

Chapter 3

Monetary Policy and Inflation

- During 2012, the rate of inflation fluctuated within the lower part of the target range (1–3 percent); the growth rate moderated; and there were fears of further deterioration in the global economic situation as a result of the debt crisis in Europe and the effect of the “fiscal cliff” in the US. In view of these developments, the Monetary Committee reduced the interest rate during the year by 0.75 percentage points, from 2.75 percent at the beginning of the year to 2 percent at the end. The interest rate for January 2013 was lowered by an additional one-quarter of a percentage point.
- The CPI increased in 2012 by 1.6 percent, which is within the target range. Inflation expectations for the coming 12 months, as derived from the capital market and the forecasts of analysts, were somewhat above the center of the inflation target range (i.e., 2 percent).
- The moderate inflation in 2012 was primarily the result of two components of the CPI: education and culture as result of the lower cost of preschool following the implementation of the Trajtenberg Committee’s recommendations; and communication which was due to the increased competition in the industry. In contrast, the dwellings maintenance components increased as a result of higher energy prices, as did the food and housing (rent) components. The housing component rose faster than the overall CPI, though its rate of increase was more moderate than in previous years.
- The nominal effective exchange rate indicated moderate Shekel depreciation in the first 3 quarters of the year, and appreciation at the end. For the full year, the shekel depreciated by 0.6 percent. The Bank of Israel did not intervene in the foreign exchange market this year.
- Against the background of a renewed rise in home prices, primarily in the second half of the year, and continuing measures adopted in the previous year, in November the Supervisor of Banks limited the loan-to-value ratio of housing loans, with the goal of reducing the risk of instability in the banking system. This step also reduced the transmission from the Bank of Israel interest rate to demand for homes, thus providing monetary policy decision makers greater flexibility in deciding on the interest rate.

1. MONETARY POLICY

a. Policy measures

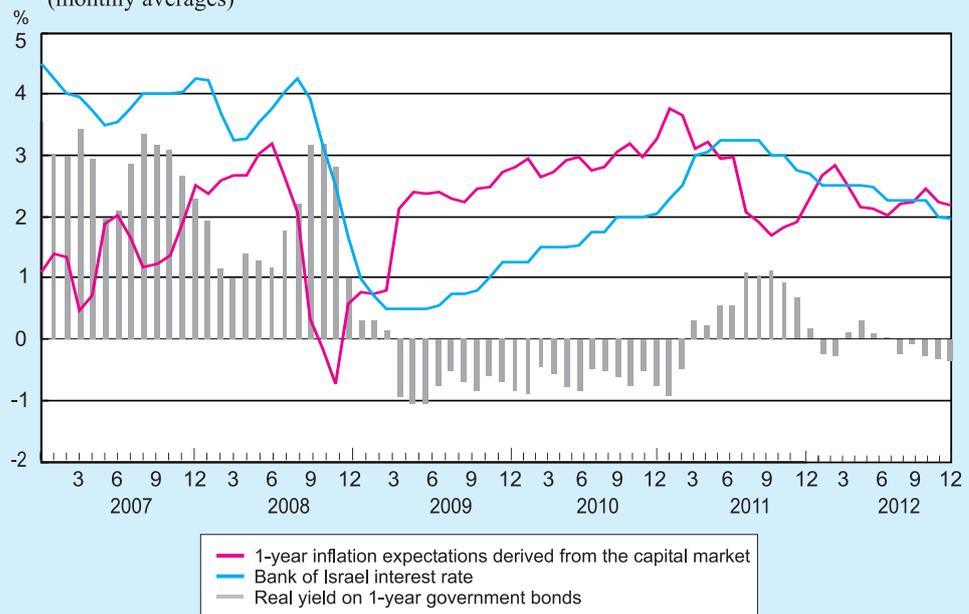
During 2012, the Monetary Committee reduced the interest rate.

Monetary policy was expansionary in 2012, continuing the trend of the end of the previous year. During the year, the Monetary Committee reduced the interest rate gradually, from a level of 2.75 percent at the beginning of the year to 2 percent at its conclusion (Table 3.1). This was a response to the slowdown in economic growth relative to the previous two years and the concern of a deterioration in the global crisis and its effect on the Israeli economy. It should be noted that 2012 was the first full year in which monetary policy was determined by the Monetary Committee, which began operating in October 2011.

With a lack of inflationary pressures, the moderation in economic activity led to a downward path of the interest rate during the year.

Several factors contributed to the downward path of the interest rate. The rate of inflation was below the center of the target range (of 1 to 3 percent) and inflation expectations were greater than actual inflation throughout the year, although they did not deviate from the target range (Figure 3.1). The rate of growth during the year was moderate. Investment in fixed assets, particularly in machinery and equipment, declined and exports were weak. In advanced economies, particularly those in

Figure 3.1
Bank of Israel Interest Rate^a, Inflation Expectations^b, and Real Yield on 1-Year Government Bonds, 2007-12
 (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.

Europe due to the fiscal debt crisis, the economic slowdown continued and global trade expanded at a slow rate. These developments constrained the growth of Israel's exports. The uncertainty with regard to resolving the debt crisis in Europe, and toward the end of the year with regard to the "fiscal cliff" in the US as well, increased concern of a further deterioration in the global economy and its adverse effect on the domestic economy.

The renewed increase in demand for homes and the rise in home prices led the Supervisor of Banks to limit the loan-to-value ratio for mortgages. Activity increased in the housing market this year, following a drop in the number of transactions and a moderate decline in prices following the social protest in the summer of 2011. Beginning from the second quarter of this year, the number of transactions increased, as did home prices, and mortgage volume grew accordingly. Against this background and as part of the macroprudential measures implemented in the housing market in previous years, the Supervisor of Banks limited the loan-to-value ratio in November. This step is intended to decrease the risk of instability in the banking system. In addition, it is expected to reduce the impact of monetary policy on the demand for mortgages and in turn on home prices, which will allow greater flexibility in managing interest rate policy.

The Supervisor of Banks limited the LTV ratio of new mortgages in order to reduce the risk posed to the banking system by the renewed increase in demand for homes.

Table 3.1
Interest rate decisions since the Monetary Committee was appointed

For month:	Interest rate decision (percentage points)	Interest rate (percentage points)	Distribution of Monetary Committee members' votes in interest rate decisions		
			Keep		
			Increase	unchanged	Reduce
November-11	No change	3	0	6	0
December-11	-0.25	2.75	0	2	4
January-12	No change	2.75	0	5	1
February-12	-0.25	2.5	0	1	5
March-12	No change	2.5	0	6	0
April-12	No change	2.5	0	6	0
May-12	No change	2.5	0	6	0
June-12	No change	2.5	0	5	1
July-12	-0.25	2.25	0	1	5
August-12	No change	2.25	0	6	0
September-12	No change	2.25	0	6	0
October-12	No change	2.25	0	6	0
November-12	-0.25	2	0	2	4
December-12	No change	2	0	6	0
January-13	-0.25	1.75	0	1	5
February-13	No change	1.75	0	6	0

SOURCE: Bank of Israel.

Monetary policy decisions are made by the Monetary Committee.

To date, most decisions to keep the interest rate unchanged have been reached through consensus, while in all decisions to reduce the interest rate there were dissenting views on the Committee.

Since October 2011 (when the interest rate for November 2011 was set), monetary policy has been determined by the Monetary Committee. The Committee has six members and is headed by the Governor. Decisions are made according to majority vote and in the case of a tie, the Governor has an additional vote.¹ Table 3.1 presents the decisions of the Monetary Committee since its appointment and the distribution of votes for each decision.

The table illustrates three facts that are worth noting: First, until now there has been a consensus only in decisions to leave the interest rate unchanged (nine decisions), although not in every case where the interest rate was left unchanged was there a consensus. Second, and as implied by the previous fact, there has not been a consensus in any of the decisions to change the interest rate (five decisions). Finally, when a decision was made to leave the interest rate unchanged and there was no consensus (two decisions), then in the following month the interest rate was changed in accordance with the minority opinion in the previous decision. These results indicate that, at least until now, the decisions to change the interest rate have not involved a consensus of the Committee members—however, in view of the fact that the observations are from a period in which the interest rate was declining, it is reasonable to assume that the disagreements centered mainly on the timing of interest rate reductions rather than the reductions themselves.

Experience from other countries indicates that the distribution of votes in monetary committees contains information as to the path of the interest rate in the future, beyond information derived from the markets.² Therefore, transparency with respect to the range of opinions among the members of the Monetary Committee can reduce uncertainty, to some extent, with respect to monetary policy. It should be emphasized that in view of the small number of observations in Israel up to now, not much weight can be attributed to the results presented above and the issue needs to be examined over time.

2. THE FUNDAMENTALS AND THEIR EFFECT ON MONETARY POLICY

a. Inflation and the monetary regime

The main goal of the Bank of Israel is to preserve price stability. The Bank also supports other objectives of the government's economic policy, particularly growth and employment, on the condition that in the opinion of the Monetary Committee the effort to achieve them will not harm price stability. In other words, achieving other goals should not shift actual inflation to outside the target range for a period of more

¹ Up until November 2011, interest rate decisions were made by the Governor alone. Box 3.1 of the Bank of Israel Report for 2011 presents a discussion of the composition of the Monetary Committee, its method of decision making and the advantages and disadvantages of decision making in the framework of a committee in comparison to a single decision maker.

² See Horvath, R., Smidkova, K., and Zapal, J., (2012), "Central Banks' Voting Records and Future Policy", *International Journal of Central Banking* 8(4), pp. 1–19.

