., from domestic and foreign activities, and not to the domestic deficit only, as was the case in Israel until 1996. In that year the Knesset approved an amendment to the Budget Deficit Reduction Law, replacing the domestic deficit with the overall deficit (excluding credit extended), and determining a declining path for that deficit from 2.8 percent of GDP in 1997 to 1.5 percent in 2001. Following deviation from the deficit target in 1999, a new declining path was set for the deficit targets, ending in 1.25 percent of GDP in 2003 (see the budget proposals for 1997–2001). A government deficit of 1.25 percent of GDP is estimated in Israel as a public-sector deficit of 2.5 percent of GDP, and is hence consistent with the definitions specified in the Maastricht Agreement (see below).

The parties to the Maastricht Agreement agree to reach a balanced budget or surplus in the medium term. A condition for acceptance into the EU is an overall deficit of no more than 3 percent of GDP (see Part B, section 4). Nonetheless, Israel has not attained international standards in the following respects: in Israel the reference is to the government deficit, while in the rest of the world it is to the public-sector deficit, i.e., the government as well as the National Insurance Institute, local authorities, and government corporations. In Israel interest expenses include only the real component, while the nominal component

deficit represents the excess of expenditure over income, so that if it increases this means that aggregate demand[23] goes up, which intensifies inflationary pressures and enlarges the balance-of-payments deficit. Increasing government expenditure by imposing additional taxes undoubtedly impairs private-sector activity, and hence long-term growth.

A larger government deficit comes also at the expense of real private-sector activity, and harms sustainable growth in several ways: there is a greater need to finance the budget deficit (which has grown); this reduces the resources available for private-sector activity and transfers them to the government by creating pressure for higher long-term interest, which harms private-sector investment; a larger deficit results in inflationary pressure and eventually in a greater balance-of-payments deficit, too. If monetary policy is tightened because of the increased deficit (in order to check the rise in inflation), private-sector activity is harmed by higher interest rates and the inflow of short-term capital which can result from it with an exchange-rate band (as occurred in Israel and described in the preceding section). This inflow causes local-currency appreciation and harms exports. Thus, a reduction in government activity serves to boost long-term growth in two ways: by boosting private-sector activity and easing inflationary pressures. Consequently, fiscal policy may be regarded as a fundamental that affects the development of the economy: many countries which have suffered from high inflation, including Israel, have been characterized by large budget deficits, and a basic component of their stabilization packages has been sharp budget cuts (Burton and Fischer, 2001).

Another problem is the financing of the deficit. The deficit is financed by borrowing from the domestic population,[24] or by taking loans from abroad, which eventually have to be repaid with interest. Thus, this is a way of mortgaging the future,unless the increase in the deficit is intended for purposes other than consumption, such as infrastructure investment which contributes to greater future growth. However, in order to ensure that the expansion of the deficit will indeed finance infrastructure investment rather than current public expenditure, a far-sighted policy is required, and that depends to a great extent on political stability.

The deficit can be sustained as long as it can be financed, and this depends on the trust of the lenders, i.e., the economy's repayment ability, which is contingent on its growth potential, on the one hand, and the rate at which the debt grows, on the other. The larger the deficit, the greater the financing needs, the damage to sustainable growth, and the increasing risk to lenders. With time, increased risk is expressed in interest-rate hikes,

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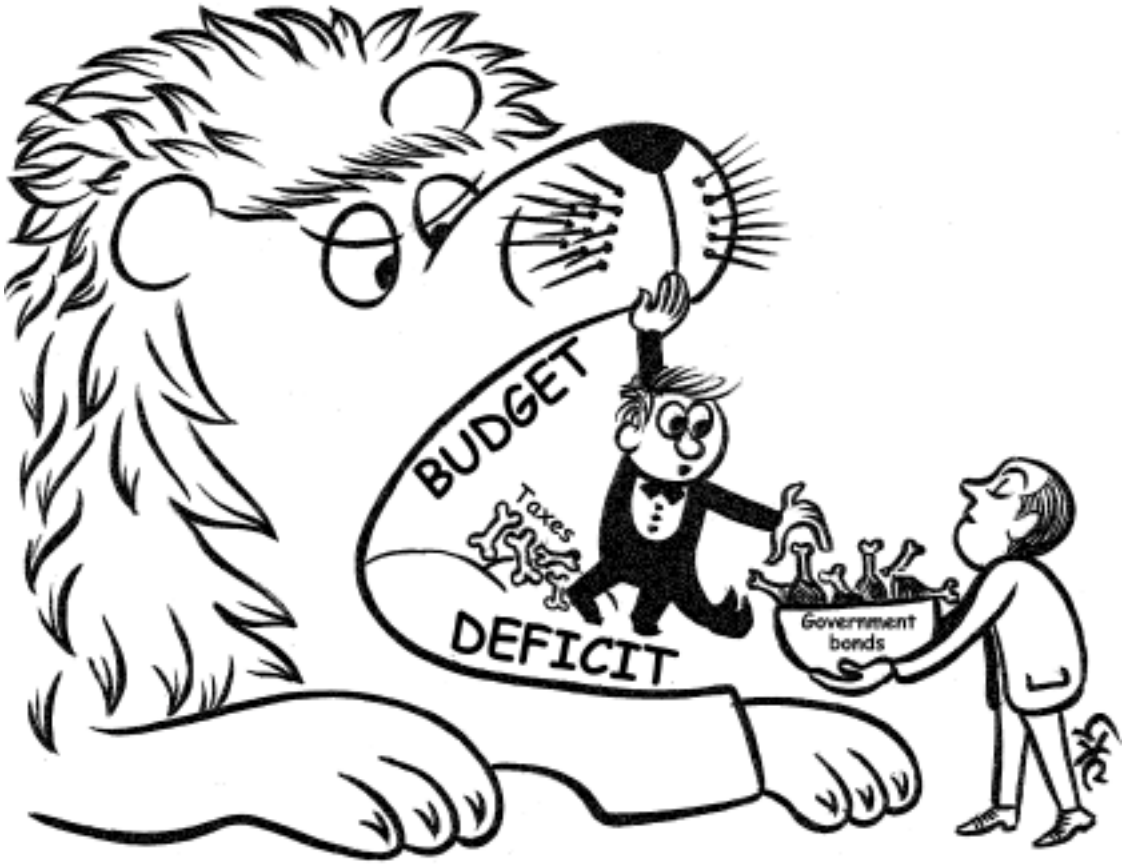
(indexation differentials) is ascribed to the financing side; by international standards, however, interest expenses include both components. Note, however, that the inflation rate abroad was significantly lower than that in Israel, so that the main share of interest expenses there is real, whereas in Israel it is indexation differentials.

[23] Aggregate demand is total demand in the economy—private consumption, public consumption, and investments. Exports are also included in aggregate demand, but the government deficit does not serve to increase them, and may even reduce them.

[24] By law, the government is unable to borrow from the central bank, except for fixed-term, interim financing.

and this could lead to a crisis, materializing in the form of the cessation of lending and withdrawal of investment from Israel. Consequently, the government deficit exerts considerable influence over Israel's international rating as regards the performance of the economy and its risk level, and hence its ability to attract foreign investment and borrow abroad (a larger deficit naturally increases the overall government debt). Under the Maastricht Agreement, a condition for entry into the EU is that the overall government debt shall not exceed 60 percent of GDP. Israel's government debt/GDP ratio was 95 percent in 2000.

Beyond the basic repercussions of the deficit on economic goals, the way it is financed also influences monetary policy: when the financing is by domestic borrowing, the government's effect on the money supply (though not on aggregate demand) is neutral. By contrast, when the financing is by borrowing abroad, the loans are converted into a local-currency injection, and monetary policy must absorb this liquidity. This incurs a cost in the form of the interest paid by the Bank of Israel (as explained in section 6 above).[25] Consequently, when considering whether to finance the government deficit from domestic or foreign sources the economic utility of the public sector as a whole (the government and the Bank of Israel), rather than that of the government alone, has to be taken into consideration.



[25] This cost is reduced by the interest rate abroad, however, as the Bank of Israel invests this foreign currency there.

APPENDIX A: THE EXCHANGE-RATE REGIME IN ISRAEL SINCE THE MID-1980S

1. Fixed exchange rate

Under the economic stabilization program (ESP) of 1985, the exchange rate against the dollar was set as the nominal anchor for prices; this was done primarily because it was simple and foreign currency was widely used at the time (when there was high inflation).[26] The anchor was changed in August 1986, since when the representative exchange rate of the NIS has been set not in relation to the dollar but to a basket of five currencies—US dollar, German mark, UK sterling, French franc, and Japanese yen—and its composition determined in accordance with the extent of Israel's trade with the countries concerned.

