Chapter 3
Risks and Capital Adequacy

This chapter naturally focuses on the global financial crisis. During 2008, the crisis and its repercussions led to an increase in the exposure of the banking system to risks, primarily credit risk. However, the banks in Israel remained stable and in good shape in comparison to leading banks world wide, thanks to the conservative approach of the banking system, comprehensive regulation and close supervision. The drop in the prices of financial assets in world capital markets and in Israel affected the banks in two ways: it increased exposure to the realization of credit risk in the investment portfolio and it reduced the repayment ability of some borrowers, primarily businesses. These two factors were also influenced by the trickling down of the crisis to the real economy both in Israel and abroad, as well as by the difficulty to recycle debt and to obtain financing in the non-bank credit market. The decline in the quality of the credit portfolio in 2008 was reflected in a noticeable increase in the ratio of the annual loan-loss provision to total credit and the increase in the share of problem loans in total credit. The deterioration in the quality of the credit portfolio encompassed most of the economy's industries and particularly the construction and real estate industry and the financial services industry, which were at the center of the crisis, as well as the manufacturing and commerce industries, which were affected by the slowdown in world trade and the decline in local demand. On the other hand, the risk related to concentration in the credit portfolio declined this year due to the reduced share of the financial services industry and the significant expansion of credit to individuals.

The major crisis in the credit market and the worldwide shortage of liquidity—which reached its peak in mid-September 2008—led to an increase in risk, and even losses, due to the exposure to foreign financial institutions whose bonds dropped sharply in value. During the crisis, the banking system acted to reduce exposure and risk in its securities portfolio. Some of the steps taken, which were mandated by the Banking Supervision, included the sale of mortgage-backed securities (MBS) and the reduction in exposure to foreign financial institutions (especially during the last quarter of the year). The increased volatility in the various markets, which was reflected in the movements of exchange rates, share indices and interest rates—following the sharp reductions in interest rates in the developed countries and in Israel as the crisis deepened—increased the exposure of the banks to market risk as well. However, despite the increase in volatility, the level of exposure, which is dependent not only on price risk but also on position, remained low. The global crisis also underlined the importance of prudent management of liquidity risk. The worsening of the financial crisis in September 2008 led to a widespread liquidity shortage in the US and other developed economies, which led authorities to adopt policy measures that were exceptional in their nature and in their scope. Although banks in Israel did not actually experience a liquidity crisis, the risk of one increased and this led the Bank of Israel to adopt a number of measures to increase liquidity. These measures had an effect by the end of 2008 and the beginning of 2009 when an uptrend in the liquidity of the banking system became evident.

Capital adequacy, whose main purpose is to enable banks to absorb losses that are liable to result from the realization of risk, improved somewhat this year and reached a level of 11.2 percent, despite the difficult environment and the minimal profits recorded by the banking groups. However, the capital adequacy of banks in Israel remained low relative to that in the advanced economies (where it was about 12 percent on average this year). It is essential for the banking system in Israel to follow an upward trend in capital adequacy in order to reach a level of 12 percent by the end of 2009, and this is particularly important in view of the uncertainty that characterizes the economic situation. At this point in time, other countries are also working to strengthen capital adequacy in the banking system and to bring it to levels that even exceed 12 percent, in order to create an additional buffer against larger-than-expected losses. To this end, they are providing funds to increase capital adequacy and improve the composition of capital. The increase in the capital adequacy ratio this year was a result of the increase in the Tier 2 capital of the five large banking groups and the slight drop in the level of Tier 1 capital. The increase in capital adequacy is a result of the position of the Supervisor of Banks that the banks should adopt an upward path in capital adequacy that will lead them to a capital ratio of at least 12 percent by the end of 2009, and is also the result of the decision by the banks' executives to follow such a path. In December 2009 the banks will move to a Basel II environment, in which one of the goals will be to strengthen the link between a bank's risk profile and its systems for risk management and risk reduction on the one hand and its capital on the other.

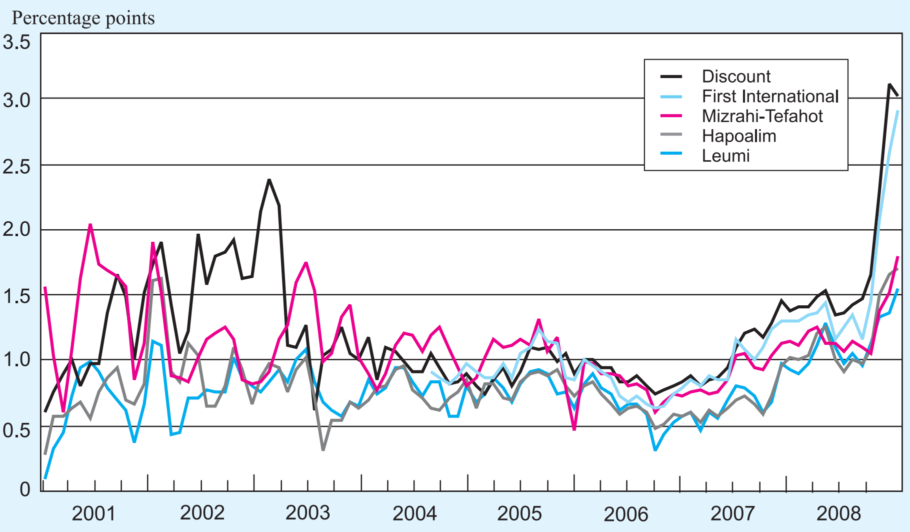
In addition to the risks described above, the banks are also exposed to non-financial risks, which are difficult to quantify or estimate, and which the Basel II capital adequacy framework is intended to deal with. One of these is operational risk, which unlike credit risk and market risk that are taken on intentionally in order to create business income, is structured within all the bank's activities and processes—in its products, its systems and its human capital. As part of the implementation of Basel II in Israel, starting in December 2009 the banks will be required to allocate capital against this type of risk and to identify potential focal points at which this type of risk may be realized.

Main developments from the perspective of a full business cycle

The most recent business cycle, which lasted about eight years, began in 2001 with a domestic recession, the result of the bursting of the hi-tech bubble and the outbreak of the second Intifada. It came to a conclusion at the end of 2008 with the development of the global crisis, following five years of rapid growth. This period makes it possible to analyze risk and capital adequacy in the banking system from the perspective of a full business cycle.

Capital market indices show that the risk of the banking system reached a higher level in 2008 than during the previous recession. The yield spread between the banks' bonds and government bonds reached a peak at the end of 2008, primarily due to the increased credit risk premium. However, it was also due, to a certain extent, to the increase in the liquidity premium, which was a result of the credit shortage in the market following the large redemptions from bond and provident funds. The global financial crisis was also reflected in the decline in the market value of the banks and in increased volatility. This can be seen in the ratio of market value to book value (MV/BV) which dropped to the very low level it reached at the end of 2002 (Table 3.1 and Figure 3.1). This decline was the result of both the increase in the risk of the banking system and the reduced profitability of the banks.

Figure 3.1
The Average Gap between the Yields on the Bonds of the Five Major Banks and the Yield on *Galil* Bonds with the Same Duration, 2001-08



SOURCE: Bank of Israel.

Table 3.1

Indices of Risks and Capital Adequacy in the Banking System, 2001–08 (end-of-year)

	Market value/Book value ratio (MV/BV)	Average yield gap between bank and government bonds	Robustness index	Ratio of annual loan-loss provision to total credit risk[a] (multiplied by 100)	Share of non-performing loans in total credit to the public (%)	Share of balance sheet credit to problem borrowers[b] in total credit to the public (%)	Share of the balance of the loan-loss provision in total problem debts[b] plus the balance of the loan-loss provision (%)	Capital adequacy (%)	Equity as share of total assets (%)
2001	0.8	0.8	2.9	0.58	1.7	8.8	28.3	9.38	4.88
2002	0.6	0.8	2.8	0.93	2.5	10.1	30.1	9.90	4.88
2003	0.8	0.7	2.4	0.78	2.6	10.5	32.6	10.32	5.30
2004	1.0	0.8	2.2	0.61	2.5	10.6	34.2	10.73	5.46
2005	1.4	0.7	2.1	0.45	2.3	9.5	37.1	10.67	5.57
2006	1.3	0.6	2.0	0.33	2	8.4	39.3	10.82	5.87
2007	1.2	1.1	1.9	0.17	1.5	6.2	44.2	10.96	6.09
2008	**0.6**	**1.9**	**2.3**	**0.47**	**1.5**	**7.0**	**40.1**	**11.22**	**5.70**

[a] Credit risk minus bonds and minus credit risk on derivatives.

[b] Including non–performing loans, restructured loans, loans to be restructured, loans temporarily in arrears, and loans under special supervision.

SOURCE: Based on published financial reports.

It should be emphasized that even though the drop in the market value of the banks in Israel was substantial, it was less than that of the major foreign banks.

In contrast, the accounting ratios, which are based on financial statements, indeed showed a decrease in the robustness of the Israeli banking system and an increase in the risk of the banks' credit portfolios. However, most of the banks[11] are far from the record levels reached at the end of 2002 (Table 3.1) It should be mentioned that although problem loans grew this year, the banks have sought to accumulate reserves against these debts in recent years and this has been reflected in an increase in the ratio of the allowance for loan losses to balance-sheet problem loans plus the allowance for loan losses.

The banking system entered the present crisis with a record level of capital adequacy, which acts as a buffer to absorb unexpected losses and which contributed to its resilience and stability. The equity/assets ratio, which is one of the indices that has taken on added importance as a result of the crisis, has also shown improvement. In this context, it is important to recall that the regulatory regime in Israel makes it difficult to take assets off the balance sheet in order to improve capital ratios, which contrasts with the situation in other developed countries.

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[1] Apart from the ratio of the annual loan-loss provision to total credit risk, which reached 0.9 percent during the last quarter of this year in annual terms, which was similar to its level in 2002.

1. CREDIT RISK

Credit risk is the main type of financial risk that a bank is exposed to in its operations. A bank's credit portfolio risk is influenced both by the size, quality, and level of diversification of its credit portfolio. The more diversified the credit portfolio, the smaller is its total risk. Also affecting the portfolio is country risk, which can express political risk and transfer risk.

In this section, we will analyze the quality of the total credit portfolio of the largest five banking groups, while also relating to the financial situation of Israeli firms and households. The analysis will be carried out using data taken from the banks' financial statements, from the banks' reports to the Supervisor of Banks and from the capital market. In addition, we will look at the concentration in the credit portfolio while also relating to the diversification of credit among the various and among the various borrowers. We will go into greater detail regarding the increase in the risk of the banking system due to the crisis and its implications for the banks' investment portfolio and their exposure to foreign financial institutions and country risk.

In 2008, total risk increased as a result of the reduced quality of credit, which was expressed in the decline in indices of credit quality. The worsening in the quality of the credit portfolio encompassed most of the principal industries and primarily the construction and real estate industry and the financial services industry, which were the focus of the crisis, as well as the manufacturing and commerce industries, which were hurt both by the slowdown in global trade and the decline in domestic demand. The increased volume of credit also contributed to the increase in credit risk. On the other hand, the risk related to concentration in the credit portfolio declined this year, due to the decrease in the share of the financial services industry and the significant expansion of credit to individuals. It should be mentioned that despite the increase in credit risk, the interest rate spread did not change significantly.[1] (For more details, see Chapter 2, Box 2.1.)

a. Total credit[2]

During 2008 total credit grew by 5 percent, which represented a continuation of last year's expansion (at a rate of 11 percent). The growth in total credit was reflected in the growth of balance-sheet credit (10 percent), while there was no substantial change in off-balance-sheet categories. This year was characterized by a change in trend in the Israeli credit market. Thus, non-bank credit, which had grown rapidly during the period 2004–08, shrank this year, a development which reinforced the growth in bank credit. The expansion of total credit was not uniform among the various industries: while there was significant expansion of credit to individuals, the construction and real estate industry and the manufacturing industry, credit to the financial services industry declined, primarily due to the sale by Bank Hapoalim of most of its mortgage-backed securities (MBS) portfolio, as well as the drop in the value of bonds held in the investment portfolios of the banking groups (Table 3.4). The rate of increase in balance-sheet credit was higher than the economy's rate of growth, which indicates an increase in credit risk.[3] In addition, there was an increase in the ratio of credit to regulatory capital, which is meant to absorb the losses of the banks, including losses due to credit risk.

b. The quality of the credit portfolio

This section will analyze the quality of the total credit portfolio of the five major banking groups, while relating to the financial situation of firms and households in Israel. The quality of the credit portfolio reflects the probability that a borrower or group of

[1] Which is estimated by the difference between the interest rate on credit and the interest rate on unindexed deposits.

[2] Total credit includes balance-sheet credit risk and off-balance-sheet credit risk, according to the reports of total credit risk to the public by industry in Appendix F of the banks' financial statements. For further details, see Chapter 1.

[3] For further details, see Chapter 1.

borrowers will not repay some of their liabilities to the banks, and is affected primarily by the repayment ability of borrowers and the value of collateral against credit. The analysis will make use of data from the financial reports, from reports to the Supervisor of Banks and from the capital market.

The analysis will be divided into two parts:

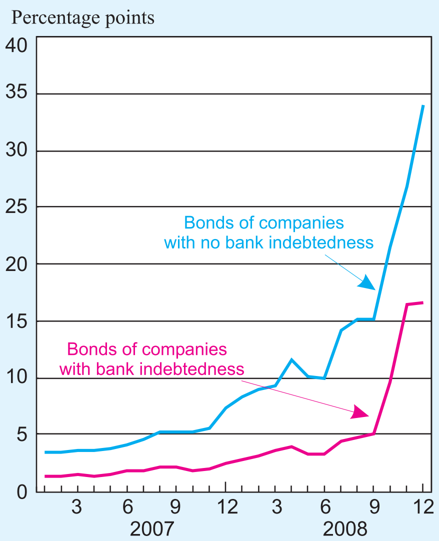
1. An analysis of the sources of risk to the quality of the credit portfolio in the Israeli banking system, i.e., the capital markets and real activity, both of which were affected by the global crisis.
2. An analysis of the quality of the credit portfolio of the banking groups according to accepted indices of quality, which are based on financial statements and on the reports to the Supervisor of Banks.

1. Sources of risk to the quality of the credit portfolio of the Israeli banking system

(i) The capital markets

The weakness in the capital markets represented a source of risk from two aspects: the drop in the value of assets, and the stagnation in the non-bank credit market due to the worsening financial crisis (for further details, see Box 3.2). The prices of shares and corporate bonds both in Israel and world wide recorded sharp declines in September, which further intensified in October and November. These price declines led to a worsening of the positions of those borrowers for whom shares are a substantial part of their asset value or serve as collateral on which their lending banks depend. The deterioration in firms' financial situation was also reflected in the sharp rise in the risk premium on corporate bonds[4] during the last quarter of the year (Figure 3.2). It should be mentioned that although credit risk among firms with debt to the

Figure 3.2
The Gap between the Yield on Corporate Bonds and the Yield on Government Bonds,[a] 2007-08



[a] Calculated as the median gap, and not the average gap, because the gap does not have a normal distribution, The calculation is based on data relating to 47 corporate bonds of companies with no indebtedness to banks, and 109 bonds of companies that do have indebtedness to one or more of the five major banking corporations. Government bonds are represented by *Galil* bonds with the same duration as the corporate bonds.

SOURCE: Bank of Israel.

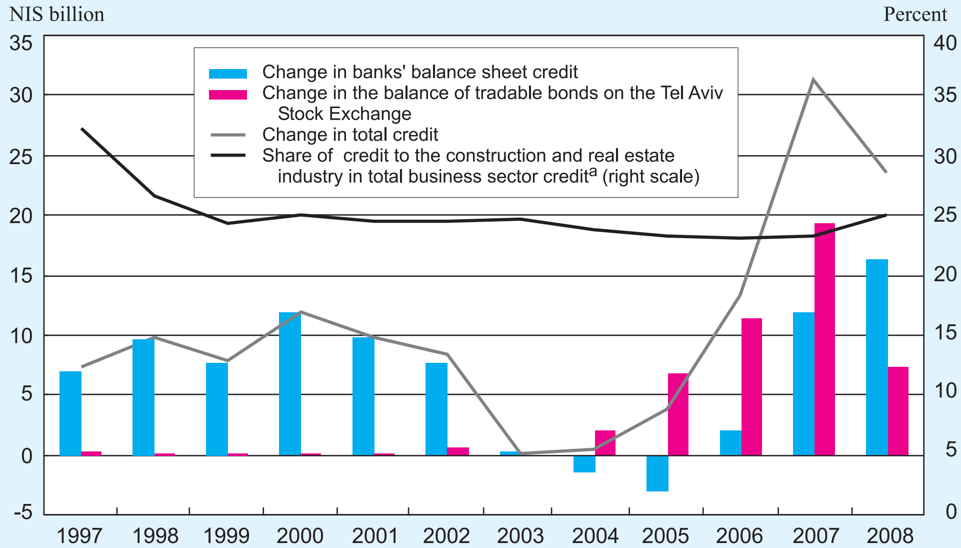
[4] The risk premium on corporate bonds is estimated by the spread between average yield-to-maturity on corporate bonds and that on government bonds (which are considered to be risk-free) with similar duration.

banks did indeed increase, it was lower than that of firms that issued bonds and have no debt to the banks. The reason for this is related to the developed system for monitoring and evaluation of credit among the banks. This monitoring process is characterized by thoroughness and prudence and includes an examination of a client's collateral, repayment ability and financial stability (Figure 3.2).

The non-bank credit market, which grew rapidly in recent years, was severely affected by the crisis. Investors' fear of problems in the redemption of bonds and the uncertainty in the financial markets led to a preference for solid investments, and during the second half of 2008 new issues sank to a very low level. The slowdown in the non-bank credit market, which began in July 2007, also affected the quality of the credit portfolios, since the more solid firms could continue to obtain credit from non-bank sources, while other firms were forced to turn to the banking system.

The supply of this credit from the banking system is increasing the proportion of less solid firms in the credit portfolio. Evidence of this can be seen in the change in total credit to the construction and real estate industry. From 2004 until the second half of 2007, the increase in total credit[5] to this industry was primarily due to the growth of non-bank credit. The higher degree of risk seeking among investors, which allowed high-risk firms to raise capital at low spreads (together with the lack of restrictions on

Figure 3.3
Indicators of Credit to the Construction and Real Estate Industry, 1997-2008



[a] Total credit excluding credit to individuals.
SOURCE: Bank of Israel and reports to the Supervisor of Banks.

[5] Bank and non-bank.

the amount of credit a financial institution can provide to a particular industry), led to an abnormal situation at the end of 2008 in which some 40 percent of tradable bonds had been issued by firms in the construction and real estate industry. As a result of the financial crisis, which led to a change in the assessment of risk among investors, the supply of non-bank credit shrank, particularly credit to firms in that industry. This development led to a sharp rise in balance-sheet credit provided by the banks to these firms, which are characterized by a higher level of risk than that faced by firms in other industries (Figure 3.3). (On the other hand, this was accompanied by an increase in the collateral required by the banking system, which reduced the risk involved.) The increase in the share of this industry in the credit portfolio also has a negative effect on the risk of the bank credit portfolio, since it raises the level of concentration in credit.

(ii) Real activity

Following five years of rapid growth, the financial crisis began to have an effect on real activity during the second half of the year. The decline in demand abroad due to the financial crisis and the global slowdown affected the exports of firms in the manufacturing and service industries. In addition, private consumption and domestic demand slowed, which affected the repayment ability of local firms. The end of the expansion in employment and the drop in wages also began to have an effect on households' resilience.

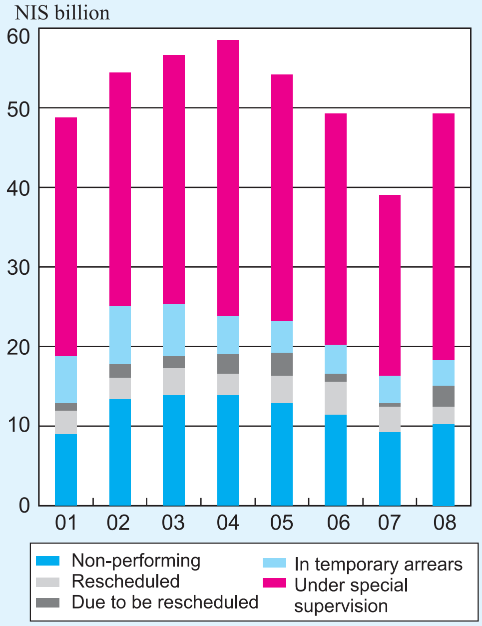
2. Indices of the quality of the credit portfolio

The decline in the quality of the credit portfolio in 2008 was reflected in most of the accounting indices that are calculated on the basis of data in the financial statements. An examination of the trend in the indices reveals that it was not uniform over the course of the year: during the first half of the year the indices indicated a drop in total credit risk, which reached its lowest level in many years, while in the third quarter this trend came to a halt and for some of the banking groups there were already indications of a deterioration in the quality of credit. During the last quarter of the year, the situation worsened significantly for all the banking groups. It should be emphasized that this deterioration characterized most of the indices. The only index that indicated a high level of credit risk—similar to that in previous recessions—was the ratio of annual loan-loss provision to total credit to the public, whereas most of the indices rose only slightly and remained at levels characteristic of economic booms (Table 3.2). One of the reasons for the relatively low level in the indices of the share of balance-sheet credit to problem borrowers in total credit to the public is that these indices do not accurately reflect the quality of credit in a situation where credit grows substantially, as happened this year. This is due to the delay between the granting of credit and its becoming problematic.

