Chapter 4
The Securities Market

Yields to maturity, both nominal and real, declined moderately in 2004, following a relatively sharp decline last year. The nominal yields reached a similar average level to those at the end of 2001, and the real yields reached a lower level. In the first half of the year the yields on medium- and long-term bonds increased, while during the second half the yields for all terms declined, especially the short and the medium.

Share market prices rose moderately this year—as opposed to the sharp increases recorded in 2003—with a sharp rise of turnovers in shares and in derivatives on the share index, to record heights. In the Treasury-bill and government-bond market, trade turnovers increased impressively this year, reaching a higher level than in previous years.

The volumes of activity in derivative financial assets were characterized in 2004 by a mixed trend: trading volumes in interest-rate derivatives in the banking system and the stock exchange contracted, against the background of the decreased uncertainty, which was reflected in the prices of options, and in the low volatility characterizing the exchange rate this year. As opposed to these, the volume of trade in share derivatives traded on the Tel Aviv Stock Exchange increased, and especially the volumes of activity in interest derivatives and CPI derivatives offered by the banks. The Maof clearing house at the stock exchange inaugurated a real-time security-control system in 2004, whose characteristics are detailed in Section 5.

During the year, the government reduced the deficit and the net negotiable domestic borrowing; at the same time the volumes of issues in the corporate bond market, the stock market and the convertibles market grew sharply.

1. MAIN DEVELOPMENTS

During 2004, the downward trend of yields to maturity, which characterized the nominal and the real bonds throughout most of 2003, eased. The nominal yields declined to an average level similar to that at the end of 2001, and the real yields—to

a lower level. The development of yields was not uniform throughout the year—until May 2004, yields on medium- and long-term bonds, both nominal and real, increased. In June the rising trend of long-term yields was checked, and during the second half of the year the yields for all terms declined, especially the short- and the medium-terms. The changes in yields were influenced this year both by external and domestic factors. The major external factors were the increase in the long-term bond yield in the United States in the first half of the year, and a decline in the second half. The major domestic influences were the policy of gradually reducing monetary interest, the increasing public confidence in budget policy aiming to reduce the deficit, the progress of essential reforms for developing the capital market, and the gradual expansion of the activity of the pension funds in the capital market, in the wake of the reform, together with a reduction in the government deficit and in domestic borrowing—developments that contributed to declining yields.

Share market prices increased moderately in 2004, as opposed to the sharp increases of 2003, together with a growth in turnover to record heights. This constituted a continuation of the positive trend that began in February 2003, as opposed to the trend of falling prices and a low level of trading turnover that characterized 2001 and 2002. In both the Treasury bill and the government bonds market impressive increases in trading turnover were recorded, reaching a higher level than in previous years.

The level of uncertainty regarding developments in the foreign currency market, as reflected in the derivatives market, declined during 2004, a continuation of the trend that began in the second half of 2003. During April and May 2004, with a rise in the exchange rate of the dollar vis-à-vis the NIS, and fears of a rapid contraction of interest differentials between Israel and the United States (as detailed in Chapter 2), the declining trend in the level of uncertainty was checked, and even rose slightly. The decrease in uncertainty reestablished itself in June, and continued until December when, on the basis of some of the indicators detailed below, it reached its lowest level in years. In the last quarter of 2004, in the light of political developments and the publication in November of the decision to reduce monetary interest by two-tenths of a percent, the uncertainty rose, offsetting part of the decline that had accumulated during 2004. Also the need for protection against changes in the exchange rate declined during the year, which was expressed in the volume of trade in exchange-rate derivatives and in the volume of demand for options sold in Bank of Israel auctions. The average daily turnover in derivatives of the Tel Aviv 25 index reached record heights this year; a significant rise was recorded in the balance of the open positions in the banking system in interest derivatives, despite the fact that by international standards the volume of trade in these derivatives is still small. In March, the Bank of Israel began to undertake "Repo" transactions in Treasury bills with the banking corporations and members of the stock exchange. This instrument is meant to contribute to the continued improvement of the Treasury bill market and the short-term-interest derivatives market, to improving the transmission between the array of interest rates in the economy and to the development of extra-banking mediation.

The government's borrowing needs decreased this year as a result of the contraction in the deficit, which was also expressed in the reduced net negotiable capital borrowing in the domestic market. The contraction in this borrowing in the past two years supported the decline in yields in the government bonds market, and the expanded borrowing by the private sector.

A sharp increase was recorded in 2004 in the volume of issues in the corporate bond market, a continuation of the revival of the market for issues of these bonds that had already started in 2002. The main increase in borrowing by means of corporate bonds this year was the issue of negotiable bonds. Both the share issue and the convertibles market rose sharply in 2004, mainly through the issue of basket certificates. Despite the continuing recovery in the stock market, borrowing by means of private bonds was greater than by shares. Corporate borrowing by means of private bonds took place, inter alia, against the background of low financing costs relative to the alternative of using bank credit.

2. THE TREASURY BILL AND GOVERNMENT BOND MARKETS

a. The Treasury bill market

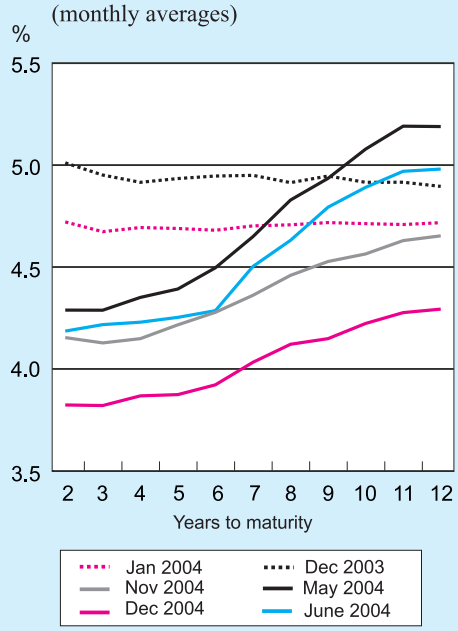
(i) The Treasury bill yield curve

Treasury bills are unindexed bonds with a maturity of up to one year that do not bear interest (coupon), and are issued and traded at a discount. The Bank of Israel sells this security to the public as one of the instruments of monetary policy. Treasury-bill yields for different time periods are influenced mainly by the Bank of Israel interest rate and the public's expectation of changes in the rate.

The average annual yields to maturity of Treasury bills declined during 2004 by about 1 percentage point from their December 2003 level (Figure 4.1), thus moderating the downward trend of Treasury-bill yields that began in 2003, and reached lower levels than at the end of 2001.

Changes in the yield curve during the year were not uniform. Three-

Figure 4.1
Treasury Bill Yield Curve, December 2003 - December 2004
(monthly averages)



SOURCE: Bank of Israel.

month short-term Treasury-bill yields declined from the beginning of the year until May 2004 by about 0.6 percentage points to a level of about 4.3 percent, against the background of the decrease in the Bank interest rate. As opposed to this, the long-term yields for a year increased until May by about 0.3 percentage points to a level of about 5.2 percent, thereby imparting a positive slope to the Treasury-bill curve. The gap between the Treasury-bill yield for a year and the Bank of Israel interest rate widened, while the gap between the three-month Treasury-bill yield and the Bank of Israel interest rate contracted, a situation that expressed expectations of no change in the Bank of Israel interest rate in the short term and an increase in the interest rate toward the end of the year—inter alia, against the background of expectations of a rise in interest in the US. From June until the announcement of the reduction in the interest rate in November, expectations of an increase in the annual interest declined, the three-month Treasury-bill yield remained almost unchanged at a level of 4.2 percent, while the long-term yield for a year fell to about 4.7 percent—all these parallel to the lack of change in the Bank of Israel interest rate. This reduced the positive slope of the curve, and the gap between the Treasury-bill yield for the year and the Bank of Israel interest rate contracted. In December, in the wake of a reduction in the Bank of Israel interest rate, the Treasury-bill curve flattened for all terms. The slope of the curve was almost completely flat up to a three-month term, and beyond this term it became positive, a reflection of the expectation of a moderate reduction in the three-month interest rate, and its increase only at the end of the first quarter of 2005.

(ii) Activity in the Treasury bill market

At the end of 2004, the public held a total of about NIS 72 billion in Treasury bills (without the banks—about NIS 66 billion), as opposed to about NIS 55 billion at the end of 2003. The removal of the ceiling on the issue of Treasury bills in February 2002 facilitated a gradual process of replacing bank deposits at the Bank of Israel with Treasury bills. Since then and up to the end of 2004, the average balance of Treasury bills grew by about NIS 33 billion, while the balance of the banks' deposits at the Bank of Israel declined by about NIS 20 billion. The replacement of the banks' deposits at the Bank of Israel—which are not tradable and are only available to the banks—by Treasury bills, which are traded by the public in the capital market, increases the ability of the monetary policymakers to maintain price stability through relatively small changes in the interest rate (see Box 4.1 in the Monetary Department's review of 2003). Furthermore, in March 2004 the Bank of Israel began offering Repo auctions as part of the management of monetary policy with a market instrument. This is an acceptable and tradable instrument in the international capital market that many central banks in the world use for managing interest policy. The Bank of Israel's Repo auctions take place twice a month in which the bank sells Treasury bills to banking corporations and to members of the TASE, and repurchases them two weeks later. The amount proposed for sale beginning in June was NIS 200 million per auction (from March to May the amount was NIS 100 million), and the participants compete on the auction for the interest they will obtain from the Bank of Israel. The Repo auctions

Table 4.1
Average Daily Turnover in Treasury Bills and Government Bonds, 2001–2004

(NIS million, current prices)

	Treasury bills		Total bonds in TASE				Total bonds	
	In TASE	Total	Shahar	Gilon	CPI-indexed	Foreign-currency indexed	In TASE	In and outside TASE
2001	183	205	148	73	84	66	371	497
2002	342	371	269	103	210	75	657	753
2003	452	489	295	116	198	35	644	697
2004	593	622	445	133	249	8	835	890

SOURCE: Based on data from TASE.

Table 4.2
Distribution of Holders of Bonds and Treasury Bills, 2003–2004

(percent)

	Treasury bills		Unindexed bonds (Shahar)		CPI-indexed bonds		Traded corporate bonds		Shares[a]	
	2003	2004	2003	2004	2003	2004	2003	2004	2003	2004
The public, directly	42.4	41.8	17.9	16.6	16.9	18.5	21.4	44.5	69.6	69.7
Mutual funds	39.7	44.0	20.4	15.2	5.0	6.7	5.8	9.3	2.7	3.3
Provident funds and advanced study funds	2.5	4.4	28.8	26.3	48.1	45.2	40.2	27.3	9.1	10.0
Banks	12.2	8.1	18.3	21.5	11.6	7.3	6.5	2.7		
Nonresidents	1.7	0.6	0.9	1.2	0.1	0.3	0.2	0.2	11.3	9.6
The government									4.5	4.0
Insurance firms	1.3	0.9	12.7	16.2	14.7	12.7	19.5	11.4	2.9	2.6
Pension funds	0.1	0.3	1.0	2.9	3.5	9.2	6.5	4.5	0.4	0.8
Total[b]	100	100	100	100	100	100	100	100	100	100

[a] The government holds shares directly.
[b] Excluding Bank of Israel.
SOURCE: Based on banks' balance sheets, TASE, and the Capital Market Department of the Ministry of Finance.

undertaken during the year were characterized by high demand, and in some cases a lower interest rate was determined than the Bank of Israel effective interest rate. In addition, the Bank of Israel has drafted a bill that will regulate the legal infrastructure for conducting these transactions. These steps are additional elements in the process the Bank of Israel has initiated over the years to enhance the Treasury-bill market and to improve the transmission mechanism between the Bank of Israel interest rate and the array of interests in the economy. With the acceptance of this instrument and the strengthening of the legal infrastructure for its operation, the Bank of Israel will expand its activities in this area and the instrument is likely to become a major component in managing Israeli monetary policy and the capital market. (See Box 1 in the Inflation Report for the first half of 2004.)