Table 3.2
Main Indicators of Inflation and Monetary Policy, 2007–12

	2007	2008	2009	2010	2011	2012	2012			
							Q1	Q2	Q3	Q4
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	3.4	3.8	3.9	2.7	2.2	1.6	1.5	2.3	4.6	-1.9
3. Seasonally adjusted quarterly inflation ^b							4.5	-1.6	4.6	-1.0
4. One-year inflation expectations derived from capital market ^c	1.4	1.9	1.8	2.9	2.7	2.3	2.6	2.3	2.2	2.3
5. Ten-year inflation expectations derived from capital market ^c	2.4	3.0	2.3	2.5	2.5	2.3	2.5	2.4	2.3	2.3
6. Forecasters' one-year inflation forecasts ^c	2.0	2.5	1.8	2.7	2.8	2.3	2.4	2.4	2.3	2.0
B. Yields (percent)^e										
1. Bank of Israel key interest rate	3.9	3.7	0.8	1.6	2.9	2.3	2.6	2.5	2.3	2.1
2. One-year real yield to maturity on government bonds ^d	2.9	1.9	-0.4	-0.7	0.4	-0.1	-0.1	0.2	-0.1	-0.3
3. Ten-year nominal yield to maturity on government bonds ^e	5.6	6.1	5.4	4.9	5.1	4.6	4.8	4.8	4.5	4.3
4. Ten-year real yield to maturity on government bonds ^e	3.4	3.5	2.9	2.2	2.4	2.0	2.2	2.2	2.0	1.7
C. Shekel depreciation (percent)^f										
1. Nominal effective	-1.4	-8.3	3.5	-7.1	3.6	0.6	0.6	0.4	3.4	-3.7
2. Vis-à-vis the dollar	-7.1	-0.9	-2.1	-4.9	4.7	0.1	-0.3	3.4	1.7	-4.6
3. Vis-à-vis the euro	2.4	-8.4	6.3	-13.9	4.2	-0.3	0.0	-1.8	4.0	-2.3
D. Asset prices (percent)										
1. Total nominal return on shares ^f	22.9	-46.4	78.8	12.6	-22.1	4.5	4.7	-7.0	6.9	0.4
2. Home prices ^g	3.2	10.6	19.9	14.1	4.0	6.8	1.2	1.0	2.2	2.2
E. The monetary aggregates (nominal rates of change)^f										
1. M1 money supply	17.7	17.5	52.1	4.6	1.6	8.6	-2.2	6.2	5.4	-0.7
2. Total credit (C3)	6.0	6.6	-0.5	2.7	6.3	4.8	4.0	0.9	1.2	-1.5
F. Other background data (percent, seasonally adjusted quarterly data)										
1. Unemployment rate ^c	9.1	7.6	9.5	8.4	7.1	6.9	6.8	6.9	6.8	6.9
2. GDP growth rate ^h	5.9	4.1	1.1	5.0	4.6	3.1	2.6	2.8	2.7	2.4
3. Share of total government debt in GDP ⁱ	76.6	75.4	77.8	74.4	72.4	71.6				

^a Change in CPI during the period. Quarterly rates shown in annual terms.

^b In annual terms. As calculated by the Bank of Israel (see article on page 20 of Inflation Report No. 30, January to March 2010).

^c Period average.

^d Period average, based on the zero curve.

^e Gross yield, based on the zero curve. Period average.

^f Average of last month in period compared with average of last month in previous period.

^g Data for 2012 refers to the first 11 months of the year, and data for the fourth quarter of 2012 refers to October and November.

^h Annual average compared with average of previous year.

ⁱ End of year figure.

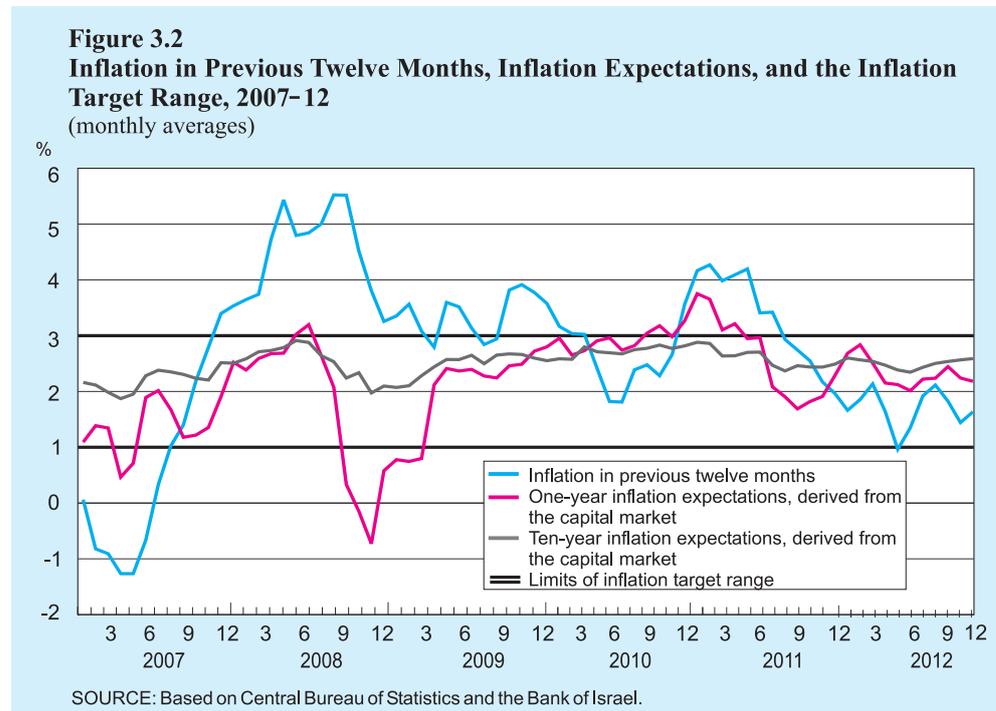
SOURCE: Ministry of Finance, Central Bureau of Statistics and the Bank of Israel.

than two years.³ In the short term, therefore, the Bank of Israel has flexibility with regard to meeting the inflation target.

This flexibility was exercised during the period 2008–10. During those years, inflation fluctuated around the upper bound of the target range and for most of the period exceeded it (Figure 3.2). In 2008 and 2009, monetary policy was expansionary, due to expectations of a slowdown in economic activity at the beginning of the period and the subsequent realization of those expectations later in the period. In 2010, against the background of a recovery in economic activity, the Bank of Israel retreated from monetary expansion, and at the same time inflation entered the target range.

During 2012, inflation was within the target range. Excluding the components that are directly affected by energy prices, which are not sensitive to the local economy’s

In 2012, inflation—actual and expected—fluctuated within the target range.



³ The Bank of Israel Law sets reducing social gaps as an additional goal. Monetary policy does not have the necessary tools to directly achieve this goal. However, within the framework of the Bank’s role as advisor to the government on economic matters, the Research Department analyzes the various aspects of the economy and offers policy suggestions accordingly. Two examples that can be provided in this regard are the Bank’s involvement in establishing an Earned Income Tax Credit and in discussions on setting the retirement age for women—these issues have direct impact on inequality in the economy. In addition, studies in other countries have shown that inflation is a regressive tax and that it is positively correlated with inequality. Therefore, striving for price stability also works to reduce inequality in a society. For studies on the link between inflation and inequality see:

Erosa, A., Ventura, G., (2002), “On Inflation as a Regressive Consumption Tax”, *Journal of Monetary Economics* 49(4), pp. 761–795.

Albanesi, S., (2007), “Inflation and Inequality”, *Journal of Monetary Economics* 54(4), pp. 1088–1114.

macro conditions, inflation was located in the lower part of the target range and for part of the period even declined to below its lower boundary. This development is consistent with the weakness in economic activity during the year. Inflation expectations for the coming 12 months, derived from the capital market and based on private analysts' projections, were within the target range throughout the year. The absence of major inflationary pressures, as well as the expectation that inflation would remain in the target range, made it possible to lower the interest rate during the course of the year in response to the moderation in economic activity.

During the course of the year, monetary policy maintained its credibility among participants in the market. The expectations of annual inflation for two to ten years (forward expectations) were relatively stable and fluctuated somewhat above the midpoint of the target range for the entire year. The conclusion that monetary policy maintained its credibility is further reinforced by the fact that the estimates derived from the capital market include risk and liquidity premiums and therefore are somewhat higher than the actual expectations.

b. Domestic economic activity

With a lack of inflationary pressures, the moderation of economic activity led to a downward path of the interest rate during the year. GDP increased at a somewhat slower rate than its potential this year, continuing the slowdown in growth during the second half of 2011.⁴ During 2012, GDP maintained a relatively stable rate of growth of about 2.6 percent in annual terms, and business sector output increased at a slightly higher rate. The Composite State of the Economy Index, which is published before the GDP figures and is available to decision makers at a higher frequency than National Accounts data, also showed weakness during the year and its rate of increase slowed. Despite the slow rate of growth, the unemployment rate remained stable during the year, ranging around 6.9 percent.⁵ However, it appears that support for employment this year came from the public sector and therefore it is reasonable to assume that the rate of unemployment is not a reliable indicator of the state of the business cycle. This is because there was a decline in demand for labor in the business sector—reflected in the decline in the rate of available posts, from an average of 3.1 percent in 2011 to an average of 2.8 percent this year. Likewise, the moderation in the rate of growth in wages also indicates some weakness in the labor market.

The moderation of real activity was a factor, as mentioned above, in the decisions to lower the rate of interest this year and it is reasonable to assume that if the real rates of interest had not been so low throughout the yield curve, economic activity would have been even weaker.⁶

⁴ A discussion of potential GDP growth appears in Box 2.2 of the Bank of Israel Annual Report for 2011.

⁵ This year, there were changes made in the methodology used to measure unemployment in the Labour Force Survey conducted by the Central Bureau of Statistics, and therefore the data appearing in this chapter differ from that in previous Bank of Israel Annual Reports.

⁶ For further discussion of real economic activity, see Chapter 2.

With a lack of inflationary pressures, the moderation in economic activity led to a downward path of the interest rate during the year.

c. Developments abroad

Global developments—particularly the slowing of global growth alongside expansionary monetary policy—supported the lowering of the interest rate in Israel.

During 2012, global growth slowed.

During 2012, global growth slowed. In the eurozone, GDP contracted, and in Germany, the strongest economy in the eurozone, growth weakened considerably. In emerging economies, the rate of growth slowed, as did the growth rate of world trade. In contrast, there was some improvement in the US, though the growth rate remained low.

At the center of global developments this year was the debt crisis in Europe. In response to the crisis, a restraining fiscal policy was adopted; however, the European Central Bank at the same time adopted an expansionary monetary policy in order to support economic activity and reduce the cost of raising capital by lowering market yields.

In the US, economic activity is recovering, albeit at a slow pace. The rate of growth in GDP has accelerated and the unemployment rate has declined. However, the level of economic activity is still low and toward the end of the year, the US economy again began to show signs of weakness. At the beginning of 2013, cuts in government expenditures as well as the cancellation of various tax exemptions were to go into effect—contractionary fiscal measures that have come to be called the “fiscal cliff”. Agreements reached since the beginning of 2013 deal with the issue of tax revenues, at least partially, but on the expenditure side the cuts have only been delayed. Therefore, the risk derived from fiscal restraint is still holding back the recovery in the US.

Central banks worldwide maintained expansionary policies.