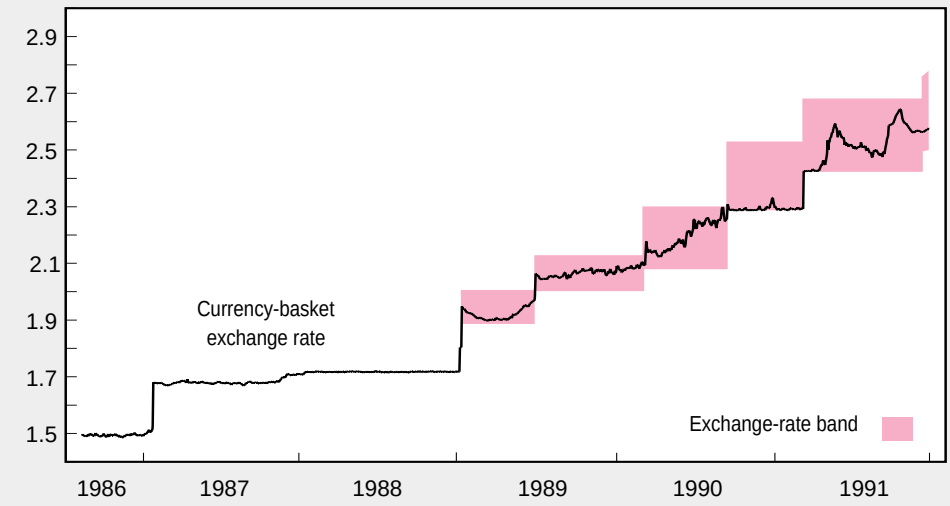
The ESP succeeded in bringing inflation down from an annual rate of several hundred percent. But as inflation had remained at 15–20 percent a year since 1986, the exchange rate could not remain fixed for long, and this was expressed in speculative waves of foreign-currency purchases every few months. The Bank of Israel's response over time would have drawn down the foreign-exchange reserves; in order to obviate this possibility, a new level was set administratively for the anchor, resulting in local-currency depreciation.

2. Horizontal exchange-rate band

In the wake of another speculative attack, a new exchange rate was set in January 1989, but this time it was allowed to vary within a horizontal band. Under this regime, the exchange rate is permitted to move within a given range, thereby to some extent giving expression to market forces; this is in contrast to a regime with a fixed exchange rate, which can be changed only by administrative intervention. In other words, instead of a specific, known exchange rate, as under the previous regime, the exchange-rate band allows the rate to move between a maximum and minimum, but the specific exchange rate for the next day is not known. The width of the band was initially set at 3 percent above and below the last exchange rate determined under the previous regime, and this became the *mid-point rate* (Figure A.3a).

[26] During a stabilization period it is customary to use an exchange-rate anchor because there is foreign-currency indexation (dollarization) and the public's confidence in policymakers is low. The advantage of using the exchange rate as an anchor is that it is easily comprehended by the public, information about it can be obtained on a daily basis, and hence the commitment of policy to its stability is constantly tested. The exchange rate was used as an anchor in the stabilization packages of Israel, Argentina, Mexico, and other countries. Fixing the exchange rate in a framework other than a stabilization package is widespread in small open economies, which adopt that stance vis-à-vis a major trading partner with a stable currency, e.g., Holland, Belgium, and Austria vis-à-vis the German mark (before the EMU). Targets are usually set for inflation or the money supply (rather than the exchange rate) in open economies with relatively large financial markets (Cukierman, 1997).

Figure A.3a
Exchange-Rate Regime and Currency-Basket Exchange Rate, August 1986–December 1991



The narrow band was not sufficient to allow for the exchange-rate adjustments required under an inflation rate of 15–20 percent and the waves of speculative purchases which still occurred, albeit less frequently than under the previous regime, so that the Bank of Israel was forced to shift the band up from time to time. In 1991, alongside the shift in the band, it was widened to 5 percent on either side of the mid-point rate.

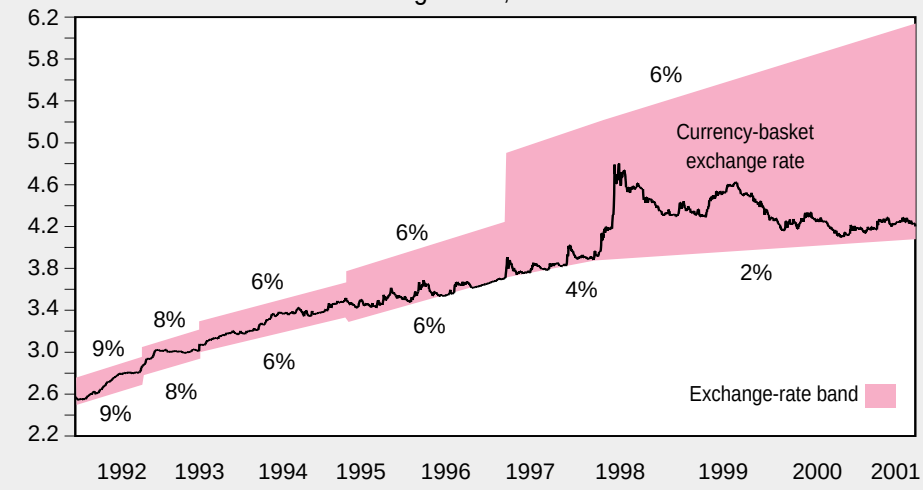
In the ESP, where the exchange rate served as an anchor, the role of monetary policy was to support the development of the exchange rate in accordance with the policy stance. Thus, when demand for foreign currency rose, exerting pressure for depreciation, an interest-rate hike was required in order to dampen demand and stabilize the exchange-rate anchor; when this pressure eased, interest could be lowered. Under that system, the exchange rate served in effect as an interim goal in the process of price stabilization.

3. Diagonal (crawling) exchange-rate band

The waves of speculative foreign-currency purchases associated with the horizontal exchange-rate band distorted economic activity. At the end of 1991, after another such attack, a *diagonal band* (also known as a ‘crawling peg,’) replaced the horizontal band. Under this system the upper and lower limits within which the exchange rate may fluctuate shift every day (at a pre-set rate), i.e., they slope upwards, thereby giving expression to inflation differentials, whereas with the horizontal band they are fixed (as long as no change has been announced). In this way there is automatic daily adjustment of the mid-point rate and the range within which it may fluctuate, while the distance between the limits of the band enables market forces to be expressed. Thus, the purpose of the diagonal band (Figure A.3b) is to reduce speculative attacks and administrative

intervention in determining the exchange rate, as well as to obviate the need for sharp interest-rate fluctuations.

Figure A.3b
Exchange-Rate Regime and Currency-Basket Exchange Rate, 1992–2001



The angle of the slope was determined on the basis of the inflation differentials between Israel and abroad. Since the inflation rate abroad is given, it was necessary to define the rate in Israel, and this led for the first time to the determination of an inflation target. This was presented as part of the change in the exchange-rate regime, but only with time, when it emerged that there was a conflict between adhering to the diagonal band and attaining the inflation target, did it become clear that there had been a substantive shift in monetary policy. In contrast with the past, the inflation target constituted a guide for monetary policy, and the interest rate was a means for attaining the target directly—rather than via the exchange rate, which had been the anchor in the past—meaning that the exchange rate was permitted to vary freely. A change in the exchange rate *per se* is not a reason to alter the interest rate unless this endangers the inflation target set by the government.

In order to attain the inflation target, given fundamentals that aggravate inflationary pressure—chief among them expansionary fiscal policy—tight monetary policy was required. Since 1994 this has given rise to capital inflow, causing NIS appreciation, and the exchange rate has shifted towards the lower limit of the diagonal band. The closeness to the lower limit has created greater certainty about the future exchange rate, leading to greater capital inflow; this serves to make monetary policy less effective (as explained in section 6), so that from time to time the band (within which the Bank of Israel does not intervene) had to be widened. In May 1995 the band was widened to 7 percent on either side of the mid-point rate, which was raised by one percent. In December 1996 the exchange rate was once again close to the lower limit; as a result, the band was widened

by another 14 percent (i.e., to 28 percent) in June 1997, and the lower limit of the band was reduced from 6 to 4 percent (so that another 2 percent was added to it each year).

In August 1998 the slope of the lower limit of the band was altered to 2 percent, alongside the determination of an inflation target of 4 percent for 1999. The reduction of the lower slope enables the exchange rate to shift further downwards, in response to market forces, thereby making monetary policy more effective.

Since mid-1997 the Bank of Israel has not intervened directly in the foreign-currency market (except for a few days around the end of 1997), and the exchange rate has been decided within the band by market forces. This was also the case at the time of the sharp depreciation in October 1998, in the wake of the series of world financial crises (see also note 14 above).

