Chapter 2

Monetary Policy, Inflation, and Prices

The consumer price index rose by 6.5 percent in 2002, considerably more than the 2.3 percent level of inflation targeted for the year. A major difference was apparent between the first and the second half of the year: During the first half, prices rose by 6.3 percent along with a large rise in inflation expectations. In the second half, prices increased by a moderate rate of only 0.2 percent, and inflation expectations fell, although they only reverted to within the targeted range of inflation towards the end of the year.

Economic developments during 2002 were affected by the economic program that was implemented at the end of 2001. Apart from structural changes in the financial markets, this program included a one-time 2 percentage point cut in the Bank of Israel's interest rate to 3.8 percent, and a government decision (which was not implemented) to revert to fiscal restraint that would lead to a downtrend in the budget deficit. At the time, it was believed that these changes would result in a one-time exchange rate adjustment (which would be reflected by a real depreciation) and a decline in interest rates for all terms without undermining financial stability and price stability.

The exchange rate rose appreciably and continually during most months of the first half of the year, to a greater extent than was expected. The level of uncertainty, as reflected by the implied volatility in foreign currency options, also rose sharply. Background developments in this respect were as follows:

It soon became clear that the government would be unable to revert to a fiscal contraction, as was apparent from large-scale government borrowing and from the frequent rises in the budget deficit target for 2002 and the following years. The security situation deteriorated, culminating in Operation Defensive Shield in the second quarter of

the year. The government attempted to restrict the Bank of Israel's ability to maintain price stability by adopting a proposal to change the Bank of Israel Law. Concurrently, the public redirected their investments from unindexed shekel assets to dollar assets, nominal and real bond yields rose sharply, the inflation expectations derived from the capital market and from analysts' forecasts increased, and a real threat to financial stability and price stability was perceived. All these factors were expressed by a large rise in inflation expectations, which also reflected the loss of the public's credibility in macroeconomic policy. As a result of these developments, the Bank of Israel raised the interest rate for June and July by a cumulative rate of 4.5 percentage points, following two interest rate hikes by a cumulative rate of 0.8 percentage points during the first half of the year.

Following the interest rate hikes, the markets were calm during the second half of the year in comparison with the first half: Prices rose by only 0.2 percent, and the exchange rate fell (during most of the period), the bond markets were relatively calm, and the inflation expectations derived from the capital market declined (during most of the period), although they remained above the inflation target. The decline in inflation expectations was not consistent. This was because of various developments, such as the lowering of the three largest banks' credit rating in September, the threat of war with Iraq in the last quarter of the year and the geopolitical situation in Israel, which created uncertainty in the markets and halted the decline in inflation expectations. Although inflation expectations reverted to within the targeted range of inflation and despite the relative calm in the markets, the level of uncertainty in the markets during the second half of the year was higher than in the past.

1. MAIN DEVELOPMENTS

The consumer price index rose by 6.5 percent in 2002, exceeding the inflation target of 2.3 percent for the year. This came after three consecutive years when actual inflation was between zero and 1.4 percent, lower than its targeted level. The development of prices was not uniform in the course of the year. Prices rose by 6.3 percent during the first half of the year, but by only 0.2 percent in the second half.

Developments in actual inflation and the range of indicators of its future development differed greatly between the first and second half of 2002. In the first half of the year, prices rose by an annualized rate of 13 percent. Inflation expectations increased and continued to rise during the second quarter when they exceeded the targeted range of inflation. This period was notable for a high degree of uncertainty in the economy as a whole and in the financial markets in particular, a large depreciation, a fiscal expansion that was accompanied by a large increase in government bond yields, and low interest

rates in the short terms. The inflation expectations derived from the capital market for a year ahead and for the medium term rose and exceeded the inflation target to a considerable extent, peaking at an average of 5 percent. These developments led to fears of financial instability and loss of price stability. During the second half of the year, prices rose by only 0.2 percent (an annualized rate of 0.4 percent), and inflation expectations fell but remained higher than the inflation target for most of the period. The exchange rate fell during most of the period, the bond markets were relatively calm, and the inflation expectations derived from the capital market fell for most of the period but remained above the inflation target. Despite the relative calm in the markets, the uncertainty in them remained high.

Due to its assessments of inflation and developments in the markets, the Bank of Israel raised the interest rate by 5.3 percentage points in 2002. This was done by means of two interest rate hikes amounting to a cumulative 0.8 percent during the first five months of the year, and another three interest rate hikes by a cumulative 4.5 percent during June and July. Following these rate hikes, the Bank of Israel's interest rate amounted to 9.1 percent at the end of 2002 compared with 3.8 percent at the beginning of the year.

We will begin our analysis of monetary policy in 2002 by reviewing the background economic conditions prevailing during the year, conditions that were affected by factors unique to the Israeli economy and by worldwide developments.

The global economic slowdown continued in 2002, both in the American market and in the European market, although there were some signs of an end to the recession. The slowdown was accompanied by a price slide in the world's capital markets and by a large decrease in investment. The global slowdown aggravated the recession in the Israeli economy, which suffered from a fall in exports and investments due to the contraction of world trade. The export-oriented industries were badly hit by the world crisis due to the reduced demand for their products. The high-tech industries were also badly affected as a result of the difficulty in raising capital and the large drop in foreign investment on which they had relied for financing their activity. The output of the traditional industries suffered as well due to the increased prices of imports and raw materials, and the fall in domestic demand.

The political and security situation also affected economic activity. The increasingly violent intifada continued to harm incoming tourism, leading to a drop in demand in sectors connected to the tourism industry, and adversely affected industries that relied on workers from the Palestinian Authority. Since the extent of security and political stability influences economic stability, it is among the considerations that guide the investment decisions of foreign investors.

In the area of fiscal developments, following the large upward deviation in the budget deficit in 2001 (4.5 percent of GDP compared with a planned deficit of 1.75 percent of GDP) a decision was taken to revert to fiscal restraint at the beginning of 2002 concurrent with a monetary expansion. However, fiscal expansion continued in 2002, leading to a large budget deficit of 4 percent of GDP and to a repeated increase in the multi-year deficit target. (The target for 2002 was raised from 1.5 percent of GDP in the original budget to 3.9 percent of GDP in May 2002.)

The increase in the multi-year deficit target further undermined the government's multi-year commitment to reduce the budget deficit over a number of years to the economic norm accepted in developed economies. The growth in the deficit was accompanied by a large increase in issues in the local bond market, which led to a rise in long-term yields. These yields rose sharply, mainly in the first half of the year, but remained high in the second half as well. The fiscal expansion was also reflected by a considerable growth in the government debt to 103 percent of GDP, following a downtrend in this ratio since 1985 to a level of 89 percent of GDP in 2000. As a result of the deteriorating fiscal situation, two credit rating companies reduced their rating of the economy's internal debt, and it was feared that the economy's external debt rating would be lowered as well. This apprehension pushed up the premium demanded for loans to the Israel Government, on which the interest rates serve as a benchmark for interest rates on loans in the private sector.

The shekel-dollar exchange rate rose by 9.8 percent in 2002. The development of the exchange rate was not uniform in the course of the year. The shekel depreciated by 15.5 percent during the first half due to the contraction of the interest rate differentials and to continued external and internal shocks, and especially the increased fiscal uncertainty and security-related uncertainty. During the second half of the year, following the Bank of Israel's interest rate hikes and a curtailment of the increasingly rapid fiscal expansion, the markets were relatively calm and the shekel appreciated. An exception was September, when it was feared that the economy's credit rating would be reduced, and the period towards the end of the year, when the markets were affected by apprehension regarding the implications of a possible American attack on Iraq. The shekel appreciated by 5 percent during the entire second half of the year. The large depreciation of the shekel during the first half of the year affected the development of prices, which rose by 6.5 percent as stated. During the second half of the year, the appreciation of the shekel contributed to a moderate rate of price increase. Although prices rose despite the recession in the economy, the rate of increase was less than that in the exchange rate, apparently due to a partial absorption of the depreciation by firms as a result of the continued recession in the economy.

2. MONETARY POLICY IN 2002

The principal instrument that the Bank of Israel uses to attain the inflation target is the monetary interest rate that it pays to the commercial banks on their deposits (which are allocated in tenders). (These deposits are not regarded as a fulfillment of the banks' liquidity requirements.) This interest rate affects inflation via several channels—aggregate demand, inflation expectations and the exchange rate. The interest rate has a delayed effect on prices, the intensity and timing of which is not always possible to predict. It should also be remembered that external shocks affect local prices in an open economy.

Monetary policy is intended to offset and neutralize fluctuations and shocks in the economic variables within and outside the economy. The function of monetary policy is to provide the business sector with a convenient environment for its activity, principally by maintaining price stability.

Monetary policy operates within the framework of multi-year inflation targets set by the government, and is directed at attaining the targets for the coming two years—the span of time in which it has an impact—and also takes into account developments that are expected in the longer terms. If a mismatch arises between short-term and long-term developments, a flexible policy approach is adopted. This is in order to prevent the emergence of conditions in which frequent changes of policy are required, which could undermine financial stability (see Chapter 1 for details). The extent of flexibility required is dependent on the public's credibility in policy-makers' ability to implement the monetary policy that is necessary for achieving price stability.

The Bank of Israel raised the interest rate five times in 2002, by a cumulative rate of 5.3 percentage points. During the first five months of the year, the Bank of Israel raised the interest rate twice, by a cumulative rate of 0.8 percentage points, followed by another three interest rate hikes in June and July (one of which was not at the scheduled date), by a cumulative rate of 4.5 percentage points. From July, the interest rate remained unchanged at 9.1 percent. This compares with the reduction in the interest rate between 1999 and 2001, during which period the rate was cut from 13.5 percent in December 1998 to 3.8 percent in December 2001 (Table 2.1).

In order to examine the monetary policy that the Bank of Israel adopted in 2002 against a background of a large increase in prices following low inflation during the previous three years, we need to study the different indicators of inflation, macroeconomic conditions and the situation in the financial markets, all of which guided policy-makers' decisions. We should also remember that interest rate decisions are made on the basis of a policy that looks to the future, meaning that the decisions take account of future developments in inflation expectations. Past developments are only relevant to the extent that they affect the assessment of future developments.

Monetary policy decisions are largely made on the basis of an examination of inflation expectations relative to the inflation target. Generally, when assessments of future inflation are above the inflation target, the Bank of Israel raises the interest rate in order to adhere to the target, and when the forecasts are lower than the inflation target, it lowers the interest rate. Although the Bank of Israel publishes its decision regarding the interest rate for the coming month, this interest rate is part of an assessed interest-rate course that is intended to bring inflation expectations for one-two years close to the targeted range of inflation. The entire range of indicators is analyzed before each interest-rate decision is made, and the interest-rate course is adjusted on the basis of this new analysis.

