Chapter 3
Monetary Policy and Inflation

- In 2013, the inflation rate was 1.8 percent. For most of the year, the annual inflation rate fluctuated in the lower part of the target range of 1–3 percent, increasing toward the end of the year. Inflation expectations for the coming 12 months fluctuated within the range throughout the year: In the first half of the year, they fluctuated within the upper part of the range, and in the second half they were in the lower part. One-year ahead inflation expectations for various terms have, in recent years, fluctuated within the target range, indicating the credibility of monetary policy in its commitment to maintain price stability.
- Since there have been no marked inflationary pressures in the past two years, the main challenge facing monetary policy makers was how to support growth and exports in view of the continued increase in home prices. The Monetary Committee lowered the interest rate from 1.75 percent in January to 1 percent in October, continuing the line it has adopted since the end of 2011, against the background of accommodative monetary policy around the world.
- The policy decisions reflected the concept that the interest rate tool is intended to support economic activity and employment. At the same time, the Supervisor of Banks adopted measures to reduce the risk in the mortgage market.
- In April, 2013, the Bank of Israel resumed its activity in the foreign exchange market, after not intervening in 2012, in order to moderate the pressures for the appreciation of the shekel. In May, the Bank also began operating a foreign exchange purchase program in order to offset the effect of natural gas production on the current account, and through it on the exchange rate. During the year, the shekel appreciated by about 7 percent in terms of the nominal effective exchange rate, with most of the appreciation taking place prior to May.
- After six years of significant accommodative monetary policies adopted by central banks around the world, expectations were formed at the end of May 2013 that accommodative monetary policy in the US would be tapered. That tapering began in January 2014. The turnaround was, and continues to be, accompanied by a high degree of uncertainty, which is reflected, *inter alia*, in the increased volatility of securities prices worldwide.

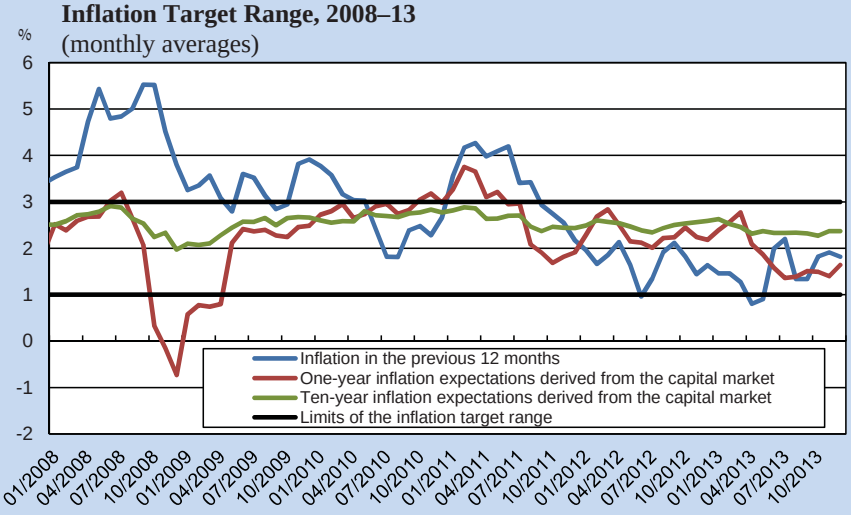
1. MONETARY POLICY

a. Summary of developments and policy measures

Monetary policy in Israel was accommodative, continuing its trend since the end of 2011, against the background of the continued stagnation in the global economy and highly accommodative monetary policy around the world. The main challenge facing the Monetary Committee in the past two years has been how to support economic activity and exports in view of the continued increase in home prices. The source of this challenge has been in the risk posed to borrowers' ability to repay their mortgages and to the stability of the banking system by the increase in home prices and mortgage volumes.

In Europe—particularly in the eurozone—and in emerging markets, the slowdown continued, which weighed on the global recovery. In each of the six quarters preceding the second quarter of 2013, real GDP in the eurozone contracted, with moderate growth only in the second quarter of 2013. Deflationary pressures in the eurozone led to a further reduction in the interest rate toward the end of the year to a historically low level. In the US, moderate recovery continued, which was reflected, inter alia, in a decline in the unemployment rate and an improvement in the housing market. At the end of December 2013—following considerable uncertainty that began in May—the Federal Reserve announced that it would begin tapering its quantitative easing program in January 2014, depending on improvement in economic activity becoming entrenched. The moderation of demand abroad was also reflected in low inflation rates worldwide, which supported continued accommodative monetary policy around the world.

Figure 3.1
Inflation in the Previous 12 Months, Inflation Expectations and the Inflation Target Range, 2008–13
(monthly averages)



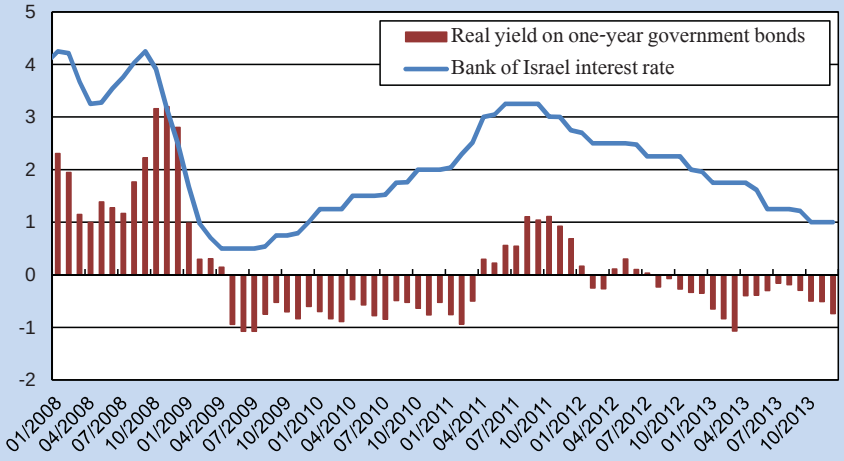
SOURCE: Based on Central Bureau of Statistics.

The growth rate of the economy slowed against the background of moderating demand from abroad and the continued appreciation of the shekel.

Against the background of moderating demand from abroad and the continued appreciation of the shekel, the growth rate of the economy slowed. With that, the economy continued to grow at a higher rate than other countries in the OECD. The annual inflation rate fluctuated in the lower part of the target range (1–3 percent) during the past two years (Figure 3.1); the tradable goods component of the Consumer Price Index increased in that period at a lower rate than the nontradable goods component. Inflation expectations[1] declined to the lower part of the target range during the second half of the year, after fluctuating in the upper part of the range in the first half of the year and in 2012. Home prices continued to increase in 2013, with an increase in mortgage volume and in the number of transactions.

The Monetary Committee lowered the interest rate in 2013 from 1.75 percent in January to 1 percent in October (Table 3.A.1 and Figure 3.2). In a decision made outside the normal schedule in mid-May, the Monetary Committee reduced the interest rate by 0.25 percentage points, and in its regularly scheduled decision at the end of May, it lowered the rate by a further 0.25 percentage points. The unscheduled decision was made against the background of the continued appreciation of the shekel since the fourth quarter of 2012, and further to the Bank of Israel's renewal of foreign exchange purchases in April. Since the Monetary Committee's assessment was that some of the shekel appreciation pressures derived from the excessive response of the foreign exchange market to the expected effect of natural gas production and royalties, the Monetary Committee announced, in parallel with its interest rate decision in mid-

Figure 3.2
The Bank of Israel Interest Rate[a] and the Real Yield on One-Year Government Bonds, 2008–13
(monthly averages)



[a] The effective interset rate in Bank of Israel tenders.
SOURCE: Bank of Israel.

