Chapter 3
Inflation and Monetary Policy

- The consumer price index rose by 3.9 percent in 2009, which was above the upper limit of the inflation target. The annual inflation rate exceeded the upper limit of the target for most of the year. The index exclusive of tax hikes on consumer goods went up by 2.8 percent, which was within the upper part of the target range.
- The higher than targeted inflation rate, despite the serious global crisis, derived from three main factors: price rises resulting from the government's indirect tax hikes, the rapid increase in the housing component of the index, which reflected a rise in rental prices, and an increase in the energy component of the index. The improvement in the economic environment during the year, expansionary monetary policy and the substantial depreciation of the shekel from the middle of 2008 acted against the moderating effect of the crisis on prices.
- Monetary policy at the beginning of the year was dictated by the serious global financial and economic crisis, to which governments and central banks worldwide reacted with aggressive policy measures. Later in the year, monetary policy was managed against the background of the economy's gradual recovery from the crisis.
- Serious concern over the potential adverse impact of the crisis on the Israeli economy at the end of 2008 and at the beginning of 2009, and the improvement in the economic environment later in the year, were reflected by the development of inflation expectations for a year ahead. These fell heavily, to below the lower limit of inflation target, and were actually negative during the last quarter of 2008. As assessments regarding the economic environment became more optimistic, from May 2009 inflation expectations reverted to around the center of the target range.
- Due to the global crisis and the implications for the economy, the Bank of Israel cut the interest rate on its sources heavily, to a minimal level of 0.5 percent in April, and left the rate at this low level until August.
- In addition to the reduction in the monetary interest rate to the vicinity of its lower bound, the Bank of Israel used other, unconventional instruments in order to help the economy cope with the global crisis. The central bank began daily purchases of government bonds in the secondary market in order to directly influence longer-term interest rates. The Bank also maintained its daily purchases of foreign currency, beyond the amount planned for the purpose of increasing the foreign exchange reserves, a program that started in March 2008.
- In the second half of the year, against the background of an initial rebound in the economy that was characterized by a high level of uncertainty, policymakers were

faced with a challenge. They had to adjust the extent of monetary expansion to the improvement in the economic conditions and the rise in the inflation environment while continuing to help the economy recover from the crisis, at a time when central bank interest rates worldwide remained low.

- In August, the Bank of Israel began to gradually reduce the exceptional monetary expansion which it had adopted due to the threats posed by the global crisis. Bond purchases ceased as planned, the policy of intervention in the foreign-currency market was changed from fixed purchases to case-specific intervention, and the interest rate for September was raised to 0.75 percent. In December, when indications for the improvement in the economic environment accumulated, the central bank continued to adjust the interest rate, and raised it to 1 percent, increasing it again in January, to 1.25 percent.

1. MONETARY POLICY

a. Introduction

Monetary policy during the last quarter of 2008 and the beginning of 2009 was dictated by the global financial and economic crisis.

Monetary policy in 2009 was managed against the background of the serious global financial and economic crisis. The management of monetary policy against the background of the crisis can be divided into two periods: The first period, from the fourth quarter of 2008 to April 2009, was at the height of the crisis. The Bank of Israel responded to the sharp deterioration in the economic environment at the time with unprecedented strident measures, by trimming the monetary interest rate to a minimum level of 0.5 percent, and by using additional monetary instruments in the form of government bond purchases and continued purchases of foreign currency beyond the amount planned for the purpose of increasing the foreign exchange reserves. In addition, the central bank made a number of changes to its monetary instruments in light of the crisis. (See the Bank of Israel announcement of December 24, 2008 and Section 4 of this chapter).

Monetary policy during the second half of 2009 was dictated by the gradual and largely uncertain recovery of the economy from the crisis.

The second period was characterized by an improvement in the economic environment, starting from the second quarter of the year. This development presented a challenge for policymakers, due to the need to balance between the policy adjustment necessary in order to accommodate the change in the economic environment, and in particular the rise in the inflation environment, and continued support for economic activity and the credit markets, given the adverse effects of the crisis on the level of activity and employment and in light of the major uncertainty regarding the pace and extent of recovery from the crisis worldwide, and therefore in Israel as well. In addition, the principal central banks' interest rates were expected to remain low over time, because the countries in question were hit harder by the crisis.

Table 3.1
Main Indicators of Inflation and the Monetary Policy, 2004–09

	2004	2005	2006	2007	2008	2009	2009 I	2009 II	2009 III	2009 IV
A. Inflation (percent)										
1. Inflation target	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3
2. Actual inflation[a]	1.2	2.4	-0.1	3.4	3.8	3.9	-0.1	2.3	1.3	0.5
3. One-year inflation expectations derived from the capital market[b]	1.6	2.0	1.8	1.4	1.9	1.8	0.7	1.8	2.3	2.4
4. Ten-year inflation expectations derived from the capital market[b]	3.6	2.5	2.5	2.4	3.0	2.3	2.1	1.8	2.6	2.6
5. Forecasters' one-year inflation forecasts[b]	2.1	2.1	1.9	1.9	2.4	1.8	0.5	1.8	2.5	2.6
B. Yields (percent)[b]										
1. Bank of Israel key interest rate	4.2	3.7	5.1	3.9	3.7	0.8	1.2	0.5	0.6	0.8
2. Expected real interest rate[c]	2.6	1.7	3.4	2.6	1.8	-1.0	0.4	-1.2	-1.7	-1.5
3. Nominal yield to maturity on unindexed government bonds[d]	6.8	5.7	6.1	5.5	5.8	4.8	4.5	4.9	5.1	4.8
4. Real yield to maturity on CPI-indexed government bonds[d]	4.1	3.5	3.8	3.4	3.4	2.8	2.9	2.9	2.9	2.6
C. Depreciation of the NIS (percent)[e]										
1. Effective nominal	4.4	0.0	-3.4	-1.4	-8.3	3.5	4.4	0.3	-2.3	1.2
2. Against the dollar	-1.2	6.2	-8.9	-7.1	-0.9	-2.1	7.5	-5.2	-4.5	0.6
3. Against the euro	8.0	-6.1	1.5	2.4	-8.4	6.3	4.5	1.5	-0.8	1.0
D. Change in asset prices (percent)[e]										
1. Total (nominal) return on shares	17.6	32.8	5.8	22.9	-46.4	78.8	20.3	18.3	10.3	13.8
2. Apartment prices[f]	-1.2	3.8	-3.8	1.7	10.6	19.6	2.1	4.0	6.5	5.8
E. The monetary aggregates (nominal rate of change, percent)[e]										
1. Money supply (M1)	18.0	23.9	8.3	17.4	17.4	52.3	20.1	16.1	10.2	-0.9
2. Total credit (C3)	2.4	4.0	2.3	5.8	6.6	-0.4	-0.5	-1.6	1.4	0.2
F. Actual budget deficit (percent of GDP)										
1. Domestic deficit excluding credit granted	3.0	1.0	0.2	-0.9	1.3	4.9				
2. Total deficit excluding credit granted	3.6	1.8	0.9	0.1	2.1	5.6				
G. Other backround data (percent)										
1. Rate of unemployment[b]	10.4	9.0	8.4	7.3	6.1	7.6	7.2	7.7	7.9	7.6
2. Rate of GDP growth[g]	5.0	5.1	5.3	5.2	4.0	0.7	-2.7	1.3	3.6	4.9
3. Share of total government debt in GDP[h]	97.4	93.5	84.5	78.2	76.9	79.4				

[a] Change in CPI during the year.
[b] Annual average.
[c] Nominal rate of interest on Bank of Israel auctions minus inflation expectations, annual average.
[d] Gross yield to all terms.
[e] December average vis-à-vis December average in previous year.
[f] According to the House Prices Survey.
[g] Annual average vis-à-vis that of previous year.
[h] Balance of debt at end of year divided by annual GDP.
SOURCE: Based on Ministry of Finance and Central Bureau of Statistics data.

Since data on activity (National Accounts data) are published with a lag, policy decisions have to be based on current indicators of the state of activity at a time of considerable uncertainty—especially in periods of a turnaround in the economic environment. Accordingly, although it eventually transpired that the economy had reverted to a growth pattern as early as the second quarter, an initial estimate of this was only published in August (and the second estimate in September). Similarly, data on the consolidation of growth in the third quarter were only obtained close to the end of the year, in November.

From August, as indicators accrued of a recovery in the economy and a rise in the inflation environment, the Bank of Israel began a gradual process of reducing the extent of the monetary expansion.

The reaction of monetary policy to the global crisis was resolute in view of the potential effects of the crisis on the economy.

The monetary policy response to the global crisis was resolute: The Bank of Israel interest rate was cut to an unprecedented extent, almost to the lower limit, in a manner similar to that in countries which eventually proved to have been more badly hit by the crisis.[1] (See the international comparison in Chapter 1). A rapid and resolute response was necessary in view of the assessments regarding the potentially serious implications of the global crisis. This was concurrent with a fiscal policy that was much less aggressive in response to the crisis than in other countries. (See Chapter 6 for details of fiscal policy, and Chapter 1 for a discussion of the mix between monetary and fiscal policies adopted). In retrospect, as a result of the resolute policy measures adopted worldwide and in Israel, the impact of the crisis was more moderate than in worst-case scenarios, and the recovery—worldwide and in the local economy—began earlier than had been expected at the start of the crisis. Since the Israeli economy was less hard hit than the majority of developed countries and the rebound came earlier than in those countries, the Bank of Israel was one of the first central banks to start raising the interest rate.

b. Monetary policy until April: A resolute response to the global crisis while coping with the lower limit of the nominal interest rate

(1) Background: The global crisis and its implications for the economy

The global economic crisis worsened considerably during the last quarter of 2008.

The global financial and economic crisis, which began in the summer of 2007, worsened considerably in the last quarter of 2008 following the collapse of the Lehman Brothers investment bank. The crisis, which threatened to devastate the global financial system, greatly undermined the confidence of investors and the public, and led to a major recession in the majority of the world's countries. In view of the considerable harm caused to the capital and credit markets, and to economic activity as a result, worldwide fiscal and monetary authorities adopted measures that were exceptional in their nature

[1] It should however be noted that other countries adopted additional and more aggressive measures than in Israel—especially in the form of governments' fiscal measures and central banks' intervention in various asset markets.

and intensity in order to cope with the serious crisis. Central banks cut their interest rates to historically low levels, and adopted a range of additional measures in order to stabilize the financial markets and increase liquidity and the supply of credit in the economy. This was done in order to support economic activity, and to prevent economies from sliding into a depression.

The global crisis affected the Israeli economy primarily through the reduction in exports and the influence on financial markets.

The global crisis harmed activity in the Israeli economy through several channels. Most notable were the downturn in exports resulting from reduced global demand and the impact of the crisis on the financial markets—plunging share prices in the last quarter of 2008, increase in the assessment of companies' and households' risks, and the impairment caused to the nonbank credit market. Expectations of the adverse effect of the crisis on companies and economic activity were reflected by an increase in the yield spreads between corporate bonds and government bonds, by an expansion of the margin between the cost of bank credit and the Bank of Israel interest rate,[2] and by the almost complete cessation of bond issues in the capital market. The downturn in exports and pessimistic assessments regarding economic activity worldwide and consequently in Israel adversely affected the labor market and job security, and dampened companies' demand for investments. The reduced perception of wealth resulting from the undermining of job security and the large decreases in the prices of financial assets had the effect of reducing private consumption, which exacerbated the adverse impact on the labor market. The increased assessment of the risk inherent in companies and households resulting from the deterioration in the economic environment led to stricter terms of credit and added to their difficulties in coping with the crisis.

In reaction to the crisis, expectations of inflation dropped below the lower boundary of the price stability target range and even reached negative levels.

The major deterioration in the economic environment was reflected initially by indicators from the capital market which, as stated, responded rapidly and very negatively to developments in the last quarter of 2008. The turnaround in the economic environment was also rapidly reflected by inflation expectations and forecasts for a year ahead, which fell sharply in the last quarter of 2008—to below the lower limit of price stability target and even to negative levels (Figure 3.1 and Table 3.2), and remained below the target until April.[3]

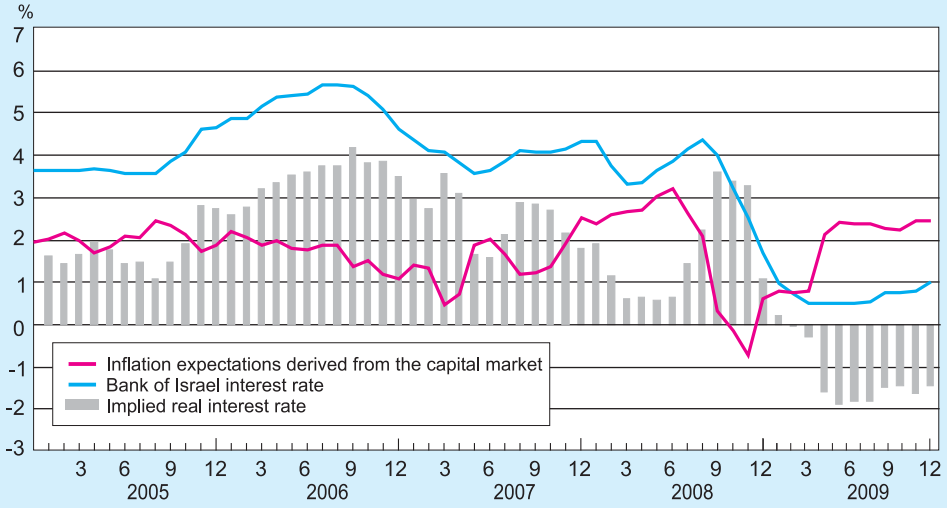
The fall in expectations of inflation in view of the crisis led to a danger of a recessionary spiral.

The decline in inflation expectations resulting from the global crisis created the risk of a deflationary spiral: A decline in inflation expectations increases the expected real interest rate. When the central bank has reduced the nominal interest rate to the lower limit (in order to support activity and to increase inflation), it cannot continue cutting it as a means of reducing the real interest rate and thereby supporting activity. An excessively high real interest rate harms real activity, and the reduced levels of activity push down inflation even more, increasing the real interest rate further, and so

[2] Figure 3.3 highlights the large increase in the margin between lending rates and the Bank of Israel interest rate in 2009. For other possible reasons for the increase in margins, see later in this chapter.

[3] Accordingly, private analysts and the capital market expected the interest rate to fall. Here and throughout the chapter, the term "forecasts" or "private analysts" refers to a number of economic entities in the economy whose forecasts—mainly with respect to inflation and the interest rate—are regularly reviewed by the Bank of Israel.

Figure 3.1
Bank of Israel Interest Rate,[a] Inflation Expectations,[b] and Implied Real Interest Rate, 2005-09
(monthly averages)



[a] Effective interest rate in Bank of Israel auctions.
[b] For next twelve months; derived from the capital market.

SOURCE: Bank of Israel.

on.[4] As will be discussed later, in such circumstances monetary policy must employ additional instruments in order to reduce the real interest rate, and one of the channels to achieve this is by influencing inflation expectations. As can be seen from Table 3.2, this situation did not actually occur. Real interest rates fell from the last quarter of 2008, and in 2009 reached exceptionally low levels. However, the global crisis did lead to concern over the onset of recession accompanied by possible deflation, especially in view of the large decrease in inflation expectations to below the lower limit of the target at the end of 2008 and beginning of 2009.

During the first half of the year, evidence accumulated of the crisis' effect on real activity and the labor market, and the forecasts of economic growth were adjusted downward.

During the initial months of 2009, following the last quarter of 2008, data accrued on the impact of the global crisis on economic activity in the local economy. National accounting data showed a large decrease in exports and declines in investment and private consumption, the Composite State of the Economy Index fell heavily, labor market data showed a major deterioration, and Companies Survey data reflected a downturn in activity and pessimistic expectations for the short and medium term. Pessimism over the state of the global economy and the local economy as a result were reflected in the downward adjustment—and sometimes large downward adjustment—

[4] This is one of the arguments supporting a positive rather than a zero inflation target. A positive target supports positive inflation expectations and reduces the chances of the real interest rate of being excessively contractionary —despite a low level of the nominal interest rate—due to low inflation expectations.

