Chapter 1

Israel's Banking System: A Long-Term View

Israel's banking system underwent a very difficult year in 2002, even more difficult than 2001. Taking a long-term view, these two years were exceptional in many aspects: *return on equity (*ROE*)* in the five major banking groups fell to a low single-digit average of 4.4 percent—comparable only to the level at the end of the 1980s and the beginning of the 1990s (Figure 1.2)—with a marked rise in the variance between the different groups. The decline of ROE in 2002 was the outcome of the combination of a halt in the increase in bank credit (which rose by 1.6 percent after increasing at a two-digit annual rate throughout most of the 1990s), a stable total net interest margin (NIM) (2.3 percent in 2002) and *a significant rise in credit risks in 2001 and 2002*. The increased risks were reflected by annual loan-loss provisions at unprecedented levels of about NIS 4.6 billion in 2001 and NIS 7.3 billion in 2002 (compared to about NIS 2 billion in 1999 and 2000). The ratio of annual loan-loss provision to outstanding credit more than doubled in the last two years, and reached 1.32 percent in 2002. The ratio of problem loans to equity in the banking groups has also risen sharply, from an average of 0.8 in second half of the 1990s to 1.3 in 2002, and so too has the share of problem loans in total bank credit, from 7 percent in 2000 to about 10 percent in 2002 (Table 1.3).

In April 2002 an operational risk was realized that resulted in the collapse of a commercial bank, the first since the bankruptcy of the North American Bank in 1987: a case of embezzlement was discovered in the Trade Bank amounting to more than the bank's equity. In the course of 2002 the situation of the Industrial Development Bank of Israel deteriorated due to the realization of liquidity risk, against the background of problems in its management of credit risk, the realization of its reputation risk, and the sensitivity of its depositors following the collapse of the Trade Bank. In the light of these developments, the government (the bank's owner) decided to introduce steps that would lead to the ending of the bank's activity.

The combination of the fall in ROE and the rise in risks led to a significant reduction in *risk-adjusted return on capital* (RAROC) in the banking system, and this was reflected by the erosion of more than half of this return in the last two years in most of the banking groups. The leading credit rating companies Moody's, Fitch, and S&P also assessed that the performance of the large banks had greatly deteriorated in this period and was not expected to improve in the near future, and they therefore reduced their ratings. Operators in the capital market were also of the opinion that performance had declined in the banking system and that no improvement was expected in the near future. These assessments found expression in sharp falls in the prices of shares of most banks, so that the market value of banks at the end of 2002 was only 70 percent of their book value. This decline in market value to book value (MV/BV) of banks was an extension of the trend that had started at the beginning of 2000.

The dismal picture that emerges regarding competition and risks, and the indices that combine them, also encompasses the two other tests normally applied in analyses of the robustness and market functioning of a banking system, i.e., competition and operating efficiency.

With regard to *competition*, particularly in the area of credit to the public, the situation has been deteriorating for some years, as can be seen from the rise in several concentration indices since the mid-1990s. This is mainly due to the fact that in the last few years the large banks in Israel gave large amounts of credit to large borrowers who in some cases proved to be problematic. In the industrialized countries there has been a general increase in concentration, but this was due to a rise in mergers and acquisitions (M&A), that has at least till now passed over Israel's banking system (except for a few mergers of small banks with large ones). Regarding competition it is important to emphasize the "market power" exercised by the banks over households is generally greater than that which they yield over businesses.

As far as *operating efficiency* is concerned, although some of the banks did introduce measures in the last two years intended to reduce operating costs—wage cuts, encouraging early retirement, laying off staff, closure of redundant branches—but due to the high expenses involved in early retirements, there is no evidence yet of significant improvement in the indices of operating efficiency normally used in banking, such as the efficiency ratio or the coverage ratio, which have not changed significantly in the last few years.

Many of the negative developments described above were affected very strongly by the deep economic recession that has persisted for some years (with negative GDP growth rates and a marked rise in unemployment), by the escalation of security incidents, and the prevailing political and economic

uncertainty. It appears that the capital market crises in Israel and throughout the world (for example the collapse of the Nasdaq in the US and its failure to recover) had a negative effect on the banks' performance in 2001 and 2002.

Macroeconomic developments also affected the activity and performance of principal industries, headed by construction and real estate, tourism and hotel services, high-tech and communications, and recently also the household sector, and this also had a significant adverse effect on the banks' performance. This is reflected in the sharp rise in the credit/output ratio in these industries and in the rates of loan-loss provision for credit extended to them.

Against the background of higher credit risk and lower profitability, the banks improved their capital adequacy slightly in 2002: the risk-weighted capital ratio of the five major banking groups rose by half a percentage point from 9.4 percent to 9.9 percent. Nevertheless, the capital ratios in Israel remain about 1–2 percentage points lower than those in most other banking systems throughout the world. Against the background of the persistent recession and the continued deterioration expected in businesses' and households' repayment ability, it would be advisable for banks to continue to improve their capital ratios, to be better able to deal with the possible future realization of risks.

1. FINANCIAL RESULTS, RISKS AND CAPITAL ADEQUACY

a. Financial results

The year 2002 was a very difficult year for Israel's banking system, as the negative developments evident in 2001 persisted. *Total profit* of the five major banking groups were halved, plunging from about NIS 2.3 billion in 2001 to some NIS 1.1 billion in 2002.

The drop in profits reflects a further sharp decline in return on equity (ROE) from 5.8 percent in 2001 to only 2.8 percent in 2002 (Table 1.2 and Figure 1.2). In 2001 and 2002 ROE was significantly lower than in most of the 1990s, and was similar only to the years 1989–91 (3.6 percent). Once again there was marked variation between the ROE of the different banking groups: 4.1 percent in Leumi; 2.4 percent in Hapoalim; 0.2 percent in Discount; 1.4 percent in the First International; and 8.6 percent in Mizrahi (Table 3.2).

Loan-loss provisions, especially for the business sector, were the main cause of the notable reduction in the profit of the banking groups in 2001 and 2002. Total loan-loss provisions amounted to NIS 7.3 billion, up from NIS 4.6 billion in 2001 (Table 3.2). They were affected by the continued deep economic recession and the escalation of security incidents that had a major influence on some of the main industries such as construction and real estate, hotels and tourism. The worldwide slowdown in economic activity also adversely affected Israel's economy, principally its export-oriented and high-tech industries, communications and computer services and the advanced industries.

Table 1.1
Activity and Net Interest Margins in the Commercial Banks, Mortgage Banks and Overseas Offices, 1992-2002

(change from previous year, percent)

	2002[a]	1995	1996	1997	1998	1999	2000	2001	2002
1. Commercial banks									
Total assets	694,925	3.0	7.3	5.3	10.0	1.3	6.0	7.3	1.2
Total credit to the public	429,962	6.3	7.0	7.4	13.1	12.6	12.5	11.2	1.2
Total deposits in the Bank of Israel	50,372	–47.5	79.4	166.4	6.2	20.8	2.5	–3.9	25.6
Total deposits of the public	581,411	11.7	10.8	78.5	0.0	12.3	7.2	6.4	–2.1
Total net interest margin (%)	1.9	2.3	2.3	2.4	2.3	1.9	1.9	2.0	1.9
2. Mortgage banks' total assets									
Total assets	117,979	25.5	18.2	15.8	9.0	9.6	8.3	5.2	3.1
Total credit to the public	116.139	28.7	20.6	17.2	10.0	9.4	8.5	4.6	3.7
Total deposits	106,577	30.7	21.0	17.6	10.0	10.5	8.1	5.8	4.5
Total net interest margins (%)	1.0	1.2	1.1	1.2	1.0	1.0	1.0	1.0	1.0
3. Overseas offices									
Total assets	142,735	6.4	23.1	–7.7	37.5	14.0	19.1	20.8	13.6
Total credit to the public	52,329	3.7	19.4	–0.9	41.0	5.3	15.0	12.0	7.1
Total deposits	120,496	6.4	22.7	–5.8	34.0	13.8	17.9	17.3	10.3
Total net interest margins (%)	1.5	2.3	2.2	2.1	2.1	1.7	1.7	1.7	1.5
4. The five major banking groups									
Total assets	792,954	3.6	6.2	6.1	10.0	11.7	8.2	6.8	–0.3
Total assets incl. credit equivalent of off-balance-sheet items	916,050	4.7	6.8	7.8	14.0	10.3	8.5	7.6	–0.4
Total credit to the public	552,174	12.2	8.1	9.9	14.5	12.1	12.5	9.8	1.6
Total deposits of the public	663,546	9.9	8.9	7.4	11.1	13.2	9.2	6.7	–0.5
Value added	16,542	3.8	5.8	9.1	–1.2	13.0	5.8	–7.7	–11.3
Total net interest margin (%)	2.3	2.6	2.5	2.5	2.2	2.4	2.3	2.3	2.3

[a] NIS million, end-year balance at December 2002 prices.

SOURCE: Published financial statements and Supervision of Banks Research Unit.

There were no major changes in the other items in the profit and loss accounts. The stability of net interest income before loan-loss provision and of non-interest income was noteworthy, and occurred despite Israel's ongoing recession.

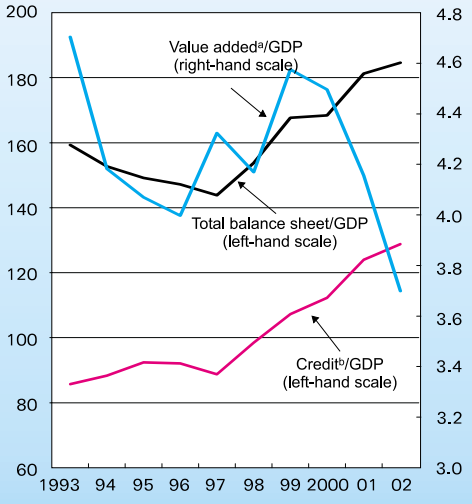
The reasons for the very modest rise in interest income (before loan-loss provision) in 2002 (0.2 percent) were the halt to the expansion of financial activity (the quantitative effect) in nearly all the components of the banking groups (mainly in the commercial banks and the mortgage banks), and the stability of the total net interest margin (the price effect) (Table 1.1). The total net interest margin of the five major banking groups was 2.3 percent at the end of 2002, slightly higher than the average in the group of countries in Israel's peer group (Table 3.2). It seems that the stability of the margin in 2002 derived from the combination of demand and supply factors: demand for bank credit went down because of the income effect—the deepening of the recession expressed by a 1 percent fall in GDP, by a 3.6 percent drop in the composite state-of-the-economy index, by a 3 percent reduction in per capital GDP and by a rise in the rate of unemployment to 10 percent. At the same time the supply of credit contracted, for several reasons:

1. The supply of sources available to the banks—derived mainly from deposits of the public, which declined by about half a percent—contracted.
2. The deterioration in the quality of credit, especially in 2001 and 2002, prompted banks' managements to adopt prudent policies in the management of credit risks; this was expressed by the application of stricter criteria in granting credit.
3. The persistent decline in the capital surplus (i.e., capital above that required by the minimum capital ratio of 9 percent) in almost all the banking groups during more than a decade reduces the potential to increase credit to the public. These surpluses fell to their lowest level, 0.3 percentage points, at the end of 2001, and then rose again to 0.9 percentage points at the end of 2002. The decision by banks' managements to improve their capital ratios in itself reduces the supply of credit to the public.
4. The high real rates of interest prevailing in 2002 (about 7 percent) prompted banks' managements to adopt a policy of credit rationing, which is also intended to filter out risky borrowers—those willing to invest in risky projects when real interest rates are high.