[1] As derived from the capital market, the banks' internal interest rates and private forecasters' projections.

May, that it would initiate a foreign exchange purchase program intended to offset the effect of natural gas production on the current account. In the absence of inflationary pressures in the past two years, the reduction of the interest rate—to a level in line with the low interest rate environment around the world—was intended to support domestic economic activity. In view of continued home price appreciation and the increase in the balance of mortgages, the Banking Supervision Department adopted a number of macroprudential measures in the mortgage market, which increase the Monetary Committee's room to maneuver in its interest rate decisions.

Table 3.1
Main indicators of inflation and monetary policy, 2009–13

						2013			
	2009	2010	2011	2012	2013	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
2. Actual inflation[a]	3.9	2.7	2.2	1.6	1.8	0.1	5.3	2.0	0.0
3. Seasonally adjusted quarterly inflation[b]						1.9	2.3	2.0	1.1
4. One-year inflation expectations derived from capital market[c]	1.8	2.9	2.7	2.3	1.8	2.6	1.8	1.4	1.5
5. Ten-year inflation expectations derived from capital market[c]	2.3	2.5	2.5	2.3	2.3	2.3	2.3	2.3	2.3
6. Forecasters' one-year inflation forecasts[c]	1.8	2.7	2.8	2.3	1.8	1.9	1.9	1.9	1.7
B. Yields (percent)[c]									
1. Bank of Israel declared interest rate	0.8	1.6	2.9	2.3	1.4	1.8	1.5	1.2	1.0
2. One-year real yield to maturity on government bonds[d]	-0.4	-0.7	0.4	-0.1	-0.5	-0.8	-0.4	-0.2	-0.6
3. Ten-year nominal yield to maturity on government bonds[e]	5.4	4.9	5.1	4.6	4.0	4.2	3.9	4.1	3.9
4. Ten-year real yield to maturity on government bonds[e]	2.9	2.2	2.4	2.0	1.6	1.6	1.5	1.8	1.6
C. Shekel depreciation (percent)[f]									
1. Nominal effective	3.5	-7.1	3.6	0.6	-7.8	-3.7	-1.9	-1.7	-0.8
2. Vis-à-vis the dollar	-2.1	-4.9	4.7	0.1	-7.2	-2.2	-1.7	-1.9	-1.6
3. Vis-à-vis the euro	6.3	-13.9	4.2	-0.3	-3.1	-3.4	-0.1	-0.6	0.9
D. The monetary aggregates (nominal rates of change)[f]									
1. M1 money supply	52.1	4.6	1.6	8.7	15.3	3.6	2.8	7.2	0.8
E. Other background data (percent, seasonally adjusted quarterly data)									
1. Unemployment rate	9.5	8.4	7.1	6.9	6.3	6.6	6.7	6.0	5.8
2. GDP growth rate[g]	1.2	5.7	4.6	3.4	3.3	2.2	4.7	1.8	2.7
3. Share of total government debt in GDP[h]	77.8	74.4	72.4	71.6	72.6				

[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] Based on the zero curve. Period average.
[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] Annual average compared with average of previous year.
[h] End of year figure.
SOURCE: Based on Ministry of Finance and Central Bureau of Statistics data.

b. The fundamentals and their effect on monetary policy

(1) Inflation and the monetary regime

The Bank of Israel's objectives, as listed in the Bank of Israel Law, 5770–2010, are to maintain price stability—its central goal—and to support other objectives of the government's economic policy, particularly growth, employment and the reduction of social gaps, provided that, in the Monetary Committee's opinion, this support will not endanger price stability for a period of more than two years—and to support the stability and proper functioning of the financial system. As of October 2011, monetary policy is determined by the Monetary Committee.[2]

The generally accepted framework that the central bank has several goals, with the main one being the maintaining of price stability, is referred to as a "flexible inflation targeting regime". In such a regime, when inflation deviates from its short-term target, policy makers act to gradually return it to the target range. This gradualness enables policy makers to also act to achieve the other goals in parallel to maintaining price stability over the intermediate and long terms. With the completion of the disinflation process in Israel at the beginning of the 2000s, this regime succeeded in anchoring inflation expectations for various terms within the price stability target range of 1–3 percent.

The years 2012 and 2013 were characterized by an absence of inflationary pressures. The Consumer Price Index increased by 1.6 percent in 2012 and by 1.8 percent in 2013. The tradable goods component of the Consumer Price Index increased moderately, affected by the global slowdown and the continued appreciation of the shekel, and the nontradable goods component fluctuated within the upper part of the target range. Inflation expectations for the coming 12 months fluctuated within the upper part of the target range in 2012 and in the first half of 2013, and declined to the lower part in the second half of 2013 (Figure 3.1). Annual inflation expectations for ranges from two to ten years (forward expectations) stabilized slightly above the center of the target range, but within the range, testifying to the fact that monetary policy maintained credibility concerning its commitment to the inflation target.

In the absence of inflation pressures in the past two years, the main challenge facing monetary policy makers was how to support economic activity and exports in view of the continued increase in home prices—an increase that may create risks to the

The years 2012 and 2013 were characterized by an absence of inflationary pressures. The tradable goods component of the Consumer Price Index increased moderately, affected by the global slowdown and the continued appreciation of the shekel, and the nontradable goods component fluctuated within the upper portion of the target range.

Expectations of inflation for various ranges fluctuated within the target range, testifying to the credibility of monetary policy in terms of its commitment to maintain price stability.

[2] Until October 2011, interest rate decisions were made by the Governor alone. Since October 2011, they are made by the Monetary Committee. The Committee consists of six members, led by the Governor, and its decisions are made by majority vote. In case of a tie vote, the Governor has an extra vote. Since the departure of Stanley Fischer as Governor at the end of June 2013, the Monetary Committee has consisted of five members led by Dr. Karnit Flug, first as Acting Governor, and since mid-November as Governor. With the appointment of the deputy governor in March 2014, the Monetary Committee again consists of six members. 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.

stability of the economy and to the financial system. This is because the low interest rate, which is in line with low interest rates worldwide, encourages activity and acts to moderate the appreciation of the shekel, but also reduces the costs of mortgages and the yields on some alternative forms of savings.

(2) Domestic economic activity

The growth rate slowed in 2013, against the background of moderation in global trade, the continued appreciation of the real exchange rate of the shekel, the essential fiscal tightening that was adopted during the year, and the decline in investments with the completion of large projects.

The Israeli economy grew by 3.3 percent in 2013, similar to its growth rate in the previous year. However, excluding the effect of natural gas production from the Tamar site, which began this year, the growth rate slowed to 2.5 percent, compared to higher growth rates in 2010 and 2011 (Chapter 2, Table 2.1). It should be noted that despite the slowdown, Israel's growth rate this year was higher than the other OECD countries, similar to the situation that prevailed in recent years. The slowdown in growth came against the background of (a) the moderation in global trade and the continued appreciation of the real exchange rate of the shekel, two developments that contributed to the decline in exports this year; (b) the essential fiscal tightening that was adopted during the year and the decline in the deficit that began in the middle of the year (see Chapter 6); and (c) the decline in investments with the completion of the Intel production facility and with the completion of the investments made in the energy field following the discovery of natural gas. The slowdown in economic activity, and with it the absence of inflationary pressures, led to a path of decline in the interest rate during this period. The accommodative monetary policy contributed to growth in private consumption and supported exports (Chapter 2).