The ratio of the annual loan-loss provision to total credit to the public grew significantly in 2008 as a result of the financial crisis. The slide into recession during the fourth quarter and the sharp drop in the values of financial assets affected the repayment ability of borrowers and eroded the value of their collateral. The ratio worsened significantly, primarily in the fourth quarter, when it reached a level of 0.9 percent of total credit risk in annual terms, which is similar to the peak level recorded in 2002 as a whole. The annual provision for loan losses imputed to the profit and loss statement grew substantially during 2008 and totaled NIS 5.1 billion, about half of which is attributed to the fourth quarter. The increase in the provision encompasses the majority of industries and was noticeable both with respect to the increase in the current provisions and in the decreased recovery of debts.[6]

Total credit risk among the five banking groups due to problem loans grew during the year by NIS 13.7 billion to a total of NIS 59.3 billion (Table 3.3). Balance- sheet problem loans,[7] which constitutes 83 percent of the exposure to problem loans, grew by 25.8 percent to NIS 49.2 billion (Table 3.3). This was a result of the reduced repayment ability of borrowers and the erosion of the value of collateral, which were the result of the slowdown in economic activity due to the global crisis. The increase in total problem loans was noticeable among most of the banking groups and primarily in indebtedness under special supervision, which grew at a high rate (about 37 percent) to a total of NIS 31.0 billion. This represents 63.0 percent of balance-sheet credit to problem loans (Table 3.3 and Figure 3.4). This includes both credit that the bank managements feel needs greater monitoring and supervision, even though they do not expect credit losses to result from it, and the balance of credit to a borrower another part of whose credit has been defined as a problem loan of a different kind. The growth in this type of credit can serve as an indication of total future insolvencies. In 2008, problem

Figure 3.4
The Distribution of the Components of Problem Loans in the Banking Industry, 2001-08



SOURCE: Published financial reports.

[6] For further details, see Chapter 2.

[7] Balance-sheet problem loans are divided into five sub-categories as defined in Proper Conduct of Banking Business, Directive no. 314. Following are the components of problem loans in order of their severity (from most problematic to least): debts not accruing income; debts which have been rescheduled; debts regarding which rescheduling has been approved but not yet executed; debts in temporary arrears; and debts under special supervision.

Table 3.2
Indices of Credit Portfolio Quality, the Five Major Banking Groups, 2002-08

	Year	Hapoalim	Leumi	Discount	Mizrahi–Tefahot	First Intl.	The five groups
Ratio of risk-weighted assets to total assets[a]	2002	0.715	0.701	0.571	0.653	0.656	0.675
	2003	0.711	0.685	0.581	0.645	0.654	0.669
	2004	0.714	0.674	0.588	0.670	0.617	0.667
	2005	0.719	0.679	0.600	0.673	0.614	0.673
	2006	0.722	0.670	0.598	0.666	0.613	0.669
	2007	0.728	0.690	0.619	0.682	0.588	0.680
	2008	0.719	0.695	0.649	0.669	0.591	0.682
Share of balance sheet credit to problem borrowersb in total credit to the public (%)	2002	10.4	9.8	12.4	7.5	9.1	10.1
	2003	11.3	9.8	11.7	7.7	12.3	10.5
	2004	11.5	10.7	10.2	6.5	12.7	10.6
	2005	9.9	9.7	9.0	6.8	11.9	9.5
	2006	8.5	9.8	7.8	6.0	7.6	8.4
	2007	6.4	6.5	6.3	5.0	5.1	6.2
	2008	6.2	8.5	6.7	6.8	5.9	7.0
Share of non-performing loans in total credit to the public (%)	2002	2.1	2.3	3.9	1.7	2.9	2.5
	2003	2.9	2.3	3.8	1.4	2.5	2.6
	2004	3.2	1.5	3.5	1.4	3.3	2.5
	2005	2.9	1.3	3.1	1.5	2.7	2.3
	2006	2.4	1.4	2.8	1.4	1.6	2.0
	2007	1.9	0.8	2.2	1.3	1.2	1.5
	2008	1.9	0.9	1.9	1.3	1.2	1.5
Ratio of annual loan-loss provision to total credit riskc (multiplied by 100)	2002	1.21	0.80	0.77	0.42	1.03	0.93
	2003	0.89	0.79	0.73	0.40	0.81	0.78
	2004	0.62	0.63	0.73	0.43	0.56	0.61
	2005	0.41	0.55	0.50	0.34	0.37	0.45
	2006	0.30	0.35	0.37	0.33	0.25	0.33
	2007	0.14	0.14	0.25	0.23	0.19	0.17
	2008	0.41	0.70	0.43	0.30	0.24	0.47
Share of the balance of the loan-loss provision in total problem debts plus the balance of the loan-loss provision (%)	2002	30.2	28.8	33.0	29.7	28.8	30.1
	2003	33.3	31.7	36.6	31.9	25.6	32.6
	2004	34.7	30.8	40.5	37.1	29.9	34.2
	2005	38.2	34.6	42.8	37.4	30.8	37.1
	2006	41.0	33.6	46.4	40.4	41.2	39.3
	2007	44.4	40.4	48.1	43.9	50.1	44.2
	2008	43.9	35.3	44.5	34.8	44.2	40.1

[a] Total risk assets are total balance sheet and off-balance-sheet assets weighted by risk. Total assets are total balance sheet and off-balance-sheet assets without risk weighting.
[b] Including non-performing loans, restructured loans, loans to be restructured, loans temporarily in arrears, and loans under special supervision.
[c] Credit risk minus bonds and minus credit risk on derivatives.
SOURCE: Based on published financial reports.

loans grew substantially (by 26 percent), but at the same time total balance-sheet credit also grew (by 10 percent). Thus, the proportion of balance-sheet credit to problem loans within total credit to the public increased by only 0.8 percentage points and totaled 7.0 percent, which is significantly lower than the 10-percent level recorded at the end of the previous recession (Table 3.2 and Figure 3.5). The off-balance-sheet credit risk due to problem loans grew significantly this year (by 40 percent) to NIS 8.2 billion. There was significant growth recorded in total bonds issued by problem borrowers and in other derivative assets of problem borrowers. These totaled NIS 0.9 billion and NIS 0.8 billion, respectively.

Non-performing loans,[8] which are the most serious type of problem loans, grew by about 11 percent (Table 3.3 and Figure 3.4), which is similar to the expansion in balance-sheet credit, and therefore the proportion of non-performing credit[9] within total credit to the public remained unchanged this year at 1.5 percent (Table 3.2), which is lower by one percentage point than during the period 2002–4.

A deterioration was also recorded in the ratio of risk-weighted assets to total assets, which reflects the degree of risk in the mix of assets. The increase in this ratio is affected by the growth in credit to the public, which is considered to be the riskiest asset. In this context, it is worth mentioning that one of the main sources of losses this year was in fact assets which until now were perceived as having low risk, such as exposure to financial institutions abroad, rather than credit to the public. An additional development that points to the growth in credit risk is the increase in the GDP/credit ratio, which is the source for repayment of credit, for the second year in a row. This was the result of an increase in total credit that exceeded the rate of growth in GDP (Figure 1.6).

In the Report on Credit Exposure, the banks rate the credit exposure to each borrower.[10] Since the scales of ratings reported by the banks differ from each other, for this survey we constructed a single rating for all five banking groups combined, which runs from 0 to 100.[11] The lower the rating, the higher is the quality of the firm's credit. We examined those borrowers whose total credit risk is greater than NIS 20 million, which represent about 70 percent of total business credit risk.[12] The analysis of these borrowers indicates a deterioration in the average credit rating[13] given by the five large banks during 2008,

8 Non-performing debt: debt whose interest is not recorded in the profit and loss statement, a rescheduled loan whose balance (including accrued interest) prior to the new arrangement is greater than the total expected receipts according to the arrangement, debt in arrears or other debt whose accumulated interest is unlikely to be collected, even though the debt itself has not been declared as doubtful.

9 Non-performing debt: debt whose interest is not recorded in the profit and loss statement, a rescheduled loan whose balance (including accrued interest) prior to the new arrangement is greater than the total expected receipts according to the arrangement, debt in arrears or other debt whose accumulated interest is unlikely to be collected, even though the debt itself has not been declared as doubtful.

10 Credit risk includes balance-sheet credit risk and off-balance-sheet credit risk after making the loan-loss provision.

11 A rating of 0-36 indicates low risk, 37-57 intermediate risk and 58-100 high risk.

12 Total credit risk apart from credit to individuals.

13 The credit rating is weighted by the borrower's credit risk.

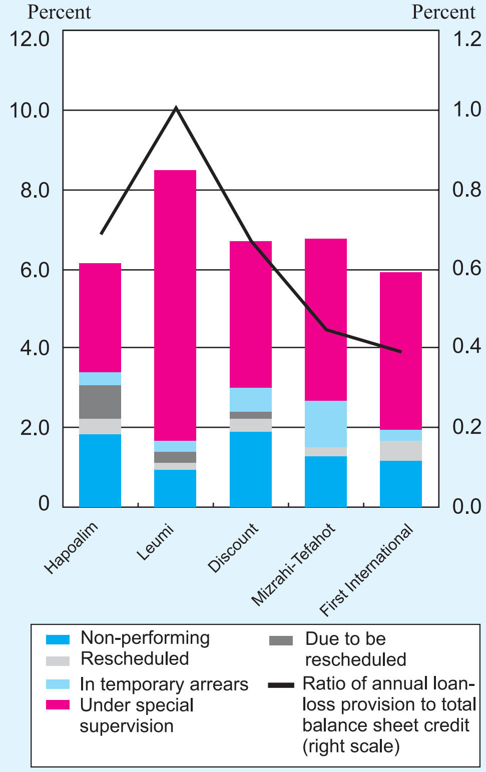
Table 3.3
Distribution of Problem Loans, the Five Major Banking Groups,[a] 2006-08

		Hapoalim	Leumi	Discount	Mizrahi–Tefahot	First Intl.	The five groups
				(NIS million)[a]			
Non-performing	2006	4,496	2,519	2,529	1,003	815	11,362
	2007	3,820	1,604	2,230	934	662	9,250
	2008	4,140	2,012	2,242	1,145	713	10,252
Rescheduled	2006	2,339	1,179	290	172	236	4,216
	2007	1,536	929	278	185	281	3,209
	2008	829	405	354	194	324	2,106
Due to be rescheduled	2006	369	134	143	15	348	1,009
	2007	338	85	33	2	-	458
	2008	1,884	558	231	-	3	2,676
In temporary arrears	2006	970	658	327	1,475	224	3,654
	2007	1,164	764	387	1,027	172	3,514
	2008	702	562	690	1,034	153	3,141
Under special supervision	2006	7,727	13,548	3,767	1,567	2,349	28,958
	2007	6,261	9,618	3,521	1,582	1,696	22,678
	2008	6,120	14,545	4,330	3,582	2,430	31,007
of which: Debts for which there is a specific loan-loss provision	2006	4,715	5,484	893	146	405	11,643
	2007	4,085	4,672	893	120	401	10,171
	2008	3,919	7,373	622	989	288	13,191
of which: Housing credit for which there is a loan-loss provision according to the depth of the arrears	2006	431	830	209	732	118	2,320
	2007	499	523	188	670	107	1,987
	2008	457	505	178	615	100	1,855
Total balance-sheet credit to problem borrowers	**2006**	**15,901**	**18,038**	**7,056**	**4,232**	**3,972**	**49,199**
	2007	**13,119**	**13,000**	**6,449**	**3,730**	**2,811**	**39,109**
	2008	**13,675**	**18,082**	**7,847**	**5,955**	**3,623**	**49,182**
Total off-balance-sheet credit to problem borrowers	2006	1,706	2,410	928	493	288	5,825
	2007	1,512	2,438	1,038	616	255	5,859
	2008	2,040	3,482	1,348	941	407	8,218
Bonds of problem borrowers	2006	97	15	1	-	3	116
	2007	525	4	21	-	14	564
	2008	358	505	26	-	29	918
Other assets related to derivatives of problem borrowers	2006	-	-	-	-	-	-
	2007	1	32	22	-	-	55
	2008	12	612	209	-	-	833
Total exposure to problem borrowers	**2006**	**17,714**	**20,486**	**7,995**	**4,725**	**4,263**	**55,183**
	2007	**15,157**	**15,474**	**7,530**	**4,346**	**3,080**	**45,587**
	2008[a]	**16,142**	**22,790**	**9,430**	**6,908**	**4,059**	**59,329**

[a] Including problem loans to foreign financial institutions of NIS 57 million in Hapoalim, NIS 109 million in Leumi, and NIS 12 million in Mizrahi-Tefahot.

SOURCE: Based on published financial reports.

Figure 3.5
The Share of Balance Sheet Credit to Problem Borrowers in Total Credit to the Public, and the Ratio of Annual Loan-Loss Provision to Total Balance Sheet Credit to the Public,[a] 2008



[a] This ratio is calculated for balance sheet credit only, and therefore different from the ratios shown in Tables 3.2 and 3.4 which refer to total credit risk.
SOURCE: Published financial reports.

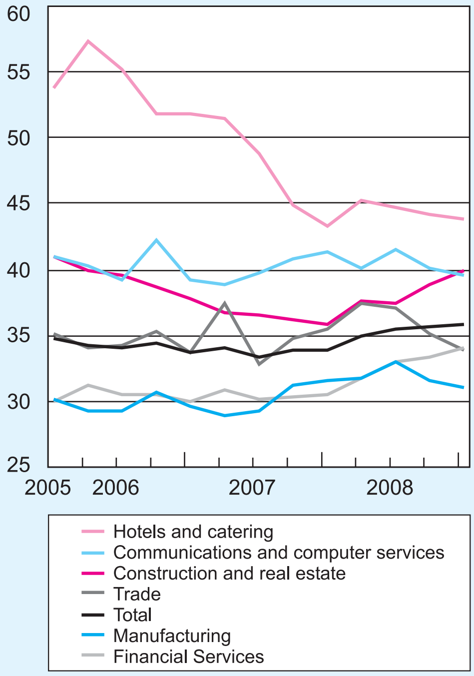
in contrast to the improvement recorded in recent years (Figure 3.6).

The increase in credit rating, i.e., the deterioration in the quality of credit, resulted from the reduced proportion of low-risk borrowers at the end of 2008 and the simultaneous increase in the proportion of medium- and high-risk[14] borrowers to 35.3 percent and 6.7 percent of total credit risk, respectively (Figure 3.7).

An analysis of credit risk in the principal industries shows that it rose sharply in 2008 in most industries, particularly in the fourth quarter of the year. This was a result of the increased severity of the crisis in Israel and the slowdown in economic activity. This was evident in the sharp increase in the share of the annual loan-loss provision in total credit, in the increase in the share of problem loans in total credit, in the worsened rating of credit risk according to the Report on Credit Exposure (Table 3.4 and Figure 3.6), and in the sharp increase of risk premiums on corporate bonds in all industries and at all ratings (Table 3.5 and Figure 3.2). The effect of the global crisis was dominant particularly in the construction and real estate industry and in the financial services industry, which stood at the center of the global crisis. In the construction and real estate industry, the ratio of the annual loan-loss provision to total credit doubled to 0.59 percent (Table 3.4). The share of problem loans in total credit grew by 2.8 percentage points in 2008 to 10.9 percent (Table 3.4). The rating of credit risk, according to the Report on Credit Exposure, also indicated an increase in risk, which began already in the first quarter of 2008 and continued throughout the year (Figure 3.6). The sharp declines in the prices of shares and bonds issued by real estate companies are evidence of the sharp increase in the industry's risk premium. This occurred within the context of the exposure of companies that invest in real estate abroad and their substantial dependence on debt financing, part of which is obtained in

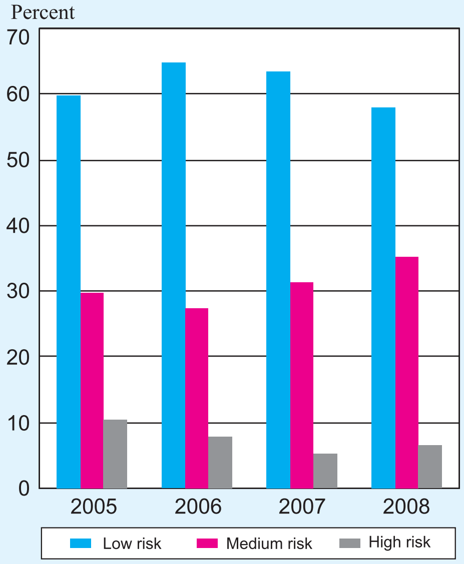
[14] Borrowers with a high probability of reaching a situation of repayment failure.

Figure 3.6
Average Credit Risk Rating[a] by Industry in the Five Major Banking Groups, December 2005 to December 2008



[a] See footnote 12 and related text.
SOURCE: Reports to the Supervisor of Banks—Report on Credit Risk Exposure.

Figure 3.7
Distribution of Credit Risk Ratings by Risk Level in the Five Major Banks, December 2005 to December 2008



SOURCE: Reports to the Supervisor of Banks—Report on Credit Risk Exposure.

the capital market. The accelerated expansion of balance-sheet credit to the industry (by 15 percent in 2008), which continued in the fourth quarter as well, also led to an increase in the risk of the bank credit portfolio. During the last two years, following years of stagnation, there was renewed rapid growth (of 15 percent) in balance-sheet bank credit to the construction and real estate industry. This occurred against the background of the drop in the number and scope of issues on the Tel Aviv Stock Exchange (TASE), primarily by non-rated companies (Figure 3.2). The exposure[15] of the five banking groups to companies in the construction and real estate industry that had issued corporate bonds on the TASE totaled NIS 33.4 billion at the end of 2008.

[15] Outstanding credit to the public, the public's investment in bonds, other derivative assets and credit risk in off-balance-sheet financial instruments, as calculated for the purpose of the single borrower indebtedness limitation.

This represents about 18 percent of the total exposure to companies in the construction and real estate industry. About NIS 14 billion of total credit was provided to companies whose bonds traded with a yield of more than 20 percent in December 2008, a rate that indicates a high level of risk (Table 3.5).

The financial services sector was hurt by the sharp fall in share price indices world wide and from the increase in risk spreads. The decline in the value of financial assets led to a more difficult situation for borrowers, for whom shares are a significant portion of their assets or of the collateral they provide to their lending banks. Also affected was the stability of the investment houses, whose revenues and activity declined as a result of withdrawals by the public, who shifted their investments to less risky investment channels. These developments were reflected in the increase in the share of problem loans in total credit to a level of 5.0 percent (Table 3.4), in the increase of the share of loan-loss provision in total credit from a negligible level to 0.4 percent this year, and the increased credit risk rating for the industry (Table 3.4 and Figure 3.6). In contrast, the total credit to the industry declined this year, primarily due to the sale by Bank Hapoalim of most of its MBS portfolio, as well as the decrease in the value of bonds held by the banks. An additional decline occurred as a result of the reduction in credit to capital market customers.

In the second half of the year, particularly during the last quarter, risk also increased in those sectors that were not directly affected at the beginning of the crisis, i.e., the manufacturing and commerce industries and individuals.

In the manufacturing and commerce industries, the loan-loss provisions increased substantially during the last quarter of the year. The manufacturing industry was hurt both by the slowdown in global trade and global demand, which led to a drop in manufacturing exports, and by the contraction in local demand. The slowdown in local demand also weakened companies whose activity is primarily domestic, such as companies in the commerce industry.

With respect to credit to individuals,[16] which is characterized by a high level of diversification and low correlation between borrowers, risk is expected to be low relative to that in other sectors. During the second half of the year and particularly during the fourth quarter, the public's asset portfolio shrank in size due to the sharp declines in the capital markets, which affected this sector's repayment ability. The public's expectations of an economic slowdown and reduced employment security were reflected both in private consumption, which declined during this quarter following a long period of expansion, and in the reduced demand for credit during the last quarter of the year, following three years of 10 percent annual growth. However, despite the rapid growth in credit to individuals in recent years, there was no increase in the ratio of credit to disposable income, which serves as a measure of individuals' repayment ability, and it remained low in relation to other countries as well. One of the reasons for this is the high rate of saving among households in Israel.

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[16] This sector includes households and private banks, as reported in Appendix 6 of the financial statements.