The combination of the fall in the supply of credit described above with that in the demand for credit, which was affected as stated by the reduced income effect, resulted in a halt to the growth of total banking activity. This was reflected by a 0.3 percent reduction in the assets of the five major banking groups and an exceptionally steep drop of 11.3 percent in the banking system's value added, which is generally accepted as an estimate of the industry's output (Table 1.1 and Figure 1.1).

The halt in the growth of banking activity against the background of the economic slowdown resulted in a continuation of the rise in the credit/GDP ratio and the total assets/GDP ratio, but also in a sharp fall in the value added/GDP ratio, from about 4.1 percent in 2001 to 3.7 percent in 2002, in the wake of falls in this ratio in 1999 and 2000 (Figure 1.1).

Figure 1.1
Indices of Banking Activity Relative to GDP, 1993–2002



[a] Value added is the sum of net ordinary before-tax income, salaries and related expenses, general expenses, maintenance and depreciation on buildings and equipment.
[b] Credit to the public, excluding guarantees.

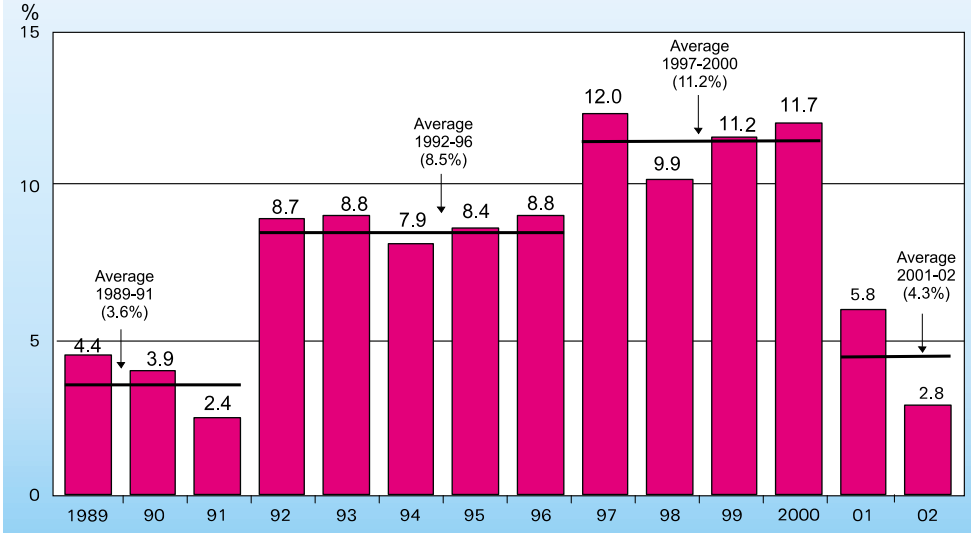
SOURCE: Returns to Supervisor of Banks and Central Bureau of Statistics.

The stability of *non-interest income* in 2002 was notable (Table 3.2); it was the outcome of conflicting forces that offset each other. On the one hand, the rise of some 3 percent in the income from operating fees and commissions, mainly fees for payment system services and for securities activity, acted to increase this income. On the other hand, the losses in most of the banking groups on their investments in shares and the lack of profit from the severance pay funds, due to the relatively low yields on bonds held by the funds to cover their liabilities, served to reduce the banks' non-interest income.

Stability was also the main characteristic of *operating expenses* in 2002. It derived from the cost-saving measures and streamlining introduced by the banking groups that resulted from the accelerated erosion of profitability in the banking system. Stability of operating and other expenses was mainly due to stability in employee-related expenses, that constituted about 70 percent of total operating expenses. This remained stable because of two developments that counterbalanced each other: the reduction of some 6 percent in direct salary expenses—deriving in part from the reduction in the bonuses awarded to employees in 2002, the cutback in staffing levels and the change in the staffing mix expressed by the rise in the proportion of employees at the lower end of the wages scale—acted to reduce operating expenses. The erosion of the real wage, resulting from inflation that turned out to be faster than the expected rate on which wage agreements had been based, also served to lower operating expenses. Acting in the opposite direction was the sharp 12 percent rise in salary-related expenses; this occurred mainly in the category of expenses on voluntary early retirement, which rose by NIS 520 million in 2002, mostly in the largest two banks, in a move intended to make the system more efficient and reduce future labor-related expenses. If the non-recurring expenses on early retirement are deducted, the remaining operating expenses showed a reduction of about 5 percent. As banking output (using any of its various definitions) did not change, and as operating expenses also stayed stable, the expenses per unit of output did not change in 2002 (Table 1.2).

Due to the insignificant changes in non-interest income and operating expenses, the *coverage ratio*, defined as the ratio of non-interest income to total operating expenses,

Figure 1.2
After-Tax Return on Equity, the Five Major Banking Groups, 1989–2002



SOURCE: Published financial statements.

hardly changed between 2001 (55.7 percent) and 2002 (56.5 percent). These figures are lower than the levels in the banking systems of the industrialized countries (69 percent), and also lower than in the countries in Israel's peer group (61 percent) (Table 3.3).

The *efficiency ratio*, defined as total (interest and non-interest) income, also remained stable in 2002. This ratio indicates a bank's ability to channel the available production inputs so as to maximize the income derived from the process of financial intermediation. A high ratio indicates efficient exploitation of the production inputs.

In 2002, with the halt in the growth of both interest and non-interest income and the stability of operating expenses, the efficiency ratio was stable at 1.55 compared with 1.53 in 2001 (Table 1.2). The norm for the efficiency ratio in industrialized countries is not very different from that in Israel's banking system; in 2001 it was 1.57, and in the countries in Israel's peer group, 1.61 (Table 3.3).

In addition to these efficiency indices, operating efficiency derived from changes in banks' size (*returns to scale*), and efficiency derived from the cut in a bank's operating expenses without a change in its size (output), known as *X-Efficiency*, are examined in Chapter 3. The X-Efficiency ratio generally relates to the quality of a bank's management, as it expresses management's ability to make strategic decisions that can reduce production expenses without harming output. Savings in production expenses are measured, as stated, for a given level of production, so that the efficiency of every bank is measured relative to that of other banks of the same size (its peer group).

Table 1.2
Financial Results of the Five Major Banking Groups,[a] 1994-2002

	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total after-tax profit (NIS million at Dec. 2002 prices)	2,088	2,335	2,585	3,702	3,307	3,866	4,138	2,253	1,130
(percent)									
Total after-tax returns on equity (ROE)	7.9	8.4	8.8	12.0	9.9	11.3	11.7	5.8	2.8
Returns on assets (ROA)	0.4	0.4	0.5	0.7	0.5	0.6	0.6	0.3	0.1
Total net interest income	2.2	2.6	2.5	2.5	2.2	2.4	2.3	2.3	2.3
Operating expenses/total balance sheet	2.8	2.8	2.7	2.6	2.5	2.3	2.4	2.2	2.2
Operating expenses/total book balance of balance-sheet and off-balance-sheet assets	1.9	1.9	1.9	1.7	1.5	1.4	1.4	1.2	1.2
Operating coverage ratio[b]	63.7	58.0	56.2	58.0	57.2	58.9	58.2	55.7	56.5
Efficiency ratio[c]	1.4	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.6

[a] See notes to Table 3.2.
[b] Ratio of non-interest income to total operating expenses.
[c] Ratio of non-interest and interest income to total operating expenses.
SOURCE: Published financial statements and returns to Supervisor of Banks.

The most prominent finding of the long-term analysis of returns to scale is that there are economies of scale in Israel's banking system. This finding is consistent with those of many empirical studies into this subject carried out in the last twenty years. In order to ensure that the production expenses of the whole range of a bank's activities is taken into consideration, in this chapter total earning assets—represented by the balance of balance-sheet assets and the credit equivalent of off-balance-sheet assets—have been used as a measure of banking output.

The most notable finding related to the X-Efficiency index is that there are significant differences in expenses per unit of output between the small banks, and smaller differences between the medium sized banks (Discount, First International, Mizrahi, Union and Mercantile Discount), whereas there is hardly any difference between the largest two banks (Figure 3.9 and Table 3.12). Hence, the potential for improved operating efficiency is greatest among the small banks (which also constitute a very heterogeneous group with regard to their types of activity) and the medium-sized ones. This potential can be realized by cutting back on staffing, reducing wages, closing redundant branches, changing the mix of production inputs, etc.

b. Risks

The financial results in the banking system, and in particular long-term return on equity (ROE) should be analyzed together with the changes in the groups' exposure to the range of risks—credit risks, market risks, liquidity risks, operating risks, etc. The exposure of the banking groups to these risks over the last few years is examined below, in the light of the lack of stability of ROE during the last decade. In order to examine the possible link between ROE and risk, changes in credit risks and market risks will be analyzed first, focusing on several indices used to assess these risks, and then the risk-adjusted return on capital (RAROC) will be studied.

