

Chapter 4

The Securities Market

During 2001, nominal and real yields-to-maturity fell in the treasury bill market and the government bond market, and inflation expectations stabilized within the range of the long-term inflation target. These developments occurred against the background of the continued reduction of the Bank of Israel's interest rate and the continued recession in economic activity. The level of uncertainty as apparent from foreign currency derivatives was relatively low on average. In the equity market, returns on holdings fell concurrent with the downturn in prices in equity markets abroad, principally among the high-tech shares traded on the NASDAQ.

The development of yields-to-maturity on financial assets was not uniform in the course of the year. Concurrent with other developments relating to inflation expectations, the year can be divided into three periods: the first half, the third quarter and the fourth quarter.

The downtrend in yields-to-maturity that has continued for several years now prevailed during the first half, and the negative slopes of the curves became more moderate. The uncertainty during this period mainly resulted from the worsening confrontation with the Palestinians (the *intifada*) that began in October 2000, but the level of uncertainty was lower than in the last quarter of 2000.

In the third quarter, the downtrend in yields ceased, and yields actually rose among all terms-to-maturity, especially among long terms, and inflation expectations rose with them. This was mainly due to expectations that the budget deficit would exceed its planned level, and that the supply of bonds issued by the government to finance the higher than planned deficit would increase. The rise in yields appears to have derived from uncertainty over the increase expected in the budget for 2002, in view of the reduced credibility in the government's commitment to reducing the budget deficit during the coming years and reducing the public debt. As a result, the slopes of the yield curves became positive following a long period of negative or flat slopes. The increased uncertainty also resulted from the terror attacks in the USA in September, and was reflected *inter alia* by a large rise in turnover in derivatives on a variety of underlying assets.

In the fourth quarter of 2001, bond yields fell again and following the announcement of the one-time 2 percentage point cut in the Bank of Israel's key interest rate at the end of the year, continued to fall, especially among short terms. As a result the slope of the yield curves remained positive. The interest rate cut, which came as a surprise to the market, led to a rise in uncertainty and to a continued growth in turnover in the derivatives market.

The development of yields-to-maturity in 2001 was accompanied by a large rise in average daily turnover, particularly in Shahar fixed-rate unindexed bonds, due to the consolidation of inflation at a low level. Concurrently, turnover in the equity market fell considerably although it rose to some extent at the end of the year. A notable growth in activity was recorded in foreign currency derivatives at the commercial banks and on the stock exchange. As a result, demand for the shekel-dollar options issued by the Bank of Israel was higher than in previous years.

1. THE TREASURY BILL AND GOVERNMENT BOND MARKETS

a. The treasury bill market

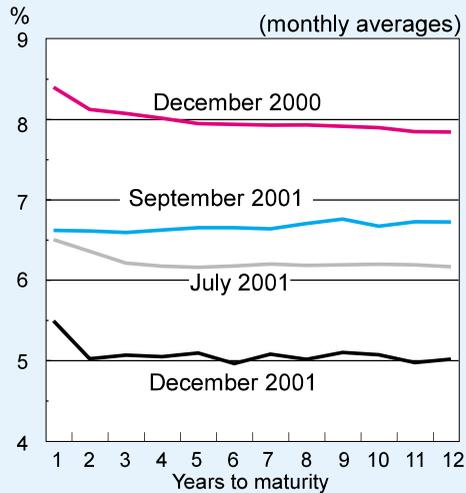
(1) The treasury bill yield curve

Treasury bills are unindexed discount bonds that are issued for terms-to-maturity of up to one year, and are one of the tools used by the Bank of Israel in managing its monetary policy (Box 4.1). Yields on the different terms of treasury bills are affected, particularly at the short end of the curve, by changes in the Bank of Israel's key interest rate, and the slope of the curve is affected by expectations regarding changes in this rate.

Yields-to-maturity in the treasury bill market fell throughout 2001, by a total of 3 percentage points to the lowest ever average level of 5 percent (Figure 4.1). This was concurrent with the gradual cumulative 2.4 percentage point reduction in the Bank of Israel's key interest rate until December, and the one-time reduction of 2 percent at the end of December. The fall in yields-to-maturity was the continuation of a trend that began in 1994 (and temporarily ceased in 1996 and 1998), concurrent with a fall in inflation expectations and a reduction in the Bank of Israel's interest rate.

The development of the treasury bill yield curve was not uniform in the course of the year: Yields fell until July, reflecting expectations that inflation for 12 months ahead would not exceed 2 percent. The slope of the yield curve was moderately negative, reflecting expectations of some degree of reduction in the Bank of Israel's interest rate in the term of up to a year. During the months August and September, as inflation expectations rose, the fall in yields-to-maturity ceased, yields climbed, and the slope of the

Figure 4.1
Treasury Bill Yield Curve,
December 2000–December 2001



curve became moderately positive. Accordingly, the markets' assessments regarding a continued fall in yields became more moderate and may have reflected expectations of a rise in the Bank of Israel's interest rate. In October, when inflation expectations fell, the downturn in yields resumed and intensified following the one-time reduction in the Bank of Israel's interest rate at the end of the year.

In contrast to previous years, in 2001 yields fell consistently throughout all the months of the year among all terms-to-maturity. This development resulted from the Bank of Israel's continued reduction in the monetary interest rate and in particular, from the increased relative certainty regarding the continued stability of the market, which was also an offshoot of monetary policy: Despite the

interest rate cuts, the public expected that the low level of inflation would remain within the limits of the long-term target, reflecting the public's awareness of the Bank of Israel's commitment to maintaining price stability.

(2) Activity in the treasury bill market

The balance of treasury bills held by the public totaled NIS 35.6 billion at the end of 2001, compared with NIS 30.6 billion at the end of 2000 and NIS 25.8 billion at the end of 1999. The Bank of Israel absorbed a net amount of NIS 2.5 billion via treasury bills in 2001. In 2000, this absorption amounted to NIS 2.1 billion.

Annual daily turnover in treasury bills rose to a moderate extent, from NIS 191 billion in 2000 to NIS 199.3 billion in 2001, although turnover reached a record level in the course of the year (Table 4.1). Turnover during the first half of the year was low and stable at an average level of NIS 160 million. In the third quarter, as uncertainty increased and led to a rise in yields-to-maturity of treasury bills, turnover rose and in September reached a daily average of NIS 315 million. Turnover contracted in the last quarter but following the announcement of the 2 percent interest rate cut in December and the intention to abolish the treasury bills ceiling, rose sharply as players in the market adjusted the composition of their asset portfolios.

The distribution of treasury bill holdings shows that the share of the mutual funds and the banks increased in 2001 at the expense of other investors, and amounted to 43 percent and 25 percent of the balance of treasury bills respectively. In 1996, the mutual funds accounted for only 3 percent of treasury bill holdings. Since then this share has risen consistently (Table 4.2).

Box 4.1**The Management of Monetary Policy and the Treasury Bill Law**

The purpose of issuing short-term debt certificates (treasury bills) under the Short-Term Debt Certificate Law of 1984, is to provide the Bank of Israel with a policy instrument that it can use to influence the interest rate via activity in the open market. The deeper the market, the greater will be the central bank's ability to operate via the market. In this way, treasury bills are playing a growing and central role in central banks' monetary policy worldwide.

In the course of the disinflation process and the growth in demand in the treasury bill market, which was also reflected by turnover for future treasury bills, amendments were implemented in the Law and a further amendment was introduced in 1995. One of the aims of this amendment was to offset the injection deriving from the Bank of Israel's involvement in the bond market during problem periods for the provident funds. Under the amendment, the ceiling for the issue of treasury bills was raised to NIS 15.5 billion and the process of changing the ceiling was adjusted. As a result, once every six months, on January 1 and July 1, the ceiling is adjusted in accordance with the cumulative change in the consumer price index (from November 1994) or the cumulative change in the means of payment (from October 1994), whichever is larger.

Under a government decision of the end of December 2001, the Treasury Bill Law is likely to be changed and the treasury bill ceiling abolished. This measure will increase the Bank of Israel's room for maneuver in the management of monetary policy and its opportunity for influencing the interest rate in the market. This is because the restriction compels the Bank of Israel to manage its policy for the most part vis-a-vis the commercial banks and changes in the volume of their deposits with it, rather than directly in the financial markets vis-à-vis the public.

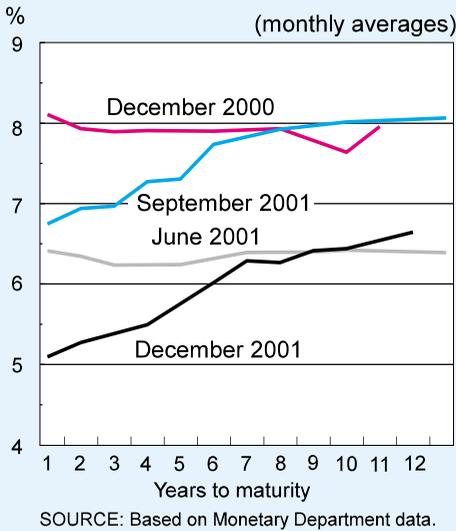
The removal of the treasury bill ceiling will contribute to the development of the treasury bill market as an alternative source to short-term bank credit and with it, to the sophistication of the money markets and a decrease in the banks' net interest margins in the unindexed segment. A deeper money market, which constitutes a basis for pricing in the capital market, will also contribute to the development of the bond market and the commercial securities market (Box 4.2).

2. The government bond market*(1) The unindexed bond yield curve*

Shahar is a fixed-rate unindexed government bond, and is issued for longer terms than treasury bills. (In May 2001, the maximum term-to-maturity was extended from 7 years to 10 years in accordance with amendments from 1998).

Yields fell among all terms-to-maturity of unindexed bonds during 2001, but more

Figure 4.2
Unindexed Bond Yield Curve,
December 2000–December 2001



heavily among short terms than long terms: a decrease of 3 percentage points to a level of 5 percent—compared with a decrease of 1.5 percentage points to a level of 6.6 percent (Figure 4.2). The development of the unindexed bond yield curve was not uniform in the course of the year: During the first half, yields fell consistently among all terms-to-maturity, by an average of 1.5 percentage points, concurrent with the developments in the Bank of Israel's interest rate and a stabilization of inflation expectations within the range of the long-term target. The yield curve was almost flat during this period, implying that the expectations of a reduction in the interest rate in the long term as well were apparently lower than in previous years (when the slope of the curve was more negative).

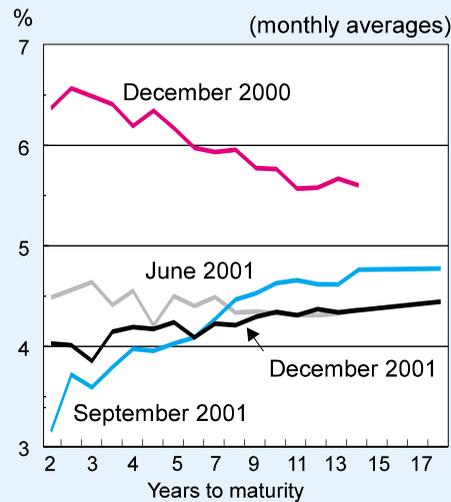
In the third quarter of the year, as inflation expectations rose and reduced the relative attractiveness of unindexed investment, the fall in yields ceased. Yields rose among all terms-to-maturity, especially long terms, and the yield curve became positive¹ and relatively steep, following a long period of a negative or nearly flat slope. Long-term yields reverted to their level at the beginning of the year, approximately 8 percent, which was more than one percentage point higher than short-term yields.