Table 3.2
Nominal and Real Interest Rates and Inflation Expectations, 2008-09

(period average, percent)

	Bank of Israel key interest rate[a]	The Bank of Israel's effective interest rate[b]	Effective interest on overdraft facilities	Difference between interest on overdraft facilities and Bank of Israel effective interest rate	1-year inflation expectations		Derived real interest[d]	Real yield to maturity on	
					From capital market[c]	Forecasters' average		1-year CPI indexed treasury bills[e]	10-year CPI - indexed treasury bills[e]
2008	3.67	3.72	9.8	5.9	1.9	2.4	1.8	1.9	3.5
January	4.25	4.34	10.4	5.8	2.5	2.6	1.8	2.3	3.6
February	4.25	4.31	10.5	5.9	2.4	2.4	1.9	1.9	3.2
March	3.75	3.74	9.9	6.0	2.6	2.6	1.1	1.1	3.2
April	3.25	3.30	9.6	6.1	2.7	2.8	0.6	1.0	3.2
May	3.25	3.33	9.2	5.7	2.7	3.2	0.6	1.4	3.3
June	3.50	3.60	9.5	5.7	3.0	3.1	0.6	1.3	3.2
July	3.75	3.83	9.7	5.6	3.2	3.1	0.6	1.2	3.3
August	4.00	4.11	10.2	5.9	2.6	3.0	1.4	1.8	3.3
September	4.25	4.34	10.4	5.8	2.1	2.8	2.2	2.2	3.5
October	4.00	4.00	10.1	5.9	0.3	2.0	3.6	3.2	4.0
November	3.25	3.20	9.4	6.0	-0.1	1.3	3.4	3.2	4.2
December	2.50	2.53	8.9	6.2	-0.7	0.4	3.3	2.8	3.5
2009	0.77	0.77	8.0	7.2	1.8	1.8	-1.0	-0.4	2.8
January	1.75	1.69	8.3	6.5	0.6	0.3	1.1	0.9	3.2
February	1.0	0.98	8.0	6.9	0.8	0.5	0.2	0.3	2.9
March	0.75	0.70	7.8	7.1	0.7	0.6	0.0	0.3	2.8
April	0.50	0.50	7.8	7.3	0.8	1.1	-0.3	0.1	2.7
May	0.50	0.50	7.9	7.4	2.1	1.9	-1.6	-0.9	3.1
June	0.50	0.50	7.8	7.2	2.4	2.3	-1.9	-1.1	3.2
July	0.50	0.50	7.9	7.4	2.4	2.6	-1.8	-1.1	3.0
August	0.50	0.54	7.7	7.1	2.4	2.4	-1.8	-0.7	2.9
September	0.75	0.75	7.9	7.1	2.3	2.3	-1.5	-0.5	2.9
October	0.75	0.75	8.2	7.4	2.2	2.4	-1.5	-0.7	2.7
November	0.75	0.79	8.3	7.5	2.5	2.6	-1.6	-0.8	2.5
December	1.00	1.01	8.4	7.3	2.5	2.7	-1.4	-0.6	2.5

[a] By liquidity month.
[b].Effective interest; in annual terms.
[c] Based on a zero curve.
[d] Nominal interest rate on Bank of Israel auctions *minus* inflation expectations.
[e] Smoothed curve of *Galil* yields - zero curve..
SOURCE: Bank of Israel and Central Bureau of Statistic data.

of world trade growth forecasts in the first third of the year and accordingly, a downturn in forecasts regarding the local economy.

(2) Monetary policy against the background of the crisis

The Bank of Israel's response to the crisis was resolute in order to support economic activity and financial stability.

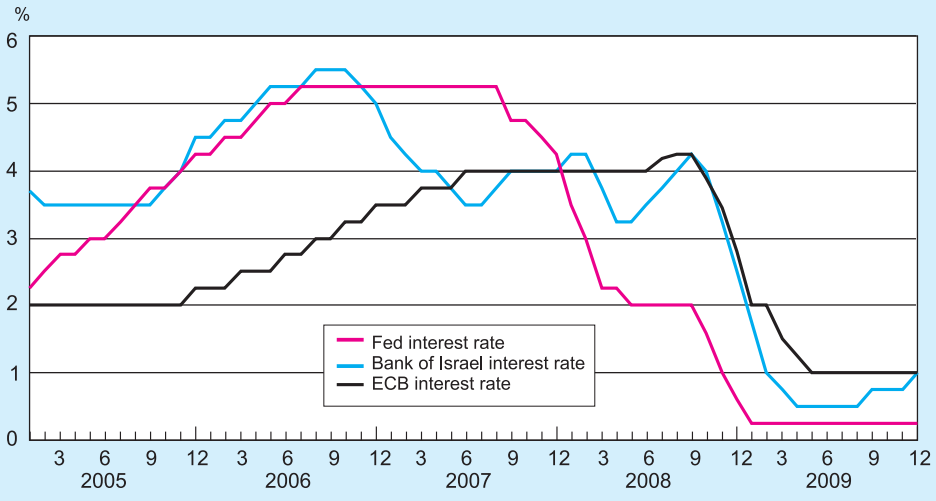
Due to the serious global crisis, the Bank of Israel had to respond very actively in order to help the economy cope with its implications. The need for a resolute monetary policy response in view of the threats to the economy posed by the crisis derived from all policy targets: the desire to support economic activity and maintain financial stability, concurrent with assessments that inflation was declining rapidly due to the decreases in energy and food prices and the global and local economic downturn. The large interest rate cuts by the world's leading central banks (Figure 3.2) also supported a major rate cut by the Bank of Israel.

The monetary interest rate was cut heavily, to 0.5 percent in April, close to the zero lower limit.

Following the reduction in the interest rate in the last quarter of 2008 to a level of 2.5 percent in December, the Bank of Israel cut the interest rate for January and February to the exceptionally large extent of 0.75 percentage point each time, and subsequently cut the interest rate for March and April by 0.25 percentage point each time. The interest rate for April was therefore set at 0.5 percent, the lowest level ever and close to the zero lower limit.

The decision not to cut the interest rate to below 0.5 percent was based on the assessment that at such low interest rate levels, the transmission between the Bank of Israel interest rate cut and the reduction in the banks' lending rate is minor. This is because the banks try to maintain a margin between the interest rate which they charge

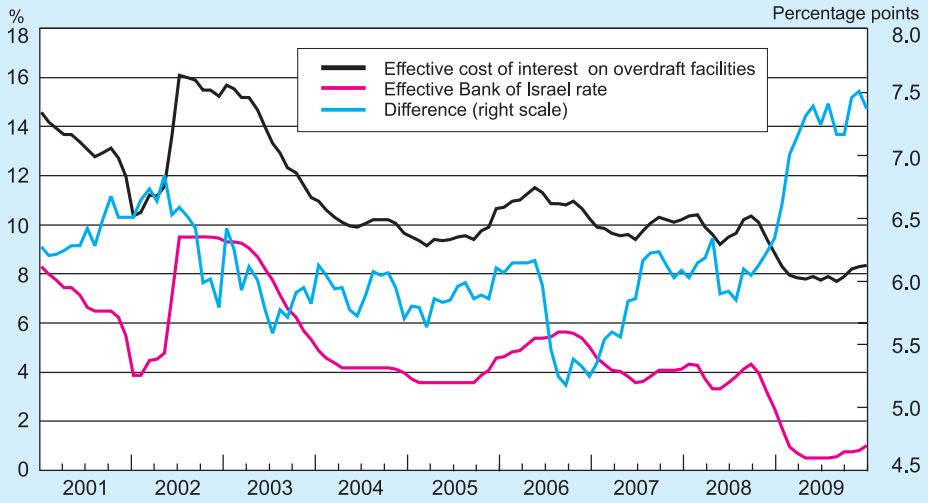
Figure 3.2
Short-Term Interest Rates in Israel, the US, and the Eurozone, 2005- 09
(monthly averages)



SOURCE: Bank of Israel, the Fed and the ECB.

on credit and the interest rate which they pay on deposits. As in a situation where the monetary interest rate is low, the interest rate on part of the banks' deposits reaches zero, and therefore cannot decline when the Bank of Israel's cuts its rate further; therefore there is no further significant decrease in the lending rate, if the Bank makes further interest rate cuts.[5] This is one possible explanation for the increase in the spread between interest rates on bank credit and the Bank of Israel interest rate during the first half of 2009 (Table 3.2 and Figure 3.3), when the Bank of Israel interest rate fell heavily to low levels and interest rates on credit fell less. Other possible explanations are the increased assessment of the risk inherent in businesses and households against the background of the crisis and its implications for activity and the labor market, and the increased share of credit to households, against which the banks exert greater market power. In contrast to the margins between bank credit and the monetary interest rate, the spreads between corporate bond yields and government bond yields fell during 2009.[6] Nevertheless, the high banking margin may indeed reflect, at least partly, a high assessment of risk. This can be explained by the differing nature of bank credit customers and corporate bond issuers, and also possibly by the banks' more cautious attitude compared with purchasers of corporate bonds.

Figure 3.3
Bank of Israel Interest Rate, Interest on Overdraft Facilities, and the Gap Between Them, 2001-09
(monthly averages)



SOURCE: Bank of Israel.

[5] In a situation where due to the zero barrier on the interest rate for depositors the interest rate paid by borrowers falls more than the interest rate paid to depositors, the banks' profitability is impaired. In normal times, the banks' profitability is not a monetary policy consideration. However in view of a serious financial crisis, which could undermine the stability of local financial institutions, policy may have to refer to this issue as well.

[6] See Chapter 4: The Financial System.

Use of additional policy instruments

The main monetary policy instrument which the Bank of Israel uses to influence inflation and economic activity is the interest rate on its sources. As stated, due to the exceptional conditions that arose as a result of the serious global crisis, the Bank of Israel cut the interest rate heavily, to close to its lower limit. In this situation, in order to increase support for economic activity and the financial markets at a time of crisis, additional instruments have to be employed in monetary policy.[7] The need to support economic activity by means of monetary policy increased in view of the relatively moderate fiscal policy response (see Chapter 6).

Due to the exceptional conditions, the Bank of Israel used additional monetary instruments in the form of government bond purchases in the secondary market and continued purchases of foreign currency, in order to relax the terms of credit and to support the exchange rate.

Central banks in many countries worldwide adopted a range of measures in addition to aggressive cuts in the interest rate, in response to the financial crisis and the deep recession that was caused as a result.[8] Part of the action taken by central banks, and notably by the Federal Reserve System in the USA, was intended to assist specific financial institutions that had encountered difficulties and whose collapse would have threatened the stability of the financial and economic system, or to deal with specific assets or credit markets whose impaired functioning would have threatened to exacerbate the crisis.[9,10] The Bank of Israel did not have to take measures of this type. (See Chapter 4 for details of the relative resilience of the financial system in Israel). The Bank of Israel's use of unconventional policy instruments—intervention in the government bond market and the foreign-currency market—was intended to relax the terms of credit in the economy and support the exchange rate, and thereby help the economy cope with the serious implications of the global crisis (those which materialized and those which were expected to materialize according to assessments).

The Bank of Israel's purchases were sterilized: The liquidity surpluses were absorbed, in order to ensure that the level of the interest rate in the market would match the rate set by the Bank.

The Bank of Israel's purchase of government bonds leads to the question of whether the central bank was financing the budget deficit and printing money for this purpose. With respect to foreign-currency purchases as well, the question arose as to whether this involved money printing by the Bank of Israel which is contributing to inflation. When addressing these questions, several points should be noted: Firstly, government bond purchases were carried out in the secondary market, meaning that they did not involve the printing of money for financing government expenditures.[11] Secondly, the purchases did not lead to money printing because the bank sterilized them, in

[7] See also Box 1 in Inflation Report 26 (the first quarter of 2009) and the references therein for further discussion of monetary policy given the zero lower bound on the nominal interest rate.

[8] This was in combination with measures on an unprecedented scale by the fiscal authorities.

[9] For example, in the USA—the asset-backed credit market, the commercial paper market and the money market mutual fund industry.

[10] Thus, against the background of the panic in the markets, central banks, including the Federal Reserve Bank and the Bank of England, fulfilled an important function as "market makers of last resort" in addition to their traditional function as lenders of last resort.

[11] Accordingly, Bank of Israel purchases of government bonds in the secondary market—at the Bank's initiative and as part of monetary policy management—does not contravene the amendment to Paragraph 45a of the Bank of Israel Law, known as "The Non-Printing Law."

the sense that it absorbed the liquidity surpluses that they created, such that the level of the short-term interest rates in the money market would match the interest rate which was determined by the bank. (See also Section 4 in this chapter for details of the absorption of liquidity surpluses). Thirdly, the contribution of the purchases to increasing inflation and preventing deflation—by relaxing credit terms and influencing the exchange rate—was in line with policy objectives (see the discussion of monetary policy transmission mechanisms in Section c below).

Government bond purchases

The Bank of Israel purchased government bonds in the secondary market in order to affect longer-term interest rates directly.

In February the Bank of Israel began to purchase government bonds in the secondary market, and in March announced that it was increasing the use of this instrument and would be purchasing a daily average of NIS 200 million, with the intention of buying a total of between NIS 15 and 20 billion under the program.[12] The bond purchase program was intended to support a decline in longer-term interest rates, and thereby alleviate credit terms in the economy and promote economic activity.[13] The increasing steepness of the yield curves before the intervention in the bond market, when short-term yields plummeted and longer-term yields fell less, motivated the attempt to impact medium-to-long-term interest rates directly and thereby increase the effectiveness of monetary policy. According to studies conducted at the Bank of Israel, the bond purchases led to a decrease in government bond yields by between 30 and 40 base points.

Foreign-currency purchases

In March 2008 the Bank of Israel began to purchase foreign currency in the foreign-currency market in order to increase the foreign exchange reserves and to prevent an excessive appreciation of the shekel, in view of a global financial crisis which threatened to harm the economy.

The Bank of Israel had not intervened in the foreign-currency market since 1997.[14] After over 10 years of non-intervention in the market, in March 2008 the Bank of Israel began to purchase foreign currency in the secondary market under a program that was aimed at increasing the economy's foreign exchange reserves.[15] The need to increase the reserves was determined in view of the rapid GDP growth during recent years and the Israeli economy's growing integration in the world economy and the global financial system. The timing of the commencement of the program, from the first quarter of 2008, was determined in light of the large and continued appreciation

[12] Daily turnover in government bonds during 2009 averaged NIS 2.5 billion (NIS 1.7 billion in unindexed bonds and NIS 800 million in CPI-indexed bonds). At the end of the program, the Bank of Israel had purchased bonds in the amount of NIS 18 billion. The Bank of Israel's share in government bond holdings rose from 0.8 percent in 2008 to 5.5 percent in 2009 (Table 4.A.10).

[13] See the discussion of monetary policy transmission mechanisms below.

[14] For information on the Israeli economy's transition from a managed exchange rate regime to an inflation target regime with a floating exchange rate, see: David Elkayam (2003), "The Long Road from Adjustable Peg to Flexible Exchange Rate Regimes: The Case of Israel," *Monetary Studies*, Bank of Israel.

[15] The implementation of the program was preceded by Bank of Israel intervention in the foreign-currency market on March 13-14, 2008, due to a failure that was observed in this market.

of the shekel (Figure 3.6). This was against the background of assessments that the global financial crisis, which began in 2007, would adversely affect the economy and that an appreciated local currency would make it difficult for the economy to cope with the implications of the crisis. From the end of March 2008 the Bank of Israel purchased $25 million of foreign currency a day, and from July of that year, due to a large appreciation of the shekel, the Bank increased the amount of daily purchases to $100 million.

In March 2009, as a result of the deteriorating economic situation, the Bank of Israel decided to continue daily foreign currency purchases beyond the amount planned for the purpose of increasing the foreign reserves.