The slowdown in economic activity, and with it the absence of inflationary pressures, led to a path of decline in the interest rate this year as well.

These developments were accompanied by a decline in the unemployment rate toward the end of 2013 (Chapter 2). The number of employee posts[3] in the business sector was essentially unchanged over the past two years, while the figure in public services continued to increase at a stable rate. Despite the low unemployment rate, real wages increased by only about 1 percentage point since 2011—in line with its development trend since 2004 (Chapter 2)—and less than the growth in output per worker. Therefore, there were no inflationary pressures emanating from the labor market.

(3) Developments abroad

Monetary policy in Israel is affected by monetary policy worldwide, and reacts to it.

Since the Israeli economy is a small and open economy, monetary policy in Israel is affected by monetary policy abroad, and reacts to it. The global crisis that began in 2008 led to highly accommodative monetary policy, which was intended to rebuild the trust in the global financial system and to support real activity. This policy continued in 2013, in light of the moderating demand in Europe and in most emerging economies, and in view of the decline in the global inflation rate. Monetary accommodation was reflected in conventional policy—meaning the reduction of central bank interest rates—where possible, and in unconventional monetary policy, including quantitative

[3] Out of the labor force aged 25 to 64.

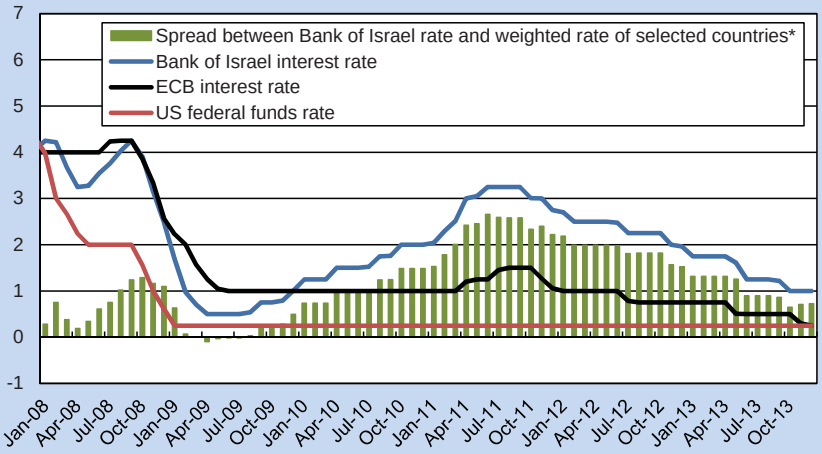
easing programs, credit easing programs, and intervention in the foreign exchange market.[4] Global growth forecasts continued to be revised downwards throughout most of the year, improving only at the end of the year.

In Europe, there was a moderate recovery in economic activity during the year, but the unemployment rate remained high and the monetary interest rate was reduced and reached a historically low level.

In Europe, the concern of a severe debt crisis receded at the beginning of the year, but real economic developments there continued to be the main risk to global growth. There was moderate recovery in growth during the second and third quarters of the year, following six quarters of recession, but the unemployment rate remained high—around 12 percent—and the annual inflation rate declined from 2.7 percent in 2012 to 0.8 percent in 2013—below the temporary target of slightly below 2 percent. Against the background of these developments, the European Central Bank reduced its interest rate in November to the historically low level of 0.25 percent, and signaled that it is expected to remain in this range for an extended period of time (Figure 3.3).[5]

In the US, the gradual recovery continued, reflected inter alia in a decline in the unemployment rate and improvement in the housing market. Against the background of the recovery, the Chairman of the Federal Reserve said in May that the Fed would consider initiating tapering of the quantitative easing program, depending on its assessment of how much progress is being made toward the economy's recovery. Following this, there was a sharp increase in yields (in general, and real yields in particular) on US Government bonds, which led to an increase in parallel yields in

Figure 3.3
Short-term Interest Rates in Israel, the US and the Eurozone, 2008–13
(monthly averages)



* The weighted interest rate is calculated as: US (weight of 0.49), eurozone (weight of 0.32), UK (weight of 0.13), and Japan (weight of 0.06).
SOURCE: Bank of Israel, European Central Bank, and US Federal Reserve.

[4] See "Unconventional Monetary Policy: Goals and Means", in the Bank of Israel's Monetary Policy Report number 40, for the second half of 2013.

[5] See the announcement made by the President of the ECB in parallel with the November 2013 interest rate announcement. http://www.ecb.europa.eu/press/pressconf/2013/html/is131107.en.html

In the US, the gradual recovery continued, reflected inter alia in a decline in the unemployment rate and improvement in the housing market. In May, the Federal Reserve began assessing the possibility of tapering the quantitative easing program. Tapering began in January 2014.

other countries and in Israel, although the increase in Israel was temporary (Section 1.c.(1)). The uncertainty concerning the timing of the start of tapering increased in September, when the Fed, in contrast to expectations, did not begin the process, and this was reflected in high volatility of yields in the markets. But on December 18, following the improvement in the labor market with unemployment declining to 7 percent[6], and due to improvement in consumer spending and in investments, the Fed announced that the tapering would begin in January 2014. The Fed explained that this gradual reduction was in line with its assessments regarding the continuation of economic recovery, and that it would decide whether—and at what pace—to continue tapering depending on developments, particularly the convergence of inflation to the target of 2 percent—in October, inflation over the past 12 months was 1.1 percent.[7] The Fed also announced that the interest rate was expected to remain at its low level for a considerable period of time after the unemployment rate falls below 6.5 percent and the inflation rate increases to 2 percent.[8]

The accumulation of indicators of a moderate recovery in activity in Europe in the second half of 2013, and that the recovery in the American economy had become entrenched, led—for the first time in three years—to an upward revision of the global growth forecasts.

As noted, monetary policy worldwide affects policy in Israel, since Israel's economy is small and open. The slowdown in global growth, and with it accommodative monetary policy around the world, pushed for lowering the interest rate in Israel through two main channels: First, global activity affects demand for exports and investments in Israel by nonresidents; and second, interest rate spreads affect the exchange rate[9] which, for its part, affects the profitability of exports and employment in the export sector, as well as the prices of imports and the current account. Monetary policy around the world was accommodative compared to policy in Israel, and the positive fundamentals in Israel's economy supported the appreciation of the shekel. The appreciation, and the decline in foreign demand for Israeli exports negatively impacted the profitability of Israel's exporters and the volume of their business. In order to support exports and domestic employment rates and activity, the Bank of Israel interest rate was reduced and brought in line with the low interest rate environment worldwide.

6 The unemployment rate relating to October.

7 The PCE index, net of the food and energy components, serves as a core index of inflation and reflects its trend. The Fed does not have an inflation target that is set by law, but in practice it acts to maintain a core index target of around 2 percent.