The average annual turnover of the daily Treasury-bill transactions grew considerably in 2004, reaching about NIS 620 million, as opposed to about NIS 490 million in 2003 (Table 4.1). This is a continuation of the positive trend in recent years.

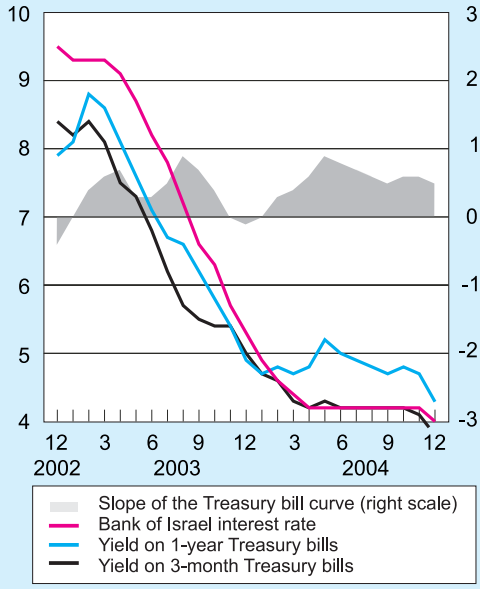
Regarding the distribution of Treasury-bill holdings (Table 4.2), conspicuous this year was the growth in the rate of Treasury-bill holdings by the mutual funds, which reached about 44 percent, as opposed to about 40 percent at the end of 2003. On the other hand, the banks' share declined during the year from about 12 percent at the end of 2003 to 8 percent at the end of 2004.

Box 4.1
The Information Embodied in the Treasury Bill Curve

By examining the changes in the slope of the Treasury bill yields curve, it is possible to identify the direction and the intensity of the expected change in the Bank of Israel interest rate as it is perceived over time by the players in the Treasury-bill market. The Bank of Israel uses the interest rates determined by the market as an important indicator for monetary policy in Israel, the reason being that they conceal important information about the market's expectations of future monetary policy. Treasury bill yields that rise as the term to maturity increases (a curve with a positive slope) generally reflect a risk premium and investors' expectations of an increase in the Bank of Israel interest rate and the market interest rates. And conversely: Treasury bill yields that decrease as the term to maturity increases (a curve with a negative slope) reflect expectations of a fall in future interest rates. In periods where there is an expectation of an incipient process of an interest rate increase/decrease, the Treasury bill curve assumes a steep positive/negative slope that flattens the more the process of increase/decrease matches the expectations and the more the expectations of a change in interest declines.

A further aspect of the way in which the market perceives interest-rate policy is expressed in the gap between the yields on three-month and one-year Treasury bills, and the Bank of Israel interest rate. In analyzing this gap, it is necessary to consider the "natural gap", which represents a risk premium, and it is thus customary to observe the change in the gap. The importance of the change in the gap between Treasury bill yields and the Bank of Israel interest rate lies in the fact that it reflects important information from the money market on the way in which the market evaluates this policy. Thus, the greater this gap, the more the market expects that the current Bank of Israel interest rate will rise or fall (depending on the direction of the gap) in the short term. Or, in other words, an increasing gap indicates that the current Bank of Israel interest rate level is incompatible with stable prices. Thus, if the yield to maturity on the Treasury bill is substantially different from the Bank of Israel interest rate, this can be seen as a sign from the market that the Bank of Israel cannot simultaneously continue its current interest rate policy and maintain stable prices.

Figure 4.2
Bank of Israel Interest Rate, Yield on 1-Year and 3-Month Treasury Bills and the Slope of the Curve, December 2003-December 2004
(percent, monthly averages)



SOURCE: Bank of Israel Monetary Department.

From the beginning of the year to May 2004, the yields on short-term three-month Treasury bill yields declined (a decline concentrated mainly in the first three months of the year, parallel to the reduction in the Bank of Israel interest rate), while the long-term one-year yields increased. These changes altered the slope of the curve to positive. During this period, the gap between the yield on one-year Treasury bills and the Bank of Israel interest rate widened, while the gap between the yield on three-month Treasury bills and the Bank of Israel interest rate contracted. These developments expressed expectations of no change in the Bank of Israel interest rate in the short term, and an increase in the interest rate in the term of up to a year, and indeed, the Bank of Israel ceased the process of lowering the interest rate (Figure 4.2). Concurrent with the lack of change in the Bank of Israel interest rate, the yield on three-month Treasury bills from June to the middle of November remained virtually unchanged at a level close to the Bank of Israel interest rate, while the long-term one-year yields decreased. This moderated the slope of the curve somewhat, and the gap between the yield on one-year Treasury bills and the Bank of Israel interest rate contracted. These developments reflected a moderation in expectations of an interest-rate increase within a one-year period. In November and especially December, following an interest-rate decrease of 0.2 percentage points, the slope of the curve for a period up to three months was almost flat, while beyond this period the slope became positive. Almost identical declines were recorded in the short- and long-term yields: the three-month yield reached a slightly lower level than the Bank of Israel interest rate, while the one-year yield was slightly higher than this interest—a situation expressing expectations of a continuing

modest lowering of the interest rate in the coming months and a rising rate over the period of a year.

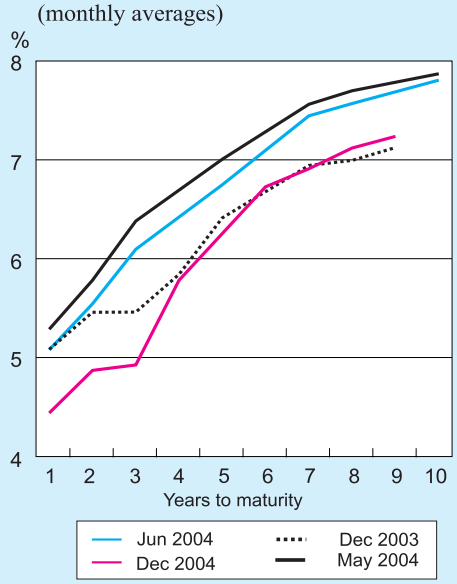
For comparison: private forecasters' interest-rate assessments were similar to those derived from the Treasury bill curve. Thus, at the beginning of the year the forecasters assessed that the lowering of interest would cease by April, following which the interest rate would remain unchanged until October 2004, and that the process of raising the interest rate would commence toward the end of 2004. During the year, the forecasters repeatedly postponed the date for raising the interest rate, and at the end of 2004, they expected that the interest-rate increase would not commence before April 2005, and even forecast the continuation of modest interest-rate decreases in January 2005.

The continued development of the Treasury bill market is an essential component in the promotion of competition and efficiency in the capital market. A major milestone in the expansion of the Treasury bill market in recent years was the aforementioned cancellation of the Treasury bill ceiling in February 2002. The removal of the Treasury bill ceiling enables the replacement of non-tradable bank deposits at the Bank of Israel with Treasury bills that are traded on the stock exchange, and which contribute to deepening the Treasury bill market and to increasing the efficiency of monetary policy. The implementation of "Repo" transactions in Treasury bills is also likely to contribute to the continued enhancement of the Treasury-bill market and to improving the transmission mechanism in the array of interest rates in the economy.

b. The government bond market

The trend of declining yields, which characterized the nominal and the real government bonds during most of 2003, was checked in January 2004. From February to May bond yields rose, especially medium and long term. In June their increase was halted, and from then until the end of the year they even declined. The increased yields until May were a consequence of external influence, supported by domestic entities. A major factor behind the increased yields in Israel in this period was the increase in yields of US government bonds, which reflected expectations of an interest-rate hike there during 2004, in light of the recovery of activity and the increased inflation. Also contributing to the increasing yields was the rising geopolitical risk of emerging economies. Among the domestic factors that supported the increased yields were the recovery in activity during this period, expectations of a growth in investments, and increased expectations of inflation in the first quarter. During this period, the increase in unindexed long-term yields was greater than the increase in indexed long-term yields, seemingly an expression of expectations of higher inflation in the future. This development is also apparently inherent in the strong influence that the increased

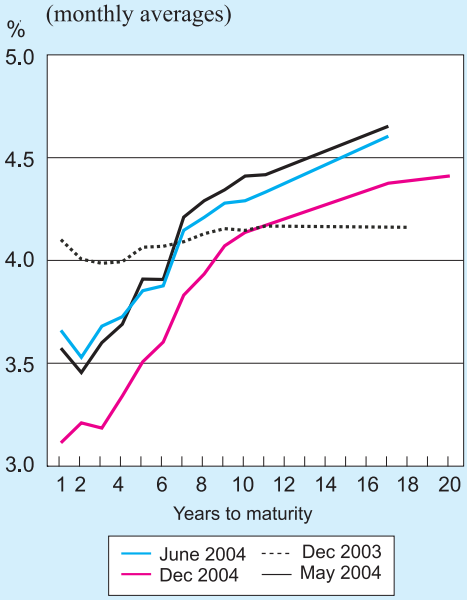
Figure 4.3
Unindexed Bond Yield Curve, December 2003 - December 2004
(monthly averages)



SOURCE: Bank of Israel.

yields of US government bonds had on the nominal government bonds in Israel. From June to the end of the year, a decline in nominal and real yields was recorded, especially in the medium and short terms, thus steepening the positive slopes of the curves. Short-term yields declined below the level prevailing at the end of 2003 and that of recent years, while for longer terms the decline in yields was more moderate, and they were still at a slightly higher level than at the end of 2003. However, up to February 2005 long-term yields continued to fall and reached lower levels than in previous years. The declining yields in the second half of the year occurred against the backdrop of declining long-term yields in the US, despite the interest-rate hikes there, as well as against the backdrop of domestic factors such as the decrease in Israel's risk, the increased public confidence in the budgetary policy and in the government's determination to reduce the deficit. Also, the decline in yields—especially in the short term—was supported by a lowering of the interest rate in Israel in December. Among the domestic factors that supported the decline in yields in 2004 was the reduction in tradable borrowing together with the cessation of issues of government bonds designated for the pension funds as part of the reform.

Figure 4.4
Yield Curve of CPI-Indexed Bonds December 2003 - December 2004
(monthly averages)



SOURCE: Bank of Israel Monetary Department.

(i) The yield-to-maturity curve for unindexed fixed-interest government bonds

"Shahar" is an unindexed government bond bearing fixed annual interest, which is issued for medium and relatively long terms. Up to May 2004, "Shahar" yields increased, mainly in the medium and long terms, while in

the second half of the year they declined in all the terms, especially the short and the medium (Figure 4.3).

The development of the yields was not uniform throughout the year: they rose from February to May, especially in the medium and long terms, to average levels 0.9 and 0.7 percentage points respectively higher than the end of 2003. On the other hand, the rise in yields in the short term during this period was more moderate and unsteady. These changes led to a steepening of the positive slopes of the curve, which reflected expectations of higher interest rates in light of the expected interest-rate hike abroad. From June to the end of the year nominal yields fell, among others, against the backdrop of a decline in the long-term yields in the US, despite the interest-rate hikes there, and the renewed lowering of the Bank of Israel interest rate in December. The decline in short-term yields was relatively sharp and reached an average level of about 4.7 percent—lower than the level at the end of 2003 and of previous years. The decline for long terms was more moderate, and reached a level of about 7.2 percent (Figure 4.3). Long-term yields continued to decline until February 2005, and they reached a level of 6.7 percent, a similar level to that at the end of 2001.