Long-term yields are mainly affected by fiscal policy, while the direct transmission mechanism of monetary policy mainly affects short-term yields. A rise in long-term yields therefore derives principally from the expectation of an increased supply of government bonds, over and above that planned in the budget for 2001 due to the need to finance the additional budget deficit. Since approximately half of the government's borrowing is by means of Shahar bonds, these developments made a notable contribution to the rise in Shahar yields. The rise in yields also appears to have implied a premium deriving from uncertainty regarding the expected growth in the budget for 2002 and expectations of continued issues in the future, as well as doubts over the government's commitment to reducing the budget deficit and the public debt during the coming years.

Yields fell again among all terms-to-maturity during the fourth quarter of the year. Short-term yields fell to their lowest ever level and following the announcement of the

¹ A positive curve slope is very common in the world's capital markets. The longer the term-to-maturity, the higher will be the yields demanded by players in the market, even when interest rate adjustments are not expected. This is to compensate for the lack of liquidity and the level of uncertainty and the risk deriving from it, which are greater in the long term.

Figure 4.3
CPI-Indexed Bond Yield Curve,
December 2000–December 2001



one-time interest rate cut at the end of the year, continued to fall to below 5 percent. Long-term yields were slightly higher than the low yield at the end of the first half of the year, and the slope of the curve became even more positive. This development was indicative of the uncertainty still prevailing over the government's commitment to reducing the budget deficit, despite its declared commitment to do so towards the end of the year.

(2) *The CPI-indexed bond yield curve Galil and Sagi* are CPI-indexed government bonds that bear a fixed annual rate of interest. The maximum term-to-maturity of the *Galil* bond was extended, and in August 2001 was issued for 20 years for the first time.

As was the case with the unindexed yield curve, the development of the CPI-indexed bond yield curve during 2001 can be divided into three periods: the first half, the third quarter and the fourth quarter (Figure 4.3). In the first half of the year, yields fell among all terms-to-maturity. Short-term yields dropped by 1.9 percentage points to a level of 4.5 percent, and long-term yields went down by 1.2 percentage points to 4.4 percent. Due to the larger decrease in short-term yields, the real yield curve became increasingly flat, a development indicative of reduced expectations of a fall in the real interest rate. Concurrent with the declining expectations of a reduction in the Bank of Israel's nominal interest rate, inflation expectations for all terms were in the middle of the long-term inflation target.

In the third quarter of the year, when yields on terms of up to seven years fell (more notably among shorter terms), yields-to-maturity on longer terms rose, and the yield curve became positive. The rise in long-term yields reflected expectations of larger than planned government borrowing, as well as uncertainty over future fiscal policy. These factors were stronger than the forces that acted to reduce yield—the continued slowdown in economic activity and the continued fall in interest rates worldwide. The background for the fall in real short- and medium-term yields concurrent with the rise in nominal yields on those terms was the expectation of a higher rate of inflation during these terms that would exceed the upper limit of the inflation target. Among long terms, however, the rates of increase in nominal and real yields reflected a relatively small rise in inflation expectations for these terms, meaning that the increase yield can be mainly attributed to uncertainty over fiscal policy.

During October and November, nearly all the decline in yields that was recorded in the previous quarter among short and medium terms was offset, with the result that the

Table 4.1
Average Daily Turnover in Treasury Bills and Bonds, 1998–2001

	Treasury bills	Unindexed bonds			CPI-indexed bonds	Dollar-indexed bonds
		Total	Shahar	Gilon		
	(NIS billion, current prices)					
1998	137.9	110.2	65.7	44.5	123.3	47.5
1999	163.1	105.9	62.3	43.6	104.8	45.0
2000	191.7	146.6	81.3	65.3	92.4	54.8
2001	85.9.3(?)	316.3	217.0	99.3	134.7	85.1
	Stock exchange trades as percentage of total trades					
1998	67.2	59.3	62.4	54.6	51.5	43.4
1999	90.8	83.6	87.5	78.0	70.8	74.4
2000	89.9	83.2	82.4	84.2	62.3	80.7
2001	88.8	77.3	77.9	76.1	68.2	77.4

SOURCE: Monetary Department.

positive slope of the yield curve became more moderate. At the end of December, with the announcement of the one-time cut in the interest rate, the curve fell by a similar rate among all terms, and during the year as a whole yields among long terms reverted to their level in June. Yields among short terms fell to half a percentage point below their level in June.

The process of change in the slope of the yield curve from negative at the beginning of the year to flat in June and subsequently to positive, and more moderate in the fourth quarter occurred therefore within a relatively short period of time. The stabilization of the curve at the end of the year around an average yield of 4.2 percent (4 percent among short terms and 4.4 percent among long terms) indicates as stated that the changes in the second half derive from fiscal uncertainty that affected long-term yields, and from a rise in inflation expectations, which particularly affected short and medium-term yields.

(3) Activity in the government bond market

The development of yields in the bond market was accompanied by relatively high turnover (Table 4.1). Average daily turnover on and off the stock exchange rose sharply, from NIS 294 million in 2000 to NIS 536 million in 2001. After remaining stable in the initial months of the year, turnover rose continually during the third quarter. This phenomenon is indicative of growing interest in the market, as opposed to the equity market where turnover fell heavily. Turnover fell when yields dropped in the fourth quarter, but climbed to a record level of NIS 935 million at the end of the year. However, turnover is still very sparse compared with the usual level in emerging markets and all of the world's capital markets.

The growth in average daily turnover in 2001 mainly derived from a particularly large increase in Shahar unindexed bond trading, which reached a daily average of NIS 217 million in the course of the year compared with NIS 81 million in 2000. At the same time, the proportion of Shahar bonds among total listed capital in the bond market increased, principally because the public were internalizing the low level of inflation as a continued phenomenon, the growth in Shahar turnover was consistent throughout the year and peaked in December, when the interest rate cut was announced, at an average of NIS 405 million a day. Shahar bonds accounted for 43 percent of total trading in the bond market in 2001, compared with 27 percent in 2000. Turnover in the rest of the market—in CPI-indexed bonds and *Gilon* floating-rate unindexed bonds—also rose in 2001, but to a more moderate extent, and remained low at daily averages of NIS 135 million and NIS 99 million respectively in the course of the year. Most of the growth was recorded in September when the level of uncertainty increased and yields rose as a result. Turnover in these bonds fell during the last quarter of the year, but following the announcement of the interest rate cut in December, rose again and reached a record level. It should be noted that while floating-rate unindexed bonds are not indexed, they contain an element of indexation because the interest rate on them changes in accordance with treasury bill yields, which are affected by adjustments in the Bank of Israel's interest rate that affects inflation.

(4) *The short sale market*

In a short sale, an investor sells a security that he does not own but has borrowed from another investor, after having undertaken to return it to its owner in the future. The

Table 4.2
Distribution of Holders of Bonds and Treasury Bills, 2000–2001

	Treasury bills		Unindexed bonds		CPI-indexed bonds		Dollar-indexed bonds		Traded corporate bonds		Shares ^a	
	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001	2000	2001
	(percent)											
Public, directly	32.4	18.4	20.9	21.2	13.5	15.2	15.4	7.5	21.1	16.0	68.1	71.5
Mutual funds	31.5	43.2	32.1	28.0	1.5	3.8	13.2	31.1	3.1	3.0	3.5	2.8
Provident funds	13.3	6.2	30.7	27.9	50.1	52.4	20.2	23.3	54.9	53.0	9.4	9.4
Banks	13.8	25.1	8.9	17.4	18.7	12.1	40.3	32.0	11.1	13.9		
Nonresidents	0.5	0.4	0.4	0.2	0.2	0.1	1.2	0.5	0.2	0.1	10.9	8.9
Bank of Israel/govt.	1.5	0.6			7.1	6.9					6.5	5.6
Insurance firms	6.5	5.8	6.7	4.8	7.6	7.8	4.1	5.1	9.7	14.1	1.6	1.7
Pension funds	0.5	0.4	0.4	0.4	1.2	1.5	5.6	0.6				
Total	100	100	100	100	100	100	100	100	100	100	100	100

^a The government holds shares directly, while bonds are held for it by the Bank of Israel.

SOURCE: Based on banks' balance sheets, and TASE, the Securities Authority, the Capital Market, Department of the Ministry of Finance, and Foreign Exchange Control Department.

development of the market for these transactions could increase the sophistication and the liquidity of the capital market, as well as the potential turnover of the securities that are traded in it.

The short sales market has increased considerably during recent years, from NIS 96 million at the end of 1998 to a billion shekels at the end of 2000 and NIS 2.4 billion at the end of 2001. However, the market is still small because the low overall volume of turnover in the market increases the element of risk involved in short sales transactions. Apart from this factor, the status of short sales transactions has not yet been subjected to regulatory procedures, from the aspect of taxation and liquidity ratios. The currently existing situation reduces the feasibility of short sales, which if they were increased would have contributed to the establishment of a Repo market as elsewhere in the world (Box 4.2).

The short sales market includes transactions in treasury bills and CPI-indexed and unindexed government bonds. As in the entire market, the attractiveness of unindexed investments is increasing relative to the other indexation components in the short sales market. Interest appears to be centered on fixed-rate unindexed bonds and treasury bills, which constitute 60 percent of turnover, although this ratio is low compared with 2000 because the proportion of CPI-indexed bonds also increased. The minimal, NIS 36 million balance of Gilon bonds, less than 2 percent of turnover in the short sales market, is indicative of these bond's lack of attractiveness in the short sales market as in the entire bond market.

(5) Distribution of bond holdings

An examination of the composition of unindexed bond holdings shows that the proportion held by the provident funds and the mutual funds has fallen, while the banks have increased their holdings of these bonds (Table 4.2). Most of the increase in the banks' holding was in Gilon bonds, which provide an attractive form of coverage for the banks' liability to the public in floating-rates deposits more so in fact than their deposits at the Bank of Israel.

With holdings of CPI-indexed bonds, the opposite situation is apparent. The share of the provident funds, which held the majority of bonds of this type, rose by 2 percentage points to 52 percent, while the banks' share fell to 12 percent. The concentration of CPI-indexed bond holdings in the provident funds is attributed to the structure of the market, and the fact that long-term saving is in CPI-indexed assets. The mutual funds also increased their holding of CPI-indexed bonds, by 2 percentage points, but their weighting in total holdings of this type was low at 4 percent. The proportion of the provident funds' and mutual funds' holdings of dollar-indexed bonds also rose, at the expense of the banks' share and the public's direct holdings, which fell in a continuation of the trend of recent years (Table 4.2).

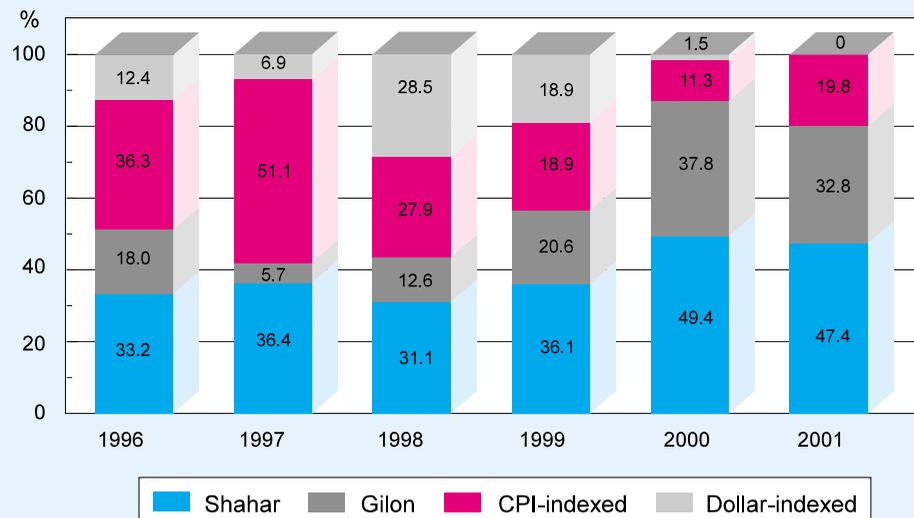
Foreign investors' share of bond holdings is minimal: The highest holding proportion was 0.5 percent in dollar-indexed bonds, compared with 1.2 percent in 2000 and 2.4 percent in 1999. This situation is indicative of foreign investors' lack of interest in the bond and treasury bill market in Israel. One of the reasons for this lack of interest is the low level of turnover and the lack of progress in the development of the market, which is attributed *inter alia* to the absence of market makers.