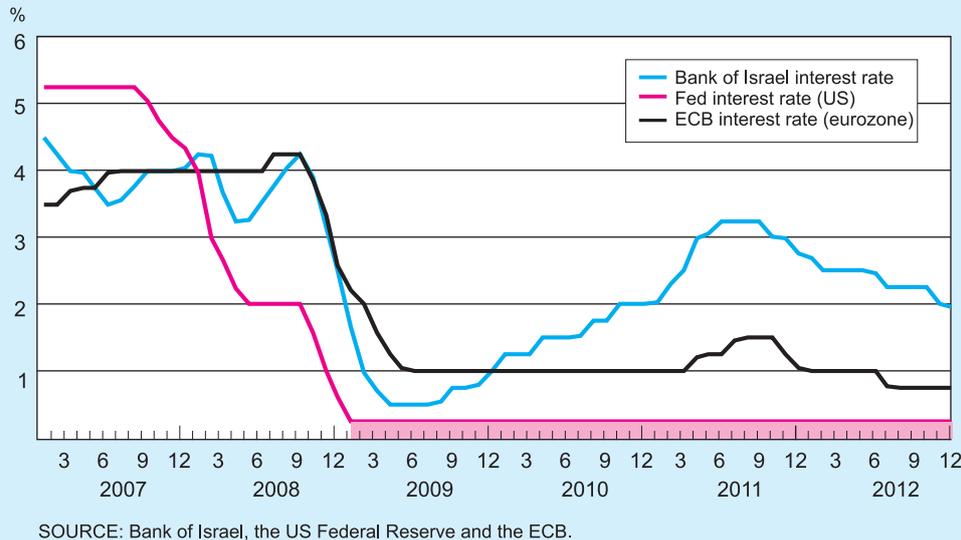
In view of these developments, monetary policy remained expansionary worldwide. The advanced economy countries maintained low rates of interest and in Europe the interest rate was reduced to its lowest level since the onset of the crisis—0.75 percent (Figure 3.3). In addition, central banks continued to purchase assets. In this context, it should be noted that in the US the motivation for these purchases has changed over the course of the crisis, reflected in the type of assets that the Fed was purchasing. At the beginning, purchases were meant to remove risky assets from the balance sheets of financial institutions and to provide them with short-term liquidity. Later on, the purchase of assets was intended primarily to reduce the long-term rate of interest, with the goal of boosting economic activity—consistent with standard actions of central banks over the course of the business cycle.⁷

As stated, in advanced economies, a low level of interest rates has been maintained for more than four years. While this supports economic activity in the short term, it could contain risks of undesirable longer term developments.⁸ A central argument in support of this position is that low interest rates may lead to overinvestment

⁷ The effect of the recent asset purchases on the balance sheet of the Fed was partially offset by the sale of assets which mature in the short term.

⁸ A discussion of the ramifications of “ultra easy monetary policy” appears in White, W. R., (2012), “Ultra Easy Monetary Policy and the Law of Unintended Consequences”, Federal Reserve Bank of Dallas, Globalization and Monetary Policy Institute, Working Paper No. 126.

Figure 3.3
Short-Term Interest Rates in Israel, the US, and the Eurozone,
2007-12
 (monthly averages)



in the present, and when the interest rates are increased to the levels that existed before the crisis, investment will decline to a level that would not compensate for the depreciation of the capital stock and the economy would enter a recession. Furthermore, should the low interest rate not be accompanied by a decline in risk appetite among individuals, it may encourage taking risks both in real investments and in the purchase of financial assets, which may lead to a mistaken allocation of resources across investment ventures (malinvestment). Moreover, low interest rates over the long term are good for borrowers and hurt lenders; therefore, low long-term bond yields may create a negative wealth effect among those saving for retirement, which could lead to reduced demand in the present and harm the level of economic activity. Against these arguments, and further to the advantage of encouraging activity in the short term, it should be noted that low interest rates, primarily long-term, also have a stabilizing effect on the economy, since they encourage taking longer-term credit and reduce its current cost over time.⁹

As a small and open economy, Israel's economic activity is significantly affected by global developments. The slowdown in the global economy reduces the demand for exports. Similarly, monetary policy in other countries influences domestic policy since if the Bank of Israel interest rate is significantly higher than global interest rates it will lead to the inflow of short-term capital. This will in turn lead to appreciation of the shekel and a worsening of conditions for exports, as occurred in recent years.

Israel's economic activity and its domestic monetary policy are affected by the global slowdown and the monetary policy response, primarily in advanced economies, to it.

⁹ See the testimony by the Chairman of the Federal Reserve before Congress on February 26, 2013.

Figure 3.4 illustrates this situation by presenting the gap between the monetary rate of interest in Israel and that in the major advanced economies—the US, eurozone, Japan and UK¹⁰, and the nominal effective exchange rate of the shekel against the currencies of those countries. The graph indicates that there is a negative correlation between the variables (-0.78). In other words, an increase in the interest rate gap relative to the rest of the world is accompanied by pressure for an appreciation of the shekel, at least since 2007. It should be noted that in the past, a significant portion of the changes in the interest rate gap relative to the rest of the world reflected fluctuations in Israel’s risk premium and therefore, in the past, a widening of the interest gap was often accompanied by a depreciation of the shekel rather than an appreciation. This occurred, for example, during the period of the second Intifada and during the LTCM crisis at the end of the 1990s.

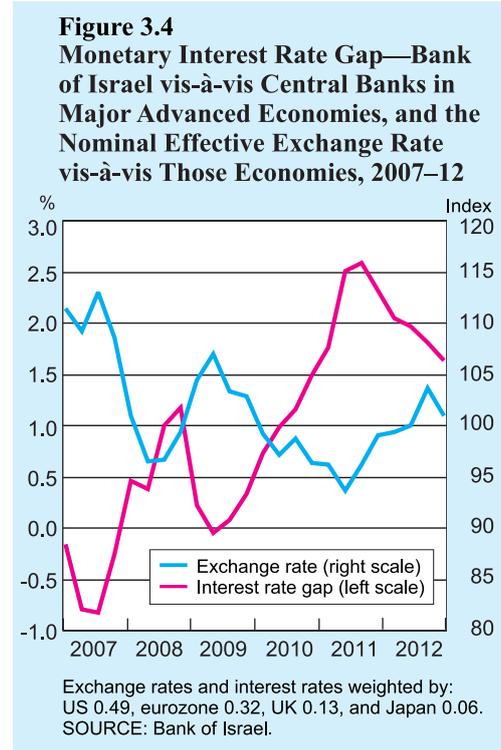
Both the global economic slowdown and the monetary expansions of major central banks have therefore supported the reduction of the domestic interest rate over the past year. It should be noted that similar to Israel, other small, advanced economies again began lowering their monetary interest rate over the course of the year, after interest rates had already started to rise from the lows they had reached in 2009.¹¹

d. The exchange rate and the foreign exchange market

The nominal effective exchange rate indicated moderate shekel depreciation in the first 3 quarters of the year, and appreciation at the end. Among the forces creating pressure for a depreciation were the reduction in the interest rate (even though the interest rate gap with the main advanced economies remained positive) and the political instability in the Middle East. In contrast, the decline in the government’s default risk in the second half of the year, as reflected in the narrowing of Israel’s CDS spread, worked to strengthen the shekel. The current account moved from a deficit during the first six months of the year to a surplus during the last six months.

¹⁰ A weighted average with the following weights: 0.49 for the US, 0.32 for the eurozone, 0.13 for the UK, and 0.06 for Japan.

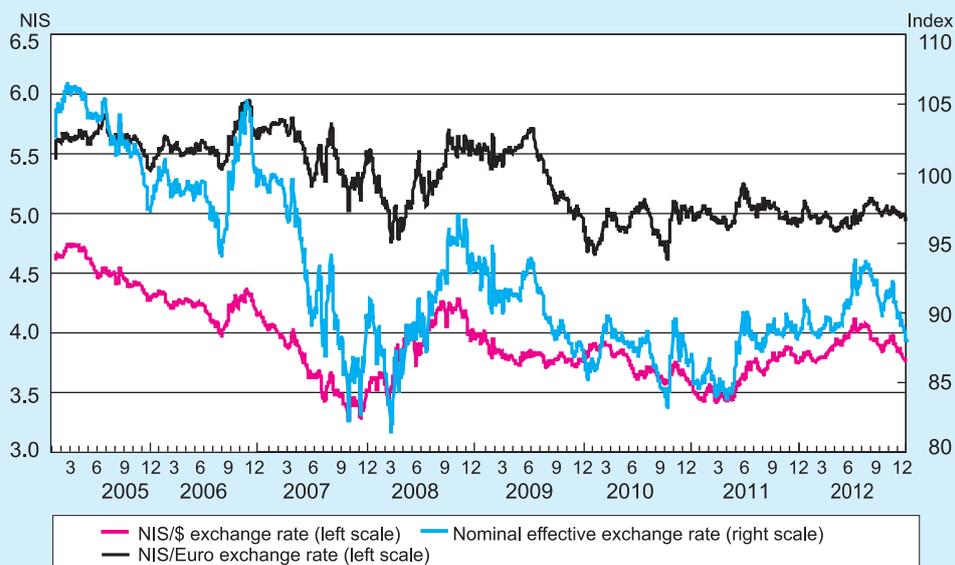
¹¹ For example, Sweden, Norway, Korea, and Denmark.



The nominal effective exchange rate depreciated moderately for the second consecutive year, after continued appreciation since 2006.

During the first three quarters of 2012, and particularly during the third quarter, the nominal effective exchange rate of the shekel depreciated while during the fourth quarter it appreciated. During 2012, the shekel depreciated by 0.6 percent (the average for December 2012 relative to the average for December 2011). The real effective exchange rate reflected depreciation at a somewhat higher rate of 1.8 percent. This is the second consecutive year in which the shekel has depreciated moderately, following a long period of appreciation that began in 2006 (Figure 3.5).

Figure 3.5
NIS/\$ Exchange Rate, NIS/Euro Exchange Rate, and Index of Nominal Effective Exchange Rate (January 1, 2007 = 100), 2005-12
(Daily data)



SOURCE: Bank of Israel.

The effective short term yield gap relative to the rest of the world was low in 2012 in comparison to the previous year. Three main channels contributed to the narrowing of the gap: First, the downward path of the interest rate in Israel and the stability of interest rates in the developed markets narrowed the interest rate gap. Second, during the previous year the tax exemption for nonresidents on interest income from short-term government bonds and *makam*, as well as on capital gains from short-term state loans, was cancelled. This measure lowered the effective yield received by foreign residents on these assets and therefore contributed to narrowing the yield gap. Finally, in the previous year, the Bank of Israel imposed a reserve requirement of 10 percent on nonresidents' transactions in foreign exchange derivatives. This requirement also reduced the effective yield received by nonresidents on domestic assets and therefore contributed to narrowing the effective yield gap with the rest of the world.