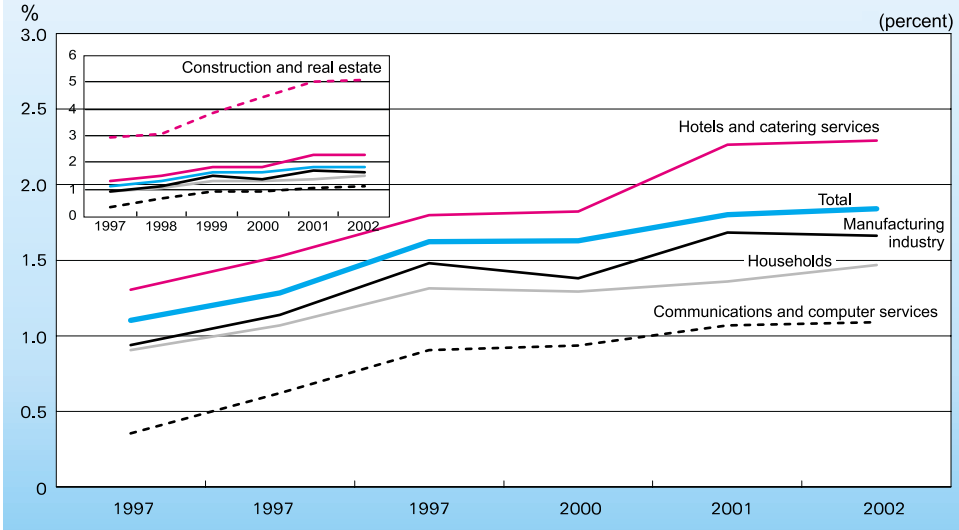
(i) Credit risk

Credit risk is usually assessed by means of three components—the quantity, quality, and concentration of credit. In order to review the overall effect of these components on a bank's risk it is necessary to examine its credit risk vis-à-vis its equity, thereby taking into account the way the bank treats the whole range of risks. Since the risks are expressed not only in terms of capital adequacy but also through the risk premium, the extent of collateral, and ongoing monitoring of the development of a risk and its resulting classification, the extent of loan-loss provision, etc., it is also necessary to examine the bank's attitude to its risk exposure via these parameters.

The *amount of credit* given by the five major banking groups increased by only 1.6 percent in 2002, and stood at NIS 552 billion at the end of the year, reversing a long-term trend of two-digit annual growth. Most of the components of the banking groups experienced this halt in the growth of credit to the public (Table 1.1). A rise in the credit/GDP ratio increases credit risk, as GDP reflects customers' repayment ability.

The ratio of balance-sheet and off-balance-sheet credit to business-sector product rose a little, from 1.8 to 1.84, after rising steadily over the last five years (from 1.1 in 1997 to 1.8 in 2001). The rise in this ratio since 1997 was particularly notable in several principal industries: in construction and real estate it rose from 3.0 to 5.1; in communications and computer services, from 0.4 to 1.1; and in hotels and catering services it rose from 1.3 to 2.3 (Figure 1.3).

Figure 1.3
Ratio of Credit to Industry Output in Selected Industries, the Five Major Banking Goups, 1997–2002



SOURCE: Published financial statements and Central Bureau of Statistics data.

The *quality of credit* is generally measured by three indices: the share of banks' risk-weighted assets in their total assets, the ratio of their problem loans to total credit or to equity, and the ratio of their annual expenditure on loan-loss provision to outstanding credit.

The share of banks' risk-weighted assets in their total assets edged up in 2002, from 67.3 percent to 67.6 percent, in contrast to the long-term trend of steep rises prevailing since 1992 (Table 1.3). This trend was the direct outcome of the long process of liberalization that included a gradual reduction of commercial banks' liquidity ratio until the mid-1990s. Thereafter, the rise in risk assets derived in the main from the increase in the public's demand for local-currency and foreign-currency credit. The rise in the ratio of risk-weighted assets to total assets in the last decade, denoting a deterioration in the quality of bank credit, is an important indicator, particularly in the light of the slowdown on economic activity in the last few years, and especially in 2001 and 2002. It should be noted that the halt in the rise of this ratio in 2002 was the direct result of the increase in the amount of bank credit. In contrast to this indicator of the quality of credit, other indices showed a significant decline in the quality of credit.

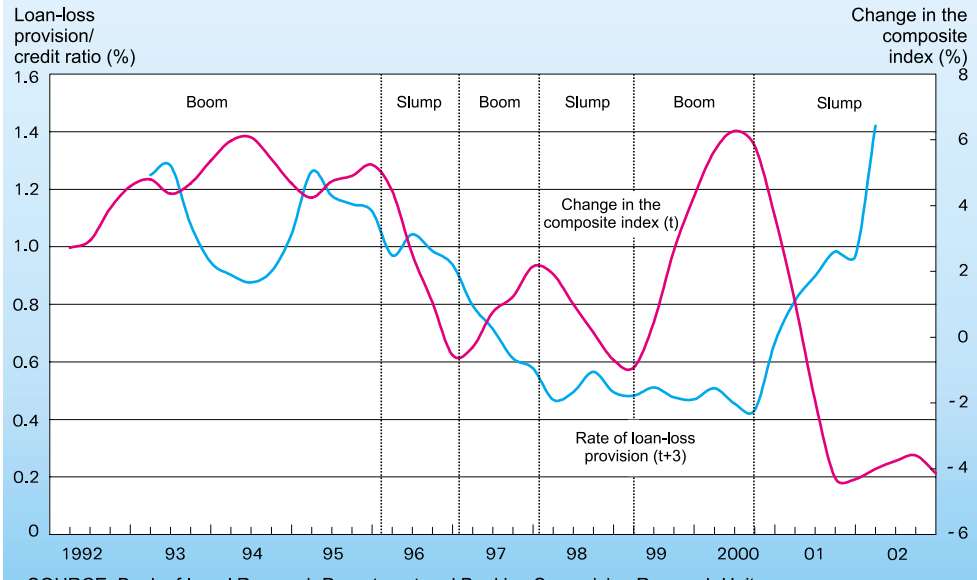
Table 1.3
Concentration of Credit, Quality of Credit and Capital Adequacy, the Five Major Banking Groups, 1993–2002

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Concentration of credit										
H-Index of concentration by industry	0.136	0.139	0.141	0.153	0.157	0.149	0.144	0.142	0.144	0.144
(*percent*)										
Concentration by borrower[a]						44.7	46.4	47.1	47.5	48.0
Quality of credit										
Annual loan-loss provision/credit to the public at groups' responsibility	1.20	0.80	1.15	0.92	0.75	0.61	0.49	0.50	0.85	1.32
Problem loans/total credit at groups' responsibility	13.5	14.3	12.9	11.3	9.6	9.4	8.7	7.0	9.0	10.0
Problem loans (excl. agriculture)/equity	69.0	91.8	89.3	81.9	74.0	83.4	83.7	76.9	110.3	129.8
Problem loans[b]/equity	30.2	34.1	29.1	26.3	22.1	26.7	34.7	35.9	38.8	57.4
Risk-weighted assets ratio	49.1	53.3	56.3	56.3	57.8	62.9	62.9	65.3	67.3	67.6
Credit/GDP ratio	0.68	0.68	0.71	0.74	0.78	0.87	0.95	1.00	1.11	1.13
Credit/business-sector-product ratio[c]					1.1	1.28	1.62	1.63	1.8	1.84
Capital adequacy										
Capital/risk-weighted-assets ratio	10.5	9.80	9.60	9.66	9.97	9.21	9.43	9.24	9.38	9.91
Tier 2 capital/risk-weighted-assets ratio				0.91	1.07	1.77	2.35	2.58	3.16	3.48
Share of subordinated notes in Tier 1 capital						18.3	27.7	33.4	44.5	46.6

[a] Share in total of those borrowing more than NIS 35 million.
[b] Excluding agriculture and indebtedness under special supervision and collateral that has been realized by the bank.
[c] Including off-balance-sheet credit; calculated for all the commercial banks.
SOURCE: Published financial statements and returns to Supervisor of Banks.

The ratio of problem loans to equity deteriorated rapidly in 2001 and 2002 (Table 1.3). Another index pointing to the fall in the quality of credit in that period is the ratio of annual expenditure on loan-loss provision to outstanding credit at the banks' responsibility: after declining since the end of 1980s, to a level of 0.5 percent in 1999 and 2000, it rose to 0.85 in 2001 and to 1.32 in 2002 (Table 1.3). An analysis of the link between business cycles and the quality of credit since the beginning of the 1990s shows a negative correlation (as expected) between changes in the composite state-of-the-economy index and changes in the quality of credit as reflected in the annual loan-loss provision. It was also found that the banks react to a deterioration in the economic situation and the resulting impairment of the quality of credit after a lag of three quarters (Figure 1.4). In the light of the continued slack in the economy in 2003 and the correlations described above, the adverse effect on the quality of the banks' credit portfolios may continue in the near future, and will be expressed in relatively high rates of loan-loss provision.

Figure 1.4
Ratio of Annual Loan-Loss Provision to Balance of Credit to the Public, and Annual Changes in the Composite (State-of-the-Economy) Index, the Largest Two Banking Groups (Quarterly Data), 1992–2002



SOURCE: Bank of Israel Research Department and Banking Supervision Research Unit.

The *concentration of credit by industry*, as measured by the *H* index (Table 1.3) has been stable since 1998, after rising in the period from 1992 to 1997. The relatively high degree of stability of concentration by industry derives from the steep rise in credit to major industries such as construction and real estate, communications and computer services in the last few years. Two other indices of concentration which also attest to high concentration in the area of credit are the Gini coefficient of the distribution of

credit by size of borrower, and the share in total credit of credit extended to borrowers whose indebtedness exceeds NIS 35 million. The Gini coefficient has been at an exceptionally high level of around 0.92 for several years. (For comparison, the Gini coefficient for the distribution of income in the economy is about 0.35.) The share in total credit of credit extended to borrowers whose indebtedness exceeds NIS 35 million has also remained stable at about 48 percent (Table 1.3). About 1 percent of borrowers received about 71 percent of all bank credit in 2002. It appears that the high indices of concentration in the bank credit portfolio accurately reflect the high degree of concentration in major industries in Israel.

A combined analysis of all the credit indices described above (quantity, quality and concentration) indicates unequivocally that the credit risks to which banks are exposed has risen in the last two years, and particularly in 2002. This assessment is based chiefly on the persistent rise in the credit/GDP ratio, the sharp increase in the ratio of loan-loss provision to total credit and the marked deterioration of the ratio of problem loans to the banks' equity. All this has occurred against the background of the continued recession in economic activity, the worsening of the security situation and the slump in the capital markets in Israel and abroad.

(ii) Market risks: interest, exchange-rate and inflation risks

Exposure to *interest-rate risk* is examined in this review via the value at risk (VaR) index, that reflects a bank's maximum expected loss for a given planning horizon (generally one month) at a given level of probability (usually 99%) (see Chapter 5 for a fuller discussion).

The total value at interest-rate risk in the three indexation segments varied from 4.1 percent of net worth in the Hapoalim group, amounting to NIS 491 million, to 17.7 percent (NIS 644.3 million) in the Discount group. Total VaR is calculated as the sum of the VaRs in each segment, on the conservative assumption of the realization of the worst-case scenario in all segments simultaneously, ignoring the covariances between the changes in the various interest rates. A calculation of the total value subject to interest-rate risk taking these covariances into account, using the method of the normal distribution and incorporating the variance-covariance matrix, is given in the appendix to Chapter 5. The calculation shows that low and even negative correlations between the prices of the risks in the last few years significantly reduce the VaR in most of the groups.

With regard to *indexation-base risks (i.e., inflation and exchange-rate risks)*, total VaR (in absolute value and also as a percentage of net worth) went down slightly in 2002 in the Discount and Leumi groups; the reduction in the Hapoalim group was more significant, and in the other groups the VaR rose slightly.