Table 3.4
Distribution of Credit by Principal Industry, the Five Major Banking Groups, 2007-08

	Balance of credit to public[a]		Change in balance of credit	Distribution of credit balance		Problem loans: Balance		Problem loans: Share in total credit		Annual specific loan-loss provision		Loan-loss provision/total credit	
	2007	2008	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
	(NIS million)		(percent)			(NIS million)		(percent)		(NIS million)		(percent)	
Agriculture	7,345	7,775	5.9	0.7	0.7	530	513	7.2	6.6	-14	-136	-0.19	-1.75
Manufacturing	147,841	159,801	8.1	13.8	14.2	9,075	9,756	6.1	6.1	526	1,344	0.36	0.84
Construction and real estate[b]	175,946	190,017	8.0	16.4	16.9	14,313	20,711	8.1	10.9	505	1,119	0.29	0.59
Water and electricity	12,411	13,940	12.3	1.2	1.2	16	46	0.1	0.3	1	4	0.01	0.03
Commerce	91,909	92,550	0.7	8.6	8.2	2,933	3,514	3.2	3.8	259	407	0.28	0.44
Tourism[c]	19,181	19,722	2.8	1.8	1.8	3,964	3,722	20.7	18.9	-27	54	-0.14	0.27
Transport and storage	21,381	24,521	14.7	2.0	2.2	774	1,372	3.6	5.6	23	110	0.11	0.45
Communications and computer services	21,609	23,597	9.2	2.0	2.1	2,038	1,690	9.4	7.2	77	140	0.36	0.59
Financial services	185,679	153,910	-17.1	17.3	13.7	2,193	7,739	1.2	5.0	-185	683	-0.10	0.44
Other business services	43,012	47,679	10.9	4.0	4.2	1,096	1,459	2.5	3.1	140	245	0.33	0.51
Public and community services	24,301	24,121	-0.7	2.3	2.1	1,374	1,112	5.7	4.6	-1	28	-0.00	0.12
Individuals	319,863	365,852	14.4	29.9	32.6	7,281	7,518	2.3	2.1	727	1,007	0.23	0.28
of which: housing loans	134,139	150,474	12.2	12.5	13.4	4,084	3,636	3.0	2.4	159	170	0.12	0.11
of which: non-housing loans	185,724	215,378	16.0	17.3	19.2	3,197	3,882	1.7	1.8	568	837	0.31	0.39
Total	**1,070,478**	**1,123,485**	**5.0**	**100.0**	**100.0**	**45,587**	**59,152**	**4.3**	**5.3**	**2,031**	**5,005**	**0.19**	**0.45**
Municipalities	8,917	9,050	1.5	0.8	0.8	266	443	3.0	4.9	-2	-2	-0.02	-0.02

[a] Including outstanding credit to the public, the public's investment in bonds, other assets in respect of derivatives and the credit value equivalent of off-balance-sheet items in respect of borrowers' activity in Israel and abroad.
[b] The data for this industry are calculated without regard to the industry concentration limitation.
[c] Hotels, catering and accommodation.
SOURCE: Published financial statements.

Table 3.5
Distribution of the Balance of Total Credit[a] to the Business Sector by Companies that Issued Tradable Bonds on the Tel Aviv Stock Exchange (TASE), and the Average Yield on Their Bonds in December 2008

		Companies whose total credit risk is more than NIS 20 million					
			Companies that issued tradable bonds with average yields in December of				
	Companies whose total credit risk is less than NIS 20 million	Companies that did not issue tradable bonds[b]	up to 10%	10%-20%	20%-30%	more than 30%	Total
Construction and real estate	40.1	116.6	1.8	17.2	7.6	6.8	190.0
Financial services	40.1	105.3	6.0	0.5	0.3	1.8	153.9
Manufacturing	51.8	93.0	10.8	2.4	0.1	1.7	159.8
Commerce	42.9	44.2	2.9	1.7	0.4	0.4	92.6
Tourism[c]	6.7	13.1	-	-	-	-	19.7
Agriculture	3.8	4.0	-	-	-	-	7.8
Communications and computer services	5.1	13.6	4.5	0.2	-	0.2	23.6
Other	52.6	55.8	1.0	0.2	0.2	0.5	110.3
Total	243.0	445.4	26.9	22.1	8.6	11.6	757.6

[a] Including the balance ofcredit to the public, the public's investment in bonds, other assets deriving from derivatives, and credit risk of off-balance-sheet financial instruments as calculated for purposes of the single-borrower-indebtedness limitation.

[b] On the TASE.

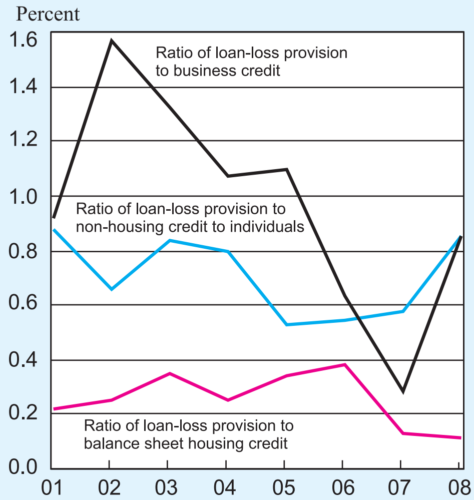
[c] Hotels, guest houses and catering services.

SOURCE: Reports to the Supervisor of Banks—Report on Credit Risk Exposure, and published financial statements.

The reduced repayment ability of individuals was reflected in the negative changes in a number of indices during 2008, including an increase in the loan-loss provision due to non-housing loans (Figure 3.8) and the increase in the proportion of checks returned due to lack of coverage within the number of debits in the public's current accounts during the fourth quarter of the year. However, these negative developments were not reflected in financial statements in the indices of the quality of credit provided as housing loans. Problem housing loans even declined this year and there was no substantial change in the loan-loss provision, which remained at the low level it was at in 2007.

It should be mentioned that in Israel, in contrast to markets abroad, there was no uptrend in housing prices during the period 2000–07. The decline in housing prices in world markets, which began in 2007 and accelerated in 2008, led to an increase in the exposure of banks active abroad due to credit provided for housing, the result of the reduced value of collateral.

Figure 3.8
Ratio[a] of Specific Loan-Loss Provision to the Balance of Balance Sheet Credit to Individuals and to Business Credit



[a] This ratio is calculated for balance sheet credit only, and therefore different from the ratios shown in Tables 3.2 and 3.4 which refer to total credit risk.
[b] The specific balance sheet loan-loss provision that is imputed to the Statement of Income.
[c] Other credit is total credit excluding credit to individuals.

SOURCE: Reports to the Supervisor of Banks.

c. The concentration of credit

In this survey, the concentration of a bank's credit portfolio is measured in two ways: (1) by industry,[17] i.e., the wider the spread of the credit portfolio among industries, the smaller is the credit risk due to concentration; and (2) by size of borrower, i.e., the wider the spread of the the credit portfolio among borrowers, the smaller is the exposure to credit risk. This will be expanded on below.

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[17] The concentration by industry was examined on the assumption that there is less than full correlation in the volume of activity and business results between borrowers in the various industries.

1. Concentration of the credit portfolio by industry[18]

There was a decrease in the concentration of the credit portfolio by industry this year. This improvement was reflected in a decline in the Herfindahl index of concentration for the business credit portfolio and for the total credit portfolio, not including credit to individuals (Table 3.6).[19]

The improvement in the concentration of the business credit portfolio is to be attributed solely to the 17 percent decline in total outstanding credit[20] to the financial services industry. The reduction in the share of this industry, which in 2007 was the highest of all industries, was primarily the result of the realization of investments in bonds abroad, most of which consisted of Bank Hapoalim's sale of its holdings of about $3.4 billion of mortgage-backed securities (MBS) in May 2008. The proportion of the financial services industry in total business credit risk dropped to a level of 20 percent at the end of 2008, compared with the peak level of 25 percent reached in December 2007. This followed seven consecutive years of increases, starting from a level of 13 percent in December 2000. If the effect of the financial services industry is excluded, the result is an increase in the concentration of the business credit portfolio, as a result of the increase in total credit to the construction and real estate industry and the manufacturing industry, which are the largest (as of the end of 2008). It is worth emphasizing that this was the second consecutive year that credit to the construction and real estate industry expanded, which occurred against the background of the stagnation in the non-bank credit market and in spite of the financial crisis that led to a sharp increase in the industry's risk (Table 3.4 and Figure 3.2).

In parallel to the decrease in the concentration of the business portfolio, total credit to individuals grew sharply by 14 percent. This in turn led to an increase in 2.7 percentage points in the share of credit to individuals in the total credit portfolio, to 32.6 percent at the end of 2008. Since credit provided to individuals is characterized by a high level of heterogeneity, an increase in their share of credit reduces the concentration of the banks' total credit portfolio.

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[18] The industries are those appearing in Table 3.4, apart from credit to individuals. The credit portfolio includes outstanding credit to the public, the public's investment in bonds, other derivative assets and the equivalent value of off-balance-sheet credit items arising from the activity of borrowers in Israel and abroad.

[19] Individuals, whose proportion of total credit stood at 29.6 percent in 2007, are characterized on the one hand by a high degree of heterogeneity (low correlation between their characteristics) and on the other hand by a high level of correlation between the credit provided to them and the total credit in the economy and therefore they are not defined as a sector. For further details, see H. Bar, A. Barnea and Y. Landskroner (1998) "Consumer Credit—its Characteristics and the Risk Inherent in it," Discussion Paper 98.03, Banking Supervision Department, Research Unit.

[20] Outstanding credit to the public, the public's investments in bonds, other derivative assets, and the credit risk in off-balance-sheet financial instruments as calculated for the single borrower indebtedness limitation.

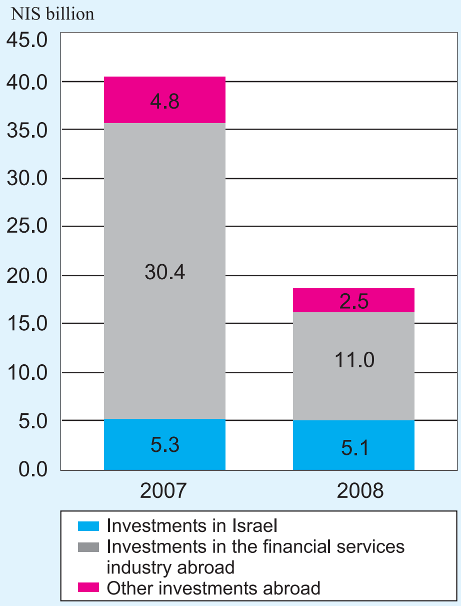
Table 3.6
Indices of Concentration in Public's Credit Portfolio, the Five Major Banking Groups, 2005–08[a]

	Year	Hapoalim	Leumi	Discount	Mizrahi–Tefahot	First Intl.	The five groups
Concentration by principal industry							
Herfindahl-Hirschman (H) Index of concentration in the total credit portfolio[b]	2005	0.187	0.164	0.146	0.326	0.156	0.170
	2006	0.194	0.167	0.151	0.325	0.169	0.176
	2007	0.184	0.172	0.156	0.265	0.175	0.176
	2008	0.183	0.176	0.165	0.306	0.175	0.184
H-Index of concentration in the business credit portfolio[c]	2005	0.164	0.167	0.163	0.224	0.180	0.163
	2006	0.171	0.169	0.168	0.216	0.177	0.167
	2007	0.193	0.176	0.174	0.199	0.192	0.177
	2008	0.171	0.183	0.170	0.186	0.172	0.172
H-Index of concentration in the total credit portfolio excluding credit to individuals[d]	2005	0.072	0.088	0.103	0.050	0.114	0.080
	2006	0.073	0.088	0.102	0.049	0.093	0.079
	2007	0.095	0.090	0.104	0.060	0.103	0.087
	2008	0.078	0.092	0.089	0.045	0.084	0.078
Credit to individuals as percentage of total credit	2005	33.9	27.5	20.7	52.5	20.4	30.0
	2006	34.8	28.1	22.0	52.6	27.6	31.1
	2007	29.9	28.5	23.0	45.3	26.7	29.9
	2008	32.3	29.0	27.4	51.1	30.1	32.6
Concentration by borrower size							
Gini index of credit diversification by borrower size[e]	2005	0.839	0.867	0.900	0.798	0.929	0.864
	2006	0.886	0.905	0.901	0.798	0.903	0.891
	2007	0.879	0.907	0.909	0.825	0.897	0.891
	2008	0.866	0.889	0.902	0.810	0.885	0.879
Share in the group's total credit of credit given to borrowers whose indebtedness exceeds NIS 40 million (%)	2005	46.6	41.5	43.8	22.7	46.0	42.3
	2006	51.6	41.9	44.8	26.0	41.5	44.3
	2007	51.1	41.6	42.9	32.6	41.0	44.2
	2008	49.0	42.6	41.6	29.0	37.8	42.6
Share in total credit of borrowers whose indebtedness exceeds five percent of the group's equity[f] (percent)	2005	6.7	4.3	7.8	5.8	18.6	
	2006	8.3	5.0	8.7	6.5	14.0	
	2007	7.5	6.1	7.3	10.2	15.0	
	2008	8.3	7.5	8.2	8.9	13.3	

[a] On balance-sheet and off-balance-sheet basis.
[b] This index is the sum of the squares of the weights of the credit in an industry (including credit to individuals) in total credit to the public (including credit to individuals).
[c] This index is the sum of the squares of the weights of the credit in an industry (excluding credit to individuals) in total credit to the public (excluding credit to individuals).
[d] This index is the sum of the squares of the weights of the credit in an industry (excluding credit to individuals) in total credit to the public (including credit to individuals).
[e] The Gini index reflects the inequality of the distribution of credit by borrower.
[f] Plus minority shareholders' rights.
SOURCE: Based on published financial statements.

An analysis of the concentration of investment in corporate bonds, which totaled NIS 18.6 billion and constituted about 3 percent of balance-sheet credit to the public, shows that although the sale of Bank Hapoalim's MBS portfolio led to a reduction in concentration, these investments were still characterized by a high level of concentration., with almost 60 percent of them in the financial services industry abroad (Figure 3.9).

Figure 3.9
Distribution of the Investment of the Five Major Banking Groups in Corporate Bonds, December 2007 and December 2008



SOURCE: Reports to the Supervisor of Banks.

2. Concentration of the credit portfolio by size of borrower

Another indicator of the concentration of the credit portfolio is the extent of the portfolio's diversification among the various borrowers according to size. The highly concentrated structure of ownership and control in the Israeli economy increases the vulnerability of the banking system to a situation in which a major company arrives at a situation of default, the probability of which has increased as a result of the global crisis. The credit risk due to the largest ten individual borrowers stood at 4 percent of total credit risk in 2008 and 48.7 percent of regulatory capital,[21] and the share of the largest six groups stood at 9.9 percent of total credit risk and 120 percent of regulatory capital.[22] In 2007 the share of the largest ten borrowers stood at 4.1 percent of credit risk and 50.4 percent of regulatory capital[23] and that of the largest six groups stood at 9.4 percent of credit risk and 115 percent of regulatory capital.

A factor that worked to reduce concentration in the credit portfolio this year was the significant expansion of credit to individuals, a group which is characterized by a high level of diversification among small borrowers. This improvement was reflected in the decline of the Gini coefficient for credit diversification by borrower size during the year (Table 3.6). An additional factor that affected concentration in the bank credit portfolio

[21] Total capital used to calculate the risk-based capital ratio.
[22] Source: Report on Credit Exposure.
[23] Total capital used to calculate the risk-based capital ratio.

was the share of credit provided to large firms in total bank credit to businesses. Thus, although it did not grow this year, this type of credit is characterized by high levels of concentration. Thus, for example, the proportion of the largest ten borrowers in total business credit stood at about 6 percent in 2008 while that of the largest hundred borrowers stood at 22.3 percent.[24]

d. Country risk

The source of country risk is the exposure to individuals or institutions abroad. This type of risk has two sources: 1) political risk, which includes both external and internal threats to the stability of the government, the default on a contract by the government and the nationalization or seizure of assets by the government; and 2) transfer risk, which involves the inability to repay a loan in the same currency. This is liable to occur as a result of a moratorium on the country's external debt or a decision by the country not to allow free foreign-currency capital movements.

Country risk is created both when a bank provides credit to foreign individuals, institutions or governments and when bank branches in foreign countries provide local residents with credit that is not backed by local liabilities. As a result of the financial crisis, this type of risk grew substantially and the banks were required to report their exposure to foreign financial institutions and foreign countries in their financial statements to the public.

The total exposure[25] of the Israeli banking system to other countries in 2008 totaled NIS 249 billion, of which 75 percent was to six countries with AAA credit rating. Of those six, the US accounted for the largest exposure (NIS 108 billion) (Table 3.7). The exposure to less-developed countries (LDCs) totaled NIS 12 billion. The total of all balance-sheet exposure was NIS 162 billion, which represents 16 percent of bank assets. The global crisis particularly affected the risk due to exposure to the US, which was directly affected by the crisis, and this was particularly evident in total credit risk due to problem loans in the US, which totaled NIS 2.4 billion and constituted 2.2 percent of total exposure. This contrasts with exposure to LDCs, which have a lower rating than the US according to the international rating companies, of only 1 percent of the total.

[24] Source: Report on Credit Exposure.

[25] Credit risk is made up of balance-sheet credit risk and off-balance-sheet credit risk due to exposure abroad and net exposure after deducting local liabilities of bank branches abroad to local residents.

e. Credit exposure to foreign financial institutions

The exposure to foreign financial institutions[26] among the five major banking groups stood at about NIS 86 billion in 2008, one-and-a-half times their equity (Table 3.8). Of that, total balance-sheet credit to foreign financial institutions stood at NIS 75 billion, which represent 7 percent of bank assets. This followed the reduction by all the banking groups, apart from Discount, of exposure to foreign financial institutions during the last quarter of the year by a total of about NIS 24 billion (22 percent), as the global financial crisis worsened.

The deterioration in the global financial markets in September 2008 led to a sharp rise in the banks' risk due to exposure to foreign financial institutions. The major crisis in the credit market and shortage of liquidity led to the bankruptcy of financial institutions, the merger of smaller investment houses and banks with larger ones and the nationalization of financial institutions. Out of concern over the effects of the crisis on foreign financial institutions, the Supervisor of Banks issued a directive to include a separate disclosure of the exposure of credit to foreign financial institutions in financial statements, starting from September 30, 2008.

As a result of the crisis, the banks had to deal with risks in the management of assets that until then had been considered low-risk, including deposits at foreign banks, securities of foreign financial institutions and credit provided to these institutions. The losses to the banks due to this exposure led to a changed perception of this type of risk and the executives of the banks took steps to reduce this exposure and its duration.

The drop in the value of the securities of foreign financial institutions was manifested both in the losses imputed to the profit and loss statement due to adjustments as a result of "other-than-temporary" declines—losses that include provisions for exposure to Lehman Brothers and Washington Mutual—and in declines in the value of securities "of a temporary nature" imputed to equity (Table 3.9).

The risk from exposure to foreign financial institutions was influenced by the size of the exposure, the period of the exposure and the quality of the financial institutions, as reflected in their external credit rating and the degree of diversification between the various financial institutions and countries. We would stress that the correlation between countries grew during the crisis and as a result there was less advantage in diversification among countries.

Size: The credit exposure to foreign financial institutions totaled NIS 86 billion in December 2008, of which NIS 75 billion was balance-sheet risk (7 percent of total bank

[26] Foreign financial institutions include banks, investment banks, brokers/dealers, insurance companies, institutional entities and entities controlled by them. The credit exposure to foreign financial institutions does not include investment in MBS (as described in Section f. below—The securities portfolio of Israeli banks) nor the exposure to foreign financial institutions that have an explicit and full government guarantee. (Fannie Mae and Freddie Mac are not included in this definition.) It should be stressed that credit risk includes deposits with the banks, unlike total credit risk to the public by industry (Appendix 6 to the Executive Summary) and does not include potential balance-sheet credit due to derivative instruments, since the focus is on current credit exposure.

Table 3.7
Exposure of the Five Major Banking Groups to Other Countries, December 2008

	Cross-border balance sheet exposure			Net balance sheet exposure[b] of overseas offices of banking corporations to local residents	Total balance sheet exposure	Off-balance-sheet exposure[c]	Total exposure	Balance of problem debts[d]
	Governments[a]	Banks	Other					
AAA-rated countries	5.6	37.2	25.2	45.0	113.0	74.3	187.4	3.2
of which: US	4.6	14.1	15.1	35.3	69.1	39.0	108.1	2.4
Exposure to less developed countries and Turkey	0.3	2.5	3.5	8.0	14.4	1.4	15.7	0.2
Other countries	0.5	22.8	13.9	-2.8	34.4	11.9	46.3	1.0
Total	6.4	62.5	42.6	50.3	161.8	87.6	249.4	4.4

[a] Governments, official institutions and central banks.

[b] After deducting local liabilities.

[c] Credit risk of off-balance-sheet financial instruments, as calculated in relation to the single-borrower indebtedness limitation.

[d] Balance of problem debts minus debts covered by securities that can be deducted for purposes of the single-borrower and group-of-borrowers indebtedness limitation. Does not include off-balance-sheet risk components.

SOURCE: Published financial statements.