(6) Domestic borrowing

Government borrowing for the purpose of financing the budget deficit increased due to the higher than planned level of the deficit, which amounted to 4.6 percent of GDP compared with 1.75 percent of GDP in the budget plan, and the lower than planned level of privatization receipts, which totaled NIS 181 million compared with a planned level of NIS 3 billion. As a result, net domestic borrowing in 2001 totaled NIS 16 billion compared with NIS 6.3 billion in the budget plan, and gross borrowing totaled NIS 52.4 billion compared with NIS 44.3 billion in the budget plan. Net domestic borrowing via tradable loan instruments totaled NIS 12.2 billion in 2001 and gross borrowing via tradable instruments totaled NIS 39.5 billion. Since non-tradable borrowing is determined on the basis of the existing arrangements that apply to institutional investors, the government only raises in the tradable domestic loan market the remainder of the capital that it requires to finance its deficit (in addition to privatization receipts). As the budget deficit falls, the government's commitment to these arrangements will reduce the level of turnover in the tradable government bond market, which constitutes the infrastructure for determining interest rates in the economy (Box 4.2).

Due to the particularly high turnover in Shahaar bonds that resulted from the consolidation of inflation expectations at a low rate, the government continued to raise the majority of its tradable capital via these bonds. This was part of the process of turning the public debt into an unindexed debt, as a result of which the government did not issue Gilboa floating-rate dollar-indexed bonds for the second consecutive year (an exception was January 2000). A major factor contributing to the decision not to

Figure 4.4
Indexation Composition of Government Borrowings, 1996–2001



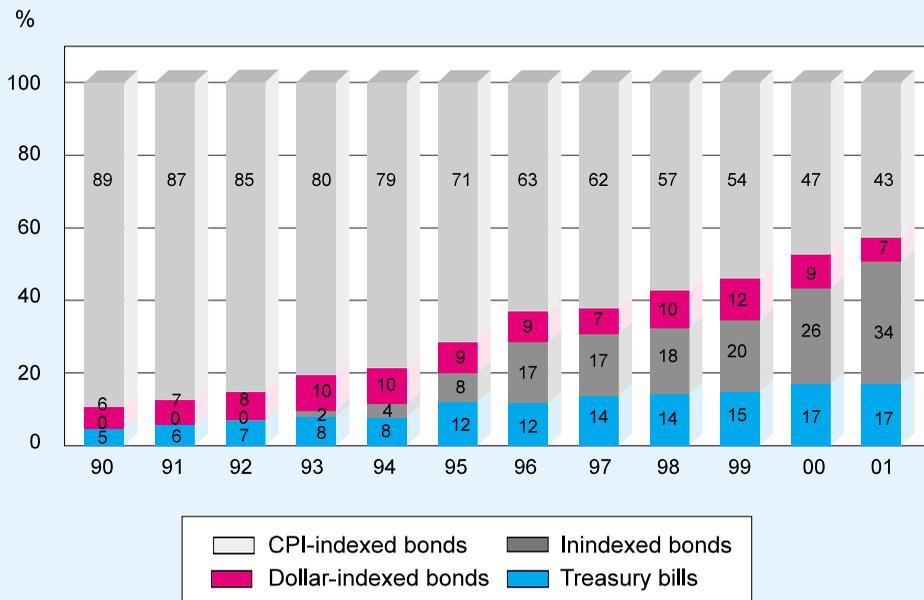
SOURCE: Based on Capital Market Department of Ministry of Finance and Monetary Department data.

issue Gilboa bonds was, of course, the opportunity for issuing directly abroad. At the same time, the ratio to total tradable loan issues of Shahar fixed-rate unindexed bonds fell from 49 percent in 2000 to 47 percent in 2001, and the ratio of issues of floating-rate Gilon bonds fell by 5 percentage points to 33 percent (Figure 4.4). However, the proportion to total issues of CPI-indexed bonds doubled to 20 percent of the portfolio. As a result, and although Shahar bonds predominated, their proportion to total issues fell and the share of the CPI-indexed component increased. These developments show that the process of transforming the public debt into an unindexed debt, as accepted in the developed countries, is still far from complete.

Government borrowing by means of Shahar bonds has major implications for the development of the bond market. Shahar bonds are known in the world, are relatively simple, are easy for investors to price, and the coupon payments on them are fixed and known in advance throughout their entire lifetime. Government borrowing via them is therefore essential for the development of the bond market and, in particular, the entry into the market of foreign investors, which will lead to increased turnover.

During recent years, concurrent with the increased share of Shahar bonds in total government borrowing, their maximum term-to-maturity has been extended from seven to ten years, and an emphasis has been placed on issues for terms of five and ten years. This development has facilitated the creation of interest rate benchmarks in the unindexed credit market. In addition, the maximum term-to-maturity of Galil fixed-rate CPI-indexed bonds has been extended from 15 to 20 years, with the aim of increasing the amount of listed capital in long-term CPI-indexed bonds. In order to enhance the

Figure 4.5
Listed Capital in Bonds and Treasury Bills, 1990–2001



SOURCE: Based on Monetary Department data, Bank of Israel.

efficiency of the markets, an emphasis has been placed on issues of bonds for terms of 10 and 20 years, which creates interest rate benchmarks in the market for the long-term CPI-indexed credit market and the mortgage market in particular.

(7) The distribution of listed capital

The downtrend of recent years that has been recorded in the share of CPI-indexed bonds and the increase in the share of unindexed bonds to total listed capital in treasury bills and government bonds (in market values) continued in 2001 (Figure 4.5). This trend mainly derived from the change in the composition of government borrowing.

The share of unindexed bonds rose by eight percentage points and reached 34 percent of the market. This resulted from net positive borrowing of NIS 2.2 billion, concurrent with the growth in the volume of existing series and a decrease in the number of these series. Due to issues of CPI-indexed bonds falling below redemptions by NIS 6.5 billion, their share in total listed capital fell by four percentage points to 43 percent, half of their share at the beginning of the 1970s. To conclude, it can be said that for the first time unindexed listed capital (treasury bills and unindexed bonds) accounted for the majority of listed capital—51 percent. However, the distribution of the inventory of unindexed bonds shows not only a growth in Shahar bonds, but also an increase in the share of Gilon bonds, which as stated contain an element of indexation. The share of dollar-indexed bonds in listed capital fell to 7 percent because of the government's negative net borrowing in these bonds (redemptions without issues) of NIS 2.7 billion.

(8) International comparison

The changes that occurred in the structure of the yield curve during 2001 brought it closer to the structure that is usual in Western countries—a curve with a positive slope, which is regarded as a normal curve. The extension of the term-to-maturity of bonds makes it possible to compare developments in this area to worldwide developments (even though the maximum term-to-maturity in Western countries is still longer, at 30 years). It should be noted in this respect that the bond market in Israel is notable for a large turnover in CPI-indexed bonds, in contrast to other countries where, if there are any such bonds, these are usually for long terms. This unique feature of the market in Israel has an advantage, in that it makes it possible to derive inflation expectations from the gap between the yields on CPI-indexed bonds and the yields on unindexed bonds.

The yield curve of government bonds fell in most Western countries during 2001, concurrent with their central banks' interest rate cuts. Yields fell on all terms-to-maturity, except for longer terms.² The shorter the term-to-maturity, the larger was the decrease in yield, with the result that the yield curves changed from negative at the beginning of 2001 to positive at the end of the year.

The nominal yield differential for the term of five and ten years between Israeli government bonds and US government bonds contracted by half a percentage point and one percentage point respectively in 2001, and before the interest rate cut at end of

² Yields on long terms are naturally less volatile over time than short-term yields.

December 2001 averaged two percentage points. But in the short term (a year to maturity) the differential expanded from 2.5 percentage points in December 2000 to 5.5 percentage points in December 2001. This was because the decline in yields in the USA to 1.7 percent, approximating to the development of the Fed's interest rate, was larger than the decline in yields in Israel.

In comparison with yields in the majority of European countries, yield differentials contracted by one percentage point among both short and long terms. (This was before the interest rate cut at the end of December 2001.) The level of yields in Israel was 5.5 percent for the term of a year compared with an average of 3.2 percent in Europe, and 6.8 percent for the term of ten years compared with an average of 4.8 percent in Europe.

2. THE CORPORATE BOND MARKET

Firms stopped raising capital via share issues due to the recession in Israel and worldwide and the slump in the secondary equity markets, and expanded their issues of bonds to a very considerable extent.

a. Private issues of securities

Issues of capital via non-tradable securities that did not constitute public offerings amounted to approximately NIS 3.5 billion in 2001. This raising of capital for a longer term, as a substitute for short-term bank credit, was particularly attractive for firms in 2001 because of the falling yields in the government bond market, which forms the basis for the pricing of corporate bonds. The majority of private issues during the year were CPI-indexed and part of them, especially at the beginning of the year, were unindexed.

Private issues are usually made by large companies with a high credit rating that wish to diversify their sources of capital, and enhance their bargaining ability with the banking system. Such issues expose the companies to activity in the capital market which can facilitate potential future issues on the stock exchange. Most securities in private issues are graded or issued by organizations that are subject to supervision (banks and insurance companies) or that are required to place a specific pledge on an asset as security for them. Private issues usually involve an offer to 'sophisticated' investors—institutional investors. Since these issues are managed by non-banking organizations without an underwriting obligation, which in itself is a disadvantage for the issuers, commissions on the issues are lower than on public offerings. It is also quicker and less expensive to raise capital from a private issue than by means of a public offering, because private issues are exempt from the requirement to publish a prospectus and the requirement to register and report to the Securities Authority, and are therefore not subject to the Authority's regulations and current supervision. Another disadvantage of private issues is the absence of clearing services. Only at the end of 2001 did the stock exchange's board of directors decide that corporate bonds would also be cleared in the stock exchange clearing house. This could contribute to the efficiency of this market and its further development.

The buyers in private issues are usually long-term institutional investors—provident funds, advanced study funds and insurance companies³—that wish to compensate for non-tradability by means of a higher yield. The mutual funds are not allowed to invest in non-tradable assets and the public prefer to invest directly in tradable assets, because they can obtain information on companies' position from these assets. Under an amendment to the Securities Law that was introduced in 2000, the restriction that was imposed on a number of institutional investors was lifted, permitting them to participate in private issues. This development led to a large increase in the size and number of private issues.⁴ Institutional investors have an incentive to invest in private issues, since they can obtain a higher yield than on deposits and government bonds, obviously at a price of a higher element of risk. Another advantage for these investors of investing in non-tradable securities, is the ability to obtain a stable return over time that is not affected by the volatility in the financial markets.

b. Corporate bond issues on the stock exchange

Corporate bond issues on the stock exchange also increased, from NIS 300 million in 2000 to NIS 2.7 billion in 2001.⁵ The corporate bond index rose by 10 percent in 2001 concurrent with a similar rise in the government bond index. The market value of corporate bonds increased by 27 percent compared with December 2000 and totaled NIS 13 billion. However, this market accounts for only six percent of the tradable bond and treasury bill market. The principal holders of corporate bonds are the provident funds and the advanced study funds, whose share of total holdings amounted to 53 percent, although this was down from 55 percent in 2000 and 61 percent in 1998 (Table 4.2). The share of the public's direct holdings fell by five percentage points, mainly to the benefit of the insurance companies' share, which amounted to 14 percent at the end of the year. Daily turnover in corporate bonds averaged only a few million shekels during 2001.