To summarize: *total market risks* in the banking groups, particularly interest risk, have risen in the last few years, but their level is still relatively low, and they still represent only a small share of the total risks that banks are exposed to, about 1.4 percent. In terms of the minimum capital ratio the addition of market risks is minimal, at about 0.14 of a percentage point.

Given the above background, especially the aspects related to the collapse of the Trade Bank and the decline of the Industrial Development Bank, in 2002 the Bank of Israel recommended the introduction in Israel, for the first time, of a formal *deposit insurance* scheme.

Over the last ten years thirty countries have joined the group of countries operating deposit insurance, in most cases against the background of the many financial crises in the banking industries in nearly all continents in the 1980s and 1990s. In 2002 there were seventy-two formal systems of deposit insurance operating, whose principal objective was to strengthen the financial stability of the banking systems by preventing situations of panic amongst depositors. In such situations depositors are likely to withdraw their money indiscriminately and without real cause, and thus—via the "domino" or "contagion" effect—bring about a crisis in the entire banking system. There are two secondary reasons for introducing a deposit insurance scheme: it provides better defense for the small, unsophisticated depositor who is unable to assess the true risk involved in making a deposit in a particular bank (i.e., is unable to impose "market discipline"), and it enables the small banks to compete successfully with the large ones.

To ensure the success of the system of deposit insurance in Israel, it is essential to learn from the experience of other banking systems, to choose appropriate timing for its introduction, to formulate it in such a way that it will not undermine the public's confidence in the system as a result of banks taking excess risks (such as "moral hazard") and to ensure that its very introduction will not encourage banks to be less cautious with regard to risk (a natural tendency in any entity that insures its assets).

(iii) Capital adequacy

Despite the considerable reduction in profitability and the significant rise in exposure to credit risk in 2001 and 2002, the capital adequacy of the banking system did not change to a great extent.

Capital adequacy is an expression of the attitude of banks' management to the whole range of risks to which they are or expect to be exposed. This is because a bank's capital serves as a safety net to absorb expected and unexpected losses should the risks be realized. In 2002 the capital/risk-weighted-assets ratio rose by half a percentage point, from 9.4 percent to 9.9 percent. The improvement may have been due to the halt in the growth of bank credit, largely due to supply factors related to the severe recession and a more conservative credit-risk-management policy than in the past. Only a small part of the improvement can be explained by the non-distribution of dividends and/or raising (primary or secondary) capital.

All banks met the minimum capital ratio required in 2002, and actually exceeded it, as a result of management initiatives to improve their capital adequacy. If risks in general are realized, and credit risks in particular, banks have less room to maneuver to correct their capital adequacy because in the last few years their capital surpluses, over the minimum capital ratio, have also declined (although the capital ratios are still above the

minimum 9 percent in all the banks), and the share of subordinated notes in total primary capital in certain banking groups is approaching the maximum permitted level of 50 percent.

It should be noted that in the banking systems of most industrialized countries the capital/risk-weighted-assets ratio is significantly higher than that in Israel, and are some 3 or 4 percentage points higher than the minimum 8 percent required by the supervision authorities in those countries (Table 3.3).

The reduced ability to cope with risks may be connected with the long-term process that took place in the 1990s: banks capital surplus over the minimum required ratio declined even at a time of economic growth and relatively high quality of credit (in the first half of the decade); currently, when the economy is not growing, the quality of credit is worse than it was, and the capital/risk-weighted-assets ratio is close to the minimum requirement, banks' ability to increase credit, particularly to good customers, is limited. As a result the banks are also less able to contribute to the economy's recovery from the recession (especially as they are the main suppliers of credit).

c. Risk-adjusted return on capital (RAROC) in the years 1994–2002

The banking groups' return on equity (ROE), after declining steeply in 2001, fell from 5.8 percent in that year to 2.8 percent in 2002, following several years of two-digit ROEs.

In the light of the slump in the profitability of the banking system and the rise in banking risks, the system's profits must again be adjusted to the risks in 2002. This will be done by analyzing the changes in the RAROC over the last few years.

RAROC, in its wider definition, ascribes expected surplus income (income above risk-free return), i.e., the risk premium, to risk. Risk is measured via the capital the bank must hold to cover maximum losses from its transactions in a given period (e.g., one month) and with a given probability (confidence interval, e.g., 99 percent). The definition of risk is derived from the bank's value at risk (VaR). There are several ways of calculating RAROC (variance-covariance, historic approach, Monte Carlo, etc.), which differ mainly in their methods of calculating risk or the value at risk.

Here the variance-covariance method is used. This is based on the assumption that the distributions of the prices of risk are normal, and hence VaR is calculated on the basis of the standard deviation of these distributions, assuming that the expected (mean) change in the prices of risk is zero. In this approach the RAROC index is similar to the Sharpe index of performance.

RAROC was calculated for 1994–2002 for each of the five major banking groups and for the whole banking system. The indices were calculated for the total activity of the banking groups for two periods, 1994–2000 and 1994–2002, to isolate the effect of the deterioration in the banks' financial results and risks in the last two years.

Table 1.4 shows the RAROC for the five major banking groups in the above periods. RAROC was calculated for the total activity of each group and for the seven main activities

Table 1.4
RAROC According to Variance-Covariance Method,[a] by Banks and Activity Segment, 1994–2002

	Hapoalim	Leumi	Discount	Mizrahi	First International	Total banking system
a. Commercial banking, small banks, and parent bank	0.65 (41.8%)	0.38 (38.9%)	–0.21 (51.3%)	0.27 (28.7%)	0.17 (17.7%)	0.37 (43.9%)
Mortgage banks	1.25 (6.2%)	0.60 (6.9%)	0.46 (6.7%)	1.79 (47.4%)	1.77 (3.1%)	1.32 (10.3%)
Overseas offices	–0.16 (8.3%)	0.18 (19.9%)	0.25 (32.4%)	–0.03 (6.9%)	0.18 (2.9%)	0.14 (16.3%)
Financial companies	–0.07 (18.1%)	–0.23 (11.6%)	–0.21 (2.8%)	–0.18 (11.7%)	–0.06 (1.1%)	–0.18 (11.7%)
Credit card companies	1.14 (1.1%)	–0.13 (1.6%)	0.24 (1.2%)	0.29 (0.2%)	–0.25 (0.0%)	0.03 (1.1%)
Nonfinancial and insurance companies	0.08 (19.3%)	0.42 (7.4%)	- (0.7%)	- (0.1%)	0.00 (0.0%)	0.17 (9.0%)
Other (non-major) companies	0.02 (5.2%)	–0.51 (13.7%)	0.42 (4.9%)	–0.17 (5.1%)	0.14 (0.8%)	0.49 (7.7%)
b. Total activity of the banking groups						
1994-2000	1.71	1.09	–0.01	1.03	1.34	2.30
1994-2002	0.71	0.57	–0.18	0.93	0.26	0.54

[a] Variance-covariance method: $RAROC_S = \frac{ROE - R_f}{2.33 * \sigma_{ROE}}$.

[b] Risk-free interest (R_f) for 10-year CPI-indexed *Galil* bonds: 4.66%.

[c] Figures in parentheses beneath RAROC indices are the share of investment in the activity as percentage of equity, 1994–2002 average.

SOURCE: Published financial reports.

engaged in by the bank heading each group: commercial banking (including the bank itself, solo) mortgage banking, overseas offices, financial companies, credit card companies, non-financial companies (including insurance companies), and non-principal companies. RAROC is calculated as follows, similar to the calculation of the Sharpe index):

$$RAROC_s = \frac{ROE - R_f}{Z \cdot \sigma_{ROE}}$$

where

ROE is the banking group's mean return on equity;
R_f is risk-free interest (the yield to maturity on 10-year government bonds);
σ_{ROE} is the standard deviation of the ROE;
Z is the value of the confidence interval with 99 percent probability derived from the normal distribution, i.e., 2.33.

The excess return on equity is divided by the standard deviation of ROE, σ_{ROE}, on the basis of the assumption that in the reduced form the changes in risks over time are reflected in the distribution of the bank's profit and its ROE.

A comparison of the development of RAROC over time and between the banking groups (Table 1.4) shows that from the performance aspect the years 2001 and 2002 were indeed the worst for all the five banking groups. A comparison of the two periods, 1994–2000 and 1994–2002 shows that in 2001 and 2002 RAROC declined sharply, both for the whole banking system (from 2.3 to 0.54) and in each of the large groups. For example, in the Hapoalim group RAROC fell from 1.71 in 1994–2000 to 0.71 in 1994–2002, and in the First International group from 1.34 to 0.26.

The differences in performance between the banking groups, and the changes within the groups over time, derive from the way the banks' managements function, as expressed in the choice of capital investment in the various areas of activity as well as in how these investments are managed. The groups are also very different in the kinds of activity they undertake. Thus, in commercial banking the differences could be created by the management focusing on retail rather than wholesale banking, or by specializing in specific indexation segments (indexed, unindexed, foreign currency), etc. Hence, comparing the performance of different banking groups presents more problems than comparing the performance of different portfolios which comprise homogeneous securities (shares, bonds, etc.).

The effect of the lack of homogeneity between the banking groups can best be illustrated by means of an example: the proportion of its capital invested by Israel Discount Bank in commercial banking was similar to that invested by Bank Hapoalim; however, whereas the Hapoalim investment yielded a positive RAROC of 0.65 in 1994–2002, the RAROC of the Discount investment was negative (–0.21). Mortgage banking performed better than all other activities in 1994–2002, both in the banking system as a whole (RAROC

of 1.32) and in each of the five major groups (see Chapter 4 for a fuller discussion). It should be borne in mind that the performance of all the banking groups, regarding each activity as well as total activity, should be compared with that of the market (represented here by the performance of the whole system), which serves as a benchmark for this purpose.

To summarize: the analysis of performance, i.e., differences between the banking groups and over time, indicates differences, sometimes significant, that may derive from the choice of investments (the rate of investment in a particular activity) and from the quality of management. The deterioration in the performance of the banking groups in the last two years relative to their performance in most of the 1990s is notable.

d. The components of return on equity (ROE)

In addition to the analysis of banks' performance using RAROC, performance is usually also measured by the relation between return and equity by means of the separate components of ROE.

In breaking ROE down into its components, consideration is given to changes in the return on assets (ROA), in the share of risk-weighted assets in total assets, in capital adequacy (capital *divided by* risk-weighted assets), and in the composition of the banking group's capital base, represented here by the ratio of the capital base to equity. The share of risk-weighted assets expresses the change in credit risk, while capital adequacy and the composition of capital expresses the banks' cover against this risk, i.e., the attitude of management to this risk exposure. Since 1999 capital adequacy also expresses the allocation of capital (the cover) against market risk.