The short-term yield gap with the rest of the world narrowed this year, supporting depreciation of the shekel.

These factors reduced the attractiveness of short-term shekel deposits and contributed to the reduced holdings of these assets by nonresidents. These measures also likely had an additional, indirect, effect—the fact that policy makers were willing to act in a focused manner and to bring down the short-term yield on nonresidents’ shekel deposits led to foreigners reducing their holdings out of concern over further measures in the future.

The current account went into deficit at the beginning of the year following the cessation of gas imports from Egypt and their replacement by oil, a more expensive input. The current account deficit created pressure for a depreciation of the shekel. The import of oil is expected to continue to affect the current account until gas deliveries begin from the Tamar reservoir. However, it is unclear what the effect of this will be on the exchange rate, since at this stage the effect of gas deliveries from Tamar is already expected and it is reasonable to assume that at least part of its effect is already priced in to the current exchange rate. Further discussion of the exchange rate and the balance of payments appears in Chapter 7.

In contrast to these factors, the decline in Israel’s sovereign default risk reduced the pressure for shekel depreciation during 2012. Israel’s CDS spread narrowed during the year, primarily beginning from the second half of the year, by 59 basis points (average of December 2012 vis-à-vis the December 2011 average) to 138 basis points, despite the political instability in the Middle East, the escalation in the security situation during the second half of the year and Operation Pillar of Defense that followed it. The latter was apparently reflected in increased uncertainty in general, for example with regard to the exchange rate and macro circumstances, but not in default risk.

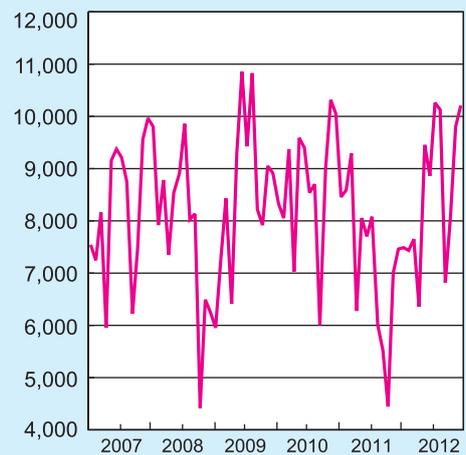
The decline in the default risk premium this year supported the shekel.

e. The housing market

In 2012, demand increased in the housing market, after having declined in the summer of 2011 following the social protest. At the same time, home prices renewed their increase at a relatively rapid rate, though at a slower pace than during the peak years of 2008–10. Overall, home prices increased by about 7 percent in 2012. The uptick in the market could be seen clearly in the increased number of transactions during the year (Figure 3.6). In parallel to the increase in home prices, rents continued to increase this year at a rate that outpaced the CPI. Developments in the housing market were taken into

In 2012, there was a renewed increase in demand for homes, after it moderated in the summer of 2011.

Figure 3.6
Number of Housing Transactions^a,
2007–2012
(actual transactions)



^a Based on Purchase Tax and Betterment Tax Records.
SOURCE: Based on Israel Tax Authority data.

consideration in the monetary discussions on the interest rate toward the end of the year.

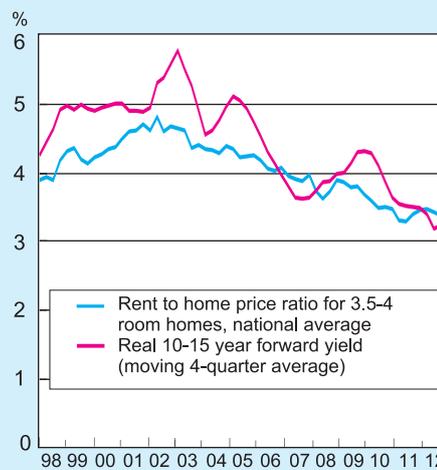
The increase in the number of transactions was accompanied by a rapid expansion in credit for housing. This development increased the risk of instability in the banking system, particularly because in recent years there have already been major increases in home prices and an increase in the leverage in the financing of home purchases. Therefore, and as a continuation of the steps taken in the mortgage market in 2010 and 2011, the Supervisor of Banks, in November 2012, imposed a limitation on the loan-to-value ratio for mortgages. A buyer of a home for residential purposes, when it is his only home (primarily first-time home buyers), was limited to a loan-to-value ratio of 75 percent. In the case of a purchase of a home for investment purposes or by nonresidents the ratio was limited to 50 percent. For other home buyers (primarily buyers moving up), the limit was set at 70 percent. This measure is intended to reinforce the stability of the banking system, but it also dampens the transmission from the monetary rate of interest to the demand for homes. This latter effect provides monetary policy makers with greater freedom to achieve the main objectives of the Bank of Israel, i.e., price stability and growth, with reduced effect on the demand for homes.

Rent under new and renewed¹² contracts increased this year, at a rate which exceeded that of the increase in the CPI for the fifth year in a row. The rapid increase in rents in recent years is evidence that demand for housing services increased at a faster pace than the expansion of supply, in contrast to the demand for purchases of homes, part of which derives from the need for a place to live, and part of which is driven by investment motives. In recent years home prices increased faster than rents and therefore the yield on renting out an apartment has eroded, in parallel to the decline in other real yields in the market. Thus, the increase in home prices can be viewed through two primary channels: 1) the conditions in the housing market as they are reflected in the trends in rent and 2) changes in real yields. Under the first channel, an increase in rent, when alternative yields are fixed, leads to a similar increase in home prices in order that the yield in the housing market will remain unchanged. Under the second, a decline

The Supervisor of Banks limited the LTV ratio of new housing loans in order to bolster the stability of the banking system.

Rents increased markedly in recent years, indicating that housing services demand increased more rapidly than supply.

Figure 3.7
Rent to Home Price Ratio, and the Real 10-15 Year Forward Yield on CPI-indexed Government Bonds, 1998-2012



SOURCE: Bank of Israel and CBS.

¹² The owned-housing services component of the CPI.

in yields in the capital market, when rents are fixed, will lead to an increase in home prices in order to align housing market yields to alternative yields.

Figure 3.7 presents the real long-term forward yield relative to the average yield (across regions)¹³ on the most common types of apartments in the market, i.e., 3.5 and 4-room apartments.¹⁴ The graph indicates that the yields are of similar magnitude and that they move together over time. A prolonged downward trend since 2003 is particularly noticeable. From January 2008 through the end of 2012, the increase in rents, reflecting demand for housing services, explains more than half of the increase in home prices, the rest of the increase is partly attributed to a decline in alternative real yields.^{15,16} Therefore, the increase in home prices at a faster rate than the increase in rents in recent years reflects, among other things, the trends in alternative real yields in the capital market.

The decline in real alternative yields supported, in recent years, an increase in home prices at a more rapid pace than rents.

3. ANALYSIS OF MONETARY POLICY

a. Real yields and monetary policy

During 2012, there was a shift downward in the government bond real yield curve (Figure 3.8). The slope of the yield curve remained stable over the course of the year; however, relative to the second half of 2011, the curve steepened since most of the decline in real yields was in the short term, a result of the lowering of the monetary interest rate. The real forward yields for the long term (about 10 years) remained relatively stable, particularly during the first half of the year. It is likely that the stability in long-term forward yields reflects the assessment by the markets that the recent moderation in economic activity is temporary and does not constitute evidence

Real yields for all terms declined during the year.

¹³ That is, this is a national average of regional yields.

¹⁴ In Israel, the number of rooms generally includes the living room, so that a 3 bedroom home is described as having 4 rooms.

¹⁵ This result is consistent with the estimate of the contributions of supply and demand factors to prices, primarily with the estimated contribution of the development of the population relative to the stock of homes, as derived from the model developed by Nagar and Segal (2011) (Nagar, W., and Segal, G., "What Explains the Development of Home Prices and Rents in Israel, 2009–10?", Bank of Israel Economic Survey 85, pp. 7–59). A discussion appears within the framework of the analysis of the construction industry in Chapter 2.

¹⁶ It is worth mentioning that during the sample period as a whole, and in particular from 2003 onward, the yields in the capital market dropped more sharply than those in the housing market. The difference in yields reflects the difference in premiums between the types of assets (for example, a risk premium and a liquidity premium). The fact that at the beginning of the sample, the yield from the capital market was higher than that from housing perhaps reflects the insurance premium (negative risk premium) for ownership of an apartment relative to renting. Therefore, the narrowing of the gap reflects a decrease in the insurance premium (an increase in the risk premium). In addition, it may be that the premium is characterized by cyclical behavior, since in the first part of the sample the housing market was in recession while in the second part it was in a boom.

For a discussion of the insurance premium for residence in an occupier-owned home and for empirical results for the US housing market, see Sinai, T., and Souleles, N. (2005), "Owner Occupied Housing as a Hedge against Rent Risk." *Quarterly Journal of Economics* 120(2), pp. 763–789.

that growth will be lower in the longer term.

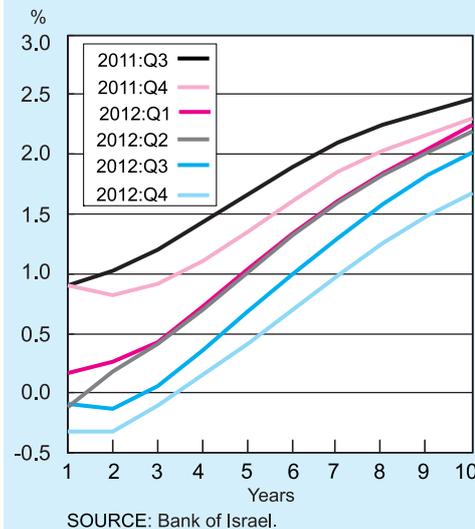
The level of the real short term interest rate, and its development over time, together with assessments of the inflation environment and real activity, indicate the extent of monetary policy expansion or contraction. Thus, for example, over two years beginning with the second quarter of 2009—with the beginning of the recovery from the recession in the economy due to the global crisis—the expected real yield on 1-year government bonds was negative, despite the continued increase of the monetary interest rate. Only an additional rapid increase in the monetary interest rate, by 1.25 percentage points in the first half of 2011, raised the real short term yield to a positive level, even though it was still low in a historical comparison. These developments, together with rapid growth and inflation that ranged around the upper bound of the inflation target range, support the assessment that monetary policy was accommodative during that period.

The reduction of the monetary interest rate during 2012 was accompanied, as noted, by a decline in the short term real interest rate, which returned to being negative primarily in the second half of the year (Figure 3.8). Despite the decline in the interest rate, no significant inflationary pressures were seen this year, and actual inflation and inflation expectations remained within the target range. These points, together with the moderate real activity, indicate that monetary expansion this year was more moderate than experienced in the economy in 2009. If not for the decline of real yields, it is plausible that the moderation of the economy's rate of expansion would have been sharper and the inflation rate would have been lower.