Since all the relevant information available is incorporated in inflation expectations, these expectations are based on numerous indicators (the main indicators are detailed in Section 3 below): inflation expectations for the different terms that are derived from

Table 2.1
Nominal and Real Interest Rates, Inflation Expectations, and Price Increases, 1995–2002

	Nominal monetary interest rate[a]	Inflation expectations[b]	Real interest rate[c]	Real yield on CPI-indexed bonds[d]	Consumer price index[e]	Consumer price index[f]
1995	15.6	10.6	4.5	4.3	8.1	
1996	16.3	11.6	4.2	4.4	10.6	
1997	14.7	9.1	5.1	4.0	7.0	
1998	12.6	6.2	6.0	5.0	8.6	
1999	13.0	5.3	7.4	5.3	1.3	
2000	9.8	2.5	7.2	5.8	0.0	
2001	7.1	1.9	5.1	4.7	1.4	
2002	7.3	3.3	3.9	4.7	6.5	
2001						
January	8.4	1.4	7.0	5.9	–0.1	–6.8
February	8.1	2.0	6.0	5.5	0.3	–1.2
March	7.9	2.0	5.8	5.3	0.7	2.4
April	7.6	1.3	6.2	5.2	1.2	11.4
May	7.6	1.2	6.3	4.9	0.7	4.9
June	7.3	1.8	5.5	4.4	0.7	3.6
July	6.8	2.1	4.6	4.2	0.8	4.8
August	6.6	2.9	3.6	4.2	1.7	3.6
September	6.6	3.5	2.9	4.0	2.5	2.4
October	6.6	2.3	4.1	4.3	2.0	1.2
November	6.4	1.3	5.0	4.5	1.4	–6.8
December	5.6	1.6	4.0	4.1	1.4	–1.2
2002						
January	4.0	2.9	1.2	3.0	3.1	13.8
February	4.0	3.1	0.8	3.0	4.0	9.8
March	4.6	2.4	2.2	3.9	4.3	6.0
April	4.6	3.4	1.3	4.2	5.0	20.1
May	4.9	4.5	0.4	4.2	5.5	12.0
June	7.3	5.0	2.2	4.6	6.6	16.9
July	9.7	2.7	6.7	5.6	6.9	8.1
August	9.6	2.0	7.5	5.6	6.2	–4.3
September	9.6	3.0	6.5	5.7	6.4	4.5
October	9.7	4.0	5.5	5.7	6.9	8.0
November	9.6	3.6	5.8	5.6	6.7	–9.4
December	9.6	2.8	6.7	5.4	6.5	–3.3

[a] Period averages; in effective annual terms.
[b] Period averages; for the next 12 months.
[c] Period averages; nominal interest rate on Bank of Israel tenders *less* inflation expectations.
[d] Period averages; gross yield to maturity for all terms.
[e] During the period; the change in monthly data represents an increase over the same month in the previous year.
[f] Monthly average, in annual terms.
SOURCE: Monetary Department, Bank of Israel and Central Bureau of Statistics data.

the capital market and from forecasters' assessments, the foreign currency market, fiscal policy, returns in the capital market, the monetary and credit aggregates and real activity. These indicators are analyzed by means of scenarios calculated from the econometric models developed at the Bank of Israel, and on the basis of judgmental considerations. Due discretion needs to be employed in these considerations, because differing assessments of future interest-rate courses are inherent in the expectations of the development of inflation derived from the different indicators.

The year 2002 began after the 2 percentage point cut in the interest rate at the end of December 2001 to a level of 3.8 percent. This resulted from a consensus between the Bank of Israel and the government regarding a change in the components of macroeconomic policy, whereby monetary restraint was to be reduced while the government would increase its fiscal restraint. This was intended to attain the inflation target while maintaining low interest rates for all terms. The main objective was to extricate the economy from the recession, by encouraging employment and growth. It was presumed that the change in the composition of macroeconomic policy would lead to a one-time increase in prices in the short term concurrent with a real depreciation, without harming financial stability and price stability in the long term.

The interest rate cut was followed in January and early February by a depreciation of the shekel and by a rise in inflation expectations to within the targeted range. Although the exchange rate and inflation expectations stabilized and then fell later in the first quarter, in the second quarter of the year the shekel depreciated and it was feared that the depreciation would have a continuing effect on prices. This was due to the loss of government control over the budget deficit, the government's failure to abolish draft legislation initiated by individual members of the Knesset that involved significant budgetary outlays, and the draft amendment to the Bank of Israel Law, as well as the uncertainty regarding monetary policy following the reduction in the interest rate. This apprehension also derived from the deterioration in the security situation, which led to increased uncertainty in the financial markets as reflected *inter alia* by a large rise in yields on government bonds and long-term interest rates, despite the low short-term nominal interest rate. Inflation expectations for all terms increased, and exceeded the upper limit of the inflation target. These developments reflected the reduced credibility of macroeconomic policy in the eyes of the public due to the failure to implement the decision to adopt a policy of fiscal restraint, and the deviation from the monetary policy of gradual cuts in the interest rate. The developments in question indicated that inflation expectations for the current year and for coming years were higher than the multi-year inflation target. As a result of these developments, the Bank of Israel raised the monetary interest rate for March by 0.6 percentage points, following a declaration of its steadfast commitment to restore the economy to a path of price stability. The foreign currency market became relatively calm after this interest rate hike, and inflation expectations fell back down to within the targeted range in March. As a result, it was believed that the one-time adjustment to a new interest rate environment was complete, and that the price increase would not push up the level of inflation.

The security situation became even more serious in April, when Operation Defensive Shield was launched, and the fiscal situation continued to deteriorate. These developments and the government's attempt to enact a law impairing the Bank of Israel's ability to maintain price stability led to a depreciation of the shekel, to a further rise in yields in the bond market, and to a rise in inflation expectations for the current year and the coming years. In view of the assessment that the rise in inflation expectations was temporary, and mainly derived from the security situation and its implications, the Bank of Israel decided to make do with a moderate increase of the 0.2 percentage points in the interest rate for May. This rate hike was meant to show that the Bank of Israel intended to continue directing its efforts at achieving price stability, and at reducing inflation expectations without resorting to a large rise in the interest rate.

However, this interest rate hike failed to restore stability to the markets and the upsurge in inflation was not halted in May, despite the government's announcement of an emergency fiscal program. The upward deviation from the long-term inflation target increased as the level of uncertainty in the markets rose, the shekel depreciated even more, and yields on government bonds surged. In addition, the public continued to liquidate their shekel deposits and directed their investments towards foreign currency assets. In order to bring inflation expectations back down to within the targeted range and stabilize the markets, the Bank of Israel raised the interest rate by one percentage point at the beginning of June.

But even this interest rate hike failed to restore stability to the markets. At the beginning of June, new indicators showed that the chances of achieving an environment of price stability were becoming increasingly remote. These indicators included a rise in inflation expectations for the coming years derived from the capital market and forecasters' assessments, a rapid and continued depreciation of the shekel, increased uncertainty resulting from the deteriorating security situation, and the rise in long-term interest rates, which pointed to a relaxation of fiscal discipline. Inflation expectations at the time were double the lower limit of the targeted range of inflation. As a result of these developments, the Bank of Israel raised the monetary interest rate on June 11 by 1.5 percentage points. (This was before the scheduled date for the monthly interest rate announcement.)

But in view of the reduced stability in the financial markets and reduced price stability, the interest rate hikes that were intended to bring inflation expectations back within the targeted range were clearly inadequate, and a further rise in the interest rate was necessary in order to calm the markets. Given the continued erosion of credibility in macroeconomic policy since the beginning of the year, a more resolute policy appeared to be necessary in order to halt the upsurge in inflation expectations. Accordingly, the interest rate was raised by another 2 percentage points at the beginning of July, leading to a cumulative rate hike of 4.5 percentage points within a month, to a level of 9.1 percent.

Following these rate hikes, the markets were calm in July and August, the shekel appreciated, inflation expectations fell (although not to within the limits of the targeted range of inflation), and yields on government bonds also fell. Inflation expectations

therefore appeared to be reverting to within the targeted range. Nevertheless, the uncertainty in the markets remained high.

In September however, inflation expectations rose again, mainly due to the reduction in the rating of the three largest banks and doubts regarding the approval of the 2003 budget, leading to fears that Israel's debt rating would be reduced. The possibility of war with Iraq and its implications were also a source of increased anxiety. All these factors were reflected by a renewed depreciation of the shekel, a rise in the inflation expectations derived from the capital market and from forecasters' assessments, and by a rise in bond yields.

Although inflation expectations fell during the last quarter of the year, these only reverted to within the targeted range towards the end the year. The decline in inflation expectations was not consistent: Various factors, including the threat of war in Iraq and the geopolitical situation in Israel, halted the downturn in inflation expectations by increasing the uncertainty in the markets. As a result, the Bank of Israel decided not to change the interest rate during the second half of the year, and left it at a level of 9.1 percent. In January 2003, since inflation expectations had returned to within the targeted range, the Bank of Israel cut the interest rate by 0.2 percentage points, the first decrease since the interest rate hikes in mid-2002.

Actual inflation exceeded the inflation target to a considerable extent in 2002, after three years when actual inflation had been lower than the targeted level. The initial upward deviation from the target can be attributed to the monetary expansion caused by the 2 percentage point cut in the interest rate, which was not accompanied by a fiscal contraction, despite the decision to adopt such a measure. The fiscal expansion and the deterioration in the security situation led to a continued depreciation of the shekel, and also undermined the stability in the financial markets. The rise in the exchange rate was reflected by a price increase, which was accentuated by the indexation mechanisms that operate in the economy. The reduced credibility of macroeconomic policy resulting from a combination of fiscal policy, which repeatedly failed to adhere to defined objectives, and monetary policy, which in December 2001 deviated from the tendency towards a gradual adjustment in the interest rate, made it difficult to restore stability to the markets. In the first half of the year, the government's attempt to muzzle the policy of maintaining price stability by presenting a bill to amend the Bank of Israel Law also reduced the credibility of macroeconomic policy as viewed by the public. During the initial months of the year, it was difficult to tell whether the price increase was a temporary phenomenon, resulting from an adjustment to policy changes, or a continued upsurge in inflation. The Bank of Israel therefore decided to raise the interest rate in a series of moderate increases (for March and May), assuming that the markets would stabilize. Only when it became clear that these moderate rate hikes were ineffective and after the government announced an emergency program that revealed a more resolute intention to revert to fiscal restraint but also failed to calm the markets, did the Bank of Israel opt for a sharp rise in the interest rate. While this did indeed restore stability to the markets, it was not possible to adhere to the inflation target for 2002 due to the fact that monetary policy affects prices with a lag.

It is difficult to assess the hypothetical course of economic developments that might have occurred in 2002 had the government actually implemented the fiscal restraint that was decided in December 2001. At the time however, when inflation expectations were below the inflation target and the government had decided to implement fiscal restraint, policy-makers believed that a reduction in the interest rate would enable inflation to be maintained within the targeted range and allow interest rates to be cut for all terms, which would thereby help to end the recession without harming price stability and financial stability. But in the event, the previously mentioned factors disturbed the balance in the currency and money markets, and concurrent with the erosion of credibility of macroeconomic policy, led to a large rise in prices during 2002. This development proved that despite the modest level of price increases during the previous three years, low inflation was a quite new, and therefore fragile phenomenon in the Israeli economy that has such a long history of inflation. The actual scenario mainly derived from the strong indexation mechanisms that still operate in the economy, and the strong pass-through from the exchange rate to prices. Credibility of fiscal and monetary policy is therefore extremely important. A policy of moderate and gradual adjustments in the interest rate, even in periods that appear to be stable, could enhance credibility and could thereby also contribute to financial stability and price stability.