ROE is broken down into its components as follows:

$$\frac{\pi}{E} = \frac{\pi}{A} \cdot \frac{A}{A^*} \cdot \frac{A^*}{\tilde{E}} \cdot \frac{\tilde{E}}{E}$$

where

$\frac{\pi}{E}$ = return on equity—ROE;

$\frac{\pi}{A}$ = return on assets (balance-sheet and off-balance-sheet)—ROA;

A^* = risk-weighted assets, so that A / A^* = the ratio of total (balance-sheet and off-balance-sheet) assets to total risk-weighted assets;

$\tilde{E}$ = the bank's capital base, i.e., the capital recognized for purposes of calculating capital adequacy (primary plus secondary capital);

E = the bank's equity (primary capital);

$\frac{A^*}{\tilde{E}}$ = the inverse of the capital/risk-weighted-capital ratio (i.e., the inverse of capital adequacy)

Table 1.5
Return on Equity[a] and its Components, the Five Major Banking Groups, 1993–2002

(percent)

	Average 1993–96	Average 1997–2000	2001	2002	Average 2001–02
Return on equity (ROE)[a] π/E	8.51	11.22	5.83	2.78	4.31
Return on assets (ROA)[b] π/A	0.45	0.54	0.30	0.14	0.22
Assets to risk-weighted assets ratio, A/A*	1.91	1.61	1.46	1.46	1.46
Inverse of capital adequacy, A*/$\tilde{E}$	9.95	10.54	10.66	10.10	10.38
Capital base/equity, $\tilde{E}$/E	1.01	1.23	1.46	1.54	1.50

[a] ROE is as follows; $\frac{\pi}{E} = \frac{\pi}{A} \bullet \frac{A}{A^*} \bullet \frac{A^*}{\tilde{E}} \bullet \frac{\tilde{E}}{E}$.

[b] Total assets in the denominator include off-balance-sheet credit equivalents, and differ from the data in Chapter 3.

SOURCE: Returns to Supervisor of Banks.

This breakdown enables the identification and analysis of the factors which affect the components of ROE, as well as the distinction between long-term factors that affect capital adequacy and that are effected by the regulations, and the short-term factors that affect risks.

Table 1.5 summarizes the development of ROE and its components from 1993 to 2002. It shows that from 1996 to 1997 ROE moved onto a different level. In 1997–2000 it was higher than in 1993–96. In 2001 it fell to a new level, an average of 4.3 percent in 2001–02, similar to its level of 3.6 percent in 1989–91.

The fall in level in 2001–02 was the result of the following developments:

1. A fall in ROA from 0.54 to 0.22.
2. A fall in $A^* / \tilde{E}$ from an average of 1.61 in 1997–2000 to an average of 1.46 in 2001–02, meaning a rise in the risk-weighted-assets/total assets ratio, from 62 percent to 68 percent, indicating the rise in credit risks in the last two years.
3. A rise in the $\tilde{E}/E$ ratio from 1.23 in 1997–2000 to 1.5 in 2000–01. The rise indicated a change in the composition of the banking system capital base in the last two years, that derived from the raising of secondary capital (subordinated notes, etc.) to improve the capital/risk-weighted-assets ratio. Secondary capital is considered less stable than primary capital, since it does not constitute a means of absorbing current losses, but only in case of liquidation. Hence the rise in $\tilde{E}/E$ reflects a rise in risk.
4. The stability of $A^* / \tilde{E}$ between 1997–2000 (10.54) and 2000–02 (10.38). As this ratio is the reverse of the capital adequacy ratio, this small change may be interpreted as a very slight rise in the banking system's capital adequacy, from 9.49 percent in 1997–2000 to 9.63 percent in 2001 and 2002.

To conclude, the drop of ROE to a new level in 2001–02 was related to the rise in banks' exposure to risks (a rise in the share of risk-weighted assets), and was accompanied

by the attitude of banks' managements to the increased exposure and risk realization in 2002, an attitude reflected in the actions they took to improve capital adequacy.

2. COMPETITION IN THE BANKING SYSTEM

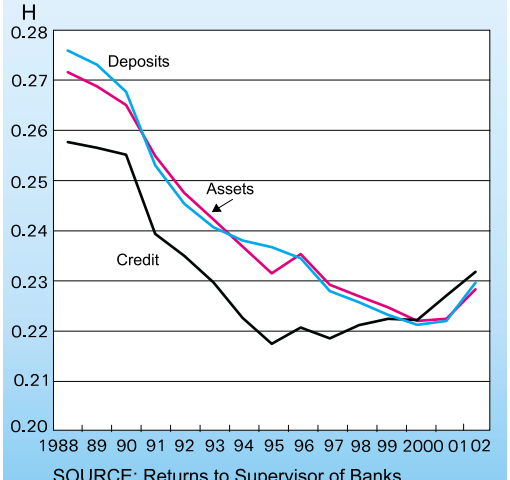
Several indicators are generally accepted as estimates of competition in the banking industry. The two most commonly used are the Herfindahl (*H*) index and market-power (*M*) index.

The *H* index estimates the distribution of banks' or banking groups' market shares combined with changes in the number of banking institutions. It is an index of concentration.[1] It is assumed that the higher the degree of concentration the lower the level of competition, and vice versa.

In the last ten years the index of concentration of the assets of the five major banking groups has declined continuously, steeply at the end of the 1980s and the beginning of the 1990s, and then more moderately in the second half of the 1990s (Figure 1.5). Thus in 1988 the *H* index calculated from all banking assets was 0.272, and in 2002 it was 0.228.

The sharp reduction in the concentration in the banking system was mainly due to the liberalization of the money and capital markets and the foreign currency market by the Bank of Israel and the government, and the gradual exit of the government from the financial intermediation process in banking. As the number of banking groups did not change in this period, the reduction of the *H* index was the direct result of the change in the distribution of the market shares of the assets of the banking groups. The distribution shows that the three largest groups (Hapoalim, Leumi and Discount) lost market share in most years in the 1990s to the two medium sized groups (Mizrahi and the First International).

Figure 1.5
Concentration (H-index) of the Five Major Banking Groups and the Independent Banks, 1987–2002



SOURCE: Returns to Supervisor of Banks.

Figure 1.5 shows that unlike the *H* index of assets and deposits, that continued to fall throughout the 1990s, the downward trend of the concentration index relating to credit showed a clear change from 1997. From then till 2002 that index rose moderately.

[1] The *H* index is defined as follows: $H = \sum_{i=1}^{n}\left(S_i - \bar{S}\right)^2 + \frac{1}{n}$ where S_i is the market share of bank or banking group *i*, and *n* is the number of banks or banking groups in the banking system.

At the beginning of that period the privatization process in Israel accelerated, and was accompanied by the banks granting large amounts of credit to large customers, and most of this credit was advanced, naturally, by the large banking groups. The capital surpluses (capital in excess of the minimum capital ratio required by the Banking Supervision), that constitute an important source for the expansion of bank credit, had a pronounced effect on the distribution of the credit portfolios between the banking groups. Thus, at the beginning of the 1990s the capital surpluses of the medium sized banks vastly exceeded those of the largest groups, increasing the potential for the former to expand credit at the expense of the latter. A comparison of banks' capital surpluses over the last five years shows that the advantage of the medium banks over the large ones shrank, especially as the most of the issue of primary and secondary capital (that serve as a source for the expansion of credit) for purposes of improving capital adequacy was carried out by the two largest banking groups. The developments described above may explain, at least partially, the rise in the share of the two largest banking groups in total banking credit since 1997.

The rise in concentration in the banking system gives cause for concern, as it adversely affects the public's welfare, and is also a disappointing development, as for several years concentration had been declining, and interbank competition had increased.

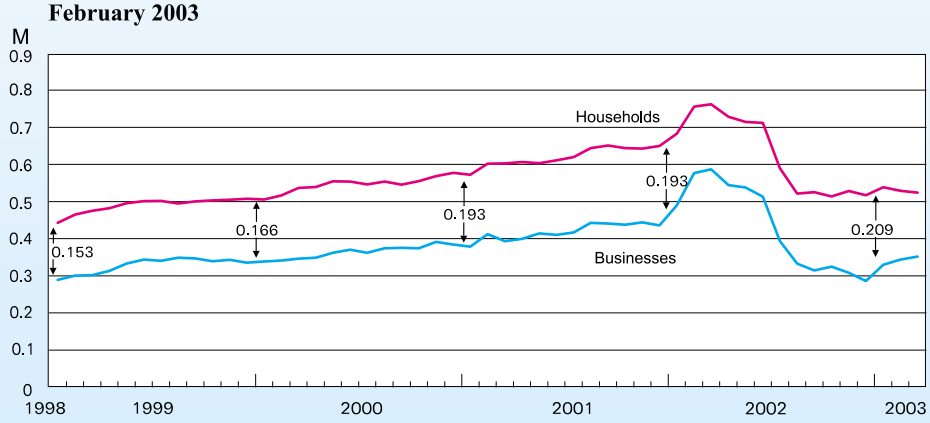
Against this background of reduced competition, the fact that the market (monopolistic) power[2] exercised by the banks over households is still vastly greater than that exercised over businesses assumes even greater importance (Figure 1.6). It apparently shows that market discipline (which is one of the indicators of competition in the industry) is exercised more by large customers than by households. In other words, households' ability to negotiate with banks is inferior to that of businesses. This is the direct outcome of the fact that businesses are faced with more alternative sources of credit, e.g., raising capital on a stock exchange (in Israel or abroad), credit lines from banks abroad, and finance from venture capital funds. The difference in the degree of competition between households and businesses is also expressed in differences in the *H* index of concentration in banking intermediation: the *H* indices for households since 1999 are higher than those for businesses (although the difference between them is shrinking). It was also found that the simple interest-rate spreads for households are higher than those for businesses (Figure 1.6b and 1.6c).

In contrast with the rise in concentration in the banking system itself, the share of bank credit (from commercial and mortgage banks) in total credit and its substitutes granted during the year plunged from about 60 percent in 2001 to only 28 percent in 2002, after being as high as 90 percent at the beginning of the 1990s (Figure 1.7 and Table 1.6).