(ii) The yields-to-maturity curve for CPI-indexed government bonds

"Galil" is a CPI-indexed government bond that bears fixed annual interest and is issued for relatively long terms. Up to May 2004 medium- and long-term yields increased, and short-term yields declined. In the second half of the year yields for all terms declined. In the short and the medium term, they reached a lower level than at the end of 2003 and of previous years, while in the long term they were still higher than at the end of 2003 (Figure 4.4). In February 2005, the long-terms yields as well reached a lower level than at the end of 2003. The slope of the curve went from almost flat at the end of 2003 to steeply positive during the year.

The development of the yield curve was not uniform over the year: the indexed yields fell in January, continuing their decline throughout most of 2003. The main decline was in the short terms, and thus the slope of the yields curve became positive. From February to May real medium and long-term yields increased. The increase in the long-term yields until May totaled 0.4 percentage points, and they reached 4.7 percent, while the short-term yields remained almost unchanged at a level of 3.5 percent. Thus the positive slope of the curve steepened. These developments took place, among others, against the backdrop of the accelerated growth in the economy in the first half of the year. From June to the end of the year, a decline was recorded in the curve for all terms: the short-term yields reached an average level of about 3.2 percent, lower than at the end of 2003 and of previous years, and the long—to a level of about 4.4 percent, higher than the level at the end of 2003. The decline in the yields from June was influenced, among others, by assessments that the growth would taper off in the second half of the year, as well as from data that government expenditures were less than expected. Yields continued to decline up to February 2005 and reached a level of about 4.1 percent for the long terms, a lower level than in previous years.

(iii) Activity in the bond market

The development in yields in the bond market during 2004 was accompanied by an increase in trade turnover. Prominent was the significant increase in turnover in "Shahar" unindexed bonds, a continuation of their increasing trend in recent years. The average daily trading of "Shahar" both on and off the stock exchange totaled about NIS 470 million in 2004, as opposed to about NIS 315 million in 2003, and about NIS 150 million in 2001. As opposed to this growth, the unindexed, variable-interest-rate "Gilon" bonds were also far less tradable this year than "Shahar". It appears that investors prefer to invest in bonds that pay a fixed interest rather than bonds of the "Gilon" type whose future receipts are unknown (See Chapter 1). Trade turnover in CPI-indexed bonds increased this year, after declining somewhat in 2003: the average daily turnover of CPI-indexed bonds both on and off the stock exchange totaled about NIS 260 million in 2004, as opposed to about NIS 215 million in 2003 (Table 4.1).

Trade turnovers in the bond market, despite their increase, are still relatively low in international terms. The capital market reform, which aims to reduce the dominance of the large banks in this market, is meant to contribute to deepening the tradability of government bonds. It is also important to include market makers who will operate in the secondary bond market, a move that is also meant to increase their tradability. The way in which their activity in the market is regulated is also important (see Chapter 1 and Box 4.1 in the 2003 monetary review).

(iv) Distribution of bond holdings

An analysis of the composition of "Shahar" unindexed bond holdings shows that in 2004 the banks, the insurance companies and the pension funds increased their investment in these—particularly at the expense of the mutual funds (Table 4.2). The growth of the banks' share in "Shahar" holdings is a continuation of the trend in recent years: their share rose from about 7 percent at the start of the decade to about 21.5 percent this year. The growth in the share of the pension funds, which this year reached 2.5 percent, as opposed to only one percent at the end of 2003, and as opposed to zero rates at the beginning of the decade, was apparently due to the influence of the reform in these funds. The decline in the share of the mutual funds' holdings of "Shahar" bonds can be explained by the negative accumulation in the NIS funds. It appears that the funds preferred to realize mainly long-term nominal assets, and on the other hand increased their share in Treasury-bill holdings.

In the CPI-indexed bonds (Table 4.2), the increased share of the pension funds, the mutual funds, and the public was noteworthy, at the expense of the shares of the banks and the insurance companies which fell. The increased proportion of the mutual funds in these bonds can possibly be explained by the positive accumulation that concentrated on the funds specializing in investments in bonds and state bonds. The sharp increase in the share of the pension funds in indexed bonds, as well as in unindexed "Shahar" bonds, starting from the end of 2003, is explained by the funds' turning to the capital market in the wake of the reform in the pension funds. This

Table 4.3
Government Borrowing, 2002–2004

(NIS billion, current prices)

			2004					Budget proposal
	2002	2003	I	II	III	IV	2004	2004
1. Overall surplus (+) / deficit (–) (excl. credit extended)	–19.3	–27.7	0.1	–7.4	–3.3	–9.8	–20.4	–20.6
2. Domestic surplus (+) / deficit (–) (excl. credit extended)	–19.2	–26.6	–1.1	–5.0	–2.1	–9.2	–17.4	–17.4
3. Total net borrowing (domestic and abroad)	21.7	29.4	6.1	4.3	2.7	7.7	20.8	21.0
4. Net domestic borrowing (including privatization)	24.3	22.7	4.4	2.6	2.6	3.4	13.0	12.4
of which Tradable	21.5	19.1	5.5	3.6	4.6	4.7	18.4	20.1
5. Gross domestic borrowing								
Tradable	44.9	44.4	13.0	10.4	7.0	5.5	36.0	37.5
Non-tradable	12.1	13.1	0.7	0.2	2.3	0.6	3.8	3.0
Total	57.1	57.5	13.7	10.6	9.4	6.1	39.8	40.5
6. Privatization	0.4	0.3	0.5	0.5	-0.2	0.2	1.0	2.6
7. Domestic redemptions (principal)[a]								
Tradable	23.5	25.3	7.5	6.8	2.5	0.8	17.6	17.4
Non-tradable	9.7	9.8	2.3	1.6	4.1	2.1	10.2	8.2
Total	33.2	35.1	9.8	8.5	6.6	2.9	27.8	30.7
8. Net borrowing abroad	–2.6	6.7	1.7	1.7	0.1	4.3	7.8	8.6
9. Injection (–) / absorption (+)	5.1	–3.9	3.3	–2.4	0.5	–5.8	–4.4	–5.0

[a] Excluding national insurance.
SOURCE: Based on data from the Ministry of Finance.

year the pension funds' investment in CPI-indexed bonds[1] totaled about NIS 8.7 billion as opposed to about NIS 3.5 billion at the end of 2003, and in "Shahar" bonds of about NIS 2.1 billion as opposed to NIS 0.7 billion respectively. The provident funds and the advanced-study funds hold the major share of the CPI-indexed bonds, about 46 percent. The concentration of CPI-indexed holdings by the provident funds is explained by the funds' long-term investment horizon.

The proportion of bonds held by nonresidents in 2004 was lower than one percent, as in previous years, indicating the lack of attractiveness of the Israeli bond market for foreign investors. Despite this, the share of foreign investors in "Shahar" is higher than in CPI-indexed bonds. The integration of market makers in the secondary market could contribute to increasing the tradability of the Israeli bonds and to widening their volume held abroad, despite the experience of a number of developed countries in which the secondary market is sufficiently deep without official market makers.

(v) Government domestic borrowing

Gross government borrowing in 2004 totaled about NIS 40 billion (Table 4.3), as opposed to planned borrowing (budget proposal) of NIS 40.5 billion, made up of gross tradable domestic capital of about NIS 36 billion and gross nontradable domestic capital of about NIS 3.8 billion, a decline of about NIS 10 billion relative to 2003.

[1] Monetary Department estimate.

One of the reasons for the decline in domestic capital borrowing this year was the contraction in the deficit.

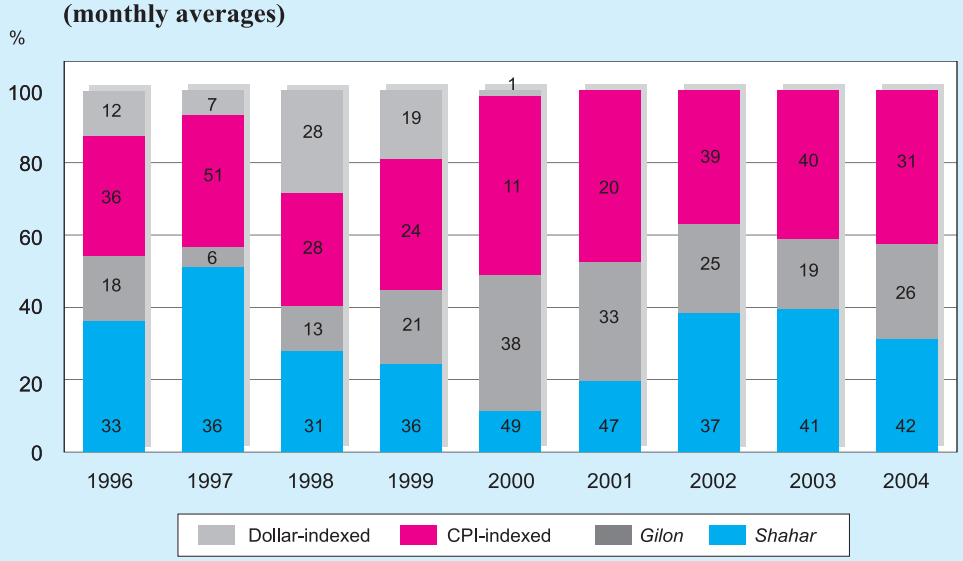
During the year the government privatized about NIS one billion, mainly by selling "Zim", "Bezeq", and "Bank Leumi" shares.

In 2004, the government's net borrowing abroad totaled about NIS 7.8 billion, as opposed to borrowing of about NIS 6.7 billion in 2003, following minimal issues abroad in 2001 and 2002. The contraction of the deficit this year enabled the government to also reduce its borrowing of tradable domestic capital, so that net tradable domestic borrowing totaled about NIS 18.4 billion this year, as opposed to about NIS 19 billion in 2003 and about NIS 21.5 billion in 2002, a reversal of the upward trend of 2001 and 2002. The reduction of local domestic borrowing enabled the expansion of the private issues market.

The government's borrowing in 2004 consisted of 42 percent of unindexed, fixed-interest bonds, 31.4 percent of CPI-indexed, fixed-interest bonds, and 26.3 percent of unindexed, variable-interest bonds. Continuing the trend that characterized 2003, the proportion of unindexed fixed-interest borrowing increased this year relative to the tradable government borrowing (Figure 4.5), and the term to maturity of the issued government bonds lengthened, both the CPI-indexed and the unindexed fixed-interest bonds.

Changes in government borrowing by indexation base: The proportion of borrowing this year through unindexed, fixed-interest "Shahar" bonds relative to total tradable capital increased, while the proportion of CPI-indexed bonds decreased,

Figure 4.5
Composition of Government Borrowing, by Indexation, 1996–2004 (monthly averages)



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

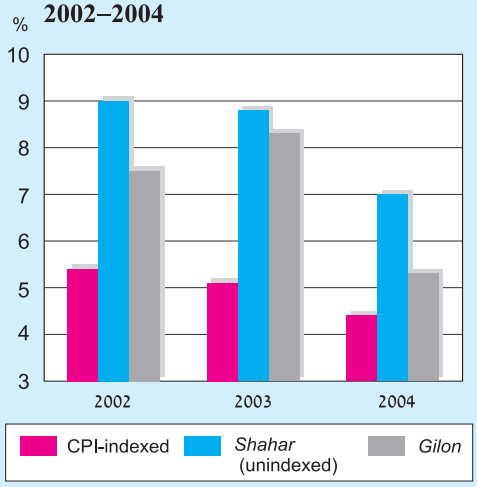
which expresses a return to the trend of recent years (except for 2002), in which, in the wake of the stabilization of the expected inflation at a low level, the proportion of "Shahar" bonds in the tradable capital borrowing was highest.