All these developments are indicative of the lack of a deep and liquid market for corporate bonds in Israel, neither for the short term and definitely not for the long term. These bonds could contribute to the sophistication of the capital market and reduce the dominance of the banking system, which adversely affects the financial stability in the economy and, indirectly, the economy's ability to expand.

³ The pension funds rarely participate in these issues because of the incentives to invest in earmarked bonds.

⁴ Before the amendment, it was only permitted to issue without a prospectus to a limited number of participants—up to 35.

⁵ Also in 2001, the banks issued CPI-indexed and dollar-indexed subordinated capital notes that are recognized as 'upper level supplementary capital,' in large quantities in order to adhere to the minimum capital ratio and to make it possible to distribute dividends.

Box 4.2**The Development of the Bond Market in Israel**

The development of the bond market is a major factor in the creation of a sophisticated capital market which is essential in a modern economy. This is because sustained growth and integration into the world economy are dependent *inter alia* on the range of sources from which the private sector can raise capital, increased competition in financial intermediation, a reduction in the cost of government and business sector borrowing, and increased opportunities for dispersing the public's asset portfolios. Such a market could also attract foreign investors.

The government bond market and particularly the corporate bond market in Israel are very small, and are mainly comprised of long-term instruments. A market for commercial papers (firms' short-term securities), an important part of a corporate bond market and a developed bond market overall, is practically non-existent in Israel. Companies in Israel raise hardly any sources of finance via bonds, mainly because the banks offer them capital at a lower rate of interest.

A number of measures for enhancing and expanding the government bond market in Israel have been adopted during the last decade: unindexed bonds have been issued and their term-to-maturity has been gradually extended; the number of government bond series has been reduced and the balance of each series has been increased; and the treasury-bill market has been expanded. Although average turnover in government bonds has grown recently, the level of tradability and liquidity of this market is still very low compared with developed markets in Western countries, and even in comparison with many emerging markets.

A number of major issues need to be dealt with in order to speed up the development of the bond market in Israel:

Completion of the process of rolling-over the government debt—The proportion of the non-tradable debt to the total government debt and the total CPI-indexed debt¹ has fallen only slightly during recent years and amounted to 33 percent and 57 percent respectively in December 2001, compared with 37 percent and 61 percent respectively in December 1996. This was due to the arrangements that require the government to issue earmarked bonds to the pension funds and to insurance plans of the 'guaranteed yield' type according to their requirements. As a result, the pension funds which are the largest investor and have a long investment horizon, are not active in the tradable bond market. Apart from that, since

¹ The non-tradable government debt is indexed to the consumer price index.

the extent of government borrowing has decreased in recent years because of the government's commitment to reducing the budget deficit, tradable borrowing has been falling over the years, a situation that impairs the tradability and liquidity of the entire tradable bond market. The tradable portion of the CPI-indexed debt has remained low because the non-tradable debt is indexed in its entirety, and this adversely affects the functioning of the CPI-indexed bond market, which is very important in the Israeli capital market because yields in it (artificially) influence the determination of the banks' interest rates and the interest rates on long-term loans. A change is therefore necessary in the arrangements that require the issue of earmarked bonds. This change is particularly important in view of the anticipated entry of new public sector employees to the accrual pension instead of the budgetary pension. Like the successful reform that was implemented with the insurance companies, members' mobility between pension funds of different types should be facilitated, concurrent with the establishment of an advice and information network for members. At the same time, it is important to speed up the early redemption of bonds in old life insurance plans. This change, within the framework of the pension funds, is important for the development of the bond market and particularly of long-term CPI-indexed bonds, which are important for long-term investments and loans.

Separation of the banks' ownership and cessation of their control of provident funds and mutual funds—The banks currently manage most of the provident funds' and mutual funds' assets. This ownership structure creates a potential for conflicts of interest, and also blocks to some extent the entry of additional factors into the Israeli capital market. The current situation therefore hinders the development of competition in the capital market because of the restrictions that are imposed on the management of the bank provident funds' investments, the prohibition from investing in the shares of their parent bank for example. An end to the banks' ownership of firms operating in the capital market will contribute to the development of the market, and will also encourage institutional investors to operate in the local bond market and in the derivatives markets that are essential for its development, such as the REPO market and the markets for futures contracts and short sales.

Ending discrimination in the taxation of income from financial instruments—There is currently discrimination in the system of taxation in the financial markets in Israel, with differential rates of tax on different financial instruments (for example, for individuals, CPI-indexed government and corporate bonds are subject to tax on the interest, while bank deposits in savings schemes are exempt from tax; CPI-indexed deposits and foreign currency deposits are subject to tax, while unindexed deposits are exempt from tax), on different savers (for example, individuals and mutual funds are subject to tax on the interest on government bonds, while the pension funds and the provident funds are exempt); between local investments and

investments abroad (non-resident *Pamah* deposits are exempt from tax, while resident *Pamah* are liable to tax). A change is therefore necessary in the tax regulations, and the rates of tax on income from different financial assets in Israel and abroad must be equalized for all savers in the economy. Such a measure will enhance the competitive structure of the financial markets as a whole and the relative position of the bond market in particular.

Ending the issue of floating-rate government bonds while increasing the issue of fixed-rate unindexed government bonds and extending their term-to-maturity—In a developed bond market, there is no place for floating-rate government bonds because of their inherent complexity, makes it difficult to price them. As an example, the Gilon bond is not really an unindexed bond in view of the indexation component in the coupon, and its tradability is therefore low. Accordingly, the issue of these bonds should be discontinued, an emphasis should be placed on the issue of Shahar fixed-rate unindexed bonds and their term-to-maturity should be extended. It should be noted that Shahar bonds are the most highly traded of all bonds. Since these bonds are known in the world, the development of their market will speed up foreign investors' entry into the bond market in Israel, and will contribute to the development of a long-term unindexed credit market (such as an unindexed mortgage market).

The establishment of a network of market makers—The establishment of a network of primary dealers and market makers that will provide continual price quotations and execute some if not all of the orders in the Israeli bond market will contribute to the more efficient marketing of bonds in the primary market, and will enhance the liquidity and tradability of bonds in the secondary market. The establishment of a network such as this that will be known in the world could also facilitate the entry of foreign investors to the Israeli capital market.

Abolition of the treasury bill ceiling—The abolition of the treasury bill ceiling will lead to an expansion of the treasury bill market in particular and the development of the short-term money market as a whole, will prompt a reduction in the banking margin, and will contribute to the development of a commercial papers market (the market for short-term corporate bonds). Such a measure will also make it possible to base monetary policy on market tools such as REPO as is accepted practice at central banks in developed economies, and will thereby contribute to the development of a market for these transactions by the private sector.

The establishment of a REPO market—REPO is one of the main instruments used in developed capital markets. It is an agreement for a limited and predetermined period for the sale of bonds against cash and the repurchase of bonds with the current and future transaction prices being determined in advance. The establishment of a REPO market in Israel will help to improve liquidity and tradability in the bond and treasury bill market, will increase the competition with the banking system, and will contribute

to the development of market makers' activity. The expected abolition of the treasury bill ceiling is not enough for this purpose; the status of REPO transactions needs to be subjected to regulatory procedures from several aspects—including the manner of the ownership of securities in the event of the bankruptcy of one of the parties to a transaction, and from the aspect of taxation and the liquidity requirements.

*Removal of the barriers from the taxation of short sale transactions—*The short sales market is one of the main elements of a developed bond market. To date, the authorities in Israel have taken a number of measures to promote the development of a short sales market but a number of barriers still remain, which like the barriers to a REPO market, principally derive from taxation procedures and the liquidity requirements.

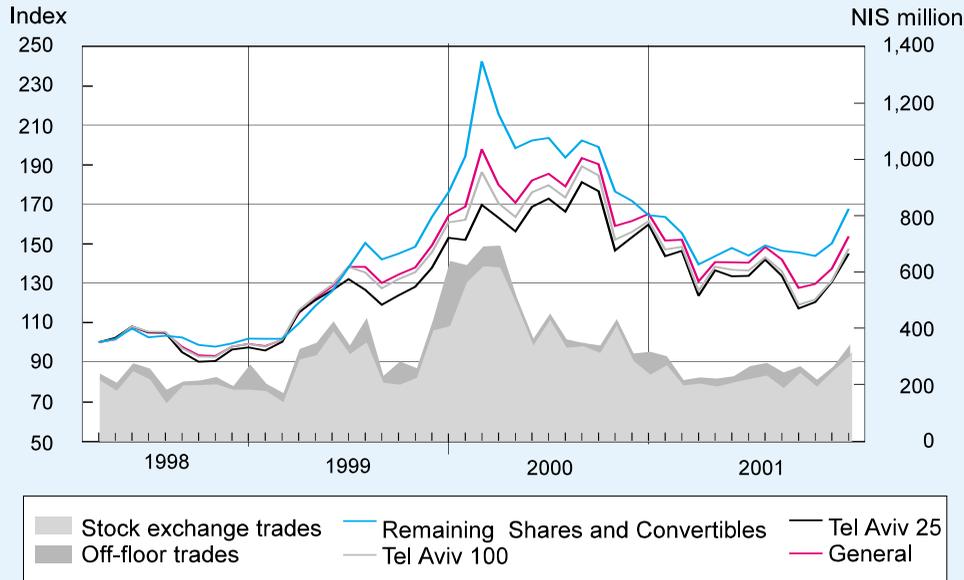
*Transfer of government bonds to trading at a clean price—*Government bonds are traded in Israel at a price that implies the accrued interest. This situation differs from that accepted in the world's developed capital markets, where bond trading relates to the price of the bonds without the accrued interest, with the result that a distinction can be made between the interest and a capital gain. The adoption of a trading method that is recognized worldwide will contribute to the development of the local bond market and will encourage the entry of foreign investors to this market.

3. THE EQUITY MARKET

Following the buoyant period of trading that prevailed in 1999 and continued until March 2000, prices in the equity market fell during 2001. This resulted from the continued slowdown in economic activity, the deterioration in the security situation, and the impact of the slide in share prices abroad, principally in the high-tech shares traded on the NASDAQ.

The general share index fell by 7 percent in 2001; the Tel Aviv 100 index and the Maof (Tel Aviv 25) index dropped by 9 percent, and the Yeter Shares and Convertibles index rose slightly, by 2 percent (Figure 4.6). Concurrently, the NASDAQ index in the USA fell by 21 percent following a large 39 percent decrease in 2000. The impact of the American market on the Israeli market is particularly strong because of the increase in the number of double-listed companies. In the first quarter of the year as the tense security situation continued, prices fell heavily, due also to the political uncertainty surrounding the election of the Prime Minister and the establishment of a unity government. Prices fell in the third quarter of the year as well and especially in September, when the world's equity markets suffered as a result of the terror attacks in the USA. The downturn in prices recorded in the course of the year became more moderate in the last quarter, when the share indexes rose by an average of 20 percent. The slowdown in non-financial activity was also reflected by the publication of profit warnings and financial statements that showed a downtrend in profitability, which also pushed down prices.