In March 2009, due to the deteriorating economic situation caused by the global financial crisis, the Bank of Israel decided to continue purchasing a daily average of $100 million in the foreign-currency market in Israel, without defining a target for the size of the reserves.[16] Hence, due to the implications of the global crisis for the economy, the bank used its foreign-currency purchases as an additional monetary policy instrument, in order to support the exchange rate and thereby help the economy to cope with the effects of the crisis. (See Section d below for details of the change in the policy of intervention in the foreign-currency market from August.)

c. The transmission mechanism of monetary policy: The interest rate and bond and foreign-currency purchases

The interest rate on Bank of Israel sources is the interest rate which the commercial banks pay on daily loans from the Bank of Israel or the interest rate which they receive on daily deposits at the Bank of Israel. This interest rate affects the interest rates which the banks charge their customers or pay to them, as well as the market interest rates. The close relationship between the Bank of Israel interest rate and the interest rates on credit can be seen from Figure 3.3.

A reduction in the Bank of Israel interest rate has the effect of increasing non-financial activity in several channels.

A reduction in the interest rate on Bank of Israel sources has the effect of increasing economic activity via several principal channels: First, because of short-term price rigidity, a reduction in the nominal interest rate is reflected by a decrease in the real interest rate. A change in the short-term interest rate affects interest rates for longer terms inter alia by means of the impact of the current interest rate on the interest rates expected in the future.[17] A decrease in real interest rates reduces the cost of credit (or makes saving less worthwhile), and thereby encourages domestic demand for investment and private consumption.[18]

[16] In February 2008, before the foreign-currency purchases began, the Bank of Israel's foreign exchange reserves amounted to approximately $29 billion. At the end of 2008, the Bank of Israel announced that the desirable amount of reserves was between $40 billion and $44 billion. In March 2009, the reserves totaled $44 billion. As stated, the central bank decided to continue with its foreign-currency purchases and in December 2009, the reserves totaled $60.6 billion.

[17] Interest-rate smoothing—refraining from large and rapid changes in the interest rate within the framework of monetary policy—supports this.

[18] As an example, a decrease in the mortgage interest rates as the result of the reduction in the monetary interest rate contributed to a growth in demand for housing. See Chapter 4: The Financial System, for further details of the mortgage market.

Second, a decrease in the local interest rate relative to worldwide interest rates leads to a depreciation of the shekel, which reduces the cost of exports in foreign-currency terms and thereby contributes to a decrease in the relative price of exports compared with foreign competition and as a result, to an increase in demand for the economy's exports abroad. In the same way, a depreciation has the effect of increasing the prices of imports compared with the prices of local production and thereby increases domestic demand for GDP, at the expense of demand for imports.[19] A depreciation also supports a rise in inflation and inflation expectations, and thereby contributes to a decrease in the expected real interest rate.

Foreign currency purchases were used as an additional channel to affect the foreign exchange rate.

In the conditions of the present crisis, the worldwide downturn in interest rates resulting from the crisis has restricted policy's ability to effect a depreciation by reducing the local interest rate. Accordingly and given the small size of the economy, foreign-currency purchases were used as a policy instrument for effecting a depreciation of the local currency. Bank of Israel studies show that foreign-currency purchases have indeed affected the exchange rate of the shekel. For example, these purchases contributed to a depreciation of the shekel in the second half of 2008 and the first half of 2009 (Figure 3.6). (See Chapter 7: The Balance of Payments for details of the exchange rate of the shekel against the background of Bank of Israel purchases and capital flows.)

Third, a reduction in the interest rate pushes up the prices of assets by increasing the discounted value of the income flow deriving from the assets—for example, dividends to shareholders or apartment rental fees. A low risk-free interest rate also encourages investors to seek higher yield while taking risks, and thereby has the effect of increasing asset prices.[20] An increase in the value of tangible capital assets encourages investment in them.[21] This increase also pushes up demand for private consumption and capital investment via the income effect and by means of the increased value of collateral and as a result, by leading to a relaxation of the terms of credit for individuals and firms.

Support for economic activity enhances companies' profitability and supports a growth in employment, and thereby also contributes to reducing the households' and companies' risks. This in turn supports a relaxation in the terms of credit for them, a mechanism that further improves activity via financial channels.

The main transmission channels via which a reduction in the interest rate has the effect of increasing inflation include a growth in demand in the previously-mentioned ways, the impact on the exchange rate and via it on the prices of imported goods, and the impact on inflation expectations.

[19] Monetary policy is unable to influence real variables—the real interest rate and the real exchange rate—in the long term, but can influence them temporarily, because of short-term price rigidity.

[20] For a discussion of the relationship between monetary policy and risk-taking—by investors and by banks in the granting of credit—see for example: Leonardo Gambacorta (2009), "Monetary Policy and the Risk-Taking Channel," *BIS Quarterly Review*, December 2009.

[21] The Bank of Israel's interest rate cuts resulting from the crisis do indeed appear to have contributed to a growth in demand for apartments, and thereby supported a growth in investment in housing construction. See the section on the construction industry in Chapter 2.

Government bond purchases directly affect longer-term interest rates.

The transmission mechanism of government bond purchases works via the effect on market interest rates, in a manner similar to the impact exerted by the level of the Bank of Israel interest rate.[22] As stated, the Bank of Israel used government bond purchases in the secondary market in order to directly influence yields for longer terms, which are the terms relevant for decision-making on investment and the purchase of durable assets. The interest rates on government bonds serve as a benchmark for the pricing of corporate bonds (the yield on the latter also reflects a risk premium) and for other interest rates on credit. Accordingly, a decline in government bond yields supports a decrease in the costs of credit in the economy, thereby making it easier to finance the activity of businesses and households at a time of crisis.

A decline in corporate bond yields encourages capital raising via the non-bank credit market, which was hit by the crisis. Support for the non-bank credit market may also help households and companies that lack access to the non-bank credit market. This is because large companies' issues of capital via the non-bank market supports the availability of bank credit for other borrowers.

Bank of Israel purchases in the capital market may contribute to an increase in prices of other assets, as the sale of assets to the Bank diverts investors' sources for the purchase of those assets. A supporting factor in this respect was the absorption of the liquidity surpluses that had been created as the result of purchases via monetary deposits instead of by means of *makam* issues, in line with the program for increasing liquidity which the Bank of Israel had operated from January. (See also the section on monetary instruments in this chapter.) As stated, an increase in asset prices is yet another way of supporting a growth in demand, via the income effect and by means of a relaxation in credit terms resulting from the increased value of collateral.

Finally, apart from specific action taken by the Bank of Israel, its clear intention to use the tools at its disposal as much as necessary in order to support economic activity and guarantee the resilience of the financial institutions and the markets played an important role in restoring the confidence of the public as a whole and investors in particular in the financial markets and in the economy, and thereby contributed to the economy's recovery from the crisis.

d. Monetary policy from May, against the background of indications of an improvement in the economic environment

(1)Improvement in the economic environment

As early as the second quarter of the year, as the result of the resolute measures adopted by governments and central banks worldwide—most notably in the USA, the source of the crisis—concern over a possible collapse of the global financial system decreased.

[22] In this sense, the use of foreign-currency purchases as a policy instrument is more unusual than bond purchases. This is because it attempts to influence the exchange rate directly rather than by means of the usual transmission mechanism, via the effect on interest rates.

Economies did nevertheless have to cope with a serious worldwide recession and the need to rehabilitate the financial system and deal with its failures. The worldwide improvement in investors' confidence was reflected in the capital market, by the rise in share prices in worldwide stock markets and by the signs of an improvement in the credit markets. By its very nature, an improvement in non-financial activity is slower and more gradual, and indications of such an improvement became apparent later in the year.

In the local economy, the turnaround in the economic environment was more noticeable and more rapid than in the majority of developed countries. The most notable turnaround was apparent in the financial markets, as evident from the rise in share prices from the second quarter of the year after these prices had slumped at the end of 2008 (Figure 4.3). An improvement was apparent in the credit markets as well, and was apparent inter alia from a decrease in the cost of credit and an increase in its availability, by a decrease in risk margins and by the resumption of corporate bond issues in the non-bank market.[23] These reflected the improvement in investors' confidence and their assessments regarding the economic environment. The change in the economic environment was also markedly reflected by the development of inflation expectations, which rose sharply from around the lower limit of the target in April to around the center of the target inflation range and even above it from May (Figure 3.1 and Table 3.2).

An improvement in the economic environment apparent in the second quarter of 2009 was initially reflected in the financial markets, and by an increase in inflation expectations to around the center of the target inflation range.

During the second quarter of the year, indications began to accrue showing that the downturn in economic activity was becoming more moderate. Subsequently, the beginnings of a recovery in the economy became apparent. The Israeli economy preceded the majority of developed economies with an end to the activity downturn and the start of a recovery. This was due to the economy's relatively good conditions prior to the crisis, and to the resolute policy measures that helped the economy cope with the crisis.

(2) Monetary policy to August: Maintaining the extent of the monetary expansion

Until August, the Bank of Israel maintained a very expansionary monetary policy. The bank left the interest rate on its sources at the minimal level which it had reached—0.5 percent—and continued its purchases of foreign currency and government bonds at an average daily amount of $100 million and NIS 200 million respectively.

Until August the Bank of Israel maintained a very expansionary monetary policy. It left the interest rate at a very low level, and continued its daily purchases of foreign currency and government bonds.

This policy reflected the bank's assessment that continued strong support for economic activity was necessary because of the adverse effect of the global crisis on activity and employment and the uncertainty over the rebound in the economy, and that the policy conformed to the bank's other objectives of price stability and financial stability. Moreover, in view of the effects of the crisis and the uncertainty regarding a recovery, the risk involved in a deterioration in economic activity was greater than the risks involved in a highly expansionary monetary policy—principally a rise in

[23] For a discussion of developments in the financial markets see Chapter 4: The Financial System.

The retention of expansionary policy was intended to support activity and the markets, against the background of the uncertainty regarding the timing and the persistence of the economy's recovery from the crisis. This was in view of the assessment that such a policy conforms to the attainment of the inflation target.

The maintenance of worldwide interest rates at a low level supported the retention of a low domestic interest rate.

the inflation environment. Despite accruing indications during the second quarter of the year of a moderation or actual end to the downturn in activity, in view of the uncertainty regarding economic activity and global economic developments, it was still too early to determine that a turnaround and the start of a recovery was indeed taking place.[24] Concern over the global recovery derived inter alia from assessments that the recovery might be based on significant government measures, and that it could peter out once these measures were removed. This was concurrent with factors that were expected to impede global recovery, such as households' high level of leverage, the weakness in the labor market, the large growth in public debt and the damage suffered by financial institutions as a result of the crisis.

Moreover, in view of the weakness in the world's leading economies and the major uncertainty regarding recovery from the crisis, worldwide interest rates remained at their low levels, and were expected to remain at these levels for some considerable time. Since a high interest rate relative to worldwide interest rates increases the attractiveness of the shekel, it is expected to lead to capital imports and a strengthening of the shekel, which could hinder a rebound in activity and especially a recovery in exports. Thus, the relatively moderate impact of the crisis on the domestic economy and the high inflation environment compared with other countries, together with the adverse effects of the crisis on activity and employment and the fragile nature of the rebound in the economy, presented a challenge to policymakers.

With respect to the price stability target: Inflation expectations and forecasts, which until April were below or near the lower limit of the target range, rose considerably in May and reached the center of the target range and even slightly above it (Figure 3.1 and Table 3.2). The Bank of Israel assessed that the increase partly reflected the improvement in the economic environment, especially the rise in energy prices which accompanied the improvement in the global environment, and expansionary monetary policy. However, the central bank also believed that part of the increase derived from the government's decisions to raise value added tax and the taxes on cigarettes and fuel, and to impose a drought surcharge on water prices—decisions that were expected to lead to non-recurring price increases during the subsequent months. Inflation expectations were therefore no longer below the target, but close to the center of the target range, and the risk of deflation decreased considerably. However, the underlying factors affecting inflation continued to exert a moderating effect because of the low level of activity in Israel and worldwide relative to production capacity, and low interest rates worldwide.

Under these circumstances, a continuation of the highly expansionary policy that was adopted from April served the purpose of maintaining close support for activity and supporting the financial markets and the credit markets as well, while conforming to the attainment of the inflation target. Concurrent with expectations and forecasts that

[24] As stated, estimates of GDP and uses growth rates in the second quarter were only published in August. Even when growth data were published, the extent to which these growth rates would persist was uncertain.

inflation a year ahead would be close to the center of the target range, no immediate rise in the interest rate was forecast. Thus, players in the market also perceived the retention of a low interest rate as conforming to the attainment of the inflation target.

(3) Monetary policy from August: A gradual reduction in the extent of the monetary expansion

The highly expansionary monetary policy adopted in view of the risks inherent in the global crisis helped the economy to cope with the implications of the crisis. However, such an expansionary policy also involves risks, highlighting the importance of adjusting the extent of the expansion to changing conditions. The policy challenge was to assess the appropriate pace of adjustment to prevent it from being too early or too rapid, which might impede the economy's recovery from the crisis—and also to prevent it from being too late or too slow in view of the risks involved in an excessively expansionary monetary policy, namely, the development of inflationary pressures, undermining of the credibility of the inflation target regime and the potential implications for financial stability. An adjustment in the extent of the monetary expansion was initiated as assessments regarding a turnaround in economic activity were increasing, concurrent with indications of a rising inflation environment.

Due to the rise in the inflation environment and growing assessments regarding a turnaround in economic activity, the Bank of Israel began to gradually reduce the extent of the monetary expansion.

As stated, the Bank of Israel estimated that the upturn in inflation expectations for a year ahead in May, from around the lower limit of the target to around the center of the target range and even above it, partly derived from expected non-recurring price increases resulting from the government decisions. However, inflation expectations and forecasts for the coming year continued to rise—to a notable extent following the publication of the surprisingly high price index for June—and these remained relatively high even after publication of the July index, which embodied most of the direct impact of these price increases.[25] Inflation expectations for longer terms as well (for two years and for three years) also rose to the upper part of the target range (Figure 3.4).[26] These developments reflected a rise in the inflation environment against the background of an improvement in the economic environment and a highly expansionary monetary policy.

The rise in inflation expectations for a year ahead to around the center of the target range, together with a very low nominal interest rate, were reflected by a particularly low expected real interest rate of minus 1.5 percent, and even below this from May onwards (Figure 3.1 and Table 3.2). A similar picture was apparent from the yields on one-year indexed bonds, which were also negative from May (Table 3.2). Such a low real interest rate reflected an exceptional extent of monetary expansion that no longer

[25] Inflation expectations for a year ahead following publication of the July index were therefore not expected to be directly affected to any major extent by changes in taxation.

[26] Since inflation expectations derived from the capital market—from the yield on CPI-indexed and unindexed bonds—include a risk premium component, it is reasonable to assume that they reflect an over-assessment of expected inflation, especially the longer is the time term to which they refer.

matched conditions in the economy, which had improved during the year, and was indicative of the need to adapt monetary policy to the improved conditions.

In August the Bank of Israel stopped buying government bonds and changed its policy of intervention in the foreign currency market.

The gradual exit from the significant monetary expansion was implemented using the three policy instruments which the Bank of Israel had used in light of the global crisis: Initially, the nonstandard policy instruments were adjusted, followed by a gradual adjustment in the interest rate. First of all, at the end of July, the Bank of Israel announced that it would be stopping its purchases of government bonds from August in line with the program which it had announced in February concerning daily purchases up to a cumulative amount of between 15 and 20 billion shekels.[27] Subsequently, in August, the bank replaced the policy of purchasing a fixed daily amount of dollars with a policy of intervention on a discretionary basis, in cases of exceptional exchange rate fluctuations which do not match the underlying economic conditions in the economy.[28] Finally, the interest rate for September was raised by a moderate 0.25 percentage point, to a level of 0.75 percent—a level that was still very expansionary.

In September, the bank began a gradual process of raising the interest rate, increasing it to 0.75 percent.

In October and November, the Bank of Israel left the interest rate at a level of 0.75 percent. This reflected the gradual nature of the reduction of the monetary expansion resulting from uncertainty over global recovery and the desire to continue supporting a rebound in economic activity. Since the interest rate spread affects capital flows and therefore the exchange rate, the interest rate had to be adjusted gradually in view of the low interest rates world wide, which were expected to remain low for some considerable time.

