Chapter 4
The Securities Market

Yields to maturity, both nominal and real, declined during 2003, thus continuing the trend evident in the last few years except 2002. The decrease in yields began in March with the announcement of the economic program, the receipt of guarantees from the US and the swift conclusion of the war in Iraq. As yields to maturity declined, financial uncertainty eased, reflected among other things by the prices of financial derivatives. Yields continued along the downward trend during the rest of the year, and by its end had reached the levels which had prevailed at the end of 2001. In the equity market, the trend evident in 2001and 2002 reversed, and the leading indices rose sharply on high turnover. This occurred against the background of a decrease in financial uncertainty, the process of lowering the interest rate and the increased efficiency of many firms.

The turnover in Treasury bills increased significantly in 2003. In contrast, there was a slight decline in the turnover of government bonds although it still remained higher than in previous years.

The net amount of tradable capital raised by the government in the domestic market declined in 2003 in contrast to the expansionary trend of previous years as the government turned to borrowing abroad, principally within the framework of the guarantees, thus also contributing to the decrease in yields in the government bond market. In 2003, there was a sharp increase in the issue of corporate, primarily nontradable, bonds.

1. MAIN DEVELOPMENTS

During 2003, yields to maturity, both nominal and real, continued the downward trend they had followed over the previous few years, except for the first half of 2002. In the Treasury-bill market, yields to maturity declined by some 3.5 percentage points to an average level of 5 percent. In the unindexed bonds market, yields to maturity declined by some 4 percentage points to an average of 6.2 percent. Yields to maturity on CPI-indexed bonds declined by some 1.5 percentage points to an average of 4.1 percent. Thus, yields to maturity declined to levels which had prevailed at the end of 2001. Financial uncertainty eased in 2003, partly reflected in the price of financial derivatives,

especially during the second half of the year. The implied standard deviation of NIS-dollar options sold by the Bank of Israel declined by some 3 percentage points, from a record level of 9 percent during the first quarter of the year to 6 percent in December. In the equity market, the trend of the previous two years was reversed and the leading indices rose sharply on high turnover. This coincided with rising prices in foreign equity markets, especially among high-tech shares. The factors behind rising share prices in the domestic equity market included a decline in financial risk, reductions in the Bank of Israel interest rate and the improved efficiency of many firms. In the corporate bond market there was a sharp increase in the volume of issues, especially of nontradable bonds.

Nominal and real yields did not decline uniformly throughout the year. Following their fall at the end of 2002, yields to maturity, both real and nominal, rose at the beginning of 2003 against the background of mounting uncertainty which was primarily due to the threat of war and the upcoming Knesset elections. With the swift resolution of the Iraq war, the announcement of the economic program and the receipt of aid and loan guarantees from the US, uncertainty decreased during March and yields to maturity on bonds and Treasury bills declined. Thereafter yields continued to fall, and at the end of the year were at the level which had prevailed at the end of 2001.

The yield curve for Treasury bills in 2003 reflected among other things the fact that unlike other assets they were exempt from taxation and that, from January 2004, they would be liable to tax on redemption. Thus, during most of the year, the taxable series had a positively sloped yield curve. Nonetheless, during October the yield curve flattened and towards the end of the year it had a negative slope, apparently reflecting expectations of further cuts in the Bank of Israel interest rate.

In 2003 turnover of Treasury bills, unindexed bonds and shares increased. Turnover of CPI-indexed bonds was slightly lower than in 2002 but still higher than in previous years. The average daily turnover of shares rose significantly, from a daily average of NIS 240 billion in 2002 to NIS 370 billion in 2003.

Net tradable capital raised on the domestic market declined in 2003 by NIS 3.2 billion, a reversal of the upward trend of the previous two years, thereby also contributing to the decline in yields in the government bond market. Underlying the decrease in domestic borrowing was the government's increased borrowing abroad, made possible by the US government guarantees. The changes in the composition of tradable capital raised by the government resumed their pre-2002 trend. Thus, in 2003, the proportion of fixed-interest unindexed capital in the total tradable capital raised by the government increased, following its decline in 2001-02. In addition, the original maturities of government bonds, both CPI-indexed bonds and unindexed fixed-interest bonds, lengthened, following their shortening in 2002.

Towards the end of 2003, the pension fund reform came into effect. The principal measure of the reform was to discontinue the issue of bonds earmarked for the veteran pension funds. It is expected that the new and veteran pension funds will only be permitted to purchase earmarked bonds again in 2008 and 2013 respectively. It is estimated that NIS 12-14 billion will be directed annually to the tradable capital market

in the next few years. It seems reasonable to assume that a significant proportion of this amount will be invested in long-term assets (see Chapter 5).

2. THE TREASURY-BILL AND GOVERNMENT BOND MARKETS

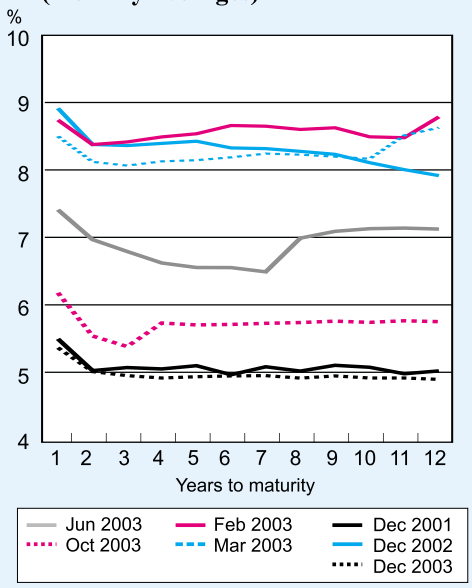
a. The Treasury-bill market

(1) 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 that 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.

The yields to maturity in the Treasury-bill market declined during 2003 by 3.5 percentage points on average from their level in December 2002 (Figure 4.1), reversing the upward trend of 2002 but reverting to the downward trend of 1999-2001.

Figure 4.1
Treasury Bill Yield Curve, December 2001–December 2003 (monthly averages)



SOURCE: Bank of Israel.

Changes in the yield curve during the year were not uniform. Against the background of increased uncertainty related to the threat of war in Iraq and the forthcoming election in Israel, yields on all maturities rose in the first two months of the year from an average of 8.2 percent at the end of December 2002 to 8.6 percent in February 2003. This followed a sharp one-percentage-point decline on average in Treasury-bill yields during November 2002 and especially December.

With the finalization of the economic program, the receipt of guarantees from the US and the swift resolution of the conflict in Iraq, Treasury-bill yields began declining in March. By December yields had fallen to an average of 5 percent. This paralleled the decline in the Bank of Israel interest rate. During 2003 the yield curve for tax-liable Treasury bills maintained a positive slope, reflecting the fact that in contrast to other assets, although they were exempt from taxation in 2003, from January 2004 they would be subject to tax. Nonetheless, in October the slope of the Treasury-bill yield curve, especially for the longer terms, started flattening and towards the end of the year it became negative, apparently reflecting expectations of a decline in interest rates in the light of reduced inflation expectations.

The method for collecting tax on the Treasury-bill discount in 2004 has yet to be determined. The discount is the difference between the price at which the bond is redeemed and the price at which it was sold, if the latter is lower than the former. Treasury bills are traded at a discount and this is the primary income they provide. (For government bonds, if there is a discount component, it is relatively small.) The difficulty in collecting tax on the discount is the fact that Treasury bills (and government bonds) are originally sold at different prices to different investors and even at different prices to the same investor. The reason for this is that Treasury bills are sold through graduated auctions in which the series are issued a number of times until their redemption. Thus, the profit at redemption arising from the discount cannot be evaluated.

(2) Activity in the Treasury-bill market

At the end of 2003, the public held a total of NIS 56 billion in Treasury bills, up from NIS 44 billion in 2002 and NIS 35.6 billion in 2001. The Bank of Israel therefore absorbed a net NIS 6.4 billion through Treasury bills, compared to NIS 6.3 billion in 2002 and NIS 2.5 billion in 2001.

The removal of the ceiling on the issue of Treasury bills in February 2002 set in motion the gradual replacement of bank deposits at the Bank of Israel with Treasury bills (see Box 4.1). During the second half of the year the Bank of Israel further increased the volume of Treasury bills issued to the public following the injection into the NIS money base resulting from the government raising capital abroad.

The average daily turnover of Treasury bills during 2003 increased significantly to NIS 490 billion from NIS 370 billion in 2002 (Table 4.1). The main part of the increase took place from March. The increased turnover was partly a result of the temporary tax exemption of Treasury bills in 2003 which gave them a temporary advantage over other investment channels.

Table 4.1
Average Daily Turnover in Treasury Bills and Government Bonds, 2000–2003

(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
2000	171	192	67	56	58	44	225	294
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

SOURCE: Based on data from TASE.

As can be seen from Table 4.2, the banks' holdings of Treasury bills fell from 24 percent of the total in 2001 to 7.9 percent in 2002 and 12 percent at the end of 2003. In contrast, the public's share of Treasury bills rose from 24 percent at the end of 2001 to 64 percent in 2002 and ended up at 42 percent at the end of 2003. One of the factors behind this process was the public's increased demand for Treasury bills, both directly and through the mutual funds, as a result of the tax reform. During 2003, the proportion

Table 4.2
Distribution of Holders of Bonds and Treasury Bills, 2002–2003

(percent)

	Treasury bills		Unindexed bonds (*Shahar*)		CPI-indexed bonds		Dollar-indexed bonds		Traded corporate bonds		Shares[a]	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
The public, directly	63.9	41.9	17.1	17.9	20.0	16.7	15.3	34.8	10.2	21.2	71.1	69.6
Mutual funds	25.4	39.7	17.4	20.4	2.4	5.0	29.9	38.6	2.3	5.8	1.9	2.7
Provident funds and advanced study funds	1.4	2.6	35.3	28.8	46.6	48.1	14.1	10.5	47.7	40.2	8.9	9.5
Banks	7.9	12.2	12.8	18.2	14.5	11.9	35.0	13.0	10.5	6.6		
Nonresidents	0.4	1.7	2.3	1.1	0.1	0.1	1.1	0.1	0.1	0.2	10.0	10.8
The government											5.1	4.5
Insurance firms	0.7	1.8	14.2	12.7	12.6	14.7	4.2	2.0	24.9	19.5	3.0	2.9
Pension funds	0.1	0.1	0.9	0.9	3.8	3.5	0.4	1.0	4.3	6.5		
Total[b]	100	100	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.

of Treasury bills in the portfolios of mutual funds rose to 40 percent as a result of the massive marketing of mutual funds which specialize in Treasury bills (see Chapter 5 in the Monetary Department's Annual Report for 2002). The tax advantage to the public of direct investment in Treasury bills gradually declined with each series that was issued during 2003 (as a result of the taxation of Treasury bills from January 2004), and indeed in April a downward trend began which contrasted with the continuing upward trend in the proportion of holdings of mutual funds. At the same time, the banks also began to increase their holdings of Treasury bills gradually. The share of Treasury bills held by nonresidents also increased, from less than 0.5 percent in 2002 to 1.7 percent in 2003.