APPENDIX B: MACROECONOMIC TARGETS SET BY THE GOVERNMENT IN 1997–99, AND FOR 2001 AND SUBSEQUENTLY*

Inflation targets

(Decision No. 1127, dated 27.12.96)

It is decided that

a. The government notes the decision of the Minister of Finance, reached after consultations with the Prime Minister and the Governor of the Bank of Israel, that the inflation target for 1997 is 7–10 percent, and that the target for 2001 will be the norm in the OECD (the Organization for Economic Cooperation and Development) countries.

b. The target for 1998 will be determined by the middle of 1997. In the following years the target will be set in a similar manner, so that it will serve as the government's working premise in determining the following year's budget framework and target, as well as monetary policy.

c. It is in this context that all the main targets of economic policy on which the proposed 1997 budget focuses should be viewed:
   i) reducing the current-account deficit;
   ii) creating the conditions to enable continued stable economic growth;
   iii) reducing the rate of inflation;
   iv) absorbing immigrants.

* Cited from cabinet decisions.

The government's economic policy—monetary policy guidelines
(Decision No. 2456, dated 8.8.1997)

It is decided that

The government adopts the decision of the Minister of Finance, taken with the knowledge of the Prime Minister and after consultation with the Governor of the Bank of Israel, and sets the following targets for economic policy for 1998:

i) To move towards full realization of the economic growth potential currently estimated at an annual 5 percent, with the aim of achieving sustainable growth.
ii) The inflation target for 1998 is 7–10 percent.
iii) To continue gradually lowering the rate of inflation, with the intention of eventually achieving the price stability customary in industrialized countries.
iv) To raise the level of employment in the business sector.

The government's economic policy—monetary policy guidelines
(Decision No. 4167, dated 12.8.1998)

It is decided that

The government notes the decision of the Minister of Finance, taken with the knowledge of the Prime Minister and the Governor of the Bank of Israel, and sets the targets for economic policy for 1999, incorporating the guidelines for monetary policy, as follows:

a. To progress towards the realization of the economy's potential growth with the aim of achieving sustainable growth.
b. To raise the rate of employment in the business sector.
c. The inflation target is 4 percent, as described below:
   i) The inflation target for 1999 refers to the Consumer Price Index (CPI), as hitherto. The Bank of Israel will nevertheless relate *inter alia* to the special, short-term effects which certain components such as fruit and vegetable prices, housing prices, and import prices have on the CPI.
   ii) The Bank of Israel will submit an inflation report biannually to the government and the public, in which it will detail the policy adopted to meet the inflation target.
   iii) If the Bank of Israel assesses that expected inflation is going to deviate from the target by more than 1 percentage point, the Governor will notify the Government in writing of the factors assumed to be responsible for the expected deviation, the recommended means for returning expected inflation to the target path, and the estimated time required to return to that path.
   iv) As part of the process of achieving the inflation target, the Bank of Israel has an annual monetary plan. The Bank of Israel advises that in order to increase the transparency of the monetary policy, the findings and conclusions of the plan will be published annually, shortly before the next target year.

The government's economic policy
(Decision no. 2183, 16 August, 2000)

It is decided that
The government notes the decision by the Minister of Finance, which has been agreed to by the Prime Minister and the Governor of the Bank of Israel, determining the following objectives of economic policy in 2001. Within that framework it determined the following guidelines for monetary policy:

1. To progress towards fulfilling Israel's growth potential with the goal of consolidating the high economic growth rate and making it sustainable.
2. To increase the employment rate in the business sector.
2. The inflation target for 2001 will be 2.5–3.5 percent. The inflation target for 2002 will be 2–3 percent, and from 2003 it will be 1–3 percent, the range defined as price stability. Furthermore:

a. The inflation target will refer to the CPI. Nonetheless, policy will take into account special, short-term influences sometimes embodied in certain components, e.g., prices of fruit and vegetables, housing, and imports.

b. The Bank of Israel will submit an inflation report to the government and the public twice a year, in which it will specify and analyze the data, assumptions, and forecasts underlying monetary planning.

If the Bank of Israel assesses that expected inflation will deviate by one percent or more from the target, the Governor will inform the government in writing of the factors assessed as being responsible for the expected deviation, and of the implications of this for planned policy.

PART B

PLANNING AND IMPLEMENTATION

1. INTRODUCTION

As we saw in the first part of this booklet, the object of monetary policy in Israel is to attain the inflation target. However, the prices of various commodities are determined by the market forces of demand and supply that are also influenced by forces not connected with monetary policy (exogenous forces), such as budget policy, wage agreements, immigration, competition, the tax structure, prices abroad, political processes, and capital flows not associated with short-term interest-rate differentials between Israel and abroad. While monetary policy cannot determine price levels directly, it aims at attaining the inflation target by determining the price of money, i.e., the interest rate, which affects the money supply, aggregate demand, and hence prices.

The influence of interest on prices is not immediate; it acts via a complex transmission mechanism (i.e., a convoluted 'pipeline' of economic variables), so that time elapses between the implementation of monetary policy and its expression in the price level.[1] Monetary policy must take the lag in its effect into account, i.e., it must anticipate the trend of inflation in the future and act appropriately in the present. In other words, it must take the lead in attaining the target, not simply react to actual inflation. A policy that fails to pre-empt the future trend of inflation leads to the fulfillment of expectations through the wage increases demanded by employees and the prices charged by firms in order to hedge against expected inflation.

Is there a rule—or set of rules—by which monetary policy operates? Since its effect is transmitted, as stated, via a complex mechanism, in order to understand the economic situation and the inflationary forces at work it is necessary to monitor the indicators of this mechanism. The various indicators, which often point to conflicting trends, attest to the conclusion that has been reached over the years in Israel and elsewhere, namely, that there is no simple rule for the implementation of monetary policy (see Box 2).

[1] Beyond the complexity of the transmission mechanism, there are additional reasons for this lag. 1) Contracts are not altered as soon as policy is changed, but only when they expire, at a pre-set date. This applies to wage agreements, as well as to credit and deposit contracts. The immediate impact will be only on new contracts or those that are indexed to the CPI, the interest rate, etc. The greater the share of these in the all contracts, the smaller will be the lag in the effect of monetary policy on the economy. 2) The influence of monetary policy in an indexed system is weaker. 3) The public does not change its habits and the composition of its consumption overnight; this takes time, and occurs only when people feel the effect of policy on their pocketbooks. 4) The more credible is monetary policy, the greater is its influence on inflation expectations; and the more flexible are prices and wages, the more rapid will the effect be.

Essentially, the indicators presented below describe the economic environment and the future trend of inflation: together they reflect the current inflation environment, the distance between it and the target, and the forces operating in the 'pipeline' that reflect the public's inflation expectations. Since the indicators depend on information about the past—which is often received with a lag of several months—they do not necessarily reflect the current economic environment. Hence, the trends of the economic variables and the way they affect the deviation of the inflation rate from the target must be assessed.

In many countries monetary policy is managed on the basis of indicators which, though not identical across economies, share similar characteristics. They are selected on the basis of their availability, the intensity of their relation to economic objectives, i.e., their effectiveness as predictors, and the influence on them of policy. The intensity of the relation and the extent of the influence attributed to them are based on both economic theory and empirical research.

In this section we present the variety of indicators employed in the discussions that precede decisions about the interest rate. These indicators are widely available, so that they can also play an important part in enabling the public to make assessments and reach decisions. The public takes inflation expectations into account in its business decisions; these are based *inter alia* on monetary policy and its effectiveness, and depend to a great extent on its credibility. Hence, the transparency of monetary policy is important—the more transparent it is, the greater is the public's confidence in the determination of policymakers to attain the inflation target, and the public will adjust its economic activity accordingly.

2. THE HORIZON OF MONETARY PLANNING

Monetary planning discussions in Israel are held in four frameworks: annual, monthly, weekly, and daily planning.

a. Annual planning

The forum in which annual planning is undertaken in the Bank of Israel consists of the Governor, senior management, the heads of the Monetary, Research, Foreign Currency, and Foreign Exchange Control departments and their deputies, and the Supervisor of Banks, together with several senior economists. The material submitted for review by the Monetary and Research departments comprises an assessment of the monetary interest rate required to attain the inflation target set by the government for the following period,[2] given the various parameters of economic policy and the actual situation. The latter include, for example, fiscal policy, the development of world trade, the level of prices abroad, and the rate of local-currency depreciation. The assessment regarding the

[2] For the inflation targets, see Part A, section 4.

monetary policy required is obtained from econometric models built in the Bank of Israel, which have become very complex over time. These provide information about the growth rates of the money supply, GDP, and inflation, in accordance with the different interest rates determined by monetary policy. The discussion relates to the level of interest required in order to attain the inflation target under changing economic conditions, while forecasting the effect policy will have on other economic parameters, such as the growth rates of GDP and unemployment. The annual planning forum does not make decisions about the interest rate, but supports the decisions of the monthly planning forum by giving quantitative expression to economic variables and the expected results of monetary policy.

b. Monthly planning

The discussions that precede the monthly interest-rate decision are held in the second half of each month, after the publication of the CPI for the preceding month on the 15th of the current month. The CPI provides important information about the development of inflation and the real short-term interest rate, although it is only one of many sources of data.