The Bank of Israel raised the interest rate to 1.0 percent in December, and to 1.25 percent in January.

In December the Bank of Israel continued to adjust the level of the interest rate towards what are regarded as normal levels, and increased the rate by 0.25 percentage point to a level of 1 percent. This process was maintained with a 0.25 percentage point rate hike for January, to a level of 1.25 percent. The decisions to maintain an increase in the interest rate were based on growing indications of a rebound in the economy, the location of inflation expectations in the upper part of the target range, and the large increases in asset prices, including housing prices.

Change in the policy of intervention in the foreign-currency market

In response to the threat to the economy posed by the global crisis, the Bank of Israel has been using foreign-currency purchases as an additional means for helping the economy to cope with the crisis. This support was especially important in view of

[27] Overall, bonds in the amount of NIS 18 billion were purchased under the program.

[28] The change in the policy of intervention in the foreign-currency market was gradual in order to prevent a shock in the market: On August 3 the Bank of Israel announced that it would operate in the foreign-currency market in the event of exceptional fluctuations in the exchange rate which do not match underlying economic conditions, or when the foreign-currency market is not functioning properly, and that it would continue its daily purchases of $100 million. On August 10, the bank announced that it would cease its fixed daily purchases following the adoption of the new policy.

the serious damage which the crisis had caused to exports, one of the main channels through which the global crisis had harmed the Israeli economy.

As part of the gradual exit from the monetary measures adopted as a result of the crisis, the Bank of Israel ceased its regular purchases of foreign currency and continued to intervene in the foreign-currency market on a discretionary basis. This policy helped to moderate unusual fluctuations in the exchange rate and prevent an excessive appreciation of the shekel at the time of the initial recovery from the crisis, which was accompanied by much uncertainty. The change in the intervention policy was a stage in the return to a normal situation, in which the Bank of Israel only intervenes in the foreign-currency market in exceptional circumstances.

The policy of intervention in the foreign currency market was changed in August, from fixed daily purchases to intervention according to conditions in the foreign-currency market and in the economy.

In Israel as in many other countries, an inflation targeting regime has been adopted in which the nominal anchor is the inflation rate and the instrument for attaining the target is the interest rate on the central bank's sources, which affects market interest rates. The nominal exchange rate is flexible, and is affected by the economic conditions that affect the real exchange rate.[29] Notwithstanding the contribution of the intervention in the foreign-currency market in helping the economy cope with the crisis, concern was expressed that this intervention could harm the credibility of the inflation target as the Bank of Israel's principal target—in particular in view of the continued intervention in the foreign-currency market even when the economy began to recover from the crisis.[30] But since inflation expectations for all terms remained within the target range, the credibility of the inflation target regime appears to have been maintained. In any event, the Bank of Israel emphasized that it regarded the period of intervention in the foreign-currency market as exceptional and a direct result of the global crisis, and that it intended to revert to a situation of non-intervention in the market except in exceptional circumstances. Accordingly, the bank encouraged those exposed to exchange rate fluctuations—exporters, importers, borrowers, lenders and investors—to protect themselves against exchange rate risks with the existing tools in the market, and exporters to increase their competitiveness by increasing their efficiency and by seeking new markets.[31,32]

The Bank of Israel emphasized that it regards the period of intervention in the foreign currency market as exceptional, and as resulting from the global crisis.

[29] For a discussion of the factors affecting the real exchange rate, see Box 2.2 in the Bank of Israel Report for 2008.

[30] The recommendation to stop the intervention in the foreign-currency market was contained in the report which the OECD submitted in January 2010, as part of the process of examining Israel's accession to the organization.

[31] See the press release of October 19, 2009: "The Bank of Israel's Exchange Rate Policy."

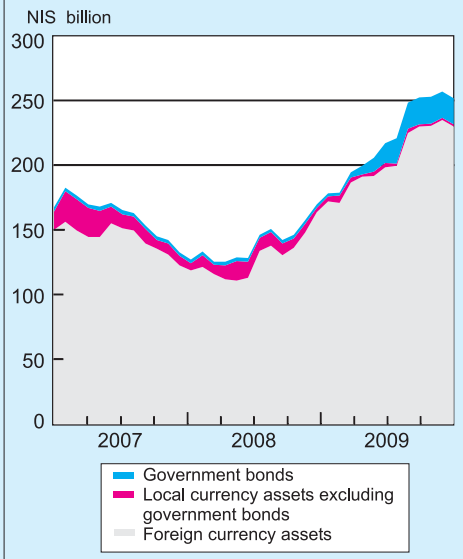
[32] According to a survey conducted by the Manufacturers Association, in 2009 the proportion of companies carrying out exchange rate hedges did indeed increase (to 81 percent among the companies participating in the 2009 survey compared with 52 percent in 2008). See Chapter 7: Balance of Payments, for details of investors' increased usage of market tools for hedging against exchange rate risks.

Box 3.1
The Bank of Israel's foreign currency and government bond purchases: an analysis of their impact on the Bank of Israel's income and expenses

In March 2008 the Bank of Israel began to purchase foreign currency for the first time in 10 years, and between February and August 2009, it also used government bond purchases in the secondary market as additional instruments of monetary policy implementation and maintaining financial stability. These instruments (hereinafter: "additional instruments") came in addition to the instruments that are regularly used for implementing monetary policy—setting of the short-term interest rate and the extent of the monetary base—which involve interest payments from the Bank of Israel (on the banks' deposits with it and on *makam* issues to the public) and interest payments to the Bank of Israel (on monetary loans to banks), hereinafter "the regular tools." This box presents an economic analysis of the implications of the use of the additional instruments for the Bank of Israel's income and expenses, and the risks deriving from the use of these instruments.

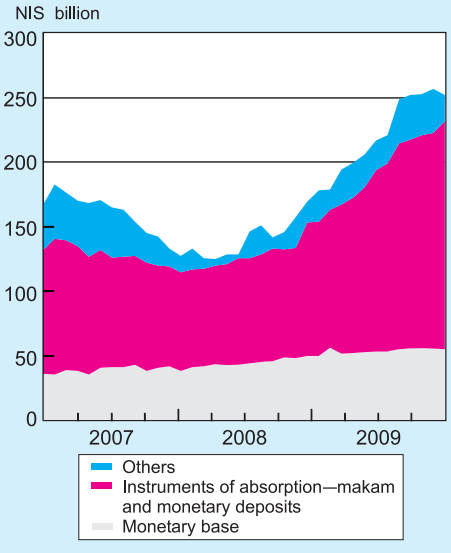
The Bank of Israel's income and expenses are affected by the size and structure of its balance sheet, and the development of this balance sheet. Figures 1 and 2 present the development of the asset side and the liabilities side of the Bank of Israel's balance sheet from the beginning of 2007. The expansion of the foreign exchange reserves and of the government bond reserves (the latter to a far lesser extent) led to a doubling of the balance sheet on the asset side at the end of 2009 compared with March 2008. On the liability side, the growth in the central bank's assets was accompanied by an increase in *makam* issues and monetary deposits. This reflects the absorption of the liquidity surpluses that arose as a result of the Bank of Israel's foreign currency and government bond purchases, in order to ensure that the monetary base matched the demand for it at

Figure 1
The Bank of Israel Balance Sheet, Assets Divided into Local Currency and Foreign Currency Assets, 2007-2009



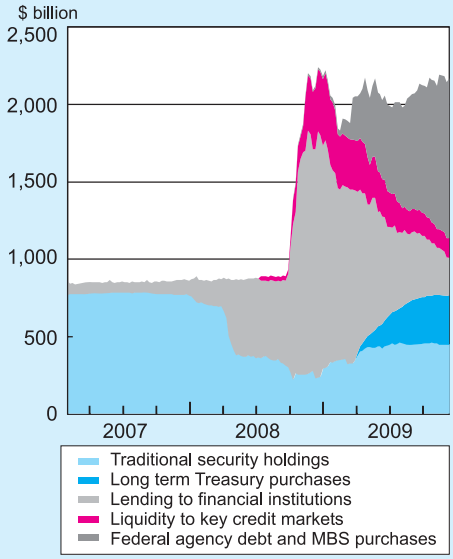
SOURCE: Bank of Israel.

Figure 2
The Bank of Israel Balance Sheet, Liabilities Divided into the Monetary Base, Instruments of Absorption, and Others, 2007-09



SOURCE: Bank of Israel.

Figure 3
The Fed Balance Sheet, Assets, 2007-09



SOURCE: Federal Reserve Bank of Cleveland.

the interest rates determined within the framework of monetary policy. This development in the Bank of Israel's balance sheet can be compared with the development of the Fed's balance sheet. Figure 3 presents the asset side of the Fed's balance sheet,[1] which also doubled and even more rapidly. This was achieved by employing a more extensive range of instruments, reflecting the drastic measures that were taken in the US for dealing with the crisis.[2]

The traditional core function of a central bank is monetary policy management, which is reflected in the determination of the short-term interest rate and supply of the monetary base used by the non-banking public for holding cash and by the banks for creating liquid assets in their clearing and settlement accounts at the Bank of Israel. Supplying the monetary base generates profits for the Bank of Israel, which are an important part of a central bank's income. These derive from the central bank's exclusivity in the management of the commercial banks' clearing and settlement accounts, and in the issue of cash (banknotes and coins). The monetary base is effectively a kind of bond on which the central

[1] or a comparison of developments in the size of other central banks' balance sheets relative to GDP, See Fig 1.2 in Chapter 1: The Economy and Economic Policy.

[2] The drastic measures in the USA were taken due to the threat of the impending collapse of very large financial institutions, a situation that did not arise in Israel, as is known.

bank does not pay interest, and when it replaces the regular interest-bearing monetary instruments, it creates the seigniorage profit.[3]

The application of the regular and additional monetary tools necessary for performing the central bank's other functions, in addition to its core function, involves a cost which can be quantified and is reflected by the bank's income and expenses. If all other factors remain unchanged, when this cost exceeds seigniorage income to the extent of creating negative capital in the Bank of Israel's balance sheet, the transfer of profits, if any, by the bank, to the government is deferred. Therefore, when application of the entire range of monetary instruments creates losses, these reduce the revenue base in the broad government budget and in the final account, as with any government or quasi-government activity, the cost of monetary policy is borne by the public. It should however be borne in mind that the application of the Bank of Israel's monetary policy, with both regular and additional instruments, contributes to price stability, Israel's financial stability and growth in the economy. These benefits, although significant, are difficult to quantify in monetary terms, in contrast to the cost of their application, so that an analysis of the Bank of Israel's income and expenses cannot present the overall picture.[4]

Three main factors affect the Bank of Israel's income and expenses and via them, its profits. The first factor is the direct cost of employing monetary instruments, which is reflected by the difference between the interest rate which the Bank of Israel pays on monetary deposits and the *Makam* yield at the time of issue, and the yield on the assets in which the foreign exchange reserves are invested. (The effect of this factor on profits during recent years was actually positive).[5] The second factor is the change in value resulting from the exchange rate differentials between the shekel and the currencies in which

[3] Although seigniorage is presented in the financial statements of a number of central banks, for historical reasons, seigniorage is more an economic than an accounting term. Seigniorage profits are not presented in the Bank of Israel's financial statements, and are expressed by a decrease in the monetary cost, as will be explained below.

[4] It should be emphasized that although the Bank of Israel is aware of the cost deriving from the use of regular and additional instruments, the objectives to which it aspires in its monetary policy are price stability and economic growth, and it does not endeavor to maximize profits.

[5] Since Israel usually has a positive risk premium relative to the markets in which the reserves are invested, it is reasonable to assume that the yield achievable on the reserves in the time horizon and at the level of risk of the monetary instruments (such as foreign government bonds) is less than the interest rate that has to be paid on the monetary instruments, which can be expected to cause losses. In practice however, part of the Bank of Israel's foreign exchange reserves are invested for a term exceeding that of the monetary instruments, which by definition is short. Apart from that, Israel's risk premium has decreased continually during recent years. Accordingly and for other reasons as well, during the past decade the reserves have produced income slightly higher than the interest expenses on the monetary instruments. As a result, this factor actually had the net effect of reducing the deficit in the bank's capital, albeit to a minor extent.

the foreign exchange reserves are invested: A depreciation of the shekel against the currency composition of the foreign exchange reserves increases the shekel value of the reserves, and thereby creates (realized or non-realized) income, and correspondingly, an appreciation of the shekel creates losses. The third factor is the seigniorage profit as stated. The size of this component is dependent on the size of the monetary base: The more the monetary base expands—at a rate that is (positively) affected by the rate of GDP growth—the less will be the need to increase the amount of absorption by means of the monetary instruments, which obviously reduces the cost of applying the monetary instruments. This cost reduction reflects seigniorage profits.

The foreign-currency purchases in 2008 and 2009 increased both the foreign exchange reserves managed by the Bank of Israel, and the use of monetary instruments for absorbing the liquidity surpluses that were injected in return for the foreign currency that was purchased. This development increases the risk of a decrease in the bank's profits, because of the negative difference between the yield on the reserves and the cost of applying the monetary instruments, which are now employed more extensively. However, a growth in the reserves could also contribute to the creation of profits, and the risk can be reduced by sophisticated risk management methods, as well as by exploiting economies of scale deriving from the management of a larger portfolio. In the longer-term, economic growth will be lead to an expansion in the monetary base and to an increase in seigniorage profits. Accordingly and based on a reasonable assumption of growth, the cost of applying monetary instruments, which increased as a result of the foreign-currency purchases, is expected to decrease over the years.

An additional effect of foreign-currency purchases can be expected in the form of exchange rate differentials. Due to the growth in the foreign exchange reserves in the Bank of Israel's asset portfolio, the effect on them of the rate of depreciation/appreciation is greater, thereby creating larger profits/losses in shekel terms. Unlike the direct cost, which has risen due to the increased usage of monetary instruments and is expected to fall in the long-term—assuming that the size of the foreign exchange reserves will remain at its present higher level, both the increased risk of losses (in shekel term) due to appreciation and the increased chance of profits (in shekel term) due to depreciation are expected to persist.

The Bank of Israel's purchases of government bonds for its asset portfolio was also accompanied by the absorption of the liquidity surpluses that were injected in return for the purchase of the bonds. For as long as the average cost of employing monetary instruments (the Bank of Israel interest rate and the *makam* yield) throughout the period in which the bonds are held is less

than the average yield to maturity at which the bonds were purchased, their purchase can be expected to contribute to a growth in the bank's income, as indeed has occurred so far. Only in the event that the average cost of employing monetary instruments throughout the period in which the bonds are held exceeds the average yield-to-maturity at which the bonds were purchased, will their purchase contribute to a growth in the Bank's losses. Exchange rate differentials are not relevant to the effect of the bond purchases on the Bank of Israel's profits because the bonds that were purchased are denominated in local currency. In any event, when the government bonds held by the Bank of Israel reach maturity, the use of the regular tools for absorbing the liquidity that was injected at a result of their purchase will decrease, and the cost of using these instruments will zero.

e. Monetary policy, actual inflation and inflation expectations

The principal objective of monetary policy is the maintenance of price stability, which since 2003 has been defined as inflation within the range of between 1 and 3 percent. As can be seen from Figure 3.4, actual inflation 12 months back exceeded the upper limit of the target throughout 2008 and for most of 2009.[33] This was after inflation had actually deviated below the lower limit of the target for most of the time in 2007. What was notable, concurrent with the deviations, sometimes significant, of actual inflation during the period from 2003, was the relative stability of inflation expectations derived from the capital market (break-even inflation), which were within the target range throughout almost the entire period.[34] The stability of these expectations despite significant fluctuations in actual inflation reflects the credibility of the inflation target policy.

In a flexible inflation targeting regime, policy is directed at gradually restoring inflation to within the target range concurrent with the other policy aims of supporting real activity and employment and the stability of the financial system.[35] A policy such as this was clearly apparent in 2009: Even though inflation exceeded the upper limit of the target, policy was expansionary because of the serious global crisis and the dangers which it posed to activity and financial stability. This was based on the assessment that inflation would come into the target range within a few months.

[33] In May, September and October 2009 inflation was within the target range, but close to the upper limit.