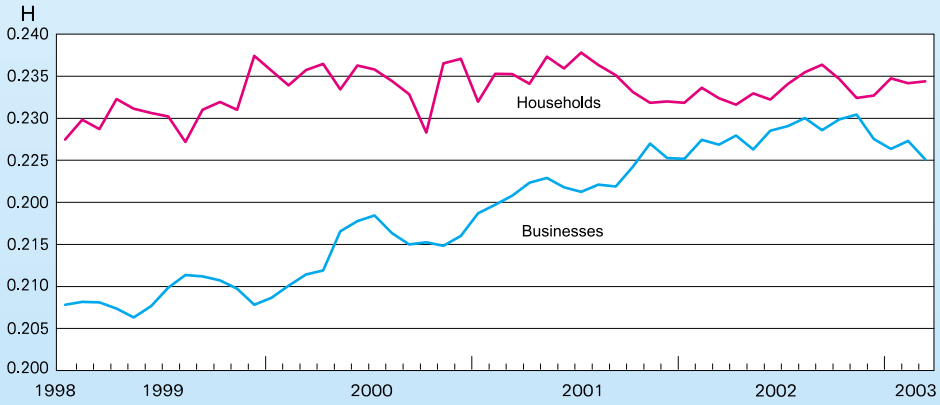
[2] Market power (*M*) is defined as the relative deviation of the price of the banking product (R_L) from its marginal cost (R_d). The price of the product is represented here by interest on unindexed local-currency credit (including income from ledger fees on this credit). The marginal cost is measured here as interest paid on self-renewing overnight (SRO) deposits. The formula is $M = (R_L - R_d)/R_L$.

Figure 1.6

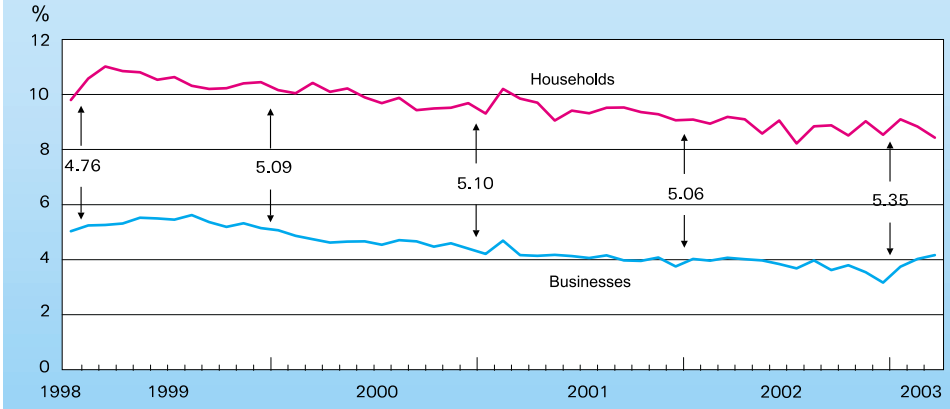
a. Market Power Index (M) for Businesses and Households, December 1998–February 2003



b. Concentration Index (H) for Businesses and Households, December 1998–February 2003



c. Interest-Rate Spread[a] for Businesses and Households, the Unindexed Local-Currency Segment, December 1998–February 2003



[a] The interest-rate spread is calculated as income from interest and management fees on unindexed credit *less* expenses on raising money from unindexed sources (the rate of interest on overnight deposits). The values showing the differences between the spreads for households and those for businesses are in percentage points, in December of each year.

SOURCE: Returns to the Supervisor of Banks.

Table 1.6
Bank Credit and its Main Substitutes, 1997–2002

(NIS million, December 2002 prices)

	Total credit	Total bank credit[a]	Capital raised via main substitutes[b]	*Of which* Capital raised by Israeli firms in stock exchanges abroad	*Of which* Direct credit from abroad	Share of bank credit in total capital raised
1997	57,222	36,522	20,700	7,028	4,804	0.638
1998	59,276	43,000	16,276	4,650	-328	0.725
1999	87,120	46,974	40,146	18,145	6,609	0.539
2000	106,841	51,438	55,403	19,638	2,990	0.481
2001	77,131	50,782	26,349	7,463	-1,247	0.658
2002	32,430	9,010	23,420	1,082	4,590	0.278

[a] Credit to the public from commercial and mortgage banks. The change in outstanding credit is assumed to reflect new credit extended.

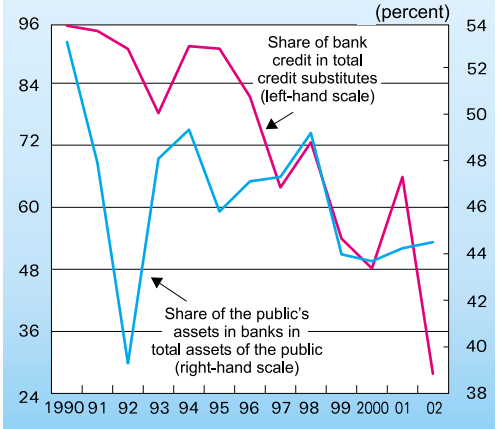
[b] Capital raised by the private sector in Israel and abroad; direct credit from abroad; financing of venture capital funds; and credit given by institutional investors.

SOURCE: Returns to Supervisor of Banks, and Bank of Israel Monetary Department.

The credit sources offering alternatives to bank credit are raising capital from the private sector in Israel or abroad, direct credit from abroad, finance from venture capital funds, and credit given by institutional investors (provident funds, insurance companies and pension funds). As can be seen from Table 1.6, total credit and its substitutes declined significantly from about NIS 77.1 billion in 2001 to some NIS 32.4 billion in 2002. Most of this reduction was in bank credit, which fell from NIS 50.7 billion to just NIS 9 billion.

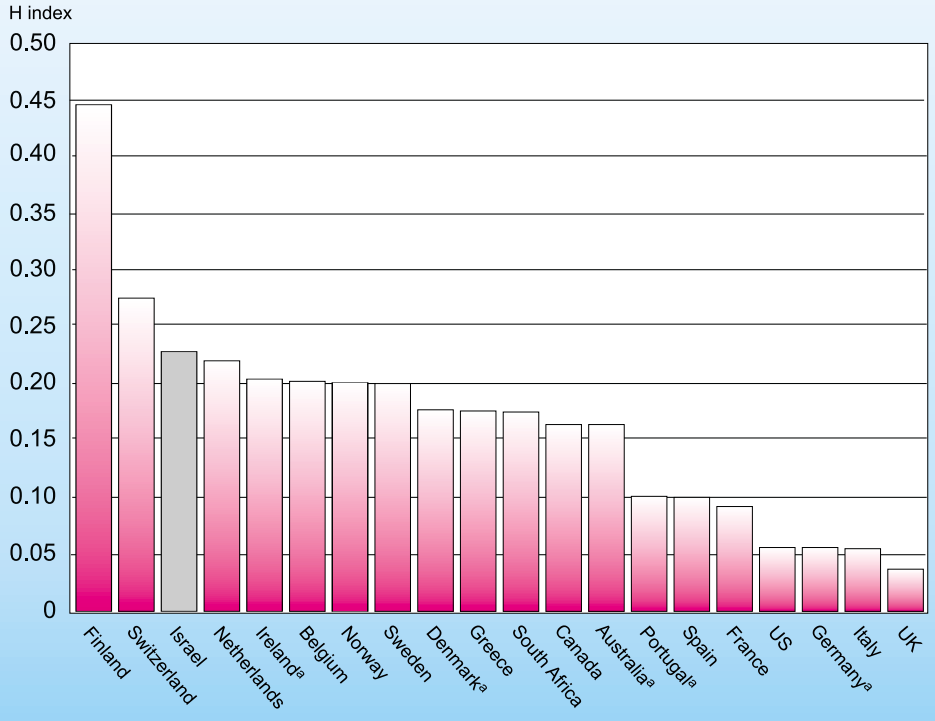
The decline in the share of bank credit in total credit (disintermediation) indicates greater competition and a reduction of banks' potential market power. This process generally occurs at times of boom in the capital market, because then businesses (and not just the good ones) are able to raise capital on the stock exchange as a substitute for bank credit. Hence the decline in the share of bank credit specifically in a period of a prolonged recession in the stock exchange and a slowdown in economic activity is an indication not only of increased competition, but also of the banks' efforts to improve the quality of their credit portfolios either by imposing stricter criteria

Figure 1.7
Banking Intermediation vis-à-vis Nonbanking Intermediation, 1991–2002



SOURCE: Tables 1.1, 2.2 and 2.3 in this publication.

Figure 1.8
Concentration (H-Index) in Selected Banking Systems, 2002



[a] Based on data for 1999.

SOURCE: Data for 2002-The countries' supervisory authorities
Data for 1999-The *Bankstat* data base.

for granting credit or by rationing it. This policy was adopted, as explained above, as part of the lessons learned from the developments at the end of the 1990s, when bank credit continued expanding despite the deep economic recession, thereby endangering the banks' stability.

In contrast to the decline in the share of bank credit in total credit and its substitutes, the distribution of the public's assets portfolio between assets in the banks (deposits) and others (shares, bonds, etc.) did not change significantly in 2002, despite the marked reduction in the size of the portfolio (Figure 1.7 and Table 2.8).

The share of the public's bank assets in total assets remained steady in 2002 at 44 percent, the outcome of similar reductions in bank deposits (due to the recession—the income effect) and in investments in stock-exchange channels such as shares, bonds and Treasury bills (due to the slump in the Tel Aviv Stock Exchange, and also, to a large extent, to the income effect mentioned above).

Israel's banking system is one of the most highly concentrated in the world, as is known. Hence the rise in concentration in the last few years (and particularly in the field of bank credit), the fall in the share of bank credit in total credit and its substitutes, the

failure of the Trade Bank and the Industrial Development Bank, all these again raise the question of the optimal structure for Israel's banking system, and bring it into even sharper focus. The ideal structure would combine increased efficiency and stability on the one hand with greater competition on the other. In this context the Banking Supervision Department is again reviewing the issue of mergers between banks, which has become more widespread in the industrialized countries in the last few years. It may be assumed that certain mergers, including those of mortgage banks with commercial banks, might provide a reasonable solution to problems of operating inefficiency and failure to take advantage of economies of scale and of scope, to the increased risk exposure of several banking institutions and to the persistent decline in the level of competition in the industry. Mergers and acquisitions assume even greater significance in the restructuring of the banking system as the public makes increased use of technological innovations, such as the internet, to obtain banking services via technological means that provide direct, almost instantaneous, access to banking information, and to perform banking transactions without being physically present in the branch (see Chapter 6). The use of these channels reduces the traditional roles of the branch, and indeed the number of branches has been falling constantly over the last few years (Table 1.6). Certain mergers are likely to save production costs and may even increase competition in the industry.

It appears that competition in banking will not really intensify unless and until there is a significantly increased presence of foreign banks (of an appropriate size) in the Israeli market, either by the entry of new banks (i.e., de-novo) or by mergers with domestic banks. This assumption is based on the experience of many developing and industrialized countries over the last ten years, which found that the presence of foreign banks contributed to improved operating efficiency, stability and competition in their banking industries.