The process of preparing the information on economic developments, which involves several departments and includes their recommendations about what the interest rate should be, takes 3–4 days and is preceded by internal discussions within the departments. Once the material has been prepared it is distributed to the various participants and presented at the first round of discussions, in which the Governor, the Bank's senior management, the heads of the Monetary, Research, Foreign Currency, and Foreign Exchange Control departments participate, together with their deputies, economists who analyze economic developments, and the Supervisor of Banks. The second round of discussions has fewer participants—the Governor, senior management, and the heads of the aforementioned departments. The Governor's decision about the interest rate is made after these decisions and reflects the recommendations of the Bank's economic departments. Thus, note that the interest rate is set following discussions that reflect various recommendations, even though formally it is made by the Governor alone. Once made, the interest-rate decision is published towards the end of the month and refers to the following month.

c. Weekly meeting

The Governor, senior management, heads of the aforementioned departments, and their deputies participate in the weekly meeting. This forum focuses mainly on monitoring the implementation of the Bank of Israel's interest-rate policy and weekly developments in the financial markets—bond yields, the yield curve, the stock market, the foreign-exchange market, the exchange rate, etc.—as well as the development of the government budget. A decision to change the interest rate is rarely made in this forum.

d. Daily planning

The economists of the Monetary Department participate in this forum, the purpose of which is to ensure that the interest rate on the Bank of Israel's loans to banks, and on the deposits of the banks with the Bank of Israel—as determined in the framework of the monthly planning meeting—is maintained throughout the month. To achieve this, the banking system must be provided with the money supply (liquidity) required for the interest rate set. However, since the money supply changes daily (Box 1), for example because of the government's activity, the short-term interest rate might shift accordingly. In order to prevent interest-rate fluctuations during the month, the appropriate amount of money has to be injected or absorbed. Making this decision is the role of the daily monetary planning forum.

BOX 1: SOURCES OF CHANGE IN THE MONETARY BASE

There are three possible sources of change in the monetary base: the activity of the government vis-à-vis the public, the activity of the Bank of Israel in the foreign-exchange market, and the activity of the Bank of Israel using the monetary instruments at its disposal.

The activity of the government vis-à-vis the public: this includes various payments such as the wages to general-government employees, transfer payments to the public (e.g., child allowances, old-age pensions), payments against contracts issued for projects, interest payments on the government's debts, etc. These are offset by the government's income from tax receipts. In addition, certain activities are needed to finance the budget; these include issuance of government bonds, on the one hand, and redemption of bonds that have reached maturity, on the other.

The *activity of the Bank of Israel in the foreign-exchange market*: this occurs when the Bank wishes to maintain a given exchange rate. In such cases, when the public sells foreign currency the Bank of Israel buys it, thereby injecting local currency into the system, and vice versa. Note that since mid-1997 the Bank of Israel has not intervened in the foreign-currency market, except for a few days at the end of 1997.

The activity of the Bank of Israel using the monetary instruments at its disposal: this is expressed in the issue and redemption of Treasury bills, credit auctions, auctions for deposits and the interest streams on them, and NIS/FX swaps. There are other instruments, but their effect on the monetary base is negligible.

The daily changes in the monetary base[3] in the next two months are forecast when the preparations are made for the monthly monetary discussion, i.e., in the middle of the month. This forecast is constantly adjusted as relevant information is received. Daily changes in the money supply and the sources of the changes are monitored, and the forecast revised accordingly. In addition, at the daily meeting current developments in the financial markets—the stock market, the indexed and unindexed bond market, the foreign-exchange market, etc.—are reviewed.

3. THE MONETARY POLICY TRANSMISSION MECHANISM

This section contains a brief account of the way interest-rate policy affects inflation and economic activity, i.e., the channels—known as the 'transmission mechanism'—through which the Bank of Israel affects the inflation rate and economic activity (a fuller description of these channels is given in the next section).

The Bank of Israel sets the interest rate on the short-term sources it supplies to the banking system, and on the short-term deposits it takes from it. As a result, the interest rates in the money market, which are closely linked to the Bank of Israel's interest rates (e.g., on on-call credit and 'jumbo,' deposits), are determined immediately, and in this way the effect of policy seeps through to the other rates in the unindexed local-currency segment—on both bank credit and deposits as well as on unindexed bonds. The other indexation segments, such as those indexed to the CPI and foreign currency, are also influenced by the Bank of Israel's interest rates, as they are alternative markets, although the intensity is slower and weaker, of course.

Raising the nominal interest rate also serves to reduce the narrow money supply (M1, comprising cash in the hands of the public and current accounts), which does not bear interest, by increasing the loss incurred by holding it, thereby reducing aggregate demand and lowering the inflation rate.

A change in the Bank of Israel's interest rates affects additional channels:

1. Interest-rate changes combined with the inflation target and the position of the exchange rate within the band: these affect capital flows to and from Israel, and hence the nominal exchange rate, relatively rapidly. This in turn influences inflation expectations. The greater the credibility of monetary policy, the stronger will the effect of this channel be.

2. The expected real interest rate, measured from the Bank of Israel's nominal interest less inflation expectations for the year, reflecting the intensity of monetary restraint: a high expected real interest rate serves to increase interest-bearing financial assets and reduce credit, and hence to dampen real economic activity. This affects inflation in two

[3] The 'monetary base' includes cash in circulation and the money deposited by the banks with the Bank of Israel against the reserve requirement imposed on deposits of the public in the banking system.

ways; the first directly, by moderating demand for nontradable goods and services,[4] and the second indirectly, by diminishing demand for tradables, serving to narrow the balance-of-payments deficit. This depresses the exchange rate and hence reduces prices.

3. The wealth effect: the greater the assets in the hands of the public—ranging from M1 and bonds to shares and real estate—the greater its sense of wealth, serving to increase demand. If the nominal interest rate is raised, this erodes the public's sense of wealth and hence dampens demand.

Additional factors affecting inflation are exogenous, i.e., independent of the interest rate, and are also taken into account in determining interest-rate policy. One of the most important of these is a rise in the budget deficit due to an increase in government expenditure without a concurrent growth in income. The additional demand is channeled to domestic products, thereby affecting domestic price levels, or to imports, thereby influencing the balance-of-payments deficit and/or the exchange rate. Thus, the larger the budget deficit, the tighter will monetary policy have to be in order to attain a given inflation target.[5]

The inflation rate also depends on the level of real economic activity, which is generally expressed by the rate of GDP growth relative to its potential. The larger the gap between the growth rate and the potential, the greater will be the tendency of inflation to accelerate, requiring greater monetary restraint in order to attain the inflation target, and vice versa. In this respect, monetary policy is counter-cyclical, serving to moderate fluctuations in the business cycle, prevent crises, and hence to facilitate stable economic activity over a longer period.

Given GDP growth, however, it is important to determine whether it derives from demand or supply factors. A rise in GDP due to supply-side factors, such as a structural change or technological breakthrough (e.g., the surge in the high-tech industry), has an indirect—and hence weak—effect on inflation, while demand-side factors have a strong and direct effect.

In the following section we examine the indicators used by the Bank of Israel in determining monetary policy. When reviewing the material submitted to the preliminary discussions, the Monetary Department focuses on monetary indicators while the Research Department places the emphasis on indicators of real economic activity. The Foreign Currency Department concentrates on indicators of foreign-currency activity, such as developments in the foreign-currency market, international financial markets, and Israel's risk premium in these markets. The Foreign Exchange Control Department is concerned mainly with financial risks, e.g., in capital flows to and from Israel, their composition, and Israel's exposure to exchange-rate shifts. Below we focus on the indicators that come within the sphere of the Monetary Department. A more detailed account, incorporating other economic variables, may be found in the *Inflation Report*.

[4] Tradables are goods and services that can be exported; nontradables are domestically produced goods and services intended solely for domestic consumption (see Part A, section 6).

[5] Nonetheless, in certain situations temporary adaptation to a deviation from the deficit target should be considered (see section g below).

BOX 2: INDICATORS VERSUS INTERMEDIATE TARGETS

In the 1970s and 1980s it was customary in western countries to use intermediate targets rather than indicators. Monetary policy operates in the short-term money market, from where its effect seeps through into other channels in the money and capital markets, and further into GDP adjusted for inflation. Since these effects occur with a lag, and data about GDP are also obtained with a lag, an interim target was fixed to serve as a focus for monetary policy and receive rapid feedback as to its effect. This interim target 'mediates' between the immediate influence of monetary policy in the money market and the ultimate target which, as stated, is affected by policy with a lag. Another benefit of operating in terms of an interim target is the fact that it is better defined and clearer than a policy based on indicators, thereby making policy more transparent. Choosing an interim target depends on three important variables: the ability of monetary policy to influence it, its ability to affect the final target (i.e., its predictive capacity), and the availability of information about it. Thus, countries have chosen monetary and/or credit aggregates, interest rates, or the exchange rate as interim targets.