[34] See also Box 3 in Inflation Report 21 for the second half of 2007: "Analysis of the development of expected inflation and actual inflation in the last decade."

[35] See Box 3.1 in the Bank of Israel Annual Report for 2006 for further discussion of flexible inflation targeting.

A period of turnaround in the economic environment highlights the need of policy to be forward-looking. Since monetary policy's effect on activity and prices mostly occurs with a lag, when determining policy measures decision makers have to assess future conditions and their impact on inflation. As an example, in the last quarter of 2008 and at the beginning of 2009, following the considerable worsening of the global economic conditions, actual inflation over the previous twelve months exceeded the upper limit of the target, while inflation expectations fell below the lower limit (Figure 3.4). Despite the deviation of actual inflation from the upper limit of the target range, the Bank of Israel adopted an expansionary monetary policy due to the expectation of a serious downturn in activity and inflation because of the global crisis, an expectation that was reflected inter alia in inflation expectations.

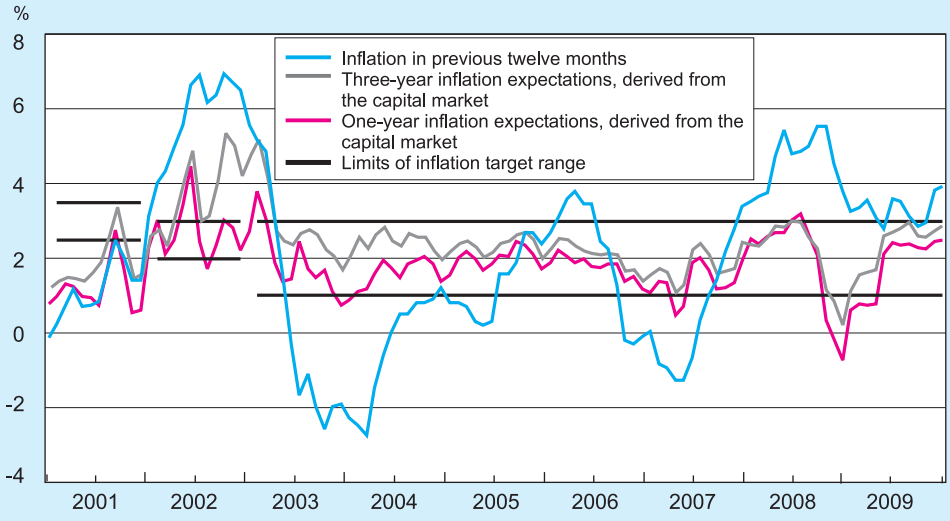
Despite the deviation of actual inflation from the upper limit of the target range, the Bank of Israel adopted an expansionary monetary policy due to the risks which the global crisis posed to activity and financial stability, and in view of the low level of inflation expectations resulting from the crisis.

As described in Section 2 of this chapter, the government's decision to increase taxes made a significant contribution to the deviation of inflation from the target during the second half of 2009. This development raises the issue of the appropriate response by monetary policy to a rise in inflation (and inflation expectations) deriving from non-recurring price increases.

The contribution of hikes in indirect taxes to the rise in inflation during the second half of the year raises the issue of the appropriate monetary policy response to an upturn in inflation deriving from non-recurring price increases.

On the one hand, the direct effect of government decisions on inflation was short-term in nature and policy, which is forward-looking, needs to refer to the underlying forces that are expected to affect inflation—forces that were largely moderating in their effect because of the global crisis. In addition, since the source of the price increases in this case was clear, they cannot be construed as evidence of inflationary pressures. On the other hand, price increases deriving from non-recurring factors

Figure 3.4
Inflation in Previous Twelve Months, Inflation Expectations, and the Inflation Target, 2001-09
(monthly averages)



SOURCE: Based on Central Bureau of Statistics data.

such as government decisions could lead indirectly to more extensive price increases through two channels: via inflation indexation mechanisms; and by the effect of actual inflation on inflation expectations, and the effect of these expectations on actual inflation.[36] The effect of actual inflation on inflation expectations can be attributed to several factors: the interpretation of a rise in actual inflation as a sign of the existence of inflationary (or less deflationary) pressures, indexation mechanisms, and expectations that are partly adaptive. Moreover, high inflation that does not evoke a monetary policy response can affect the public's assessments regarding the weight which monetary policy attributes to the retention of price stability during the period in question and consequently affect inflation expectations. This channel highlights the importance of the credibility of monetary policy. The sounder is the credibility of policy with respect to its commitment to the maintenance of price stability, the greater will be its ability to facilitate a gradual reversion of inflation to within the target range, which will enhance support for its other objectives. In the opposite direction, inflation expectations affect actual inflation because owners of businesses, who refrain from frequent adjustments in the prices of the products which they sell (an adjustment that involves a cost), take the expected level of inflation into account when they do adjust their prices. In an inflation targeting regime, monetary policy is directed at anchoring inflation expectations within the target range, and thereby it helps to prevent price increases from spreading. As previously described, the rise in inflation expectations to the upper part of the target range during the second half of the year indicated that the extent of the monetary expansion needed to be reduced.

Monetary policy is aimed at anchoring inflation expectations within the target range, and thereby it helps to prevent price increases from spreading.

f. Lessons from the global crisis regarding the monetary policy framework

Undoubtedly, there are lessons that need to be learned in numerous areas from the serious global crisis. The appropriate conclusions should be drawn and applied worldwide during the coming years. Many of the serious flaws that were revealed during the crisis involved the regulation of financial markets and the system of incentives motivating participants in these markets. With respect to the monetary policy framework, the prevailing opinion among central banks worldwide and in Israel as well is that a flexible inflation targeting policy generally withstood the test of the crisis.[37]

A flexible inflation targeting policy—which is committed to maintaining price stability while permitting flexibility regarding the pace at which inflation reverts to the target in order to support activity, and concern for financial stability—provided the Bank of Israel and central banks worldwide with an effective framework for discussing policy measures in response to the crisis and for explaining policy to the public. One

[36] As an example, the rise in inflation expectations after the publication of the consumer price index for June was attributed *inter alia* to the surprisingly high index.

[37] See for example: Spencer Dale (2009), "Inflation Targeting: Learning the Lessons from the Financial Crisis," remarks at the Society of Business Economists' Annual Conference, London, June 23, 2009.

of the advantages of such a regime is that it creates a convenient framework for communication with the public, since better understanding of policy measures by the public increases the effectiveness of policy.[38] An inflation targeting policy framework is also expected to help economies in the process of recovering from the crisis: In view of the concern of inflation risks involved in the process of economic recovery, due inter alia to the special policy measures that were adopted because of the crisis, central banks' commitment to the inflation target can be expected to serve as an anchor for inflation expectations, and thereby help in maintaining price stability.

An inflation targeting policy is expected to help economies in maintaining price stability in the process of recovering from the crisis.

Nonetheless, the lessons learned from the crisis pointed to the need for examining the policy framework and ways of improving it. One of the main issues in this respect relates to the role of considerations relating to the stability of the financial system and the possible development of an asset price bubble in the conduct of monetary policy. Some professionals point out that the global financial crisis underscored the problematic nature of monetary policy that focuses too narrowly on the price stability of consumer goods and services, and that does not adequately relate to financial stability factors—especially credit growth and the rise in asset prices. It should be noted that by its very definition, a flexible inflation targeting policy must take into account all the factors that are expected to affect inflation and activity, including asset prices and factors relating to financial stability.

The global crisis, which derived from the financial markets, highlighted the important role financial factors may play in influencing economic activity, inflation and the transmission mechanism of monetary policy, and therefore also the importance of due reference to financial channels in monetary-policy thinking. As described above, support for the credit markets and reducing the rising cost of credit concurrent with the increased assessment of risk, was a major objective of the Bank of Israel's monetary policy in 2009. Also, the central bank's considerations regarding the reduction of the monetary expansion during the second half of the year were accompanied by a discussion of the risks involved in an expansionary monetary policy over time, including the effect of the low interest rate on households' and companies' leverage and on asset prices and apartment prices in particular.[39]

The crisis highlighted the importance of due reference to financial channels in monetary policy thinking.

The crisis highlighted the importance of concern for financial stability, and economists throughout the world are discussing the appropriate tools for dealing

[38] For details of the advantages of inflation targeting and the experience of numerous countries which adopted this regime, see for example: Charles Freedman and Douglas Laxton (2009), "Why Inflation Targeting?" and Scott Roger (2009), "Inflation Targeting at 20: Achievements and Challenges," IMF working papers.

[39] As described above, a rise in asset prices was one of the transmission channels of expansionary monetary policy against the background of the crisis. However, a concern arose that a highly expansionary monetary policy over time and the resulting search for yield may increase the risk of price increases that do not derive from underlying economic fundamentals. A situation such as this could endanger financial stability and harm activity in the more distant future. An examination of the housing market in Israel showed that a housing price bubble had not developed. (See Box 3.2). However, it is reasonable to assume that the low level of the interest rate due to the crisis contributed to an increase in apartment prices.

The crisis highlighted the importance of concern for financial stability, and economists are discussing the appropriate tools for dealing with the matter.

with the matter, particularly with respect to the use of the interest rate instrument in coping with problems of financial stability and concern over the development of asset price bubbles.[40] It should be noted that the extent of the impact on the economy of problems relating to the financial system (for example, the extent of the damage that can be caused in the event of large decreases in asset prices), and therefore also the extent to which monetary policy must refer to problems such as these, is dependent on the structural arrangements within the financial system, the system of incentives for players in the markets and the quality of regulation. Proper treatment of these issues alleviates the burden of monetary policy with regard to matters relating to the financial system, and enhances its ability to achieve price stability and support employment and sustainable growth. For example, an improvement in regulation in the areas of non-bank credit and long-term saving could reduce the damage that might be caused in a situation of asset price slides, and therefore also the concern over such a situation.

In Israel, the maintenance of financial stability is one of the Bank of Israel's objectives,[41] and an important linchpin in achieving this objective is the activity of the Banking Supervision Department. Since the stability of the banking system is clearly only part of financial stability, the issues of monetary policy's role in achieving financial stability and improving the tools available to the Bank of Israel for the purpose of achieving this objective are yet to be discussed .

Box 3.2
The development of house prices

1. Introduction

This box reviews the development of house prices, and examines the existence of a bubble in these prices during 2009. The conclusion emerging from the following analysis is that there was no bubble in 2009, despite the steep rise in prices over the past two years. The price increase succeeded a prolonged erosion in prices in real terms that began in the middle of the preceding decade, and currently prices do not seem to deviate from the level implied by fundamental factors in the housing market. A comparison with the development of house prices in the US shows that the existence of a bubble, which is very conspicuous

[40] The importance placed on the matter is reflected in the speeches given by numerous central bank officials, for example: Lars Svennson (2009), "Flexible Inflation Targeting: Lessons from the Financial Crisis," Sveriges Riksbank, Adam S. Posen (2009), "Finding the Right Tool for Dealing with Asset Price Booms," Bank of England, Donald L. Kohn (2010), "Monetary policy in the Crisis: Past, Present and Future," Federal Reserve Board.

[41] As worded in the new Bank of Israel Law, which was passed by the Knesset in March 2010.

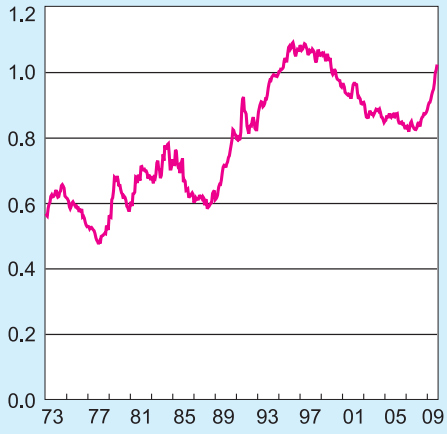
there, is not indicated by the figures for the Israeli economy. However, if the rapid increase in prices continues in 2010, it is likely that they will surpass the level corresponding to the fundamental market factors.

A bubble in house prices is defined as the difference between the actual price and the fundamental price. The fundamental price reflects the underlying market factors—the present value of the expected housing services (represented by rent), and therefore depends on supply and demand factors in the housing market, and on the interest rate, which affects the discount factor. A bubble in asset prices is created when they rise as a result of the expectation that future increases will outstrip the rise dictated by fundamental market factors. In this situation, asset buyers are willing to pay the high price because they expect to obtain capital gains when they sell the assets. Since rent reflects the fundamental value of housing services, and since rent cannot generate capital gains, a comparison of the development of house prices to the development of rent gives an indication of the detachment of house prices from the underlying fundamentals, and the development of a bubble.

2. House prices in Israel—the facts

Figure 1 displays the development of the real price of housing in Israel from 1973 up until the present time. The house prices index is based on a survey of the prices of owner occupied dwellings conducted by the Central Bureau of Statistics.[1] In the long term, house prices rise at a faster rate than the increase in the general index. The real price of housing rises by an annual average of 1.3 percent (the 2009 average, compared with the 1973 average). The existence of a long-term rising trend should come

Figure 1
Real House Price Index relative to the CPI, 1973-2009
(monthly data, January 2000 = 1)

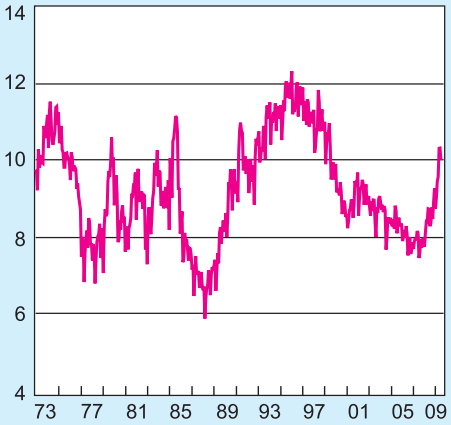


SOURCE: Bank of Israel.

[1] The prices in this index are adjusted for quality and size of the housing. Survey data for house prices are available from 1994, but because apartment prices were used until 1998 to measure the cost of owner occupied dwelling services in the Consumer Price Index, this series can be used to calculate a historical series of house prices. The real price is calculated through division by the Consumer Price Index. The beginning of the sample was dictated by the date on which the Central Bureau of Statistics began publishing the index – 1973.

as no surprise—at least as long as demand increases with time as a result of population growth, while the supply of land available for construction is inelastic (although it can be increased through construction of high-rise buildings) and technological improvements in the sector are relatively slow.[2]

Figure 2
The Ratio of the Average House Price to the Average Wage per Employee Post, 1973-2009
(monthly data, wage years)



SOURCE: Bank of Israel.

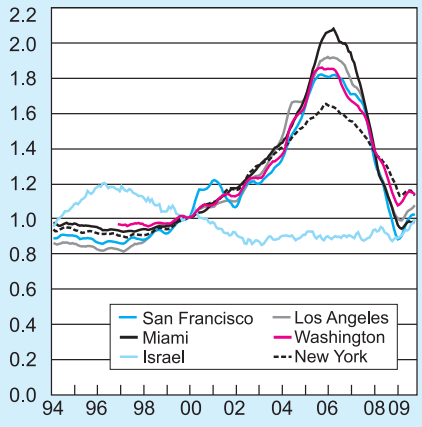
The rising trend in the real price has not been uniform in recent decades: long cycles of boom and bust are distinguishable. Particularly prominent is a significant sustained rise that began in 1989 with the start of mass immigration from the former Soviet Union and lasted until 1996. The entry of one million immigrants, which boosted the country's population by 20 percent, and consequently the demand for housing, was strongly reflected in real house prices, which rose cumulatively by almost 80 percent during this period (8.2 percent annually). From the mid-1990s until 2007, the real price fell steadily by an aggregate 25 percent (2.4 percent annually). Starting in early 2008, house prices have risen steeply; between the low point in December 2007 and November 2009, they soared 24 percent in real terms (11.4 percent annually).

Figure 2 displays the average dwelling price in comparison with the average wage. Fluctuations in this ratio reflect changes in the ability of an average individual to purchase a dwelling. During the sample period, an average of 9.2 years of labor (according to the average wage) were required in order to purchase a dwelling (at the average price). An examination of the relative price shows that its level passed the average of the sample during the second half of 2009, and eventually reached 10 years of labor. This is lower than the peak in the mid-1990s and earlier peaks.