Table 3.8

Current Credit Exposure of the Five Major Banking Groups to Foreign Financial Institutions,[a] December 2008 (NIS million)

Credit rating[c]	Hapoalim: Total credit risk[b]	Hapoalim: *of which*: Balance sheet credit risk	Leumi: Total credit risk	Leumi: *of which*: Balance sheet credit risk	Discount: Total credit risk	Discount: *of which*: Balance sheet credit risk	Mizrahi-Tefahot: Total credit risk	Mizrahi-Tefahot: *of which*: Balance sheet credit risk	First International: Total credit risk	First International: *of which*: Balance sheet credit risk	Total: Total credit risk	Total: *of which*: Balance sheet credit risk
AAA to AA–	**10,509**	**8,610**	**12,200**	**10,116**	**4,392**	**4,175**	**2,893**	**2,485**	**4,540**	**4,251**	**34,534**	**29,637**
A+ to A–	**9,391**	**8,463**	**22,107**	**18,352**	**8,242**	**7,747**	**1,658**	**1,639**	**3,662**	**3,575**	**45,060**	**39,776**
BBB+ to BBB–	**1,367**	**847**	**485**	**446**	**704**	**665**	**146**	**131**	**82**	**82**	**2,784**	**2,171**
BB+ to B–	**793**	**778**	**417**	**402**	**389**	**389**	**105**	**75**	**3**	**1**	**1,707**	**1,645**
Below B–	**49**	**49**	**122**	**119**	**6**	**6**	**155**	**155**	**12**	**12**	**344**	**341**
Unrated	610	310	793	688	522	255	46	46	36	22	2,007	1,321
Total credit exposure to foreign financial institutions	22,719	19,057	36,124	30,123	14,255	13,237	5,003	4,531	8,335	7,943	86,436	74,891
Balance of problem debts[d]	90	90	135	135	46	46	0	0	14	14	285	285
Total exposure/assets (%)		6.2		9.7		7.3		4.0		8.0		7.4
Total exposure/equity (%)	120.9	101.4	193.5	161.3	162.0	150.5	84.1	76.1	151.8	144.7	149.8	129.8

[a] Investment banks, brokers/dealers, insurance companies, institutions and entities controlled by them. Credit exposure does not include exposure to financial institutions that have explicit and full government guarantees, or investment in asset-backed securities.

[b] Balance sheet credit exposure includes deposits in banks, credit to the public, investments in bonds, securities borrowed or bought in RRepo agreements, and other derivative assets. Off-balance-sheet credit risk consists mainly of guarantees and commitments to give credit, including guarantees to insure third-party indebtedness. Credit risk is shown after deduction of the specific loan-loss provision.

[c] External credit rating by rating agencies S&P, FITCH and Moody's.

[d] Balance of problem debts minus debts covered by securities that can be deducted for purposes of the single-borrower and group-of-borrowers indebtedness limitation, including off-balance-sheet risk components.

SOURCE: Published financial statements.

assets). The largest exposure was that of Bank Leumi (about NIS 36 billion) while the smallest was that of Bank Mizrahi (about NIS 5 billion).

Quality: About 95 percent of the liability involves "investment-grade" financial institutions,[27] about 2 percent involves less than investment-grade financial institutions and the rest involves unrated financial institutions, which in general are more risky than rated firms. The banks' total exposure to problem loans involving foreign financial institutions totaled NIS 285 billion, which represented 0.33 percent of their credit risk exposure.

Diversification: This exposure is characterized by a high degree of concentration. Thus, the ten largest exposures account for about 60 percent of the total exposure to foreign financial institutions. The US accounts for about 30 percent of the total liability and the UK for about 25 percent.

f. The securities portfolio of Israeli banks

The banks' portfolio of securities totaled NIS 129 billion on December 31, 2008, compared with NIS 160 billion in 2007. This represents about 13 percent of the banks' total assets. The sharp drop was a result of two main factors: the sale by Bank Hapoalim of most of its MBS portfolio and the drop in the fair value of securities which the banks do not intend to hold until maturity, due to the sharp fall in prices in the capital markets.

The accepted accounting rules for banking corporations have a significant influence on the way in which these factors affect the book value of the securities portfolio. "Fair value" accounting requires that firms use market prices to value the securities that they do not intend to hold to maturity. As a result, during a period of recession and falling prices in the capital market, such as occurred in 2008, the banks are required to reduce the book value of the securities they hold.[28] In addition, it is important to mention that the

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[27] A rating of between AAA (the highest rating awarded to the most stable institutions) and BBB-.

[28] The Bank's nostro portfolio is divided into three categories and the accounting treatment of a drop in the value of the portfolio is different for each:

1. Tradable securities—presented in the balance sheet according to fair value. The difference between fair value and the reduced cost is recorded in the profit and loss statement.

2. Securities available for sale—presented in the balance according to fair value: A temporary drop in value is imputed to equity and thus reduces shareholders' equity (but does not influence the capital adequacy ratio since it is not included in regulatory capital used for calculating the ratio) while a drop in value other than of a temporary nature is imputed to the profit and loss statement. The test for determining whether a drop in the value of a security that is available for sale is of a temporary nature is primarily based on the following criteria: the length of time that the value of the security has been lower than its cost, the proportion of value lost and a change in the rating of the securities by international rating agencies or of the assets and collateral that back them up.

3. Securities held to maturity—presented according to their reduced value. Their valuation is presented in a note to the financial statements but losses or gains as a result of the valuation are not imputed to profits or to capital.

credit crisis made certain securities almost non-liquid, which exacerbated the difficulty in evaluating them accurately.

Furthermore, the change in the mix of the securities portfolio, which occurred in 2006 and 2007 and led to unprecedented levels of risk prior to the crisis, was a major factor in the losses recorded as a result of the drop in value during 2008.

1. Changes in the composition and size of the securities portfolio from 2006 until the eve of the crisis

During 2006–07, the share of the securities portfolio in the total value of the balance sheet remained unchanged at 17 percent; however, its composition changed substantially, which increased the risk of the portfolio. Thus, the proportion of government bonds, which are low-risk assets, declined, while the proportion of other debt securities increased, as a result of the purchase of MBS (by financial institutions and firms). In addition, the component consisting of shares grew, which led to a sharp increase in the risk of the banks' securities portfolio.

The purchase of MBS and asset-backed securities (ABS) during 2006 and 2007 led to a sharp rise in the total investment in non-government bonds, which at the end of 2007 stood at about NIS 74 billion, compared with NIS 47 billion in 2005. This increase was largely the result of the activity of Bank Hapoalim.

2. Changes in the composition of the securities portfolio and its risk from the onset of the crisis until the end of 2008

The financial crisis, which began in the second half of 2007, led in its first stage to a free fall in the value of MBS and ABS, and as a result there was a drop in the value of these securities, part of which was imputed to equity and part to the profit and loss statement. This development had a particularly large influence on Bank Hapoalim, whose profitability was reduced during the last quarter of 2007 by the drop in value of asset-backed securities.

During the second quarter of 2008, the exposure of the banks to non-government bonds, which are considered to be higher risk assets than government bonds, declined substantially and returned to its end-2005 level. The decline was the result of the decision by the Bank Hapoalim Board of Directors to sell off its MBS portfolio, which was held by its New York branch.[29] The size of the investment on the day of sale stood at $3.4 billion and due to the sale, the Bank recognized a significant loss totaling NIS 3.1 billion.

[29] In April 2008, Bank Hapoalim received a directive from the Supervisor of Banks to weight its holdings in most of the MBS portfolio at double their value on the Bank's books when calculating the capital ratio. The implementation of this directive reduced the attractiveness of continuing to hold the MBS portfolio, particularly in view of the assessment that the crisis in the US real estate market was not yet over and may even worsen due to the declines and fluctuations in the world market prices of MBS.

Table 3.9
Investments in Securities—Balances, Losses and Falls in Value Imputed to Equity, the Five Major Banking Groups, December 2007 and December 2008
(NIS million)

	Hapoalim		Leumi		Discount		Mizrahi-Tefahot		First International	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
Israeli and foreign government bonds	16,795	15,799	16,766	21,098	16,905	12,751	4,158	7,136	11,145	9,349
Asset-backed bonds under guarantee or issued directly by Federal agencies taken into public ownership.		0		3,300		11,156		0		80
Bonds backed by other assets	17,742	1,196	6,270	1,126	8,676	405	159	83	1,368	781
Other bonds	11,963	7,829	18,778	16,062	9,924	5,856	1,429	1,660	8,086	5,760
Shares	1,906	1,833	5,355	3,324	1,773	1,367	399	380	899	704
Total securities	**48,406**	**26,657**	**47,169**	**44,910**	**37,278**	**31,535**	**6,145**	**9,259**	**21,498**	**16,674**
Loses on bonds	551	4,317	-753	341	-108	-1,175	-84	130	-729	170
Lossses on shares	-251	113	-461	912	-58	-51	-65	-46	-141	-20
Fall in value of portfolio available for sale imputed to equity	733	-259	210	1,784	82	624	57	185	-3	219
Total exposure/equity (%)	**257.8**	**141.8**	**241.3**	**240.5**	**405.0**	**358.5**	**110.6**	**155.6**	**391.9**	**303.7**
Total exposure/total ssets (%)	**16.0**	**8.7**	**15.6**	**14.5**	**22.1**	**17.3**	**6.4**	**8.1**	**23.2**	**16.9**

[a] FHMA, FNMA and GNMA, or guaranteed by them. These agencies were taken into public ownership as part of the US government rescue program arising from the financial crisis in 2008.

SOURCE: Published financial statements.

During the third quarter of 2008, as the worsening global financial crisis led to the bankruptcy of financial institutions and countries, there was a significant increase in the risk premium, which was reflected in a sharp increase in the spreads on bonds in all markets, both in Israel and abroad. This development led to a realization of risk in assets that until then had been considered to have low risk, such as investment in the securities of foreign banks and financial institutions that are not backed by assets. During the second half of the year, these investments, most of which are included in the portfolio that is available for sale in the category of "other debt securities," recorded both "other-than-temporary losses in value," which were imputed to the profit and loss statement and thus had a significant influence on the profits of the banks, and "losses in value of a temporary nature" which were imputed to equity.[30] It is important to mention that the level of exposure to foreign banks and financial institutions varies between the banks and, as a direct result, the magnitude of their losses varies as well. Losses were primarily recorded by Bank Leumi, due to its exposure to Lehman Brothers and Washington Mutual. The sharp rise in bond spreads in Israel also led to the decline in value of corporate bonds[31] issued in Israel; however, thanks to the relatively small magnitude of this exposure (about NIS 5 billion), the effect on the risk of the securities portfolio was fairly minor. It should be mentioned that this investment is characterized by a high level of diversification among the various sectors, unlike the situation of corporate bonds issued abroad, most of which (about 80 percent) are issued by the financial sector (Figure 3.9).

3. The risk of the securities portfolio held by banks in Israel

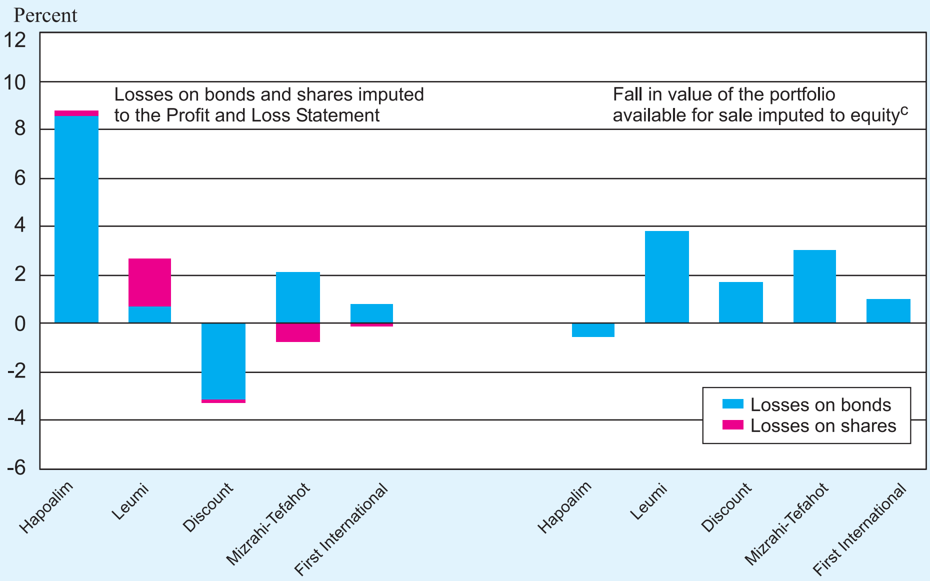
An analysis of the quality of the securities portfolio held by banks in Israel in 2008 is based on two indices which are calculated from data in the financial statements: the share of net losses in the securities portfolio imputed to the profit and loss statement to the balance of the securities portfolio, and the ratio of the fall in the net value of the portfolio available for sale imputed to equity to the balance of the securities portfolio.

It should first be mentioned that significant losses (NIS 4.7 billion) were recorded in the profit and loss statement due to investments in the securities portfolio in 2008. Most of this was due to the Hapoalim Group as a result of losses on its MBS portfolio, which was held by its branch in New York. In addition, there were losses in value imputed to equity in the amount of NIS 2.6 billion. Most of this was due to the Leumi Group as a result of losses in value "of a temporary nature" on bonds issued by foreign banks and financial institutions (Table 3.9). The share of net losses in the securities portfolio imputed to the profit and loss statement in the total balance of the securities portfolio stood at 2.9 percent in 2008 and the data is characterized by a high degree of heterogeneity among the banking groups. The highest figure (8.8 percent) was recorded

[30] Thus, they reduced the banks' net worth but did not affect the capital adequacy ratio, since the capital reserve is not included in regulatory capital used to calculate the ratio.

[31] Not including bonds issued by banking corporations.

Figure 3.10
The Ratio of Net Losses in the Securities Portfolio Imputed to the Profit and Loss Statement and the Fall in the Net Value[a] of the Portfolio Available for Sale Imputed to Equity to the Balance of the Securities Portfolio,[b] 2008

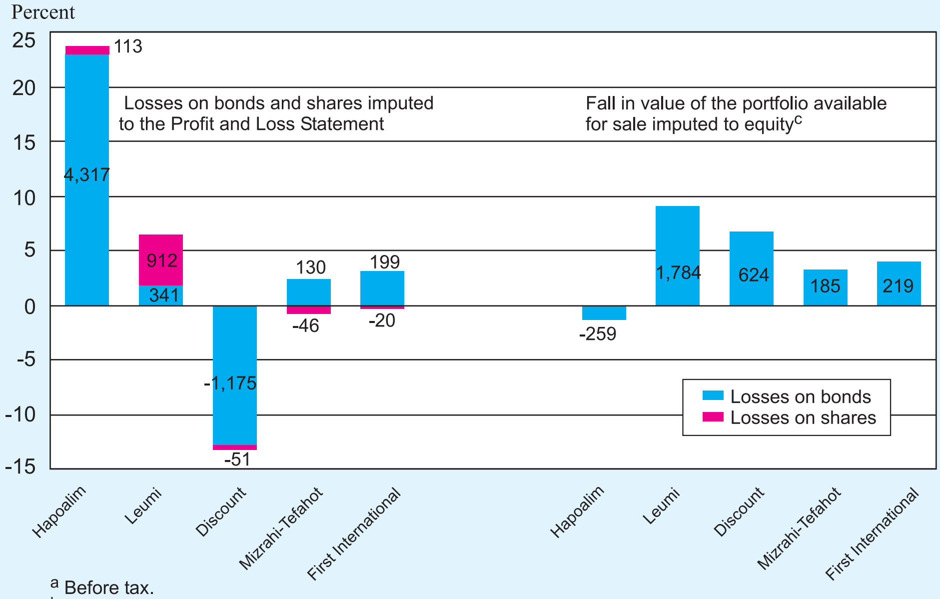


[a] Before tax.
[b] Balance on 31 December 2007.
[c] The capital reserve is not included in the calculation of capital for the minimum capital ratio.
SOURCE: Published financial reports.

by Hapoalim, followed by Leumi (2.7 percent) while the Discount group recorded a net profit (3.3 percent) (Figure 3.10). The share of losses in value “of a temporary nature” in the portfolio available for sale imputed to equity in the balance of the securities portfolio stood at 1.6 percent for the largest five banking groups, with the highest shares being those in the Leumi group (3.8 percent) and Mizrahi-Tefahot (3.0 percent) (Figure 3.10).

The risk to the banks from investments in securities is affected both by the risk of the portfolio and its proportion in total assets. In order to estimate this risk, two indices were examined that measure the risk of the securities portfolio relative to the bank’s equity. The share in equity of net losses in the securities portfolio stood at 8 percent in 2008, with a high level of heterogeneity between banking groups. The highest level of risk was recorded by the Hapoalim group, for whom the losses in the securities portfolio imputed to the profit and loss statement represented about one quarter of its equity (Figure 3.11). The share in equity of losses in the portfolio available for sale imputed to equity stood at 4.4 percent. This share was also characterized by a high level of heterogeneity among the banking groups, with the highest being recorded by the Leumi group (about 9 percent) (Figure 3.11).

Figure 3.11
The Ratio of Net Losses in the Securities Portfolio Imputed to the Profit and Loss Statementand the Fall in the Net Value[a] of the Portfolio Available for Sale Imputed to Equity to Equity,[b] 2008

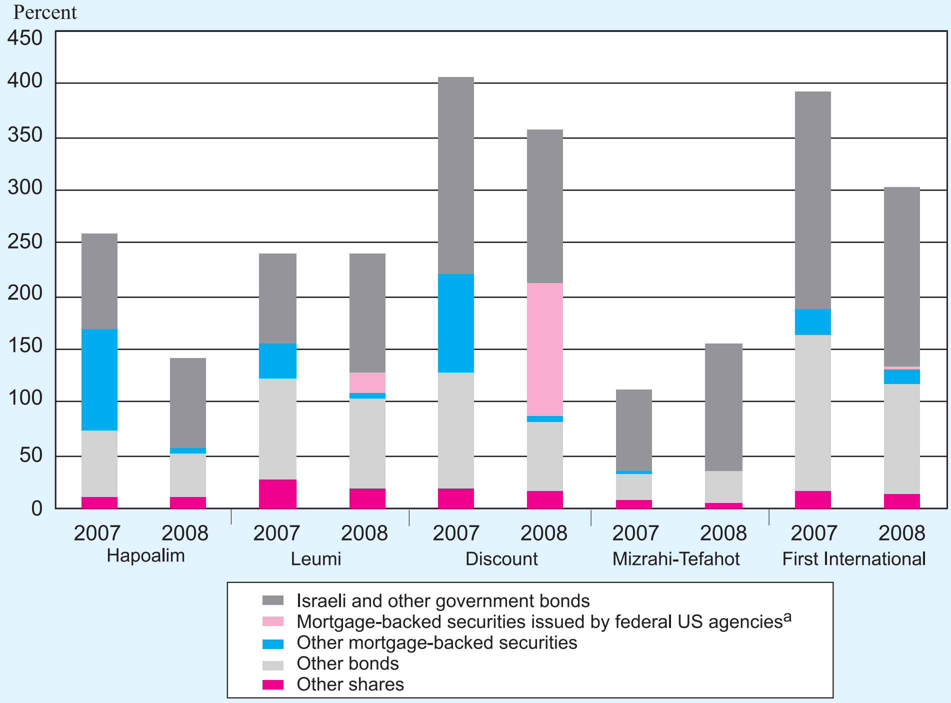


[a] Before tax.
[b] The numbers in the columns represent the losses/profits and the falls/increases in the value (NIS billion).
[c] The capital reserve is not included in the calculation of capital for the minimum capital ratio.
SOURCE: Published financial reports.

An analysis of the exposure and risk of the banks' securities portfolio at the end of 2008, following the changes that occurred in the portfolio, reveals a high level of heterogeneity between banks in portfolio size and composition. The share of the highest-risk components in the securities portfolio, i.e., other debt securities, which include bonds backed by assets and shares, was lowest (indicating the least risk) for the Mizrahi-Tefahot group and the Hapoalim group (following the sale of its MBS portfolio). The Leumi and First International groups had the highest exposure to other debt securities which include bonds issued by foreign financial institutions and corporate bonds. These assets represent 86 percent of equity in Leumi, and 105 percent in the First International (Figure 3.12). The differences in the composition of the banks' portfolios is also reflected in the ratio of total MBS and ABS exposure to capital, which ranged from one percent for Mizrahi-Tefahot group to 131 percent for the Discount group. The latter chose to increase this exposure in 2008, in contrast to the other groups, by purchasing MBS issued by agencies of the US government[32] (Table 3.9).

[32] FHMA, FNMA and GNMA or under their guarantee. These asset-backed bonds are weighted for the purpose of calculating the minimum capital ratios as follows: 0 percent for GNMA and 20 percent for GHMA and FNMA. This contrasts with a weight of 100 percent for other bonds.

Figure 3.12
Distribution of the Balance of Investment in Securities as a Share of Equity, the Five Major Banking Groups, December 2007 and December 2008



[a] FHMA, FNMA and GNMA, or guaranteed by them. These agencies were taken into public ownership as part of the US government rescue program arising from the financial crisis in 2008.
SOURCE: Published financial reports.