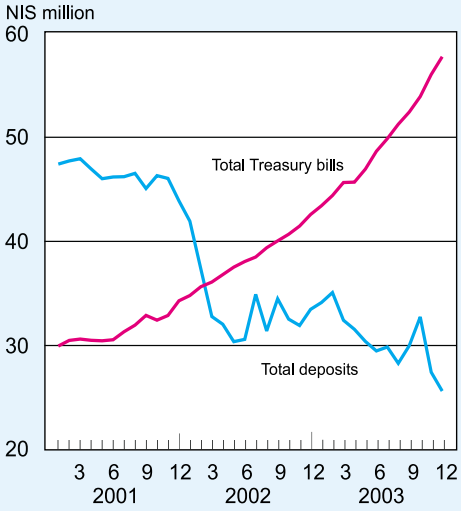
Changes were introduced into the Treasury-bill auctions in 2003. The primary change was that the Bank of Israel no longer announced a maximum yield prior to auctions, thus bringing Israel into line with the norm in other countries. This change is meant to increase the competition in auctions by increasing the degree of uncertainty.

Box 4.1
Tradability of the Interest Policy Instruments

In February 2002, the ceiling on the issue of Treasury bills was removed.[1] From that point until the end of 2003, the average holdings of Treasury bills

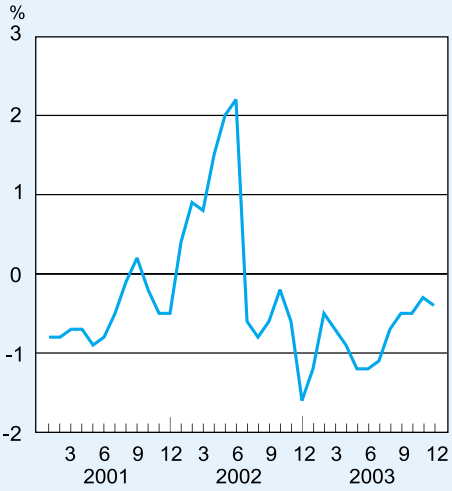
[1] The ceiling on Treasury-bill issues was set in 1995 at NIS 15.5 billion and was updated every six months according to the accumulative change in the Consumer Price Index or the accumulative change in the money supply, whichever was higher. The ceiling was finally abolished in February 2002 (see Box 4.1 in the section of the Monetary Department in the Bank of Israel Annual Report for 2001).

Figure 4.2
The Monetary Instruments: Total Deposits and Total Treasury Bills, 2001–2003 (monthly average)



SOURCE: Bank of Israel.

Figure 4.3
The Difference between the Yield on 1-Year Treasury Bills and the Bank of Israel Effective Interest Rate, 2001–2003 (monthly average)



SOURCE: Bank of Israel.

rose by NIS 22 billion while the banks' deposits at the Bank of Israel fell by NIS 12 billion (Figure 4.2). This gradual replacement of 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 markets, increased the ability of monetary policymakers to maintain price stability through relatively small changes in the interest rate.

In general, the effects of increased tradability of monetary policy instruments are similar to those of increased tradability of the government debt which began in the 1980s with the ending of the issue of bonds first to the provident funds, and then to the new life insurance schemes, and which has continued recently with the significant reduction of issues to the pension funds. Just as increased tradability of the government debt has contributed to the creation of an infrastructure for the development of the bond market, so increased tradability of monetary policy instruments has created the infrastructure necessary for the development of the money market. These processes have also improved policy management: the tradability of the debt makes it possible for those responsible for the policy of managing government debt to receive indications from the market on a continuous basis, e.g., through changes in bond yields, as to how the market perceives their policy, including their ability to adhere to the policy. Similarly, the tradability of monetary policy instruments makes it possible for policymakers

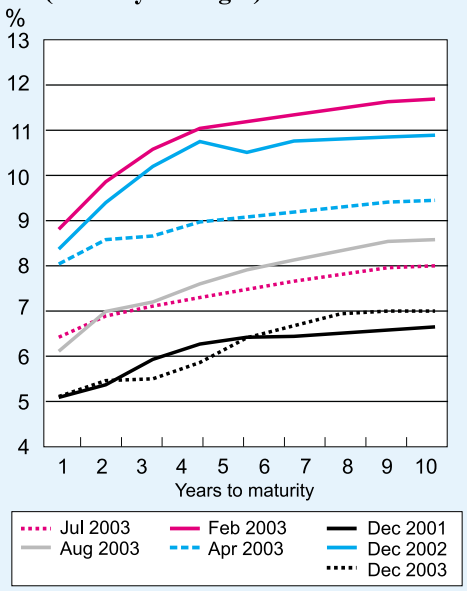
to receive continuous feedback from the markets. An important indicator of how the market perceives interest-rate policy is the difference between the yield on Treasury bills and the Bank of Israel interest rate. Thus, if the yield to maturity on Treasury bills is significantly different from the Bank of Israel interest rate, this can be seen as a signal that the Bank of Israel will not be able to continue its present interest-rate policy and also maintain price stability at the same time. For example, during the first half of 2002, the yield on Treasury bills was higher than the Bank of Israel interest rate and the latter was eventually raised. In contrast, during the second half of 2002 and throughout 2003 the yield on Treasury bills was lower than the Bank of Israel interest rate and the latter was gradually lowered (Figure 4.3).

b. The government bond market

(1) The yield 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. During 2003 the yields on unindexed bonds declined by 4 percentage points on average, from 10 percent in December 2002 to 6 percent in December 2003. This decline characterized all the various terms to maturity, and yields thus reverted to the average levels prevailing in December 2001 (Figure 4.4).

Figure 4.4
Unindexed Bond Yield Curve, December 2001–December 2003 (monthly averages)



SOURCE: Bank of Israel.

Yields did not fall immediately. At the beginning of the year they rose above the December 2002 level, but from March they fell. Against the background of increased uncertainty in the first part of the year, the nominal yield curve rose for all terms to maturity. In February the yields on long-term NIS-denominated bonds reached a level of 11.7 percent, following a decrease to 10.8 percent in December 2002.

From March to July, as a result of increased calm in the markets, the nominal curve fell at all terms to maturity. Yields for long terms fell sharply by up to 8 percent in July. Thus, the steep slope of the nominal curve gradually flattened, although it remained positive.

The downward trend in yields ceased in August. The nominal curve increased at almost every term to maturity, especially in the longer terms, to 8.6 percent, and its slope steepened. However, in September the downward trend in yields resumed and continued until the end of the year. Thus, the curve on average reached the level of 6 percent which had prevailed at the end of December 2001 and long-term yields reached 7 percent. The decline in domestic borrowing of tradable capital in the second half of the year and the continued reduction in the Bank of Israel interest rate both contributed to the fall in yields.

(2) The yield curve for CPI-indexed bonds

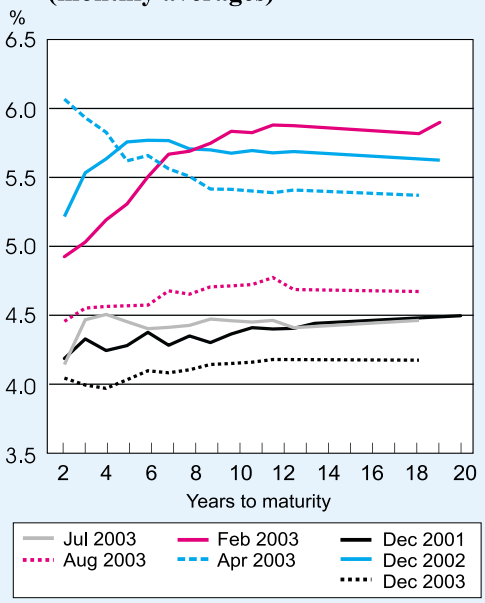
Galil is a CPI-indexed government bond which bears fixed annual interest and is issued for relatively long terms. Yields on these bonds fell by 1.5 percentage points on average during 2003 to a level of 4 percent at the end of the year, 0.2 percentage points lower than in December 2001 (Figure 4.5).

Changes in the yield curve were not uniform over the year and resembled the changes in the yields to maturity of unindexed fixed interest bonds. Thus, during the first two months of the year, medium and long-term real yields increased following their decline in December 2002. At the same time the yields on short-term indexed bonds declined, so that the slope of the curve went from flat for almost all terms to maturity at the end of 2002 to steeply positive.

From March to June long-term real yields declined while yields on short-term indexed bonds rose sharply, mainly as a result of the significant fall in inflation expectations. Thus, the slope of the real curve in March flattened to an average rate of 5.3 percent and from April till June became steeply negative, against the backdrop of the relatively rapid rise in short-term yields, low inflation expectations and the cuts in the interest rate. In July, with the rise in inflation expectations, short-term yields declined even faster than did long-term yields and the slope of the curve flattened.

In August there was a pause in the downward trend in yields and the real curve increased at all terms to

Figure 4.5
CPI-Indexed Bond Yield Curve, December 2001–December 2003 (monthly averages)



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

maturity; however, the trend was renewed in September and continued till the end of the year. Towards the end of the year the curve reached an average level of 4 percent, below the rate at the end of December 2001. The decline in yields towards the end of the year was partially due to the discontinuation of the issue of earmarked bonds to the veteran pension funds.

(3) Activity in the bond market

The change in yields in the bond market during 2003 was accompanied by a certain decline in turnover in CPI-indexed bonds, although turnover remained much higher than in previous years (Table 4.1). Average daily turnover in CPI-indexed bonds, both on and off the Tel Aviv Stock Exchange (TASE), totaled NIS 214 million, down from NIS 233 million in 2002. In contrast, the turnover of unindexed bonds in 2003 continued the upward trend of previous years, although the rise was more moderate than in 2002.

The average daily turnover of *Shahar* unindexed bonds both on and off the stock exchange totaled NIS 315 million in 2003, up from NIS 300 million in 2002.