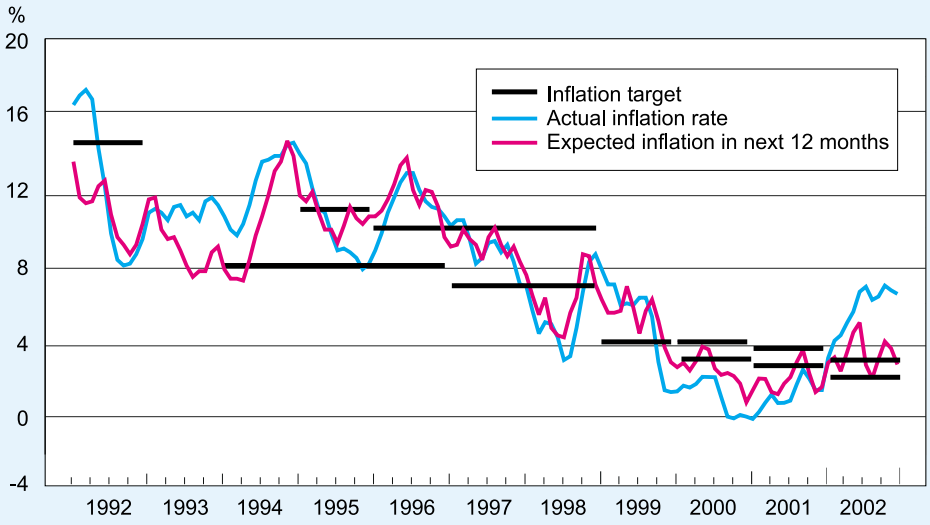
3. INDICATORS OF PRICE DEVELOPMENTS

As previously mentioned, monetary policy is managed in accordance with assessments regarding the development of inflation expectations. For as long as inflation expectations exceed the inflation target, the Bank of Israel will tend to raise the interest rate, and *vice versa*. If inflation expectations are below the target, the Bank of Israel will tend to reduce the interest rate. The expected inflation environment is assessed every month by a range of indicators and by means of models developed at the Bank itself, which examine the development of prices in response to different scenarios of monetary policy and economic developments. The indicators available do not always point in the same direction; nor is the importance attributed to them in the assessment of inflation necessarily uniform, and may change from time to time in line with the changing economic environment. The development of actual inflation has more than once differed from forecast inflation due to unexpected factors and developments. Nevertheless, an interest rate adjustment policy based on an assessment regarding the development of inflation expectations is the best mode of operation. The assessment of inflation expectations is based on several indicators as stated. We will present these indicators below, and will describe their development during 2002.

a. Twelve-month inflation expectations

One of the main indicators used for assessing inflation expectations is the level of inflation expectations for twelve months ahead, derived from the difference between the yields on unindexed securities (Treasury bills), and yields on CPI-indexed bonds (Galil and Sagi bonds).

Figure 2.1
Inflation Rate: Targets, Expectations, and Actual,[a] 1992–2002

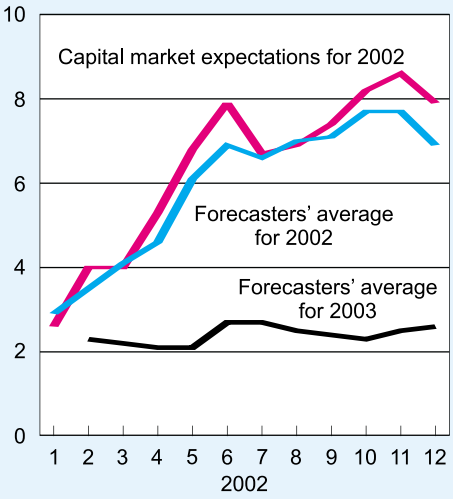


[a] Actual inflation, price rises in previous 12 months. Expected inflation, from capital market.
SOURCE: Based on CBS data and the Monetary Department, Bank of Israel.

Inflation expectations during 2002 were highly volatile, and were not characterized by any uniform trend. At times, expectations exceeded the inflation target while in other periods they reverted to within the targeted range of inflation. Volatility and the absence of a clear trend are indicative of uncertainty over the resumption of a course of price stability.

At the end of 2001, when the interest rate was cut by 2 percentage points, inflation expectations were below the lower limit of the inflation target. Following the cut in the interest rate, which was intended *inter alia* to bring inflation expectations back within the targeted range, expectations in January and February rose to the upper limit of the inflation target and actually exceeded this limit. In March, after the interest rate had been raised, inflation expectations fell to the center of the targeted range and averaged 2.4 percent (Figures 2.1 and 2.2). This decrease appeared to mark the end of a one-time adjustment of expectations to the low level of the interest rate, supporting assessments that the price increase since the beginning of the year would not develop into an inflationary spiral.

Figure 2.2
Inflation Expectations Derived from Capital Market and Forecasters' Predictions for 2002 and 2003



SOURCE: Based on forecasters' reports.

However, inflation expectations rose from April and peaked at an average level of 5.6 percent in mid-June, way above the upper limit of the inflation target. The upsurge in expectations mainly derived from the rise in the exchange rate (by 7 percent during that period), against the background of the uncertainty in the economy resulting from the excessive growth in the budget deficit and the deterioration in the security situation. In a situation where credibility in monetary policy has eroded, shocks in the financial markets are more rapidly and more strongly translated into changes in prices or expectations of such changes. The publication of several high monthly indexes also has the effect of increasing inflation expectations, due to their adaptive nature.

During July and August, the interest rate hikes made at the end of the first half of the year led to a decline in inflation expectations towards the middle of the inflation target and to a stabilization of the financial markets. But in the second half of September and in October, expectations rose again to above the inflation target, to an average rate of 4 percent. This resulted from the credit rating companies' reduction of their rating of Israel's three largest banks, and from apprehension that the credit rating of the country itself would also be lowered. This was in addition to the uncertainty regarding the approval of the 2003 budget and the continuing state of uncertainty with respect to the security situation.

In November expectations fell again as the markets calmed, a development that mainly resulted from the decision to call early elections and the postponement of the attack on Iraq. In December, expectations reverted to within the targeted range and averaged 2.8 percent.

The inflation expectations derived from Treasury bill yields may have been upward biased during the second half of the year due to the Treasury bills' taxation advantage in 2003 (see Chapter 4). Although the level of inflation expectations at the end of 2002 was similar to that at the beginning of the year, the expectations at the end of the year derived from nominal and real interest rates that were considerably higher than those at the beginning of the year. This reflected the high level of uncertainty that prevailed during the year, as well as the fiscal expansion and high risk premium, which led to skepticism (during the first half of the year) over the ability to maintain price stability and financial stability.

b. Long-term inflation expectations

Inflation expectations for long terms (up to 10 years), are derived from the yield differential between Shahar unindexed bonds, and Galil and Sagi CPI-indexed bonds (Figures 2.3 and 2.4). The inflation expectations derived in this manner include an inflationary risk premium that is likely to increase in proportion to the term of the expectations.

Inflation expectations for long terms were also highly volatile, and exceeded the inflation target for most of the year. The development of long-term expectations reflected

the uncertainty prevailing in the markets during the year, and reduced confidence in the ability to revert to a course of long-term price stability.

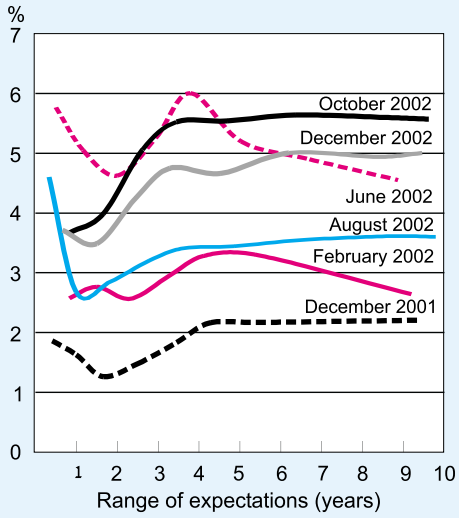
At the beginning of the year, following the interest rate cut, inflation expectations for short terms (a year to 3 years) and medium terms (6 to 10 years) rose—the latter to above the upper limit of the inflation target. However, expectations for long terms (7 to 10 years) fell slightly and their average level was in the middle of the multi-year target. During the second quarter of the year, as a result of the excessive budget deficit, the deterioration in the security situation and the depreciation of the shekel, expectations for all terms increased, peaking in June, and continued to rise even after the interest rate hikes. Expectations reached an average of 5.3 percent in short terms, 4.8 percent in medium terms and 3.6 percent in long terms, far above the inflation target.

The markets became calmer after the interest rate was raised in July. Inflation expectations for all terms fell in July and August, although they ranged between 3–4 percent, which was still above the upper limit of the inflation target.

When uncertainty increased in September as a result of the threatened reduction in Israel's credit rating, inflation expectations began to rise and peaked in October at 5.3–6 percent, higher than the level recorded in June.

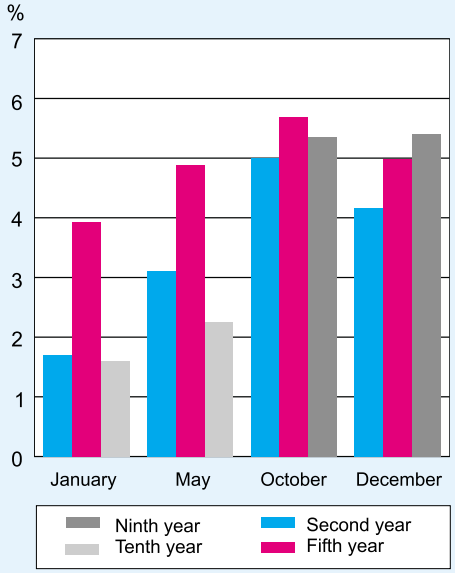
Expectations only fell again when the markets calmed in November and December. But even at the end of the year, they were still above the inflation target, at levels of 3.6–6 percent in short terms,

Figure 2.3
Inflation Expectations Derived from Capital Market, 2001–2002



SOURCE: Monetary Department, Bank of Israel.

Figure 2.4
Inflation Expectations from Capital Market for Long Terms, 2002



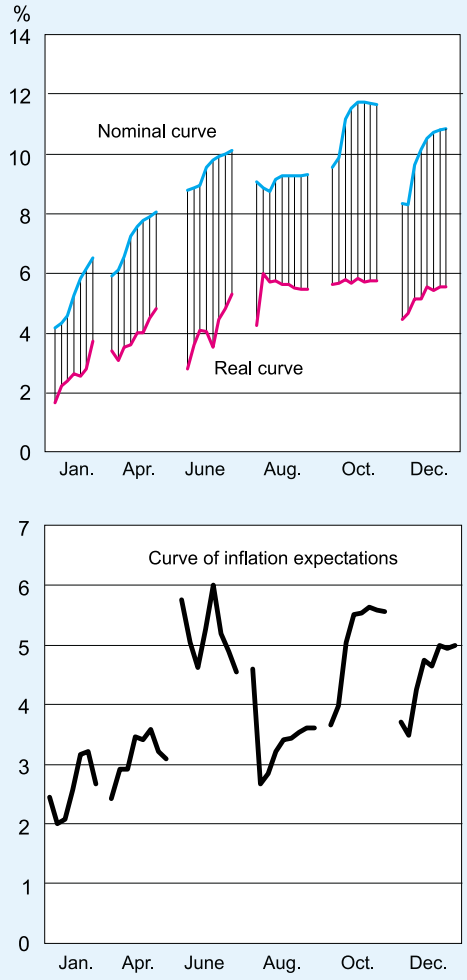
SOURCE: Monetary Department, Bank of Israel.

5–6 percent in medium terms and 4.8–5.4 percent in long terms.

The high degree of volatility in inflation expectations, the rise in these expectations above the upper limit of the inflation target in response to the previously mentioned developments, and especially the rise in expectations for medium and long terms, were indicative of the reduced credibility in the eyes of the public regarding policymakers' ability to restore price stability.

An examination of the contribution of unindexed and CPI-indexed bonds to inflation expectations shows that most of the rise in inflation expectations during the second half of the year derived from a rise in yields on unindexed bonds, while yields on CPI-indexed bonds remained largely unchanged (Figure 2.5). This difference may reflect the growth in the risk premium in the course of the year, which mainly resulted from increased uncertainty and reduced credibility of macroeconomic policy.