The reduction of the monetary interest rate during 2012 was accompanied, as noted, by a decline in the short term real interest rate, which returned to being negative primarily in the second half of the year (Figure 3.8). Despite the decline in the interest rate, no significant inflationary pressures were seen this year, and actual inflation and inflation expectations remained within the target range. These points, together with the moderate real activity, indicate that monetary expansion this year was more moderate than experienced in the economy in 2009. If not for the decline of real yields, it is plausible that the moderation of the economy's rate of expansion would have been sharper and the inflation rate would have been lower.

In this regard, it should be noted that domestic real interest rates are affected by both the Bank of Israel interest rate and the global interest rate environment. This is because in a small and open economy with free flows of capital, such as that of Israel, the capital flows work to equalize domestic and global yields and the remaining differences are the result of differences in risk premiums between economies, differences in tax rates and various frictions that slow down the alignment process. Thus, for example, the decline in yields in Israel occurred in parallel to the fall in real yields on indexed US government bonds (TIPS), which have been in a continuous downtrend since the end of 2008. Similarly, a simple regression of domestic real yields for short and long

Figure 3.8
Real Yield Curve of Government Bonds, Quarterly Average, 2011-12



SOURCE: Bank of Israel.

As Israel's economy is small and open, domestic real interest rates are influenced by monetary policy as well as by global interest rates.

terms, on the parallel yields in the US and on the Bank of Israel interest rate, shows that both factors have an effect which is statistically significant and economically important, and that the Bank of Israel interest rate is the dominant explanatory variable. However, when the sample is shortened in order to focus on the period of the financial crisis, the effect of the global interest rate increases and dominates that of the Bank of Israel interest rate in explaining the long-term interest rate.¹⁷ Therefore, the fall in real yields in the domestic market cannot be attributed only to monetary policy, but also—and especially in recent years—to global developments.

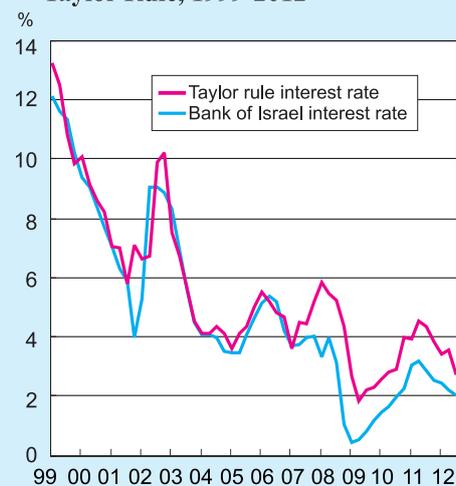
b. The Taylor Rule and the monetary interest rate

The Taylor Rule is a simple tool which provides an indication of the interest rate which is appropriate for economic conditions, based on a small number of variables.

The Taylor Rule is a monetary rule which provides an indication of the interest rate level appropriate to economic conditions, based on the output gap, the deviation of inflation from its target and the natural rate of interest.¹⁸ The simplicity of the rule and the correlation between the interest rate derived from it and the actual rate set in various countries and at various times have turned it into a popular tool in the analysis of monetary policy. It is important to emphasize that the Taylor Rule is only a decision-support tool and does not take into account additional information or other considerations that should be taken into account when making policy decisions, such as expected future developments, various types of risk and the situation of the financial markets. In particular, the Taylor Rule takes into account the expected developments in inflation, but does not fully take into account expected developments in economic activity.

Developments in the interest rate in Israel can be examined by the Taylor Rule. Figure 3.9 presents the actual monetary rate of interest alongside the rate indicated by the Taylor Rule for an open economy, a rule which is similar to

Figure 3.9
Bank of Israel Interest Rate vis-à-vis
Interest Rate Derived from the
Taylor Rule, 1999-2012



SOURCE: Bank of Israel.

¹⁷ The Bank of Israel interest rate is itself influenced by the global interest rate environment; however when the level of global monetary interest rates is added as an explanatory variable, the explanatory power of the Bank of Israel interest rate remains unchanged.

¹⁸ See: Taylor, J. B., (1993), "Discretion versus Policy Rules in Practice", Carnegie-Rochester Conference Series on Public Policy 39, pp. 195-214.

the interest rate equation in the forecasting model of the Bank of Israel's Research Department.^{19,20}

The graph indicates that during the period preceding the financial crisis, the interest rate rule accurately describes the path of the actual interest rate, and that from the outbreak of the global economic crisis in the beginning of 2008 onward a gap appears between them although their fluctuations remained correlated. It appears therefore that during the period of the global economic crisis, monetary policy was conducted differently, affected by factors that are not included in the interest rate equation—in particular, risk factors originating in the global economy and expectations of their future moderating effect on the Israeli economy led to a lower rate of interest than that dictated by the equation. On the eve of the crisis, at the beginning of 2008, the Bank of Israel lowered the rate of interest based on its assessment that the global economic situation would worsen, even though this had not yet happened, and factors affecting the interest rate rule supported increasing the interest rate rather than reducing it. Therefore, at that stage, a gap developed between the actual interest rate and that dictated by the rule, and the policy can be seen as pre-empting actual events. In other words, the Bank of Israel lowered the interest rate at an earlier stage based on the assessment that the global deterioration would also affect the Israeli economy and the fact that monetary policy affects economic activity and prices with a lag. Even after the worst part of the crisis in the global economy, in the first quarter of 2009, significant risks remained—particularly the development of the debt crisis in Europe, which threatened, and still threatens, domestic economic activity. The forecast for moderation of activity worldwide, the concern of a deterioration of the crisis and its effect on the economy, and the strong shekel were among the factors for maintaining

From the beginning of 2008, the eve of the worsening of the global crisis, the monetary interest rate was lower than that derived from the Taylor Rule, as policy makers expected that developments abroad would moderate domestic activity.

¹⁹ See Elkayam, D. Argov, E. Borenstein, E., Binyamini, A. Barnea, A. and Rozenshtrom I., 2012, "MOISE: A DSGE Model for the Israeli Economy", Research Department, Discussion Paper Series, no. 2012.06 (BoI).

²⁰ This is the interest rate rule that produced the results presented in Figure 3.9:

$$it = 0.2 \times [rtfwd + \pi T + 2.5 \times (\pi - \pi T) + 0.8 \times \text{gap} + 0.1 \times \Delta S] + 0.8 \times it-1$$

where: i is the Bank of Israel interest rate; r is the one-year forward real interest rate on government bonds, average for 5 to 10 years; πT is the inflation target; π is the average of (1) actual inflation during the last four quarters and (2) expectations of inflation for the next four quarters; gap is the output gap measured as the deviation of logged GDP from the Hodrick-Prescott trend; ΔS is the rate of nominal effective depreciation against a basket of four major currencies: the dollar (weight of 0.49), the euro (weight of 0.32), sterling (weight of 0.13) and the yen (weight of 0.06).

In contrast to the original rule, which was formulated in Taylor (1993), the above interest rate rule includes the interest rate with a lag, thus, it creates a mechanism for smoothing the interest rate. In addition, the formulation above allows the estimate of the real natural interest rate to change over time. The motivation for these two changes is based on Woodford (2001). Woodford stresses the advantage of a mechanism for interest rate smoothing: the increase in the interest rate during a specific period leads to expectations of a higher interest rate in coming periods as well and thus the effectiveness of monetary policy is enhanced and the required changes in the interest rate are smaller. This contributes to the stability of the economy. Finally, the addition of the exchange rate to the interest rate rule is an accepted practice in the modeling of small and open economies, such as that of Israel.

Woodford, M., (2001), "The Taylor Rule and Optimal Monetary Policy", *The American Economic Review* 91(2), Papers and Proceedings, pp. 232–237.

a low interest rate level. If the debt crisis in Europe deteriorates, the required interest rate in Israel will in fact be lower; however, as long as that risk does not come about, a downward deviation from the interest rate rule is called for.

In addition to the risk factors from the global economy, it should be noted that despite the gap between actual interest rates and the rate dictated by the interest rate rule, both the inflation rate and the level of activity in the previous year were not high. This fact supports the monetary policy which was adopted in practice, a policy that was more accommodative than that derived from the interest rate rule, since setting the interest rate in accordance with the rule would have led to an inflation rate and economic activity level lower than those which actually occurred.

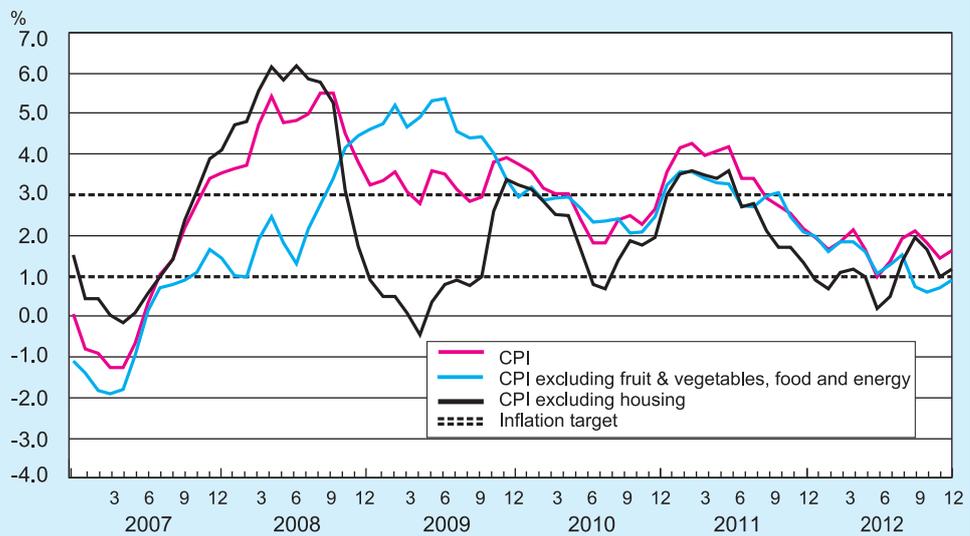
4. PRICES

a. Inflation and its components

CPI inflation was 1.6 percent in 2012, within the target range.

The CPI increased by 1.6 percent in 2012, within the price stability target range set by the government of 1–3 percent, which has been the target range since 2003. During the year, inflation over the previous 12 months fluctuated within the lower part of the target range, which was a continuation of the moderating trend in inflation that began in the middle of the previous year (Figure 3.10).