2. MARKET RISK

a. General

Market risk is defined as the erosion of a bank's net worth due to unexpected changes in market prices (interest rates, share prices, the exchange rate and inflation). The analysis of market risk in this survey is based on the method of Value at Risk (VaR), which expresses the maximum expected loss on the holdings of financial instruments due to changes in market prices for a given planning horizon and level of confidence at a specific point in time. The VaR index is measured for interest rate risk for three types of indexation (shekel indexation, no indexation and foreign-currency indexation). The normal distribution[33] is used in the calculation, based on the following assumptions: (1) risk factors distribute normally; (2) a planning horizon of 10 days; (3) a confidence level of 99 percent; (4) no account is taken of correlation between changes in the various market prices; (5) use is made of daily data for the past year; and (6) the positions are based on data appearing in the banks' financial statement (including the effect of futures transactions).

b. Effects of the financial crisis

As a result of the global financial crisis, there was an increase in market risk, which was reflected in increased volatility in the various markets (interest rates, shares and the exchange rate). Since the exposure to market risk is dependent both on price risk and on position, the banks have the option of reducing this exposure, unlike in the case of the credit portfolio, and indeed this year the total VaR with respect to interest rate risk and indexation method risk did not grow substantially, despite the sharp rise in volatility.

In 2008, following several consecutive years of price increases, most of the leading share indices world wide fell by between 40 and 60 percent as a result of the economic crisis. These declines were reflected in the fall in value of the banks' nostro securities portfolio and in both the losses imputed to the profit and loss statement and the losses in value "of a temporary nature," which were imputed to equity.

In addition, the level of exchange-rate risk rose in 2008, both in Israel and world wide. The risk in the exchange rate, which is expressed by the standard deviation of daily changes in the dollar exchange rate, rose to a record level during the year and stood at 16 percent at the end of 2008, which represents a jump of 8 percentage points compared to the end of 2007.

The sharp reductions in the interest rate both in the US and in Israel as the crisis became more severe led to a sharp increase in the volatility of interest rates in the three indexation segments: the interest rate on *makam* in the unindexed shekel segment, the interest rate on CPI-indexed bonds in the indexed segment and the LIBOR interest rate

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[33] There are two additional approaches to estimating VaR: Monte Carlo simulation and historical simulation. The former is based on a particular distribution while the latter does not assume any particular model and is based on historical asset prices. Each has its own advantages and disadvantages. Monte Carlo simulations are difficult to implement and involve a risk that the distribution chosen for the simulation will not reflect the future. The historical simulations approach requires a long period of data in order to estimate VaR over an interval of time. Thus for example, in order to calculate VaR over a period of 10 days, the required database is 10 times the size of that required for the normal distribution method. This method is liable to be affected to a large extent by events that occurred in the past. The normal distribution approach assumes that daily yields are independent of one another, such that the changes in prices over a period of 10 days distribute normally with an average and variance equal to 10 times the daily average and variance. It should be mentioned that the assumption of a normal distribution of changes for all risk factors is reasonable (although not accurate) except in the case of options, which do not behave according to the normal distribution; it is assumed that the difference between their behavior and behavior according to the normal distribution is not substantial.

in the foreign-currency indexation segment. The increase in volatility was especially pronounced in the LIBOR interest rate on the dollar following the sharp reduction in interest rates by the Fed (from 5.25 percent in mid-2007 to a level close to zero at the end of 2008). We would mention that also after the increase in volatility, the volatility of the LIBOR interest rate remained low relative to the volatility of the interest rate in the unindexed segment, which is characterized by a high level of volatility.

Another effect of the crisis was the sharp increase in correlation between price risks within each category of risk (indexation-base risk and interest rate risk) and between the various categories of risk. Thus, the deepening of the crisis in 2008 led to almost full positive correlation and, as a result, total risk increased since it was no longer significantly different from the simple summation of all the exposures in each of the various risk categories.

It is worth stating that the model on which the analysis of market risk is based does not take into account correlation between price risks. Therefore, it is oversimplified but also conservative and thus, total risk is the simple summation of all the exposures in all the risk categories.

c. Interest rate risk

1. General

Interest rate risk is defined as the risk of unexpected changes in interest rates that affect the financial situation of a bank (or reduce the economic value of its net worth).[34] This risk is created when the relative sensitivity of the value of a bank's assets to unexpected changes in interest rates differs from that of its liabilities.

The exposure to interest rate risk, which is reflected in the VaR of the bank's position,[35] is influenced by three components: (1) the difference between the present value of assets and the present value of liabilities plus the effect of futures transactions (hereafter: the

[34] The economic value of a bank's net worth is calculated as the difference between the present value of assets and the present value of liabilities. The present value of assets and liabilities is obtained by capitalizing the future stream (of principal and interest payments) at the market interest rate according to the time structure of the interest rate relevant to each segment, i.e., for each asset and liability with similar duration.

[35] This value is the expected change in the economic value of the position for the maximum expected change in the rate of interest and is calculated according to the equation:

where P – the position, D_k – the duration of the economic value of the bank's net worth, i – the discount rate and $\Delta(I+i)$ – the maximum change in the interest rate with 99 percent probability (in other words, there is a 99 percent probability that the change in the interest rate will be smaller than the maximum change, and a 1 percent probability that it will be larger). The second expression on the right side of the equation is the adjusted duration of net worth. The larger this expression, the larger the change in the present value of assets will be as a result of a change in the rate of interest, and therefore the higher the interest rate risk. For further details, see Table 3.5.

"position");[36] (2) the sensitivity of the position to changes in the rates of interest, as measured by average or adjusted duration; and (3) the maximum change in the rate of interest during the planning period. The first two components are dependent on the distribution of assets and liabilities of each bank and their characteristics over time, while the third is uniform for all banks since it is derived from the volatility of the interest rates.

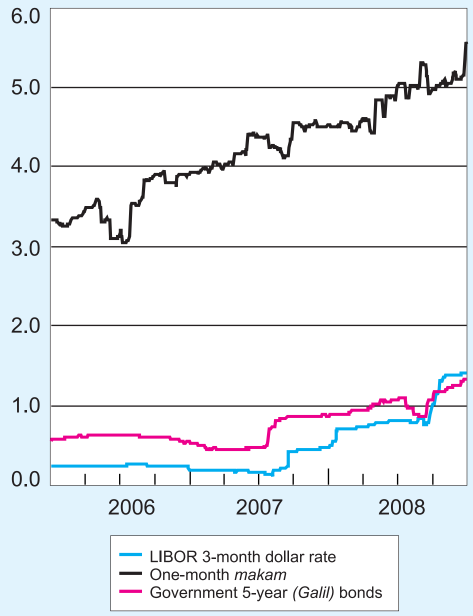
2. Interest rate VaR

There was no significant change this year in the interest rate VaR, despite the large increase in the volatility of interest rates (which was reflected in the increase in price) as a result of the global financial crisis (Table 3.10). This development was not uniform among the various segments and banking groups. Among the five major banking groups, the interest rate VaR ranged from 2.2 percent of the economic value of net worth to 11.5 percent, not including the Discount group which had a particular high level (23.4 percent).

In the unindexed segment, in which most of the activity involves a variable interest rate indexed to the prime rate and a relatively short time to maturity for assets and liabilities, the sensitivity of assets and liabilities to changes in the interest rate is smaller than in other intermediation segments. In contrast, the volatility of interest rates in this segment, which is in general correlated with yields to maturity on *makam*, is high relative to interest rates in other intermediation segments (Figure 3.13). This year there was no major change in the VaR in most of the banking groups, although in some of them positions grew as a result of a narrowing of the average duration gap.

In the CPI-indexed segment, the sensitivity of assets and liabilities to changes in interest rates is higher than in other intermediation segments since they have a long duration and are in general priced according to fixed interest rates. On the other hand, the interest rates in this

Figure 3.13
Standard Deviation[a] of Changes in Selected Interest Rates, 2006-08



[a] Calculated on a daily basis over the previous year.
SOURCE: Bank of Israel.

[36] On the basis of the accounting report in Appendix D to the Annual Report to the Public.

Table 3.10
Exposure to Changes in Interest Rates, the Five Major Banking Groups, 2007-08

	Hapoalim		Leumi		Discount		Mizrahi-Tefahot		First International	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
Unindexed segment										
Total exposure[a] (NIS million)	6,897	10,602	7,003	11,676	3,608	2,878	2,172	2,925	3,505	3,161
Duration of assets (years)	0.50	0.56	0.50	0.60	0.55	0.76	0.34	0.30	0.33	0.34
Duration of liabilities (years)	0.27	0.45	0.26	0.32	1.17	0.44	0.23	0.35	0.17	0.17
Duration gap[b] (D_{gap}) (years)	0.24	0.15	0.25	0.30	-0.56	0.34	0.12	-0.02	0.17	0.18
Modified duration of capital[c] (percent)	4.42	2.00	3.90	3.43	-13.03	8.65	2.19	-0.45	2.31	3.07
Maximum change of interest[d] (percentage points)	2.10	2.58	2.10	2.58	-2.10	2.58	2.10	-2.58	2.10	2.58
Value at risk[e] (VaR)	641	548	574	1032	989	642	100	34	170	250
Indexed segment[f]										
Total exposure[a] (NIS million)	8,254	4,050	6,719	4,707	2,032	2,085	2,828	1,654	579	1,230
Duration of assets (years)	3.99	3.99	3.89	3.66	5.22	5.14	3.88	3.49	4.14	3.96
Duration of liabilities (years)	4.59	4.98	3.78	4.29	4.93	4.71	3.94	3.82	3.12	3.81
Duration gap[b] (D_{gap}) (years)	-0.02	-0.67	0.50	-0.31	0.69	0.77	0.23	-0.17	1.12	0.41
Modified duration of capital[c] (percent)	-0.18	-10.47	4.72	-4.04	8.19	10.21	3.07	-4.20	34.42	5.77
Maximum change of interest[d] (percentage points)	-0.41	-0.62	0.41	-0.62	0.41	0.62	0.41	-0.62	0.41	0.62
Value at risk[e] (VaR)	6	262	129	117	68	131	35	43	81	44
Foreign-currency segment[g]										
Total exposure[a] (NIS million)	977	-242	-2,173	-5,240	-1,592	-1,641	-218	436	-235	-625
Duration of assets (years)	1.33	1.03	0.70	0.64	1.25	0.87	0.51	0.87	0.28	0.35
Duration of liabilities (years)	1.01	0.95	0.30	0.45	0.22	0.85	0.77	0.67	0.22	0.25
Duration Gap[b] (Dgap) (years)	0.33	0.07	0.39	0.17	1.03	0.01	-0.27	0.21	0.06	0.10
Modified duration of capital[c] (percent)	43.26	33.83	23.20	3.98	46.58	0.41	-28.54	11.86	6.91	4.08
Maximum change of interest[d] (percentage points)	0.22	0.66	0.22	0.66	0.22	0.66	-0.22	0.66	0.22	0.66
Value at Risk[e] (VaR)	94	54	113	137	166	4	14	34	4	17

(cont'd.)

Table 3.10 (cont'd.)

Exposure to Changes in Interest Rates, the Five Major Banking Groups, 2007-08

	Hapoalim		Leumi		Discount		Mizrahi-Tefahot		First International	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
Net worth[h] (NIS million)	16,127	14,410	11,549	11,143	4,048	3,322	4,783	5,016	3,849	3,766
Total value at risk[i] (NIS million)	742	863	816	1286	1222	778	149	111	255	311
As percent of net worth	4.60	5.99	7.07	11.54	30.20	23.41	3.12	2.21	6.62	8.25

[a] Present value of assets less present value of liabilities including effect of futures and options. The present value of the assets and liabilities are obtained by discounting the future cash flow (principal and interest) at the market interest rate according to the time structure of the interest rate relevant in each segment.

[b] The duration gap measures the sensitivity of a bank's net worth to changes in the interest rate in terms of time, and thus enables it to calculate the average duration of the assets/liabilities that should be bought/sold to immunize itself against interest risk. It is calculated as $D_{gap} = D_A – D_L \cdot L/A$, where D_A is the average duration of assets, D_L is the average duration of liabilities, A is the current value of assets, and L is the current value of liabilities.

[c] The modified duration of capital is calculated as $D_k/(1+i)$, where $D_k = D_{gap} \cdot A/L$, the average duration of the bank's net worth, and i is the interest rate. The modified duration may also be taken as the rate of exposure of a position to a one-percentage-point change in the interest rate. When its sign is positive, an unexpected rise in the interest rate will reduce net worth, and a drop in the interest rate will increase net worth, and vice versa when the sign is negative.

[d] The maximum change in the yield to maturity on one-month *makam* in the unindexed segment, on five-year indexed bonds in the indexed segment, and on three-month Libor in the foreign currency segment is derived from the daily changes in the previous year, assuming a normal distribution, at the 99% significance/confidence? level.

[e] The change in a bank's situation that would result from the maximum change in the interest rates, calculated from the VaR model: $VaR = P \cdot [D_k/(1+i)] \cdot \Delta(1+i)$, where, P is the position, D_k is the average duration of the bank's net worth, i is capitalization interest, and $\Delta(1+i)$ is the maximum change in the capitalization interest.

[f] Including the CPI/$ indexation option.

[g] Including foreign-currency-indexed.

[h] Total present value of assets less present value of liabilities including effect of futures and options for all segments.

[i] The total value subject to interest rate risk obtained by simply adding the adjusted value at risk in the three segments under the strong assumption of the worst scenario, from the bank's point of view, in all the segments.

SOURCE: Based on published financial statements.

segment are in general correlated with the yields to maturity on CPI-indexed bonds, which are characterized by a relatively low level of volatility, thus contributing to the reduction of potential exposure to interest rate risk. This year, as a result of the financial crisis, there was a considerable increase in yields to maturity on CPI-indexed bonds. This resulted in only a small increase in the segment's interest rate VaR due to the decreased position and the shortening of average duration in this segment.

In recent years there has been a significant narrowing of the duration gap in this segment, which was the result of the shortening of duration of assets and the simultaneous increase in duration of liabilities. The downtrend in the duration of assets in recent years was a result of the provision of long-term indexed credit, primarily by financial institutions, who have an inbuilt surplus of long-term indexed funds.

The interest VaR in the foreign currency segment is for the most part lower than in the local currency segments since it is the policy of the banks to maintain only limited positions, and in addition, the volatility of interest rates is low in this segment, as reflected in the standard deviation of the LIBOR interest rate. This year, VaR declined in most of the banking groups, despite the considerable increase in the volatility of interest rates. This was a result of the Fed's reductions in the interest rate, whose goal was to weaken the effect of the credit crisis. The decline in VaR can be credited to the considerable narrowing of the duration gap thanks to the shortening of the duration of assets, which was due to the actions taken by the banks as the crisis worsened. These included the reduction in deposits with foreign financial institutions and the shortening of their duration.

d. Indexation-base risk

1. General

The exposure to indexation-base risk is affected by two factors: the influence of quantity, which is the difference between the value of assets and the value of liabilities, plus the (net) effect of futures transactions (hereafter: the "position"),[37] and the effect of price, which is the unexpected change in relative prices between the various indexation segments. The analysis in this survey focuses on only three indexation segments (and ignores the wide variety of foreign currencies) on the assumption that financial capital is defined as unindexed. Therefore, market risk in the indexed shekel segment is realized in the event of an unexpected decline in prices (deflation) which erodes the bank's assets (in the case that the value of its assets exceeds the value of its liabilities) or in the case of an unexpected rise in prices (inflation) which erodes its liabilities (when the value of its liabilities exceeds the value of its assets). In a similar manner, the market risk in the foreign currency segment is realized when an unexpected increase in the nominal NIS/$ exchange rate (a devaluation) erodes the bank's liabilities (when the value of its

[37] On the basis of Note 16 of the Annual Report to the Public.

Table 3.11

Exposure to Changes in CPI and the Exchange Rate, the Five Major Banking Groups, December 2007 and December 2008

NIS million

	Hapoalim		Leumi		Discount		Mizrahi-Tefahot		First International	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
Unindexed segment										
Assets *minus* liabilities	7,575	11,623	8,285	14,011	3,857	3,307	2,378	3,272	3,329	3,152
Effect of futures and options	12,963	12,930	9,246	10,355	2,650	2,549	4,029	4,499	3,039	3,072
Net worth[a]	-5,388	-1,307	-961	3,656	1,207	758	-1,651	-1,227	290	80
Total position in segment[b]										
Indexed segment[c]										
Total position in segment[d]	5,533	1,543	3,406	2,457	907	1,031	1,858	1,289	29	653
Change in CPI[e] (percent)	-1.12	-1.46	-1.12	-1.46	-1.12	-1.46	-1.12	-1.46	-1.12	-1.46
Value at risk[f]	62	23	38	36	10	15	21	19	0	10
Foreign-currency segment[g]										
Total position in segment[d]	-145	-236	-2,445	-6,113	-2,114	-1,789	-207	-62	-319	-733
Change in real exchange rate[h] (percent)	3.64	7.34	3.64	7.34	3.64	7.34	3.64	7.34	3.64	7.34
Value at risk	5	17	89	449	77	131	8	5	12	54
Total VaR from indexation-base risk[i]	67.4	39.9	127.2	484.7	87.1	146.4	28.4	23.4	11.9	63.4
As percent of net worth	0.52	0.31	1.38	4.68	3.29	5.74	0.70	0.52	0.39	2.06

[a] The bank's net worth is ascribed (by definition) to the unindexed segment, so that nominal exposure to indexation bases occurs in the indexed and foreign currency segments.

[b] The difference between the current value of assets and the current value of liabilities includes the effect of forward transactions minus the net worth of the bank.

[c] Including the CPI/$ indexation option.

[d] The difference between assets and liabilities, including the effect of futures transactions.

[e] The maximum change in the CPI that was derived from the distribution of changes in that index during the last year. The probability of a change greater than that is smaller than 1%.

[f] The change in the bank's situation as a result of the maximum change in the CPI and the foreign exchange rate calculated according to the VaR model.

[g] Including foreign currency indexed.

[h] The maximum change in the nominal foreign exchange rate of the dollar against the shekel which is derived from the distribution of changes in this index during the last year. The probability of a change greater than that is smaller than 1%.

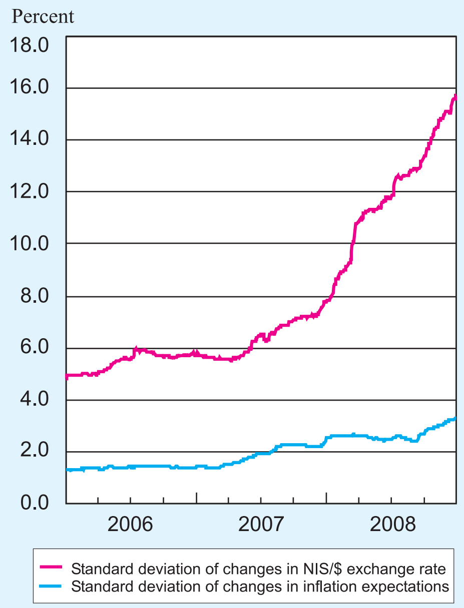
[i] The total VaR subject to indexation base risk obtained by the simple addition of the values subject to risk in the unindexed and foreign currency segments under the assumption that the worst scenario, from the bank's point of view, occurs in the two sectors.

SOURCE: Based on published financial statements and Central Bureau of Statistics data.

liabilities exceeds the value of its assets) and in the case of an unexpected decrease (an appreciation) that erodes the bank's assets (when the value of its assets exceeds the value of its liabilities).

In 2008, the CPI rose by 3.8 percent, which exceeded the upper boundary of the target range. The trend in the CPI was not uniform throughout the year: until September, inflation was high as a result of the global increase in the prices of oil and commodities and the economy's excess demand; from September onward, the rate of inflation dropped sharply as a result of the decline in global prices and in excess demand. The deviation of inflation above the upper boundary of the price stability target range and from the expected rates of inflation as derived from the capital market (which stood at about 2.5 percent at the beginning of the year) led to an increase in the economic net worth of the five major banking groups, which was characterized by a surplus of assets over liabilities in the CPI-indexed segment (Table 3.11). In 2008, the NIS/$ exchange rate appreciated by about 2 percent. Its trend over the year can be divided into two main periods: the first half of the year, when the NIS strengthened against the $ by about 16 percent, increasing the net worth of the banking groups (since they are characterized by a surplus of liabilities), and the second half of the year, when there was a nominal devaluation of a similar magnitude, which worked to erode their net worth.

Figure 3.14
Standard Deviation[a] of the NIS/$ Exchange Rate and of Changes in Inflation Expectations, 2006-08



[a] Calculated on a daily basis over the previous year.
SOURCE: Bank of Israel.

The level of risk in foreign currency rose significantly during the year and was reflected in an increased standard deviation of the daily changes in the dollar exchange rate, which reached record levels during the year (Figure 3.14).

2. Indexation-base VaR

The indexation-base VaR rose in 2008 to NIS 758 million, which is small relative to the interest rate risk. The sharp increase in price risk during 2008, which is reflected in the standard deviation of the NIS/$ exchange rate and of changes in the price level in the Israeli economy (Figure 3.14), worked to increased VaR—particularly in the foreign currency segment in which price risk is especially high—though banks' policy was to maintain a low position in this segment, which worked to reduce risk.