In order to obtain an additional indication of whether the increase in prices is supported by supply and demand factors in the housing market, we also examine the development of house prices in comparison with rent (Figure

[2] In addition, it is possible that the improvement over the years in the quality of housing is not fully deducted from the measured price, and the price increase therefore also reflects a rise in quality.

Figure 3
Ratio of House Prices to Rents, 1994-2009
(monthly data, January 2000 = 1)



SOURCE: Bank of Israel.

3). In the long term, this ratio should be fairly stable, since it (or, to be more accurate, its inverse) reflects the real return on owning a dwelling, which in the long term cannot be detached from other real returns—at least to the extent that the price of housing is supported by economic factors reflecting the supply and demand conditions in the housing market. For the sake of comparison, the figure also displays data for various regions in the US in which, as known in retrospect, a bubble developed.[3] It can be seen that the situation in Israel differs greatly from that in the US. In Israel, the ratio is relatively stable. Although there is a rising trend for the past year, it does not deviate from its long-term level, meaning that the increase in house prices was accompanied by a corresponding increase in rent. This means that the underlying factors in the housing market are working towards higher prices. In the US, on the other hand, as the figure clearly illustrates, house prices were detached from rent during the bubble years. After the bubble burst, prices returned to a more reasonable level, at least in terms of the long-term data.

From the figures displayed above, we conclude that while house prices have risen sharply since early 2008, this development can still be viewed as a correction of the sustained fall in real prices since the middle of the preceding decade. Nor is there any sign that house prices have become detached from rent and the average wage, according to either a historical comparison or a comparison with various regions in the US that were used as a control group because a real estate bubble was known to have occurred in them. At the same time, continuation in 2010 of the rapid rate of change in prices, particularly relative to the average wage and rent, will cast doubt on this conclusion.

[3] For Israel: through December 1998, the owned dwelling prices index is divided by the rent item in the Consumer Price Index. Starting in January 1999, the housing price index is divided by rent in new and renewed leases in the Consumer Price Index. For the US: house prices were taken from the Case-Shiller Index, and the rent index from the rent item in the US Consumer Price Index.

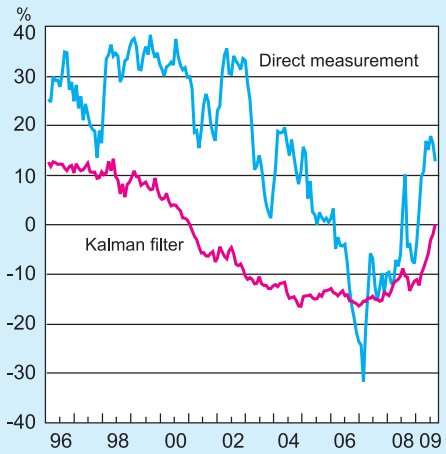
3. A rational bubble in the asset pricing equation

The analysis in this section is based on the standard asset-pricing equation, according to which the economic value of an asset (a dwelling) equals the present value of the dividends (rent) that the asset is expected to yield. This value is called the "fundamental price" of the asset. It is emphasized that the fundamental price is affected not only by the value of the future dividends, but also by the interest rate used for their discount. Therefore, the drop in the interest rate during 2009 contributed to a rise in the fundamental price during this period. A sustained deviation of the actual price from the fundamental price, which does not necessarily contradict the asset pricing equation,[4] will be called the "bubble component" of the asset price. The bubble component in house prices can be estimated as the difference between the actual price and the fundamental price.

We used two methods for estimating the fundamental price. The first measures the present value of the future rent flow at any point in time directly by using figures from the real yield curve and future rent data that were realized in practice as an estimate of the market's expectations.[5] This measurement assumes that at the end of the sample, real rent will remain stable in the future, i.e., that the nominal rent will rise at the same rate as the the general index. The second method estimates the bubble component using a Kalman filter, in which the interest rate and rent are represented through ARMA processes.

Figure 4 displays the estimates for the percentage of deviation in house prices from their fundamental value according to each of the estimation methods. The quantitative differences between the estimates under the two methods are clear, but for the sake of evaluating the existence of a bubble in 2009, we will focus on their common characteristics. We

Figure 4
Deviation of House Prices from their Fundamental Prices, 1996-2009



SOURCE: Bank of Israel.

[4] For example, see Blanchard (1979), Flood and Garber (1980), Flood and Hodrick (1990).

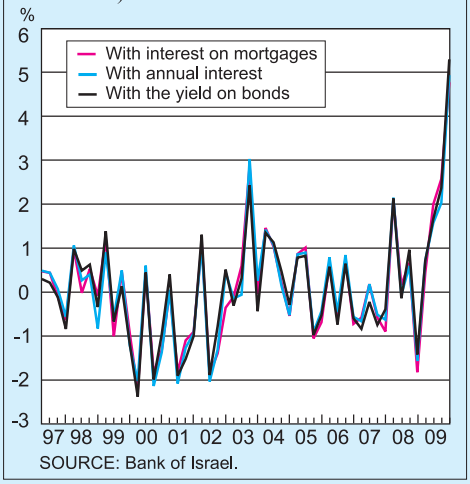
[5] Shiller (1981) uses this approach for an analysis of the American stock market. He uses actual dividend figures as an estimate of the expectations in previous periods for those dividends.

will first note that the correlation coefficient between the two series—0.76—is sizeable, and therefore the two series reflect similar trends. Secondly, the two series show that house prices were higher than their fundamental values in the second half of the 1990s, that this gap narrowed in the past decade, and that the actual prices in 2006-2008 were lower than their fundamental values. Finally, both estimation methods do show that in the past two years house prices rose at a faster rate than the fundamental price, but this increase appears to be a correction of their erosion, not the creation of a bubble.

4. An econometric analysis of house prices in comparison with supply and demand conditions[6]

Like all prices, house prices depend on supply and demand conditions in the market. In this section, house prices were estimated as a direct function of supply and demand factors. The estimation shows that a rise in unemployment and a rise in the interest rate reduce demand, thereby causing a fall in prices. Unemployment operates through a negative wealth effect, while the interest rate increases the financing costs of housing buyers and bolsters the relative attractiveness of alternative investment instruments. On the supply side, increases in the inventory of buildings and in building starts (relative to population growth[7]) increase the supply, and therefore cause prices to fall. Furthermore, during most of the period of the sample (which began only in 1997, due to data limitations), house prices were listed in dollars, and a devaluation of the shekel against the dollar therefore increased shekel-denominated prices. We have therefore also included in the regression equation the rate of shekel devaluation against the dollar (net of the price index), and multiplied it by

Figure 5
The Residuals of the Estimated Equation of House Prices, 1997-2009
(standard deviation of about 1 percent in all versions)



SOURCE: Bank of Israel.

[6] For a more extensive econometric analysis of the housing market, see Economic Developments in Recent Mon*ths* no. 125, May-August 2009, Bank of Israel.

[7] The population measured here does not include foreign workers or foreign residents, who also play a role in the demand for housing.

the proportion of leases with dollar-denominated rent in order to reflect the transition to shekel-listed prices.

Since it is unclear which interest rate is most relevant to the housing market,[8] the equation was estimated using three possible interest rates: the real annual bond yield, the real 10-year bond yield, and the real mortgage interest rate. The coefficients of the various variables are not sensitive to the choice of the interest rate variable, but it appears that the short-term interest rate has slightly better explanatory power than the longer-term interest rates.

It is interesting to test the residuals from this equation. Relatively large residuals indicate that there are other factors not included in the equation that contribute to a rise in house prices. Figure 5 displays the difference between the change in the actual housing price and that estimated through the various specifications. It can be seen that at the beginning of the new millennium, corresponding to the decrease in prices, there are also relatively large downward deviations, meaning that the price fell by more than the equation explained. The equation explains most of the fall in prices in the following years. The price increases in the past two years are not fully explained: the actual rise in the price deviates upwards from the price increase explained by the equation—but the deviations do not differ from the fluctuations in previous episodes in the sample, except for the fourth quarter of 2009.The various specifications indicate that in 2009 as a whole, prices rose by 9-10 percent beyond the increase derived from the underlying market factors. Nevertheless, it should be emphasized that the equation tests the **rates of change** in the prices in comparison with the underlying factors, not the price **levels**. Consequently, conclusions cannot be drawn directly about the deviation of the price level from the underlying market factors.

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Shiller, R. J. (1981). "Do Stock Price Move Too Much to be Justified by Subsequent Changes in Dividends?" American Economic Review 71(3), 421-436.

[8] The asset pricing equation, which constitutes the methodological basis for the analysis in the preceding section, indicates that the whole yield curve should be relevant to estimation.

2. PRICES

a. Introduction

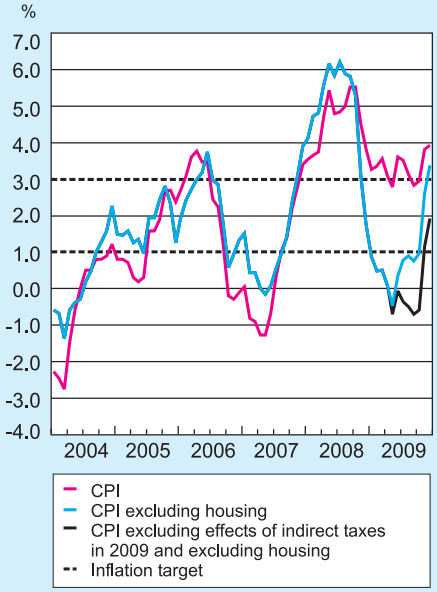
Since 2003 the inflation target has been defined as the range between 1 percent and 3 percent a year. Inflation as expressed by the consumer price index in 2009 exceeded the upper limit of the target, reaching 3.9 percent. An inflation rate exceeding the target during a period of downturn in economic activity against the background of a global crisis is largely attributed to two factors unique to the Israeli economy in that period: firstly, the government's tax hikes on consumer goods (which contributed 1.1 percent to annual inflation—see below); and secondly, an increase in the housing component in the index, which mainly reflects apartment rental prices. Another factor contributing to an increase in prices above the target was the worldwide increase in fuel prices during 2009.

Inflation in the consumer price index in 2009 amounted to 3.9 percent, which was above the upper limit of the target range.

Figure 3.5 shows the contribution to annual inflation in 2009 of the two factors unique to the Israeli economy—the rapid increase in the housing component and the rise in indirect taxes. In contrast to the inflation in the general index, which was around the upper limit or actually above it throughout the entire year, inflation in the index excluding the housing component for most of the year—until October—was below the lower limit of the target or around it. The large rise in annual inflation during the last two months of the year reflects the increase in energy prices. Energy prices were a factor in moderating the pace of annual inflation during most of the year because after having fallen in the last months of 2008, their contribution to the rise in annual inflation only became apparent in the last months of 2009. It is interesting to note that exclusive of the housing component and tax hikes, annual inflation in Israel during 2009 developed in a manner similar to the development of prices in other developed countries in the wake of the global crisis, as presented in Figure 1.2 in Chapter 1. Clearly, the differing development of the housing component in Israel, and inflation in the general index as a result, in itself reflects the differing effect of the crisis on Israel.

In contrast to the inflation in the general index, which deviated from the upper limit of the target for most of the year, inflation in the index excluding the housing component was below the lower limit of the target or around it for most of the year.

Figure 3.5
Inflation in Previous Twelve Months, CPI and the CPI Excluding Housing and Changes in Indirect Taxes in 2009,[a] 2004-09



[a] The increases in the VAT rate and taxes on fuel and cigarettes, and the water surcharge.

SOURCE: Based on Central Bureau of Statistics data and Bank of Israel.

b. Inflation in 2009 and the factors affecting it

Because of the global economic crisis, from the last quarter of 2008 underlying economic forces held down an increase in prices. Since the fall in demand for GDP, both in demand for exports and domestic demand, reduced demand for production factors, it had the effect of reducing (or moderating an increase in) prices of these factors. This effect was reflected by a reduction in the growth of wages and unit labor costs concurrent with a drop in demand for employees and a rise in unemployment (see Table 3.3 and Chapter 5: The Labor Market), and by GDP gap estimates, which indicated that the level of GDP was considerably less than the economy's production capacity.[42] The large decrease in global demand led to a downturn in world prices. This effect was clearly apparent from the sharp drop in the prices of oil and other commodities in the last quarter of 2008 (Figure 3.7). The moderating effect of the crisis on prices was expressed by low inflation (also when seasonally-adjusted) in the last quarter of 2008 and at the beginning of 2009.

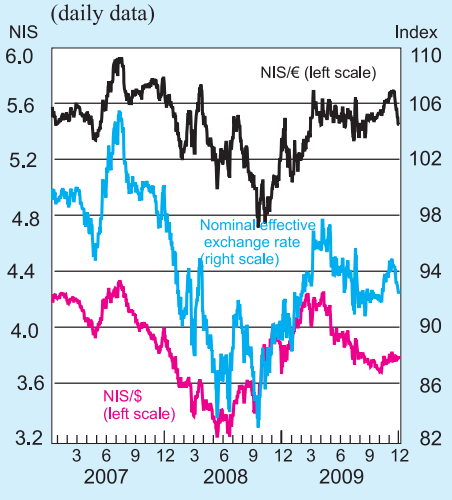
Because of the global economic crisis, from the last quarter of 2008 underlying economic forces held down an increase in prices.

Despite the moderating forces deriving from the global crisis, the inflation rate during the year was relatively high (as stated, annual inflation exceeded the upper limit of the target) for several reasons: firstly, the government's decisions to increase taxes on consumer goods (VAT, as well as the taxes on fuel and cigarettes) and to impose a water surcharge; secondly, the increase in the housing component in the index, which mainly reflects the increased costs of apartment rental; and thirdly, the rise in energy prices resulting from the improvement in the global economic environment during the year and forecast developments. The improvement in the assessment of the economic environment as early as the second quarter of the year, concurrent with highly expansionary monetary policy as a result of the crisis, appear to have limited the moderating effect of the crisis on prices.

The relatively high inflation rate in 2009 derived mainly from indirect tax hikes and the imposition of a water levy, the increase in apartment rental prices and energy prices, and the depreciation of the shekel from the middle of 2008. Expansionary monetary policy counteracted the moderating effect of the crisis on prices.

Another source of the rise in inflation was the depreciation of the shekel from mid-2008 (Figure 3.6 and Table 3.4). As shown in Table 3.4, during the last quarter of 2008 and the first quarter of 2009 import prices fell heavily in dollar terms under the impact of the global crisis; a large depreciation of the shekel, however,

Figure 3.6
NIS/$ and NIS/€ Exchange Rates, and the Index of the Nominal Effective Exchange Rate, 2007-09
(daily data)



SOURCE: Bank of Israel.

[42] See for example Figure 17 in *Inflation Report 29*, for the fourth quarter of 2009.