Figure 3.10
Inflation in Previous Twelve Months: CPI and the CPI Excluding Certain Items, 2007–12



SOURCE: Based on Central Bureau of Statistics data.

Table 3.3
Price Developments, 2007–12

	CPI	Fruit & vegetables	Food	Housing	Dwellings maintenance	Furniture and household equipment	Clothing and footwear	Education, culture and entertainment	Health	Transport and communications	Miscellaneous	Energy index ^a	CPI excluding food and energy	General CPI seasonally adjusted ^b
Percent, monthly change														
2007	3.4	7.0	6.3	1.9	6.1	0.6	-0.7	1.5	1.9	4.2	1.3	14.4	1.9	
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	4.2	
2009	3.9	8.4	1.1	5.6	5.2	-1.2	-4.4	1.4	2.5	6.5	4.5	13.0	3.6	
2010	7.2	16.0	2.0	9.4	2.1	-2.8	4.5	1.5	0.6	2.0	3.2	-0.4	3.1	
2011	2.2	-8.1	2.3	1.5	9.3	-0.4	2.1	-0.3	2.6	1.7	1.3	9.2	1.6	
2012	6.1	-1.7	4.0	3.3	7.4	-1.4	0.4	-2.9	2.5	-0.4	5.4	6.5	0.8	
2012														
January	0.0	-1.9	0.5	0.3	0.5	-0.2	-7.7	-0.5	0.4	0.4	1.4	0.9	-0.2	0.4
February	0.0	3.2	0.2	0.0	0.3	0.1	-5.6	0.2	-0.2	0.4	-0.1	1.7	-0.2	0.3
March	0.4	-1.0	0.1	0.4	0.1	0.4	-0.2	0.3	0.2	1.1	-0.1	2.3	0.3	0.4
April	0.9	0.1	0.0	0.8	2.4	-0.9	6.6	0.5	0.2	0.9	-0.4	3.0	0.8	0.2
May	0.0	3.8	-0.4	0.3	0.1	-0.5	1.0	0.1	0.1	-0.8	0.2	-1.0	0.2	-0.2
June	-0.3	-5.9	0.0	0.1	-0.1	-0.3	4.0	-0.1	0.5	-1.1	0.2	-1.7	-0.2	-0.4
July	0.1	1.3	-0.6	1.0	0.2	-0.7	-8.3	0.3	0.9	0.3	0.1	-1.4	0.4	-0.2
August	1.0	7.9	0.9	1.1	0.4	0.6	-6.0	1.3	-0.1	1.3	3.4	3.3	0.9	1.0
September	0.0	2.7	0.9	-0.1	0.6	0.6	-0.9	-3.6	0.3	0.7	0.1	4.4	-0.6	0.4
October	-0.2	-2.4	1.0	-0.8	0.2	0.3	5.5	-0.2	0.5	-1.0	0.3	-2.0	-0.2	-0.3
November	-0.5	-7.2	0.8	-0.2	-0.1	-0.1	3.7	-0.8	0.1	-1.3	0.2	-2.4	-0.5	-0.2
December	0.2	-1.4	0.6	0.4	0.1	-0.7	10.5	-0.3	-0.3	-1.1	0.2	-0.4	0.2	0.3

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

^b Calculated by the Bank of Israel Research Department. (See box on page 20 of the Bank of Israel Inflation Report for the first quarter of 2010).

SOURCE: Central Bureau of Statistics.

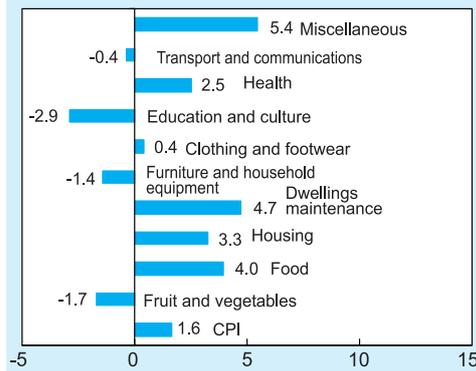
The development of core inflation indices was similar to that of the general index—moderation in the rate of increase since the middle of 2011.

The components with the main contribution to the increase in the CPI were housing (rents), dwellings maintenance, and food.

A similar trend, i.e., a moderation of the rate of price increases since mid-2011, was seen in the CPI excluding fruit and vegetables, food and energy, and at the end of 2012, inflation as measured by the CPI net of the above components, was somewhat below the lower bound of the target range. It is convenient to exclude these components from the CPI when examining the trend in inflation in the economy. This is because changes in the prices of fruits and vegetables primarily reflect temporary supply shocks, and food and energy prices are largely determined by factors that monetary policy has only a limited effect on. Thus, these components do not reflect the domestic “inflation environment”.^{21,22}

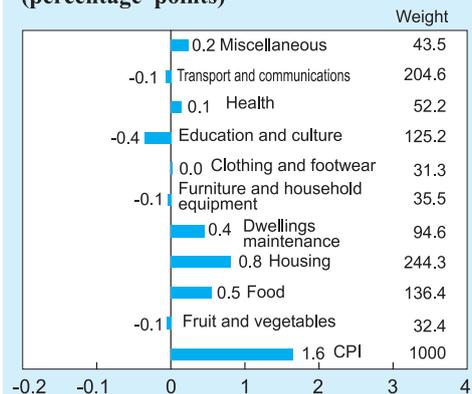
The main components which increased this year at a more rapid pace than the overall CPI include housing (rent), dwellings maintenance, and food (Figure 3.11). The housing component, which is mainly composed of rent, increased by 3.3 percent this year and contributed 0.8 percent to the overall CPI, about half of its increase.²³ The increase in the dwellings maintenance component reflects the increase in global energy prices through their effect on the prices of electricity, natural gas, oil, and diesel fuel for heating. Components of the CPI which are directly affected by energy

Figure 3.11a
Rates of Change in the Components of the CPI, 2012 (percent)



SOURCE: Based on Central Bureau of Statistics data.

Figure 3.11b
Contribution of the Components of the CPI to Total CPI Inflation, 2012 (percentage points)



SOURCE: Based on Central Bureau of Statistics data.

²¹ When analyzing the discounted indices, it is accepted practice to also remove the housing component since in the past, its fluctuations primarily reflected fluctuations in the exchange rate and to a lesser extent the inflationary environment. This is because rents were denominated in dollars. With the strengthening of the shekel in recent years, this practice has dwindled and during 2012 about 97 percent of contracts were denominated in shekels. As a result, the volatility of the housing component has declined and therefore it is reasonable to assume that it now reflects more accurately the inflationary environment also in the short term. It appears therefore that there is now less need to remove the housing component from the overall CPI.

²² For a discussion of measures of core inflation and the arguments for netting out various components from the CPI, see Ribon, S., (2010), “Measures of Core Inflation in Israel”, BOI Economic Survey 84, 125–169.

²³ For a discussion of the developments in the housing market, see Part 1 (Monetary Policy) of this chapter, section b (5).

prices rose sharply this year at a rate of 6.5 percent, even though they moderated worldwide. The main reasons for this were the termination of natural gas imports from Egypt and their replacement by oil, which is a more expensive input, as well as the depreciation of the shekel relative to the dollar during most of the year. The supply of gas from the Tamar reservoir, which is expected to begin during 2013, will moderate domestic energy prices in the future. The food component increased by 4.0 percent this year, in line with the rise in worldwide food prices.

In contrast to the above components, the prices of education and culture declined by 2.9 percent and they reduced the overall CPI by 0.4 percentage points. The drop in this component was primarily the result of the reduced cost of pre-primary school services following the implementation of the Trajtenberg Committee recommendations. The communication component also declined, at a rate of 7.1 percent, and it reduced the overall CPI by 0.3 percentage points. The decrease in this component was primarily the result of cheaper telephone and Internet services following the increase in competition in the industry.

The components with the main contribution to moderating the increase in the CPI were education and culture, and communications.

b. Background factors in price developments

A number of factors affect the development of prices, including real activity in the economy, the situation in the labor market, the exchange rate, energy and commodities prices and the response of monetary policy to these developments and to expected developments.

The development of prices this year was largely in line with developments in the real side of the economy. The weakening of growth since mid-2011 and the narrowing of the output gap, the shrinking of investment, the weak sales in the retail chains and the declines in the index of consumer confidence constituted evidence of moderation in demand, which was reflected in weaker inflationary pressures in the economy and a decline in actual inflation. In contrast, current private consumption, which accounts for more than half of GDP, grew at a relatively rapid pace; however, it did not offset the effect of the sharp decline in investment and the purchase of durable goods.

The development of prices this year was in line with slowdown in the economy's rate of expansion.

In the labor market as well, there was no discernible pressure on prices, which was a continuation of the trend that began to appear in the second half of the previous year. In competitive markets, real labor compensation equals marginal productivity.²⁴ The trend in labor productivity, i.e., real output per hour of work, constitutes an indicator of changes in marginal productivity. In general, productivity increases over time. Thus, for example, since the exit from the recession at the beginning of the previous decade, productivity has grown at an average annual rate of about two percent (Figure 3.12). At the same time, real labor compensation has grown by a similar rate and therefore during the last decade there have been no discernible rigidities that would create a persistent imbalance in the labor market. Labor compensation deviates from productivity with the frequency of business cycles, although the deviations are not large. These

Pressures to increase prices were not seen from the labor market either.

²⁴ Labor compensation is equal to the cost of employing workers and includes mainly salary payments and social benefits.

deviations can lead to price increases that are larger or smaller than their long-term rate of increase, according to the direction of the deviations a short time later. Thus, for example, during the period of prosperity that preceded the crisis at the end of 2008, the return to labor was higher than productivity and at the end of this period actual inflation deviated from the target range. During the crisis, productivity was lower than labor compensation and in parallel inflation leveled off significantly, while during the recovery from the crisis, labor compensation again exceeded productivity and as a result pressure for price increases also increased.²⁵ At the end of the previous year, the gap was closed between productivity and labor compensation and from mid-2012 onward, labor compensation was lower than productivity. Therefore, it appears that developments in the labor market were among the factors that moderated the increase in prices this year.