Figure 2.5
Inflation Expectations Curve, and its Nominal and Real Components, 2002



SOURCE: Monetary Department, Bank of Israel.

c. Private forecasters' assessments

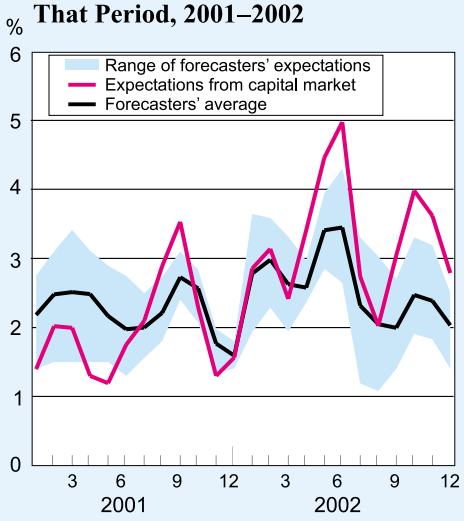
Private forecasters' assessments for 12 months ahead were within the targeted range of inflation for most of the year, and were considerably lower than the expectations derived from the capital market. However, they showed a similar trend to the capital market's expectations, rising in certain months and falling in other months.

Forecasters' assessments rose during the initial months of the year in an adjustment to the low interest environment following the interest rate cut, continued to rise during the second quarter due to the depreciation of the shekel (which mainly resulted from a deterioration in the security situation and the excessive budget deficit), and also rose in October, as a result of the increased uncertainty in the markets prompted by the threatened reduction in Israel's credit rating. But only in May and June did private forecasters' assessments slightly exceed the upper limit of the inflation target, at an

average of 3.4 percent. During the remaining months of the year, their assessments ranged between 2 and 3 percent.

Forecasters' assessments of inflation for 2003 were relatively stable for the whole year, and ranged between 2.1 and 2.7 percent, within the long-term inflation target despite the volatility and uncertainty in the local and worldwide capital markets. This reflected the assessment that the price increase was a one-time phenomenon that would not lead to a rise in inflation in longer terms (Figure 2.2).

Figure 2.6
Inflation Expectations for 12 Months Ahead Derived from Capital Market and Forecasters' Expectations for That Period, 2001–2002



SOURCE: Based on forecasters' reports.

A comparison of forecasters' assessments with the inflation expectations derived from the capital market for 12 months ahead shows that on average, the latter were much higher than the former during the year (Figure 2.6), and that the difference between them increased in those months when a large rise in expectations was recorded (April–June, September and October). During these periods, the expectations derived from the capital market were higher than the entire range of forecasters' assessments. A typical phenomenon in recent years is that expectations derived from the capital market are higher than private forecasters' assessments during a period of rising inflation expectations, and lower than forecasters' assessments when the markets are calm and relatively stable. It therefore appears that the capital market reacts more rapidly and sometimes more strongly to new information and to situations of uncertainty. Accordingly, the gap between market expectations and private forecasters' assessments may reflect the risk premium that investors demand in the markets.

An examination of the variability[1] of forecasters' assessments for 12 months ahead shows an increase in the variability between them during the second half of the year. The variability also rose during periods when forecasts decreased, in contrast to previous years when lower forecasts were usually characterized by a lower degree of variability. The increased variability of forecasters' assessments, which was also reflected by an increase in the range of these assessments, is a further indication of the high level of uncertainty that prevailed in the markets during 2002.[2]

[1] The concept of variance is the normalized variance – divided by the average, in order to allow for differences in the level of inflation between different periods.

[2] The number of forecasters has increased recently. Since the frequency with which each forecaster updates his assessments differs, this may be another reason for the increased variability between their assessments.

Table 2.2
Indicators of Inflation, 2001–2002

	CPI[a]	Inflation expectations derived from capital market: For coming year[b]	Inflation expectations derived from capital market: For second year	Inflation expectations derived from capital market: 3–10 years	Forecasters' average	NIS/$ exchange rate	Real interest rate[c]	Money supply M1[a]
	(annual change)	*(percent)*			*(monthly averages)*		*(percent)*	*(annual change)*
2001								
January	–0.1	1.4	1.3	2.0	2.2	4.12	7.0	6.5
February	0.3	2.0	1.0	2.0	2.5	4.12	6.0	11.2
March	0.7	2.0	1.1	2.1	2.5	4.16	5.8	13.9
April	1.2	1.3	1.9	1.9	2.5	4.18	6.2	12.5
May	0.7	1.2	1.7	1.9	2.2	4.14	6.3	13.7
June	0.7	1.8	1.8	2.0	2.0	4.16	5.5	13.4
July	0.8	2.1	2.8	2.1	2.0	4.20	4.6	14.9
August	1.7	2.9	2.0	2.7	2.2	4.23	3.6	16.3
September	2.5	3.5	3.7	3.2	2.7	4.32	2.9	18.5
October	2.0	2.3	2.8	2.7	2.6	4.31	4.1	16.7
November	1.4	1.3	1.6	2.2	1.8	4.24	5.0	16.2
December	1.4	1.6	1.1	2.5	1.6	4.28	4.0	15.4
2002								
January	3.1	2.9	1.7	2.9	2.8	4.54	1.2	23.9
February	4.0	3.1	2.7	2.7	3.0	4.66	0.8	25.9
March	4.3	2.4	3.0	2.4	2.6	4.66	2.2	25.9
April	5.0	3.4	3.2	3.1	2.6	4.81	1.3	21.7
May	5.5	4.5	3.1	3.7	3.4	4.89	0.4	23.2
June	6.6	5.0	4.1	4.5	3.4	4.94	2.2	21.8
July	6.9	2.7	2.6	3.9	2.3	4.72	6.7	14.6
August	6.2	2.0	3.1	3.8	2.0	4.68	7.5	10.8
September	6.4	3.0	3.6	4.8	2.0	4.78	6.5	7.7
October	6.9	4.0	5.0	5.9	2.5	4.80	5.5	5.3
November	6.7	3.6	4.8	5.7	2.4	4.69	5.8	6.3
December	6.5	2.8	4.2	5.3	2.0	4.69	6.7	5.4

[a] Annual rate of change, each month compared with same month in previous year.
[b] For next 12 months.
[c] Nominal interest rate on Bank of Israel tenders *less* inflation expectations.
SOURCE: Monetary Department, Bank of Israel and Central Bureau of Statistics data.

d. Fiscal policy

The total budget deficit in 2001 considerably exceeded its targeted level of 1.75 percent of GDP, and amounted to 4.5 percent of GDP. At the end of that year, the planned macroeconomic policy mix was changed as the Bank of Israel cut its interest rate concurrent with a fiscal contraction. At the same time, the planned deficit for 2002 was raised to 3 percent of GDP. This was after the deficit target had already been raised from 1.5 to 2.4 percent of GDP in the original budget plan for the year.

Although a policy of monetary expansion was adopted at the end of 2001, when the interest rate was cut by 2 percentage points, the government did not implement the fiscal contraction that had been agreed. It was already clear in the first half of the year that the actual budget deficit would considerably exceed its targeted level. As in the previous year, this was due to the growth in defense spending resulting from the deterioration in the security situation, and to the decline in tax revenue as the recession became increasingly serious – a development that in 2002 was reflected by a decrease in real wages and a drop in firms' profitability.

At the end of the first half of the year, the government adopted a series of measures aimed at increasing the targeted level of the budget deficit for 2002 to 3.9 percent of GDP (and waiting until 2007 before reducing the deficit to 1 percent of GDP), reducing government spending by NIS 5.7 billion, and at achieving a growth in tax revenue by increasing tax rates. The total budget deficit amounted to 4 percent of GDP in 2002, which was in line with the new target.

The government's failure to play its designated role in the program that was compiled at the beginning of the year, the large fiscal expansion, and the frequent increase in the multi-year budget deficits eroded the public's credibility in government policy. These developments were also reflected by the instability that was characteristic of the financial markets, by the rise in government bond yields, and by the large increase in the debt/GDP ratio. The end result was a reduction in the economy's internal debt rating, and apprehension that its external debt rating would be lowered as well.

Monetary expansion concurrent with increased government borrowing led to a considerable rise in the slope of the nominal and real yield curve, which reflected the situation of a low short-term interest rate that was not supported by a low long-term interest rate. A yield curve as steep as this obviously implies inflationary pressures, by encouraging the taking of short-term credit (including that deriving from central bank sources) for financing the purchase of long-term financial assets, a phenomenon implying a persistent monetary expansion. The fiscal expansion in the first half of the year thereby contributed to an exceptional price increase (*inter alia* by undermining the stability of the foreign currency market). As a result, it was not possible to maintain the monetary expansion that was agreed at the beginning of the year without harming price stability during the current year and in the coming years.

Despite the government's decision at the beginning of 2002 to restore fiscal restraint, after the budget deficit had considerably exceeded its targeted level during the previous year, the government's policy measures actually led to a fiscal expansion and a large growth in the budget deficit, similar to that in 2001. In 2002 as in the previous year, the budget was based on unrealistic assumptions, and there was even a lack of willingness to recognize promptly deviations from the targeted deficit. Moreover, the government made frequent upward adjustments in the deficit targets whenever the initial targets were likely to be exceeded, instead of attempting to reduce the upward deviation by means of a suitable fiscal contraction. At the same time, the government failed to abolish draft legislation initiated by individual members of the Knesset that involved significant budgetary outlays.

Table 2.3
Total Government Debt, 1996–2002

	1996	1997	1998	1999	2000	2001	2002
a. Reserves at end of period			*NIS billion, current prices*				
1. Internal debt	245.2	268.3	295.9	307.7	305.2	326.2	372.0
2. External debt	80.4	90.8	112.6	112.7	110.2	119.5	129.5
Total government debt	325.7	359.1	408.5	420.4	415.4	445.7	501.5
b. Debt-GDP ratio			*Percentage of GDP*				
1. Internal debt	78	76	76	72	66	69	77
2. External debt	26	26	29	26	24	25	27
Total government debt	103	102	104	98	89	95	103
c. Total government debt by type of indexation				*Percent*			
1. CPI-indexed	65	65	61	60	58	54	53
of which: Nontradable debt	37	37	35	35	34	33	32
2. Unindexed	7	7	7	9	11	15	18
3. Dollar indexed	4	3	4	5	4	4	3
4. External debt, foreign-currency denominated	25	25	28	27	27	27	26
5. Total	100	100	100	100	100	100	100
d. Average term to maturity of government debt				*Years*			
1. Internal debt	6.6	6.5	6.4	6.3	6.2	6.5	6.6
2. External debt	8.1	7.9	8.0	7.6	7.1	6.9	6.6
3. Total debt	6.9	6.8	6.8	6.6	6.5	6.6	6.6

SOURCE: Bank of Israel, and Central Bureau of Statistics data.

The total budget deficit in 2002 amounted to approximately NIS 19 billion compared with a planned deficit of approximately NIS 14 billion in the original budget plan—an upward deviation of NIS 5 billion that had to be financed. The government finances the deficit by means of domestic borrowing, overseas borrowing and privatization. Overseas borrowing was lower than planned in 2002 because of the higher cost that the Israel Government had to pay for borrowing abroad due to Israel's increased country risk as perceived by foreign investors, and as a result of the slump in the international markets. In addition, privatization receipts were negligible as compared to planned receipts of approximately three billion shekels. The shortfall deriving from these two sources, together with the considerable upward deviation in the budget deficit, forced the government to rely on domestic borrowing. Accordingly, domestic borrowing via issues of tradable bonds[3] totaled NIS 22 billion compared with planned borrowing of only NIS 14 billion. Such a large growth in domestic borrowing within a relatively short period of time, as well as expectations of a future growth in this borrowing, exert an upward pressure on yields and increase the cost of government borrowing, the government debt and the future interest payments on the debt. Since real yields on

[3] The government also raises funds via non-tradable (earmarked) bonds. But due to its obligation to institutional investors, the government cannot control the amount raised via these bonds.

government bonds serve as a benchmark for the pricing of loans in the economy, a rise in these yields increases the cost of finance for the private sector.

Apart from increasing total domestic borrowing, the government changed the composition of new issues by raising the proportion of CPI-indexed bond issues at the expense of unindexed bonds, and by shortening the term-to-maturity of the bonds issued. (See Chapter 4 for details).