This year the government increased the proportion of "Gilon" unindexed, variable-interest bonds in its borrowing of tradable capital, as opposed to the trend of reducing the proportion of these bonds in the past three years. It is important to phase out these bonds, among others, because of their low tradability. This is a continuation of the government's policy in the past in which it ceased issuing certain bonds, such as "Kfir" CPI-indexed, variable-interest bonds, and "Gilboa" dollar-indexed, variable-interest bonds.

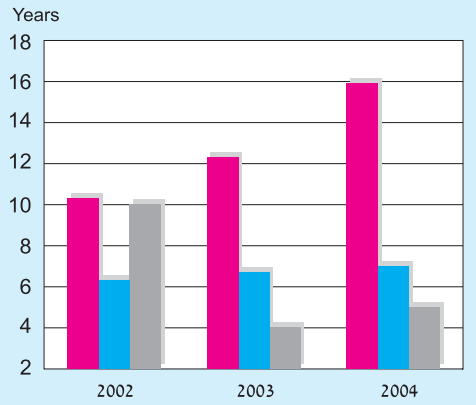
Changes in government borrowing by term to maturity: In 2004, against the background of stabilization of yields at a low level, which reduced capital-borrowing costs, the government lengthened the term of tradable, domestic capital borrowing, in continuation of the 2003 trend. The government issued "Shahar" bonds in benchmark series with terms of five and ten years, and "Galil" bonds in benchmark series with terms of ten and twenty years. Thus the average term of unindexed, fixed-interest government borrowing, at the time of issue in 2004, reached about seven years, while the term of indexed, fixed-interest government borrowing reached about sixteen years, as opposed to 6.7 and 12.3 years respectively in 2003, and 6.3 and 10.3 years respectively in 2002 (Figure 4.6).

Figure 4.6

a. The Cost of Government Bonds, 2002–2004



b. The Terms of Government Bonds, 2002–2004



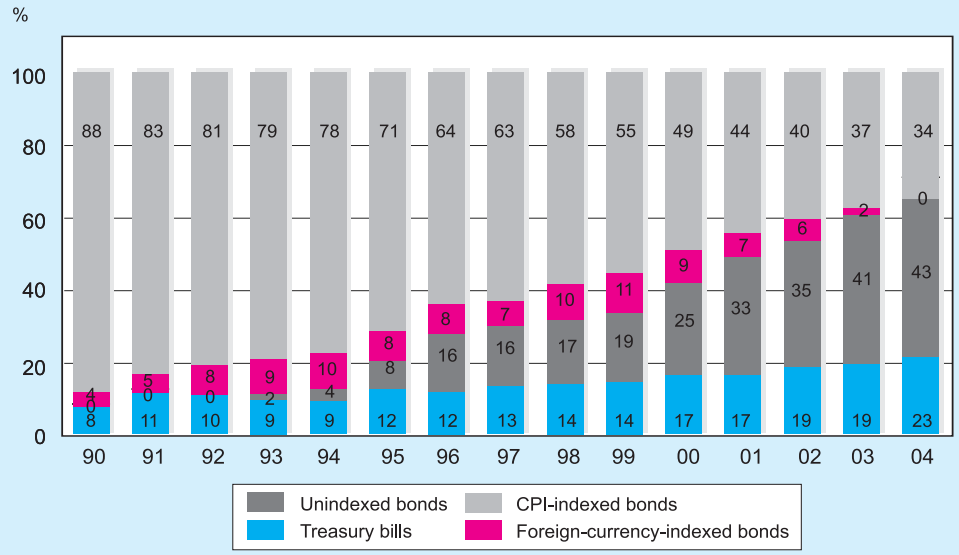
SOURCE: Based on data from the Capital Market Department, the Ministry of Finance.

(vi) Distribution of capital listed for bond trading

In 2004, the proportion of Treasury bills and unindexed bonds in the total capital listed for trade increased, at the expense of CPI-indexed and foreign-currency-indexed bonds, which fell. This is a continuation of the trend of recent years (Figure 4.7).

The proportion of unindexed bonds has risen continuously from about 8 percent in the mid-1990s to about 43 percent in 2004. The proportion of CPI-indexed bonds fell

Figure 4.7
Distribution of Registered Capital for Trading in Bonds and Treasury Bills, 1990–2004



SOURCE: Bank of Israel.

from 70 percent in the mid-1990s to about 35 percent in 2004. The increased proportion of unindexed bonds in total capital listed for trade in 2004 and the decreased proportion of CPI-indexed bonds were partly a result of the stabilization of inflation at a low level and of the change in the composition of the government's capital borrowing, i.e. the increased proportion of the unindexed bonds in the tradable capital borrowing, at the expense of the CPI-indexed bonds.

In 2004, the foreign-currency-indexed Gilboa bonds were almost completely redeemed. The issue of dollar-indexed bonds began in the early 1980s and continued until the beginning of 2000, when the government discontinued their issue. During the year, two series of Gilboa bonds with a total value of NIS 1.2 billion expired, and an additional series with a small total value will mature in 2010. The private sector has created alternatives for these assets (see Section 3.1 below – Issue of tradable corporate bonds on the stock exchange).

3. THE CORPORATE BOND MARKET[2]

In 2004 Israeli corporations raised about NIS 33 billion through the issue of corporate bonds on the TASE and via private issues outside the stock exchange, as opposed to NIS 17.8 billion in 2003 (Table 4.4). The major growth in borrowing by means of corporate bonds was via the issue of tradable bonds.

[2] Monetary Department estimate.

The revival of the corporate bond market, already evident in 2002, intensified in 2003 and 2004 against the background of conservativeness and tightening of the conditions of credit in the banking system, the ongoing process of declining interest rates in the market, the contraction of yield differentials between corporate and government bonds, and the low cost of this borrowing relative to obtaining credit from the banks. The revival was also supported by the contraction of government borrowing in the domestic market, which enabled the increase in public sector issues, by changes in the investment rules for institutional investors, which increased their demand for these instruments, and by the equalization of taxation conditions of the private bonds to those of bank deposits, which were previously tax exempt. However, despite the relative revival in the corporate bond market, activity in this market in Israel is still undeveloped both in relation to the government bond market and to parallel markets in developed countries.

a. Issues of tradable corporate bonds on the Tel Aviv Stock Exchange

The major growth in borrowing via bonds was in the issue (including allocation) of tradable bonds whose volume reached about NIS 21 billion in 2004, greater than any amount raised on the TASE in a single calendar year since the beginning of the 1990s. Prominent in 2004 were the allocations of IDB Development and the Israel Electric Company, each of which borrowed approximately NIS one billion in this manner. The major growth can, however, be explained by the growth in issues of structured bonds which totaled about NIS 10.7 billion this year, as opposed to only NIS 2.7 billion last year. While the issue of bonds serves the non-financial business sector as an alternative source of financing to bank credit, and are essentially index linked, the borrowings by means of structured bonds do not constitute a source of financing,

Table 4.4
Private-Sector Issues of Bonds and Shares, 2000–04

(NIS billion)

	2004	2003	2002	2001	2000
Shares and convertibles[a]	22.2	3.6	3.0	6.9	8.4
Of which: tracker funds (ETFs)	16.9	1.0	0.0	1.8	0.4
Tradable bonds	21.3	6.2	4.2	2.7	0.3
Of which: structured bonds and certificates of deposit (CDs)	10.7	2.7	0.3		
Nontradable bonds[b]	11.8	11.6	5.3	3.4	2.2[c]
Total bonds	33.1	17.8	9.5	6.0	2.5
Total	55.3	21.4	12.5	12.9	10.9
Of which: shares, convertibles, and bonds for financing business-sector activity	27.7	17.7	12.2	11.2	10.6
Other securities (ETFs, CDs and structured bonds)	27.6	3.7	0.3	1.8	0.4

[a] Excluding issues abroad, nontradable convertible bonds and State of Israel offers for sale.
[b] Including "Retzef Mosadiim" series since its introduction in May 2004.
[c] Private allocation of Teva nontradable convertible bonds in the US.
SOURCE: The Tel Aviv Stock Exchange and estimates of the Bank of Israel Monetary Department.

for the borrowed money is generally deposited in local or overseas banks and serves as security for the repayment of the issued bonds. The structured issues in the Israeli capital market in recent years were generally foreign-currency linked and were issued, *inter alia*, as an alternative to "Gilboa" government bonds that were gradually almost completely repaid. It thus appears that the private sector has the ability to provide dollar-indexed assets when there is a demand for them, and there is no necessity for the government to do so.

The market for public issues of corporate bonds constitutes only about 11 percent of the total tradable bond and Treasury-bill market. In 2004, the public was the major holder of these bonds, as opposed to previous years in which the major holders were the provident funds and the advanced-study funds; the proportion held by these two funds declined from 40 percent in 2003 (and from 61 percent in 1998) to about 28 percent this year (Table 4.2).

The average turnovers of corporate bonds increased this year; however, as in previous years, their average daily turnover was low. As a result of the low tradability in this market, many firms are still largely dependent on bank credit, especially small and medium-sized firms in the traditional branches that are unable to raise capital abroad. Improving the functioning of the corporate bond market could contribute to a more efficient capital market and to providing a source of credit outside the banking system.

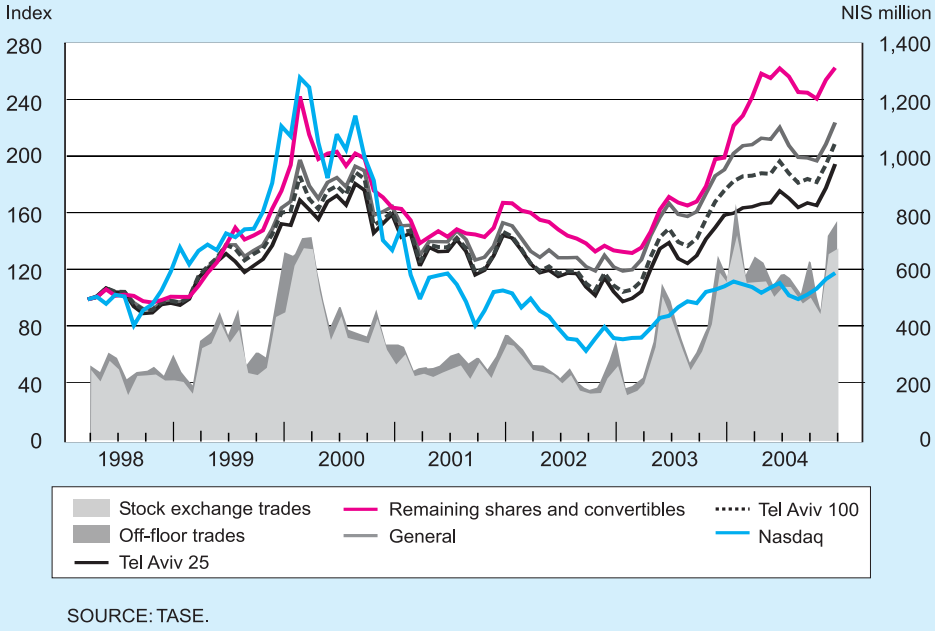
b. Private issues of nontradable corporate bonds

The growth tempo of issues of nontradable bonds subsided in 2004, their volume reaching about NIS 11.8 billion, after these issues had more than doubled in 2003 to a level of about NIS 11.6 billion (Table 4.4). Nontradable bonds are usually issued to institutional investors, who purchase them despite their liquidity disadvantage, in that investments in them are recorded in their books according to the adjusted cost, which does not expose them to fluctuations in yield. This situation is likely to change: starting in April 2005, investments in nontradable bonds will also be recorded according to market value.