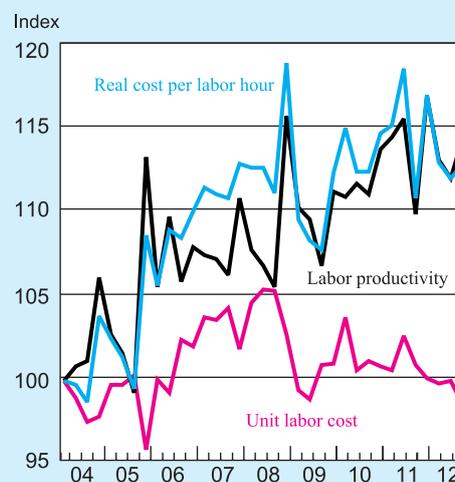
Moving from cyclical factors to structural ones, the rate of unemployment during the last decade was characterized by a downward trend, which would indicate a structural decline in the unemployment rate.²⁶ Therefore, inflationary pressures from the labor market decreased since the drop in unemployment has increased the economy's production capacity. In particular, when structural unemployment is low, it is easier to meet demand by increasing employment and thus output, and therefore the upward pressure on prices is reduced. It appears therefore that both cyclical and structural forces in the labor market worked to moderate inflation. Additional discussion of the labor market can be found in Chapter 5.

The exchange rate has an effect on inflation through the prices of imported goods. Prices of imports are usually denominated in foreign currency and fluctuations in the exchange rate change the shekel-denominated cost of imports. This price is in turn

²⁵ The position of labor productivity relative to labor compensation assumes that at the beginning of 2004, the inflationary pressures from the labor market were balanced. This is a reasonable assumption in view of the fact that the economy was located midway between the recession of the intifada years and the growth that followed it. The choice of some other point of balance would somewhat change the timing of the ranking between the two time series but not the trend in the gap between them.

²⁶ An analysis of the decrease in the rate of structural unemployment in Israel can be found in: Yakhin, Y., Presman, N., (2013), "A Flow-Accounting Model of the Labor Market: An Application to Israel", Bank of Israel, Research Department, Discussion Paper. Forthcoming.

Figure 3.12
Labor Cost and Labor Productivity in the Business Sector, 2004-12
(quarterly data, seasonally adjusted)



SOURCE: Central Bureau of Statistics and the Bank of Israel.

Table 3.4
Import Prices, the Exchange Rate and Consumer Prices, 2007–12

	(percent change)									
	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)										
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
2010	3.0	-1.2	4.2	25.4	-5.1	-2.2	-6.2	-1.1	19.5	2.7
2011	7.5	3.3	9.5	39.3	-4.1	3.0	-1.0	4.9	33.5	3.5
2012	-2.8	-2.8	-3.6	-5.3	7.8	4.8	4.8	3.9	2.1	1.7
(Change from last quarter in previous year)										
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
2010	4.9	-1.1	4.6	15.0	-3.9	0.9	-4.9	0.5	10.6	2.5
2011	2.5	0.2	4.6	29.3	2.8	5.4	3.0	7.6	33.0	2.5
2012	-1.2	-1.2	-2.3	-5.7	3.2	1.9	2.0	0.8	-2.7	1.6
(Change from previous quarter)										
2010										
I	0.3	-2.0	-0.6	3.8	-0.8	-0.5	-2.8	-1.4	3.0	-0.7
II	-0.9	-2.3	-0.2	1.9	1.3	0.4	-1.1	1.1	3.3	1.2
III	1.8	1.3	1.0	-1.2	0.3	2.1	1.6	1.3	-0.9	1.2
IV	3.7	2.1	4.4	10.0	-4.6	-1.1	-2.6	-0.4	4.9	0.8
2011										
I	2.6	0.8	3.3	19.5	-0.5	2.0	0.3	2.7	18.9	0.7
II	2.8	2.5	4.0	14.4	-4.4	-1.7	-2.1	-0.6	9.3	1.3
III	-0.3	-0.8	-0.5	-1.9	3.1	2.8	2.2	2.6	1.2	0.4
IV	-2.5	-2.2	-2.1	-3.7	4.9	2.3	2.6	2.7	1.1	0.1
2012										
I	-0.8	-0.6	-2.6	0.0	1.3	0.5	0.7	-1.3	1.4	0.1
II	-0.4	-0.6	0.2	-5.8	1.4	1.0	0.8	1.7	-4.5	1.0
III	-1.1	-1.4	-1.4	-2.2	4.3	3.2	2.9	2.8	2.0	0.6
IV	1.1	1.4	1.4	2.4	-3.7	-2.6	-2.4	-2.3	-1.4	-0.1

^a The dollar import prices of goods multiplied by the NIS/\$ exchange rate.

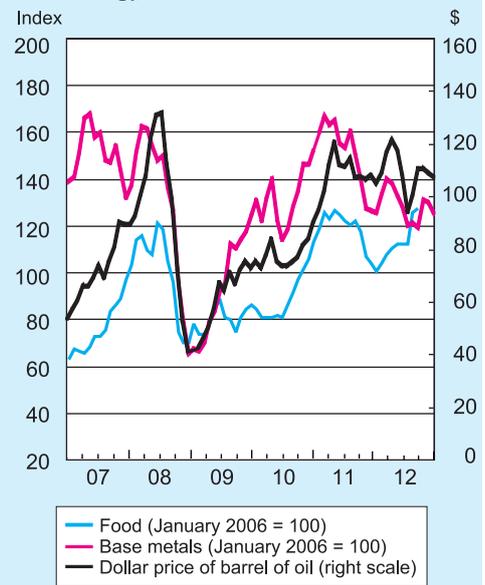
SOURCE: Based on Central Bureau of Statistics data.

passed on to the final consumer, whether directly through the price of the final good or through its effect on production costs.²⁷ According to the estimates of the Research Department, the transmission from the exchange rate to the CPI ranges from 0.1 to 0.35. In other words, a depreciation of one percent in the shekel raises consumer prices during the following 12 months by between 0.1 and 0.35 percent, depending on the reasons for the depreciation, i.e., an increase in the risk premium, a decrease in the interest rate gap relative to other countries or a drop in the demand for exports.²⁸ During the year, dollar prices of imported goods fell for all uses, i.e., consumption, investment and production inputs. However, the depreciation of the shekel against the dollar during the first three quarters of the year led to an increase in shekel prices of imported goods (Table 3.4). According to the estimate of the Research Department, about 27 percent of the local consumption basket is imported or at least tradable.²⁹ In 2012, this component of the CPI increased by 3.1 percent and its contribution to overall inflation was about 0.8 percentage points. The depreciation of the exchange rate over most of the year is among the factors that pushed the overall CPI upward.

Excluding food prices, global commodity prices contributed to a decline in the cost of raw materials, thus supporting the moderation of domestic prices.

Commodities are raw materials for production and therefore their prices affect production costs and through them prices in the economy. Apart from food prices, the prices of commodities fell this year (Figure 3.13). The fear of recession in Europe, the effects of the “fiscal cliff” on the US economy and the slowing of growth in China created downward pressure on commodity prices this year. In contrast to this trend, global food prices increased significantly in the middle of the year and as a result increases in food prices in Israel were concentrated primarily in the second half of the year. For the year as a whole,

Figure 3.13
Indices of Prices of Base Metals,
Energy, and Food, 2007–12



SOURCE: Bloomberg.

²⁷ Fluctuations in the nominal exchange rate can have an indirect effect on local prices also from the demand side. This occurs to the extent that the fluctuations are also manifested in the real exchange rate. Thus, for example, as a result of a real depreciation local goods are made cheaper relative to foreign goods. This increases the global demand for local goods and creates upward pressure on local prices while at the same time eroding the initial real depreciation.

²⁸ The estimate is based on: Argov, E., Barnea, A., Binyamini, A., Borenstein, E., Elkayam, D., Rozenshtrom, I., (2012), “MOISE: A DSGE Model for Analysis of the Israeli Economy”, Bank of Israel, Research Department, Discussion Paper No. 2012.06.

²⁹ It should be mentioned that some of the prices of tradable goods are also affected by non-tradable factors, such as storage costs, rent, shipping, etc.

the price of a barrel of oil (in dollars) did not change very much, although it was quite volatile. With respect to Israel, energy prices rose both because of the depreciation of the shekel relative to the dollar during most of the year and due to the termination of natural gas imports from Egypt, which led to the import of more expensive fuels for electricity production. In sum, the trend in global commodity prices, apart from food prices, provided support for the weakening of domestic inflation.

The monetary interest rate influences inflation through the effect of the real interest rate on demand and also through its influence on the exchange rate and foreign trade prices. Changes in the monetary interest rate generally affect inflation with a lag of about six months. Therefore, the lowering of the interest rate, which began at the end of last year, tended to offset the decline in the inflation environment, and it is reasonable to assume that if the interest rate had not been reduced, actual inflation would have been lower.

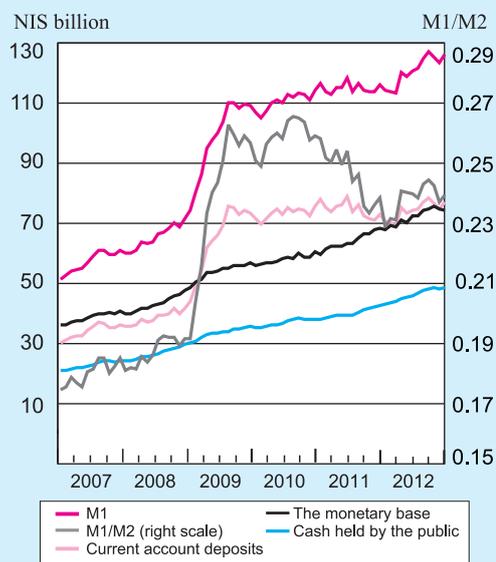
The reduction of the interest rate beginning at the end of 2011 moderated the decline in the inflation environment during the year.

c. Monetary Aggregates

When the main policy instrument in a monetary regime is the nominal interest rate, the supply of money is completely flexible and the quantity of money is determined by the public's demand for liquidity, in accordance with the interest rate and market conditions.

The unusually large reduction in the interest rate as a result of the global crisis at the end of 2008, can clearly be seen in the quantity of money as measured by M1 (Figure 3.14). M1 includes cash in the hands of the public and demand deposits. It increased during 2009 by about 52 percent (the average for December 2009 relative to the average for December 2008). This increase was more a result of an increase in demand deposits and less a result of growth in cash held by the public. This was due to the fact that demand deposits served as a substitute for short-term interest-bearing deposits since the latter offered a negligible rate of interest. Support for this conclusion can be found in the increase of the proportion of the M1 aggregate within the M2 aggregate (Figure 3.14). The latter includes, in addition to M1, unindexed deposits of up to one year. Therefore, the increase in the share of M1 in M2 indicates that during this period the public substituted

Figure 3.14
The Monetary Aggregates, 2007-12
(monthly averages)



SOURCE: Bank of Israel.

Against the background of the worsening of the global crisis at the end of 2008, the sharp reduction in the interest rate led to a marked increase in the supply of money (M1), with substitution between M1 and M2.

demand deposits, to some extent, for interest-bearing deposits as a way of maintaining the value of its assets.