The disadvantage of interim targets lies in the fact that their stability and their connection with the ultimate targets (such as price stability, growth, and employment)—and hence their predictive capacity—could be undermined as a result of domestic or global economic developments or economic policy. Thus, for example, the liberalization of the financial markets in the US (removal of interest limits, cancellation of restrictions on the spheres of activity of financial institutions, and changes in the reserve requirements) was expressed in wide fluctuations in the growth rates of the monetary and credit aggregates that served as interim targets in the 1970s. In view of the instability of the intermediate targets, the resort to indicators became widespread. There is no simple rule for using indicators to conduct monetary policy; economic development is monitored and assessed on the basis of a variety of indicators. Among the countries that have replaced interim targets with indicators are the US, Canada, New Zealand, the UK, and Finland (most of them adopting a specific inflation target). Countries that have continued to adhere to interim targets included Germany (before EMU) and Switzerland, which uses monetary aggregates, while other members of the EU, such as Belgium and Austria (small open economies) used the exchange rate. The system of indicators is less transparent and clear than that of intermediate targets, but more reliable than it when it comes to assessing economic developments. The IMF also uses interim targets, such as the development of the money supply and credit, but in addition it uses the exchange rate as an anchor in various stabilization programs, including the countries of the former USSR, because the method of operating in these instances is simpler.

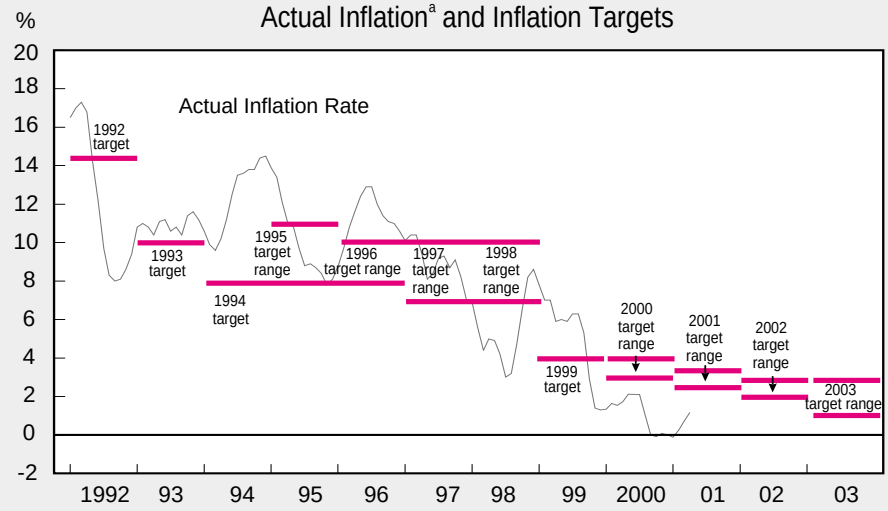
4. INDICATORS USED IN DETERMINING MONETARY POLICY

a. The inflation environment

In order to reach a decision about the appropriate interest rate for attaining the inflation target, it is necessary to know what the current inflation rate is. This is generally called the 'inflation environment' because for a variety of reasons it cannot be precisely defined. The CPI is published in the middle of the month after the one to which it refers, and reflects the average price level in that month. Consequently, there is a lag of 15–45 days, during which there is no data on the current price level and pressures which might influence future inflation. Furthermore, in most months the current CPI is not the same as the one published in the previous month, as it contains a seasonal element, and therefore fluctuates. Apart from this, the last CPI could reflect a one-off shift in the price level which is not reflected in the inflationary process.

Figure B.1

Actual Inflation[a] and Inflation Targets



[a] Actual inflation: rise in prices in previous 12 months.

The assessment of the inflation environment is based on several indicators which express both past and expected inflation.

1. Past inflation: this is measured from inflation in the last 12 months, i.e., the public expects that inflation in the coming year will be the same as it was in the previous year ('adaptive expectations'). Empirical studies have shown that adaptive expectations do indeed play a significant role in the development of future inflation. The advantage of this indicator is that it is measurable, as the reference is to indices that have been published, and since they encompass the whole year the seasonal element is neutralized. Its

disadvantage lies in the fact that it does not take into account features that are in the 'pipeline' (such as policy measures), which affect future inflation.

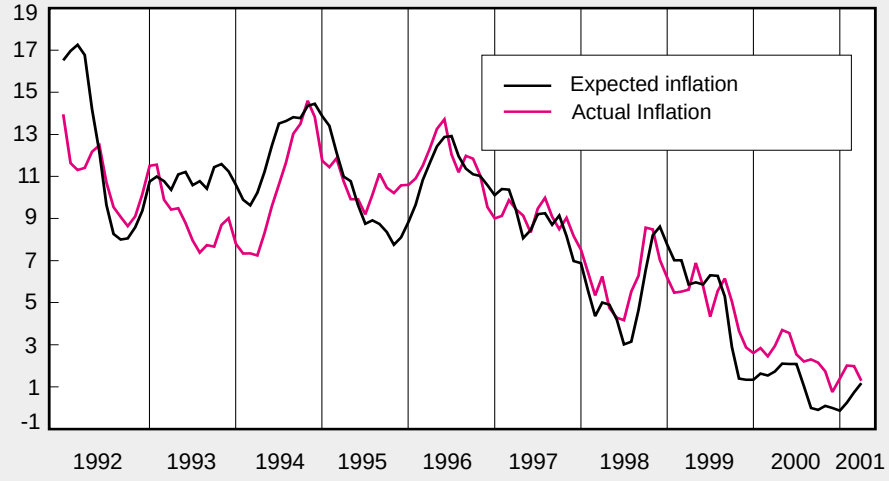
2. The development of inflation since the beginning of the year relative to the seasonal path implied by the target for the coming year (or longer): the logic of using this indicator derives from the fact that a target is set for the calendar year, and the attainment of the target is assessed by comparing it with actual inflation in the current year.

3. The inflation forecast for the current year and a year ahead prepared by private entities: since these entities undertake market transactions, their forecasts should reflect the public's inflation expectations. The forecasts are generally updated twice a month—after the publication of the CPI and at the beginning of the next calendar month. Hence, by the nature of things, they are less volatile than expectations derived from the capital market.

4. The development of forecast inflation: this indicator is based on the rational expectations theory, according to which all the forces operating currently and in the future (e.g., actual policies), and which will influence the development of inflation in the future, are taken into account in the public's decisions about purchases, savings, and investment. This approach is logical, but the main problem lies in measuring expectations.

Israel has a unique advantage in its ability to measure expectations due to the existence of unindexed and CPI-indexed government bonds for the same term: implicit in the price of unindexed bonds is the nominal yield, which incorporates two components: inflation expectations and the expected real yield (interest). CPI-indexed bonds hedge against future inflation, so that their price reflects only the expected real yield. Consequently, a comparison of the yields on the two kinds of bonds for the same term makes it possible to derive the expected inflation rate. This measurement reflects the price the public actually pays for its expectations, and therein lies its advantage. Another advantage is the

Figure B.2
Actual Inflation and Expectations for Next 12 Months



ready availability of the information (daily frequency), because these bonds are traded on the securities exchange (Figure B.2).[6]

In Israel unindexed bonds for terms of a year (Treasury bills) and up to ten years (*Shahar*)[7] are issued, while indexed bonds exist for a wide range of terms, from a few months to 15 years. Consequently, the inflation expectations derived from this market are for up to ten years.

Other countries issue unindexed bonds, but very few of them also have indexed bonds, so that they are unable to use this measurement. In the 1990s several countries which were characterized by low inflation, such as New Zealand and Canada (in 1991), Iceland and Sweden (in 1994), and the US (in 1997), issued CPI-indexed bonds, in order both to enhance market efficiency and facilitate measurement of the public's inflation expectations.

b. Monetary aggregates

This group of indicators examines the development of the money supply and credit. The effect of monetary policy on the money supply, and hence on inflation, is discussed at greater length in Part A. Money means purchasing power, and hence it encompasses not only the notes and coins in the hands of the public, but also those of its assets which are close substitutes for money, such as current accounts. Since the latter are liquid, the public can use them at any point in order to buy goods and services. Thus, money has wider definitions which are connected with measuring the liquidity of its close substitutes. Various countries have different definitions of this, according to the conditions prevailing in each one, such as the structure of the money and capital markets and the restrictions imposed on various savings channels (e.g., via legislation and taxation). Beyond this, the importance ascribed to the aggregate selected depends on the extent to which its development predicts that of the objectives of economic policy (e.g., inflation), and the ability of policy to control it.

Empirical studies undertaken in the Bank of Israel have shown that in the case of Israel the M1 monetary aggregate (cash in the hands of the public and current accounts) is a better predictor of the development of inflation in the future than other monetary and credit aggregates. Theoretically, the rate at which M1 expands should be in line with that

[6] Note that these expectations also incorporate a risk premium, which is not constant due to the variance of inflation. Even if it was possible to isolate it, it would not be appropriate to do so completely, because it embodies uncertainty regarding future inflation rates—a factor which should not be ignored.