Turnover in unindexed, variable-interest-rate *Gilon* bonds was low again this year. The reason is apparently the difficulty in pricing them as their future revenues are unknown.

(4) Composition of bond holdings

During the last quarter of 2002 the banks increased their investment in *Shahar* bonds, primarily at the expense of the mutual funds, which apparently preferred to move to Treasury bills as a result of the tax reform. In 2003 the proportion held by the banks continued to increase, but unlike in 2002, so did the share of mutual funds' holdings, primarily at the expense of the share of the provident funds' and advanced study funds' holdings as well as those of insurance companies and nonresidents (Table 4.2). As a result of these changes, the provident funds' and advanced study funds' share fell to 29 percent from 35 percent in 2002 and that of the banks rose from 13 percent in 2002 to 18 percent in 2003.

The most significant change in CPI-indexed bonds was the reduced share held by the banks, the public and the pension funds and the increased share held by the advanced study funds and the insurance companies. The provident funds and the advanced study funds, which hold the largest share of this type of bond, increased their proportion of the total to 48 percent. The concentration of CPI-indexed bonds in the provident funds is explained in part by the funds' long-term investment horizon.

The holdings of dollar-indexed bonds by the banks, who were the main holders of this type of bond, declined sharply, primarily due to the redemption of the *Gilboa* bonds, and the proportion held by the mutual funds increased (Table 4.2).

The proportion of bonds held by nonresidents is lower than 2 percent indicating foreign investors' lack of interest in the Israeli bond market. One of the reasons for this is the relatively low volume of turnover compared to that in world markets which is partly explained by the absence of market makers.

Box 4.2
Comments on the Introduction of Market Makers for Government Bonds

The activity of market makers, whose function is to supply liquidity for trading through the provision of continuous buy and sell orders, can serve as an important means for improving the liquidity of securities traded on the TASE, especially securities which currently have low tradability.

The Ministry of Finance has formulated a proposal for establishing a system of principal market makers for government bonds who will take on a number of commitments in exchange for benefits they will receive (see the Report of the Government Debt Management Unit for 2002). According to the proposal, their commitments will include quotation of buying and selling prices for government bonds for most of the trading period with a maximum difference between the two; carrying out a minimum volume of transactions in these securities; participation in government bond auctions and winning at least some of them. The privileges that the Ministry of Finance proposes to grant them include exclusive access to government bond auctions; the option to purchase an additional quantity in auctions without competition; exclusive access to a closed trading system to be administered by the Ministry of Finance; and exclusive access to an inventory of loanable securities also to be administered by the Ministry.

Although the introduction of market makers is important to improving the liquidity of securities traded on the stock exchange, the proposed system of rights and obligations and its implications for the functioning of the bond market and the capital market as a whole should be closely scrutinized. Some general comments on the proposed system follow:

1. Granting exclusive access to government bond auctions: Market makers should not be given exclusive access to government bond auctions since this is liable to curtail competition in the primary market and eventually in the secondary market as well. The Bank of Israel, together with the Ministry of Finance, has worked in the past to expand the number of participants in bond auctions with the goal of increasing competition and indeed the market currently functions well and competitively. Restricting the number of participants to market makers reverses this trend and is liable to compromise the efficient functioning of the primary market. In addition, if the banks become the local market makers, this will increase their involvement in the capital market and the potential for conflict of interest. Indeed, in many countries with a system based on market makers, including the US, market makers do not have exclusive access to buying government

bonds at source, for reasons similar to those outlined above, mainly the need to preserve and expand competition in the primary market.[1] Thus, exclusive access to bond auctions is not a necessary condition for the successful activity of market makers.

2. An inventory of loanable government bonds: It is important that an inventory of loanable bonds be established since this is an important condition for the functioning of market makers. Such an inventory would give market makers the degree of freedom essential for continuous trading, as the possibility of borrowing securities from the inventory for a certain period of time would help them meet their obligations. Nonetheless, an inventory like this must be administered by a non-government entity, since lending government bonds by the government (which issues them) essentially becomes a bond issue. In this case, the government is liable to raise capital not only to finance the deficit, which is its proper function, but also to meet the demands of market makers. In addition, the potential supply of government bonds would not be certain, making it difficult for investors to price bonds in this market, and this could compromise its functioning.

3. A trading system for market makers administered by the Ministry of Finance: It is important that a system of market makers be established, but it should not be run by the government, which is not the most suited to administer securities trading systems. The administration of this system should be under the auspices of an entity with a relative advantage, including professional experience, in the administration of such systems, e.g. the TASE.

[1] See Primary Dealers Government Securities: Policy Issues and Selected Countries, IMF working paper; Experience Guidelines for Public Debt Management: Accompanying Document, IMF; and a document published by the World Bank in March 2001, The World Bank Guidelines for Public Debt Management.

(5) Government domestic borrowing

Gross domestic government borrowing in 2003 totaled NIS 57 billion (Table 4.3), thus exceeding the budget proposal of NIS 52 billion. The total was made up of a gross NIS 44 billion of tradable domestic capital and NIS 13 billion of nontradable domestic capital, a drop of about NIS 1 billion from the level in 2002. The decrease in domestic borrowing in 2003 was due to borrowing abroad, primarily within the framework of the guarantees received from the US government.

In 2003 proceeds of privatization totaled NIS 0.3 billion, primarily through the sale of shares of El Al and Bezek.

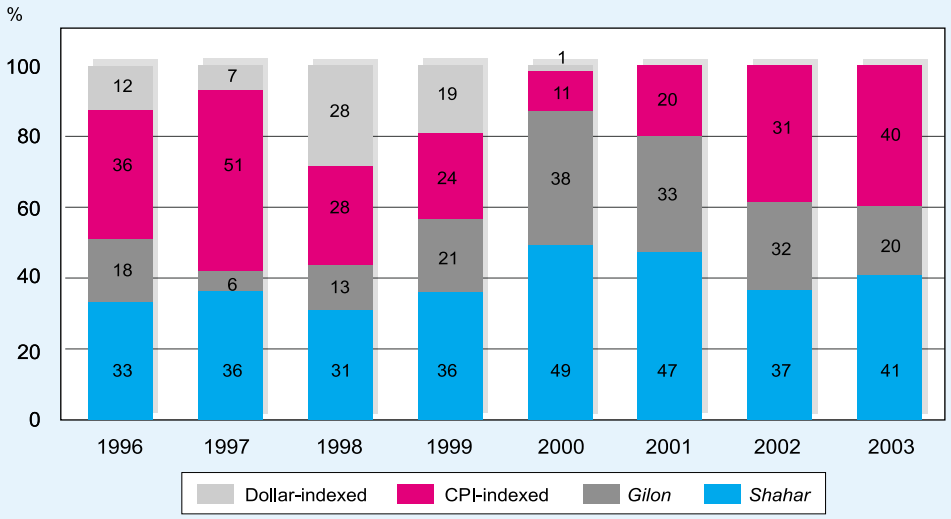
Table 4.3
Government Borrowing, 2001–2003

(NIS billion, current prices)

	2001	2002	2003 I	2003 II	2003 III	2003 IV	2003	Budget proposal 2003
1. Overall surplus (+) / deficit (-) (excl. credit extended)	–21.0	–19.3	–4.4	–9.9	–5.4	–5.9	–25.6	–15.2
2. Domestic surplus (+) / deficit (-) (excl. credit extended)	–16.9	–19.2	–5.3	–9.9	–4.0	–7.0	–26.2	-11.6
3. Total net borrowing (domestic and abroad)	19.8	21.7	5.9	11.3	5.7	8.3	31.2	15.4
4. Net domestic borrowing	16.2	24.3	7.4	8.8	1.8	3.8	21.8	15.4
of which Tradable	12.3	21.5	7.0	7.0	–0.3	4.7	18.3	12.4
5. Gross domestic borrowing								
Tradable	39.5	44.9	15.6	11.6	7.9	8.6	43.7	39.2
Non-tradable	12.9	12.1	2.8	3.6	5.7	0.9	13.0	13.0
Total	52.4	57.1	18.4	15.2	13.6	9.5	56.7	52.2
6. Privatization	0.18	0.35	0.0	0.1	0.0	0.2	0.3	1.5
7. Domestic redemptions (principal)[a]								
Tradable	27.2	23.5	8.6	4.6	8.2	3.9	25.3	26.8
Non-tradable	8.7	9.7	2.4	1.8	3.6	2.0	9.8	7.0
Reserve	0.5	0.1	0.0	0.0	0.0	0.0	0.0	4.5
Total	36.4	33.2	11.0	6.4	11.8	5.9	35.1	38.3
8. Net borrowing abroad	2.9	–2.6	–1.5	2.5	4.0	4.5	9.4	0.0
9. Injection (-) / absorption (+)	–0.7	5.1	–2.1	1.0	2.3	3.2	4.3	3.8

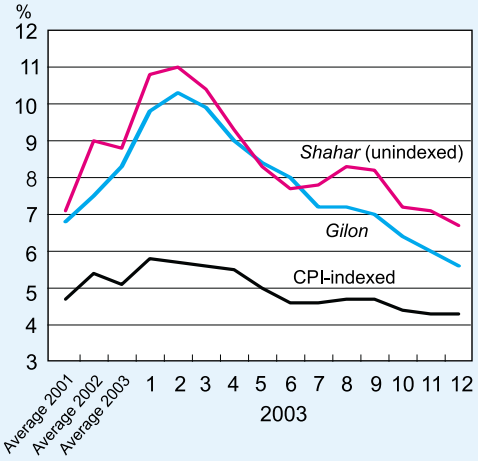
[a] Excluding national insurance.
SOURCE: Based on data from the Ministry of Finance.

Figure 4.6
Composition of Government Borrowing, by Indexation, 1996–2003
(monthly averages)

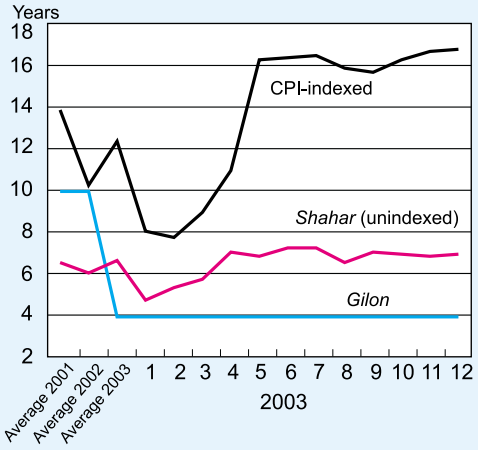


SOURCE: Based on data from Capital Market Department of Ministry of Finance.