Most (about 90 percent) bond issues of the private sector are CPI linked, and a minority foreign-currency linked. The reason for this, among others, is that most of the private sector bond holders are long-term investors, especially provident funds, insurance companies, and pension funds, which prefer to invest in CPI-linked assets. Banks use this method to issue subordinated capital notes in order to enlarge their capital base and to fulfill the minimum capital ratio requirement.

In May, the TASE introduced a trading system in these bonds that are issued to institutional investors, excluding mutual funds, without a prospectus. The on-line trading is conducted in a similar manner to that of trading in bonds issued to the public, but is only available for institutional investors. The aim of the system is to improve the liquidity of bonds that are not issued to the public, thereby diversifying firms' sources of finance and contributing to the improved functioning of the credit

Figure 4.8
General Shares, Tel Aviv 100, Tel Aviv 25 and Remaining Shares and Convertibles Indices and Nasdaq (end of month, March 1998=100) **and Average Daily Turnover** (monthly data, NIS million), **March 1998–December 2004**



SOURCE: TASE.

market. Furthermore, if in the future the mutual funds are also be permitted to invest in the securities registered for trading by means of this system, the variety of investors in these nontradable securities will increase, a situation that could contribute to developing this market.

4. THE EQUITY MARKET

Moderate price increases were recorded in the equity market in 2004—as opposed to sharp increases in 2003—accompanied by a substantial growth in turnover. This reversed the downward price trend and low turnovers of 2001 and 2002 (Figure 4.8).

The General Share-Price Index and the Tel Aviv 100 index rose by 18-19 percent in 2004, and the Maof index rose by about 23 percent, a continuation of the 50-60 percent increases in 2003. Particularly large increases were recorded in the latter part of the year, and prices reached a record height, against the background of NASDAQ increases, the purchase of shares by nonresidents, the lowering of the Bank of Israel interest rate and the prospects of a positive turnabout in the Arab-Israeli conflict (the previous record was recorded in 2000, prior to the October turmoil and the hi-tech crisis). The price increases this year encompassed nearly all sectors (Figure 4.9), especially the commercial banks and the investment companies. At the same time,

the NASDAQ index in the US rose this year by about 9 percent, after a sharp increase of about 50 percent in the previous year. The influence of the American market on the Israeli market is particularly strong, *inter alia,* because of dual listing of certain firms.

Total share capital listed for trading increased during 2004 to about NIS 370 billion against the background of the rise in share prices, as opposed to about NIS 308 billion in 2003 and about NIS 202 billion in 2002. The price increases were accompanied by a sharp growth in turnover, a continuation of the previous year's trend, and the average daily level of turnovers stood at about NIS 600 million, as opposed to about NIS 370 million in 2003 and about NIS 240 million in 2002 (Figure 4.8). Record turnovers were recorded in January and December—the highest since the record of January 1994. Despite this, turnovers were still lower than the norm in other countries.

Figure 4.9
Prices of Shares and Convertibles, Selected Industries, 2002–2004
(rates of change)

SOURCE: TASE.

The share holdings of foreign investors stood at about 10 percent of the share stock at the end of 2004 (Table 4.2). Financial investments (the holdings without stakeholders holdings) rose this year to about 4.7 percent, as opposed to about 3.5 percent at the end of 2002. This was a result of the risk in Israel's economy becoming lower than that in emerging markets over the past two years. This proportion is higher than the proportion of foreign holdings in other investment channels. The government reduced its holdings of listed capital to 3.8 percent, as opposed to about 4.5 percent at the end of 2003, *inter alia,* by privatizing Bezeq shares.

The market for equities and convertible securities revived in 2004 to about NIS 22 billion,[3] as opposed to NIS 3.6 billion during 2003 (Table 4.4). The recovery enabled more than 20 new companies to raise funds this year, as opposed to 2 new companies last year—especially in the industrial sector, a consequence of the continuing positive trends in the markets in 2004, among them an expectation of growth in the economy and an improvement in the companies' profits. NIS 17 billion of the above financing is, however, the issue of basket certificates, a financial instrument enabling the possibility of investing in a specific stock exchange index and minimizing the costs of the investment.

[3] Estimate, excluding overseas issues, nontradable convertible bonds, and offers for sale by the State of Israel.

The issue of basket certificates is not a source for financing the business sector; the issuing company uses the issue money to invest in securities that comprise an index in a particular stock exchange, such as the Maof index and indices of shares traded abroad. In July this year, the TASE announced the coming into force of an amendment to the income tax regulations, according to which basket certificates of securities reflecting international indices and which are traded in Tel Aviv, will be taxed at a rate of 15 percent, instead of 35 percent, an amendment that contributes to increasing the activity in this market. Furthermore, the TASE directorate approved, as part of the overall steps designed to develop the basket certificates market, rules for issuing basket certificates for commodities traded on overseas stock exchanges (such as gold and oil), as well as the issue of basket certificates on the index of hedge funds and on short certificates (certificates that "behave contrary" to the index that serves as their underlying asset). Toward the end of the year the TASE decided to introduce new share indices such as the Yeter-30 index, which includes the 30 shares with the highest market value on the Yeter index, and are among the 200 most traded shares on the stock exchange; the Tel Aviv Finance-15 index, which includes the 15 largest financial shares (the commercial banking sector, mortgage banks, financial services and insurance companies)—while at the same time eliminating the Tel Aviv Banks index—and the Tel Aviv Real Estate-15 index, which includes the 15 shares with the highest market value in the new real estate sector, which will include the building and real estate sectors and the investment companies sector. The introduction of the new indices will enable the issue of new basket certificates reflecting these indices, an additional layer that could contribute to the development of the market, and facilitate more diverse tradability.

5. THE DERIVATIVES MARKET

Trade in derivative financial assets is conducted in three frameworks—the Tel Aviv Stock Exchange, the commercial banks and the Bank of Israel. Futures contracts and options on the Maof index and the dollar and euro exchange rates are traded on the TASE; the commercial banks conduct transactions with their customers in nontradable derivative financial assets on a variety of underlying assets; and the Bank of Israel writes NIS-dollar options and futures contracts on Treasury bills and sells them to the public by auction.

The derivate financial assets enable the investor public to protect itself from fluctuations in prices of the underlying assets, such as the exchange rate, the share indices, and short and long-term interest rates. Therefore, the existence of wide and deep trading in the derivatives market enables the investor public to limit uncertainty regarding the possibility of financial losses, and grants a type of insurance mechanism against exceptional changes in the prices of the financial assets. Furthermore, derivatives trading increases the volume of trade in the financial assets themselves, thereby increasing liquidity, reducing liquidity premiums, and, to a certain extent, reducing fluctuations in the prices of the assets.

The volume of activity in derivative financial assets in 2004 was characterized by a mixed trend: the volume of trading in exchange-rate derivates in the banking sector and in the TASE declined as a result of the reduced uncertainty, as reflected in the prices of the options, and the low volatility of the exchange rate this year. As opposed to these, the volume of trading in share derivatives traded on the TASE grew, and a substantial rise was recorded in the volume of activity of exchange-rate derivatives and CPI derivatives offered by the banks.

In April 2004, the Maof Clearing House at the TASE introduced a real-time securities-control system. Using this system it is possible to examine at any time during the trading day whether the members of the Maof Clearing House have met the securities requirements for writing derivatives, which strengthens the ability of the members of the Stock Exchange and the Maof Clearing House to avoid insolvency. In addition, this year the TASE implemented the market making model proposed in the report of the Hauser Committee for trading in euro exchange-rate derivatives. The TASE is also working to improve trading in the derivatives market. Among the improvements is the decision to allow trading in futures contracts of *Shahar* unindexed, fixed-interest bonds. These bonds reflect the three- and seven-year NIS yield prevailing in the capital market, according to the average yield of those *Shahar* series determined by the TASE. In addition to these bonds, the TASE intends to permit trading in options and in futures contracts of the Tel-Tech 15 index, an index that includes shares of the fifteen largest companies in the electronics, computers, biotechnology and risk-fund investments fields.

With the help of the information from the derivatives market, it is possible to assess the level of uncertainty embodied in expectations of developments in the prices of a number of major financial assets—the exchange rate, NIS interest rate, CPI, and share index. This kind of assessment enables the investor public as well as economic-policy makers to evaluate developments in the capital and the financial markets more precisely.

a. Exchange-rate derivatives

The volume of trade in options and futures contracts on the rates of exchange declined during 2004, and the number of open positions in NIS-dollar options traded on the TASE also declined considerably. The contraction of trade in derivatives encompassed the derivatives granting protection both against appreciation and against depreciation in the exchange rate, and can be seen against the background of the relative stability that characterized the exchange rate during the year. The level of uncertainty regarding expected developments in the foreign exchange market declined during 2004, a continuation of the trend that began in the second half of 2003.

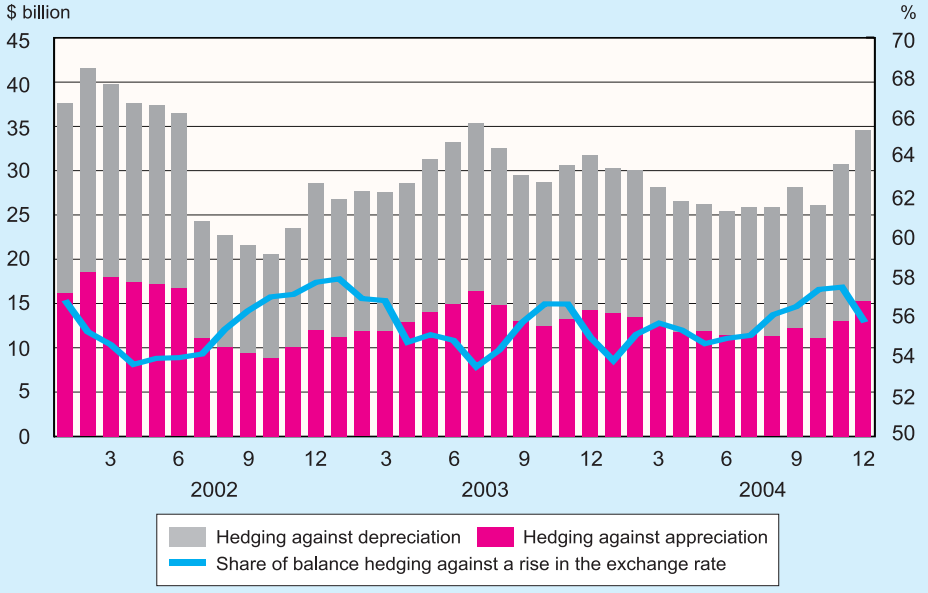
In April and May 2004, with the increasing exchange rate of the dollar against the NIS, and fears of a rapid contraction of interest-rate differentials between Israel and the United States (as detailed in Chapter 2), the trend of declining uncertainty was halted, and uncertainty even rose slightly. In June, however, the decline in the level of uncertainty reestablished itself and continued until September. In the last quarter

of 2004, in light of political developments and the November decision regarding the reduction of monetary interest by two tenths of a percent, uncertainty increased, which offset some of the reduced uncertainty that had accumulated during 2004. Overall, there was less uncertainty in 2004 than in 2003, and its level, according to some of the indicators, as detailed below, was the lowest in years.