The large growth in government borrowing and the low nominal GDP growth rate led to a substantial increase in the government debt from the second half of 2001. At the end of 2002, the debt/GDP ratio reached 103 percent, similar to that in 1996. This canceled out the 14 percentage point cumulative decrease in the debt/GDP ratio from the end of 1996 and until the first half of 2001, when the ratio amounted to 89 percent. The consistent downtrend in the debt/GDP ratio since the 1985 economic stabilization program was thereby reversed (Table 2.3). The economy incurs high interest payments on such a large government debt. In 2002, these payments totaled NIS 24 billion, approximately 5 percent of GDP.

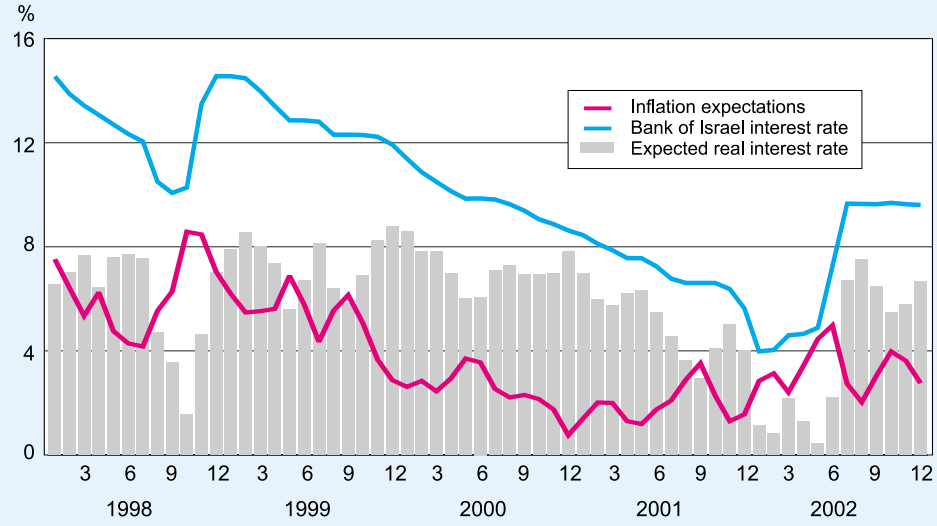
As a result of the deterioration in the fiscal environment, and especially the rise in the budget deficit and the debt/GDP ratio, two international rating companies announced that they were lowering their credit rating for Israel's internal debt from A+ to A. Although the economy's external debt rating was not changed, the rating companies warned that a significant upward deviation from the planned budget deficit for 2002 would lead to a reduction in this rating. A decrease in the government's credit rating leads to a rise in the interest rates that have to be paid on new debt, and also increases the cost of finance for the private sector.

e. The expected real interest rate on Bank of Israel sources and the real yield curve

The expected real interest rate on Bank of Israel sources is derived from the difference between the Bank of Israel's headline interest rate (the nominal interest rate) and the inflation expectations for 12 months ahead that are derived from the capital market. This real interest rate is one of the indications of the intensity of monetary restraint. In 2002, the expected real interest rate fell to an average of 3.9 percent, although the interest rate environment varied between the first and the second half of the year. In the first half of the year, the nominal interest rate was relatively low, and inflation expectations rose during most of the period. These led to a large drop in the expected real interest rate to an average of 1.3 percent, reflecting a slackening of monetary restraint. During the second half of the year, following the nominal interest rate hikes and a decline in inflation expectations, the expected real interest rate rose to 6.4 percent, similar to its rate in recent years–an average of 5.1 percent in 2001 and over 7 percent during the years 1999 and 2000 (Table 2.1 and Figure 2.7).

Another indicator of the extent of monetary restraint is the slope of the real yield curve. Real yields for short terms are mainly affected by the Bank of Israel's interest rate, that is by monetary policy, while yields for the long terms are mainly affected by fiscal policy and the economic growth rate.

Figure 2.7
Bank of Israel Interest Rate, Inflation Expectations,[a] and Expected Real Interest Rate, 1998–2002



[a] For 12 months ahead derived from the capital market.
SOURCE: Monetary Department, Bank of Israel.

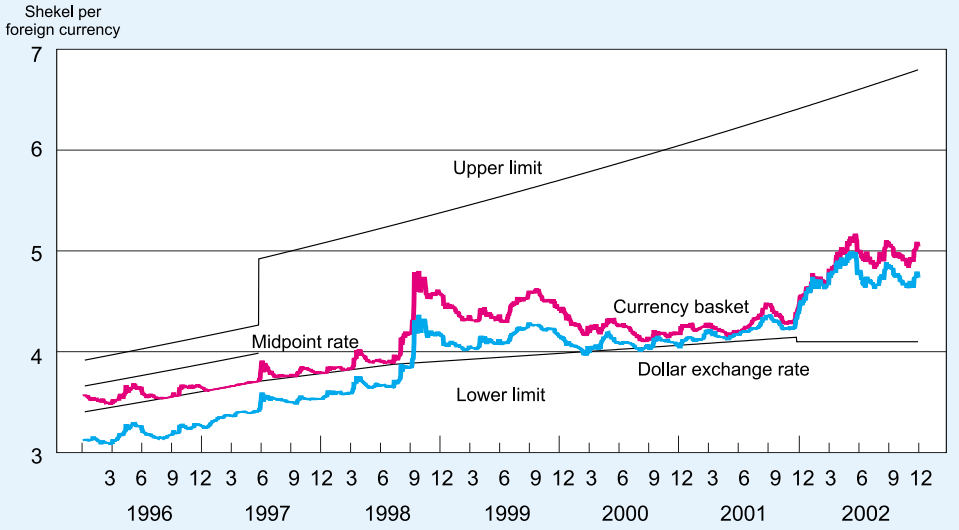
During the first half of the year, the slope of the real yield curve was positive, reflecting a relaxation of monetary restraint. This structure of the curve resulted from the fall in short-term yields at the beginning of the year in line with the reduction in the interest rate, and the rise in long-term yields throughout the entire first half. During the second half of the year, the slope of the yield curve was less steep; negative in the third quarter of the year and moderately positive in the fourth quarter as the extent of monetary restraint increased. The slopes of the curve during the second half of the year resulted from a rise in short-term yields that corresponded to the higher levels of the interest rate. However, long-term yields continued to rise for most of the second half of the year.

It can be seen that the structure of the yield curve was affected by monetary and fiscal policy: Developments in short-term yields were affected by adjustments in the Bank of Israel's interest rate, while the rise in long-term yields resulted from the growth in domestic borrowing. It should be noted in this respect that long-term yields are regarded as highly important due to their impact on the cost of investments in the economy.

f. The foreign currency market, capital movements, and import prices

The exchange rate is affected by interest rate gaps, domestic factors and external factors. In an open economy with unrestricted capital movements, the sensitivity of the exchange rate to these factors increases, and this is apparent from the impact on prices as well: A

Figure 2.8
Exchange Rate of Shekel Against the Currency Basket and the Dollar, 1996–2002



SOURCE: Foreign Exchange Activity Department, Bank of Israel.

growth in the gap between local interest rates and interest rates abroad increases the relative feasibility of local assets and leads to capital imports to the economy, which is reflected by the appreciation of the shekel and *vice versa*. Demand and supply for foreign currency are also affected by the perception of the risk inherent in the economy. A change in the exchange rate affects prices via import prices, the demand for exports and prices of tradable goods that are denominated in or indexed to foreign currency. (See Box 1.1 in the Monetary Department's *Annual Report*, 2001.)

The exchange rate of the shekel depreciated by 9.8 percent against the dollar and by 14 percent against the currency basket during 2002. However, exchange rate developments were not uniform in the course of the year (Figure 2.8). During the first half of the year, the shekel depreciated by 15.5 percent against the dollar and by 18 percent against the currency basket. Following the interest rate hikes, the shekel appreciated for most of the second half of the year (with the exception of September and December) by a cumulative rate of 5 percent against the dollar and 3 percent against the currency basket.

The development of the exchange rate is affected by long-term factors as well as short-term factors. The impact of the former was already apparent before 2002. Long-term factors include net capital exports from the Israeli economy resulting from the worldwide slowdown and the decrease in foreign investment deriving from the slowdown in world markets, as well as increased geopolitical risk. The principal short-term factors affecting the exchange rate were the decrease in the interest rate gap, the deterioration in the security situation, the further weakening of fiscal discipline, and apprehension that the country's credit rating would be reduced. All these factors affected

the relative yield on unindexed shekel and foreign currency assets, and the assessment of exchange rate risk.

The increased perception of risk in the foreign-currency market was reflected by a large increase in buy-sell margins, and in the implied volatility of the exchange rate (the actual volatility and the volatility implied in the shekel-dollar options that are traded in the stock market and in those issued by the Bank of Israel) in comparison with previous years. (See Chapter 4 for details.)

The shekel depreciated by 15.5 percent against the dollar during the first half of 2002 as stated. While the cut in the interest rate and fiscal restraint was expected to lead to some real depreciation, encouraging a shift from public sector activity to the business sector, the actual rise in the exchange rate was larger than expected.

From the beginning of the year and until the middle of February, the shekel depreciated by 7 percent, mainly due to the increase in the relative feasibility of dollar assets as the interest rate gap contracted following the cut in the Bank of Israel's interest rate at the end of 2001. Concurrent with the rise in the exchange rate, the assessment of exchange rate risk increased due to the apprehension created by the deviation from monetary policy and uncertainty regarding the measures that would be taken to stop the rapid depreciation. From February and until the end of March, demand for foreign currency moderated, and the exchange rate of the shekel stabilized. This development resulted from the Bank of Israel's public announcement in February regarding its commitment to maintaining price stability and the risks involved in converting shekel investments to foreign currency investments, and from the 0.6 percentage point rise in the Bank of Israel's interest rate at the beginning of March. From April and until the middle of June, the shekel depreciated again, by the high rate of 8 percent, due to a number of factors: the worsening security situation and Operation Defensive Shield; the slack state of fiscal discipline and the frequent increases in the targeted level of the budget deficit; the attempt to harm the Bank of Israel's commitment to maintaining price stability by means of an amendment to the Bank of Israel Law; the increased feasibility of dollar assets[4] resulting from the decision to tax shekel assets; and apprehension that the economy's credit rating would be reduced. The shekel continued to depreciate even after the one percentage point interest rate hike at the beginning of June, apparently because the public believed that this rate hike was inadequate to compensate for the risk involved in holding shekel assets. The depreciation only ceased after the half a percentage point interest rate hike in the middle of June (which was not at the scheduled date).

Most of the demand for foreign currency at the beginning of the first half of the year derived from households, via mutual funds that invest in foreign currency, and from institutional investors that needed foreign currency in order to invest abroad. Demand from foreign residents was not a dominant factor.

[4] Shekel assets were not taxed before the tax reform while dollar assets were. The taxation of shekel assets reduced the relative feasibility of investing in these assets, and the relative feasibility of dollar assets increased.

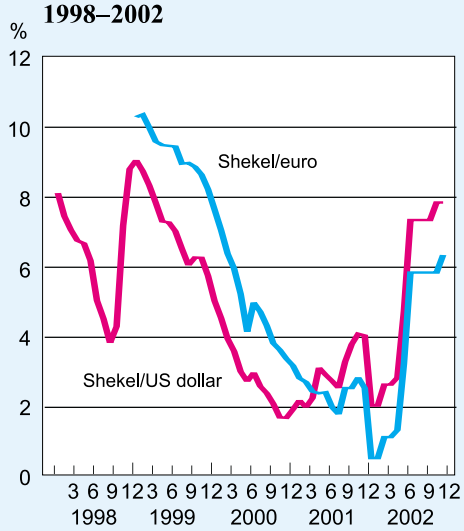
Although the shekel appreciated by 5 percent during the second half of the year, the assessment of the risk inherent in the foreign currency market remained high, and was reflected by the implied volatility in the prices of the shekel-dollar options, both those issued by the Bank of Israel and those traded in the stock market.