8 One of the unconventional policy tools is forward guidance—meaning an improvement of communications with the public, which is reflected in a commitment conditioned on developments. Accordingly, in addition to its interest rate decisions, the Fed began adding declarations of its intent to maintain a low interest rate at least until a decline in the unemployment rate. The Fed announced an open-ended delay in increasing the interest rate due to the concern that unemployment data did not fully reflect the development of the American labor market, since the participation rate there declined.

9 When the domestic interest rate is higher than the global interest rates, it attracts capital inflows, which create pressure for appreciation. The opposite is also true: when the domestic interest rate is lower than the global rates, it acts to encourage capital outflows and pressure for depreciation.

(4) The exchange rate and the foreign exchange market

The nominal effective exchange rate of the shekel appreciated by 6.7 percent in 2013, and the real effective exchange rate appreciated by 7.2 percent[10], with most of the appreciation taking place prior to May (Figure 3.4). In April, the Bank of Israel resumed its purchases of foreign exchange, and starting in May, after the bank reduced the interest rate in a decision outside the normal schedule and announced a foreign exchange purchasing program to offset the effect of natural gas production, the trend of appreciation of the shekel substantially moderated until the end of the year, with slight volatility.

The fundamental forces for the appreciation of the shekel were the surplus in the basic account and the relatively good state of Israel's economy. The basic account includes the current account of the balance of payments and the net flow of direct foreign investments[11] (Figure 3.5). This flow reflects foreign residents' trust in the Israeli economy in the medium and long terms. There was a large surplus in these two components in 2013. The surplus in the current account of the balance of payments reflected a surplus in the services account and in the secondary revenue account (current transfers) alongside a deficit in the goods account. Part of the deficit in the goods account derived from the need to replace natural gas with imported oil—a more expensive fuel—due to the interruption of natural gas imports from Egypt as well as the depletion of the "Yam Tethys" gas deposit, both of which occurred in 2011.

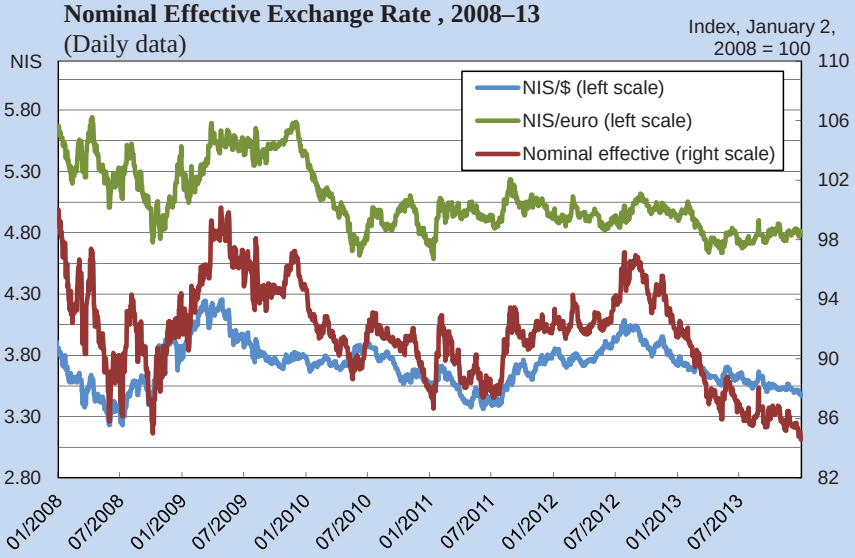
The fundamental forces for the appreciation of the shekel were the surplus in the basic account and the relatively good state of Israel's economy, the latter of which was reflected in domestic demand that was higher than its parallel abroad.

The relatively good state of the economy was reflected in domestic demand that was higher than its parallel abroad, which was in turn reflected in the fact that prices of nontradable products in the Consumer Price Index increased more than the prices of tradable products (see the section on prices in this Chapter). In addition, there was a decline in the economy's risk premium, and some of the appreciation in the exchange rate of the shekel is a correction of the depreciation that occurred in 2012, against the background of the Iranian nuclear issue and the tension in the Middle East. The risk premium of the economy, as reflected in Israel's five-year CDS spread, declined. The spread continued to narrow this year, particularly since September, with the dissipation of geopolitical tensions, and declined from an average level of 138 basis points in December 2012 to an average level of 104 basis points in December 2013.

In contrast, the reductions in the Bank of Israel interest rate during the year, and the stability of interest rates in the advanced economies[12] narrowed the interest rate spread (Figure 3.3) and the forces for appreciation, although the interest rate spread remained positive. Moreover, the effective interest rate spread for terms up to one year, which is a focus of foreign investors, is even smaller, because in 2011 the Ministry of Finance cancelled the tax exemption for foreign residents, and the Bank of Israel

[10] The December 2013 average compared to the December 2012 average.
[11] Net foreign direct investment (FDI).
[12] Excluding the ECB interest rate, which declined to historically low levels this year, although the cumulative decline there this year was less than the cumulative decline of the Bank of Israel interest rate.

Figure 3.4
NIS/$ Exchange Rate, NIS/Euro Exchange Rate, and Index of Nominal Effective Exchange Rate , 2008–13
(Daily data)



SOURCE: Bank of Israel.

imposed liquidity requirements on non-residents' transactions in foreign exchange derivatives.[13]

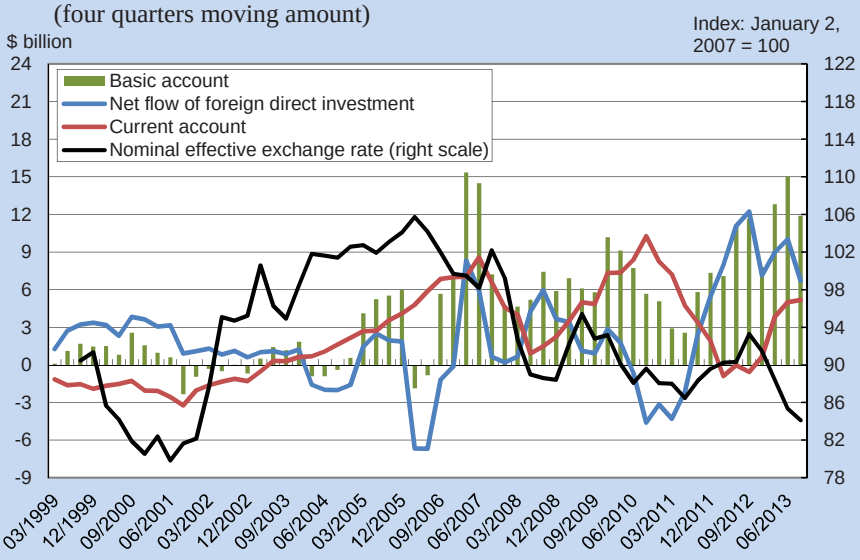
With the rapid appreciation that took place in the first four months of the year, and since Monetary Committee members assessed that the strength of the appreciation was not in line with fundamental economic conditions—according to estimates from various models of the real exchange rate that indicated overvaluations—in April, the Bank of Israel renewed its intervention in the foreign exchange market, after not intervening in 2012. This was in order to moderate the pressure for strengthening of the shekel, and to support the tradable sector, since an overvaluation of the shekel negatively impacts the profitability of exports and is liable to have a negative impact on employment in the tradable sector. Between April and December 2013, the Bank of Israel purchased $2.92 billion.[14] With the appreciation continuing, the Monetary Committee lowered the interest rate in mid-May 2013—in an unscheduled decision—by 0.25 percentage points, and made an additional such decision at the end of May. The Bank of Israel thus acted to reduce the gap between the fundamental forces and the manner in which the exchange rate was developing in practice in the short term, with the aim of supporting the tradable sector until global demand could recover.