(i) The banking system

Transactions between the banks and the public in nontradable derivative financial assets[4] are carried out in the banking sector at various exchange rates, most being NIS-dollar exchange-rate derivatives. These transactions, defined as over-the-counter (OTC) transactions are adapted to the customers' needs and requirements. Figure 4.10 presents the balance of open contracts which hedge against unexpected fluctuations in a variety of exchange rates. The balance of open contracts between the public and the banks in exchange-rate derivatives decreased in the first half of 2004, and in June reached an average of $ 25 billion. The decrease during this period was concentrated in the first quarter of the year in hedges against depreciation of the NIS, while in the second quarter the decrease was concentrated in hedges against appreciation of the NIS, both of which proceeded parallel to the depreciation that continued during the second quarter as well. In the second half, in which actual developments were less positive

Figure 4.10
Balance of Open Positions in Exchange-Rate Hedging Transactions between the Banks and the Public, 2002– 2004



SOURCE: Bank of Israel.

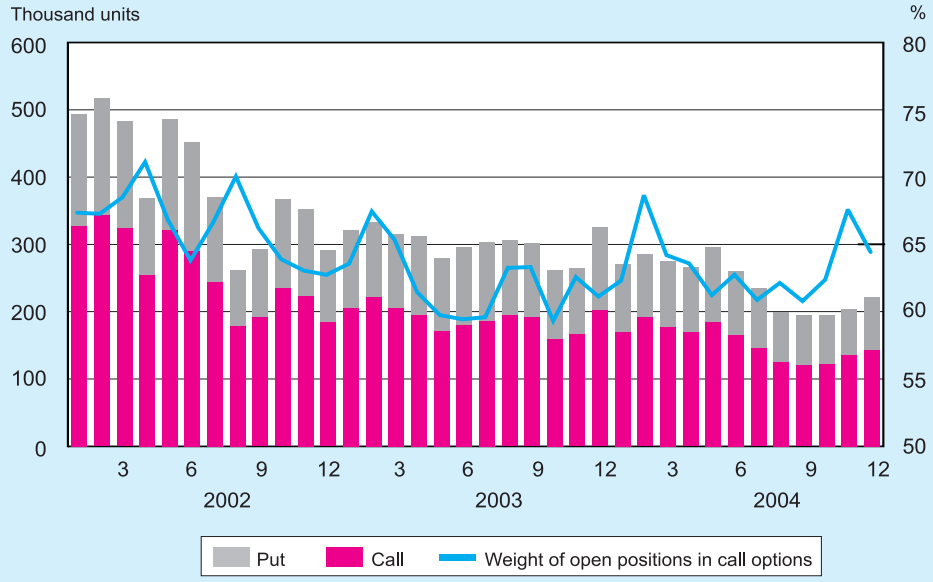
[4] Some of the transactions carried out in the banking system are between the banks themselves, which leads to an upward bias in the estimate of the public's hedging against price fluctuations in the underlying assets.

(see Chapter 2), and in which appreciation continued in the NIS-dollar exchange rate, the decline in the balance of hedges against appreciation was halted, and the balance of hedges against depreciation even rose slightly. Thus the proportion of the balance hedging against depreciation increased, reaching 57 percent in November, as opposed to 54 percent in the middle of the year. However, in December, with the reduction in the monetary interest rate by two tenths of a percent, and against the background of positive political and economic developments (see Chapter 2), the proportion of the balance hedging against an increase in the rate fell to 55 percent. Overall for 2004, the balance of open contracts fell slightly in relation to 2003 and reached a yearly average of $ 28.2 billion, while the proportion of the balance hedging against an increase in the rate in relation to the total balance remained, on average, similar to its proportion in 2003.

(ii) The Tel Aviv Stock Exchange

The number of open positions in NIS-dollar options[5] traded on the TASE declined in 2004, reaching an average of 242,000 during this period, and they provided hedging amounting to $ 2.4 billion, lower than their 2003 volume of $ 3 billion. In the first four months of 2004, the number of open positions stood on average at 280 thousand, less than the 2003 average (Figure 4.11). Against the background of an increase in the level of uncertainty in May, the number of open positions increased to about 300,000 units.

Figure 4.11
NIS/$ Options on the Stock Exchange, Number of Open Positions in Put-Call Options, 2002– 2004



SOURCE: Bank of Israel.

[5] The underlying asset for NIS-dollar options is $ 10,000.

However, from June until the end of the year (except for December), their number even fell on average to below 200,000 units.

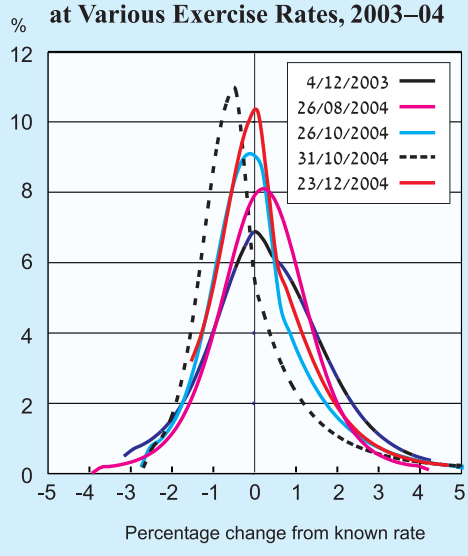
An analysis of trading according to the type of option reveals that the proportion of open options in call options as part of the total of open positions remained relatively stable, putting an end to the declining trend that prevailed in recent years. The proportion of open options in call options in the total of open positions in the TASE remained at 64 percent on average, similar to last year's average and above their proportion in the banking system. This development attests to the fact that the investor public is still hedging more against an increase in the NIS-dollar exchange rate than a decrease, despite the relative stability in the rate this year.

The expiration date of options is at the end of each month, so that at any point in time there are three series of options for the coming three months, and two additional series for the end of the next quarter and for the end of the calendar year. An analysis of trading by expiration date shows that the volume of trading in short-term series continued to be notably larger than in the longer series: 93 percent of the open positions are concentrated in the two shortest term series which had up to two months to maturity.

Using trading data for NIS-dollar options at various dates during the year, the expected distribution[6] of the NIS-dollar exchange rate was calculated for 30 days. Figure 4.12 presents the distributions for various dates characterizing the principal developments in 2004.

1. On December 4, 2003, following the first indications of global economic recovery, of relative calm in the security situation, and a moderate appreciation in the NIS-dollar exchange rate to 4.4 NIS to the dollar, the distribution was characterized by a relatively high level of uncertainty for 2004 as a whole (Figure 4.12): the median distribution showed a change of 0.3 percent, while the modal change reflected a lack

Figure 4.12
Expected Distribution of NIS/$ Exchange-Rate Changes derived from Options Traded on the TASE at Various Exercise Rates, 2003–04



SOURCE: Bank of Israel.

[6] The method of calculation is explained in Chapter 4 of the Monetary Department Review in the Bank of Israel Report for 2002. See also the work of Roy Stein, "Estimation of expected distribution of the NIS-dollar exchange rate, non-parametric distribution embodied in NIS-dollar options", Monetary Studies, April 2004, Bank of Israel.

Table 4.5
Statistical Data from the Expected Distribution of the NIS/$ Exchange Rate, December 2003 to December 2004

(percent)

	Probability		Level of uncertainty		Expected rate of change		
	of appreciation of at least 2 percent	of depreciation of at least 3 percent	Probability of most likely outcome	Inter-quartile range[b]	Mode	Median	NIS/$ exchange rate[a]
4 Dec 03	5.2	5.0	1.89	6.9	–0.0	0.3	4.441
26 Aug 04	3.8	1.6	1.50	8.1	0.2	0.2	4.539
26 Oct 04	3.1	5.2	1.49	9.1	–0.1	–0.1	4.433
31 Oct 04	2.9	7.6	1.46	10.9	–0.5	–0.4	4.460
23 Dec 04	1.1	3.2	1.41	10.3	0.1	0.1	4.337

[a] Exchange rate at the time when the sample was taken of quotes of option prices according to stock-exchange records.
[b] The difference (in percentage points) between the rate of change in the exchange rate with a 75% probability and that with a 25% probability.

of change in the rate at a level of certainty of 6.8 percent. Together with these expectations, the probability of sharp changes was still high: a 5 percent probability of a depreciation of more than three percent, and a 5.2 percent probability of an appreciation of more than two percent (Table 4.5). This distribution at the end of 2003 reflected a high level of uncertainty in the players' expectations relative to 2004, according to which the expected change in the exchange rate was similar to the interest rate differential at that time—three tenths of a percent.

2. On August 26, 2004, in light of the continued calm in the NIS-dollar exchange rate during 2004, the exchange rate stabilized at 4.52 NIS to the dollar, and with the expected distribution being symmetrical around the forward rate. The modal change and the change derived from the median distribution pointed to a slight depreciation of two tenths of a percent, similar to the interest rates differential at that time (Figure 4.12). The probability of relatively sharp changes was relatively low: only a 1.6 percent probability of a depreciation of three percent or more, and a 3.8 percent probability of an appreciation of two percent or more (Table 4.5).
3. On October 26, 2004, prior to the Knesset vote on the disengagement plan from the Gaza Strip, the NIS reached its lowest level in recent months. The center of the distribution tended toward a slight appreciation, in which the modal change and the median distribution indicated an appreciation of a tenth of a percent (Figure 4.12). The estimated level of certainty regarding the modal change increased slightly to reflect a moderate appreciation in the NIS-dollar exchange rate at a relatively low level of uncertainty. Together with this trend, the probability of a sharp depreciation, more than three percent, rose to 5.2 percent, while the probability of a sharp appreciation, more than two percent, decreased slightly, to 3.1 percent (Table 4.5).
4. On October 31, 2004, a number of events took place with conflicting influences on the exchange rate: approval of the disengagement plan, threats of resignation from

the government, and the announcement of the illness of the head of the Palestinian Authority. Ultimately these events were expressed in expectations of a continuing appreciation in the NIS-dollar exchange rate (Figure 4.12). At the same time, the probability of sharp changes in the NIS-dollar exchange rate increased, both appreciation and depreciation, while the estimated level of certainty regarding the modal change continued to increase to 11 percent (Table 4.5). These findings attest to the fact that expectations of extreme scenarios can lead to a sharp change in the exchange rate, albeit with a relatively low probability.

5. On December 23, 2004, the NIS-dollar exchange rate stabilized at its lowest level in years—4.33 NIS to the dollar. The expected distribution restabilized around moderate depreciation, which matched the interest-rate differential between the NIS and the dollar. The modal level of certainty, however, remained relatively high, and the probability of relatively sharp changes declined: a 3.2 percent probability of a depreciation of three percent or more, and only a 1.1 percent probability of an appreciation of two percent or more (Table 4.5).

Box 4.2
Expected Distribution of the NIS-Dollar Exchange Rate, the Parametric Method

During the past decade, the information embodied in the prices of options has been at the center of interest of the business and the academic communities, as well as of the central banks, and serves as a rich source of information for formulating monetary policy. This information encompasses the expectations of the general investor public regarding the price of the underlying asset that will prevail in the future, when the option expires. The information embodied in options traded on the Tel Aviv Stock Exchange at different exercise rates for the same expiry date, facilitates the calculation of a variety of probabilities of the development of the underlying asset. Thus, for example, it is possible to calculate the expected distribution of the NIS-dollar exchange rate and to analyze exceptional expected developments in the foreign exchange market, according to the prices of the NIS-dollar options traded on the TASE at different exercise rates. A distribution of this kind, which contains detailed information about the investor public's expectations, provides important information for formulating monetary policy, especially in small and open economies, like the Israeli economy, in which there is a close and positive statistical correlation between inflation and changes in the exchange rate. This correlation is particularly strong in the Israeli economy because of the linkage mechanism of apartment prices to the NIS-dollar exchange rate, which underscores the importance of the information embodied in the expected distribution of the exchange rate for the formulation of monetary policy.