3. MARKET-TO-BOOK RATIO OF BANK SHARES (MV/BV)

In the last decade the liberalization of the money and capital markets in Israel accelerated: the government pursued a declared policy of gradually reducing its role in the capital market and reducing its intervention in the intermediation processes of the banks and other financial institutions. At the same time many public corporations, including banks, were privatized. These changes resulted in increased use being made of the information available in the financial markets for purposes of analyzing and assessing the stability of business companies, including financial institutions.

This trend of increased use of market data is consistent with the recommendation of the Basle Committee on Banking Supervision issued in 2003 regarding the effective use of disclosure to strengthen market discipline. Such use of market data is based on the assumption of an efficient market, in which the price of a security at any time reflects all the relevant information about it (information which comes from the capital market, public information, and private specific information regarding the company). If the market is efficient, stock market data reflect the market value of the bank, taking into account,

among other things, the bank's future (expected) net cash flow, and via appropriate capitalization, reflect the present value of its profit.[3]

In order to examine how developments in the banking system in the last few years—particularly the sharp fall in the profits of the banking groups in 2001 and 2002—were reflected in the prices of banks' shares traded on the Tel Aviv Stock Exchange, the market values (*MV*) of the five major banks were compared to their book values (*BV*) for the period from March 1993 to December 2002. This is known as the market-to-book ratio, and is calculated as MV_i / BV_i, where

MV_i is the market value of equity ownership in shares and options of bank *i* outstanding. The market value of any company is defined as the value of its shares and options registered for trading (excluding convertible bonds). Market value includes shares not registered for trading, valued according to the market price of traded shares.

BV_i is the book value of equity (equity *plus* surplus value *plus* retained earnings) of bank *i*.[4]

The ratio of the market value of a bank to its book value indicates the degree of adjustment of the market value of its equity as assessed by investors to the book value of its equity. A ratio of more than one shows that investors assess the bank's value higher than its balance-sheet value, and reflects the bank's higher potential value in their eyes. A ratio of less than one means that investors consider that the book value is an overestimation of the true net worth of the bank's equity.

The literature on this subject, which refers mainly to data on shares of commercial banks in the US, describes three main factors responsible for the deviation of the book value from the true economic market value of bank shares:

[3] In referring to the stock market in Israel, including bank shares, certain reservations about the efficient-market assumption should be borne in mind. The volume of trade in most shares is still relatively low, as is known; as a result of the very large holdings of the holders of controlling interests in the banks, only a small proportion of bank shares are traded on the stock exchange; furthermore, the extent of capital-market activity of institutional investors—provident funds, pension funds, insurance companies and the banks themselves—is limited by quantitative restrictions, and the institutional investors and the banks are intricately linked.

[4] The banks' quarterly financial statements are published about three months after the end of the quarter to which they refer. Hence, the market value at the end of a given quarter relates to the share price prevailing at the time the statement was published, whereas the book value relates to the data of the statement that refer to the end of the relevant period. Thus the ratio in this review at time *t* is actually $\left[\frac{MV_{t+3}}{BV_t}\right]$. All the data and ratios in the above analysis are based on the official quarterly report of the Tel Aviv Stock Exchange "Data from the Financial Statements of Stock Exchange Companies," Nos. 40–51.

1. The higher the ROE (return on equity), the higher the *MV/BV* ratio.[5]
2. A rise in the risk of a banking firm, as reflected in its exposure to credit risks and market risks, has a negative effect on the *MV/BV* ratio. This exposure to risk is generally reflected by a rise in the rate of return required by the investor, i.e., by a rise in the firm's cost of capital.
3. The more proper the transparency and disclosure of the bank, and the more severe and demanding the requirements of the banking supervision authority, the lower the deviation of the book value from the market value in the long term; in other words, the closer the *MV/BV* ratio will be to 1.

Figure 1.9a shows the development of in the five largest banking groups in Israel from March 1993 to December 2002. For comparison, , the changes in the ratio for all other shares traded on the stock exchange excluding bank shares is also shown.

Based on finance theory, the link between the banks' ratio and their ROE in the last ten years (Figure 1.9b) was examined.

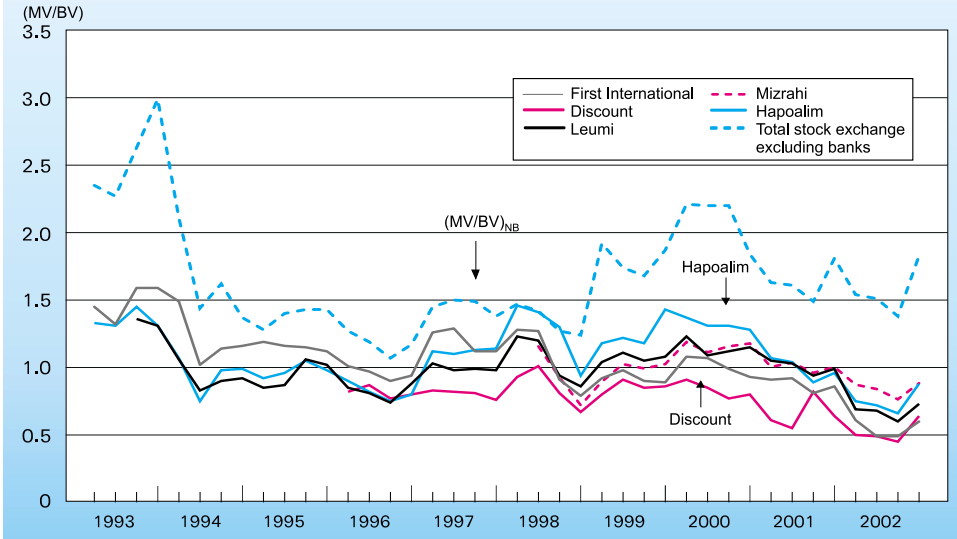
To check the relation between the *MV/BV* ratio and credit risk, the graph of the ratio was plotted against that of the ratio of credit to GDP (Figure 1.9c) and the ratio against loan-loss provision *divided by* credit (Figure 1.9d).

The analysis of these ratios yields the following main findings:

1. Since January 2000 the $(MV/BV)_B$ ratios in the five largest banks (Hapoalim, Leumi, Discount, First International and Mizrahi) declined to less than 1, after many years of stability around 1. Based on the sharp fall in 2001 and 2002, the market assessed that the banks' performance had deteriorated. The current low values indicate that investors do not expect the performance of commercial banks to improve in the near future.

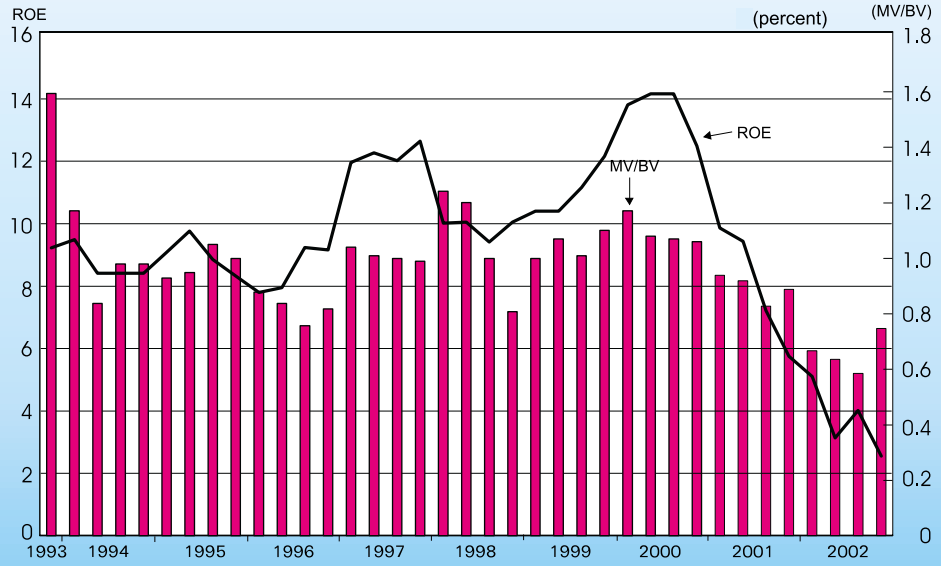
[5] According to finance theory, and based on the Gordon (1962) model of growth that assumes that the price of a share at every point in time reflects the discounted dividend flow and under other assumptions, it can be seen that in equilibrium the $\left(MV/BV\right)_i$ ratio for firm *i* is stated as $\left(\frac{MV}{BV}\right)_i = \frac{ROE(1-b)}{k-g}$, where *b* is the retention ratio, i.e., the share of profits reinvested in the firm; ROE is return on equity; *k* is the rate of return required on a share of firm *i*, which depends on the type of share and its risk group. The above equations yields $\frac{\partial(MV/BV)_i}{\partial ROE} > 0$; in other words, the MV/BV ratio and ROE are expected to be positively related. Also, $\frac{\partial(MV/BV)_i}{\partial k} < 0$, meaning that *ceteris paribus* a rise in the cost of capital or in the rate of return required from the firm by the investor (expressing a rise in risk) will reduce the MV/BV ratio.

Figure 1.9a
Ratio of Market Value to Book Value $(MV/BV)_B$ of the Five Major Banks, and of All Shares Traded on the Stock Exchange except for Bank Shares $(MV/BV)_{NB}$, March 1993–December 2002



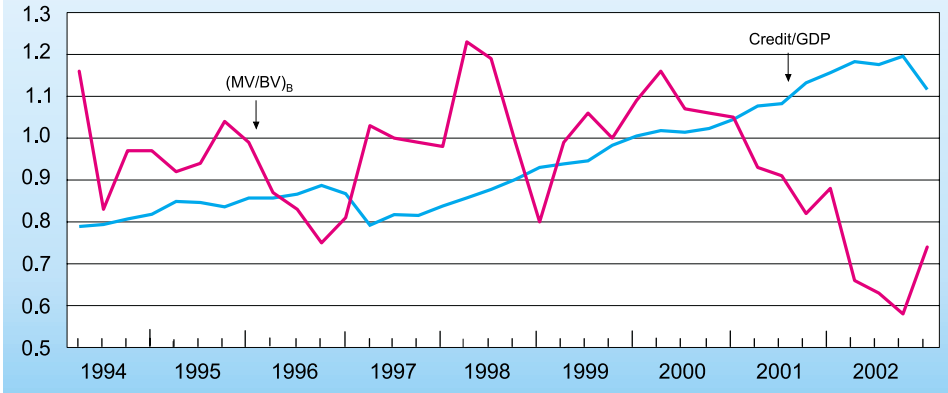
SOURCE: Tel Aviv Stock Exchange and Banking Supervision Research Unit.