Following the interest rate hikes in June and at the beginning of July, the shekel appreciated by 7 percent until the end of August, mainly due to the expansion of the interest rate gap and the reduced assessment of exchange rate risk. The shekel began to depreciate at the end of August and depreciated more rapidly in mid-September due to a wave of terror attacks and growing fears that the international credit rating companies would lower Israel's external credit rating. From the end of August until the beginning of October, the shekel depreciated by 6 percent.

From the beginning of October and in November, the shekel appreciated again, by 5.3 percent. This resulted from the expansion of the interest rate gap following the half a percentage point cut in the interest rate in the USA, and from the reduced level of uncertainty following the US President's declaration of support for the Israeli economy, his expression of willingness to provide Israel with loan guarantees and the international rating companies' decision not to change Israel's external credit rating at the time. In December, the shekel depreciated again, by 2 percent, mainly due to apprehension over the possibility of war in Iraq.

Although Israeli residents' net redemptions of assets from mutual funds specializing in foreign currency following the interest rate hikes affected exchange rate developments during the second half of the year, the exchange rate was mainly affected by foreign residents' activity. After selling foreign currency in September, foreign residents purchased foreign currency in the remaining months of the second half of the year due to their perception of the risk inherent in the Israeli economy (a perception that was influenced by the geopolitical situation, fiscal policy, credit rating and the decrease in non-financial activity), and in accordance with the changes in the interest rate gap.

Figure 2.9
Overnight Interest Rate Gap Between Israel, the USA and Europe,[a] 1998–2002



[a] As of 12.5.2001, *The Economist* stopped publishing the overnight interest rates, and from that date the representative interest is the weekly Libor rate.
SOURCE: *The Economist, Globes,* and Bank of Israel.

Following the interest rate cut of the end of 2001, the gap between the shekel and the dollar interest rate contracted to 2.1 percentage points. During the first five months of 2002, this gap ranged between 2.1 and 2.9 percent as a result of the Bank of Israel's interest rate hikes and the unchanged level of the interest rate in the USA. After the cumulative 4.5 percentage point increase

Table 2.4
The Exchange Rate, Import and Export Prices, and Consumer Prices, 1995–2002

	Basket rate	Dollar rate	Export prices[a]	Import prices[a]	Prices of tradables[b]	CPI
			Change from previous period, annual averages			
1995	4.6	0.0	5.6	11.5	8.4	10.0
1996	3.5	5.9	–1.2	–1.8	4.3	11.3
1997	4.3	8.2	–2.9	–5.1	3.9	9.0
1998	9.6	10.2	–3.2	–6.2	5.0	5.4
1999	8.3	8.9	–1.6	–2.3	6.9	5.2
2000	–4.7	–1.5	–2.3	2.4	–1.5	1.1
2001	1.4	3.1	–1.9	–2.1	1.0	1.1
2002	14.1	12.6	–0.7	–0.2	12.2	5.7
			Change from previous period, last quarter			
1995	3.6	1.2	4.0	7.8	7.2	8.1
1996	4.0	6.3	–1.6	–3.6	3.5	10.9
1997	4.7	8.7	–3.7	–4.9	4.0	8.1
1998	20.9	19.0	–2.7	–5.8	13.9	7.8
1999	–1.7	0.7	–0.4	0.4	0.7	1.9
2000	–7.8	–3.1	–2.7	–0.7	–4.7	0.0
2001	4.2	4.3	–3.5	–3.5	0.7	1.6
2002	13.9	10.5	1.7	5.3	18.1	6.7
			Change from previous period, annual terms			
2000						
I	–20.0	–15.4	–6.1	3.5	–16.7	–3.7
II	–1.7	4.3	–9.7	–4.4	–3.1	3.2
III	–7.5	–3.7	0.2	3.0	–2.2	0.8
IV	–0.7	4.0	5.5	–4.5	4.4	–0.1
2001						
I	7.4	3.6	–4.2	–0.3	1.3	–2.6
II	–3.9	2.4	–5.4	–3.5	–2.3	5.6
III	11.4	9.1	0.6	0.7	9.0	4.0
IV	2.6	2.4	–4.9	–10.5	–4.8	–0.4
2002						
I	31.5	36.4	–2.7	6.1	29.8	6.2
II	31.8	24.3	3.8	12.7	35.2	13.5
III	–3.9	–12.2	4.2	10.2	–6.2	7.0
IV	0.9	0.0	0.9	2.3	2.1	0.5

[a] In dollars.
[b] Average prices of imports and exports *multiplied by* the exchange rate of the dollar.
SOURCE: Bank of Israel and Central Bureau of Statistics data.

in the Bank of Israel's interest rate in June and July, the interest rate gap expanded to 7.4 percentage points in June and in November rose to 7.9 percentage points when the interest rate in the USA was cut by 0.5 percentage points (Figure 2.9).

The depreciation of the shekel during the first half of the year and uncertainty over the future development of the exchange rate were reflected by a large rise in inflation expectations (as detailed in paragraph a.), leading to very real fears of an upsurge in inflation. The pass-through from the exchange rate to domestic prices operates via prices of goods and factors of production that are foreign currency indexed or denominated (including non-tradable goods such as housing), and especially via the prices of imported goods. Import and export prices are known to have a major impact on domestic prices because the proportion of imports and exports to GDP in domestic uses is very high. In addition, many locally produced goods and services are close substitutes for imported goods. These prices are affected by two factors – the exchange rate and worldwide price developments. For the purpose of our discussion, we will define "tradables prices" as the exchange rate of the shekel against the dollar multiplied by the average dollar prices of merchandize exports and imports. There is a positive correlation between the rate of increase in tradables prices and domestic prices. As a result, a high/low rate of increase in tradables prices has the effect of speeding up/ slowing the rate of increase in domestic prices.

Tradables prices rose by the high rate of 12 percent during 2002 (based on data for January-September only) following a moderate one percent increase in 2001. The large increase in 2002 derived from the rise in the exchange rate and the dollar increase in import and export prices from the second quarter of the year (Table 2.4). The dominant impact of the exchange rate on prices was also apparent in most of the previous years, when the index of tradables prices was affected by the trend in the exchange rate, while import and export prices fell or remained largely unchanged.

After two years when the moderate rates of change in tradables prices contributed to a moderate rate of increase in domestic prices, the large price increase in the Israeli economy during 2002 derived from the large rises in tradables prices. This development highlights the strength of the pass-though from the exchange rate to prices, and especially the effect of the depreciation of the shekel on the rise in the consumer price index.

g. The monetary and credit aggregates

The monetary and credit aggregates are another indicator employed in the assessment of inflation expectations (Table 2.5). However, in a regime of inflation targets where the nominal anchor is the inflation target and the monetary policy instrument for obtaining the target is the interest rate, the development of the means of payment is less important than in regimes where the policy instrument is a monetary aggregate. This is because the size of the means of payment is determined by the public's demand, with the result that the mechanism in which excess supply exerts pressure on prices does not exist. Accordingly, even though its development is monitored, the means of payment is not currently regarded as a key indicator of inflation expectations. But in the event of an even temporary deviation from the inflation target, which could loosen the normal network of macroeconomic relationships, the money supply would be more prominent as an indicator.

Table 2.5
Rates of Change in the Monetary Aggregates, 1995–2002

	Total credit to public C3	CPI-indexed credit to public	Unlinked shekel credit C1	Credit in and indexed to foreign currency		Monetary aggregates		Monetary base	Nominal GDP[c]	CPI
				In $ terms	In NIS terms	M1[a]	M2[b]			
1995	38.8	59.6	8.2	70.8	75.4	16.4	36.1	–3.5	17.3	8.1
1996	19.5	22.8	13.4	20.0	26.0	6.7	32.2	19.8	16.2	10.6
1997	17.2	17.1	10.1	14.0	23.0	13.8	24.1	16.4	12.6	7.0
1998	18.7	14.8	20.3	5.3	24.4	11.7	19.1	26.1	10.1	8.6
1999	12.6	10.7	15.1	13.0	13.4	14.3	28.3	15.4	9.2	1.3
2000	10.1	2.9	28.9	9.6	6.7	7.5	19.2	11.5	8.8	0.0
2001	8.5	6.7	11.1	6.8	11.9	15.4	17.0	16.1	1.2	1.4
2002	9.0	6.1	5.5	6.9	17.4	4.9	–4.9	4.3	3.3[d]	6.5
1999										
I	6.6	9.7	16.9	9.4	–5.1	4.1	37.8	7.1		–5.5
II	11.5	8.2	9.8	8.9	15.4	3.9	21.1	9.1		4.3
III	18.9	16.3	7.0	16.7	35.7	30.9	23.8	24.0		5.1
IV	13.7	8.7	28.0	17.2	11.4	20.5	31.1	22.4		1.9
2000										
I	3.5	–2.0	54.2	4.0	–13.5	–11.2	15.1	1.1		–4.8
II	16.0	7.4	15.7	2.3	13.2	16.3	10.1	9.0		6.6
III	11.1	7.7	26.3	5.9	–0.9	12.1	24.4	8.9		–3.3
IV	10.1	–1.3	22.5	28.1	33.6	15.3	28.0	29.0		1.9
2001										
I	7.7	–1.2	18.9	9.5	18.7	12.2	22.4	17.2		–1.9
II	10.9	13.6	10.2	5.8	5.6	14.0	16.2	12.6		6.6
III	13.3	11.9	4.5	14.3	32.9	34.1	18.3	30.1		3.6
IV	2.5	3.4	11.3	–1.8	–6.0	3.5	11.4	5.7		–2.3
2002										
I	15.1	7.4	–3.2	6.4	50.7	58.8	–21.7	26.1		9.8
II	19.2	11.2	7.9	10.0	38.3	0.0	–1.1	8.0		16.3
III	2.8	8.3	6.3	7.7	–5.9	–18.1	9.0	–11.8		2.6
IV	0.2	–2.0	11.7	3.8	–3.1	–7.0	–3.3	–1.6		–1.8

[a] M1: cash and demand deposits.
[b] M2: M1 *plus* NIS term deposits *plus* long-term NIS deposits.
[c] Nominal rate of change in GDP during the year.
[d] Estimate for 2002 based on CBS figures.
SOURCE: Bank of Israel and CBS data.

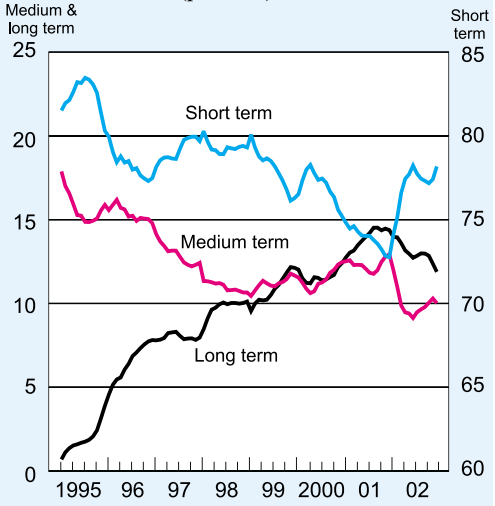
The *M1 money supply* increased by an average of 16 percent in 2002, although its development was not uniform in the course of the year: M1 expanded by 24 percent during the first half, while its rate of increase slowed to an average of 8 percent during the second half. This compares with average growth rates of 14 percent in 2001 and 12 percent during the years 1996-2000. The development of the components of the M1 aggregate also changed in 2002. After the demand deposit component expanded by a moderate 10 percent in 2001, when most of the increase in M1 derived from the cash

component (an average growth of 19 percent), apparently due to a change in commercial norms and a move to cash in transactions with traders from the Palestinian Authority, the trend in both these components was similar during 2002. During the first half of the year, when the Bank of Israel's interest rate remained low at an average of 4.6 percent, the demand deposit and cash components grew by average annualized rates of 25 percent and 23 percent respectively while in the second half, following the interest rate hikes, these components expanded by respective annualized rates of 6 percent and 11 percent.