Figure 4.7
a. The Cost of Government Bonds, 2001–2003



b. The Terms of Government Bonds, 2001–2003



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

Following two years of minimal borrowing abroad, the government's net borrowing abroad this year totaled NIS 9.4 billion. This allowed it to reduce its borrowing of domestic traded capital to a certain extent. Thus, net domestic borrowing of traded capital during 2003 totaled NIS 18.3 billion, down from NIS 21.5 billion in 2002, reversing the upward trend of the previous two years.

The composition of government borrowing reverted to what it was in previous years after deviating from it mainly in the second half of 2002. Thus, the share of unindexed fixed-interest borrowing in total government tradable debt increased, after declining in the years 2001-02 (Figure 4.6). In addition, the original maturity of government bonds—both CPI-indexed and unindexed fixed-interest bonds—lengthened, following their shortening in 2002.

Government borrowing by indexation base: The proportion of borrowing through unindexed fixed-interest *Shahar* bonds in total tradable capital raised increased to 41 percent in 2003, and the proportion of CPI-indexed bonds averaged 40 percent. Thus, following the decrease in unindexed yields during the year, especially compared to the second half of 2002 (Figure 4.7), and falling inflation expectations, the proportion of the unindexed fixed-interest component increased. These developments were part of a return to the upward trend of the proportion of *Shahar* bonds in total borrowing of tradable capital in previous years (excluding 2001 and especially 2002) following the stabilization of inflation at low levels.

In 2003 the government reduced the proportion of *Gilon* unindexed variable-interest bonds in its borrowing of tradable capital. It is important that these bonds be phased out because of their low tradability, which is partly due to the difficulty in pricing them. This is an extension of the government's past policy in which it stopped issuing bonds such as *Kfir* CPI-indexed variable-interest bonds and *Gilboa* dollar-indexed variable-interest bonds.

Government borrowing by term to maturity: In 2003 the government changed the composition of its borrowing according to term to maturity such that tradable domestically issued debt lengthened and approached the average levels of 2001. Thus, from July 2003, the government went back to issuing *Shahar* bonds only in benchmark series with terms of five and ten years, and from May 2003, it issued *Galil* bonds only in benchmark series with terms of ten and twenty years. In the last months of the year, the proportion of long-term CPI-indexed bonds increased, primarily due to the expected entry of the pension funds into the capital market.

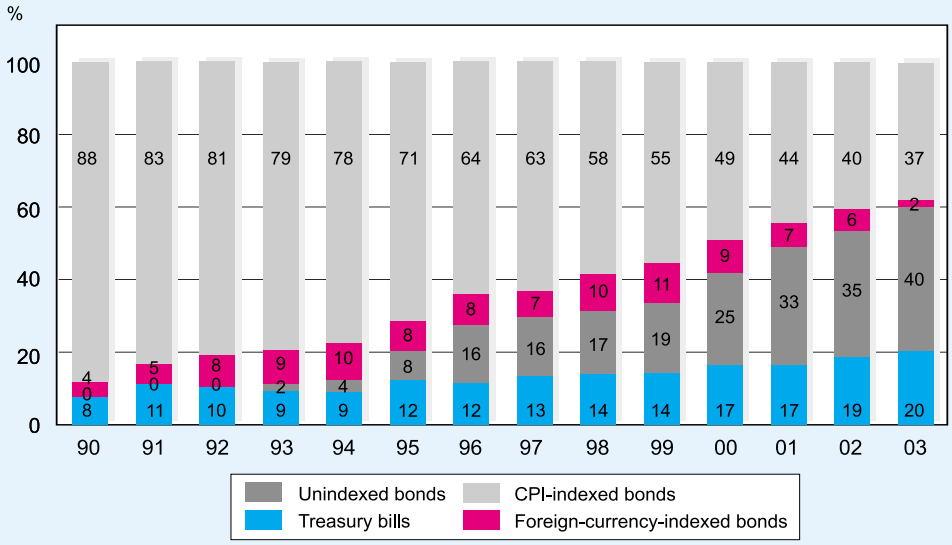
As a result of these changes, the average term of unindexed fixed-interest government borrowing increased at the end of 2003 to seven years while the term of indexed fixed-interest government borrowing rose to seventeen years as compared to five and eight years respectively at the end of 2002 (Figure 4.7).

Several changes were introduced into government bond auctions in 2003. The main changes were: (a) the announcement of a minimum internal price determined prior to the auction was discontinued; (b) the introduction of the possibility of an additional allocation of bonds at the closing price—in proportion to the basic amount—if there is surplus demand at the closing price and the difference between this price and the average price does not exceed a specified amount. The goal of these changes was to increase competition and to enable the government to sell bonds under better market conditions.

(6) Composition of capital listed for bond trading

In 2003, 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. This is a continuation of the trend of recent years (Figure 4.8).

Figure 4.8
Distribution of Listed Capital in Bonds and Treasury Bills, 1990–2003



SOURCE: Bank of Israel.

The proportion of unindexed bonds has risen continuously from 8 percent in the mid-1990s to 35 percent in 2002 and 40 percent in 2003. The proportion of CPI-indexed bonds fell from 70 percent in the mid-1990s to 40 percent in 2002 and to 37 percent in 2003. The 5-percentage-point increase in the proportion of unindexed bonds in total capital listed for trade in 2003 and the 3-percentage-point decrease in the proportion of CPI-indexed bonds reflected the change in the composition of government borrowing, i.e. the increase in unindexed fixed-interest bonds at the expense of CPI-indexed bonds during the course of the year compared to their shares of the total in the second half of 2002.

The proportion of foreign-currency-indexed bonds in the total tradable bonds declined to only 2 percent this year due to heavy redemptions of *Gilboa* bonds, totaling NIS 9 billion, and the lack of new issues. The issue of dollar-indexed bonds began in the early 1980s and continued until the beginning of 2000, when the government discontinued their issue. In 2004, two series of *Gilboa* bonds with a total value of $ 1.2 billion will mature and an additional series with a small total value will mature in 2010.

3. THE CORPORATE BOND MARKET

In 2003 the expansion of borrowing by corporations through the issue of bonds[1] which began in 2002 continued, in particular via the sale of nontradable bonds to institutional investors. During the year Israeli companies raised NIS 18 billion through corporate bonds on and off the TASE, 65 percent of which were nontradable securities and 35 percent, tradable bonds. By comparison, in 2002 companies raised NIS 10.3 billion, 59 percent via nontradable securities and 41 percent via tradable bonds.

Israel ’s corporate bond market is still undeveloped relative to the government bond market and parallel markets in advanced economies. There are a number of factors which explain the awakening of this market since 2002:

1. Against the background of the recession and the difficulty in repaying credit, particularly in the high-tech industries, the Supervisor of the Banks tightened up the relevant regulations, and the banks became more selective in extending credit. Hence the shortfall in bank credit for businesses to finance their operations became increasingly acute. Some of them turned to the capital market as an alternative source of financing.
2. The decline in yields in the government bond market, which serves as the benchmark for pricing private bonds, made it cheaper for firms to raise funds, and allowed them to improve their capital structure.
3. Against the background of the reduction in government bond issues in the second half of the year, the discontinuation of earmarked bonds for the pension funds within the framework of the pension reform, and the simultaneous decline in market yields, investors purchased corporate bonds as an alternative investment channel.

[1] Not including issues abroad and nontradable convertible bonds.

4. Against the background of the reform in the capital market, taxation on bank deposits—which were previously exempt from tax—and on corporate bonds were brought into line with each other.
5. Against the background of firms' improved efficiency and lower financial risk in the economy, the demand for corporate bonds increased.
6. The redemptions of *Gilboa* foreign-currency-indexed government bonds and the discontinuation of their issue created a demand for a similar asset, and foreign-currency-indexed corporate bonds provided one such alternative.

a. Private issues of nontradable corporate bonds

Capital raised by means of nontradable securities not offered to the public totaled NIS 11.6 billion in 2003,[2] 54 percent more than in 2002. Most private nontradable issues this year were indexed to the CPI or the dollar, despite the reduction in uncertainty regarding inflation and the exchange rate in 2003. This may be because investors who buy these issues are, in general, institutional investors who invest for the long run and tend to hold indexed nontradable bonds in order to reduce volatility in their portfolios.

There are a number of advantages to issuing nontradable over tradable securities: First, the issue of nontradable securities does not require the preparation of a prospectus, a long and expensive process which also forces the company to reveal information about itself. Second, the commissions collected by the underwriter for an issue of nontradable securities are lower than those for the issue of a tradable security since, in the former case, there is no underwriting commitment. Third, since the tradability in the corporate bond market is relatively low, firms see no significant advantage in the issue of tradable over nontradable securities. Fourth, evaluation of a nontradable security is based on the purchase price and the terms of the security on the day of issue, unlike tradable securities which are valued at market value. These rules reduce the exposure of investors to the volatility of market prices. Banks use this method to issue subordinated capital notes in order to enlarge their capital base and to fulfill the minimum capital ratio requirement.

At the end of October, the TASE announced its decision to establish a trading system for bonds that were issued to institutional investors without a prospectus (and were not listed for trade). The goal of the system is to create liquidity for bonds which were not issued to the public and thus diversify the sources of finance for firms and improve the functioning of the credit market. Recently, there has been a similar initiative in the private sector in which an over-the-counter system was established for the trade of financial assets (including some which are not listed at the Stock Exchange clearing house) by telephone among institutional investors.

Despite the awakening in the nontradable corporate bond market described above, there is still a relatively low level of competition in the capital market. For example, the underwriting sector is concentrated among the banks such that private issues are carried out by a small number of underwriters, most of whom belong to the larger banks.

[2] Monetary Department estimate.

b. Issue of tradable corporate bonds on the Tel Aviv Stock Exchange

In 2003, the issue of tradable corporate bonds also increased to a record NIS 6.2 billion (including private placement) from NIS 4.2 billion in 2002. This occurred against the backdrop of the reduction in interest, the streamlining of businesses and the income-tax reform.

Against the background of redemptions of *Gilboa* government bonds, approximately 53 percent of the issues were dollar-indexed and 41 percent were CPI-indexed securities (the rest were NIS-denominated securities). It thus appears that the private sector has the ability to provide dollar-indexed bonds when there is a demand and there is no necessity for the government to do so.