Figure 1.9b
Return on Equity (ROE) and the MV/BV Ratio of the Banking System, December 1993–December 2002



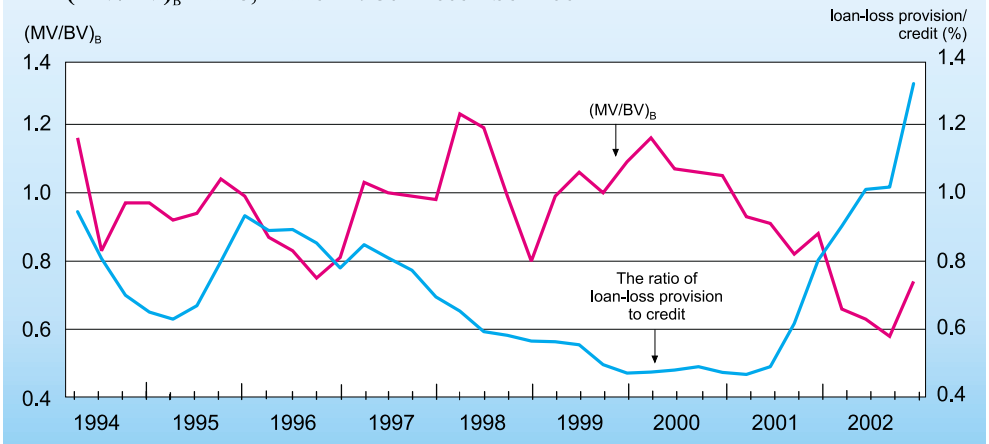
SOURCE: Tel Aviv Stock Exchange and Banking Supervision Research Unit.

Figure 1.9c
Credit/GDP Ratio of the Banking System and the $(MV/BV)_B$ Ratio, March 1986–December 2002



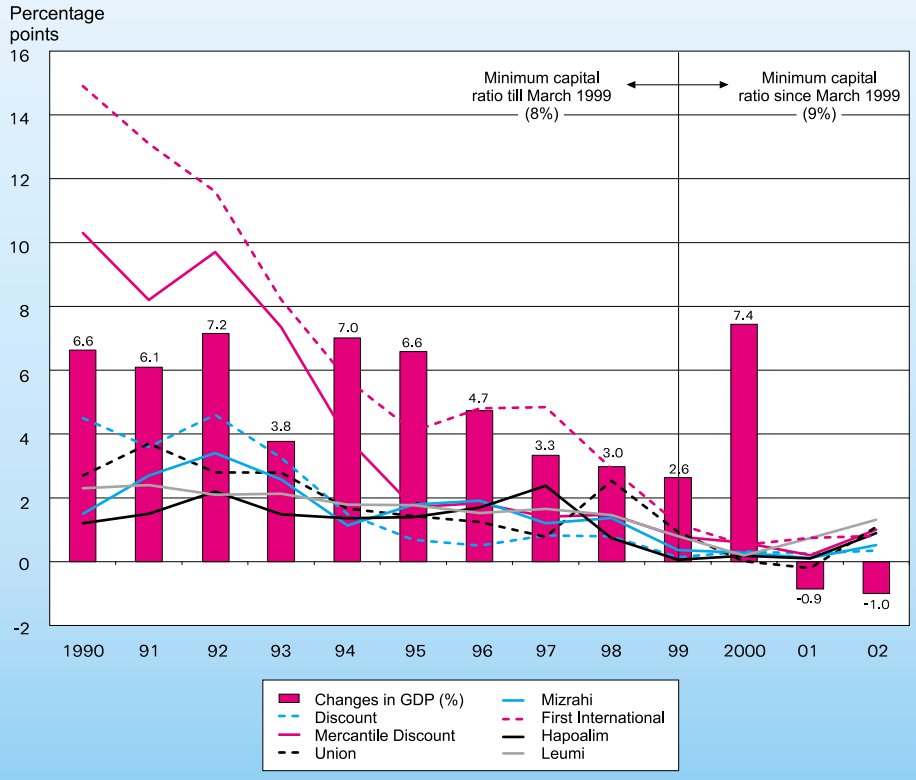
SOURCE: Tel Aviv Stock Exchange and Banking Supervision Research Unit.

Figure 1.9d
Ratio of Loan-Loss Provision to Credit in the Banking System and its $(MV/BV)_B$ Ratio, March 1986–December 2002



SOURCE: Tel Aviv Stock Exchange and Banking Supervision Research Unit.

Figure 1.10
Changes in GDP and Surplus Capital Adequacy, the Seven Major Banking Corporations, 1990–2002



SOURCE: Published financial statements and Bank of Israel Banking Supervision Department.

2. The *MV/BV* ratios in the five largest banks at the end of 2002 converged to an average of 0.75, with relatively low variation between the banks. The fact that the variation between the banks is relatively low despite the differences in their characteristics and performance in the last few years probably indicates that the sharp decline in the ratios in 2001 and 2002 accurately reflects market assessments regarding the expected drop in the performance of all banks in the near future. The expected deterioration is the result of factors that affect them all, such as the continued recession in economic activity, the difficult geopolitical situation, banks' high exposure to credit risks and market risks and closeness of the risk-weighted capital ratio in all the large banks to the minimum capital ratio required (9 percent) (Figure 1.10).
3. A comparison of the banks' $(MV/BV)_B$ ratios with the $(MV/BV)_{NB}$ ratio of the stock exchange excluding bank shares shows that throughout the period 1993–2002 the mean and standard deviation of the banks' ratios of market value to book value

were lower than that of the rest of the stock exchange (0.99 and 0.21 for the banks, and 1.68 and 0.42 for the rest of the stock exchange, respectively). This shows that over time investments in bank shares were generally more conservative.

4. Figure 1.9b highlights the positive relation betwee $(MV/BV)_B$ and ROE in the last ten years (the simple correlation between them is 0.65).
5. As expected, it was found that the $(MV/BV)_B$ ratio in the last few years (since 1998) was negatively affected by the banks' exposure to risks, particularly credit risks. Thus, as the ratio of loan-loss provision to credit and the ratio of credit to GDP rose, the $(MV/BV)_B$ ratio declined sharply. This means that investors correctly assessed the effect of the deep recession on banks' exposure to credit risk, and hence on their net worth (Figure 1.9c and 1.9d). As stated above, this relation is based on the expected negative correlation between *MV/BV* and the rate of return *k* on a share required by investors, a rate that is affected by the firm's risk.

Box 1.1

The Basle Committee's Recommendations, Business Turnover, and Capital in Excess of the Minimum Requirement in Israel's Banking System

According to the Basle Committee's recommendations of April 2003 banks (and in particular the large banks) should use internal models to improve their assessments of credit risk, and to allocate capital accordingly to cover this risk. The new recommendations are therefore expected to strengthen banks' robustness and thus improve the stability of the whole banking system.

Current assessments of the quality of credit has a certain drawback, however: as banks are a major supplier of credit, changes in the quantity of credit due to changes in the above assessments are likely to increase the volatility of macroeconomic business cycles as they boost the pro-cyclical effect that exists in any case. At times of boom high economic growth rates will result in a rise in bank profits, improved quality of credit, low loan-loss provisions, and hence (all other things being equal) in improved capital surplus above the minimum requirement, in other words, an increase in the difference between the actual risk—weighted capital ratio and the minimum capital ratio required by the Supervisor of Banks. The improved capital surplus will enable banks to increase the supply of credit, and thus strengthen the boom in the business cycle, but over-expansion of economic activity is likely to become an inflationary spiral. During a slump, on the other hand, negative or low growth rates are likely to increase credit risk, requiring higher loan-loss provisions; hence (all other things being equal) there will be a deterioration in surplus capital related to the minimum capital ratio required, which will reduce the potential growth of credit to the public, a reduction that will deepen the slump.

An analysis follows of the capital surpluses in Israel's banking system at times of boom and slum since the beginning of the 1990s. In the first period, until 1996, a boom period with relatively high GDP growth rates of 6 percent to 7 percent, the capital surpluses of the seven largest banks declined, and in particular those of the five medium-sized ones (Figure 1.10). This was the outcome of a faster rise of risk assets than of the capital base. The rise in risk assets at this time was mainly due to the increased share of credit to the public (made possible by the liberalization of the money and capital markets) and to structural changes in Israel's economy, but also to recommendations of the Basle Committee in 1991 regarding the minimum capital ratio of 8 percent. It appears that this requirement encouraged several medium-sized banks whose capital ratio at the beginning of the period was far in excess of the requirement to gradually lower their capital ratios. Although an increase in credit contributes to the expansion of economic activity, and thus to a rise in the business cycle (pro-cyclical activity), nevertheless as a result of the decline in the capital surplus relative to the minimum requirement, the potential rise in credit is reduced, and banks are less able to cope with the possible realization of banking risks when there is a turnaround in the business cycle, as happened in the second half of the 1990s. The reduction in the ability to deal with risks is especially problematic at times of deep recession, such as the current one.

Since 1997 Israel's economy has shown a moderate level of activity (except for nine months in 2000), characterized by low levels of GDP growth (2 percent to 4 percent, till 2000) and even negative growth (–1 percent in 2001 and 2002). In this period the capital surpluses continued to shrink (Figure 1.10), mainly due to accelerated public demand for credit despite the recession and despite the marked rise in banks' profits in that same period. (The dividend distribution policy had a limited effect, of about 0.26 of a percentage point on average, on the decline in capital surpluses.) The continuous reduction in risk-weighted capital ratio in all the seven largest banks in the 1990s until in 2001 the ratio in all banking institutions was close to the minimum ratio required by the Supervisor of Banks restricts the potential to increase bank credit and makes recovery from the recession more difficult.

In 2002 the five largest banking groups improved their capital ratios slightly, but this was apparently the result of stopping the rise in credit (a 1.6 percent increase compared to two-digit figures of expansion in previous years). It is assessed that the halt in the rise of credit in 2002 was decisively affected by supply factors derived from the credit-allocation policy pursued by banks' managements.

The closeness of the banking system's capital ratio to the requirement of the Supervisor of Banks at a time of a slump in the business cycle is the

opposite of what generally occurs elsewhere in the world. For example, at the end of 2001 average capital ratios in most advanced economies were about 11.6 percent (Table 3.3), a ratio that represents a safety margin of some 3.6 percentage points above the minimum ratio required by the Basle Committee.

The creation of a safety margin above the minimum capital requirement at a time of boom enables credit to rise in a slump with a certain reduction in the capital ratio (the result of a fall in profits and adverse effects on the quality of credit). This pattern of behavior, typical of most banking institutions throughout the world, does not apply in Israel, based on the findings. The banks did not take the prudent step of preserving significant capital surpluses (over the minimum requirement) during the boom years in the first half of the 1990s, and the surpluses contracted and converged towards the minimum ratio. Hence, as the recession deepened recently, banks' ability to expand credit was hampered, expansion that was so vital to pull the economy out of the deep recession, and they were obliged to adopt a policy of credit allocation to improve their capital adequacy.