Box 3.1
Stress testing

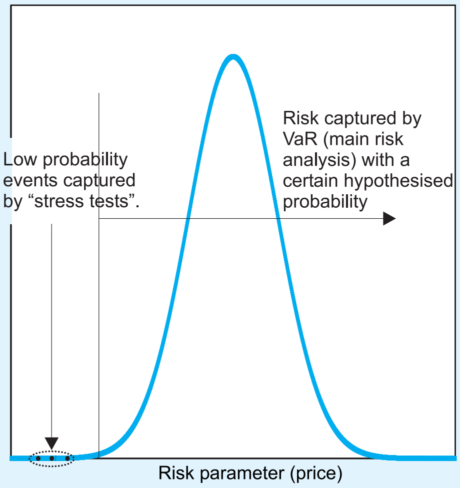
Stress testing is a technique for risk management that is used to evaluate the potential effect of a specific event or of a change in certain financial variables on a firm's financial situation. Stress tests are used as a supplementary tool in many models that evaluate a bank's exposure to various risks, such as VaR, and focus on exceptional but plausible events. While VaR, for example, reflects the daily behavior of the market, stress tests perform a simulation of portfolio performance during abnormal market periods and therefore provide information on risks that fall outside the range captured by VaR (Figure1).

In general, stress tests are divided into two categories: sensitivity tests and scenario tests. The former relate to a change in one of the parameters or in a number of risk factors, such as an increase or decrease of 200 basis points in the interest rate, while taking into account the correlation between risk factors,[1] but without assuming any specific model. Sensitivity tests on one risk factor are simple to perform and are used by a firm's senior management to obtain a first approximation of the effect on the firm of a change in a financial variable. In addition, these tests allow the firm to identify its weak spots. An example would be a test of the effect of credit risks relative to other types of risk, such as interest rate risk and exchange rate risk.

Scenario tests are based on plausible events and make it possible to examine the effect of several risk factors given various scenarios.[2]

In the last few years stress tests have become an important tool in managing the risk of financial institutions. In Pillar II of Basel II, banking corporations are required to perform stress tests as part of

Stress Tests Capturing Exceptional but Plausible Events



SOURCE: Stress Testing at Major Financial Institutions: Survey Results and Practice, BIS 2005.

1 Some firms estimate their correlation using periods of stress rather than "normal" periods.

2 The events can be based on historical scenarios (market events that occurred in the past) or hypothetical scenarios (market events that have not yet occurred).

the various risk management procedures and also in order to assess their capital adequacy.

The financial crisis which began in 2007 in the sub-prime mortgage market and spread to other markets and sectors increased the importance of stress tests both for the management of various types of risk and the assessment of a bank's capital adequacy. The depth and duration of the crisis raised the question among regulatory authorities of whether the stress tests used during the period prior to the crisis were sufficient and appropriate for the rapid changes which subsequently occurred, in view of the fact that the results of the crisis were more serious than the stress tests had indicated. In May 2009, the Basel Committee on Banking Supervision published "Principles for Sound Stress Testing Practices and Supervision." The document is the result of an assessment of the accepted procedures for stress testing during the crisis. On the basis of this assessment, and in an effort to improve existing procedures, formal guidelines were developed, both for banking corporations and for regulators, which relate to the goals of stress tests, their administration and their implementation in the evaluation of risk and specific products.

As part of this survey, a number of stress tests were run in order to evaluate the resilience of the banking system to possible exceptional events. The events selected can be considered extreme if they have a low probability of occurring. The tests were carried out from the "bottom up," whereby the incident's effect on each of the banking groups is first tested separately and then the aggregate effect is calculated. Since Israel's past experience captures only part of the extreme incidents that could occur, the tests were also based on the past experience of other countries. The tests include sensitivity tests in which the sensitivity of each factor is evaluated separately. Nonetheless, it should be emphasized that the tests presented here cover only some of the risks facing banking institutions and only some of their areas of activity. As such, they provide only a partial picture of bank risk and therefore should not be viewed as sufficient in themselves.

The following are the main results obtained for the banking system as a whole:

Credit risk – The stress tests confirm that of the various types of risk, this is the greatest risk to banking stability. The analysis was carried out by simulating the effect of a deterioration in the quality of credit. The share of credit to problem borrowers in total credit to the public and its breakdown into components were set at the levels that prevailed in 2002, when the share of balance-sheet credit to problem borrowers in total credit to the public reached a level of about 10 percent. The assumption was that any non-performing loans,[3] which are the

[3] According to its share of total credit to the public in December 2002.

most serious problem loans, will become a loss. Other components of problem loans were translated into losses according to a weighting of between 10 and 60 percent, according to level of severity.[4]These assumptions are equivalent to a ratio of annual loan-loss provision to total balance-sheet debt ranging from 2.7 to 5.2 percent. The scenario is based on the assumption that during a slowdown, the riskiest borrowers are those who will suffer the most serious problems. It should be emphasized that Israel's past experience with crises is relatively limited and that an examination of 17 financial crises in other countries indicates an average increase of about 20 percentage points in the ratio of NPL (non-performing loans) to total balance-sheet credit about a year after the crisis and an average rate of recovery of about 60 percent.[5]In this scenario, the loss to the banking system's net worth was estimated at about 2 percent of regulatory capital.

Interest rate risk – The effect of an increase of 300 basis points in the yield curve of the unindexed segment and an increase of 200 basis points in the indexed and foreign currency segments was examined.[6]The tests included only the direct effect on the banking system.[7] It was found that the effect of a change in the interest rate was less than that the effect of credit risk; however, it was somewhat larger than the effect of a change in the exchange rate and the loss was estimated at about 2 percent of regulatory capital.

Exchange risk – The effect of a 20 percent devaluation in the NIS/$ exchange rate was evaluated.[8] The direct effect of a change in the exchange rate on losses to the banking system were found to be negligible[9] since it is the policy of the system to maintain only a limited position in the foreign currency segment. This assumption leads to a loss of about 1 percent of the banking system's regulatory capital.

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[4] Rescheduled credit was weighted by 60 percent; credit designated for rescheduling by 40 percent; credit in temporary arrears by 30 percent; credit under special supervision by 10 percent. This is equivalent to an average loss of about 40 percent of problem loans.

[5] IMF Country Report No. 08/63 "Israel Selected Issues," IMF (2008).

[6] The adjusted duration is positive for most of the banks and segments and therefore the banks are exposed to an increase in the interest rate.

[7] There are of course indirect effects. An increase in the nominal interest rate raises the real interest rate and makes it difficult for borrowers to pay off their debts and to obtain new credit. In general, a positive relation is found between a high interest rate and credit losses.

[8] A devaluation scenario was chosen since the position of the banks in the foreign currency segment was negative on December 31, 2008 and therefore they were exposed to the effect of a devaluation.

[9] In contrast, the indirect effect of devaluation on risk components and on capital adequacy was significant.

3. OPERATIONAL RISK

Another of the risks that a banking corporation is exposed to in the management of its assets and liabilities is operational risk. Unlike credit risk and market risk, which can be identified by examining certain bank activities, operational risk is built in to all of a bank's activities and processes and is affected by all of its products, systems and workers.

Currently, banking corporations in Israel are not required to allocate capital against their exposure to operational risk; however, they are required to manage operational risk according to Proper Conduct of Banking Business Directives 301, 339 and 357, which briefly relate to this issue and provide banks with a large degree of freedom in defining the principles and events according to which a loss will be defined as an operational loss. Therefore, the banks use a variety of tools to prevent fraud, to minimize errors, to enhance their internal auditing, etc.

As part of the process to implement Basel II in the Israeli banking system, the Supervisor of Banks published a provisional directive[38] in December 2008 entitled "Working Framework for the Measurement of Capital Adequacy"[39] which was based on the recommendations of the Basel Committee contained in the International Convergence of Capital Measurement and Capital Standards published in June 2006 (Basel II) and will take effect on December 31, 2009. According to this working framework, a bank will manage its operational risk as a whole and will also use various methods for allocating capital against this risk, as is the case for credit risk and market risk.

In the directive, operational risk is defined as the risk of loss as a result of inadequacy or failure of internal processes, people or systems or as a result of external events. This definition includes legal risk[40] but does not include strategic risk or reputational risk and is in line with the definition presented in the recommendations of Basel II.

The guidelines presented in the provisional directive relate to the link between the total capital that a banking corporation is to hold against its various risks and the robustness and efficiency of its risk management and internal auditing systems. The banking corporations are meant to develop and upgrade their risk management, auditing, and corporate governance and also to maintain an appropriate process of internal evaluation, which combines all the major components of capital planning and management and results in the appropriate allocation of capital against those risks.

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[38] The Supervisor of Banks published an additional provisional directive at the same time entitled "Quarterly Reporting of Capital Measurement and Adequacy," according to which the banking corporations are required to report the measurement of capital and its adequacy to the Supervisor of Banks starting from the report that relates to December 31, 2008.

[39] This directive completed a process that began in mid-2007 in which draft documents on various subjects were distributed among the banks and discussed in ongoing meetings with representatives of the banking system and by joint teams created to discuss specific issues.

[40] Legal risk includes, among others, exposure to fines and penalties, to punitive damages as a result of regulatory activity and private settlements.

Of the three approaches to the calculation of capital requirements with respect to operational risk[41] that were presented in the Basel II guidelines, the Supervisor of Banks has permitted banking corporations in Israel to implement, under certain conditions, one of the following two: the Basic Indicator Approach (BIA) or the Standardized Approach (TSA; includes the alternative standardized approach). The Supervisor of Banks has encouraged banking corporations to upgrade from the first to the second approach through the development of more sophisticated systems and practices for the measurement of operational risk. In what follows, we will briefly review the two approaches. (For further details, see the directive on A Working Framework for the Measurement of Capital Adequacy on the Bank of Israel site.)

The BIA approach is the simpler one to implement and does not require special preparation or a large investment of resources. According to this approach, banking corporations are to allocate a fixed percentage (15 percent) of their average positive[42] gross annual income during the previous three years against operational risk. This approach is appropriate for small banks[43] whose operations abroad are limited.[44] Banking corporations that do not fulfill these two conditions will be permitted to implement the BIA approach only for a period of up to three years from the start of implementation. At the same time, the Supervisor of Banks stressed in the provisional directive that he expects banks that have activity abroad and banks with substantial exposure to operational risk to use a more sophisticated approach than BIA. He added that banking corporations will not be able to transfer to more sophisticated approaches for capital allocation against credit risk as long as they use the BIA approach to allocate capital against operational risk.

According to the second approach – the Standardized Approach (TSA) – the activity of the banking corporations is divided into eight business areas: corporate finance, commerce and sales, retail banking, commercial banking, payments and settlement, agency services, asset management and retail mediation. The gross income from each line of business is used as an estimate of the scope of commercial activity and also as a reasonable estimate of the scope of exposure to operational risk. The capital requirements for each business area are calculated by multiplying the gross income earned from it by a fixed percentage (beta - between 12 and 18 percent). In order to use the Standardized Approach, the banking corporation must meet the requirements set out in Sound Practices for the Management and Supervision of Operational Risk, Basel Committee on Banking Supervision, February 2003. According to those requirements, the bank's board of directors and senior management must be actively involved in the

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[41] For further details, see Bank of Israel, Supervisor of Banks, Israel's Banking System, Annual Survey 2007.

[42] Years in which gross annual income was negative or zero are not included in the calculation of the average.

[43] Net worth of less than NIS 4 billion.

[44] Limited to banking corporations whose share of total assets abroad in total assets and whose share of annual income from abroad in total annual income do not exceed 10 percent.

supervision of the management of operational risk; the bank must have an effective and fully-operational system for the management of operational risk; and the bank needs to have sufficient resources for the use of this approach both in its main lines of businesses and in the areas of monitoring and audits.

An example of the realization of operating risk occurred in the last quarter of the year at Bank Hapoalim. On November 23, 2008, the operating system of the bank's main computer malfunctioned and as a result all the computer systems that provide customer service (systems based on long-distance communication such as online banking services and ATMs) were shut down. On November 25th, the computer systems again became available to customers and the Bank's branches worked to input the data that had been recorded manually during the shutdown.

4. LIQUIDITY RISK

Liquidity risk is a result of the uncertainty regarding the scope of withdrawals by the public from its deposits with banking corporations, non-renewal of deposits on the date of their maturity or unexpected demand for credit. The realization of this risk is liable to cause a liquidity shortage at the bank and, in extreme cases, its collapse. An example is the collapse of Northern Rock, a British mortgage bank. The credit crisis had a particularly serious effect on Northern Rock, and on September 2008 it experienced a severe liquidity shortage due to, among things, the request by customers to withdraw their funds.

The crisis prevailing in world financial markets since mid-2007 has increased the importance of prudent management of liquidity risk. The deepening of the financial crisis in September 2008 led to widespread liquidity distress, which included the inter-bank credit markets, the financial markets and the bond markets in the US and other developed countries. Evidence of the crisis' effect on liquidity in the markets can be seen in a number of market and liquidity indicators, such as the increase in the short-term interest rate, most of which was the result of the increased credit-risk premium though it was also due to the increase in the liquidity premium; the increased level of volatility in the market; the widening of quote spreads; etc. In reaction to the liquidity crisis, the authorities in the US—and following their lead, in other developed economies as well—acted to increase liquidity in the market through a massive injection of funds and sharp reductions in the interest rate. In the US, for example, the Fed interest rate was lowered from 5.25 percent in mid-2007 to close to zero at the end of 2008.

In view of the crisis in the world financial markets, greater importance is being attributed to the prudent management of liquidity and it now receives a great deal of attention world wide. In September 2008, the Basel Committee on Bank Supervision published Principles for Sound Liquidity Risk Management and Supervision.

Although the banks in Israel did not experience a liquidity crisis, liquidity risk has risen. In September 2008, in an effort to monitor the stability of the banking system, banking corporations were asked to provide the Supervisor of Banks with newly formatted reports on liquidity risk.

The liquidity crisis led the Bank of Israel to adopt a series of monetary measures: a) starting from January 2009, the absorption of liquidity surpluses through the issue of *makam* was reduced; b) monetary loans of longer maturity were added to those which are currently issued by tender to the banking system for durations of a day and a week; c) the spread around the Bank of Israel interest rate at the credit window (the "corridor") and at the deposit window for commercial banks was lowered from ±1 percent to ±0.5 percent and at the beginning of 2009, there was a further reduction to ±0.25 percent; d) repo tenders to the commercial banks and financial institutions will be offered for longer than the current term of one week; and e) the purchase of government bonds by the Bank of Israel has worked to reduce the yields on long-term government bonds.

Other changes in Bank of Israel policy during 2008 (which increased liquidity although that was not their primary goal) included: a) the intervention by the Bank of Israel in the foreign currency market for the first time in eleven years, which involved the purchase of foreign currency (in the amount of NIS 55 billion so far) and the corresponding injection of shekels;[45] and b) the lowering of the interest rate five times during the last quarter of 2008 (two of which were inter-meeting decisions, i.e., taken not on the regular dates of the interest rate announcements), from 4.25 percent to 1.75 percent. Since the beginning of 2009, the Bank has continued to lower the interest rate to record low levels and in April it was lowered to a level of only 0.5 percent. [46]

In December 2008 and the beginning of 2009 there was a noticeable upward trend in the liquidity of the banking system, which was now characterized by a basic liquidity surplus, and the banks began placing deposits with the Bank of Israel. This is in contrast to the basic liquidity deficit during the year to December, during which the Bank of Israel offered the banks loans by tender.

As a result of the worsening of the crisis in September 2008, the banks also took a number of steps aimed at maintaining a level of liquidity that was appropriate to the level of uncertainly. These included an increase in their deposits both in local banks and at the Bank of Israel, as well as in their holdings of government bonds, which was carried out simultaneously with a reduction in deposits at foreign financial institutions and the shortening of their duration (Table 3.12).

Another development in 2008 that worked to reduce the liquidity risk implicit in the settlement process was the addition of the shekel as a currency cleared through CLS (Continuous Linked Settlement), an international inter-bank settlement system, in May 2008.

[45] The goal of the purchases was to halt the appreciation and to adjust foreign exchange reserves to the levels generally accepted in other countries.

[46] The main goal of lowering the interest rate was to keep to the inflation target and to support real economic activity.

Table 3.12
Local Currency and Foreign Currency Liquidity Indices, the Standard Model,[a] September 2008 to December 2008

	September	October	November	December
Ratio of liquid assets to liabilities with up to one month to redemption	0.16	0.18	0.17	0.24

[a] The standard model as in Directive 342 in the Proper Conduct of Banking Business

SOURCE: Based on reports to the Supervisor of Banks.

Liquidity risk and its management in the Israeli banking system

Liquidity risk is measured and managed in the Israeli banking system through internal models that monitor the liquidity situation using various indices and scenarios.[47] The internal models developed by the banks are differentiated from one another by their working assumptions and methods of calculation and are derived from the characteristics of each bank's customer base. These models also take into account other factors, such as the dependence of the bank on large depositors, i.e., the degree of concentration among depositors, the bank's ability to obtain a credit line abroad and from the parent bank, the bank's reputation, etc.

The banks use their internal models, based in general on statistical tests, to derive the rates at which to recycle their deposits (according to various segmentations: size, type, and period of deposit, type of indexation, etc.) and their ability to liquefy various assets. The models are also used to calculate the following liquidity indices on a daily basis: the liquidity gap according to period to maturity (a day, up to a week, up to a month, up to three months, up to six months, up to twelve months and longer than twelve months) and the ratio of liquid assets to liabilities with time to maturity of up to one month. In addition, liquidity indices are analyzed for various scenarios, such as stress tests,[48] that are related to a crisis at the bank or a general crisis (war, political upheaval, shocks to the financial markets, etc.), and make it possible to consider how the bank will continue to operate in a crisis at a reasonable cost for a one-month period. Since the crisis in September 2008, most of the banking system has been operating according to extreme scenarios, which require the holding of larger reserves of liquid assets.

[47] Liquidity risk is measured and managed in the Israeli banking system using internal models and therefore the banks are not obligated to achieve a ratio of 1, as required by the standard model in Proper Conduct of Banking Business Directive No. 342.

[48] Stress tests make it possible to examine the possible effect of extreme events. These events are not captured through the VaR model, which is appropriate for the estimation of total exposure to liquidity risk but does not provide information on losses that are likely to occur in abnormal market conditions and beyond the chosen level of confidence.

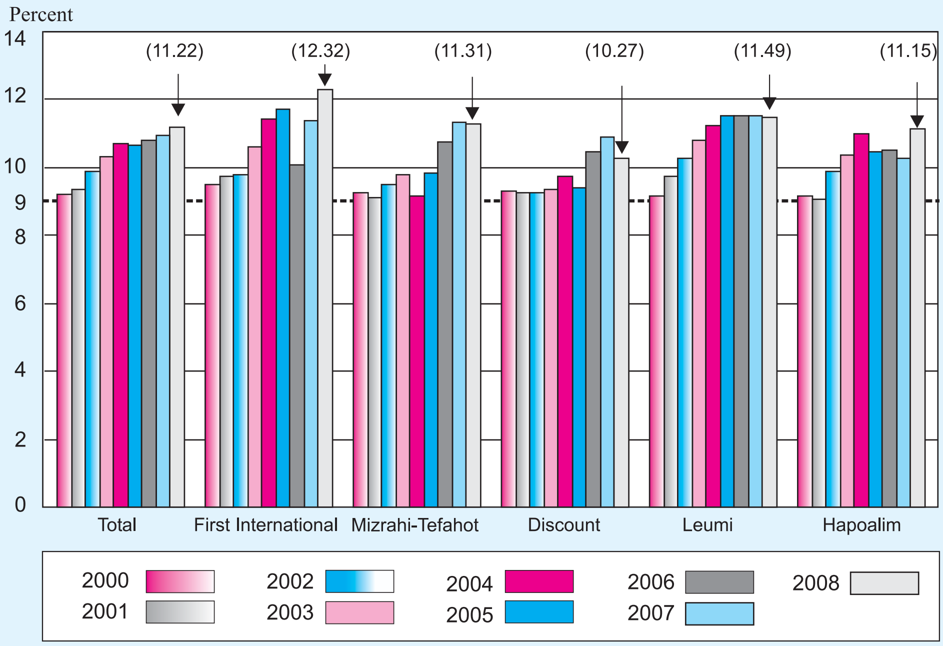
5. CAPITAL ADEQUACY

Capital adequacy is one of the means at the disposal of the Supervisor of Banks for maintaining the stability of the banking corporations and minimizing the risks related to their ongoing activity. Capital adequacy is reflected in the amount of capital held by the banking corporation to absorb unexpected losses which are liable to be caused by the realization of risks to which the bank is exposed.