The market for public issues of corporate bonds constitutes only 7.1 percent of the total tradable bond and Treasury-bill market. The main holders of these bonds are the provident funds and advanced study funds although their total holdings have declined from 48 percent in 2002 (and from 61 percent in 1998) to 40 percent in 2003 (Table 4.2).

The average turnover of corporate bonds increased in 2003; however, as in previous years, the average daily turnover was very low. As a result of the low tradability in this market, firms are still dependent to a relatively large extent on bank credit. This is especially true for small and medium-size firms in the traditional industries which are unable to raise capital abroad. Improving the functioning of the corporate bond market will contribute to a more efficient capital market and will provide a source of credit outside the banking system.

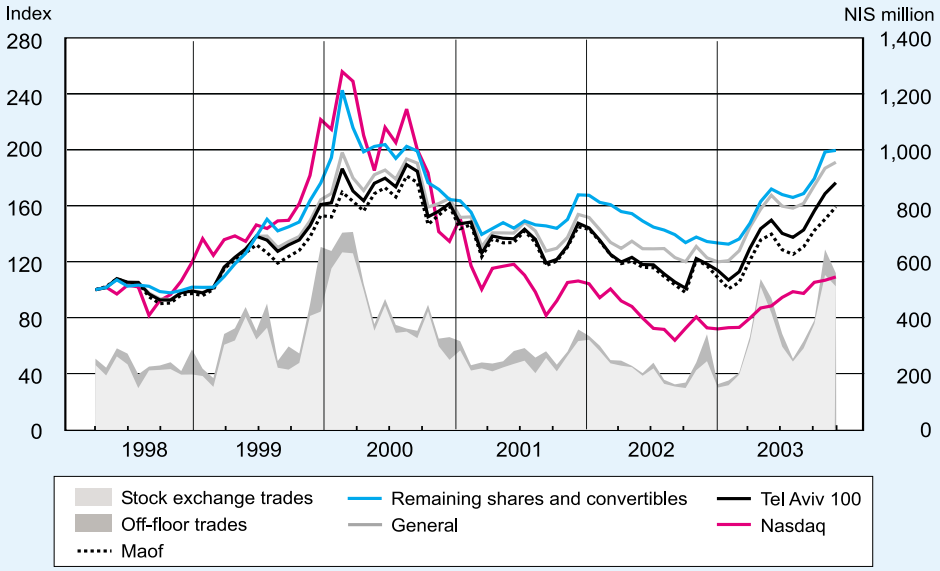
4. THE EQUITY MARKET

In the equity market in 2003 prices rose sharply and turnover increased. This reversed the downward price trend and low turnovers of 2001 and 2002 (Figure 4.9).

The General Share Price Index and the Tel Aviv 100 index rose more than 55 percent in 2003 and the Maof index rose by more than 50 percent, following declines of more than 20 percent in 2002. The price increases encompassed all sectors (Figure 4.10) with especially large increases in the commercial banking, insurance and manufacturing industries. At the same time, the NASDAQ index in the US rose by 50 percent after having fallen sharply in previous years—by 32 percent in 2002 and 21 percent in 2001. The influence of the American market on Israel's market is particularly strong due to dual listing of many firms.

Prices did not increase uniformly throughout the year: The year opened with declining prices; this trend was reversed during the second half of February and by the end of the year prices had risen sharply. The decline in prices at the beginning of the year was a continuation of the trend in 2002 prior to the tax reform which came into effect in January 2003. During the second half of February the trend reversed and prices began to rise. This continued until the end of the year except for July and August. The factors behind the price increases were the swift and successful conclusion of the Iraq war, the

Figure 4.9
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 2003

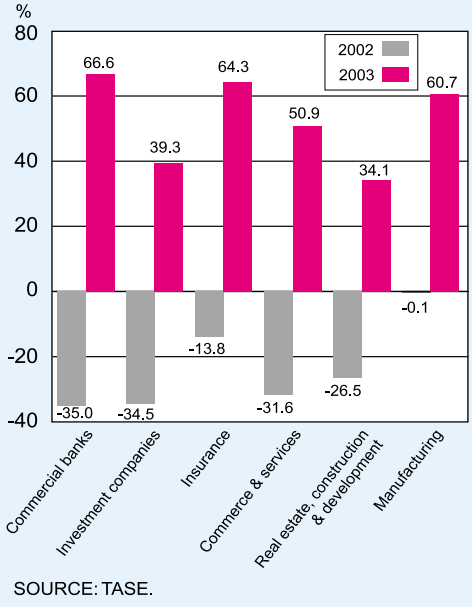


SOURCE: TASE.

economic program, the decline in interest rates and the increased efficiency of many firms.

Total share capital listed for trading increased during 2003 to NIS 308 billion, as compared to NIS 202 billion in 2002 and NIS 271.5 billion in 1999, against the background of the rise in share prices. The increase in prices was accompanied by increases in turnover following two years of declining turnover. The average turnover was NIS 360 million in 2003 as compared to NIS 240 million in 2002. The first quarter of the year was characterized by low turnover but from the second quarter it increased sharply, despite the tax reform which imposed a turnover tax on all activity on the TASE (Figure 4.9), although turnover remained lower than the norm in other countries.

Figure 4.10
Prices of Shares and Convertibles, Selected Sectors, 2002–2003 (rates of change)



SOURCE: TASE.

The share holdings of foreign investors stood at 10.8 percent at the end of 2003 as compared to 10 percent at the end of 2002 (Table 4.2). This was a result of the risk in Israel's economy becoming lower than that in emerging markets. This proportion is higher than the proportion of foreign holdings in other investment channels. The government reduced its holdings of listed capital to 4.5 percent *inter alia* by privatizing its shares of El Al and Bezek.

Issues of equity and convertible securities[3] fell from NIS 3 billion in 2002 to NIS 2.7 billion in 2003. This was due to the increase in issues of corporate bonds and private placement. The low number of issues in the equity market, despite the sharp price increases in the secondary market, support the hypothesis that the high prices in the secondary equity market are not a result of the economic recovery, since this would have led firms to issue additional equity to finance their operations.

The number of firms listed on the TASE fell from 624 at the end of 2002 to 577 at the end of 2003. This is the lowest level since the end of 1993. This is the result of many companies being de-listed from the stock exchange in recent years, in most cases a consequence of buyouts by other firms and in some cases at the initiative of the exchange.

a. Changes in the securities market

During 2003, the authorities introduced a number of changes into the securities market:

Coordinated transactions – From mid-August, the TASE allowed investors in corporate bonds and shares to carry out coordinated transactions, i.e. transactions whose details have been agreed upon ahead of time. The introduction of coordinated transactions into the *Retzef* trade improves the transparency of trading and also allows small investors, who have given in orders at prices better than the transaction price, to exercise their orders. This step is meant to increase tradability in this market.

Institutional Retzef trading system – At the end of October, the TASE announced its decision to establish a trading system for bonds which were issued to institutional investors without a prospectus (and were not listed for trading). Electronic trading will be carried out in a similar manner to that of bonds which were issued to the public, although access to this market will only be given to institutional investors. The goal is to improve the liquidity of bonds which were not issued to the public and thus to diversify the sources of finance for firms and also to improve the functioning of the credit market.

Market making – The Tel Aviv Stock Exchange has laid the foundation for market making operations in listed securities. Rules for market makers have been established, including a list of rights and obligations, and the methods for supervising market makers

[3] Including private placement but not including nontradable convertible bonds and issues abroad.

have been decided upon. Market makers selected by the Stock Exchange will begin operating in the euro derivatives market starting in March 2004. They will be required to quote prices and will be compensated through various benefits and fees (for more detail, see Section 5 – Derivatives). At a later stage, market makers will also begin operating in the trade of shares and bonds. Market makers will operate according to the *Retzef* trading rules and will have no additional advantages or information as compared to other investors. The entities that can act as market makers in the share and bond markets are members of the Stock Exchange or their subsidiaries. However, in the derivatives market, market makers are not required to be members of the TASE. In addition, the Ministry of Finance is working to establish a system of market makers in the government bond market (see Box 4.2).

5. THE DERIVATIVES MARKET

Trade in derivative financial assets is carried out within three frameworks – the 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 Stock Exchange; the commercial banks carry out 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 through auction.

The level of uncertainty in the prices of financial assets is influenced by a number of internal and external factors and is reflected by the volume of activity and by prices of derivative financial assets. This information can be used to calculate, on an ongoing basis, estimates of uncertainty as perceived by the community of investors. During the first quarter of 2003 against the background of the expected war in Iraq combined with other risk factors that had been evident at the end of 2002, uncertainty, as reflected in the derivatives market, reached its peak (for more details see Chapter 2). From the second quarter, uncertainty declined continuously, with the trend intensifying during the final quarter. Over the year as a whole, uncertainty was lower than it had been in 2002.

The volume of activity in derivative financial assets during 2003 followed different paths. The volume of trading in exchange-rate derivatives in the banking system increased, and there was a particularly sharp rise in interest-rate derivatives. In contrast, there was a slight decline in the volume of trading in exchange-rate derivatives traded on the TASE and a significant decline in CPI derivatives. The level of activity in derivatives during the first quarter of the year was influenced by increased uncertainty, which acted to raise the level of activity, and the implementation of the tax reform in the capital market, which acted to reduce overall activity in financial assets. On an annual basis, the volume of activity in derivatives was slightly lower than in 2002 and 2001, with the exception of interest-rate derivatives, thus reversing the upward trend evident since 1998.

The TASE decided to implement the model for market making which was proposed in the Hauser Report and to introduce it first in the trade in euro derivatives. Market makers, who will be compensated by the stock exchange, will be introduced into the trade of these derivates in March. Within this framework, they will be required to provide price quotations and in exchange will be compensated with various benefits and fees by the Stock Exchange. The compensation will be determined by the number of securities that they trade with non-market makers (for more details see below).

a. Exchange-rate derivatives

Uncertainty regarding fluctuations in the exchange rate remained high during the first quarter of 2003 and rose even further due to the expected conflict in Iraq. During the second quarter, following military and economic developments (as described in detail in Chapter 2), this uncertainty declined somewhat. Nonetheless, turnover in exchange-rate options and futures contracts remained high during this quarter and the balance of open contracts in the banking system actually increased. This was reflected primarily in derivatives used to hedge against appreciation, against the background of actual appreciation that occurred during this period. During the second half of the year, with the relative calm in the foreign exchange market, uncertainty declined and with it the volume of turnover. According to the indicators discussed below, by the end of 2003 uncertainty had reached its lowest level since the lowering of interest rates in 2001. It is worth mentioning that the imposition of tax on exchange-rate derivatives did not have a significant effect on turnover on the TASE, except during the first days of January 2003.