[13] Details can be found in the Bank of Israel Annual Report for 2011, Chapter 3.

[14] Excluding purchases as part of the program intended to offset the effect of receipts from the production of natural gas. See below.

International studies have indicated that the efficiency of such purchases increases when there are limitations on capital movements, and when the financial markets are not advanced. The studies also showed that an announcement regarding future purchases has a stronger effect than the purchases themselves, and that the purchases are more efficient when they are accompanied by accommodative monetary policy[15], to the extent that the domestic currency is overvalued relative to its equilibrium rate.[16] A study conducted in the Bank of Israel Research Department showed that declarations of a change in the manner of the Bank of Israel's intervention in the foreign exchange market—fixed purchases beginning in March 2008, the volume of which was expanded in July 2008, and non-fixed purchases beginning in August 2009—had an effect on the exchange rate with ranges of up to one year, and explained a marked portion of the upward deviation of the actual exchange rate from its projected level.[17] According to estimates, the interventions contributed about 0.7 percentage points to domestic economic growth and moderated the recession that developed against the background of the global crisis.[18]

Figure 3.5
The Basic Account, the Current Account and the Net Flow of Foreign Direct Investment, 1999–2013
(four quarters moving amount)



SOURCE: Based on Central Bureau of Statistics.

[15] See: Kamil, H., (2008): "Is Central Bank Intervention Effective Under Inflation Targeting Regimes? The Case of Colombia", International Monetary Fund, IMF Working Paper WP/08/88.

[16] See: Adler, G., Tovar, C. (2011), "Foreign Exchange Intervention: A Shield Against Appreciation Winds?", International Monetary Fund, IMF Working Paper WP/11/165, and Disyatat, P., Galati, G., (2007), "The Effectiveness of Foreign Exchange Intervention in Emerging Market Countries: Evidence from the Czech Koruna", Journal of International Money and Finance 26(3), pp. 92-123.

[17] Sorezcky, A. "Was the Bank of Israel's Intervention in the Foreign Exchange Market Effective?", Bank of Israel Survey 86, January 2013, pp.7–45 (in Hebrew).

[18] Flug, K., Shpitzer, A. (2013), "Rethinking Exchange Rate Policy in a Small Open Economy: The Israeli Experience during the Great Recession", BIS Papers No. 73, 189-204.

In addition to the purchases that were intended to deal with the overappreciation, there were purchases that were intended to deal with the effects of natural gas production. The discovery of natural gas deposits is a welcome development, and is expected to lower the cost of production in the economy, reduce consumer expenditures, and increase certainty in manufacturing regarding energy prices. Natural gas production reduces the import of energy products and creates pressure for the appreciation of the shekel. This pressure grows stronger when some of the gas is exported. In this context, it is worth noting that the (real) appreciation reflects the increasing wealth in the economy—in a gradual process—and indicates a transition to a new international equilibrium, and expectations of increased wealth also create pressure for appreciation of the shekel. The continued appreciation may negatively impact other industries, displace them, and even lead to their disappearance, since the production of a natural resource continues for a number of decades. As the natural resource becomes depleted, a need may arise to re-establish the industries, and that re-establishment involves high costs in terms of output. This phenomenon is known as "Dutch disease", due to the effects of natural gas that was discovered in the Netherlands during the 1960s.

In view of the assessments that some of the appreciation pressures derived from the excess effects of expected natural gas revenues on the exchange rate, in May, the Bank of Israel also began implementing a foreign exchange purchase program with the aim of offsetting this effect.

In view of assessments that some of the appreciation pressures derived from the excess effects of expected natural gas receipts on the exchange rate, the Bank of Israel also began, in May, to implement a foreign exchange purchase program with the aim of offsetting the effects of natural gas production on the exchange rate deriving from the current account. The purchase amounts are set according to the Bank's assessments concerning the expected improvement in the current account of the balance of payments as a result of natural gas exports. The Bank of Israel's assessment was that in 2013, the effect of natural gas production on the balance of payments would amount to $2.1 billion, and it purchased foreign exchange accordingly. The Bank of Israel further assessed that the effect would remain in 2014, totaling about $3.5 billion. This additional program is expected to operate until 2018, the year in which a sovereign wealth fund is planned to begin operating. The fund should reduce the effect of "Dutch disease", and particularly the appreciation inherent in it, by investing natural gas receipts abroad and using only the yields of those investments for domestic purposes.

(5) The housing market

Demand in the housing market increased in 2012–13, after temporarily declining in the summer of 2011. The increases in demand and in the volume of new mortgages were the main consideration against reducing the interest rate in 2013.

Demand in the housing market increased in 2012–13, after temporarily declining in the summer of 2011. Home prices[19] (which are not included in the Consumer Price Index) increased in 2013 at a rapid rate of about 8 percent, following an increase of 8.7 percent in 2012 (Chapter 7A). Rent under new and renewed contracts[20]—which constitute about 75 percent of the housing component in the Consumer Price Index and about 20 percent of the Index—increased in 2013 by 3.2 percent, a greater increase

19 Prices are based on the "Prices of Dwellings" index of the Central Bureau of Statistics.
20 The "Owned dwellings services" component of the CPI.

than that of the overall CPI for the sixth straight year.[21] These developments were the main consideration against lowering the interest rate in 2013, which was intended to support economic activity and exports.

The continued increase in home prices derives from the increase in demand in view of the rigidity in supply. Demand for homes is affected both by demographic needs and by the decline in interest rates in the markets against the background of low global interest rates.

The continued increase in home prices derives from the increase in demand in view of the rigidity in supply and the decline in yields.

The weighted average real interest rate on new mortgages[22] has declined since the end of 2011, in parallel with the reductions in the Bank of Israel interest rate. However, the weighted real interest rate stopped declining in the middle of 2013, and even increased slightly in the second half of the year, even though the Bank of Israel continued reducing its interest rate. This was apparently due to the effect of the restrictions imposed by the Supervisor of Banks in August on the portion of the loan that may be granted at variable-rate interest, a restriction that reduced the transmission from the Bank of Israel interest rate to the interest rate on mortgages.

A decline in the interest rate also reduces the yield of short-term savings options, and increases demand for homes. A decline in yields in investments with longer term horizons—which is mainly derived from real developments while monetary policy has only a small effect on them—also contributes to growth in demand for homes as an investment asset. This growth is accompanied by growth in mortgage volume, which increases the risk to borrowers and to the financial system.

Taking this into account, and further to the (additional) macroprudential measures adopted by the Supervisor of Banks in the mortgage market over the course of 2010–12, the Supervisor imposed additional limitations in February and in August 2013 on mortgages and on the capital buffers required in respect thereof (Chapter 7A). These measures, as those that preceded them, were intended to reduce the risk to borrowers and thereby reinforce the stability of the financial system, and initial data indicate that there was in fact a decline in the rate of loans with a high risk component and in the average loan to value ratio. Some of the measures adopted by the Supervisor of Banks in the past few years, and particularly the restriction on the share of the mortgage component with a variable (up to 5 years) interest rate, reduced the transmission from the Bank of Israel interest rate to the interest rate on mortgages, which is one of the factors affecting demand for homes. The reduction of the transmission gives monetary policy makers more maneuvering room in using the interest rate tool for other purposes.