As part of the process of international convergence in capital measurement and capital adjustment, which is based on the June 2006 recommendations of the Basel Committee, the Supervisor of Banks published a provisional directive on December 31, 2009 entitled A Working Framework for Measuring Capital Adequacy, which reflects his position on each of the subjects in which he has some discretion. The directive emphasizes the link that should exist between the total capital that a banking corporation maintains against its risks and the robustness and efficiency of its risk management processes and internal auditing. It further states that banking corporations are expected to develop and upgrade their system for managing risks, audits and corporate governance, and to maintain an appropriate internal evaluation process that combines all the major components of capital planning and management, in order to maintain an adequate level of capital against those risks. The instructions regarding a working framework for the measurement and adequacy of capital is divided into four sections: the first deals with application and explains how to implement the capital requirements within the banking group; the second (according to the instructions of the first pillar of Basel II—minimum capital requirements) describes the method for calculating the amount of capital required against credit risk, operational risk and market risk; the third outlines the expectations with respect to supervisory review; and the fourth outlines the expectations related to market discipline. In addition, the Supervisor of Banks has published an additional directive on the quarterly reporting of capital measurement and adequacy, which is part of the preparatory process prior to the implementation of the Working Framework for Measuring Capital Adequacy provisional directive. This directive requires banking corporations to report on capital measurement and adequacy to the Supervisor of Banks starting with the report that relates to December 31, 2008. The report format provides information on the process for calculating the allocation of capital (as required by the provisional directive and according to the instructions of the first pillar of Basel II), which is in line with the format of the reporting and capital allocation requirements in the directives of the Proper Conduct of Banking Business currently in force.

As part of the preparations for the implementation of the Basel II recommendations in Israel's banking system and in view of the worsening of the financial crisis during the second half of 2007, the Supervisor of Banks announced at the beginning of 2008 that the banks will be required to meet a target of 12 percent for capital adequacy by the end of 2009, the date on which they will be required to allocate capital according to the new regulations. The banking groups, from their point of view, will adopt the target set by the Supervisor and will establish a schedule for meeting it.

Figure 3.15
Risk-Based Capital Ratio of the Five Major Banking Groups, 2000-08



SOURCE: Published financial statements.

The capital adequacy ratio of the five major banking groups rose in 2008, for the fourth year in succession, and reached a level of 11.22 percent, compared with 10.95 percent in 2007. Two of the banking groups sharply increased their capital ratio this year, Hapoalim to 11.15 percent, and the First International to 12.32 percent; two groups maintained similar levels of capital to those in 2007, Leumi at 11.49 percent and Mizrahi-Tefahot at 11.31 percent; and the Discount group, which had the lowest capital level of the five groups, recorded a drop in its capital ratio to 10.27 percent.

An examination of the trend in the ratio over time clearly shows the continuing increase in capital adequacy among the banking groups. Thus, in 2000, the ratio stood at 9.24 percent, which was only slightly higher than the minimum capital ratio required of the banks in Israel (9 percent) while in 2008 the ratio stood at 11.22 percent, as mentioned above, which means that the banks are now better able to deal with any realization of credit risk or market risk in the future. An international comparison shows that despite the continuing improvement over time, the capital adequacy ratio of the Israeli banking groups is still lower than in most of the countries surveyed. In addition, it is lower by about 0.7 percentage points than the general average and about 0.9 percentage points lower than the average for Israel's reference group (Figure 3.16a). A similar picture is obtained from an examination of the relative excess capital ratio, which takes into

Table 3.13
The Distribution of Capital, and the Capital Ratios in the Five Major Banking Groups, 2007–08

	Hapoalim		Leumi		Discount		Mizrahi–Tefahot		First International		Total	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
	(NIS million)											
Equity[a]	19,720	19,225	19,654	18,917	9,351	9,023	5,557	6,303	5,824	6,009	60,106	59,477
Tier 1 capital[b]	21,152	20,873	18,842	19,307	9,952	10,130	5,497	6,275	5,402	5,681	60,845	62,266
Tier 2 capital[b]	7,819	9,786	9,982	10,281	4,819	5,321	3,817	4,410	2,080	2,816	28,517	32,614
of which: Hybrid capital investment	772	790	522	541	46	45	961	1,172	0	0	2,301	2,548
Tier 3 capital	0	0	0	0	0	0	0	0	0	0	0	0
Investment in shares and subordinated notes of consolidated companies	-45	-34	-87	-70	-1,466	-1,472	-4	-10	-318	-462	-1,920	-2,048
Total capital for risk-weighted capital ratio calculation	28,926	30,625	28,737	29,518	13,305	13,979	9,310	10,675	7,164	8,035	87,442	92,832
	(NIS million)											
Total balance sheet	303,944	307,479	302,484	311,125	168,930	182,459	95,424	114,122	92,617	99,027	963,399	1,014,212
Balance of off-balance-sheet instruments (notional value)	536,702	0	320,494	0	164,747	0	165,444	0	100,176	80,677	1,287,563	80,677
Credit value of off-balance-sheet items	76,543	67,634	49,858	50,963	24,819	24,278	22,435	23,218	11,322	8,864	184,977	174,957
Weighted balance-sheet balances of credit risk	223,951	223,201	209,256	217,747	103,422	117,716	65,334	77,499	54,374	58,434	656,337	694,597
Weighted off-balance-sheet balances of credit risk	52,899	46,330	33,740	33,759	16,469	16,449	14,999	14,343	6,753	5,319	124,860	116,200
Market risk	5,067	5,189	6,531	5,476	2,126	1,916	1,866	2,541	979	1,452	16,569	16,574
Total weighted items	281,917	274,720	249,527	256,982	122,017	136,081	82,199	94,383	62,106	65,205	797,766	827,371
	(percent)											
Capital/balance-sheet ratio	6.49	6.25	6.50	6.08	5.54	4.95	5.82	5.52	6.29	6.07	6.24	5.86
Tier 1 risk-weighted capital ratio[c]	7.50	7.60	7.55	7.51	8.16	7.44	6.69	6.65	8.70	8.71	7.63	7.53
Tier 2 risk-weighted capital ratio[c]	2.77	3.56	4.00	4.00	3.95	3.91	4.64	4.67	3.35	4.32	3.57	3.94
Total risk-weighted capital ratio	10.26	11.15	11.52	11.49	10.90	10.27	11.33	11.31	11.54	12.32	10.96	11.22

[a] Equity and minority interest, according to groups' balance sheets.
[b] In accordance with the minimum capital ratio requirement.
[c] In the calculation of this ratio, investments in shares and in letters of guarantee of companies included on an equity basis are deducted; so the sum of the Tier 1 and the Tier 2 risk-weighted capital ratios may be greater than the overall risk-weighted capital ratio.
SOURCE: Published financial statements.

account differences between countries in the required minimum capital ratio. In this case as well, Israel's ratio is below the general average (about 24.7 percent compared with 44.2 percent) and lower than the average for its reference group (44.5 percent; Figure 3.16b). However, the quality of capital for the Israeli banking groups was high relative to corresponding banks in the US and other advanced economies, which is primarily because most of its Tier 1 capital is equity, while only a small proportion is hybrid capital and intangible assets, which are characteristic of foreign banks.

Total capital for the purpose of calculating the minimum capital ratio rose this year by about NIS 5.4 billion (6.2 percent) to a total of NIS 92.8 billion. The growth in total capital was accompanied this year by a change in the mix of capital required for the calculation of capital adequacy: the ratio of Tier 1 capital[49] (the main component of capital and the most stable) to risk components declined somewhat this year from 7.62 percent to 7.53 percent, while the ratio of Tier 2 capital[50] (which is the less stable component of capital) grew from 3.57 percent to 3.94 percent (Table 3.13 and Figure 3.17).

Total Tier 1 capital grew by a low rate of 2.3 percent; it increased in all the banking groups except for Bank Hapoalim (which recorded a decline of 1.3 percent). In contrast, Tier 2 capital grew by a high rate of about 14.4 percent, which represents an addition of about NIS 4.1 billion and, although all the banking groups showed increases, the rise was primarily the result of the increases for Hapoalim, the First International and Mizrahi-Tefahot. The sharp rise in total Tier 2 is explained by two main factors: "natural increase" which is derived from the growth in the groups' total risk assets,[51] and the commitment of the five banking groups to meet the Supervisor of Banks' capital adequacy target of 12 percent by the end of 2009, in light of the sharp decline in net profit this year to about NIS 205 million.

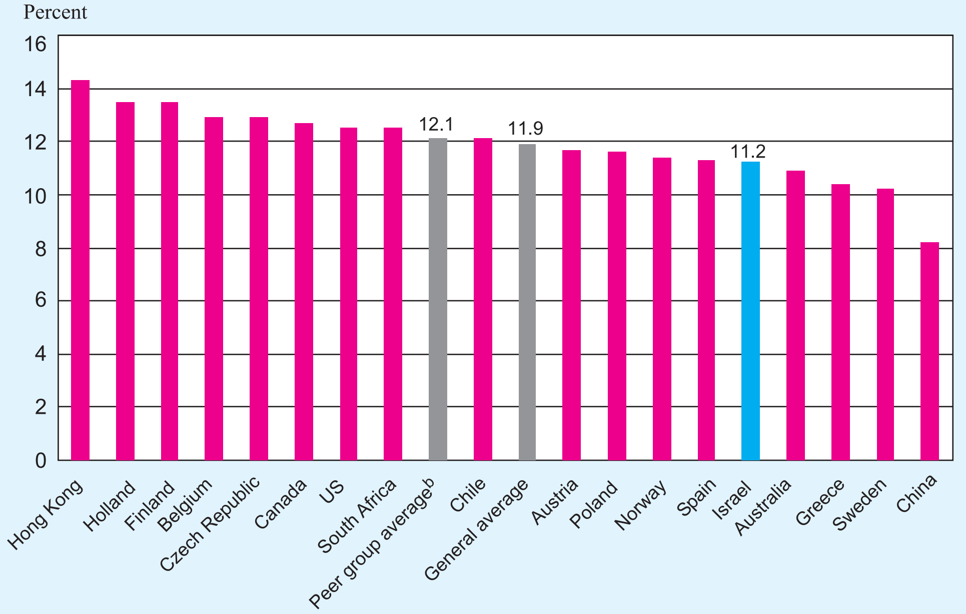
Equity was negatively affected by the losses "of a temporary nature" in the portfolio of securities available for sale. These losses were significant this year (NIS 2.6 billion; Table 3.9) and were imputed to equity. The capital reserve does not affect the capital adequacy ratio, since it is not included in regulatory capital for the calculation of the ratio. The implementation of the Basel II recommendations starting from December

[49] The components of Tier 1 capital are: paid-up share capital (not including accruing or redeemable preferred shares), reserves (as a result of the premium paid on the issues of shares, etc.), surpluses (less losses) and receipts on account of shares and shareholders' rights in the capital of subsidiaries that were consolidated.

[50] Tier 2 capital is divided into "upper Tier 2 capital," which includes accruing or redeemable preferred shares and complex capital instruments and the general loan-loss provision, and "other Tier 2 capital" which includes deferred promissory notes that are convertible into shares of the banking corporation, other deferred promissory notes whose average time to maturity is less than five years from the day they were issued or from the day that their redemption was deferred, and deferred promissory notes that were issued by subsidiaries that were consolidated.

[51] Risk assets grew this year as a result of the increase in balance-sheet credit risk (by about 5.8 percent), despite the decline in the exposure to market risk (by about 3.6 percent) and the off-balance-sheet exposure to credit risk (by 7.2 percent).

Figure 3.16a
Minimum Capital Adequacy Ratios[a] in Selected Banking Systems, 2008



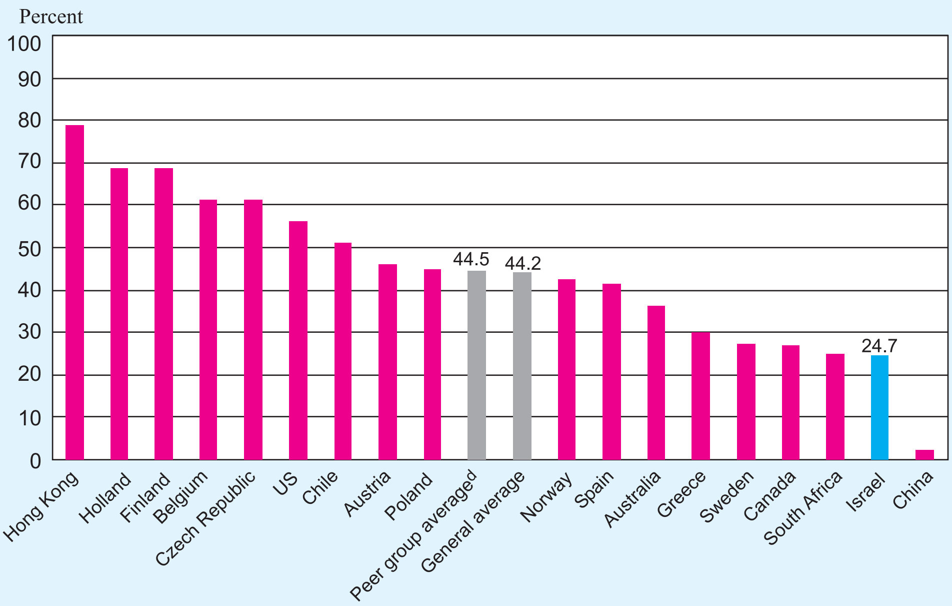
[a] The minimum capital adequacy ratio required in each country is 8 percent , except for Israel, where it is 9 percent, and Canada and South Africa, where it is 10 percent. The data on China, Greece, Holland and Hong Kong relate to the end of the first quarter of 2008; those of Austria, Finland , South Africa and Spain, to the end of the second quarter; those of Australia, Belgium, Canada, the Czech Republic, Norway, Poland and the US, to the end of the third quarter; and those of Chile, Israel and Sweden, to the end of 2008.
[b] Israel's peer group consists of five countries similar to it in terms of size of GDP and banking system: Belgium, Finland, Greece, Norway and South Africa.

SOURCE: Based on IMF data.

31, 2009 will lead to the inclusion of the capital reserve within regulatory capital for the calculation of the capital adequacy ratio. This reserve will directly affect the ratio through Tier 1 capital and indirectly through the total use of subordinated debt, which is limited to 50 percent of total Tier 1 capital and therefore is derived from the level of Tier 1 capital. An international comparison of equity as a share of total assets—one of the indices that has gained increased attention due to the crisis—shows that the ratio for the Israeli banking groups is similar to the average for the surveyed countries and higher by 0.7 percentage points than the average for Israel's reference group (Figure 3.18). In this context, it is important to mention that the banking regulations in Israel make it difficult to take assets off the balance sheet in order to improve capital ratios, in contrast to the situation in other developed countries.

The increase in the proportion of Tier 2 capital in the mix of capital this year was a result of the issue of subordinated debt. The advantages of using this tool over the raising of Tier 1 capital, especially during periods of uncertainty in the capital markets, are clear. The issue of subordinated debt is easier and faster than the issue of ordinary or

Figure 3.16b
Relative Excess Capital Ratios[a] in Selected Banking Systems,[b] 2008[c]



[a] The relative excess capital adequacy ratio is calculated as the percentage deviation of the actual capital ratio from the minimum requred. The minimu Capital adequacy ratio required in each country is 8 percent, except for Israel where the minimum required is 9 percent, and Canada, and South Africa where 10 percent.
[b] In general, values were based on the 10 largest banking goups, exept for: the US, which was based on the 50 largest banking groups, and the Czech Republic, Finland, Israel, New Zealand and South Africa, whose data are based on the five largest banking groups.
[c] The data on China, Greece, Holland and Hong Kong relate to the end of the first quarter of 2008; those of Austria, Finland , South Africa and Spain, to the end of the second quarter; those of Australia, Belgium, Canada, the Czech Republic, Norway, Poland and the US, to the end of the third quarter; and those of Chile, Israel and Sweden, to the end of 2008.
[d] Israel's peer group consists of five countries similar to it in terms of size of GDP and banking system: Belgium, Finland, Greece, Norway and South Africa.

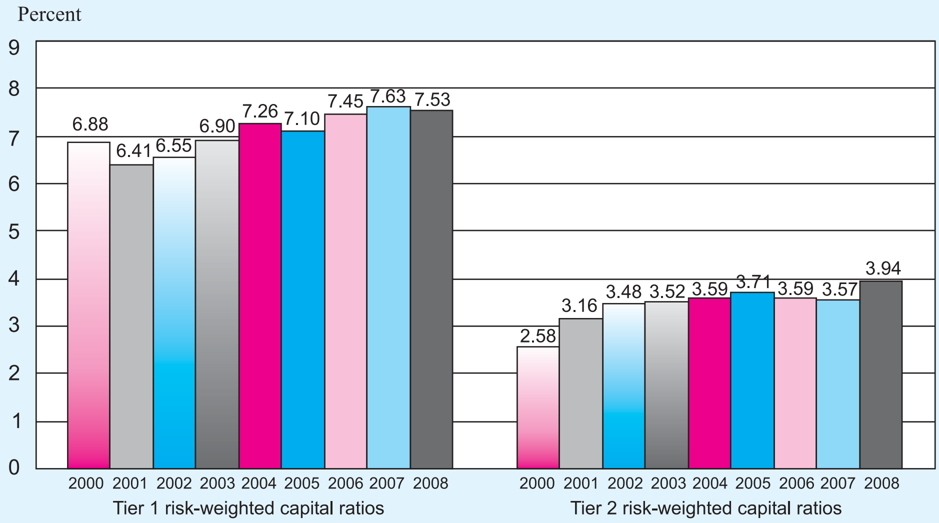
SOURCE: Based on IMF data.

preference shares that has been approved by the Supervisor of Banks. It also provides the banking groups with leverage, increases their balance sheet capital (subject to the limits) and increases their profitability as issuers (for the simple reason that interest expenses on these capital notes are recognized for tax purposes, unlike the payment of dividends on shares, which are taxable). On the other hand, subordinated debt accrues, it is issued for a limited period, it does not participate in the losses of the group on an ongoing basis and there is no certainty regarding its availability and the cost of renewing it, all of which are characteristics that make it a less stable capital instrument than Tier 1 capital. Therefore, the Supervisor of Banks limits the use of subordinated debt for the purpose of calculating the minimum capital ratio to 50 percent of total Tier 1 capital.[52] This restriction limits the ability of the banking groups to use this instrument

[52] Total Tier 1 capital less Tier 1 capital allocated against market risk.

to increase capital adequacy or to increase their assets and indeed an examination of the five banking groups shows that three of them (Bank Leumi, the First International and Bank Mizrahi-Tefahot) have exhausted the possibility of using this instruments in times of crisis and in fact reached the limit set by the Supervisor of Banks. The ratio of subordinated promissory notes to total Tier 1 capital for the five banking groups stood at about 46.7 percent this year, which represents an increase of 5.3 percentage points from the previous year's level (41.4 percent).

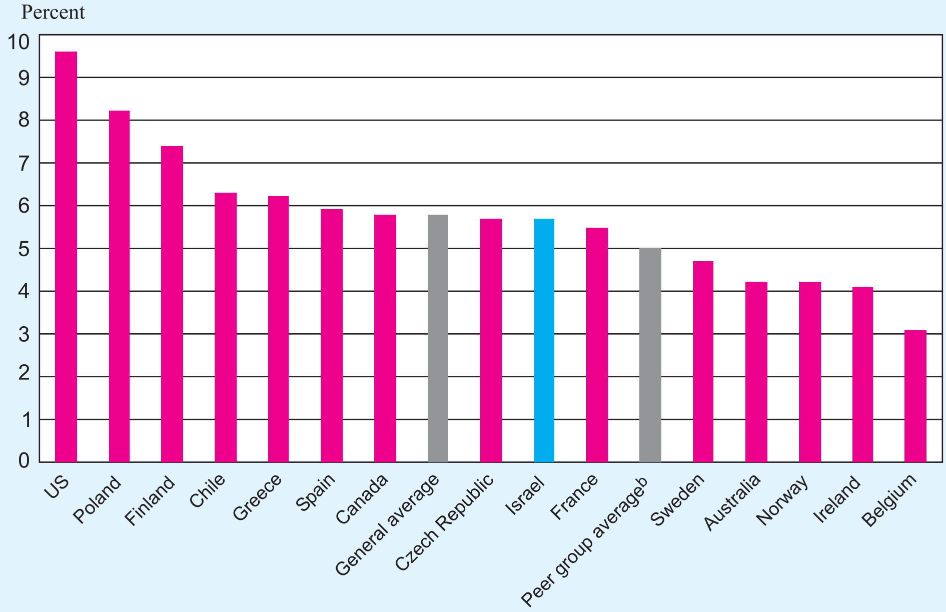
Figure 3.17
Tier 1 and Tier 2 Risk-Weighted Capital Ratios, 2000-08



SOURCE: Published financial statements.

Total weighted risk assets for the calculation of the minimum capital ratio for the five banking groups grew this year by about 3.6 percent. There was growth in all the banking groups except for Bank Hapoalim which recorded a drop of about 2.6 percent, primarily due to the sale of the MBS portfolio held by its New York branch and the sale of Bank Masad and Bank Yahav. The highest growth rate in 2008 was recorded by the Mizrahi-Tefahot and First International groups (14.8 percent and 11.4 percent, respectively; Table 3.13). The growth of risk assets this year was due entirely to the increase in balance-sheet credit risk, which this year accounted for about 84 percent of total risk components. This occurred against the background of a decline in the exposure to off-balance-sheet credit risk, which accounts for about 14 percent of total risk assets, and the exposure of the system to market risks, which account for about 2 percent of total risk components.