Figure 4.6
General Shares, Tel Aviv 100, Tel Aviv 25 and Remaining Shares and
Convertibles Indexes (month end, March 1998=100) and Average Daily
Turnover (monthly data, NIS million), March 1998–December 2001



SOURCE: The stock exchange.

Prices fell until the end of the third quarter in all sectors (with the exception of the mortgage bank sector, where prices rose slightly). Particularly large decreases of 35 percent, 27 percent and 20 percent respectively were recorded in the investment company sector, in the commerce and services sector and in the industrial sector. In the last quarter of 2001 and most notably in December, following the announcement of the one-time interest rate cut of two percentage points, the trend changed and prices rose sharply, moderating the downturn in prices during the year as a whole: 17 percent, 7 percent and 9 percent respectively (Figure 4.7). Since the price rise in the insurance, mortgage bank, and real estate and construction sectors during the last quarter offset the downturn in prices, during the year as a whole these sectors actually rose by 22 percent, 36 percent and 5 percent respectively. This was part of the adjustment of the investors' asset portfolio.

Total share capital listed for trading fell to NIS 238 billion compared with NIS 271.5 billion in 1999. Trading turnover was particularly low due to the heavy slide in prices, and averaged NIS 230 million a day compared with NIS 425 million in 2000 (Figure 4.6).

After trading had largely centered in the equity market during the last two years, in 2001 interest was largely focused on the bond and treasury bill market. The large decline in share turnover was already apparent at the beginning of the year and its average annual level fell to 40 percent of turnover in the capital market after expanding to 60 percent during recent years. At the end of the year, following the announcement of the interest rate cut, turnover rose in the equity market as well. It should be noted that

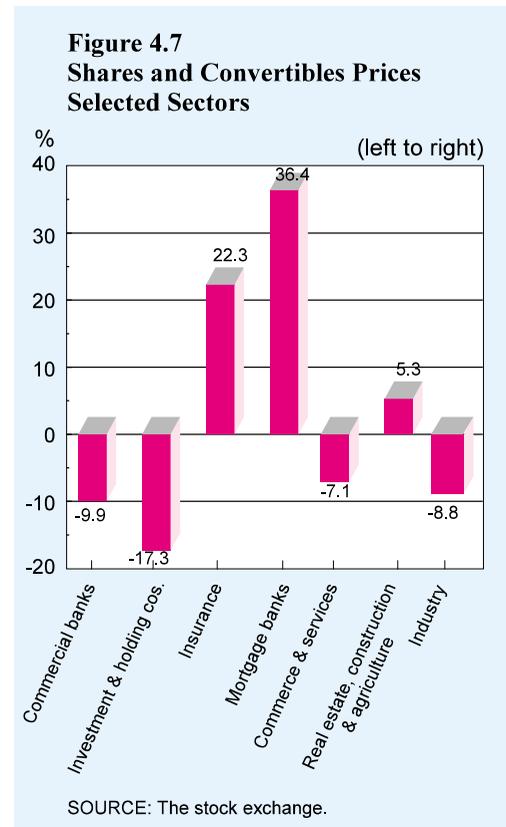
turnover in the Israeli equity market is relatively small, and was particularly low in 2001. This was due *inter alia* to the existing arrangements governing the issue of earmarked bonds to the pension funds, which prevents the transition of capital to the free capital market, including the equity market, thereby curtailing an important source of capital for economic growth.

The ownership structure in the equity market is still highly concentrated: Although the ratio of interested parties' holdings of total listed capital has fallen by 8 percent since 1999, it is still high at 62.3 percent. In addition, 47.6 percent of shares and convertible securities are held by the five largest banking groups, although this holding ratio has fallen from 53.4 percent in 2000 and 73.2 percent in 1993. As regards the low volumes of turnover, since January 2001 the stock exchange has adopted several technical measures for the purpose of increasing trading in under-traded securities. These measures have included the implement-

ation of a new method for calculating closing rates and reducing the impact of these rates on small transactions, a reduction in the minimal order size for the main (Retsef) stage of trading, and an increase in the maximum rate of fluctuation permitted in the opening stage of trading in a single share from 15 percent to 35 percent.

The inventory of holdings by foreign investors (mostly interested parties) fell to 8.9 percent in 2001 (Table 4.2). Although it fell, this ratio is higher than foreign investors' holding ratio in other forms of investment. The government reduced its share of listed capital to 5.6 percent, and recorded privatization revenue of only NIS 181 million compared with a planned level of NIS 3 billion.

The double-listing on the Tel Aviv Stock Exchange of Israeli companies that are traded in the USA and that began to be traded in Israel in October 2000 led to an increase in the public's ratio of share holdings. This was because the public's holdings in Israeli companies that were previously only traded in the USA are high. The ratio of interested parties from the public in total listed capital amounted to 44.4 percent. Since the end of 2000, 15 companies have registered for trading on the Tel Aviv Stock Exchange within the framework of double-listing. This is despite the recession in non-financial activity and the high-tech industries' activity in particular. Double-listing enhances shares' attractiveness, and thereby contributes to an increase in the value of the entire market and to a growth in turnover within the market.



The slowdown in the equity market during the year was also reflected by the paucity of issues in the primary market. The amount of capital raised from the public in the local market totaled NIS 2.8 billion in 2001 compared with more or less double that amount in 2000. Capital raised abroad totaled \$1.4 billion in 2001 compared with \$4.4 billion in 2000, and half of this amount was raised by the Israel Electric Corporation via an issue of bonds in the USA. Companies that submitted draft prospectuses for the first time postponed or cancelled their issues, and tens of companies were removed from trading in the continuation of a trend of recent years. Nevertheless, the equity market still has a large number of companies listed for trading (649 companies). Interested parties purchased shares principally by means of purchase offers by the controlling shareholders in companies, and thereby contributed to a continuation of the trend of structural changes in the groups of stock exchange companies concurrent with a decline in the phenomenon of the listing of many stock exchange companies from the same 'family,' such as parent companies and subsidiaries. As a result of the reduced profitability of stock exchange companies and heavy losses in certain cases, the total dividend that they distributed decreased, following the large drop recorded in 2000.

4. THE DERIVATIVES MARKET

Futures transactions are conducted in three frameworks—on the stock exchange, at the commercial banks and at the Bank of Israel. On the stock exchange, futures contracts and options on the Maof (Tel Aviv 25) index and the exchange rate of the dollar and the euro are traded. At the commercial banks, transactions are conducted with customers in futures contracts and non-tradable options on a variety of underlying assets. The Bank of Israel writes shekel-dollar options and future treasury bill contracts, and sells them to the public via tenders.

Activity in derivative financial assets increased in 2001 compared with 2000 after growing in 2000 and 1999, following the quantum leap in trading turnover in October 1998 that resulted from the shock in the financial markets. The growth in turnover encompassed most of the main derivatives—consumer price index derivatives, share index derivatives, interest rate derivatives and especially, exchange rate derivatives, both on the stock exchange and at the commercial banks. The growth in activity in derivative financial assets as a whole and in exchange rate derivatives in particular resulted from two main factors. The first was a material factor and the other was a technical factor:

1. The increased awareness of the need for financial hedging instruments and the internalization of strategies for hedging against changes in the prices of assets. This was despite the reduced daily volatility in the underlying assets (the Maof index and exchange rates), which implied a decrease in the actual level of risk, a development that could actually have led to reduced turnover in derivatives. In addition, as is accepted practice worldwide, a wider range of exercise rates is being used.

2. The transition to an expiration once a month in the derivatives traded on the stock exchange instead of once every two months with effect from June 2000, as part of the

change in the listing regulations for series of the various derivatives. This change was made after the stock exchange had examined the need for investors to conduct short-term hedging transactions. This was in addition to the transition to the method of continuous (Retsef) trading in the derivatives market concurrent with the underlying assets in October 1999, and the extension of trading hours. These two factors had the effect of increasing turnover as soon as the end of 1999, and were more widely reflected in 2000 and 2001.

The level of uncertainty in the financial markets is affected by internal and external factors, and is reflected by the amount of activity in derivative financial assets and in their pricing—information reflecting the level of risk as perceived by players in the capital market.

a. Exchange rate derivatives

The growth in trading in options and futures contracts on exchange rates at the banks and on the stock exchange typical of recent years continued during 2001. The number of open positions in shekel-dollar options⁶ traded on the stock exchange in the last quarter of 2001 reached 370 thousand, twice the number recorded in the last quarter of 2000. In the banking system, a consistent growth was recorded during 2001 in the balance of open contracts between the public and banks in nominal exchange rate derivatives, and in December the balance reached \$33 billion compared with \$18 billion in December 2000. This high level of turnover was accompanied by demand for the shekel-dollar options that the Bank of Israel sells at a fixed weekly amount that was 8.5 times greater than the amount offered, compared with seven times in the previous year in call options for three and six months, and 7.8 times the amount offered in put options for three months, which was similar to the level of demand in 2000.

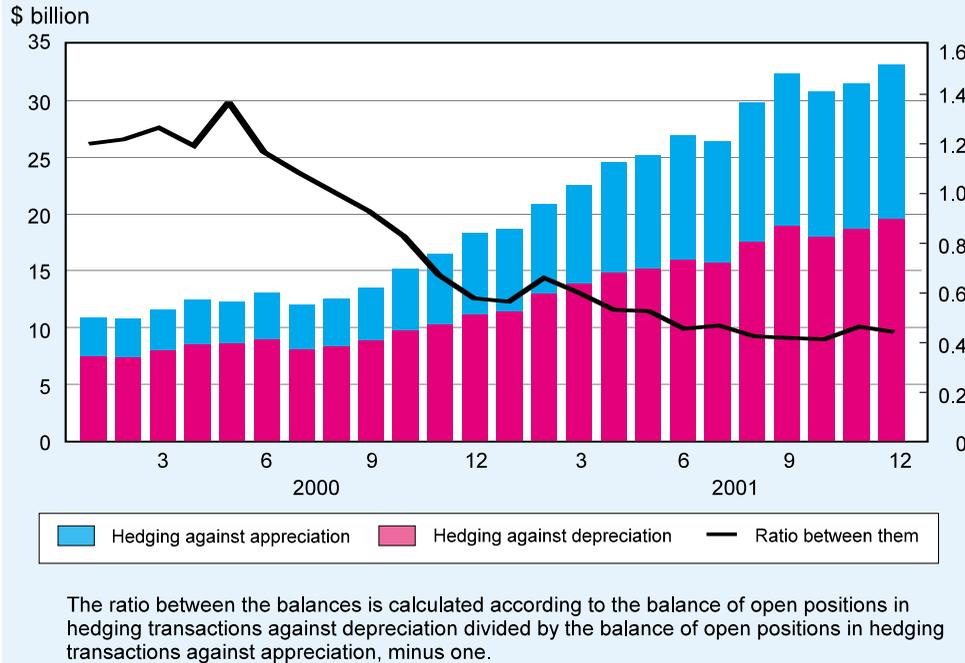
The transactions conducted in the banking system are transactions between the banks and the public⁷ in non-tradable derivative financial assets based on a variety of exchange rates and are defined as over-the-counter transactions. The balance of open positions in these assets reflects the public's demand for financial instruments for hedging against unexpected changes in exchange rates, and averaged \$27 billion in 2001 compared with \$13 billion in 2000. Figure 4.8 shows that the increase in the volume of instruments for hedging against an appreciation of the exchange rate during 2001 was larger than the increase in the volume of instruments for hedging against a depreciation. As a result, the difference between depreciation hedging and appreciation hedging instruments fell to 40 percent. This was after the volume of appreciation hedging was less than half the volume of depreciation hedging instruments in the first half of 2000.