The *M2* aggregate includes the means of payment (*M1*) and other unindexed local currency deposits. This aggregate contracted by 4.9 percent in 2002 after expanding by 17 percent in 2001, due to the growth in the indexed component of the public's asset portfolio at the expense of the unindexed component. The new trend resulted from the upsurge in inflation (as detailed in Chapter 3) and from the public's move at the end of the year to tax-exempt investments, such as Treasury bills and mutual funds specializing in these assets.

The composition of *M2* reveals the extent of credibility in monetary policy for attaining the inflation target: The longer the term of a deposit, the more the depositor is exposed to inflation risks, especially when the deposit bears a fixed rate of interest. A growth in the weighting of long-term deposits therefore reflects increased credibility of monetary policy. During the years 1999 to 2001, the composition of *M2* was notable for an extension of the term of deposits, while the first half of 2002 saw a liquidation of the *M2* aggregate concurrent with the rise in inflation. This liquidation was reflected by a growth in the proportion of short-term deposits to 78.2 percent of the total aggregate compared with 72.7 percent at the end of 2001, concurrent with a decrease in the proportion of medium-term (three months to one year) deposits and long-term deposits (over a year) to 9.1 percent and 12.7 percent respectively, compared with 12.9 percent and 14.4 percent at the end of 2001. During the second half of the year, when inflation fell to a low rate, the liquidation of the *M2* aggregate was partly offset: The proportion of medium-term deposits rose to 10 percent (Figure 2.10). However, this was at the expense of the proportion of long-term deposits, which continued to fall to 11.9 percent at the end of the year, while the proportion of short-term deposits remained unchanged (although their absolute amount decreased during most of the second half).

Figure 2.10
Term Composition of M2, 1995–2002 (percent)



SOURCE: Monetary Department, Bank of Israel.

Another indicator of the credibility of monetary policy is the ratio between fixed-rate deposits and floating-rate deposits. Since floating-rate deposits protect investors from a change in the interest rate, they effectively contain an element of indexation in contrast to fixed-rate deposits, which expose the investor to changes in the interest rate and inflation. The weight of fixed-rate long-term deposits in total long-term deposits was 48 percent in 2002, similar to that in 2001 (50 percent).

Total credit to the public (*C3*) expanded by 9 percent in 2002, similar to the rate of increase during previous years. Unindexed credit (*C1*) increased by 5 percent in 2002 compared with 11 percent in 2000, while CPI-indexed credit expanded by 6 percent in 2002 compared with 7 percent in 2001.

The weights of the different types of credit changed little. The weight of unindexed credit to total credit fell slightly, from 29.3 percent at the end of 2001 to 28.2 percent. The weight of CPI-indexed credit also fell slightly, from 40.3 percent to 39.1 percent, and the weight of foreign currency denominated and indexed credit (including direct credit from abroad) rose slightly, from 30.5 percent to 32.7 percent.

h. Real activity

The recession in real activity continued during 2002 and was reflected *inter alia* by a decrease in real GDP for the second consecutive year and by a further rise in the unemployment rate. According to macroeconomic theory, a recession in real activity alleviates the pressure on prices if it comes from the demand side, and thereby has the effect of moderating a price increase. In 2002 however, prices rose considerably in comparison with previous years. But were it not for the recession in economic activity, prices might have risen more steeply. The upsurge in inflation despite the recession conditions appears to have derived from firms' relatively low profit margins following one and a half years of recession (which made it impossible for them to absorb the incremental costs resulting from the depreciation of the shekel), and from the concurrent rigidity in real wages in the economy.

The large drop in real activity in the economy during 2002, which was reflected by a negative rate of growth as stated, resulted from the continuation of the global recession and from local factors, principally the worsening security situation. The stagnant state of activity worldwide in 2002, despite the first signs of a recovery, held down demand for Israeli exports and led to a drop in the actual volume of exports. The downturn in the world's equity markets also continued, and the markets have yet to recover from the crisis that they experienced during recent years. As a result, investment, stock issues and Israeli companies' ability to finance their activity also declined. Not only the high-tech industries suffered from a drop in activity; the functioning of the traditional industries was impaired by the increased cost of inputs and raw materials, as well as by the fall in domestic demand. Aggravating the impact of worldwide factors was the deterioration in the security and political situation in Israel, which led to a decrease in investment and consumption, and to another sharp drop in tourism and in the activity of branches of the commerce sector that are closely connected to the tourism industry.

The unemployment rate rose again in 2002 due to the continued slowdown in economic activity and the fall in domestic demand, and reached 10.3 percent. Since a rise in the unemployment rate leads to a decrease in real wages and reduces the public's purchasing power, it also slows the rate of increase in prices.

The nominal labor cost per unit of (real) GDP is an indicator of the extent of the future pressure on prices from the labor market. A rise in labor costs implies an increase in firms' expenses, for which firms try to compensate by raising their prices. The nominal labor cost per unit of GDP rose considerably in 2001 compared with 2000 due to the increase in nominal wages in the business sector and the fall in business sector GDP. This may have contributed to the upsurge in inflation during 2002.

Table 2.6
Nominal Labor Cost per Unit of GDP, Unemployment Rate and Prices, 1995–2002

	Wage per employee post		Business-sector product	Nominal labor cost per unit of GDP[a]	CPI	Unemployment rate[b]
	Business sector	Public sector				
	Average annual change over previous year					
1995	10.7	16.2	8.8	10.2	10.0	6.8
1996	12.9	13.4	5.3	13.0	11.3	6.6
1997	12.8	8.9	3.7	11.3	9.0	7.6
1998	8.5	5.8	2.9	6.4	5.4	8.6
1999	9.0	5.3	2.4	7.1	5.2	9.0
2000	7.8	6.6	8.5	1.9	1.1	8.8
2001	4.4	3.8	–2.2	6.8	1.1	9.3
2002	–1.0	1.1	–3.6	0.9	5.7	10.3
	Change compared with previous year, year-end data					
1995	9.4	7.0	7.7	8.4	8.1	
1996	13.7	14.3	3.3	15.7	10.6	
1997	12.2	7.9	3.3	9.5	7.0	
1998	7.7	5.7	3.7	4.7	8.6	
1999	10.3	8.6	5.8	6.8	1.3	
2000	7.1	1.8	6.4	3.7	0.0	
2001	0.6	2.5	–5.8	5.2	1.4	
2002	–2.3	1.3	–1.2	–2.3	6.5	

[a] Wages per FTE *less* real GDP per labor unit.
[b] Annual data.
SOURCE: Monetary Department, Bank of Israel and Central Bureau of Statistics data.

Despite the negative real GDP growth rate during the year, the rate of increase in labor costs slowed appreciably in 2002 compared with 2001, due to the decline in wages (Table 2.6). The slower rate of increase in labor costs during 2002 could support a moderate level of inflation in 2003.

i. Econometric models

Concurrent with a judgmental examination of the indicators available to it, the Bank of Israel uses macro-econometric models that it has developed in order to assess inflation expectations. These models express the complex relationships between the economic variables via pass-through mechanisms, and thereby make it possible to examine different economic scenarios and obtain forecasts of the development of inflation expectations from these scenarios. The monthly usage of specific economic models provides an additional, clear and consistent framework for the analysis of inflation expectations. However, the models operate in a 'mechanistic' and rigid manner, and are not necessarily suited to the entire range of economic situations and developments, especially when structural changes are occurring in the economy. The models are therefore just one of the many instruments that can be employed for assessing inflation expectations, together with the previously mentioned indicators and judgmental assessments.

4. PRICES

a. Price developments

The consumer price index rose by 6.5 percent in 2002. Contributing to the rise in the index were the transport and communications item, which accounted for 2 percentage points of the increase, the housing item, which accounted for 1.2 percentage points, the apartment maintenance item, which contributed one percentage point, and the food item, which contributed 0.7 percentage points. The rise in the index was offset by a 0.1 percentage point decrease in the clothing and footwear item (Table 5.7 and Figure 2.11). Detailed below are selected index items.

Figure 2.11
Development of CPI Items in 2002

SOURCE: Based on CBS data.

The housing price index rose by 8.2 percent following an increase of 5.2 percent in 2001 and decreases of 2.4 and 0.9 percent in 2000 and 1999 respectively. In 1999, the method of measuring the housing price index changed and under the new method, the index of owner-occupied housing prices is calculated on the basis of rental fees rather than apartment prices. Under this measurement method as previously, the exchange rate affects housing prices in the short term. Changes in the exchange rate

Table 2.7
Price Developments, 1990–2002

	CPI	Fruit & vegetables	Food	Housing	Apartment maintenance	Clothing & shoes	Education, culture & entertainment	Health	Transport & communication	Core index[a]	Index of controlled & supervised products	Wholesale price index of industrial production
Year-end, percentage annual change												
1990	17.6	4.9	12.7	31.6	19.5	4.3	12.0	17.5	20.1	15.4	19.9	12.6
1991	18.0	14.3	13.0	28.1	12.5	12.8	15.9	19.6	19.1	13.7	18.6	14.6
1992	9.4	14.2	8.9	5.4	8.4	6.6	12.9	20.6	10.6	9.3	12.9	9.1
1993	11.2	–1.2	8.3	23.7	5.3	4.3	11.8	7.4	9.2	7.9	10.0	7.2
1994	14.5	56.1	8.7	23.6	10.4	7.7	10.0	15.8	10.1	9.3	10.9	9.7
1995	8.1	–24.6	9.3	13.6	9.8	6.0	9.0	8.3	8.1	9.2	8.5	10.0
1996	10.6	4.9	11.2	13.2	10.9	5.2	9.8	14.0	10.6	10.2	12.0	7.0
1997	7.0	7.6	8.4	7.5	7.7	–4.4	8.6	9.2	6.6	7.8	6.7	5.9
1998	8.6	11.0	8.6	8.8	8.5	6.7	8.4	9.2	7.1	8.8	6.9	8.2
1999	1.3	6.5	2.9	–0.9	3.1	–4.0	3.3	4.9	0.8	2.4	2.0	3.5
2000	0.0	–5.9	3.3	–2.4	3.1	–0.1	–1.4	3.2	1.1	0.6	2.9	2.0
2001	1.4	6.9	1.1	5.2	0.9	–5.7	–0.3	6.0	–5.0	0.2	1.5	–1.9
2002	6.5	–1.2	4.9	8.2	10.7	–3.5	3.5	5.7	9.3	6.9	7.3	6.9
Percentage monthly change												
2002												
January	1.1	3.2	–0.2	3.3	0.1	–4.8	1.0	0.0	1.3	0.6	0.2	0.2
February	0.8	–2.1	0.1	3.2	0.6	–4.9	0.3	0.1	0.7	0.4	0.3	0.8
March	0.5	–2.2	–0.1	1.4	0.9	–3.7	0.9	0.7	0.7	0.4	0.6	0.9
April	1.5	5.6	0.5	1.5	0.6	5.9	0.9	0.6	2.8	1.5	0.4	2.0
May	0.9	–4.8	0.0	1.6	1.9	1.9	0.7	0.5	1.2	1.0	0.9	1.3
June	1.3	–4.7	1.4	2.0	1.1	4.7	0.8	0.7	1.5	1.3	0.8	0.5
July	0.6	–0.2	1.0	–0.9	3.9	–4.4	0.7	1.5	1.1	1.1	2.4	0.5
August	–0.4	6.0	0.9	–2.9	0.6	–3.0	0.1	0.8	0.0	0.3	0.7	–0.4
September	0.4	8.4	0.5	0.4	0.3	–3.0	–1.0	0.7	0.6	0.1	0.4	0.9
October	0.6	–2.9	1.1	1.6	0.5	3.3	0.0	0.0	–0.3	0.4	0.6	1.2
November	–0.8	–4.2	–0.3	–1.9	–0.2	1.0	–0.9	0.3	–0.6	–0.4	–0.1	–0.6
December	–0.3	–2.2	–0.1	–1.1	–0.1	4.4	–0.1	–0.3	0.1	–0.1	0.0	–0.4

[a] The CPI excluding housing, fruit and vegetables, and clothing and shoes.
SOURCE: CBS data.

are reflected by the local-currency value of apartment rental prices, and affect the index of housing prices. As a result, the rise in the exchange rate during the first half of the year led to a 13.6 percent increase in the housing component, while the appreciation of the shekel during the second half led to a 4.7 percent decrease in this component. During the year as a whole, the housing component rose by 8.2 percentage points, an increase that contributed 1.7 percentage points to the rise in the price index. (The housing price index accounts for 21 percent of the consumer price index.) In 2001 as well, the rise in the exchange rate led to an increase in the housing component, while the appreciation of the shekel during the years 1999 and 2000 was reflected by a decrease in the index of housing prices.