Figure 3.18
The Ratio of Equity to Total Assets in Selected Banking Systems, 2008[a]



[a] The data for Greece relate to the end of the 2008:Q1; the data for France, Ireland and Spain relate to the end of 2008:Q2; those of Australia, Belgium, Canada, the Czech Republic, Finland, Poland and the US relate to the end of 2008:Q3; and those of Chile, Israel, Norway and Sweden relate to the end of the year.
[b] The peer group for Israel consists of five countries that are similar to it in terms of their GDP and banking systems: Belgium, Finland, Greece, Ireland, Norway.

SOURCE: Based on IMF data.

6. RISK-ADJUSTED RETURN ON CAPITAL

The risk-adjusted return on capital (RAROC) declined significantly in 2008, reaching the level that prevailed during the 2001–02 recession. Since 2003, the Israeli banking system has enjoyed an increase in profitability, and at the same time the positive developments in the Israeli economy led to an increase in the repayment ability of borrowers and a decline in the risk of the credit portfolio. This year, as a result of the global crisis, these trends were reversed: the profitability of the banks in 2008 was negligible[53] and the risk exposure of the banking system increased.[54] The situation of all the banking groups worsened significantly although there was variation in the effect of the crisis, which was primarily due to differences in the size and mix of their securities portfolios (Table 3.14). An analysis of the performance of the five banking groups over the last business

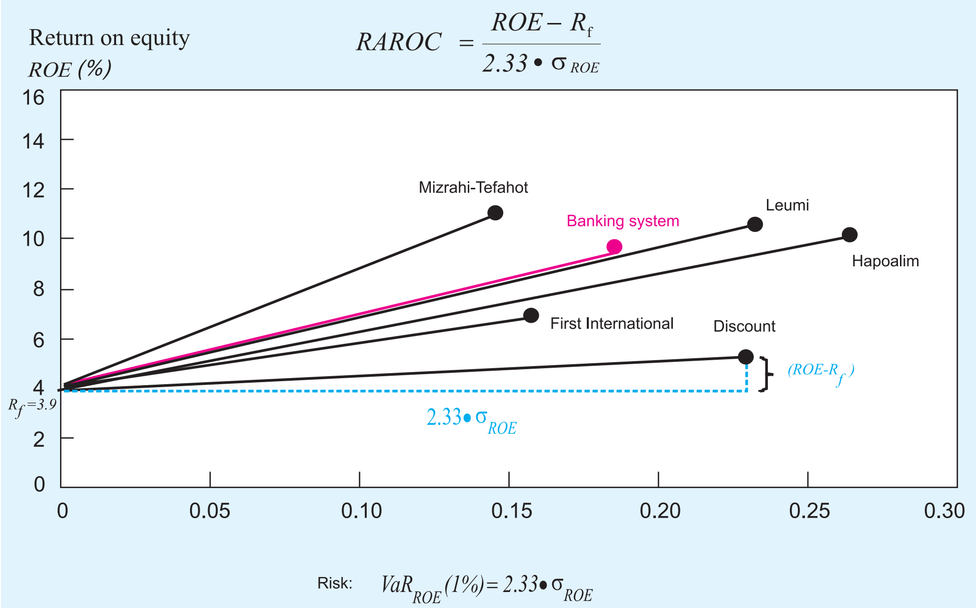
[53] For commentary and further details, see Chapter 2.
[54] For further details, see Section 1 of this chapter.

Table 3.14
Risk Adjusted Return on Capital (RAROC), the Variance-Covariance Approach,[a] by Banking Group, 2002–08

	R_f	Hapoalim	Leumi	Discount	Mizrahi –Tefahot	First Internationalc	Total
2002	4.82	-0.17	-0.10	-0.40	0.34	-0.53	-0.22
2003	4.89	0.40	0.21	-0.13	0.45	-0.02	0.28
2004	3.76	0.81	0.72	0.33	0.59	0.24	0.81
2005	2.98	1.01	0.84	0.22	0.84	0.65	0.96
2006	3.70	0.89	1.00	0.36	0.75	0.56	1.00
2007	3.19	0.60	0.83	0.48	0.90	0.73	0.83
2008	2.93	-0.27	-0.10	-0.01	0.50	0.00	-0.13

[a] *RAROC* is calculated by the variance-covariance approach: $RAROC_i=(ROE_i-R_f)/(2.33*\sigma_{ROE_i})$
where
ROE = return on equity in the last year (profit at end of year to investment at beginning of the year).
R_f = risk-free interest: yield to maturity on 5-year CPI-indexed government bonds (Galil).
σ_{ROE} = standard deviation of *ROE*, calculated from quarterly observations *ROE*s over seven years.
2.33 = the value of Z at the 99% significance level.
SOURCE: Published financial statements.

Figure 3.19
Risk-Adjusted Return on Capital during the last Business Cycle, Comparison of Five Major Banking Groups and Banking System, Average 2001-08



R_f - Annual average risk-free interest rate in the years 200108, based on the yield to maturity on *Galil* 5-year CPI-indexed bonds.
ROE - Average annual return in equity in the years 200108.
σ_{ROE} - Standard deviation of based on the ROE in every quarter in the period 2001-08 (i.e., the calculation is carried out on 32 observations).

SOURCE: Based on published financial statements.

cycle (2001–8) illustrates the differences, sometimes large, in performance between the five groups (Figure 3.19).

We did not possess good data this year on the division according to activity and over time and therefore we have reported only on the total activity of the banking groups for each of the years 2002-08.

Box 3.2
The financial crisis

The financial crisis, which began in the summer of 2007 in the sub-prime mortgage market in the US, deteriorated during 2008 and spread to other countries and sectors. The crisis became even more severe in mid-September 2008 with the collapse of several large financial institutions. This forced governments to adopt a series of costly and extreme measures in an attempt to stabilize the economic system. First and foremost of these measures was the injection of liquidity into the markets and the provision of capital directly to financial institutions in order to prevent their collapse.

The global financial crisis

In the summer of 2007, a liquidity crisis, which subsequently led to a credit shortage, began to develop in the global credit market. During the years preceding the crisis, a market for mortgages had developed in which the quality of the borrowers was lower than had previously been the norm ("sub-prime borrowers"). The boom in the real estate market, the high rates of growth and the low rates of interest led to the rapid expansion of this market. These mortgages were financed through pooling and securitization. The gradual and continuous increase in US interest rates and the fall in real estate prices in mid-2006 made it difficult for borrowers to meet their commitments and this trend only intensified during 2007. Numerous financial entities in the US and world wide had invested a significant proportion of their assets in the real estate market and in mortgage-backed securities, and the sharp drop in the value of these assets led to an erosion of their balance sheets and restricted their ability to raise capital and to recycle securities that had reached maturity.[1]

In March 2008, the authorities in the US provided assistance to the Bear Stearns investment bank in order to prevent it from going bankrupt, and following that the

[1] For further details, see the Annual Survey 2007, p. 115.

Fed was forced to rescue the Fannie Mae and Freddie Mac mortgage agencies from collapse. Although this step was meant to broadcast calm and a message that the authorities would not allow the collapse of large financial institutions, it was not successful in eliminating the market's concerns, and the inter-bank credit markets continued to demonstrate nervousness and a lack of confidence. In September 2008, the crisis entered a critical stage following a series of events in the US and European financial markets.

One of the most dramatic events—and there are those who say the most significant—was the collapse of Lehman Brothers, the fourth largest investment bank in the US, following the refusal of the authorities to provide it with assistance. Its collapse put an end to the independent existence of investment houses in the US. The three largest investment houses in the US, which in the past were not regulated by the Fed, became commercial banks. Some investment houses merged with commercial banks while others received permission to become commercial banks themselves and as a result the Fed would now have the authority to regulate them. At a later stage, AIG, one of the largest insurance companies in the US and world wide, which had exposure to complex financial instruments, almost collapsed and the US government took the unprecedented step of nationalizing it.

These dramatic events led to a substantial increase in the assessment of risk in the markets, which led to a widespread liquidity crisis. The markets reacted quickly and aggressively. Thus, most of the investment funds suffered massive withdrawals and some were even closed. These withdrawals forced them to liquefy assets and to accumulate capital and their ability to provide any financing at all to the business sector was put into doubt. Emerging economies, which until then had been relatively isolated from the crisis, were also now affected by the deterioration in the financial situation.

The reaction of the authorities to the crisis

These events, which are viewed as the worst global economic crisis since 1929, led to a reversal in the policy of intervention by government authorities in the financial markets and to an unprecedented reaction from the US government. The reaction of the authorities in the US and other developed economies during the initial stages of the crisis involved the injection of liquidity into the markets and direct intervention in order to rescue financial entities from collapse.

As part of the effort to inject liquidity into the markets, the Chairman of the Fed and the heads of other central banks around the world decided in October 2008 to lower interest rates in coordination with one another. The goal of this move, in addition to ending the stagnation in the credit markets, was to moderate the steep decline in prices on world stock exchanges and to assist small and medium-sized business (SMEs). In addition, the Fed provided massive financing to financial companies and institutions in order to ease their liquidity problems.

The direct intervention to rescue financial entities in difficulty included nationalization in order to prevent their collapse. These steps were not compatible with the economic approach that had been dominant (especially in the US) prior to the crisis, which called for only limited government intervention, and the danger of moral hazard that these new policies involved. (Thus, if investors know that the government will come to the aid of any financial entity that finds itself in difficulty, their incentive to manage risks wisely will diminish and there will be a tendency to increase risk.)

Following the intervention by the government, a certain amount of calm returned to the financial markets, although the level of risk remained high and most of the indices and interest rates did not return to their pre-crisis levels. Credit available to businesses remained limited and the terms of credit to companies and private consumers have worsened despite the lowering of interest rates by the world's central banks. The crisis, which began in the US financial system and spread to the rest of the world, spilled over into the real economy during the second half of 2008 and world growth slowed considerably.

Effects of the crisis on Israel

Although the exposure of the Israeli economy to the financial instruments that led to the crisis was limited, the global financial crisis has also affected the financial system in Israel. Most of this effect worked through globalization, which creates a high degree of correlation between the behavior of capital markets in Israel and that of world markets. As a result of the financial crisis, the positive correlation between share indices in Israel and those in the developed countries increased even further. Thus, the Israeli capital market was influenced by the major declines and increased volatility that characterized the capital markets world wide. The stock exchange fell sharply in September and the trend intensified during October and November. The sharp decline in prices also characterized the market for corporate bonds. The fear among investors of problems in the redemption of bonds and the uncertainty in the financial markets led to a preference for solid investment channels and a wave of withdrawals from bond funds. During the second half of the year, the financial crisis spilled over into real activity. The economy's rate of growth slowed, following several years of prosperity, and during the last quarter of the year the economy entered a recession, with negative GDP growth of 0.5 percent, annual rate.

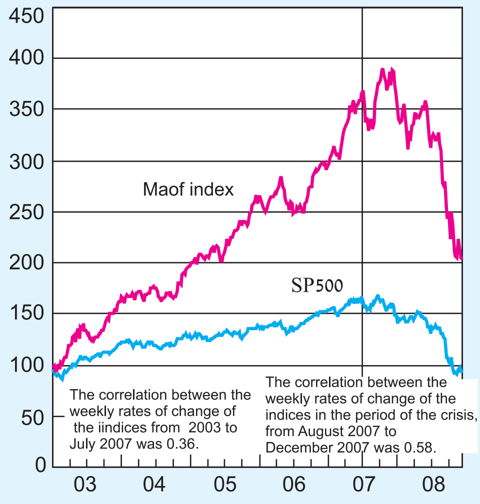
The effects of the crisis on the banking system have been, and still are, substantial; however, the banks in Israel, relative to leading banks around the world, remain stable. Indeed, their situation remains positive due to their conservative approach, comprehensive regulation and tight supervision. In 2007, the effect of the crisis on the banking system was primarily reflected in losses to the securities portfolio (in mortgage-backed and asset-backed securities). The worsening of the crisis in September 2008 was accompanied by sharp declines in the bond and share markets. These declines led to heavy losses in the banks' securities portfolio due to the securities of foreign banks and financial institutions, which until then had not been perceived as risky, as well as losses due to investments in corporate bonds and holdings in nonfinancial companies. During the second half of the year, and particularly during the last quarter, the deterioration in firms' situation was evident also in banks' annual loan-loss provision. This followed five years of a downward trend in the share of loan-loss provision in total credit to the public.

Steps taken in Israel as a result of the crisis

As the crisis worsened, the Supervisor of Banks instructed the banks to increase the frequency of some of the reports that they submit and to provide a number of new reports in areas that are expected to be most affected by the crisis. The banks were required to increase the frequency of reporting to the Supervisor of Banks regarding their exposure to financial institutions abroad to bi-weekly. In addition, the banks are now required to map out and evaluate their exposure to local entities which are exposed either directly or indirectly to the crisis and to report on the exposure of their large customers to non-bank entities. In addition, the banks are required to report on liquidity risk using an updated format. (For further detail, see Chapter 4.)

Additional measures taken by the government and the Bank of Israel include the following: the provision of government guarantees in the amount of NIS 6 billion for subordinated debt to be issued by the banks; the creation of investment funds ("leverage funds") to expand

Share Price Indices in Israel and the US, 2003-08



SOURCE: Based on data from the Bank of Israel Information and Statistics Department.

the supply of non-bank credit by NIS 5 billion; the appointment of credit officers who will assist companies in dealing with the difficulties of rescheduling tradable bonds issued by them; and tax breaks to encourage foreign investment in the Israeli economy and the inflow of funds from foreign companies controlled by Israeli residents into Israel. The government has created a defined safety net for pension savings, with the goal of ensuring a basic pension for savers close to retirement whose pension savings have a significant exposure to the capital market. In addition, the Bank of Israel has initiated a series of measures using monetary instruments, with the goal of improving the liquidity situation in the economy and reducing costs for the business sector.

7. THE ROBUSTNESS OF THE BANKING SYSTEM ACCORDING TO THE ROBUSTNESS INDEX[55,56]

The financial system demonstrated a high level of robustness in 2008 in the face of the global financial crisis, which has affected the financial stability of banking groups world wide and even led to the bankruptcy of some. Although the effect of the financial crisis was evident in the rise of the Robustness Index during the second half of the year, which followed the continuous improvement in the index during the last five years (starting in 2003 with the exit from the recession), the level of the index remained low relative to previous recessions (Table 3.15 and Figure 3.20). The effect of the financial crisis increased the differences in robustness between the various banks. This follows a period of prosperity in which these differences narrowed and it appeared that the banking system in Israel was becoming more homogeneous, as indicated by the decrease in the ratio of the range of scores (from the highest to the lowest) and the weighted average of robustness (Figure 3.20). The index is based on six main categories: capital adequacy, quality of assets, quality of management,[57] profits and profitability, the exposure to liquidity risk and the exposure to market risk. Each of these categories is also divided

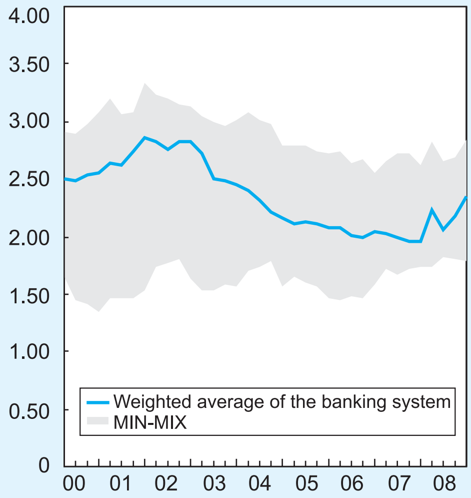
[55] This index was developed and implemented by the Banking Supervision Department. For a detailed explanation of the index and its components, see Box 1.1 of the Annual Survey 2003, p. 28–29 and Y. Fishman and D. Ruthenberg, "Robustness – an Index for the Evaluation of the Stability and Resilience of the Banks in Israel," Issues in Banking 17, p. 61–93.

[56] In this review, a number of changes were made in the calculation of the Robustness Index: First, the index was calculated on a quarterly basis, rather than an annual one, which had been the norm until now. Second, the principle that a bank whose financial ratios deviate from those of other banks is to be punished has been abandoned and therefore the scale of the index now ranges from 1 (the best score) to 4 (the worst), rather than from 1 to 5 as before. In addition, there have been changes in some of the financial ratios as part of an effort to improve the index.

[57] Quality of management is based primarily on the subjective evaluation of professionals within the Bank Supervision Department.

into sub-categories, which are made up of various financial ratios. It appears that the worsening of the index in 2008 was reflected in all categories except for capital adequacy. The main deterioration was concentrated in two categories: profits and profitability and quality of assets. The significant deterioration in profit and profitability was a result of the banks' reduced profits this year. In some of the banking groups (particularly the largest two) the return on capital[58] was close to zero. The quality of assets was also affected, following a prolonged period of improvement during the boom years. This was due to the deterioration in the quality of credit,[59] which was the result of the impaired repayment ability of borrowers affected by the global crisis.

Figure 3.20
The Overall Robustness Index of Israel's Banking Institutions, 2000-08
(weighted average of the banking system)



SOURCE: Based on reports to the Supervisor of Banks and published financial statements.

Table 3.15
The Robustness Index of Banking Institutions in Israel; Weighted Average for the Entire System, 2000-08

2000	2001	2002	2003	2004	2005	2006	2007	2008
2.6	2.9	2.8	2.4	2.2	2.1	2.0	1.9	2.3

[58] For further details, see Chapter 2.
[59] For further details, see Section 1 in this chapter.

Table A.3.1
Distribution of Credit to the Public[a] by Single Borrower Indebtedness, the Five Major Banking Groups,[b] 2007-08

	Outstanding credit to public, and off-balance-sheet credit risk		Number of borrowers		Average outstanding credit		Cumulative proportion of outstanding credit		Cumulative proportion of borrowers	
Credit per borrower	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
(NIS thousand)	(NIS million)				(NIS thousand)		(%)		(%)	
Up to 10	15,528	13,256	2,711,730	3,218,239	6	4	100.0	100.0	100.00	100.00
10 to 20	11,249	15,278	688,935	945,315	16	16	98.5	98.8	55.25	55.35
20 to 40	21,626	28,390	734,943	948,649	29	30	97.5	97.4	43.88	42.24
40 to 80	41,375	48,329	735,178	849,319	56	57	95.4	94.9	31.75	29.08
80 to 150	60,047	57,507	571,383	537,357	105	107	91.5	90.6	19.62	17.30
150 to 300	67,995	79,449	328,684	392,812	207	202	85.8	85.4	10.19	9.85
300 to 600	74,875	81,049	181,489	195,685	413	414	79.3	78.3	4.77	4.40
600 to 1,200	48,716	58,731	60,305	73,007	808	804	72.2	71.0	1.77	1.69
1,200 to 2,000	24,465	27,673	16,155	18,305	1,514	1,512	67.6	65.7	0.77	0.68
2,000 to 4,000	32,177	33,724	11,529	12,055	2,791	2,798	65.3	63.2	0.50	0.43
4,000 to 8,000	38,464	39,034	6,825	6,983	5,636	5,590	62.2	60.2	0.31	0.26
8,000 to 20,000	71,603	72,578	5,673	5,745	12,622	12,633	58.6	56.7	0.20	0.16
20,000 to 40,000	76,731	72,964	2,762	2,603	27,781	28,031	51.8	50.2	0.11	0.08
40,000 to 200,000	233,148	222,725	2,894	2,804	80,563	79,431	44.5	43.6	0.06	0.04
200,000 to 400,000	97,657	91,077	338	331	288,926	275,157	22.4	23.6	0.01	0.00
400,000 to 800,000	72,350	86,050	130	155	556,538	555,161	13.2	15.4	0.00	0.00
800,000 to 1,200,000	23,084	29,968	25	31	923,360	966,710	6.3	7.7	0.00	0.00
1,200,000 to 1,600,000	20,202	16,891	15	13	1,346,800	1,299,308	4.1	5.0	0.00	0.00
1,600,000 to 2,000,000	12,801	18,116	7	10	1,828,714	1,811,600	2.2	3.5	0.00	0.00
2,000,000 to 2,400,000	4,183	4,366	2	2	2,091,500	2,183,000	1.0	1.9	0.00	0.00
2,400,000 to 2,800,000	2,794	5,258	1	2	2,794,000	2,629,000	0.6	1.5	0.00	0.00
2,800,000 to 3,200,000	0	2,857	0	1	0	2,857,000	0.3	1.0	0.00	0.00
Higher than 3,200,000	3,295	8,133	1	2	3,295,000	4,066,500	0.3	0.7	0.00	0.00
Total	**1,054,365**	**1,113,403**	**6,059,004**	**7,209,425**	**174**	**154**	**100.00**	**100.00**	**100.00**	**100.00**

[a] Includes the balance of credit to the public and credit-risk equivalent of off-balance-sheet financial instruments, calculated according to the definitions used for calculating the single borrower limitation. Excludes the public's investment in bonds.
[b] The data in the "up to 8,000 shekels" category are the summation of the figures for each consolidated company (consolidation on the basis of layers) in the credit categories, while for over 8,000 shekels, the credit data and the number of borrowers were
SOURCE: Published financial statements.