In 2001, foreign banks began to participate in activity in derivative financial assets. Most of their transactions were in the foreign-currency-for-shekels type exchange rate derivatives. These transactions differ from the common transactions among the local banks in the manner of exercise: While with the usual transactions among the local banks the parties concerned transfer the difference between the exercise price and the

⁶ The underlying asset in shekel-dollar options is \$10,000.

⁷ Although there are transactions between the banks and other banks, and these lead to an upward bias in the estimate.

Figure 4.8
Open Positions in Shekel-Dollar Hedging Transactions Between the Banks and the Public, 2000–2001



actual price at the time of redemption, in these transactions the sides transfer the underlying asset itself. In contrast to the increased volume of turnover in nominal exchange rate derivatives, turnover in real exchange rate derivatives fell in 2001 compared with 2000: Futures contracts that are intended to hedge against real changes in exchange rates averaged only \$1.8 billion in 2001.

The stock exchange conducts trading in tradable options on the exchange rate of the dollar against the shekel (Figure 4.9). Turnover increased in this sector of trading as well and averaged 24.3 thousand option units in 2001, compared with a daily average turnover of 12.5 and 9.1 thousand option units in 2000 and 1999 respectively. In September 2001, following the terror attacks in the USA, a particularly large growth was recorded in daily turnover on the stock exchange, and this reached an average of 45 thousand options. Turnover in the last quarter of 2001 was affected by the continuing security-related incidents in Israel and abroad and remained relatively high although in that period, with the exception of the second half of December, the foreign currency market was not hit by any major shocks. This phenomenon was indicative of fears (which proved to be groundless) of sharp fluctuations in the foreign currency market. However, following the two percentage point interest rate cut in December 2001, turnover reached a new record level: On December 23, when the interest rate cut was announced, daily turnover totaled 110 thousand units.

An examination of trading by option type shows that daily turnover in put and call options increased during 2001 compared with 2000 by 120 and 85 percent respectively

and as a result, the difference between average daily turnover in put options and call options contracted in 2001. This relative growth in daily turnover in put options was largely centered in the last quarter of 2001 due to the currency basket exchange rate moving away from the lower limit of the diagonal band of mobility. Average daily turnover in call options during the last quarter of 2001 was twice the average daily turnover in put options, compared with 3.5 times in the first half of 2001 and in 2000 (Figure 4.9). The relative growth in turnover in put options as compared to call options in periods when the currency basket exchange rate is moving away from the lower limit of the diagonal band of mobility serves to emphasize the fact that the band provides free insurance against large changes in exchange rates.

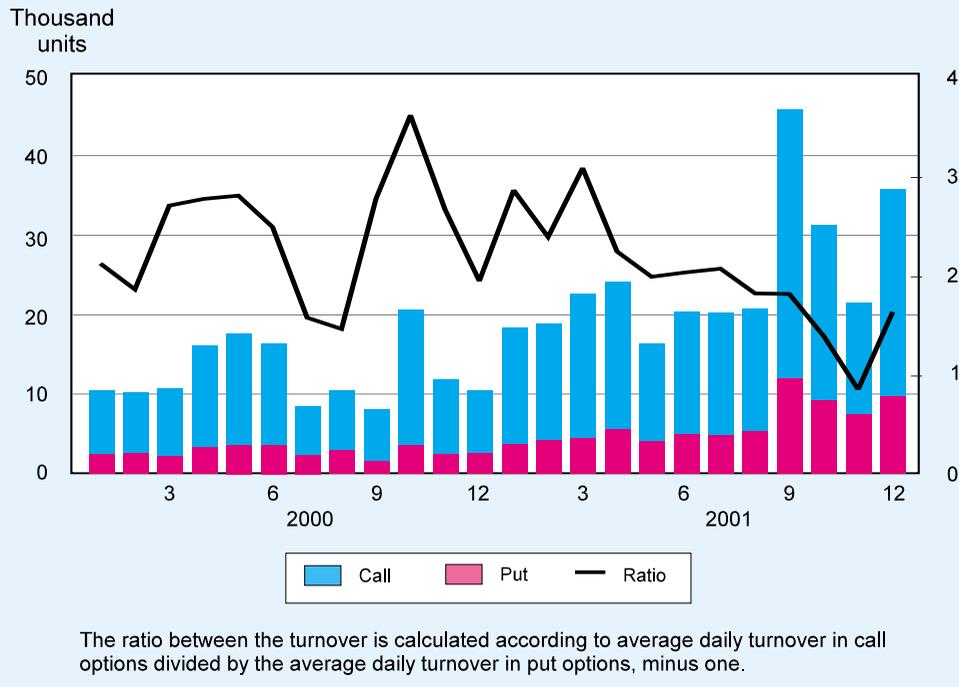
Since 1989, the Bank of Israel has offered non-tradable shekel-dollar options at a fixed weekly amount in order to provide the market with a guaranteed and permanent supply of hedging instruments, which also constitutes a benchmark for the pricing of similar options. In 2001, the Bank of Israel issued call options for three and six months at weekly amounts of \$10 million and \$5 million respectively, and put options for three months at a weekly amount of \$10 million in a situation of pure-in-the-money.⁸ These options (at a fixed term-to-maturity and at an exercise rate equal to the forward rate) make it possible to calculate the implied volatility that serves as a consistent index of the uncertainty surrounding anticipated changes in the dollar exchange rate, and can be used to estimate the level of risk in the foreign currency market. The implied volatility obtained from put and call options for three months averaged 5.3 percent in annual terms compared with 6.1 percent in 2000 and 7.4 percent in 1999. The implied volatility was relatively stable and within the range of 4.3–6.5, compared with 8 percent in October 2000, the month when the violent confrontation with the Palestinians began.

Figure 4.10 shows that the implied volatility increased at the end of January and the beginning of February 2001, although no large increase in the exchange rate was recorded at the time, apparently due to the increased uncertainty over the policy of the new government that would be elected. In the second half of March, the exchange rate began to rise concurrent with the implied volatility, a development indicative of the market's expectations of continued high volatility in the exchange rate, apparently due to the uncertainty over the state budget for 2001 and the worsening security situation in Israel. On September 11, 2001, following the terror attacks in the USA, the implied volatility rose to 6.5 percent and remained at this high level during the month, apparently due to the fear of further terror attacks and the impact on the level of non-financial activity in Israel and worldwide. Another development that raised the level of risk in the foreign currency market as reflected in the options market was the 2 percentage point interest rate cut in December 2001. The surprise reduction in the interest rate pushed up the implied volatility to high levels at the end of December and to even higher levels at the beginning of January 2002, apparently due to fears of a continued devaluation in the exchange rate.

The probability of a large depreciation of over 10 percent within the range of six months is affected by the level of uncertainty in the foreign currency market and the differentials between the shekel and the dollar interest rates. This probability increased

⁸ Options in a discounted exercise rate that is equal to the underlying asset—the representative rate of the dollar.

Figure 4.9
Shekel Dollar Options on the Stock Exchange – Average Daily Turnover
in Put Call Options and the Ratio Between Them, 2000–2001



during 2001, mainly due to the expansion of the differentials between the shekel and the dollar interest rates in the course of the year (Figure 4.11), and reached 3 percent in September and October compared with half a percent in December 2000. This was because the reduction in the dollar interest rate was greater than the reduction in the shekel interest rate, which increased the interest rate differentials, and due to the higher level of uncertainty resulting from the terror attacks in the USA in September. Although the interest rate differential continued to expand during November, the probability of a depreciation fell to 2 percent due to a fall in the level of uncertainty. The Bank of Israel's 2 percentage point interest rate cut in December reduced the interest rate differential but raised the implied volatility. The probability of a large depreciation in December 2001 therefore remained.

At the end of November 2001 the stock exchange launched shekel-euro options, complementing the shekel-dollar options that have been traded since 1994. Daily turnover in December was relatively volatile and averaged 700 options units. The number of open positions increased during the month and reached 12 thousand option units. It is reasonable to assume that turnover in options on the euro exchange rate will grow continually, for the following reasons:

1. The implied volatility of the exchange rate of the euro against the shekel is relatively high and amounts to 12 percent compared with 5 percent in the exchange rate of the dollar against the shekel on average for the last three years.

2. The coefficient of the correlation in the daily changes between the exchange rate of the dollar against the shekel and the exchange rate of the euro against the shekel is

Figure 4.10
Shekel-Dollar Exchange Rate and Implied Volatility on 3-Month Bank of Israel Shekel-Dollar Options, 2000–2001

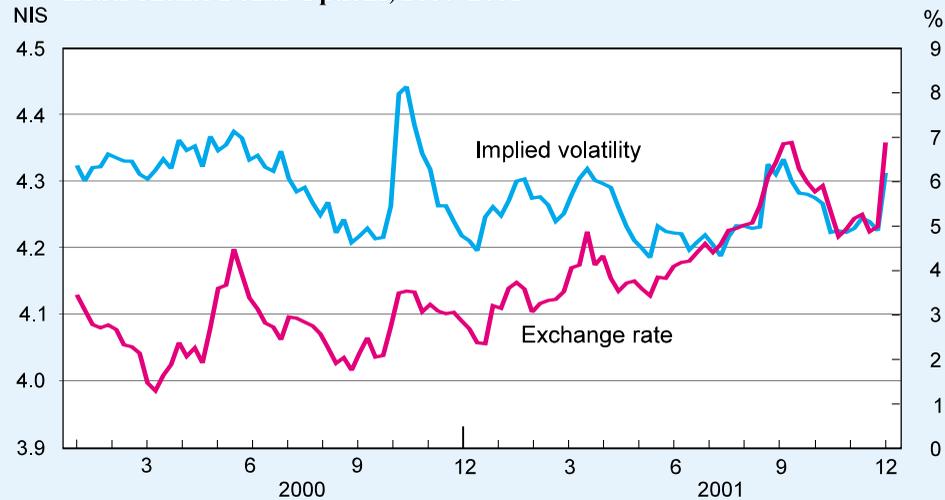
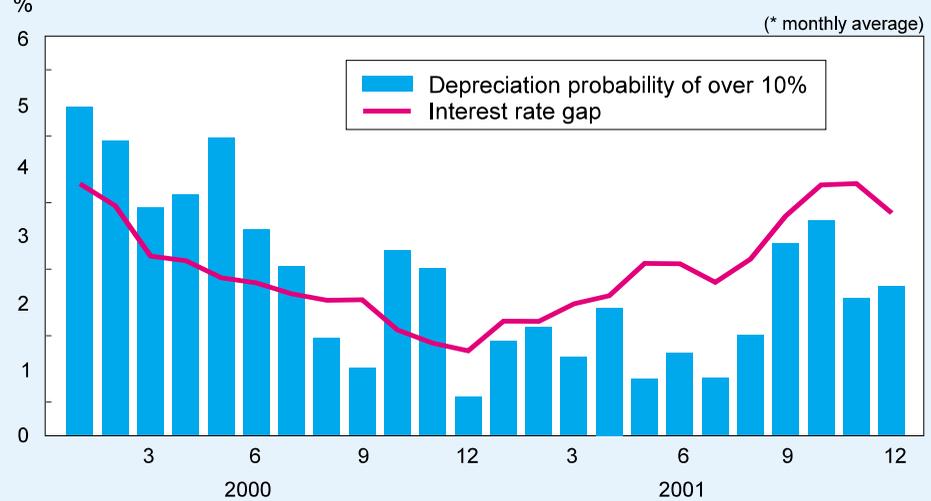


Figure 4.11
Depreciation Probability of Over 10% Over Six Months and Shekel-Dollar Interest Rate Gap



* Average of 4-5 monthly observations – according to the option tenders.

relatively low and has amounted to 40 percent since the currency was introduced. This is indicative of a different pattern of development between the two currencies relative to the shekel, which leads to risk in currency cross-rates (see Box 4.3).