[7] *Shahar* bonds were first issued in 1995 for a term of two years. With time, and as inflation fell, the term to maturity was extended, to 3, 5, and 7 years. In May 2001 issues for 10-year terms began.

of nominal GDP growth, i.e., expected or potential real GDP *plus* the inflation target.[8] Thus, if this aggregate expands too rapidly it implies upward pressure on the future inflation rate, so that the future inflation rate may overshoot the target. The connection between the real change in the money supply (nominal change *less* the rise in real GDP) in each quarter and the inflation rate in the subsequent two quarters is presented in the scatter chart in Figure B.3. The figure clearly shows the positive relation between them.[9]

Figure B.3
Relation Between Growth Rate of Money Supply[a] and Rate of Price Increases[b], 1990–2000 (percent, quarterly data)

[a] Quarterly average of nominal growth rate of money supply *less* change in real product in that quarter.
[b] Two quarters ahead.

If GDP growth is too rapid, however, and overshoots the required path, the growth rate of real GDP could exceed its potential. This is not desirable either, because growth that outstrips the optimum—if it is the result of demand-side factors—means the over-utilization of resources in the present, which will be expressed in a shortage of resources and slowing of growth in the future, i.e., wider fluctuations in the business cycle. Thus, the appropriate growth rate reflects a balanced, counter-cyclical policy.

Apart from monitoring M1, the Monetary Department of the Bank of Israel also reviews other monetary and credit aggregates, presented below; unlike M1, however, they are not good predictors in the case of Israel.

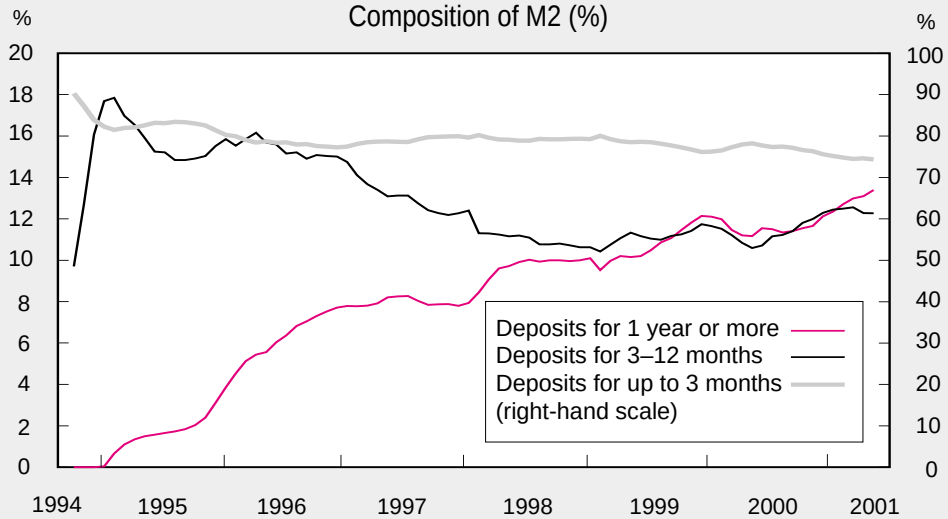
The M2 aggregate is wider and incorporates M1 as well as all the other unindexed, local-currency deposits (on-call, resident time, and local-currency time deposits). The development of this aggregate is not a good predictor of nominal GDP in the future, and the signals it sends are not unequivocal. When the interest rate rises, M1 tends to fall because it does not bear interest, whereas the other deposits included in M2 tend to rise,

[8] This result is consistent with the money supply theory, see note 3 in Part A. The growth rate of potential GDP is that rate which the economy can sustain with the resources available to it. In terms of uses, this means a sustainable rise in the standard of living.

[9] For additional evidence, see Bufman and Leiderman (2001).

as they do bear interest. Furthermore, since the public's asset portfolio includes, in addition to M2, assets indexed to the CPI and foreign currency, as well as foreign-currency-denominated assets, a rise in the unindexed deposits held by the public, expressed as a rise in M2 (the 'shekel mountain'), could reflect two situations: increased public confidence in the shekel, i.e., in a decline in inflation and its variance in the future, but also an increase in liquidity, and hence the potential for a rapid switch to other tangible and financial assets that serve to hedge against inflation—attesting to the public's expectations that inflation will rise. Consequently, in the Bank of Israel it is customary to sub-divide the aggregate by the relative liquidity of its components—deposits for up to three months, which express the most liquid part of the aggregate, deposits of between three and twelve months, and deposits for a year or more. If the illiquid component of the portfolio rises, this indicates that the portfolio is more stable, and that monetary policy is perceived as being more credible. Figure B.4 gives the composition of M2, and shows that since mid-1996 the share in it of short-term deposits (up to three months) has remained stable, after a decline. Only since 1999, when inflation fell to the rate accepted in western countries, has the share of short-term deposits continued to decline, alongside a rise in the share of deposits for a year or more.

Figure B.4
Composition of M2 (%)



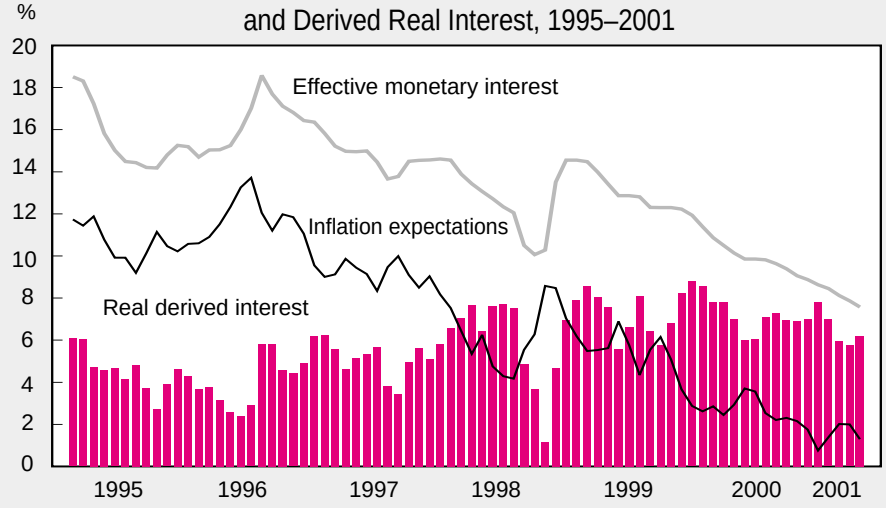
The credit aggregates are additional indicators of economic activity. A rapid growth rate of these aggregates points to considerable activity in the goods and/or financial markets (e.g., borrowing in order to buy shares or foreign currency), which could serve to accelerate the inflation rate in the future. There is a negative relation between the interest rate and credit. Thus, if demand for credit expands too quickly there is upward pressure on interest rates. The Monetary Department monitors the C1 aggregate, which includes unindexed local-currency credit, as well as the C3 aggregate, which comprises C1, CPI-indexed credit, and foreign-currency-indexed credit, and foreign-currency credit from both the domestic and foreign banking systems.

c. Expected real interest on the central bank's sources

The Bank of Israel sets the nominal interest rate; this does not reflect the intensity of monetary restraint because a large and volatile part of the nominal interest rate simply compensates for the erosion of purchasing power due to inflation, while the real interest rate does reflect monetary restraint. Thus, for example, raising nominal interest in view of growing inflation expectations does not necessarily increase real interest to the level that prevailed before expectations rose, i.e., monetary restraint could become weaker instead of tighter. Naturally, the required intensity of restraint, or the level of real interest, depends on the inflation target, the inflation environment, the exchange-rate regime, and macroeconomic conditions. Given the dynamic nature of the situation, it is more appropriate to refer to the required interest-rate environment than to a specific rate, both because it is impossible to know exactly what the required interest rate should be and because the measurement of inflation expectations is inexact. In addition to historical and international comparisons, the Bank of Israel also uses econometric models developed in the Monetary and Research departments to assess the real interest rate required in given situations.

The expected real interest rate, which serves, as stated, as an indicator of the intensity of monetary restraint, is derived from the Bank of Israel's interest rate less inflation expectations for a year (Figure B.5).