[21] An analysis of the ratio between home prices and rents appears in the Bank of Israel Annual Report for 2012, Chapter 3.

[22] To calculate this interest rate, the interest rates on various tracks are multiplied by the weight of the tracks in the entire mortgage flow. On nominal tracks, the assumption is that the inflation rate is 2 percent.

c. Analysis of monetary policy

(1) Real yields and monetary policy

The highly accommodative monetary policy adopted in many countries since the onset of the global crisis at the end of 2008 led to a significant decline in real yields around the world, particularly one-year yields. Real one-year yields in Israel (Figure 3.6) were negative, testifying to the accommodative monetary policy adopted in order to support economic activity. This development continued during the past two years as well, against the background of the slowdown in the growth rate of the economy. During the first half of 2013, the decline in real yields mainly reflected the interest rate reductions, and in the second half of the year, it mainly reflected the decline in one-year inflation expectations.

Until September, the development of real yields in Israel was in line with the development of yields in the US, but since September, yields in the US increased while yields in Israel declined. Long-term domestic real yields are affected by a number of factors, including capital productivity, the risk premium, the Bank of Israel interest rate and the global interest rate environment—both by actual values and by expected values. The effect of global developments on domestic real yields has increased over the past decade with the liberalization of foreign trade and capital flows and movement to a flexible exchange rate regime (Chapter 7C). This is because in a small and open economy with free flows of capital, such as Israel's economy, capital flows work to equalize domestic and global yields, and the remaining differences in yields are the result of differences in risk premiums and tax rates between economies, and various frictions that slow down the alignment process. A study conducted by the Bank of Israel Research Department[23] found that (a) the monetary interest rate has a marked effect on real short-term yields, but it also has an effect on long-term yields, although to a lesser extent; (b) an increase in the government debt to potential GDP ratio mainly increases long-term yields, while increasing short-term yields to a lesser extent; and (c) an increase in real yields in the US increases yields in Israel to a moderate extent. These three factors—and with them, as noted, other factors—have an impact on the development of real yields in the economy.

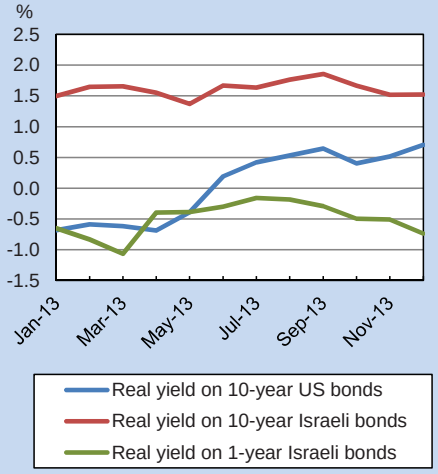
Ten-year yields in Israel and in the US were stable until May (Figure 3.6). At the end of May, after the Fed signaled that it was considering the possibility of starting the tapering of its quantitative easing, 10-year real yields on US Treasury Inflation-Indexed Securities increased sharply, from –0.2 percent to 0.4 percent. As the year progressed, with increasing uncertainty concerning the timing of the start of tapering, yields in the US fluctuated on average around 0.5 percent until December. In December, yields continued to climb, reaching 0.7 percent due to expectations of the

[23] Brender, A. and Ribon, S. (2014): "Do Fiscal and Monetary Policies Affect Real Yields of Government Bonds? A Re-assessment a Decade Later," Internal memorandum.

start of tapering, which were confirmed with the Fed's announcement that tapering would begin in January 2014.

In parallel with this, 10-year yields in Israel also increased, from 1.4 percent in May to 1.9 percent in September, but they returned to 1.5 percent later in the year, among other things against the background of the dissipation of geopolitical tension. This development supports the assessment that the risks to Israel from the tapering are not high (Chapter 7C). This is because the tapering is expected to progress in parallel with a recovery in economy activity, public debt in Israel is relatively low and there has been a fiscal correction in it, Israel holds a high level of foreign exchange reserves, and macroprudential measures have been adopted with the aim of strengthening the resilience of the financial system.

Figure 3.6
Real Yields of 1-Year (Israel) and 10-Year (Israel and US) Government Bonds, Monthly Average, January 2013 to December 2013



SOURCE: Bank of Israel.

(2) The Taylor rule and the monetary interest rate

The Bank of Israel Annual Report for 2012[24] provides an analysis of monetary policy in Israel by way of the Taylor rule.[25] According to the Taylor rule, the interest rate level appropriate to economic conditions reacts to the deviation of inflation from its target, the output gap[26], and the natural rate of interest.[27] It is important to emphasize that the Taylor rule is a descriptive rule[28] and may reflect the path of the monetary interest rate, but it does not take into account information or other considerations that must be assessed when making monetary policy decisions.[29]

The Taylor rule may provide an indication of the interest rate level that is appropriate to economic conditions. An augmented Taylor rule, which also includes a response to growth forecasts in the US, explains the path of the monetary interest rate in Israel both before and after the crisis, and hence indicates that monetary policy was forward-looking.

[24] See Figure 3.7, Annual Report for 2012.

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

[26] The output gap is defined as the gap between actual GDP and potential GDP. There are a number of definitions and different estimates for potential GDP. Details appear in the Bank of Israel Annual Report for 2011, Box 2.2. In this Section, we make use of the estimate of potential output calculated through the Hodrick-Prescott trend of GDP.

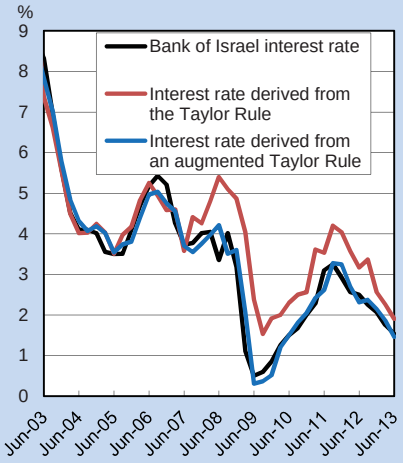
[27] The natural rate of interest reflects the expected growth rate of GDP. Based on the most basic model, when the monetary interest rate is in line with the natural rate, it cancels out demand-side inflation pressures. The estimate of the natural rate of interest is the real interest rate for one year forward on government bonds, averaged over 5 to 10 years.

[28] In other words, it is not normative. It may describe what policy was actually adopted, and not which policy to adopt.

[29] See for instance: Svensson, L.E.O. (2003), "What Is Wrong with Taylor Rules? Using Judgment in Monetary Policy through Targeting Rules", Journal of Economic Literature 41: 426-477.