3. Foreign trade (import-export) activity between the European bloc and Israel has grown continually in recent years concurrent with the volume of foreign currency

conversions: The proportion to total conversions in Israel of conversions between the shekel and the currencies of the European bloc reached 12 percent in 2001 compared with 8 percent in 1998.

Box 4.3

The Advantages Inherent in Trading in Shekel-Euro Options Alongside Shekel-Dollar Options on the Stock Exchange

Although many derivative financial assets on exchange rates exist, an investor who wishes to neutralize the risk of investment in an asset whose price is denominated in foreign currency will find in certain cases that there is no derivative financial asset on that currency. In such a case, the investor can limit the risk with the help of another derivative financial instrument on a foreign currency that has a high degree of correlation between its development and the development of the investment currency. That is, the investor can conduct a cross hedge. The higher the degree of the correlation, the more effective is the cross hedge transaction likely to be in neutralizing the risk exposure (even if this neutralization is not complete).

In November 2001, the stock exchange launched derivative financial assets on the euro exchange rate in addition to derivatives on the dollar exchange rate, which have been traded since March 1994. In order to examine the advantages of adding euro derivatives to stock exchange trading, we examine the nature of hedging with respect to the euro exchange rate by means of dollar derivatives alone.

Figure 4.12
Shekel-Dollar and Shekel-Euro Exchange Rate, 1999–2001

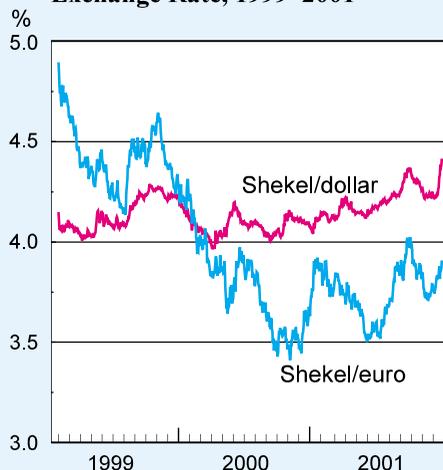
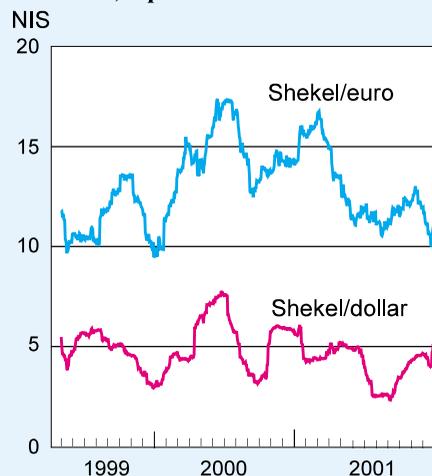


Figure 4.13
Daily Implied Volatility in Shekel-Dollar and Shekel-Euro Exchange Rates, April 1999–2001



The implied volatility is calculated on the basis of the last three months in annual terms.

The risk inherent in currency cross rates derives from the difference in the change in the rates between different currencies against the local currency, in our case, between the shekel-dollar exchange rate and the shekel-euro exchange rate. This risk is expressed by the coefficient of correlation between the change in the shekel-euro exchange rate and the change in the shekel-dollar exchange rate.

Figures 4.12 and 4.13 show the major differences between these exchange rates and also between the implied volatility of changes in their daily rates: The actual implied volatility of the exchange rate of the dollar against the shekel was 5 percent in 2001, compared with 14 percent in the exchange rate of the euro against the shekel. These differences reduced the effectiveness of hedging against the shekel-euro exchange rate by means of dollar derivatives, with the result that a cross hedge on the shekel-euro exchange rate by means of shekel-dollar exchange rate derivatives is not effective. In addition, these differences affect the pricing of the options and as a result, the results of the hedging instruments are different.

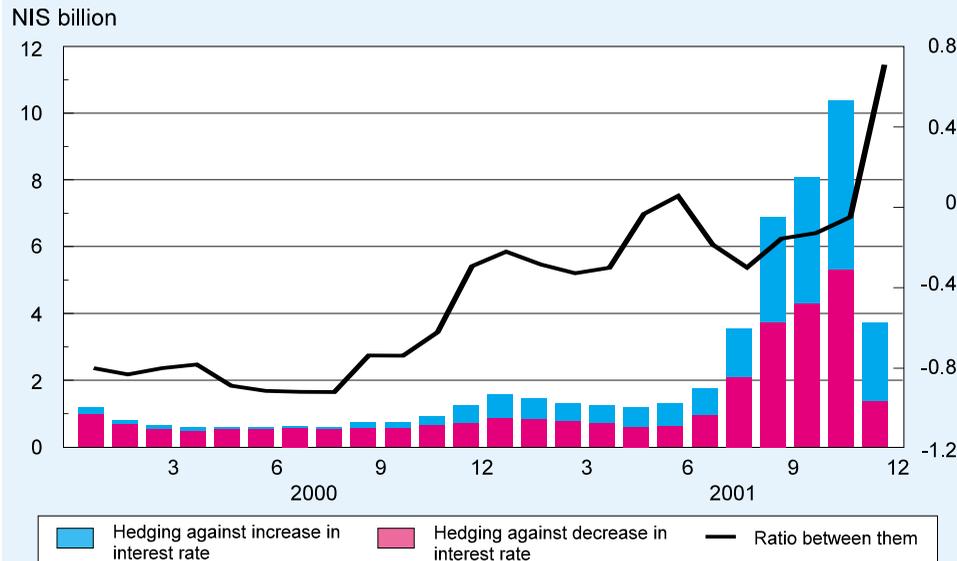
b. Interest rate derivatives

Turnover in interest rate derivatives in the banking system and in the Israeli economy as a whole increased greatly in 2001, but was still low compared with the volume of turnover in exchange rate derivatives. This differs from the situation in the developed countries, where the proportion of turnover in interest rate derivatives to total turnover in derivatives is very high. The relatively low turnover in interest rate derivatives appears to result from the small size and extreme openness of the Israeli economy. For these reasons, inflation expectations are mainly affected by the development of the exchange rate, which increases the feasibility of financial hedges by means of exchange rate derivatives. The volume of turnover in these derivatives is indeed higher at the commercial banks and on the stock exchange compared with the volume of turnover in interest rate derivatives.

The level of turnover between the banks and the public⁹ increased greatly during the last quarter of 2001, and the balance of open positions in nominal interest rate derivatives (Figure 4.14) reached an average of NIS 7 billion in the last quarter compared with an average of a billion shekels during the first three-quarters and in 2000. The considerable increase in 2001 was recorded in hedging transactions against an unexpected rise in the nominal interest rate, and in the last quarter of 2001 the volume of such transactions exceeded the volume of hedging transactions against a decline in the rate, apparently due to the market's assessment that the process of reduction in the interest rate was complete. Apart from nominal interest rate derivative transactions, real interest rate derivative transactions are also conducted in the banking system as required by the market. The volume of transactions in these derivatives decreased, and the balance of

⁹ Part of the transactions are conducted in the banking system between the bank and other banks, leading to an upward bias in the estimate in the volume of the public's hedging transactions against changes in the prices of underlying assets.

Figure 4.14
Open Positions in Shekel Interest Rate Hedging Transactions Between the Banks and the Public, 2000–2001



The ratio between the balances is calculated according to the balance of open positions in hedging transactions against an increase in the interest rate divided by the balance of open positions in hedging transactions against a decrease in the interest rate, minus one.

open positions in future assets of the real interest rate fell to NIS 4 billion in December 2001 in the continuation of a trend that began in March 1999.

In 1991, the Bank of Israel began to sell non-tradable futures contracts on the nominal interest rate in order to assist in the development of a derivatives market in the economy. In these transactions, the central bank promises to sell to the winning bidders, at the end of three months from the date of the tender, a series of treasury bills for three months or 12 months at a guaranteed yield that is determined in the tender.

The amount of the weekly tender for each series of treasury bills remained fixed in 2001 in accordance with Bank of Israel policy, and amounted to NIS 20 million. Demand at the tenders during 2001 and especially in the last quarter was particularly high, and reached an average of 13 times the amount offered on the two series. The growth in demand appears to have resulted from the increased uncertainty regarding the future nominal interest rate and macroeconomic conditions, which were affected by the shocks that hit the American economy on September 11, 2001. The attractiveness of the tenders was also reflected by the continued decrease in the gap between the average yield on the tenders and the yield on the series traded in the market at the time of the tender, on series for both three months and a year, until a negative gap developed in the last quarter of 2001, which was indicative of the willingness to 'buy' certainty with respect to the future nominal interest rate.

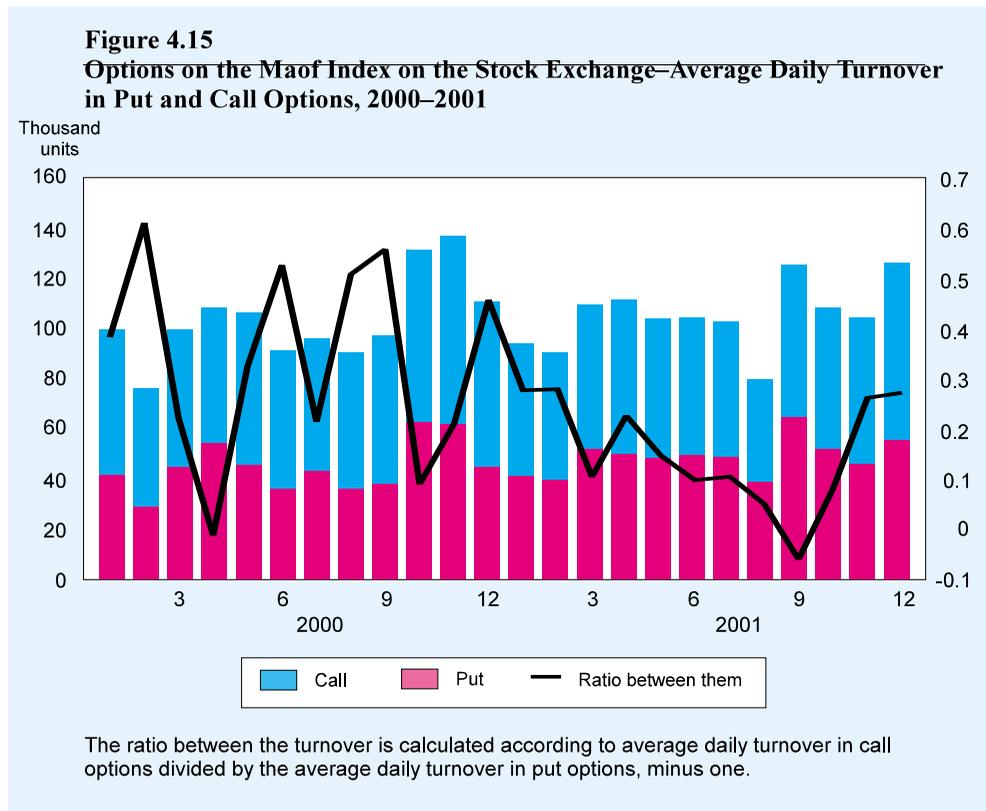
An examination of the average yields determined in the tender compared with those prevailing in the market on the exercise date shows that the yield set at the tender was

one percentage point higher than the yield in the secondary market at the time of exercise in the first four months of 2001 (apparently because of the chain of ‘surprises’ regarding the decline in the inflation environment), while the gap between them during the rest of the year was small and inconsistent.