Table 3.3
Nominal Labor Costs per Unit of GDP, Unemployment Rate, and Prices, 2001–09

(percent)

	Wage per employee post		Nominal unit labor costs in business sector[a]	CPI	Business-sector product prices	Business-sector product	Unemployment rate[b]
	in business sector	in public sector					
	(average annual change over previous year)						
2001	4.4	3.7	6.3	1.1	0.8	-1.7	9.3
2002	-1.4	1.1	0.7	5.7	4.0	-2.5	10.3
2003	-1.8	-3.5	-4.1	0.7	1.0	2.0	10.7
2004	1.1	4.2	-3.1	-0.4	-1.0	6.8	10.3
2005	3.7	1.8	1.9	1.3	1.0	6.0	9.0
2006	3.8	2.5	2.3	2.1	2.2	6.4	8.4
2007	1.9	2.8	1.5	0.5	-0.2	5.7	7.3
2008	3.8	3.8	3.3	4.6	1.3	4.6	6.2
2009	0.1	1.1	-0.6	3.3	4.8	-0.3	7.6
	(change from same quarter in previous year)						
2006							
I	4.8	1.5	2.8	3.1	3.7	6.9	8.8
II	4.0	4.7	-0.6	3.6	2.5	8.9	8.7
III	3.2	2.0	1.8	2.0	1.8	5.8	8.3
IV	3.4	1.6	5.3	-0.2	0.9	4.1	7.9
2007							
I	1.6	2.2	0.9	-0.6	-0.3	5.6	7.7
II	2.4	2.6	3.6	-1.1	-0.8	3.9	7.5
III	2.0	1.4	2.2	0.9	0.1	5.5	7.3
IV	1.4	5.1	-0.5	2.8	0.0	7.7	6.8
2008							
I	4.5	5.8	4.1	3.6	-0.2	6.1	6.1
II	4.8	4.2	4.0	5.0	1.4	5.7	5.9
III	3.6	3.9	2.3	5.1	0.8	5.2	6.0
IV	2.5	1.3	3.0	4.6	3.3	1.3	6.5
2009							
I	0.6	0.7	0.3	3.4	5.8	0.0	7.6
II	-1.5	0.6	-2.1	3.2	6.1	-0.9	7.9
III	0.7	1.9	0.2	3.2	5.4	-1.3	7.7
IV	0.7	1.3	-0.9	3.6	1.9	1.2	7.4

[a] Wage per employee post as reported to the National Insurance Institute, adjusted by real GDP.
[b] Average during the period.
SOURCE: Based on Central Bureau of Statistics data and Bank of Israel.

Table 3.4
The Exchange Rate, Import Prices and Consumer Prices, 2003–09

(percentage changes)

	Import prices ($)				Dollar exchange rate	Import prices[a] (NIS)				CPI
	Consumer goods	Investment goods	Production inputs			Consumer goods	Investment goods	Production inputs		
			Excl. fuel	Fuel				Excl. fuel	Fuel	
	(Change from to previous period, annual averages)									
2003	4.6	5.0	7.9	12.1	-4.0	0.4	0.7	3.5	7.6	0.7
2004	4.2	2.1	8.1	28.9	-1.5	2.7	0.6	6.5	26.8	-0.4
2005	1.0	-2.4	3.0	36.7	0.1	1.1	-2.3	3.1	37.3	1.3
2006	1.4	-1.2	3.7	17.6	-0.7	0.7	-1.8	2.9	16.5	2.1
2007	3.4	3.7	8.7	13.1	-7.8	-4.6	-4.4	0.3	3.9	0.5
2008	8.8	2.7	10.8	43.1	-12.7	-5.0	-10.4	-3.3	24.4	4.6
2009	-3.5	-2.1	-12.0	-37.4	9.6	5.7	7.3	-3.5	-31.2	3.3
	(Change from last quarter in previous year)									
2003	6.8	4.2	8.7	7.5	-6.0	0.5	-2.0	2.2	1.1	-2.1
2004	2.7	0.9	8.5	45.7	-1.0	1.7	0.0	7.4	44.3	1.0
2005	-2.1	-5.7	-1.8	25.4	5.5	3.3	-0.5	3.6	32.3	2.6
2006	4.4	2.5	9.0	3.2	-8.3	-4.3	-6.0	-0.1	-5.4	-0.2
2007	4.7	4.5	10.2	48.1	-7.4	-3.1	-3.2	2.0	37.2	2.8
2008	5.5	-2.5	2.3	-21.5	-3.2	2.1	-5.7	-1.0	-24.0	4.6
2009	-1.6	3.0	-5.9	8.5	-1.3	-2.9	1.6	-7.1	7.0	3.6
	(Change from previous quarter)									
2008										
I	4.0	1.9	2.9	12.5	-8.1	-4.5	-6.4	-5.5	3.4	0.5
II	2.9	1.5	5.0	21.5	-5.6	-2.9	-4.2	-0.9	14.7	2.1
III	0.5	-1.8	2.0	1.2	2.1	2.6	0.3	4.1	3.4	2.0
IV	-1.9	-4.1	-7.1	-43.2	9.3	7.2	4.8	1.5	-38.0	0.0
2009										
I	-3.7	-0.1	-9.9	-23.9	6.4	2.4	6.3	-4.2	-19.1	-0.7
II	-0.5	0.9	-1.6	10.7	0.5	-0.1	1.4	-1.1	11.2	1.9
III	1.5	1.6	3.3	21.7	-6.1	-4.7	-4.6	-3.0	14.3	2.0
IV	1.3	0.6	2.8	5.8	-1.7	-0.5	-1.1	1.1	4.0	0.4

[a] The change in dollar import prices of goods multiplied by the NIS/$ exchange rate.

SOURCE: Based on Central Bureau of Statistics data.

moderated the downturn in shekel terms.[43] The prices of consumer and capital goods actually rose in shekel terms during this period despite their decrease in dollar terms. Thus, nominal depreciation of the shekel at the height of the crisis had the effect of reducing the moderating effect of the crisis on prices in the economy. Conversely, the appreciation of the shekel during the second half of the year had the effect of moderating price increases.

[43] The shekel import prices in Table 3.4 are import prices in US dollars multiplied by the exchange rate of the dollar against the shekel. Direct observations of shekel prices of imported goods are not available. It can be assumed that a gradual transmission operates from changes in world prices and the exchange rate to changes in the shekel prices of imports.

The contribution of indirect tax hikes to inflation

Table 3.5 presents the contribution of the rise in indirect taxes to inflation in 2009. Against the background of the global crisis, in May the government increased the tax on cigarettes and the excise duty on fuel, and in July raised the level of value added tax by one percentage point, to 16.5 percent, and the water surcharge went into effect.[44] Table 3.5 shows that price increases derived from the tax hikes contributed 1.1 percent to inflation in 2009.[45] As a result of these price increases, the inflation rate during the second half of the year exceeded the upper limit of the target. Exclusive of these increases—which do not reflect inflationary pressures—the inflation rate was within the target range.

The price increases deriving from the rise in indirect taxes and the imposition of a water surcharge contributed 1.1 percent to inflation in 2009. Excluding these increases, the inflation rate in the second half of the year was within the target range.

Table 3.5
The Effect on Inflation of Changes in Indirect Taxes in 2009

(percent)

		Changes in CPI resulting from government decisions					
	Monthly change in CPI	Tax on cigarettes	Water surcharge	Fuel surcharge	Change in VAT[a]	Inflation in previous 12 months	Inflation in previous 12 months excluding the effect of changes in taxation
January	-0.5					3.3	3.3
February	-0.1					3.4	3.4
March	0.5					3.6	3.6
April	1.0					3.1	3.1
May	0.4	0.11		0.07		2.8	2.6
June	0.9			0.15		3.6	3.3
July	1.1		0.29		0.30	3.5	2.6
August	0.5		0.08		0.10	3.1	2.0
September	-0.3		0.07			2.8	1.7
October	0.2		0.06			2.9	1.7
November	0.3		-0.09			3.8	2.6
December	0.0					3.9	2.7
Total 2009		0.1	0.4	0.2	0.4		

[a] Bank of Israel estimates
SOURCE: Based on Central Bureau of Statistics data.

[44] The government decided to increase the taxes because of its concern over its growing expenditures and a decrease in tax revenue as a result of the global recession. (See Chapter 6). The rise in VAT was intended to be effective until December 2010 and water surcharge was also meant to be temporary. In practice however the rate of VAT was cut to 16 percent in January 2010, and the water surcharge was abolished although water prices were increased. The negative contribution of the water surcharge in November derived from an adjustment of the surcharge (consumption brackets) in that month.

[45] The contribution of the VAT hike is not measured directly. With respect to part of the items concerned, it is reasonable to assume that the tax increase did not fully and/or immediately impact prices for the consumer. The contribution of the VAT hike presented in Table 3.5 and the relevant references in the text are based on the Bank of Israel assessments.

The housing component

The housing item rose by 5.6 percent in 2009. A rapid rise in the housing component of the CPI began in 2008 and its pace of increase slowed in 2009.

The housing item, which has a 20.7 percent weighting in the consumer price index, rose by 5.6 percent in 2009 and contributed 1.2 percent to the rise in the general index (Figure 3.8). Housing prices in the consumer price index mainly reflect apartment rental prices.[46] The rapid rise in housing prices began in the second half of 2008 and their pace of increase slowed in 2009. (The housing component rose by 12.1 percent in 2008 and by 5.6 percent in 2009—Table 3.6). This followed a downtrend in the real prices of housing services from 2003 to 2008.

A number of factors contributed to the rapid increase in rental prices from 2008:[47] (1) Supply and demand conditions in the housing market, which were reflected by a rapid rise in the ratio between the population and the stock of apartments from 2001. (See the section on the construction industry in Chapter 2). (2) The delayed effect of the peak in the business cycle, which was reflected by a decline in the unemployment rate from 2004 and until the second quarter of 2008. Accordingly, it can be assessed that the decline in economic activity at the end of 2008 resulting from the global crisis held down price increases in 2009. (3) The depreciation of the shekel in the second half of 2008 and the first quarter of 2009 (Figure 3.6). Although the transmission from the dollar exchange rate to the housing item in the index declined during recent years, it was found that the exchange rate still explains short-term fluctuations in the housing item.[48] The appreciation of the shekel against the dollar during the second half of 2009 therefore appears to have contributed to moderating the rate of increase of the housing component in the course of the year. (4) The rise in house prices, due to demand and supply forces in the housing market as mentioned in item (1) and due to the decline in interest rates, especially mortgage interest rates, against the background of the economic crisis. A growth in demand for house purchases as the result of lower interest rates could actually be reflected by a decrease in rental prices,

[46] For a description of the method of measuring the housing item and its relationship to the exchange rate, see Recent Economic Developments 125, May to August 2009, Part 2: Broader Review of Selected Issues.

[47] For more details see Recent Economic Developments 125, May to August 2009, Part 2: Broader Review of Selected Issues.

[48] In the past, the majority of apartment rental contracts were denominated in dollars—a relic from the period of a high inflation environment in Israel. In fact, since most of the housing item is based on new or renewed apartment rental contracts, in which it is usually possible to change the apartment rental price in accordance with market conditions, there is no reason for expecting a high correlation between housing prices and the dollar exchange rate even if contracts are denominated in dollars. The existence of a high actual correlation is indicative of dollar price rigidity, a rigidity that is reasonable with respect to renewed dollar-denominated contracts in which the tenants have the right to extend the contract at the same terms. It is also reasonable to assume that this reflects inertia in apartment prices, in the absence of substantial pressures in the rental market. Since 2007, as a result of the considerable weakening of the dollar concurrent with tighter conditions in the rental market, the pressure for a rise in rental prices beyond that to be derived from dollar contracts increased, which also contributed to a decrease in the proportion of dollar-denominated contracts. The finding concerning the continued dominance of the dollar in explaining short-term fluctuations in the housing item despite the move to shekel contracts is rather surprising.

Table 3.6
Price Developments, 2001—09

	CPI	Fruit & vegetables	Food	Housing	Household maintenance	Furniture and household equipment	Clothing and footwear	Education, culture and entertainment	Health	Transport and communications	Miscellaneous	Energy index[a]	CPI excluding housing and energy	Index of controlled and supervised products	Wholesale price index of industrial production[b]
								Year-end, percentage annual change							
2001	1.4	6.9	1.1	5.2	0.9	-2.3	-5.7	-0.3	6.0	-0.5	2.3	-4.5	0.8	1.5	0.5
2002	6.5	-1.2	4.9	8.2	10.7	2.2	-3.5	3.5	5.7	9.3	9.7	20.1	5.2	7.3	5.6
2003	-1.9	4.2	0.3	-6.7	0.0	-2.6	-4.0	-0.5	-0.4	-0.6	-1.7	3.5	-0.8	-0.6	2.9
2004	1.2	6.0	1.8	-2.5	5.6	-1.4	-4.2	-0.6	3.3	3.3	3.0	12.1	1.5	2.6	5.2
2005	2.4	-9.6	2.0	5.9	5.1	-1.4	-4.3	0.7	2.2	1.4	2.4	7.1	0.2	3.9	4.3
2006	-0.1	12.0	3.6	-6.1	-1.2	-0.3	-1.7	1.2	1.8	0.0	2.0	-2.0	1.7	0.3	2.7
2007	3.4	7.0	6.3	1.9	6.1	0.6	-0.7	1.5	1.9	4.2	1.3	2.1	-2.7	5.7	6.7
2008	3.8	-2.0	9.1	12.1	3.9	-2.5	-3.0	1.6	1.8	-2.0	2.2	-9.5	3.0	5.0	3.0
2009	3.9	8.4	1.1	5.6	5.2	-1.2	-4.4	1.4	2.5	6.5	4.5	13.1	2.4	4.0	0.0
								Percentage, monthly change							
2009															
January	-0.5	0.4	-0.6	-0.7	0.1	0.8	-3.4	-0.8	0.4	-1.4	0.7	-2.9	-0.3	-0.2	-0.9
February	-0.1	-0.9	0.5	0.5	0.1	-0.5	-8.8	0.1	0.5	0.1	0.2	3.4	-0.5	0.2	0.0
March	0.5	3.6	0.4	1.6	0.3	0.0	-3.9	0.2	-0.2	0.4	-0.3	-0.2	0.2	0.1	0.9
April	1.0	2.0	0.5	0.5	0.1	-0.2	3.5	1.1	-0.1	2.6	0.2	4.0	0.8	0.1	0.3
May	0.4	3.5	-0.4	0.5	-0.1	-0.2	0.8	0.2	-0.4	0.2	3.0	0.1	0.3	-0.1	-0.4
June	0.9	-3.6	0.0	0.5	-0.7	-0.1	12.2	0.1	0.6	2.6	0.0	3.7	0.7	0.1	-0.5
July	1.1	4.2	0.9	0.4	3.2	-0.7	-2.7	1.0	1.1	1.7	-0.1	1.8	1.2	2.1	1.0
August	0.5	4.4	0.2	1.2	1.2	0.6	-7.8	1.1	0.4	-0.5	0.8	-0.3	0.2	0.7	-0.4
September	-0.3	-4.1	0.4	0.7	0.6	-0.5	-5.0	-1.2	0.2	-0.5	-0.4	0.6	-0.7	0.5	0.6
October	0.2	-0.6	0.2	0.3	0.7	-0.4	4.1	0.2	0.2	-0.5	0.0	-1.1	0.3	0.4	-0.2
November	0.3	-0.3	-0.4	0.6	-1.0	0.0	0.7	-0.2	-0.1	1.5	0.4	2.8	-0.1	-0.4	-0.3
December	0.0	-0.2	-0.5	-0.6	0.8	0.0	8.0	-0.4	-0.1	0.1	0.0	0.7	0.1	0.4	-0.1

[a] The energy component includes motor fuel and oils, and electricity, gas and diesel oil for domestic use.

[b] Excluding fuel.

SOURCE: Central Bureau of Statistics data.

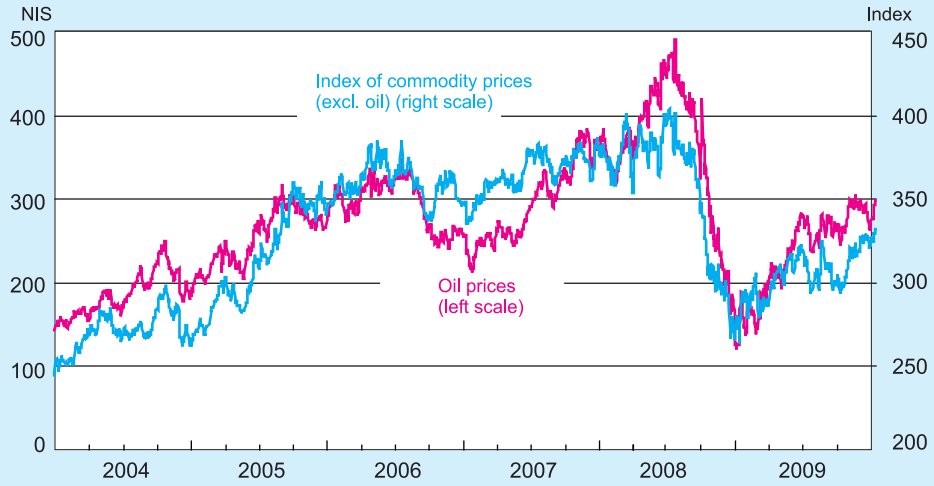
because of the shift in demand from rental to purchase (substitution between the two). An increased supply of houses for rent concurrent with the growth in demand for houses for investment purposes given the low interest rate acts in the same direction. However, the long-term co-movement of house prices and rental prices, based on the fact that house prices should reflect the discounted value of the expected housing services, supports a rise in apartment rental prices concurrent with an increase in apartment purchase prices.[49]

Energy prices

Commodity prices rose in 2009 after plummeting in the last quarter of 2008 because of the global crisis.