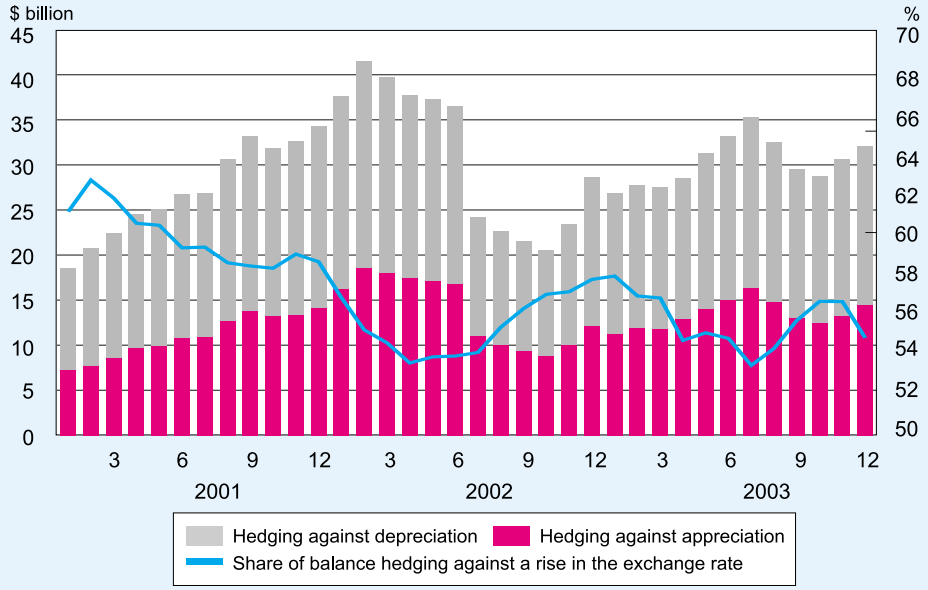
The banking system

Transactions between the banks and the public in nontradable derivative financial assets[4] are carried out in the banking sector. These involve a variety of exchange rates and are defined as over-the-counter transactions. Most of the activity in the banking sector is focused on NIS-dollar and NIS-euro derivatives, which constitute 90 percent and 8 percent, respectively, of the activity in exchange-rate derivatives. Figure 4.11 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 rose during the first half of 2003 to reach a total of $ 35 billion in July. This increase was concentrated in hedges against appreciation in the light of the actual appreciation of the NIS that began at the end of the first quarter. During the second half of the year, with further positive developments in the foreign-currency market, the balance of open contracts stopped rising and actually dipped to $ 31 billion. At the same time, the proportion of the balance of contracts which hedge

[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 asset.

against an exchange-rate increase in the total balance stopped falling and even increased somewhat. Over the year as a whole, the downward trend of this proportion flattened at about 56 percent, similar to its level in 2002 and lower than its level in 2001 (60 percent).

Figure 4.11
Balance of Open Positions in NIS/$ Hedging Transactions between the Banks and the Public, 2001– 2003



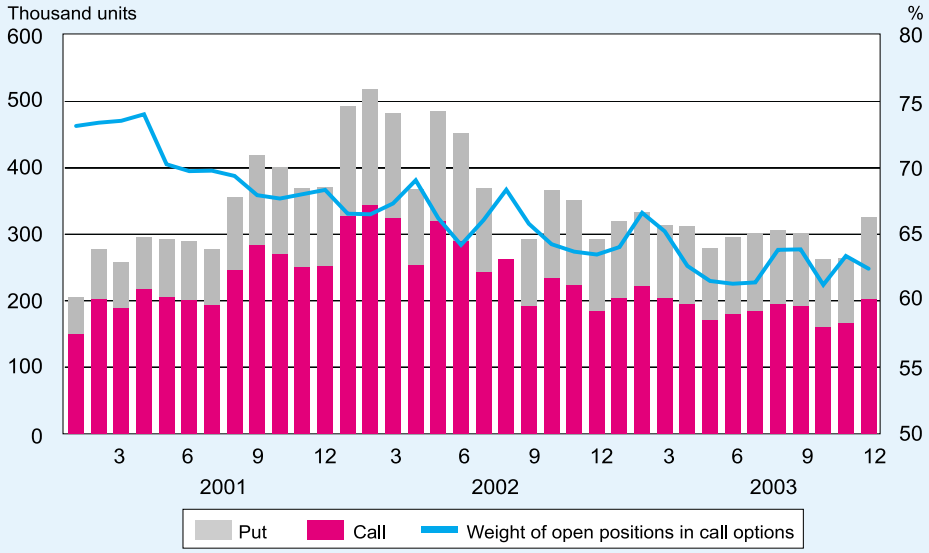
SOURCE: Bank of Israel.

The Tel Aviv Stock Exchange

The number of open positions in NIS-dollar options[5] traded on the TASE remained at an average of 320,000 during the first quarter of 2003, similar to that in the last quarter of 2002. These positions provided hedging amounting to $ 3.2 billion (Figure 4.12). During the second and third quarters, the number of open positions declined to an average total of 300,000. During October and November this decline continued, to a level of 260,000 while in December the whole decline was offset and the number of open positions returned to a level of 320,000. The proportion of open positions in call options in the total of open positions continued its downward trend, falling from 70 percent in 2001 to 66 percent in 2002 and to an average of 63 percent in 2003 (Figure 4.12). This trend reflected the fact that investors continued to internalize the need for protection against a fall in the NIS-dollar exchange rate in the face of appreciation of the NIS against the dollar, particularly in the second quarter. Nonetheless, the proportion of open positions in call options in the total of open positions on the Stock Exchange was still higher than that in the banking sector.

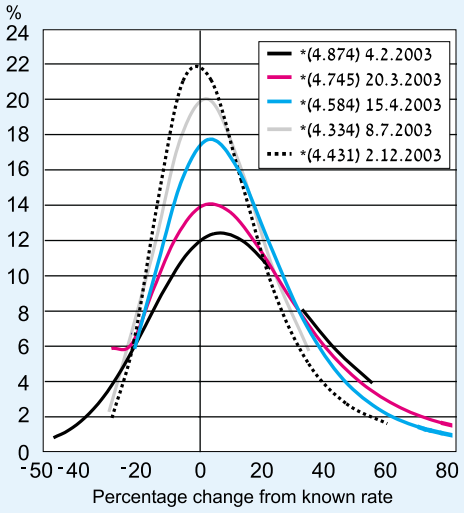
[5] The underlying asset for NIS-dollar options is $10,000.

Figure 4.12
NIS/$ Options on the Stock Exchange, Number of Open Positions in Put-Call Options, 2001– 2003



SOURCE: Bank of Israel.

Figure 4.13
Expected Distribution of NIS/$ Exchange-Rate Changes derived from Options Traded on the TASE at Various Exercise Rates,[a] 2003



[a] Numbers in porentheses are NIS/$ exchange rates.
SOURCE: Bank of Israel.

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 an additional series for the end of the next quarter. During 2002, an additional series of options was issued with expiration date the end of the calendar year. An analysis of trading by expiration date shows that the volume of trading in short-term series in 2003 continued to be notably larger than that in longer series. Thus, 94 percent of open positions were in the two shortest term series which had up to two months to maturity.

Using trading data for NIS-dollar options for various dates during the year, the expected distribution[6] of the NIS-dollar exchange rate was calculated. Figure 4.13 presents the distributions for a number of dates which reflect the principal developments of 2003.

[6] The expected distribution for one-and-a-half months in annual terms. The method of calculation is explained in Section 4 of the Monetary Department Survey in the Bank of Israel Report for 2002.

1. On February 4, 2003, about one week after the Knesset elections, and during a period when the was in Iraq was expected to begin, the NIS-dollar exchange rate stood at NIS 4.87 to the dollar. As shown in the figure, the distribution was a wide one, reflecting a high level of uncertainty about future developments in the foreign-currency market and the high probability of large changes, in either direction, in the exchange rate. The largest probability, of 12.4 percent, was for a 5-percent depreciation of the NIS against the dollar. The probabilities of large changes in the exchange rate, i.e., a depreciation or appreciation of 25 percent or more, were relatively high at 25.6 and 13.6 percent respectively.
2. On March 20, about one week following the initial announcement of the economic program, the start of the war in Iraq and the approval of guarantees and military aid by the US Congress, the distribution indicated a certain calm in the foreign-currency market. The largest probability, of 14 percent, was for a 3-percent depreciation of the NIS against the dollar. The probabilities of large changes in the exchange rate, i.e., a depreciation or appreciation of 25 percent or more, decreased somewhat to 22.7 and 11.7 percent respectively. This finding indicates that investors felt that the US guarantees and the economic program would make the foreign exchange market more stable than it was in the previous period.
3. On April 15, about one week following the end of the conflict in Iraq and following the appreciation of the NIS to 4.58 NIS to the dollar, the distribution reflected a higher rate of certainty around the known NIS-dollar exchange rate. Nonetheless, the Figure shows that the right tail of the distribution is thicker than its left tail, indicating that despite the decline in uncertainty, the probability of a relatively large depreciation remained high. The largest probability, 17.7 percent, was of a depreciation of 3 percent. The probabilities of a large change—a depreciation or appreciation of 25 percent or more—were relatively low at only 18.4 and 7.4 percent respectively.
4. On July 8, a few days after the ceasefire with the terror organizations and the appreciation of the NIS to 4.33 NIS to the dollar, the distribution reflected a decline in uncertainty around the NIS-dollar exchange rate. The highest probability, 20 percent, was of a moderate appreciation; the probabilities of an appreciation or depreciation of 25 percent or more were relatively low at 17 and 6.2 percent respectively.
5. On December 2, following the first indications of a global economic recovery and relative calm in the security situation, the distribution reflected the highest level of certainty since the beginning of 2003. The highest probability, 22 percent, was of a moderate appreciation. The probabilities of an appreciation or depreciation of 25 percent or more were the lowest, at 12.1 and 5.6 percent respectively.

This type of analysis of the options traded on the stock exchange makes it possible to examine the expected movement of the NIS-dollar exchange rate and thus improves the analysis of developments in the foreign exchange market.