The analysis showed that in the years preceding the financial crisis, the Taylor rule provided a good outline of the actual path of the Bank of Israel interest rate.[30] However, since the outbreak of the global economic crisis at the beginning of 2008, the actual interest rate deviated downward from the interest rate derived from the rule estimated for the period that preceded the crisis, although their fluctuations remained in line with each other. The analysis indicated that during the crisis, the Bank of Israel changed how it manages monetary policy, and took into account factors that are not included in the original Taylor rule, particularly risk factors from the global economy. An augmented Taylor rule, which also includes a response to growth forecasts in the US, explains the policy adopted in Israel both before the crisis and after it, and is presented in Figure 3.7. Growth forecasts in the US[31] reflect in simplified form the risk factors from the global economy, meaning the shocks (both positive and negative) expected abroad, and their expected effect on the Israeli economy. More particularly, the indicator portrays how a future change in economic activity abroad is expected to affect Israeli exports and the expected path of global interest rates—a path that has an effect on the exchange rate, on the domestic interest rate, and on the current account.

Figure 3.7
Bank of Israel Interest Rate vis-a-vis Interest Rate Derived from Taylor Rules, June 2003 to June 2013



SOURCE: Bank of Israel.

Figure 3.7 illustrates that policy makers acted in a forward-looking manner both prior to and during the crisis. During those two periods, they assessed how the expected changes abroad would affect the Israeli economy: Before the crisis, the expected high level of economic activity abroad contributed to an increase in the monetary interest rate, and when the crisis began—and the expected risks from abroad became stronger—the trend was reversed and the interest rate was reduced to an extent that deviated, as noted, from what would have been pointed to by the original Taylor rule.

[30] This rule also included an element of smoothing the monetary interest rate, which is very much accepted in the literature, and a response to the nominal effective exchange rate.

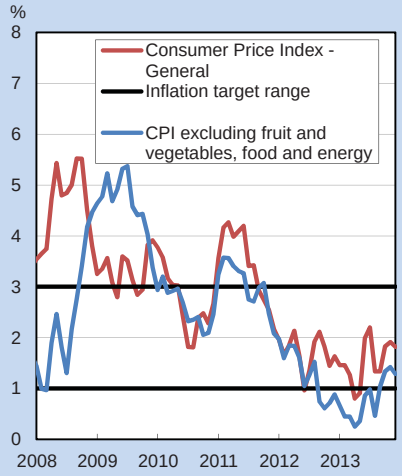
[31] The forecasts were taken from the Livingston Survey and relate to forecasts of the expected growth rate in the US in the next six months. In the augmented rule, the interest rate reacts to a deviation of the forecasts from their multi-year average. The rule that is presented was estimated between the third quarter of 2003 and the second quarter of 2013.

2. PRICES

a. Inflation and its components

The Consumer Price Index increased by 1.8 percent in 2013—within the bounds of the price stability target set by the government in 2003 (1–3 percent, Figure 3.8). Until May, inflation fluctuated in the lower part of the target range, continuing the trend of moderation since August 2012, against the background of the continued appreciation of the shekel in terms of the nominal effective exchange rate. Starting in June, inflation moved closer to the center of the target range, against the background of the one percentage point increase in the VAT rate, stability in the nominal effective exchange rate, and the reductions in the monetary interest rate. The CPI excluding the fruit and vegetables, food, and energy components, which indicates developments in inflation trends[32], fluctuated below the lower bound of the target range between September 2012 and August 2013, and increased to 1.3 percent at the end of 2013.[33]

Figure 3.8
Inflation in Previous 12 Months: CPI and Adjusted CPI, 2008–13



SOURCE: Based on Central Bureau of Statistics.

As in 2012, the main components that increased at a more rapid pace than the overall CPI in 2013 included housing (rents), food and home maintenance. Together, these three items comprise about half of the overall CPI (Figure 3.9). The housing item increased by 2.9 percent in 2013, contributing 0.7 percentage points to the change in the CPI. This is the sixth consecutive year that the housing index increased at a higher rate than the CPI.[34]

The components that increased at a more rapid pace than the overall CPI in 2013 included housing (rents), food, home maintenance, education, and the miscellaneous component. In contrast, the communications component declined this year.

The home maintenance item increased by 3.9 percent and contributed 0.4 percentage points to the change in the overall CPI. This increase was derived mainly from an increase in electricity and water prices. While the increase in this item in 2012

[32] In the past, the housing index was also excluded because the volatility in that index mainly reflected the volatility in the exchange rate, and was less a reflection of the inflation environment, due to the custom of listing rental prices in dollars. This custom has faded with the strengthening of the shekel in recent years, and since 2012 about 97 percent of rental prices have been listed in shekels. As a result, the volatility in the housing index has decreased, and it is therefore reasonable to assume that it better reflects the inflation environment in the short term as well.

[33] A discussion of the indices of core inflation, and the considerations in favor of excluding the various items from the overall CPI, appears in: Ribon, S. (2010), "Indices of Core Inflation in Israel," Bank of Israel Survey 84, pp, 125–169 (in Hebrew). See also, Bank of Israel Annual Report for 2012, Chapter 3, Prices.

[34] A discussion of developments in the housing market appears in the first section of this Chapter, (Monetary Policy), Section b(5).

Figure 3.9a
Rates of Change in the CPI Components, 2013
(percent)

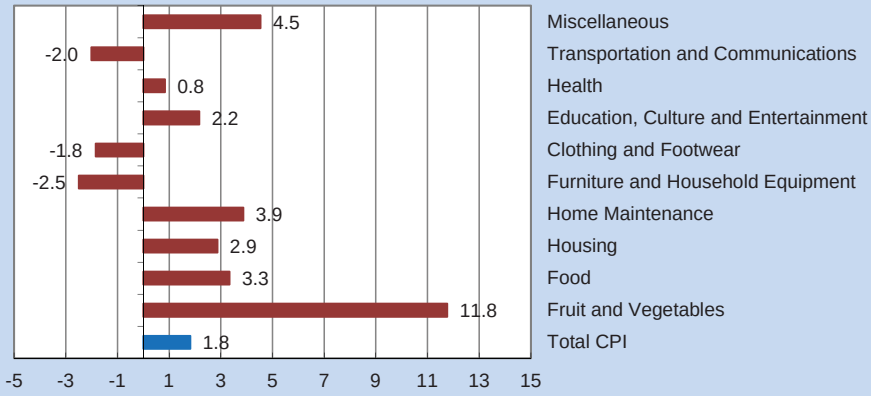
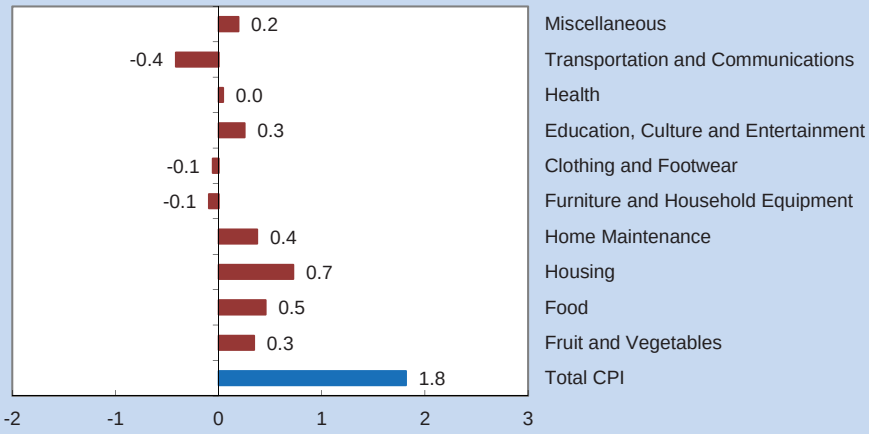


Figure 3.9b
Contribution of the CPI Components to Total Inflation, 2013
(percentage points)



SOURCE: Central Bureau of Statistics.

reflected increases in global energy prices—which in turn had an impact on electricity, natural gas, crude oil and heating oil prices—and the depreciation of the shekel, in 2013 the increase in energy prices moderated and the shekel appreciated (Table 3.2). Nonetheless, electricity prices increased this year by more than energy prices—electricity prices were updated in June (after the start of natural gas production from the Tamar site)—due to a government decision from 2011 to smooth the required increase in electricity prices over a number of years until the Israel Electric Corporation covers the losses it incurred as a result of the halt in natural gas imports from Egypt and the

depletion of the Yam Tethys natural gas reservoir, and the replacement of natural gas with more expensive petroleum.