Figure B.5
Bank of Israel Interest Rate, Inflation Expectations, and Derived Real Interest, 1995–2001

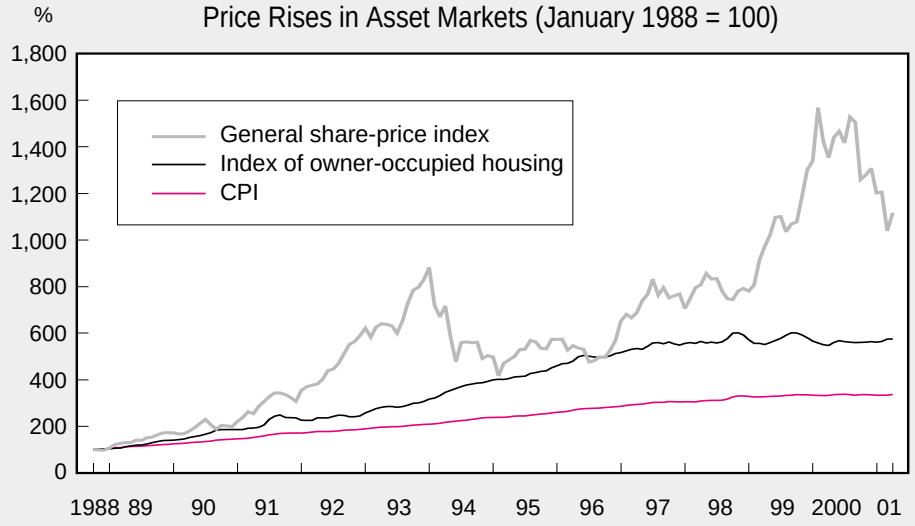


d. Asset price inflation

The influence of monetary policy on asset prices constitutes another channel by which monetary policy affects inflation, although asset prices are also influenced by other economic factors.

Asset price inflation is a continuous rise in prices of real assets (e.g., apartments) and financial assets (e.g., shares), and usually accompanies the expansion of the monetary and credit aggregates. This development embodies two main dangers: first, a rise in asset prices expands the public's wealth, increasing its demand for goods and services, and hence aggravating inflation; second, asset price inflation is accompanied by a 'bubble' effect, whereby prices rise to a level that is far higher than is consistent with future economic activity. This bubble will burst one day, giving rise to a crisis and a protracted economic slump. Raising the interest rate will serve to reduce the value of property, thereby moderating both the inflation rate and business-cycle fluctuations (Figure B.6).

Figure B.6
Price Rises in Asset Markets (January 1988 = 100)



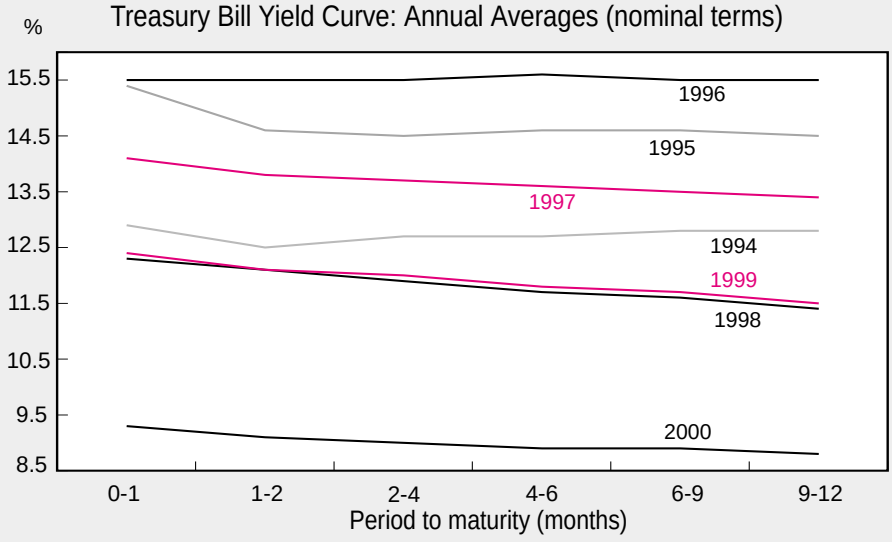
One of the characteristics of asset price inflation is that part or all of it is not expressed in the CPI, and hence it is important to monitor the various kinds of assets separately. Share prices are not included in the CPI in Israel, but apartment prices are—to a great extent until 1998 and to a lesser extent since 1999. Share prices in Israel rose by 800 percent between 1988 and 1994; from mid-1992 the market climbed steeply, and at the beginning of 1994 there was a crisis. Apartment prices rose continuously between 1988 and 1992, and began to surge at the end of 1993; since 1996 activity in the real-estate industry has slowed, and this trend intensified subsequently. In countries where apartment prices are not included in the CPI, or do not serve as an indicator of policy, business-cycle swings can be expected to be more severe. Asset-price inflation occurred

in the 1980s in Japan, Sweden, the UK, New Zealand, Australia, the US, and other countries. In those countries the rise in apartment prices is not expressed in measured inflation because the housing component of the CPI includes expenditure on housing services rather than the price of apartments. In the early 1990s share prices fell, after which the crisis also reached the real-estate market (and in Japan this was also accompanied by a severe banking crisis), and in the mid-1990s several central European countries experienced a recession. In the second half of 1997 there was a crisis in the stock and real-estate (and foreign-currency) markets of several Asian countries, including Thailand, the Philippines, Malaysia, Indonesia, South Korea, and Hong-Kong.

e. The yield curve on indexed and unindexed bonds

The *Treasury-bill yield curve* presents the nominal yield each month for the next 12 months. A curve with a positive shape means that nominal interest is expected to rise during the year, and it usually embodies expectations of a rise in future inflation rates. A shift in the slope and level of the curve may also reflect a change in the real component—though not in the nominal one—and hence it does not necessarily indicate a change in inflation expectations. Nevertheless, in the situation that emerged in Israel during the period of disinflation in the 1990s, large and frequent changes in the short-term curve generally reflected changes in inflation expectations, which are characterized by greater volatility than real interest (Figure B.7).

Figure B.7
Treasury Bill Yield Curve: Annual Averages (nominal terms)



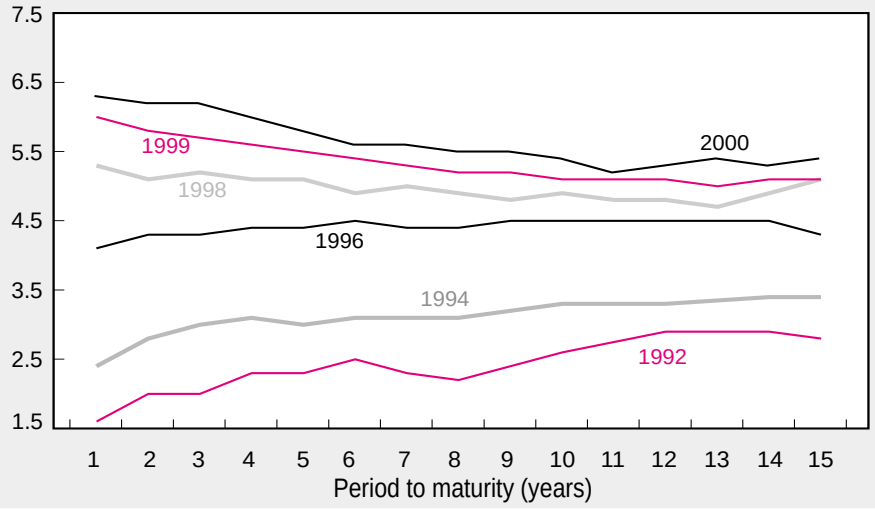
The *yield curve on CPI-indexed bonds* indicates the real yield each year for the next 15 years. It is generally accepted that short-term yields are affected primarily by monetary policy, and the longer the term to maturity, the weaker is the effect of monetary policy and

the greater that of real economic factors such as fiscal policy. The real yield curve usually expresses expected changes in real economic activity over time. Thus, for example, in the wake of tight monetary policy (a decline in inflation expectations) real short-term yields to maturity rise and the yield curve tends to be negative; this means that looser monetary policy—and hence the acceleration of economic activity—can be expected in the future. Another example is the expansion of the budget deficit, with increased issuance of government bonds in order to finance it, resulting in higher long-term yields to maturity. In this case the yield curve tends to become positive, so that in the future it will be necessary to slash the budget and dampen economic activity. Notwithstanding, changes in the yield curve often reflect short-term shocks in the financial markets, so that they do not necessarily predict real economic activity in the future.

The slope of the curve reflects yields for given terms at specific points in time, and hence it is important to periodically compare levels of yields in order to see how they develop over time: a long-term comparison for 1992–2000 in Israel shows that since the early 1990s the curve displayed a rising trend for all terms. The slope of the curve was positive, until 1996, and since 1997 it has become negative. This picture serves to indicate that alongside greater monetary restraint, basic real factors were at work that exerted upward pressure on long-term yields[10] (Figure B.8).