At the end of November 2001, the TASE added NIS-euro options to the NIS-dollar options that had been traded since 1994. The trade in options on the euro exchange rate did not increase during 2003 and average daily turnover remained at 1,600 units, similar

to the volume in 2002. This is a very small volume of trading relative to that of NIS-dollar derivatives despite the high volatility in this market during the past year. The TASE therefore decided to begin in March with the implementation of the market makers model suggested in the report of the Hauser Committee in NIS-euro option trading. The market makers will be compensated by the TASE. They will be required to quote prices of seven options with various exercise prices around the spot rate in the two series which are closest to maturity. The market makers will receive a fixed monthly payment, an exemption from trading and clearing commissions, and in addition will share with the TASE revenues from trading and clearing commissions on all options transactions with non-market makers in excess of 6,000 a month. The influence of the market makers on the volume of activity in euro derivatives is likely to be significant in view of the meager volume of trade in these options at present and the difference between the movements of the NIS-euro rate and those of the NIS-dollar rate.

The Bank of Israel

The options sold in the Bank of Israel auctions are 'pure in-the-money'[7] which 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 on an ongoing basis. This is information which is not available through simple derivation from other NIS-dollar options that are traded in the banking sector and 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 regarding expected changes in the dollar rate. Using this measure, the level of risk in the foreign exchange market can be evaluated on an ongoing basis. Therefore, the Bank of Israel continued issuing these options in 2003 although with a change in the composition of the issue: at the beginning of 2003, six-month put options were added to the weekly auctions. The weekly issue of this option was $ 4 million, which offset the amount offered in the auctions of the other options—six-month call options of $ 4 million and three-month call and put options of $ 8 million each per week. The cost of these auctions to the Bank of Israel—put and call options in equal amounts at each maturity—means that it is selling a type of insurance against unexpected fluctuations in the exchange rate (for more details see Box 4.3). Demand was on average 6.4 times larger than the amount offered for all types of options in the auctions in 2003, compared to 8.5 times in 2002. The decline in total demand was also reflected in the number of participants in the auctions, which fell from an average of 4.5 per auction in 2002 to 3.5 in 2003. Nonetheless, an analysis of the demand in the auctions over the course of the year shows that in January 2003, when the Bank of Israel began issuing a new option, the total demand in the auctions was 8.3 times higher than the amount offered, similar to the average in 2002. During the rest of the year, demand gradually decreased until it reached 5.1 times the amount offered during the last quarter of the year.

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

The implied standard deviation in three-month put and call options was an average of 8 percent in annual terms during 2003, down from 8.4 percent in 2002 (Table 4.4). The standard deviation during 2003 was characterized by a relatively high degree of volatility, a consequence of the political and security situation. The main forces which had been influential in 2002, including the security situation in Israel and the worsening economic situation, continued to have an influence in the first quarter of 2003. In addition to these factors, the increasing expectation of war in Iraq in early 2003 raised the implied standard deviation on NIS-dollar options to a record level of 9 percent during the first quarter of the year. The swift conclusion of the war, the approval of the economic program and the granting of US guarantees in the amount of $ 9 billion resulted in a limited decline in the standard deviation during the second quarter. However, the standard deviation remained at the relatively high level of 8 percent, and this continued into the third quarter. Towards the end of the year, there was relative calm in the foreign exchange market and the implied standard deviation fell to 6 percent. At the end of 2003, the implied standard deviation for three-month options remained slightly higher than it was at the end of 2001 before the reduction in the Bank of Israel interest rate.

Table 4.4
Estimates of Implied Risk in Bank of Israel Options, 2001–2003

(Annual and monthly averages)

	NIS/$ exchange rate	3-months implied volatility	Probability of relatively steep depreciation[a]
Annual average		(Percent)	
2001		5.28	1.8
2002		8.35	11.5
2003		7.96	11.1
2003 - monthly average			
January	4.836	9.18	15.5
February	4.866	9.20	16.7
March	4.781	9.01	15.8
April	4.619	7.83	12.7
May	4.478	8.44	12.5
June	4.378	8.86	12.9
July	4.371	8.21	10.8
August	4.452	8.21	10.4
September	4.465	7.73	9.5
October	4.448	6.61	7.0
November	4.494	6.22	6.3
December	4.401	5.96	4.3

[a] The probability of depreciation of more than 10 percent within a six-month period.
SOURCE: Bank of Israel.

A similar picture is obtained from the estimate of the probability of a depreciation of more than 10 percent of the NIS against the dollar within a period of six months. This estimate is influenced both by the level of uncertainty in the foreign exchange

market and by the interest differentials between the NIS and the dollar[8] and serves as an estimate of the probability of exceptional fluctuations in the exchange rate. In the first quarter of the year the probability stood at 16 percent, similar to its level in the last quarter of 2002 (Table 4.4). During the second and third quarters, primarily as a result of the narrowing of the interest-rate differential between the NIS and the dollar, the probability fell, although it still remained high. In the last quarter, the probability continued to fall, due to the continued narrowing of the interest-rate differential between the NIS and the dollar and the reduced uncertainty in the foreign exchange market, and in December reached an average level of 4.3 percent. By the end of the year, the probability had dropped to its lowest level since the reduction in the interest rate at the end of 2001.

Box 4.3
The Significance of the Options Issued by the Bank of Israel

In 2003 the Bank of Israel sold equal amounts of pure in-the-money put and call options with terms to maturity of three and six months. The sale of two put and call options with the same term to maturity and an exercise price equal to the expected exchange rate requires that the seller compensate the buyer in the case of a change in the dollar exchange rate which is larger than expected. This is equivalent to the sale of insurance against high volatility in the exchange rate. In summing up the Bank of Israel's cash flow from its option auctions, we can expect a balance over time. Thus, in periods of unexpected depreciation, the Bank of Israel will pay the exchange-rate differences due to the call options, and in periods of unexpected appreciation, it will pay the exchange-rate difference on the put options. The summation of cash flows from the options for each of the terms to maturity will therefore be negative during periods when the dollar rate is more volatile than expected, as occurred for example during the first eight months of 2002, and positive during periods when the exchange rate is relatively stable.

During 2003 the exchange rate was highly volatile, with a relatively large appreciation of the NIS against the dollar, particularly during the months February-July. Looking at the cash flow balance for three-month options that were sold in the auctions and that matured in 2003 (Table 4.5), we see that the net cash flow for put and call options which matured during the first quarter of the year was positive, despite the fact that the NIS appreciated against the dollar during the last quarter of 2002 and depreciated during the first quarter of 2003. Apparently, these fluctuations were not sufficiently large to create a negative cash flow for both types of options together. In the second quarter of the year and the month of July the cash flow from put

[8] The main assumption in this calculation of the probability of a depreciation is that the distribution of changes in the exchange rate is normal.

options was negative as a result of the appreciation during that period, and this led to a negative cash flow for both of the options together. In the last five months of the year the total cash flow for put and call options was positive, because during this period there were no major fluctuations in the exchange rate.

We obtain a similar, though more pronounced, picture from the net cash flow from six-month options which were sold in auctions and which matured during 2003. The six-month put options first matured in July 2003, following a relatively large appreciation in the NIS-dollar rate. In July, August and September exchange-rate differences were particularly large and led to a negative cash flow on put options. In contrast, call options yielded a positive cash flow during the whole second half of the year. Thus, the cash flow from both types of six-month options was positive for only the last two months of the year. This analysis of the cash flow illustrates that through these auctions the Bank of Israel is selling a kind of insurance against unexpected fluctuations in the exchange rate.

Table 4.5
Cash Flows in Issues of Bank of Israel Options, 2003

(NIS million)

2003	Call 3	Put 3	Total cash flow, 3-month options	Call 6	Put 6	Total cash flow, 6-month options
January	2.8	1.1	3.9			
February	–0.6	3.2	2.6			
March	0.9	1.5	2.4			
April	3.9	–8.2	–4.3			
May	3.0	–11.7	–8.7			
June	2.9	–12.6	–9.7			
July	2.7	–9.1	–6.4	2.8	–7.8	–5.0
August	2.8	–1.1	1.7	2.1	–7.3	–5.2
September	2.0	2.8	4.8	2.5	–7.2	–4.7
October	1.6	1.8	3.4	1.7	–3.1	–1.4
November	1.9	1.6	3.5	1.9	–0.3	1.6
December	2.3	–1.8	0.5	1.8	–0.2	1.6

SOURCE: Bank of Israel.

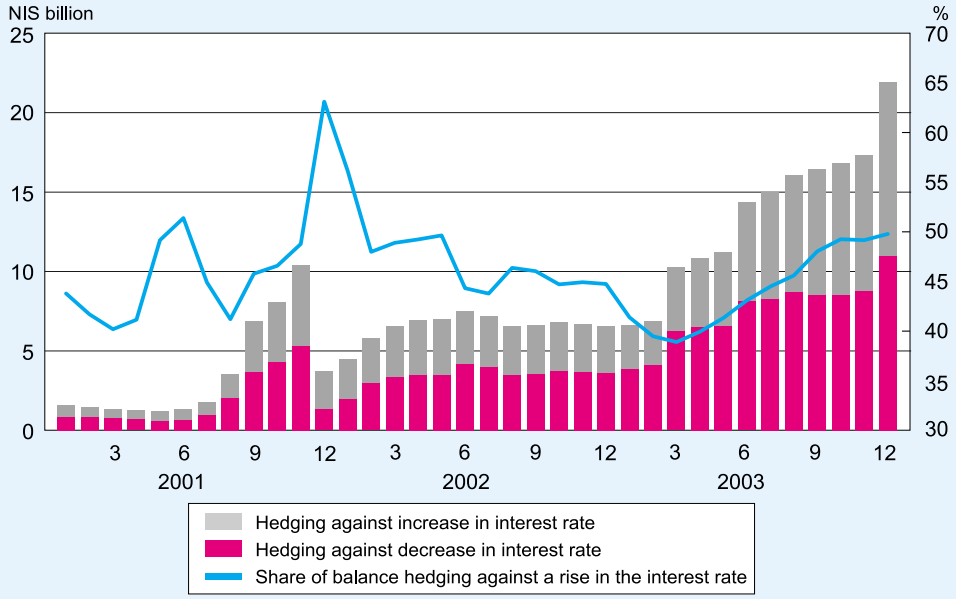
b. Interest-rate derivatives

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, only a few transactions took place in these contracts in the period following their introduction. Thus, in 2003 trade in interest-rate derivatives took place primarily in the banking sector.