The index of clothing and footwear prices fell by 3.5 percent in 2002 due to respective 3.7 percent and 2.6 percent decreases in the clothing and footwear items. This decrease offset the increase in the consumer price index during 2002 by 0.1 percentage points. The change in the clothing and footwear index was not uniform throughout the year. During the spring and autumn months, large seasonal price increases were recorded at monthly rates of up to 6 percent, while in the remaining months of the year prices fell, leading to an annualized decrease of 3.5 percent. The decrease in the clothing and footwear index during 2002 followed a cumulative 9.6 percent decrease in this index during the years 1999 to 2001. The continued decrease in the prices of clothing and footwear came against the background of the slowdown in economic activity and the rise in unemployment, and reflected the growing extent of the recession.

The wholesale price index of industrial production[5] rose by 6.9 percent in 2002, after falling by 1.9 percent in 2001. The wholesale price index represents the cost to the productive sectors. Since prices in the productive sectors affect prices to the consumer, the wholesale price index can serve as a leading indicator for the consumer price index: a large rise in the wholesale price index can be expected to lead to a future rise in the consumer price index and *vice versa*. The large change in the wholesale price industrial production is indicative of the high costs incurred by the productive sectors in 2002, which partly derived from the rise in the exchange rate that increased the local-currency cost of imported raw materials. This high cost was reflected by the increase in the consumer price index during the year despite the recession in real activity.

b. The variability of the consumer price index

It is important to take into account the variability of the consumer price index when assessing the extent of price stability. This is because stability can be examined according to the distribution and extent of price volatility, and not only on the basis of their rates of change during a specific period. The extent of the volatility of the index can be examined in a number of ways, including an examination of the month-to-month volatility of the price index (that is, its variability over time) and an examination of the inter-month variability of the components of the index.

[5] Although this index is not part of the consumption groups in the consumer price index, it serves as an indication of price developments.

Month-to-month implied volatility: An examination of volatility over time shows that the implied volatility in the consumer price index rose to 0.68 percent in 2002, concurrent with the rise in the index. But even during 1999-2001, years when inflation was lower, the implied volatility did not fall below 0.40 percent, which was high compared with Western countries with a similar inflation environment.

Intra-month implied volatility: One of the reasons for the relatively high variability of the consumer price index is the seasonal element in the components of the index. Many components of the index contain seasonal features. Examples are clothing and footwear, and fruit and vegetables, which tend to rise at the beginning of a season and fall at the end of a season, and apartment rental prices (part of the housing component), which change at the beginning and end of the academic year due to the rental of apartments by students. A monthly seasonal element is typical of the holiday months (the Jewish New Year and Passover), when prices rise due to pre-holiday shopping, and the summer months, when prices of tourism and vacation activities increase. This gives rise to the seasonal nature of the general index.

The most volatile components of the index during 2002 were the fruit and vegetables item and the clothing and footwear item. The variability of these components was considerably higher than that of the other components of the index. This phenomenon has occurred throughout the past decade, and derives from the high degree of seasonality in these components, which is also reflected by the seasonality of the entire price index. The seasonality of the different components of the index is also apparent when the intra-monthly implied volatility of the components of the index is examined. This implied volatility ranged between half a percent and 3 percent during 2002 and averaged 2 percent, more than in 2001 but similar to that in 1999 and 2000.

5. SOURCES OF CHANGE IN THE MONETARY BASE, AND MONETARY POLICY INSTRUMENTS

Every month, the Bank of Israel announces the interest rate that it is prepared to pay to the banks for their deposits with it. These deposits are distributed by means of tenders, and are not included in the monetary base. The public's demand for the monetary aggregates is closely related to this interest rate, and the Bank of Israel determines supply conditions for the base via the instruments available to it. A change in the money supply can derive from three sources: government injections, private sector conversions of foreign currency and the Bank of Israel injection. Given the first two sources, the Bank of Israel determines the volume of its injection/absorption that will supply the amount of monetary base required at the rate of interest that the Bank of Israel determines (Table 2.8).

The change in the monetary base during 2002 resulted from government and Bank of Israel injections, while private sector foreign currency conversions did not contribute to this change. This was due to the Bank of Israel's policy of non-intervention in the foreign currency market for as long as the exchange rate is within the limits of the band

Table 2.8
Sources of Change in the Monetary Base, 1995–2002

	1995	1996	1997	1998	1999	2000	2001	2002	2002 I	2002 II	2002 III	2002 IV
1. Monetary injection, govt. + Jewish Agency	2,207	7,005	1,889	1,901	4,067	–2,729	–2,611	–7,439	–9,270	375	–1,469	2,925
of which: Government	1,402	6,096	939	781	3,139	–3,493	–4,341	–8,731	–9,626	59	1,838	2,674
2. Conversions of foreign currency	18,414	5,753	22,817	1,041	237	286	–723	–1,459	–445	–369	–385	–260
of which: Dealing room	19,160	6,451	23,324	1,746	0	0	0	0	0	0	0	0
3. Total (1+2)	20,621	12,758	24,706	2,942	4,304	–2,443	–3,334	–8,898	–9,715	6	–1,854	2,665
4. Monetary injection by Bank of Israel	–21,975	–8,958	–21,036	–2,700	–381	2,754	7,697	10,668	11,134	–12	–96	–358
of which: Government	–11,002	–3,052	470	–631	–12	–3	21	–22	23	–26	164	–183
Treasury bills	–4,648	–1,912	–1,059	–2,794	–1,843	–4,855	–4,866	–8,549	–1,634	–2,925	–1,555	–2,435
Swaps	–5,146	–917	1,111	–892	–20	145	–252	–573	–556	–397	281	99
Banks' term deposits		–5,000	–27,500	–7,500	–8,700	–1,800	5,500	12,000	12,000	2,000	–500	–1,500
Interest[a]	–920	276	3,420	4,957	5,825	4,492	3,411	2,671	447	453	898	873
5. Change in monetary base	–720	3,801	3,670	242	3,927	311	4,363	1,771	1,421	–7	–1,950	2,307

[a] Excluding Treasury bills.
SOURCE: Bank of Israel.

Table 2.9
Monetary Instruments,[a] December 2001–December 2002

(monthly averages, NIS million)

	Total deposits	Deposit			Treasury bills total	*of which:* held by banks	Total deposits *plus* Treasury bills
		Daily	Monthly	Weekly			
December 2001	43,903	9,452	24,000	10,452	34,304	8,608	78,208
2002							
January	41,945	8,752	23,935	9,258	34,816	7,655	76,761
February	37,364	8,757	18,786	9,821	35,654	7,340	73,018
March	32,790	8,274	16,000	8,516	36,110	8,575	69,901
April	32,050	9,117	16,000	6,933	36,823	10,032	68,873
May	30,381	7,542	16,000	6,839	37,538	10,483	67,919
June	30,601	9,201	14,133	7,267	38,078	10,184	68,679
July	34,921	12,877	4,625	17,419	38,509	10,004	73,430
August	31,412	11,412	-	20,000	39,396	10,199	70,808
September	34,500	14,500	-	20,000	40,057	10,256	74,557
October	32,548	12,548	-	20,000	40,692	9,508	73,240
November	31,933	11,933	-	20,000	41,478	7,629	73,411
December	33,484	13,484	-	20,000	42,589	4,831	76,073

[a] Unindexed resident time deposits (*Pazak*) *plus* Treasury bills.
SOURCE: Monetary Department, Bank of Israel.

of mobility. Since the exchange rate was located within the limits of the band of mobility, there have been no private sector conversions of foreign currency since February 1998, compared with large conversions of NIS 47 billion during the years 1995 to 1997. In 2002, the government absorbed NIS 8.7 billion, mainly due to the increase in net domestic borrowing that resulted from the higher than planned budget deficit.

The monetary base expanded by NIS 1.8 billion in 2002. As the result of a government absorption in the course of the year, the Bank of Israel injected NIS 10.7 billion (meaning that it reduced the absorption). The Bank of Israel uses various monetary instruments in order to inject or absorb money — auctions for the banks' term deposits with it, short-term debt certificates (Treasury bills), swap transactions and monetary loan quotas.

In the past, the principal instrument used in the management of the current liquidity system took the form of the auctions for the banks' term deposits at the Bank of Israel. This situation changed at the end of 2001, when as part of the structural changes in the financial markets, it was decided to remove the Treasury bill ceiling that was anchored in the law until then. Although the issue of Treasury bills to the public serves as a monetary instrument that is similar in its effect to the banks' deposits at the Bank of Israel, while Treasury bills are traded in the stock market after being issued and are open to investment by the general public, deposits at the Bank of Israel are permitted only to the banks and are not tradable. The removal of the Treasury bill ceiling makes it possible to increase issues of Treasury bills at the expense of deposits at the Bank of Israel, with the result that the public can also benefit from this monetary instrument. The expansion of issues increases the tradability of Treasury bills in the stock market,

Table 2.10
Monetary Deposits, 2000–2002

	Utilization of deposits[a]				Cost of deposits (*percent*)		
	Daily tender	Weekly tender	Monthly tender[b]	Total	Daily tender	Weekly tender	Monthly tender
2000							
IV	9,161	16,967	20,000	46,128	8.84	8.84	9.01
2001							
I	8,598	19,111	20,000	47,709	8.14	8.13	8.31
II	8,998	17,396	20,000	46,394	7.46	7.46	7.63
III	8,733	16,293	20,935	45,961	6.67	6.67	6.81
IV	9,585	11,837	24,000	45,422	6.20	6.24	6.46
2002							
I	8,589	9,178	19,600	37,367	4.20	4.20	4.40
II	8,608	7,011	15,385	31,004	5.60	5.54	5.33
III	12,913	19,130	1,542	32,043	9.65	9.63	7.57
IV	12,663	20,000	–	32,663	9.64	9.62	–

[a] NIS million.
[b] The monthly tender was stopped on 16 July 2002.
SOURCE: Monetary Department, Bank of Israel.

enhances the operation of the secondary market, and thereby helps to create the infrastructure that is essential for the development of the money market.

Following the removal of the Treasury bill ceiling, the Bank of Israel increased its issues of Treasury bills to the public at the expense of the banks' deposits with it, which decreased (Table 2.10). The balance of Treasury bills rose from NIS 34.3 billion at the end of 2001 to NIS 42.6 billion at the end of 2002. Concurrently, the balance of deposits from the banks at the Bank of Israel fell from NIS 43.9 billion at the end of 2001 to NIS 33.5 billion at the end of 2002. The banks' deposits at the Bank of Israel are for a period of a day to a week and bear a floating rate of interest. The opportunity for placing deposits for a period of a month was abolished in the middle of the year.