The sharp increase in liquidity was not accompanied by an increase in inflation, although according to economic theory one would expect a positive correlation between the quantity of money and prices, at least in the long term. In order to understand why the increase in liquidity was not accompanied by an increase in prices of a similar magnitude, it is important to break down the total demand for liquidity. The two main motives that create a demand for liquidity are to execute transactions and to preserve value in the short run, primarily in the absence of attractive channels for saving.

Table 3.5
Rates of Change in the Monetary Aggregates, 2007–12
(average of last month in period compared with average of last month in previous period, percent)

	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 ^c	Term deposits up to 1 year ^c	Self-renewing overnight deposits ^d	M2 ^b
2007	13.6	15.0	19.5	17.7	14.2	10.9	13.7	14.4
2008	16.7	21.8	14.6	17.5	12.5	12.0	13.3	13.5
2009	19.9	19.6	75.3	52.1	-4.4	1.8	40.2	13.6
2010	6.3	7.6	3.2	4.6	4.0	16.2	-4.5	3.6
2011	12.3	11.5	-3.4	1.6	14.5	25.4	4.5	10.5
2012	9.2	13.4	5.8	8.6	8.0	8.5		8.2
2010								
I	11.3	12.6	32.1	24.8	-1.2	-1.2	2.4	5.1
II	7.2	9.6	10.3	10.1	1.9	11.7	-2.2	3.9
III	7.0	11.4	-0.9	3.0	-1.5	26.3	-6.3	0.9
IV	6.3	7.6	3.2	4.6	4.0	16.2	-4.5	3.6
2011								
I	9.2	8.2	3.2	4.9	9.1	27.6	-2.6	7.4
II	9.4	7.2	7.8	7.6	13.0	27.7	-6.6	9.3
III	10.9	7.0	-2.7	0.6	22.1	20.0	5.8	13.3
IV	12.3	11.5	-3.4	1.6	14.5	25.4	4.5	10.5
2012								
I	10.7	13.6	-6.2	0.6	13.4	19.6	2.0	8.9
II	13.8	16.6	-5.6	1.8	10.9	12.2	5.9	7.9
III	12.3	16.4	8.2	11.2	7.8	7.9	-0.9	7.2
IV	9.2	13.4	5.8	8.6	8.0	8.5		8.2

^a M1: cash and demand deposits.

^b M2: M1 plus unindexed term deposits of up to one year and self-renewing overnight deposits.

^c Deposits for a set term.

^d Self-renewing overnight deposits - liquid deposits.

SOURCE: Bank of Israel and Central Bureau of Statistics.

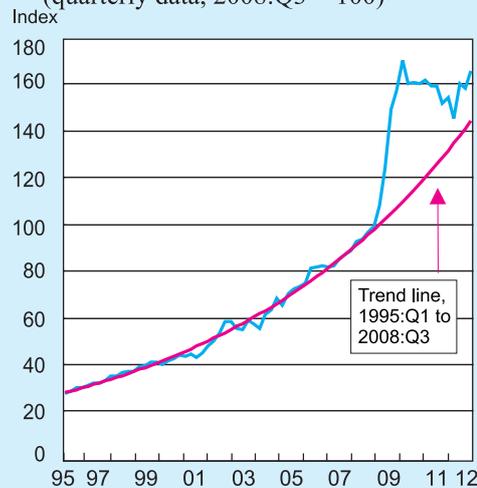
The transactions motive is the component that creates the link between liquidity and prices. In times of prosperity, the aggregate demand for goods and services grows and upward pressure is created on prices. At the same time, the volume of activity in the economy increases and in order to maintain it, there is a need for a greater amount of liquidity in order to carry out transactions. Thus, a positive correlation is created between liquidity and prices.

With respect to retaining value, this component is more sensitive to the interest rate. When the interest rate is high, the holding of cash in demand deposits has a significant opportunity cost since these deposits do not bear interest and therefore this channel does not efficiently maintain the value of wealth in the hands of the public. In contrast, when the interest rate is low, the alternative cost is low and with the addition of transactions costs, the alternative becomes even less worthwhile.³⁰ In addition, if the interest rate is increased earlier than the markets had expected, this will lead to capital losses on interest-bearing assets and therefore this factor reduces even further the opportunity cost involved in holding liquidity.

With the lowering of the interest rate to near zero during 2009, the increase in the quantity of money, and of liquidity in general, was the result of a lack of attractive savings channels, rather than unusually high demand for liquidity to carry out transactions. Therefore, the sharp increase in the quantity of money was not reflected in a general rise in prices of a similar magnitude since the liquidity was not intended for the financing of demand. Evidence of this is the trend in the quantity of money relative to domestic uses in fixed prices, i.e., private consumption, public consumption and investment (Figure 3.15). With the onset of the crisis, this ratio rose sharply to above the pre-crisis trend, without creating inflationary pressures in the economy of a similar magnitude. Therefore, it is clear that the growth in the quantity of money did not trickle down to domestic demand. With the recovery in economic activity, the

Figure 3.15
Quantity of Money Relative to Domestic Uses—Private Consumption, Public Consumption, and Investment, 1995-2012

(quarterly data, 2008:Q3 = 100)



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

The unusual increase in supply of money was not accompanied by a similar increase in inflation, as it derived from a lack of attractive savings vehicles and not from demand for liquidity to conduct transactions.

³⁰ It is worth mentioning that the first component of the demand for money, i.e., that related to the transactions motive, also reacts to changes in the interest rate. However, its sensitivity to the interest rate is lower than the preservation of value component. This is because interest-bearing assets usually cannot fulfill the function of money in carrying out transactions while for the purposes of preserving value they constitute a good substitute.

ratio between the quantity of money and uses started to return to its pre-crisis trend, although the rate of adjustment is slow and the recent reductions in the interest rate are delaying the process. A comparison of the quantity of money relative to GDP paints a similar picture.

The rate of increase in the quantity of money this year was high relative to the last two years and in December 2012 the quantity of money was about 8.5 percent higher on average relative to December 2011. The lowering of the interest rate during the course of the year provided support for the relatively rapid rate of growth in the quantity of money. Nonetheless, and despite the rapid expansion of the quantity of money this year, it appears, as mentioned, that the monetary aggregates are returning to their pre-crisis paths.

d. Sources Of Change In The Monetary Base

The main tool of monetary policy is the short-term nominal rate of interest. The interest rate is the alternative cost of holding liquidity and therefore changes in the interest rate influence the demand for liquidity and its quantity in the markets. The component of liquidity over which the Bank of Israel has direct control is the monetary base, i.e., the total banknotes and coins in circulation and demand deposits of the commercial banks at the Bank of Israel.³¹

The Bank of Israel has a number of tools through which it can absorb or inject liquidity in the markets, among them the monetary auctions among the banks, the issue of *makam* and trading in various assets (such as foreign exchange and bonds). The monetary auctions are planned such that they will support the interest rate determined by the Bank. In other words, the supply of liquidity is totally flexible at the interest rate set by the Monetary Committee.

The actions of the government also influence the monetary base. The government's accounts are held at the Bank of Israel, in accordance with the Bank of Israel Law. Any withdrawal or deposit by the government with the Bank affects the monetary base. If as a result of these actions, temporary excess liquidity is created in the markets, at the existing interest rate, it will return to the Bank of Israel through deposits at the commercial banks or through absorption by way of increased demand for *makam*. Similarly, a shortage of liquidity will be manifested in withdrawals by the banks from their deposits and a drop in the demand for *makam*.

Up until the crisis in 2008, government activity was among the main factors affecting the monetary base (Table 3.6). From 2008 until mid-2011, with the transition to purchases of foreign currency (and in 2009 also as a result of the purchase of government bonds), the Bank also had to offset the effect of its activities on the monetary base, since the purchases injected tens of billions of shekels into the market each year, and if they had not been sterilized, pressure would have been created on

From 2008 through mid-2011, the Bank of Israel sterilized the liquidity surpluses created by its foreign exchange purchases through banks' deposits and issuances of *makam*.

³¹ Demand deposits held by the public are also part of the liquidity in the economy but the Bank of Israel only has an indirect influence on their quantity, through the reserve requirement imposed on the commercial banks.

Table 3.6
Sources of Change in the Monetary Base, 2007–12

	2007	2008	2009	2010	2011	2012	2012			
							I	II	III	IV
1. Government and the Jewish Agency injection	-10,809	-17,371	-14,195	1,418	-2,142	-9,131	-9,238	-1,714	2,493	
of which: Government	-11,977	-18,470	-14,949	598	-2,611	-9,665	-9,366	-1,856	2,407	
2. Foreign currency conversions ^a	-870	43,034	78,216	43,064	15,901	-234	-58	-3	-62	
of which: Bank of Israel	0	43,995	77,413	43,752	16,169	0	0	0	0	
3. Total (1+2)	-11,679	25,663	64,021	44,482	13,759	-9,365	-9,296	-675	2,431	
4. Bank of Israel injection	15,694	-17,305	-58,855	-32,962	-7,495	10,045	6,891	6,080	1,298	
of which: Monetary loan	-7,500	0	420	-420	0	0	0	0	0	
Makam	23,729	8,847	4,960	-47,269	16,651	8,148	-2,274	-3,288	7,610	
Swaps	0	0	0	0	0	0	0	0	0	
Banks' term deposits	-300	-28,011	-63,189	13,135	-27,635	-1,000	8,375	8,625	-7,000	
Interest ^b	21	14	421	1,255	2,894	2,302	636	599	527	
Bond purchases	0	0	18,000	0	0	0	0	0	0	
Repo	-6	1,974	-2,009	0	0	0	0	0	0	
5. Total change in monetary base	3,979	8,280	5,141	11,509	6,079	747	-2,208	5,427	-1,982	

^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.

the short-term interest rate. This pressure in turn would have lowered the short-term interest rate to less than the level set by the Bank of Israel. In the years 2009 and 2011, most of the absorption was accomplished through the deposits of the banks while in 2010 it was accomplished through the issue of *makam*.

Since mid-2011, the Bank of Israel has not intervened in the financial markets through the purchase of assets and therefore it has not had to offset its effect on the monetary base and has only had to offset the effect of the government, as during the period prior to 2008. During 2012, the deposits of the government with the Bank of Israel reduced the monetary base by about NIS 9 billion. Against that amount, the Bank of Israel injected liquidity back into the markets primarily by reducing the balance of issued *makam* (Table 3.6). Overall, the monetary base grew by a small amount this year, particularly in comparison to recent years, and despite the lowering of the interest rate during the course of the year.

This year, there was a very small increase in the monetary base, relative to previous years.