A third factor contributing to the price increase in 2009 was the rise in energy prices. Changes in energy prices mainly reflect changes in world prices. (The changes in shekel prices are also determined by changes in the shekel exchange rate.) As can be seen from Figure 3.7, the rise in commodity and oil prices resumed in 2009. This followed a slide in their prices in the last quarter of 2008 as a result of the global crisis. The price increase in 2009 derived inter alia from the improvement in assessments regarding the adverse impact of the crisis on growth in the developing economies. A rise in energy prices affects the consumer price index directly, via an increase in the energy component of the index, and indirectly, via an increase in the prices of

Figure 3.7
Index of Commodity Prices,[a] and Oil Prices, 2004-09
(daily data)

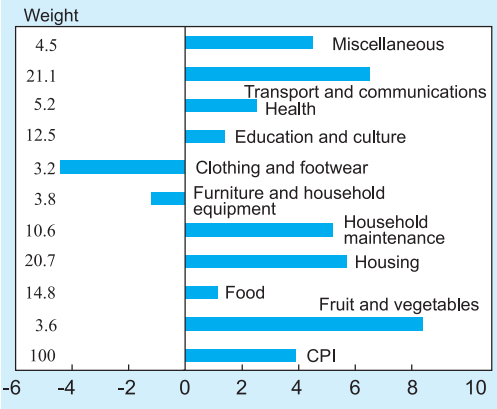


[a] Index of shekel prices.
SOURCE: Based on Bloomberg and Bank of Israel.

[49] See the reference in Footnote 47. In the analysis there, a common long-term trend in apartment prices and rental prices was found, as well as an "error correction" of deviations from this trend in the short term. Accordingly, a large increase in apartment prices can drag up rental prices as well.

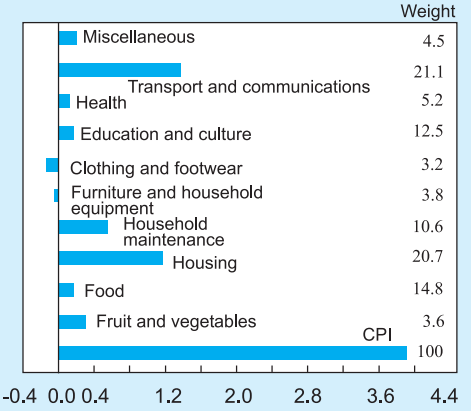
production inputs. The energy component in the consumer price index[50] rose by 13 percent in 2009 (Table 3.6). This increase largely reflects increases in world prices and partly the government's tax hikes—the increase in excise duty and the increase in VAT.[51]

Figure 3.8a
Rates of Change in the Components of the CPI, 2009 (percent)



SOURCE: Based on Central Bureau of Statistics data, Bank of Israel.

Figure 3.8b
Contribution of the Components of the CPI to Total CPI Inflation, 2009 (percent)



SOURCE: Based on Central Bureau of Statistics data, Bank of Israel.

3. THE MONETARY AGGREGATES[52]

In an inflation targeting regime, where the nominal anchor is the target and the policy instrument for attaining it is the interest rate, the money supply in the economy is determined in accordance with the public's demand. The development of the monetary aggregates reflects the public's demand for money, given market interest rates and conditions in the economy. Therefore a situation of disequilibrium in the money market, which affects the markets for products and labor, could not arise. This principle applied in 2009 as well, when in the course of the year, apart from using the interest rate instrument, the Bank of Israel operated in the foreign-currency market and the government bond market.

The money supply rose sharply against the background of the global crisis.

As can be seen from Table 3.7, the exceptional conditions that arose in the economy as a result of the global crisis were reflected by an exceptional increase in the money supply (M1). This aggregate, which is comprised of cash and shekel current account deposits, expanded by the high rate of 52 percent in 2009. However, M2, which is

[50] The energy component includes fuel and vehicle oils, as well as electricity, gas and diesel for domestic consumption. The proportion of this component in the consumer price index is about 7 percent.

[51] The tax hikes' contribution to the increase in the energy item (an increase of 13 percent) is assessed at 4.5 percent.

[52] The credit aggregates are discussed in Chapter 4: The Financial System.

Table 3.7
Rates of Change in the Monetary Aggregates, 2003-09

(end of period, monthly averages, percent change in period, year on year)

		1	2	3=1+2	4	5	6	7=3+4+5+6
	Monetary base	Cash in the hands of the public	Current accounts	M1[a]	Term deposits up to 3 months	Term deposits up to 1 year	Self-renewing overnight deposits	M_2[b]
2003	6.3	6.2	9.2	7.7	-0.5	-6.9	19.7	2.0
2004	8.3	8.6	27.1	18.0	-0.2	5.2	22.7	5.6
2005	14.8	17.1	29.5	23.9	2.7	-10.7	8.3	5.3
2006	4.0	3.0	12.3	8.3	5.0	17.2	8.7	7.2
2007	13.6	15.0	19.1	17.4	14.0	10.9	13.7	14.3
2008	16.7	21.8	14.5	17.4	12.7	12.8	13.3	13.7
2009	19.9	19.6	75.6	52.3	-4.4	1.0	40.2	13.5
2006								
I	14.9	19.3	19.3	19.3	3.1	-4.0	0.9	4.7
II	9.3	11.5	17.9	15.1	1.0	5.8	-4.8	2.8
III	7.2	7.6	14.5	11.5	7.3	11.9	-6.8	6.2
IV	4.0	3.0	12.3	8.3	5.0	17.2	8.7	7.2
2007								
I	6.4	1.7	19.0	11.3	11.2	21.3	17.5	13.1
II	10.6	7.1	22.1	15.7	11.9	18.9	32.6	16.2
III	12.3	13.7	25.6	20.6	13.9	15.2	26.5	16.9
IV	13.6	15.0	19.1	17.4	14.0	10.9	13.7	14.3
2008								
I	9.7	14.1	11.7	12.7	12.4	6.9	8.9	11.4
II	10.3	15.8	9.1	11.7	11.5	-1.3	1.8	8.7
III	12.5	15.4	9.4	11.8	6.3	-2.8	16.1	7.9
IV	16.7	21.8	14.5	17.4	12.7	12.8	13.3	13.7
2009								
I	25.0	28.6	49.3	40.9	4.2	10.6	50.6	18.3
II	27.5	28.8	75.3	56.3	-0.5	12.0	51.7	19.2
III	25.2	24.6	87.6	61.7	0.6	7.7	41.8	19.5
IV	19.9	19.6	75.6	52.3	-4.4	1.0	40.2	13.5

[a] M1: cash and demand deposits.

[b] M2: M1 plus unindexed term deposits of up to one year.

SOURCE: Bank of Israel.

comprised of M1 plus unindexed shekel deposits for a term of up to a year, rose by 13 percent in 2009, which was similar to the rate of increase in the previous two years.

When the Bank of Israel purchases bonds or foreign-currency from the public for shekels, the money supply held by the public increases. Because of the low interest rate on deposits, the public chose to leave its money in current accounts. The effect of foreign-currency and bond purchases was therefore mainly reflected by a large growth in M1, and less by an increase in the monetary aggregates including longer-term deposits. Thus, the exceptional increase in M1 during 2009 derived from the decline in the interest rate, which had the effect of increasing the demand for money,

from Bank of Israel purchases in the markets, and from the use of current account deposits in that period as an alternative means of saving to other deposits.

As is apparent from Table 3.7, the growth in the monetary aggregates became more moderate during the last quarter of the year, when the Bank of Israel began to raise the interest rate.

4. SOURCES OF CHANGE IN THE MONETARY BASE AND THE OPERATIONAL TOOLS OF MONETARY POLICY

The principal objective of monetary policy is to attain the inflation target subject to supporting growth, employment and financial stability. Since mid-1997 and until March 2008, when the Bank of Israel began to purchase foreign currency, the sole policy instrument was the determination of the interest rate at which the central bank lends to the banking corporations or borrows from them. The Bank of Israel interest rate thereby influences market interest rates, which in turn affect inflation by means of non-financial and financial activity as well as the monetary base in the economy. The monetary operational tools via which the Bank of Israel injects or absorbs the amount of liquidity required to attain the policy rate are banking corporations' loans/deposits as well as market based tools—Makam and repo. This activity is intended to offset changes in the amount of liquidity resulting from government injections/absorptions in the course of the management of fiscal policy, and from foreign currency conversions deriving from conversions by the government or purchases by the Bank of Israel.

In 2008, for the first time in ten years, the Bank of Israel operated in the foreign-currency market and began to increase the country's foreign exchange reserves. In 2009, due to the implications of the global crisis, the bank continued to operate in the foreign-currency market, and also purchased government bonds in the secondary market. These purchases injected liquidity into the market, but the Bank of Israel enabled the commercial banks to divest themselves of the liquidity surpluses that had arisen in the banking system as a result of the purchases, in order to ensure that the level of the shorter-term interest rate would match the declared interest rate. That is, the Bank's interventions in the markets were sterilized.

The Bank of Israel absorbed the liquidity surpluses resulting from bond and foreign-currency purchases, in order to ensure that the market interest rate would match the declared interest rate.

Table 3.8 shows the money injection in 2009 resulting from the Bank of Israel's NIS 95 billion foreign-currency and government bond purchases exceeded the NIS 14 billion absorption deriving from the government's activity by NIS 81 billion. However, the monetary base expanded by only NIS 5 billion. The surplus—the injection resulting from foreign-currency and government bond purchases minus the government absorption and the growth in demand for the monetary base—was re-absorbed by the Bank of Israel.

As can be seen from Table 3.9, until August liquidity was absorbed from the banks mainly by means of monetary deposits, which thereby rose from an average level of less than NIS 3 billion in the last quarter of 2008 to over NIS 80 billion in the last quarter of 2009. The reduced usage of Makam issues as a tool for the absorption

Table 3.8
Sources of Change in the Monetary Base, 2004-09

(NIS million)

	2004	2005	2006	2007	2008	2009	2009 I	2009 II	2009 III	2009 IV
1. Monetary injection, government and the Jewish Agency	1,600	-1,452	-3,789	-10,812	-17,371	-14,195	-5,398	-7,001	-10,145	8,334
of which: Government	244	-2,679	-5,235	-11,977	-18,470	-14,949	-5,646	-7,156	-10,313	8,166
2. Foreign currency conversions[a]	-1,751	-1,087	-1,141	-870	43,034	78,231	21,390	21,707	30,019	5,115
of which: Bank of Israel	0	0	0	0	43,995	77,413	21,628	20,372	30,171	5,242
3.Total (1+2)	-151	-2,539	-4,932	-11,679	25,663	64,036	15,992	14,706	19,874	13,449
4. Monetary injection by Bank of Israel	1,117	9,896	3,798	15,694	-17,305	-58,855	-14,171	-13,247	-17,017	-14,417
of which: Monetary loans	152	-756	7,470	-7,500	0	420	0	0	0	420
Makam	-17,986	-10,508	-7,362	23,736	10,820	-13,040	-4,534	-860	-1,901	-5,746
Swaps	-53	6,216	0	0	0	0	0	0	0	0
Banks' term deposits	14,257	12,440	3,560	-300	-28,011	-63,189	-11,182	-24,007	-18,570	-9,430
Interest[b]	1,104	432	134	20	14	421	70	59	111	181
Bond purchases	0	0	0	0	0	18,000	1,370	11,412	5,218	0
Repo	0	0	0	-6	1,974	-2,009	-6	-1	-2,002	0
5. Total change in monetary base	**966**	**7,357**	**-1,176**	**3,979**	**8,297**	**5,141**	**1,819**	**1,451**	**2,783**	**-913**

[a] This item includes, inter alia, Bank of Israel and government receipts from and payments to the private sector, such as income tax payments. These payments do not change the monetary base, and appear in the item Government Injection, and with the opposite sign in this item.

[b] Excluding *makam*.

SOURCE: Bank of Israel.

In order to help the economy cope with the crisis, the Bank of Israel implemented a number of monetary measures. These included the reduction in the use of Makam issues as an instrument for the absorption of liquidity surpluses.

of liquidity surpluses was one of the monetary measures which the Bank of Israel began to employ in January with the aim of increasing the liquidity of the financial system.[53] Other operational measures included offering loans and repo auctions for terms longer than one week and a reduction in the Bank of Israel interest margin in discount-window loans and deposits for the commercial banks from 1 percent to 0.5 percent. As the interest rate approached the lower limit, the margin was cut again, and from March amounted to 0.25 percent.

In August the Bank of Israel began a gradual process of reducing the extent of the monetary expansion. Bond purchases were stopped, as planned, and the policy of intervention in the foreign-currency market was changed from fixed daily purchases to intervention on a discretionary basis. In September, the Bank of Israel began to raise the interest rate. Concurrently, the Bank of Israel reverted to the use of *makam* issues as a means for the absorption of excess liquidity in the banking system (Table 3.9). As can be seen from Table 3.8, the Bank of Israel's foreign-currency purchases were reduced considerably in the last quarter of 2009, in line with the policy of intervention in accordance with the prevailing conditions.

[53] See the Bank of Israel announcement of December 24, 2008.

As Table 3.9 shows, no monetary loan auctions were conducted in 2009. Instead, as stated, monetary deposits served as a means for the absorption of excess liquidity from the banking system, which arose as a result of the Bank of Israel's purchases in the market. It is interesting to note that developments in monetary tools in Israel contrasted with developments in the world's developed economies, most notably the USA and Europe, where central banks increased loan tenders in order to alleviate the problem of liquidity shortage in the markets. The money market in Israel did not suffer from any such liquidity crisis.

Table 3.9
Monetary Instruments[a] - Monetary Deposits, Monetary Loans and *Makam*, 2006–09
(total system, quarterly averages)

	Utilization of deposit auctions			Cost of daily deposit auctions	Utilization of loan auctions			Cost of loans in daily auctions	*Makam*	
	Daily	Weekly	Total		Daily	Weekly	Total		Total	Held by the banks
	NIS million			percent	NIS million			percent	percent	
2006										
I	3,500	376	3,876	4.78	2,310	452	2,761	4.82	81,993	12,671
II	3,559	452	4,011	5.30	839	0	839	5.41	86,977	12,803
III	1,949	0	1,949	5.56	2,036	0	2,036	5.61	90,306	11,076
IV	731	0	731	5.52	5,990	1,355	7,345	5.35	92,962	8,970
2007										
I	0	0	0	---	8,575	5,226	13,801	4.37	94,202	10,426
II	0	0	0	---	9,365	7,257	16,621	3.82	87,840	10,144
III	1,914	0	1,914	3.69	3,470	0	3,470	3.88	81,514	13,888
IV	630	0	1,914	4.08	2,165	0	2,165	4.10	77,325	9,670
2008										
I	859	0	859	4.12	3,814	698	4,512	4.11	74,414	7,038
II	97	0	97	3.30	5,943	2,147	8,091	3.43	74,325	5,191
III	27	0	27	3.82	4,261	1,065	5,326	4.11	75,486	5,420
IV	2,690	0	2,690	3.10	1,366	0	911	3.51	77,918	4,889
2009										
I	13,948	13,463	27,411	1.12	0	0	0	---	76,987	6,149
II	22,736	26,556	49,292	0.50	0	0	0	---	76,256	12,647
III	35,897	40,085	75,982	0.60	0	0	0	---	77,828	16,703
IV	37,511	45,352	82,863	0.77	0	0	0	---	82,520	18,574

[a] Monetary instruments in addition to those mentioned are: the credit window, the deposit window, and repo.
SOURCE: Bank of Israel.