The professional literature indicates a number of methods of calculating the expected distribution of the price of any financial asset by means of the prices of the options at various exercise rates around the price of that asset. The Bank of Israel has begun to calculate the expected distribution by the parametric method, in addition to the nonparametric method it has used during the past two years.[1] The parametric method incorporates a distribution function described by means of a mix of two log-normal distributions, and estimates the parameters of the distribution by the best fit between the actual prices of options and their theoretical prices, in which the theoretical prices are determined according to a formula for pricing options, which contains assumptions regarding the stochastic course of the exchange rate. This method is called parametric, because it has a number of parameters structured within it that dictate the form of the distribution. The major assumption for calculating according to the parametric method is that the distribution of the NIS-dollar exchange rate is described by means of a mix of two log-normal distributions.[2] This distribution also reflects, as a private case, the only log-normal distribution that Black and Scholes assumed in their option pricing formula. The advantage of the estimation method based on the bi-log-normal distribution lies in identifying market expectations of the future conduct of the exchange rate, and in providing greater flexibility in determining the form of the distribution, as reflected in the prices of the options. This estimation method thus enables us to identify the players' expectations of developments in the exchange rate on each day of trading, including the possibility of a non-consecutive process. This method thus enables us to identify expectations of exceptional changes in the rate.

The prices of options sampled in order to calculate the distribution are the trading data of NIS-dollar options on the TASE whose date of maturity is closest to 30 days and at different exercise rates. The prices of the options are sensitive to the price of the underlying asset, which is the NIS-dollar exchange rate, to the NIS and dollar interest rates, and to market expectations regarding the future course of the underlying asset. At any point in time during the trading day, a change in one of these factors will affect the price of the options. In order to maintain synchronization between the different data, the best supply and demand prices for each option[3] was sampled on each trading day at one point in time, as they were

[1] See comment 6 in the body of the chapter.

[2] See the work of Yoel Hecht and Roy Stein, "Estimated distribution of the NIS-dollar exchange rate implicit in option prices", Economics Quarterly, 51, March 2004 (in Hebrew).

[3] The best supply and demand prices are the lowest supply prices and the highest demand prices, as recorded in the books of the TASE.

written in the stock exchange's books. At the same time, the other data that serve to price the option were sampled, namely the known exchange rate and the NIS and dollar yield.

From the parameters obtained from the estimation equations of the option prices, it is possible to calculate the structure of investors' expectations regarding the change in the exchange rate for a one-month range. In this way it is possible to calculate the distribution expectancy, which represents the average and the expectations of changes in the exchange rate, the standard deviation of the expectancy, which represents the extent of the uncertainty regarding the averaging of the expectations, as well as additional parameters that reflect the structure of the expectations. In this context, it is possible to calculate an index for analyzing the normalcy of expectations, which quantifies the percentage of trading days in the previous month in which trading was conducted as part of the expectations based on the assumption of a single normal distribution.[4] An analysis of this kind of the foreign-exchange market provides monetary policy makers with important information for analyzing some of the risks threatening the stability of the inflation environment—risks that flow directly from developments in the foreign-exchange market.

[4] For an explanation of this index and other indices, see the work of Yoel Hecht and Helena Pompushko, "Normality, modal risk level, and exchange-rate jumps", Monetary Studies, 02.2004, Bank of Israel.

Besides trading in NIS-dollar options, the TASE also conducts trading in NIS-euro options. Trading in these options expanded slightly during 2004, influenced by the introduction of market makers into the trading, and the daily turnover grew to an average of 2.4 thousand units, as opposed to 1.6 thousand units in 2003 and 2002—even though its volume is still small relative to activity in NIS-dollar derivatives. As mentioned above, in March 2004 the TASE implemented the market making model proposed by the "Hauser Committee", and three market makers were integrated into the trading in NIS-euro options. In this context, the market makers undertake to quote prices in seven options at different exercise rates regarding the money, in the two series closest to maturity. In return, they receive a fixed monthly payment, exempt from trading and clearing commissions, in addition to which, the stock exchange shares with them, beyond the first six thousand options, the incomes from trading and clearing commissions that they execute every month with any entity other than market makers. In March and April, with the official entry of market makers into this market, the average daily turnover rose on average to 3.5 thousand option units, as opposed to about 1.5 thousand units on average in the six months preceding the introduction. However, already by May the average daily turnover had declined, so that by the end of the year the average volume was about 2.2 thousand option units. An analysis of

the number of open positions, which reflects the extent of hedging against unexpected changes in the NIS-euro exchange rate, shows that the influence of market makers in these derivatives is small and even negligible. These findings attest to the fact that the introduction of market makers in euro-derivatives trading did not motivate the investor public to increase its activity in the market, despite the considerable volatility of the NIS-euro rate relative to the NIS-dollar market during the year. At the end of 2004, the TASE announced that in 2005 only one market maker would operate in trading in these options.

(iii) The Bank of Israel

The options sold in Bank of Israel auctions are "pure-in-the-money".[7] These are options that provide protection against deviations in the NIS-dollar exchange rate from the exercise price, which is the forward rate at the time of the auction. Therefore, information on the risks in the foreign exchange market can be derived from these options, distinctive information that cannot be derived simply from other NIS-dollar options offered by the commercial banks and traded on the TASE. These options can be used to calculate the implied standard deviation for fixed terms—three and six months—which serves as a measure of uncertainty surrounding the expected changes in the dollar rate, and with the use of this measure, the level of risk in the foreign exchange market can be evaluated on an ongoing basis. For this reason, among others, the Bank of Israel continues to issue six-month put and call options at a weekly sum of $ 4 million, and three-month put and call options of $ 8 million each per week.

The cash flow arising from the Bank of Israel's activities in the options auctions—an equal amount of put and call options for each term—shows that the level of fluctuation of the NIS-dollar exchange rate in 2004 was relatively small. (See Box 4.3 in the 2003 report.) In the first half of 2004, the cash flow was positive for each of the four types of option. Based on this flow, the development of the NIS-dollar exchange rate was not essentially different from its expected development according to the interest-rate differentials between Israel and the US. In the second half of the year, on the other hand, in which a gradual appreciation in the exchange rate was recorded, the cash flow from the Bank of Israel's activities was only positive in the call options, while in the put options it was negative, albeit by a relatively small amount. Overall for the year, in contradistinction to the past two years, the income from premium from the sale of the options in auctions was greater than the payments for the exercise of the options. The positive cash flow this year constitutes additional evidence of the relatively stable development of the NIS-dollar exchange rate during the year.

The implied standard deviation for three-month options in 2004 was an average of 5 percent in annual terms, down from 8 and 8.4 percent respectively in 2003 and 2002 (Table 4.6). The standard deviation continued to decline in 2004, as part of the trend beginning in the middle of 2003 when the deviation stood at 9.5 percent.

[7] Options at a discounted exercise price which is equal to the underlying asset—at present the dollar exchange rate.

Table 4.6
Estimates of Implied Risk in Bank of Israel Options, 2001–04

(Annual and monthly averages)

	NIS/$ exchange rate	3-months implied volatility	6-months implied volatility	Implied volatility ratio[a]
Annual average		(Percent)		
2001	4.20	5.3	5.5	1.05
2002	4.74	8.4	8.1	0.96
2003	4.55	8.0	7.9	1.00
2004	4.48	5.0	5.5	1.10
2004 - monthly average				
January	4.43	6.0	6.2	1.04
February	4.47	5.9	6.1	1.04
March	4.50	5.1	5.7	1.12
April	4.55	4.9	5.5	1.12
May	4.60	5.3	5.7	1.08
June	4.52	5.0	5.5	1.10
July	4.49	4.4	5.0	1.14
August	4.53	4.4	5.0	1.15
September	4.50	4.2	5.1	1.20
October	4.46	4.5	5.3	1.18
November	4.39	5.2	5.4	1.03
December	4.35	5.7	5.7	1.00

[a] The 6-months implied volatility divided by the 3-months implied volatility.
SOURCE: Bank of Israel.

Up to September 2004, the standard deviation fell to an average of 4.2 percent—the lowest level for many years. However, in October, with expectations of the approval of the disengagement plan, the threat of resignation of coalition members from the government, and preliminary signs of the renewal of political negotiations with the Palestinian Authority, the implied standard deviation in options rose for the last quarter to 5.5 percent. On the other hand, the implied six-month standard deviation also fell during the first half of 2004, as part of the trend that began in the middle of 2003, reaching an average of 5.5 percent. However, in the second half of 2004, contrary to the trend recorded in the three-month standard deviation, the six-month standard deviation did not continue to fall and ranged between 5 and 5.5 percent. This development points to the fact that in the third quarter of the year the level of uncertainty for six months remained greater than that for the short-terms—three months, and in the final quarter the levels of uncertainty for relatively short terms and for long terms were similar.

b. Interest-rate derivatives

During 2000, the TASE introduced three-month forward contracts on the NIS interest rate (in annual terms), which was determined according to the average yield on Treasury bills (the average of the three Treasury-bill series closest to three months). However, besides a few transactions following the introduction, no transactions took

place in these contracts. In a series of meetings between representatives of the Bank of Israel and the TASE the following appeared to be the reasons for this situation: (1) The major barriers to the development of the future Treasury-bill contracts market on the TASE are the difficulty for active participants in the market to find Treasury-bill lenders, the high lending costs, and the cumbersomeness bound up with the need for writing the lending, all of which reduce the viability of the lending; (2) The Bank of Israel is a dominant factor in the money market, and clears the inter-bank liquidity market at an interest rate close to the monetary interest rate. The less the Bank of Israel is involved in the money market, the greater will be the fluctuation in the short-term interest, and with it the greater the investor public's need for interest-rate derivatives. The contraction of the monetary deposits of the banking system to a week, as the Bank of Israel is planning, and the transition to real-time clearing (as mentioned at the beginning of this section) will increase the attractiveness of interest-rate derivatives; (3) The continued development of the "Repo" market and the approval of the Repo Bill will help to develop the market for short-term lending and contracts. (See the discussion in Chapter 4.2.)

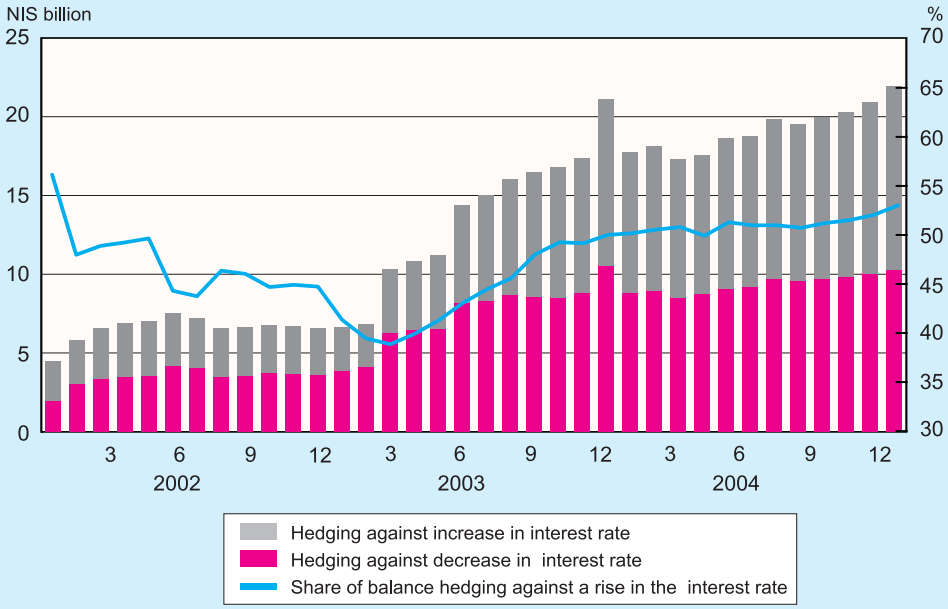
The TASE is also attempting to promote trading in future contracts on long-term NIS interest rates, and in this context it has been decided to permit trading in future contracts on "Shahar" obligation certificates—unindexed, fixed-interest bonds. These certificates reflect the NIS yield in the capital market for three and seven years, according to the average yield of those "Shahar" series determined by the TASE. Trading in these contracts could contribute greatly both to minimizing risks for the investor public, as well as to the capital market as a whole in increasing the liquidity of the NIS bonds. However, the clearing method between the Treasury and the TASE has still not been fully agreed upon, which prevents the TASE from introducing these contracts and trading in them. (See the discussion in Chapter 1.2.)