In March 2000, the stock exchange launched futures contracts on the shekel interest rate (in annual terms) for three months, which was determined on the basis of the average treasury bill yield (the average for the three series of treasury bills closest to three months). However, no transactions were recorded in these contracts apart from a few transactions following the launch date.

c. Derivatives on the share indexes

The stock exchange conducts trading in options and futures contracts on the Maof index. Daily turnover (Figure 4.15) averaged 100 thousand option units¹⁰ in 2001, similar to that in 2000 and considerably higher than the average daily turnover of 44 thousand units in 1999. When examining trading by option type, it should be noted that although the number of transactions in call and put options increased by 26 percent and 15 percent respectively in 2001 compared with 2000, daily turnover rose by 8.5



¹⁰ The underlying asset in options on the Maof index is the Maof index multiplied by a hundred.

percent in put options but fell by 8.4 percent in call options, and there was no major change in the overall level of turnover. The proportion of put options to total daily turnover therefore increased, a development indicative of growing fears of a fall in share prices. Figure 4.15 presents the daily turnover in the two types of options and the gap.¹¹ A consistent decline in this estimate during 2001 until the high point in September is apparent. At that point, turnover in put options was higher than that in call options. During November and December, however, the opposite trend emerged and turnover in call options was higher.

Despite the growth in average daily turnover, the number of open positions fell in both types of options—put and call—by 17 percent and 9 percent respectively, reflecting a decrease in hedges against changes in the underlying asset (the Maof index) as a result of the fall in the Maof index during 2001 compared with 2000. The number of open positions rose slightly during the last quarter of 2001 to the increased uncertainty deriving from the potential implications of the terror attacks in the USA.

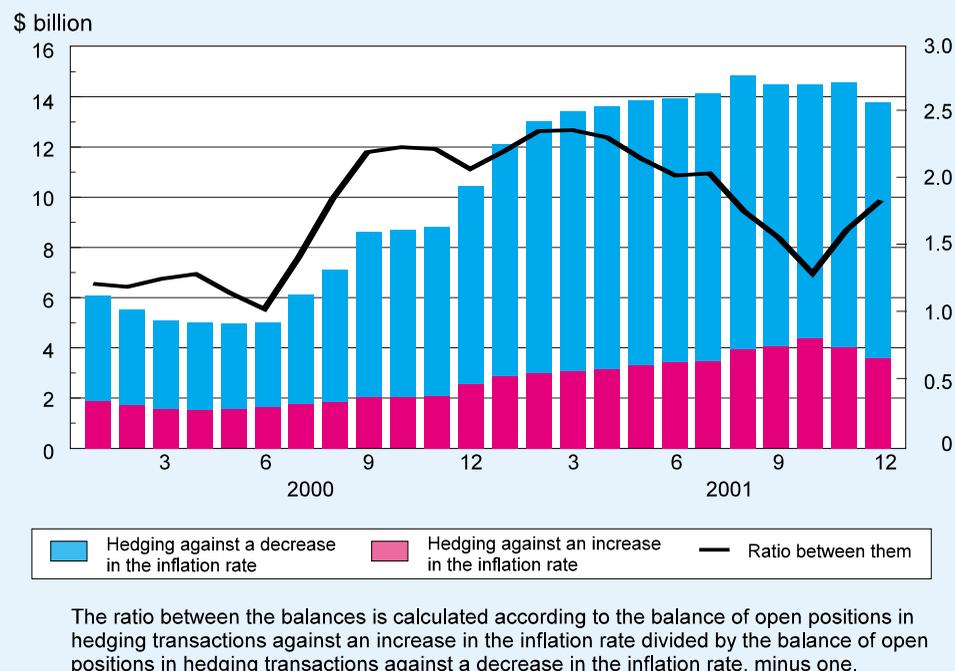
When making an international comparison with respect to options on the Maof index, it is usual practice to examine the daily turnover in options in underlying asset terms compared with the daily turnover in the underlying asset itself—an index that makes it possible to compare activity in options between stock markets with different volumes of trading. It was found that the volume of trading in options on the Tel Aviv Stock Exchange is considerably higher than that in the stock markets of developed and developing countries. This high volume of turnover could make it worthwhile to distort the Maof index on expiration dates by distorting the prices of the shares that are included in this index. Accordingly, turnover in derivatives that is appreciably higher than turnover in the underlying assets is suggestive of a lack of sophistication in the market.

Compared with the high volume of turnover in options, turnover in futures contracts remained low in 2001 as well, and the average daily number of open positions was 3.5 thousand units. However, the number of open positions increased to a considerable extent during 2000, and in the second half of that year reached 7,000 units. This level of turnover was maintained in the first quarter of 2001 but fell again in the second quarter. During the second half of 2001, a daily average of a thousand units was traded, similar to the level of turnover in 1999.

In August 2000, the stock exchange launched derivative assets on the Tel Aviv Banks index as a result of the successful trading in derivatives on the Maof index. During the first week of trading, daily turnover averaged only 300 options, and in 2001 there was no activity in these options. One of the reasons for the lack of interest in them is the similarity, in the short term, between the Tel Aviv Banks index, which is comprised of the five largest banks, and the Maof index, in which these five banks constitute 25 percent. This similarity is reflected in the statistical relationship between them: The coefficient of correlation (the estimate of the statistical relationship) of the changes between the two indexes amounts to 88 percent. In addition, the implied volatility of the changes in the Tel Aviv Banks index is lower than that of the changes in the Maof index, which reduces the feasibility of speculative trading.

¹¹ The gap is calculated by dividing the average daily turnover in call options by the average daily turnover in put options minus one.

Figure 4.16
Open Positions in CPI Hedging Transactions Between the Banks
and the Public, 2000–2001



d. Derivatives on the Consumer Price Index

Transactions in derivative assets on the consumer price index are currently only conducted in the banking system (Figure 4.16), and their balance reflects the public's demand for financial hedges against unexpected changes in the consumer price index.¹² The volume of hedges against an upsurge in inflation increased consistently during the second half of 2000. The balance of open positions reached NIS 10 billion at the beginning of 2001 and remained around this level in the course of the year, compared with NIS 4 billion in the first half of 2000. The volume of hedges against a fall in the inflation rate rose during the first three quarters of 2001 in a continuation of a trend recorded in the last quarter of 2000, and averaged NIS 4 billion in the last quarter of 2001 compared with NIS 2 billion at the end of 2000. A comparison of the volume of hedges against an upsurge in inflation with the volume of hedges against a fall in inflation (Figure 4.16) shows a relative decrease in the former during 2001 until October, when the volume of hedges against an upsurge in inflation amounted to 140 percent of the volume of hedges against a fall in inflation.

¹² Part of the transactions conducted in the banking system are between the banks and other banks. These transactions lead to a downward bias in the estimate of the volume of the public's hedges against changes in prices of the underlying assets.

e. Additional instruments

In June 2001, the Bank of Israel cancelled its bond-for-T-bill swap tenders (the sale of series of T-bills for CPI-indexed bonds) since their function was no longer relevant. The main objective of these tenders, which the Bank of Israel had offered since 1992, was to generate additional tools for the development of the unindexed market. The considerations that prompted the central bank to create this tool were:

1. An additional way of selling T-bills and promoting the development of the shekel market;
2. Promoting the tradability of short-term CPI-indexed series;
3. Easing the transition from the CPI-indexed market to the shekel market due to the low tradability.

These objectives were achieved over the years, and it was therefore possible to cease the tenders.

Box 4.4: Implied Volatility by Exercise Rates of Shekel-Dollar Options

Inherent in derivative financial assets is information on the public's expectations regarding the future prices of the underlying assets and the volatility of these prices. The implied volatility can be derived from shekel-dollar options by means of an equation for estimating the value of the options¹ and the volatility expected in the shekel-dollar exchange rate. The main assumption implied in deriving this information is that the distribution function of the underlying asset is lognormal and as a result, that the underlying asset has a single fixed expectation and a single fixed implied volatility during the lifetime of the option. Under this equation, of all the parameters that determine the price of the option, including the known dollar exchange rate, the shekel interest rate and the dollar interest rate, one parameter is not known in advance: This is the future implied volatility of changes in the price of the underlying asset. But given the price of the option and the other parameters, it is possible to derive the implied volatility from the equation.

The implied volatility of shekel-dollar options can be examined by means of the number of exercise rates, with options that have the same maturity date and that are traded simultaneously on the stock exchange. A positive and square implied volatility curve is usually obtained that is known in the literature as a 'smile curve.' This curve indicates that the distribution function of the exchange rate is not lognormal, because the implied volatility of the underlying asset is not fixed and is dependent on the exercise rate. The distribution function of the underlying asset is only lognormal when the curve of the implied volatility by the different exercise rates is completely

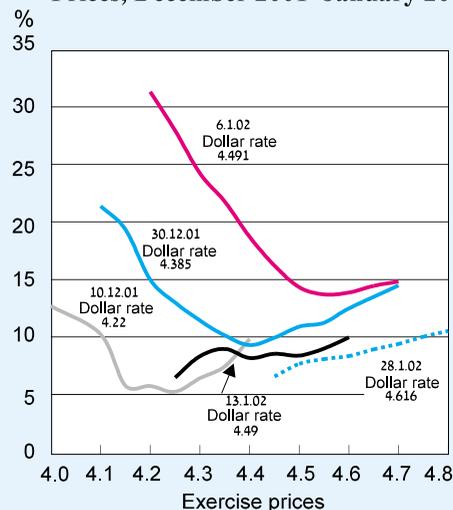
¹ The equation was developed by Fischer Black and Myron Scholes (henceforth, B-S) in 1973.

flat. Three main features therefore need to be examined on the implied volatility curve:

1. The level of implied volatility in exercise rates around a known rate—which reflects the level of general uncertainty.
2. The extent of symmetry in the curve—which shows the difference between the possibility of a depreciation and the possibility of an appreciation. A positive (negative) slope of the curve indicates that the mass of the distribution function tends towards a depreciation (appreciation).
3. The extent of ‘the smile’ of the curve, a high implied volatility at the extremes of the range of exercise rates—indicates a higher level of probability of sharp changes in the underlying asset (‘oiling’ of the distribution extremities).

Figure 4.17 presents a number of implied volatility curves on different

Figure 4.17
Implied Volatility of Shekel-Dollar
Options on the Stock Exchange
According to Different Exercise
Prices, December 2001–January 2002



dates close to the publication of the two percentage points interest rate cut in December 2001. We will describe the market’s expectations regarding the potential development of the exchange rate as reflected in the implied volatility curve. It can be seen that before the publication of the announcement (on December 10, 2001), the implied volatility was symmetrical around the known dollar exchange rate, at a relatively low level of 5-6 percent. In addition, the curve was notable at the time for a large ‘smile,’ meaning that the distribution mass was at the

center of the distribution range, and the probability of large changes (in both directions) was relatively large.

Following the publication of the interest rate announcement and until January 6, 2002, the exchange rate rose and reached approximately NIS 4.5 to the dollar. It can be seen that the implied volatility curve rose during this period, principally on the left part, revealing that uncertainty had increased and that the probability of an appreciation of the exchange rate was greater than that of a depreciation.

In the second half of January, between January 13 and January 28, 2002, the trend of depreciation in the exchange rate resumed. Concurrently the slope of the implied volatility curves was positive, and the level of the curves was slightly higher than in the period before the interest rate announcement. This shows that the distribution mass tended towards a continued depreciation of the exchange rate, and that the probability of large changes (in both directions) was not particularly high.

This analysis of the options market can be used to derive extensive information on the public's expectations regarding the potential development of the exchange rate. Inherent in such information are not only the public's expectations regarding the position of the exchange rate—the first moment—but also expectations of higher moments.