Figure B.8

% Yield Curve on CPI-Indexed Government Bonds: Annual Averages (real terms)



Most other countries do not have CPI-indexed bonds, and hence their long-term yield curves are nominal rather than real, and as such include both real and inflationary effects, which cannot be separated. Thus, from the information implicit in them it is difficult to make inferences about the development of inflation and real activity in the future. Nevertheless, considerable importance is attached to this indicator in the US, on the

[10] For a fuller explanation, see Bank of Israel Monetary Department, *Annual Report 1999*, chapter 2.

assumption that in the short term the real interest rate is fixed, so that changes in the curve in the short run express changes in inflation expectations. In pre-EMU Germany, on the other hand, no great importance was attached to this indicator because of the difficulty in differentiating the inflation expectations component from the real one.

f. Balance-of-payments developments: the trade deficit, capital inflow, and the exchange rate

Another channel through which monetary policy affects inflation is the foreign-currency market. The trade deficit essentially reflects a situation in which aggregate domestic demand[11] exceeds GDP. Excess demand is channeled partly to domestic production, expressed in higher inflation, and partly to greater demand for imports, resulting in a wider trade deficit. In principle, the deficit cannot grow indefinitely, as it depends on the willingness of nonresidents to extend credit, i.e., on the ability of the economy to repay those debts in the future. Consequently, a rise in the trade deficit, like an increase in inflation, requires tight fiscal and monetary policy in order to dampen demand.

The exchange rate is another channel through which monetary policy affects the prices of tradables, via expectations of local-currency appreciation or depreciation (the exchange rate also influences prices through changes in prices of imports and other tradables).

When real conditions, such as fiscal policy, increase inflationary pressures, tighter monetary policy is required in order to attain the inflation target. An interest-rate hike widens the interest-rate differential between Israel and abroad, so that holding local-currency assets becomes more worthwhile than holding foreign-currency ones, and pressure is exerted for short-term capital inflow, leading to local-currency appreciation.[12] In this situation, prices of imported goods (inputs, intermediates, and finished products) fall, as do those of other products indexed to the exchange rate, and with them inflation. Short-term capital inflow is affected by interest-rate differentials between Israel and abroad and by risks such as expected depreciation, which depends on the exchange-rate regime and the position of the exchange rate within the band. The wider the range within

[11] Disregarding interest payments on capital services, the trade surplus (i.e., the mirror-image of the trade deficit) is equivalent to exports *less* imports, which by definition is equal to GDP *less* private consumption, public consumption, and investment, i.e., national savings. This identity indicates that when there is a trade deficit, national savings are negative.

[12] This is an example of real appreciation that is not due to supply-side effects: on the one hand, inflationary pressures rise because of fiscal expansion, while on the other there is greater trust in the central bank's determination to attain the inflation targets, i.e., to persist with tight monetary policy—in order to neutralize the fiscal expansion. Thus, the domestic interest rate rises, so that the differential between it and interest abroad widens, and this affects short-term capital inflow. This trend cannot persist for long, however, as explained in Part A, so that fiscal contraction at a later stage is inevitable, and the pressure for real appreciation will gradually diminish. Another possibility is for real appreciation to be generated from the supply side: if the Israeli economy's capacity to grow expands, e.g., as a result of increased productivity or technological advances, confidence in the economy will rise given a stable economic environment, serving to increase long-term investment. This inflow is not contingent on short-term interest-rate differentials between Israel and abroad.

which the exchange rate is permitted to move, the greater is the risk. When the exchange rate is near the lower limit of the band and the conditions for real appreciation exist, there is greater certainty that it will remain there, and hence greater confidence in the continued worthwhileness of capital inflow. This trend weakens the effectiveness of monetary policy because of the need to sterilize these flows (see Part A, section 6). In this situation, short-term capital inflow derives, as stated, from interest-rate differentials, which are the result of expansionary rather than contractionary fiscal policy. This is not consistent with the inflation target policy, and in effect expresses the discrepancy between actual and declared fiscal policy (the budget and the deficit target). In the long term it will not be possible to attain the inflation target under these conditions and eventually there will be a crisis.

The mirror-image of this situation is to be found in the following indicators: the trade deficit, the foreign-exchange reserves, and capital inflow—primarily that deriving from interest-rate differentials; the exchange rate, its position within the band, and the extent to which it embodies pressures for continued capital inflow; increased monetary absorption and the cost (interest payments) of sterilization.

Capital flows to and from Israel, their subdivision into long- and short-term flows, and the exposure of the economy to exchange-rate shifts are analyzed, as stated, by the Foreign Exchange Control Department, and the analysis is presented in the department's *Annual Report*, and in the semi-annual *Inflation Report*, which is prepared by the Monetary, Research, and Foreign-Exchange Control departments. These indicators will not be described at length here, nor will we enter into an extensive account of the indicators of Israel's country risk rating (which is the sphere of the Foreign Currency Department) or the development of the balance-of-payments deficit (which is reviewed by the Research and Foreign Exchange Control departments). All these are discussed in full in the *Inflation Report* and the annual reports of the various departments. Nonetheless, these indicators are important for assessing current economic developments and the economic environment prior to making decisions about the interest rate—as referred to in the section on monthly planning.

g. Fiscal policy

In effect, fiscal policy expresses the economic targets, including the inflation target, set by the government for the coming year. This policy is expressed in the Budget Law, which is brought before the Knesset for approval, and in which the government commits itself to a specified maximum expenditure during the fiscal year, as well as to a deficit (excess of expenditure over income) as a share of GDP

Fiscal policy should be consistent with the targets set by the government: if the deficit exceeds the target, aggregate demand rises—exacerbating inflationary pressures—and the balance-of-payments deficit grows, undermining price stability, so that tighter monetary policy is needed in order to attain the target. There are additional effects, such as the need to finance the deficit from domestic sources, involving a rise in the real long-term interest

rate, or from foreign sources, which has an adverse effect on the balance of payments, Israel's credit rating, etc. (see section 7 in Part A). Tighter fiscal policy will serve to limit these effects, making it possible to attain a given inflation target by means of a lower interest rate.

Hence, it is important to constantly monitor the implementation of fiscal policy, and to warn of deleterious effects in time, both by practical action—i.e., monetary policy—and through the dissemination of information. Ongoing monitoring is achieved by comparing the actual deficit—its income and expenditure components, and the way it is financed—with the implementation outlined in the national budget, as well as by analyzing the extent to which execution adheres to the restrictions of the Budget Law.

Note, however, that not every departure form the deficit target requires fiscal restraint, and that it is important to ascertain the reason for the deviation. In the literature a distinction is made between two kinds of reasons: those associated with the deliberate adoption of expansionary fiscal policy because of political pressure or aimed at extricating the economy from a recession—reasons known as 'fiscal impulse.' The second category relates to reasons deriving from exogenous factors; these includes events such as the collapse of the Nasdaq in 2000 and the security incidents that erupted in Israel, starting at the end of September 2000, and which led to an economic slowdown. In cases of the second kind, the government deficit tends to grow, mainly due to the drop in tax receipts, but also because of a possible rise in expenditure, e.g., due to unemployment benefit payments. However, cutting expenditure in order to attain the deficit target could exacerbate the economic slowdown, thereby further worsening the situation. Hence, when the departure from the deficit target arises from circumstances that are beyond the control of policy, it is necessary to adapt temporarily to the new situation, a stance known as 'the passive approach' or 'the automatic stabilizer.'[13]

Experience teaches us that boom and bust are part of the economic cycle which recurs approximately every 8–10 years. The approach that advocates active intervention in a slump—the Keynesian approach—permits increasing expenditure in order to emerge from the slowdown. This attitude prevailed from the Second World War until the 1970s. The inflation of the 1970s gave rise to criticism of this stance, coming from several directions: a) The monetarist approach elucidated by Milton Friedman (1969) claimed that in the long run there is no substitutability between unemployment and inflation, and hence that the Keynesian approach was untenable. b) According to the rational expectations theory developed by Robert Lucas (1972), there is no substitutability between unemployment and inflation even in the short run. This relation obtains only if the government succeeds in surprising the public, so that it does not manage to protect itself against the policy and sterilize its effect; however, many studies—not to mention simple logic—show that the public cannot be surprised again, as the government's credibility is undermined and the public makes sure to hedge against surprises. c) By this

[13] See, for example, Eijffinger and de Haan (2000), Knot (1996), Dahan (1993).

action, the government crowds out the private sector, and hence prevents it from returning to its customary level of activity and emerging from the slump.

The approach adopted in most western countries since the late 1980s has been to allow the automatic stabilizer to do its work. Thus, for example, the Maastrich Agreement refers to the cyclical nature of economic activity by permitting a temporary deviation from the deficit of up to 3 percent of GDP, notwithstanding the fact that the signatories to the agreement committed themselves to a balanced budget and even a surplus in the medium term.[14] On the other hand, a departure from the deficit will not be tolerated if it is the result of excessive expenditure. An increase of this nature—even if due to exogenous causes, such as increased defense needs—must be financed by cutting other expenditure items in the budget. Note that both kinds of deviation can occur simultaneously (as has been the case in Israel since October 2000), in which case each of them must be dealt with in a different way.

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[14] In addition, even with a deviation of 3 percent of GDP, sanctions will not necessarily be imposed; a deviation of this kind is tolerated in exceptional circumstances if it is the result of exogenous events whose effect on the budget is unavoidable, and if there was a decline of at least 2 percent of GDP vis-à-vis the preceding year (Eijffinger and de Haan, 2000).

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