In 2004 the banking system thus remained the major focus of trading in interest-rate derivatives in the Israeli capital market. Despite the continuing growth trend of trading volumes in interest-rate derivatives in 2004, they are still small in relation to activity in the other types of derivative. This is contrary to the situation in developed countries, where trade in interest-rate derivatives is the highest of all derivatives trading.

(i) The banking sector

The balance of open contracts in interest-rate derivatives continued to grow progressively during 2004, following pronounced growth in 2003 (Figure 4.13). This development of the interest-rate derivatives in the banking sector is especially salient in view of the lack of activity in this area on the stock exchange. In the first three months of 2004, the balance of open contracts declined slightly from the record level of December 2003 to NIS 17 billion (Comment 4), but by April the rising trend had reinstated itself and continued for the rest of the year. By the end of the year, the balance of these contracts had reached NIS 22 billion, despite the fact that there were no sharp fluctuations in the NIS interest rate during this period, that the monetary

Figure 4.13
Open Positions in Interest-Rate Hedging Transactions between the Banks and the Public, 2002–2004



SOURCE: Bank of Israel.

interest rate remained almost unchanged, and that the inflation environment had lodged itself in the middle of the inflation target range (as detailed in Chapter 2). The proportion of hedges insuring against increases in the NIS interest rate in the total balance rose progressively and moderately throughout the year. The increasing trend in the proportion of open contracts hedging against interest rate increases continued, against the background of cuts in the monetary interest rate in the first months of 2004. The proportion of open contracts hedging against increases in the NIS interest rate in the total balance reached 53 percent in December. Thus, at the end of 2004, the public insured its assets more against an increase in the NIS interest rate than against its decrease.

(ii) The Bank of Israel

In order to support the development of the interest-rate derivatives market in the economy, in 2004 the Bank of Israel continued selling nontradable futures contracts on the nominal interest rate, contracts that contribute to improving trading in Treasury bills. In these transactions, the Bank of Israel commits itself to delivering to winners, three months from the date of the auction, three- or twelve-month Treasury-bill series at a guaranteed yield determined in the auction.

The monthly amount offered in each Treasury-bill series also remained fixed in 2004 at NIS 80 million, in accordance with Bank of Israel policy. While the demand in the three-month Treasury-bill auctions remained steady throughout the year with

the average volume exceeding supply by 8 times, the demand in auctions for twelve-month Treasury bills was characterized by fluctuations, so that overall in 2004 demand exceeded supply by 9 times, slightly higher than in 2003.

The gap between the average yield in the auctions and the market yield[8] at the time of the auction is an indicator of investors' expectations of a change in the NIS interest rate in three months' time. In January 2004 this gap was negative in three-month series at a rate of 0.2 percentage points—a gap that reflects expectations of a slight decrease in the relatively short-term NIS interest rate. The gaps from February to April were small and inconsistent, which is to say that there were no expectations then of interest rate changes, even though the Bank of Israel continued to reduce the interest rate during this period. As opposed to this, in May the gap turned to positive at a rate of 0.4 percentage points, a gap that reflects expectations of an interest rate increase. This positive gap was maintained until the end of year, even though the Bank of Israel did not increase the monetary interest rate during this period.

An analysis of the average yields determined in the auctions as compared with those that prevailed in the market on the day of delivery (three months later), shows that the yield determined in the auctions in the first four months of 2004 was slightly higher than that which prevailed in the secondary market at the time of delivery. This apparently reflects the unexpected decrease of the inflation environment at the beginning of 2004, which led to continued cuts in the Bank of Israel interest rates. From May 2004, the yield determined in the auction was significantly higher than that which prevailed in the secondary market at the time of delivery—between half a percentage point and a full point—apparently due to the non-increase of the inflation environment, and thus the non-increase of the monetary interest-rate, contrary to the expectations that prevailed for that period three months previously.

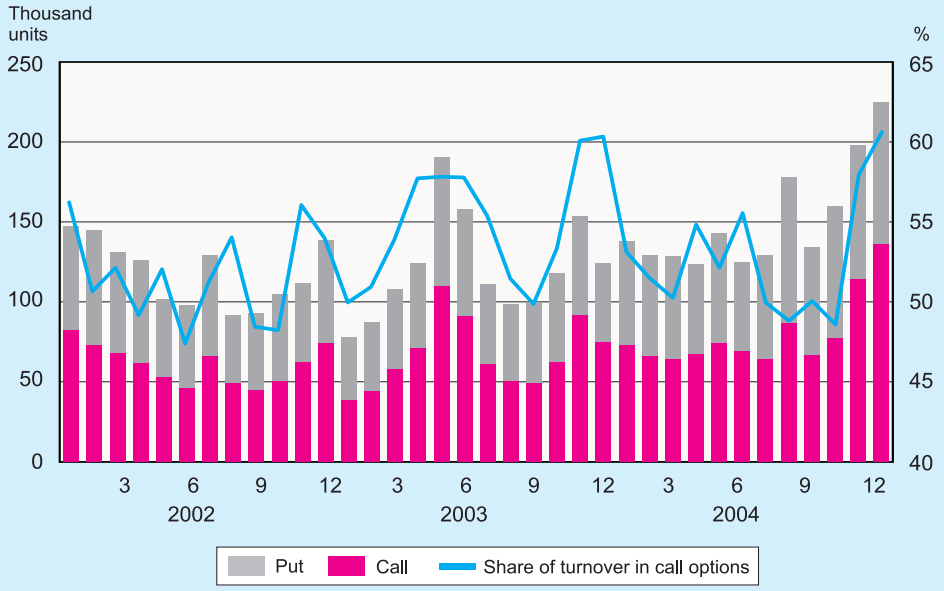
c. Derivatives on the share indices

The TASE conducts trading in options and futures contracts on the Tel Aviv 25 index and the Tel Aviv Banking index, and plans to introduce derivatives on the Tel-Tech 15 index in 2005. In 2004, the average daily turnover of options on the Tel Aviv 25 index was about 150 thousand option units,[9] higher than in 2003 and 2002 (Figure 4.14). Since January 2003, the month in which the tax reform was implemented, the volume of trading in these options has grown, with substantial fluctuations in trading turnover, contrary to fears concerning the impact of the reform on the trading in derivatives. In the last quarter of 2004, and especially in December, trading turnover increased, with the average daily turnover reaching 220 thousand option units—an all-time record,

[8] It should be recalled that the gap between the average yield in future Treasury-bill auctions and the market yield includes a premium on the nontradability of the contract. The market yield is on the series that is delivered as part of the auction. If the series is still not traded, such as in the case of auctions for future delivery of 12-month Treasury bills, the market yield will be that of the series whose date of maturity is closest to one year.

[9] The underlying asset for options on the Maof index is the Maof index multiplied by NIS 100.

Figure 4.14
Options on the TA25 Index on TASE, Average Daily Turnover in Put and Call Options, 2002–2004



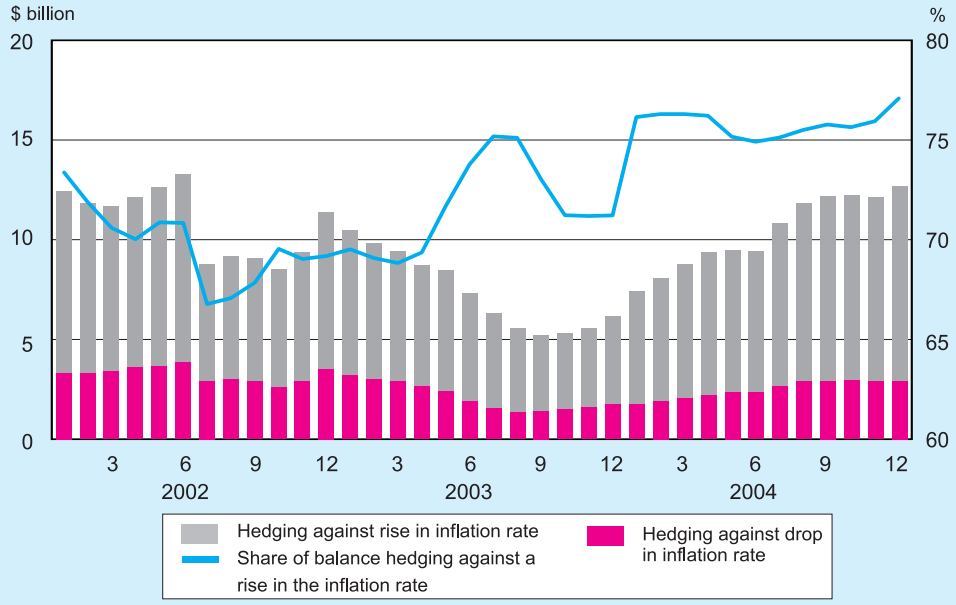
SOURCE: Bank of Israel.

and accompanied as well by a growth during that period in trading turnover of the shares included in the index. (See Chapter 4.4.) Furthermore, the daily turnover in call options as a proportion of total turnover fluctuated according to short-term trends in the share prices. Figure 4.14 presents the daily turnover of put and call options, and the proportion of the daily turnover in call options in the total turnover. We can see at the end of 2003, and at the end of 2004, that together with increases in share prices and high trade turnovers, the proportion of call options in total turnover increased to 60 percent. This indicates expectations of a continuing upward trend in share prices at the beginning of 2005 as well. As opposed to the substantial volume of trading in options on the Tel Aviv 25 index, the volume of trading in options on the Tel Aviv Banking index also remained negligible in 2004.

d. Derivatives on the CPI

Transactions in derivatives on the Consumer Price Index are presently only conducted in the banking sector (Figure 4.15), and their balance reflects the public's demand for financial protection against unexpected changes in the Consumer Price Index (see footnote 4). In 2004 an increase in the volume of hedging was recorded against both the weakening of inflation and its strengthening, and the balance of open positions reached a total of NIS 12.5 billion at the end of the year, as opposed to 6 billion at

Figure 4.15
Balance of Open Positions in CPI Hedging Transactions between the Banks and the Public, 2002– 2004



SOURCE: Bank of Israel.

the end of 2003. The proportion of hedges against an increase in inflation in the total hedges (Figure 4.15) grew in 2004 and reached an average of 76 percent, as opposed to an average of 71 percent in 2003. The proportion remained at 76 percent throughout the year, and reached its highest level of 77 percent in December. This increase could reflect the fact that the public was still apprehensive about an increase in the rate of inflation, despite the fact that the inflation environment during this period was low and stable, and that in some cases even negative indices were published. It is possible, however, that this high proportion of hedges against unexpected increases in the rate of inflation is connected to the process of contracting the public's holdings in indexed assets, as mentioned in Chapter 3, and does not indicate increasing fears of an unexpected increase in the rate of inflation.