The banking sector

There was significant expansion in the volume of trade of interest-rate derivatives in 2003 in the banking sector which accounts for most of the trading in this area. The balance of open contracts reached a new record of NIS 22 billion in December (Figure 4.14). The average balance of open contracts during the first months of 2003 was NIS 7 billion, similar to what it was during the second half of 2002 (see footnote 4). Although apprehension about the security and economic situation had eased somewhat during March (as explained in Chapter 2), from this point until the end of the year the volume of hedges against both an increase and a decrease in the interest rate rose. The proportion of open positions hedging against increases in the NIS interest rate in the total balance stood at an average of 40 percent during the first quarter; however, against the background of cuts in the Bank of Israel interest rate, the balance of open positions started rising in the second quarter, especially those hedging against an increase in the interest rate. This trend continued during the second half of the year and the proportion of open positions hedging against increases in the NIS interest rate reached 50 percent in December. Thus, in December 2003, the public insured its assets against an increase and a decrease in the NIS interest rate to the same extent.

Figure 4.14
Open Positions in Shekel Interest-Rate Hedging Transactions between the Banks and the Public, 2001–2003



SOURCE: Bank of Israel.

Apart from transactions in nominal-interest-rate derivatives, the banking sector also conducts trade in real-interest-rate derivatives in response to market demand. The

volume of transactions in these derivatives continued to contract, a continuation of the trend which began in March 1999. The balance of open positions in real-interest-rate futures fell to NIS 100,000 in December 2003.

The Bank of Israel

In 2003, the Bank of Israel continued selling nontradable futures contracts on the nominal interest rate in order to support the development of the interest-rate derivatives market in Israel. In these transactions, the Bank of Israel commits itself to delivering three- or twelve-month Treasury-bill series three months in the future at a guaranteed interest rate which is determined in the auction.

The monthly amount offered in each Treasury-bill series remained fixed at NIS 80 million also in 2003, in accordance with Bank of Israel policy. The demand in the three-month Treasury-bill auctions was particular heavy during the first two months of the year and the beginning of March and outstripped supply by 14 times. This increase in demand was apparently the result of the greater uncertainty surrounding the (relatively short-term) nominal interest rate which would prevail with the beginning of the war in Iraq. Nonetheless, on an annual basis, the volume of demand in the three-month Treasury-bill auctions exceeded supply by 10 times, which is somewhat higher than in 2002. In auctions for twelve-month Treasury-bills demand exceeded supply by 8.5 times, slightly lower than in 2002.

The gap between the average yield in the auctions and the market yield[9] at the time of the auction is an indicator of investors' expectations of a change in the NIS interest rate in three months' time. During the first half of 2003, this gap was negative and varied from –0.4 to –0.8 percentage points for three-month series, reflecting expectations of a decline in the NIS interest rate. The gaps during the months of April and May were the largest and indicated expectations of a reduction of more than a percentage point in three months' time. During the second half of the year the gaps were not significant, indicating that there were no expectations of large changes in the interest rate despite the fact that during this period the Bank of Israel continued cutting the interest rate.

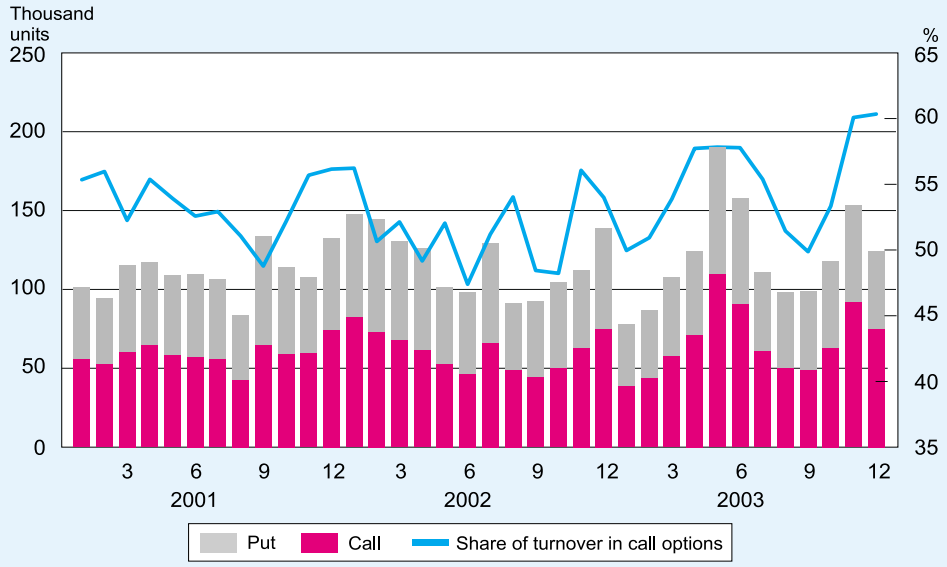
An analysis of the average yields determined in the auctions as compared to those which prevailed in the market on the day of delivery (three months in the future) shows that the yield determined in the auctions during the first half of 2003 was up to 2 percentage points higher than that which prevailed in the secondary market at the time of delivery. This was apparently due to the reduction in inflation expectations which led to more rapid than expected cuts in the Bank of Israel interest rate. In July-September the yield determined in the auction was still higher than that which prevailed in the secondary market at the time of delivery. This was apparently due to the continuing reduction in inflation expectations and occurred even after the trend of appreciation in the NIS-dollar rate came to a halt.

[9] The market yield on the series which is delivered as a part of the auction. If a series is still not yet 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 maturity is the closest to one year.

c. Derivatives on the share indices

The TASE conducts trading in options and futures contracts on the Tel Aviv 25 index. The average daily turnover in 2003 was 121,000 option units,[10] which was somewhat higher than in 2001 and 2002 (Figure 4.15). In January 2003, the month that the tax reform was implemented, daily turnover was low and totaled an average of $ 80 million. However, it rose during the first quarter and reached its average level. Figure 4.15 shows the daily turnover in put and call options and the proportion of the daily turnover in call options in total turnover. During the second quarter and simultaneous with the rise in the leading indices on high turnover, the proportion of call options in total turnover increased to 58 percent. This indicates expectations of a continuing upward trend in share prices. During the fourth quarter of the year, the upward trend in the stock market resumed, and the proportion of the daily turnover in call options in total turnover reached 60 percent in November-December, the highest rate in three years.

Figure 4.15
Options on the TA25 Index on TASE, Average Daily Turnover in Put and Call Options, 2001–2003



SOURCE: Bank of Israel.

In August 2000, the TASE introduced derivatives on the Tel Aviv Banking index following the success of the Maof index derivatives. During 2001, the volume of transactions was very low with an average daily turnover of 150 option units. In 2002, the interest in these derivatives dwindled even further and the volume of transactions contracted significantly. During the first half of 2003 only a few transactions were

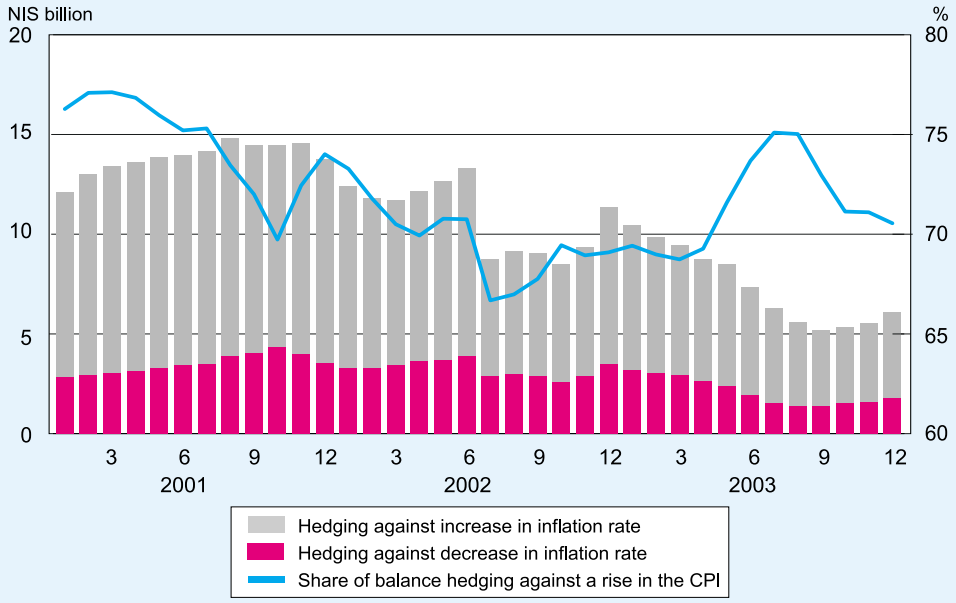
[10] The underlying asset for options on the Maof index is the index multiplied by 100.

carried out, and during the second half of the year not one transaction took place. One of the reasons for this lack of interest is the similarity, in the short run, between the Tel Aviv Banking index, which is based on the five large banks, and the Tel Aviv 25 index which includes four of those five banks (they account for 23.4 percent of the index). This similarity can also be seen in the statistical relationship between them. Thus, the correlation coefficient (an estimate of the statistical connection) between changes in the two indices was 91 percent in 2003.

d. Derivatives on the CPI

Trade in derivatives on the Consumer Price Index is presently only conducted in the banking sector (Figure 4.16) and the balance reflects the public's demand for financial protection against unexpected changes in the Consumer Price Index (see footnote 4). In 2003 there was a drop in the volume of hedging against both the weakening of inflation and its strengthening. The balance of open positions reached a total of NIS 6 billion at the end of the year as compared to NIS 11.3 billion at the end of 2002. The proportion of hedges against an increase in inflation in the total hedges (Figure 4.16) fluctuated: during the first quarter, the proportion of hedges against an increase in inflation stood at an average of 69 percent while in the second quarter this proportion rose, and reached 75 percent at the beginning of the third quarter. This increase reflects

Figure 4.16
Balance of Open Positions in CPI Hedging Transactions between the Banks and the Public, 2001–2003



SOURCE: Bank of Israel.

the fact that the public was in fact apprehensive about an increase in the rate of inflation despite the negative price indices during that period which were a result of the appreciation of the NIS-dollar rate during the second quarter of the year. Following negative price indices during the second half of the year as well, the increase in the proportion of hedges against an increase in inflation was offset and in the fourth quarter of the year fell to an average of 71 percent. This decline is an indication that the fears of a surge in inflation had disappeared or at least diminished.