The food component increased by 3.3 percent in 2013, and contributed 0.5 percentage points to the change in the overall CPI. Even though there was a slowdown in the rate of increase in the food item in the second half of 2013, the increase this year was not in line with the decline in global agricultural commodity prices (Figure 3.10) and the shekel appreciation that occurred. An examination carried out by the Bank of Israel Research Department indicated that food prices increased in 2013 to a greater extent than what could be derived from changes in global prices, the exchange rate and the VAT increase.

The VAT increase in June, by one percentage point, was distributed among the components of the CPI and also contributed to the increase in the overall CPI that took place during the year. (A discussion of the characteristics of setting prices in Israel and the effects of VAT appears in Box 3.1.)

Other components that increased this year at a more rapid pace than the overall CPI were the education component and the miscellaneous component. The education component increased by 6.2 percent due to the cancellation of the subsidy for annual trips and due to the higher prices in several items—personal accident insurance, benefits such as book loans, daycare centers and private kindergartens. In contrast, in 2012, there was a decline of a similar rate in the education component, due to the implementation of the recommendation of the Committee on Social and Economic Change (the Trajtenberg Committee) to provide free education to children aged 3–4 in public kindergartens, the implementation of which was spread out over three years and is still continuing. The miscellaneous component increased by 4.5 percent in 2013, continuing the increase of 5.4 percent from 2012, mainly affected by the increase in taxes on cigarettes and tobacco.

In contrast with the above, the communications component declined by 6.4 percent this year, following a decline of 7.1 percent in 2012, and deducted a quarter of a percentage point from the change in the overall CPI. This decline derived mainly from lower telephone and internet service prices due to regulation that led to a change in the structure of the market and increased competition in the industry.

b. Background factors in price developments

There are a number of factors that have an effect on price developments, including real economic activity, developments in the labor market, the exchange rate, commodity and energy prices, and the response of monetary policy to these developments and expected developments.

The development of prices in the past two years was in line with developments on the real side of the economy. The growth rate in 2013 reflected relatively rapid expansion of private consumption alongside an essential standstill in exports. These developments were reflected in the absence of inflationary pressures and in inflation within the lower part of the target range.

The development of prices in the past two years was in line with developments on the real side of the economy, and was reflected both in the absence of inflationary pressures and in inflation within the lower part of the target range. In the labor market as well, there were no noticeable inflationary pressures.

Table 3.2
Development of prices, by various components, 2009–13

Period	Consumer Price Index	Fruit and Vegetables	Food	Housing	Home Maintenance	Furniture and Equipment	Clothing and Footwear	Education, Culture and Entertainment	Health	Transport and Communication	Miscellaneous	Energy Index[a]	Index excluding energy and food	Index excluding energy, food, fruit and vegetables	Seasonally adjusted index[b]
(end of period, rate of change, percent)															
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	3.4	
2010	2.7	16.0	2.0	4.9	-1.2	-2.8	4.5	1.5	0.6	2.0	3.2	-0.4	3.1	2.5	
2011	2.2	-8.1	2.3	5.1	3.9	-0.4	2.1	-0.3	2.6	1.7	1.3	9.2	1.6	2.1	
2012	1.6	-1.7	4.0	3.3	4.7	-1.4	0.4	-2.9	2.5	-0.4	5.4	6.5	0.8	0.9	
2013	1.8	11.8	3.3	2.9	3.9	-2.5	-1.8	2.2	0.8	-2.0	4.5	1.6	1.6	1.3	
(monthly rate of change, percent)															
2013															
January	-0.2	5.7	0.2	-0.1	0.5	0.0	-8.1	0.0	-0.4	-0.4	0.1	-0.2	-0.3	-0.4	0.1
February	0.0	1.1	1.1	-0.4	0.2	0.5	-5.9	-0.1	0.5	0.2	0.0	2.1	-0.4	-0.5	0.2
March	0.2	-2.9	-0.4	0.8	-0.2	-0.4	-1.0	0.9	-0.2	0.5	-0.4	0.8	0.2	0.4	0.2
April	0.4	3.1	1.0	0.9	0.4	-0.4	3.8	-0.2	-0.1	-0.9	0.1	-2.8	0.6	0.5	-0.3
May	0.1	-0.2	-0.2	0.3	0.9	0.1	0.1	0.5	0.3	-1.1	3.2	-1.2	0.3	0.3	0.0
June	0.8	0.4	0.8	0.3	1.5	-0.5	5.9	0.3	0.5	1.0	0.9	3.4	0.6	0.6	0.8
July	0.3	3.3	0.4	1.0	0.3	-0.5	-8.0	0.6	0.3	0.3	0.2	-0.5	0.4	0.4	0.2
August	0.2	-2.3	0.2	0.7	0.1	-0.2	-3.7	0.9	0.5	0.3	-0.2	1.2	0.1	0.1	0.1
September	0.0	-0.3	0.5	-0.1	0.1	-0.6	-0.8	0.0	0.2	0.1	-0.3	1.8	-0.3	-0.1	0.2
October	0.3	5.9	0.4	0.1	0.1	0.8	6.4	0.3	-0.1	-1.4	0.6	-2.9	0.6	0.2	0.1
November	-0.4	-3.5	-0.7	-0.3	0.0	-0.7	2.3	-0.6	-0.1	-0.5	0.1	-0.7	-0.3	-0.2	-0.1
December	0.1	1.5	0.1	-0.3	0.0	-0.6	9.1	-0.5	-0.5	-0.1	0.1	0.7	0.0	0.2	0.2

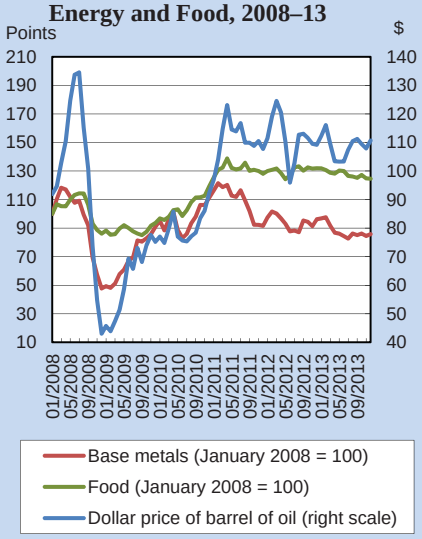
[a] The energy component includes vehicle fuels and oils, and household electricity, natural gas and diesel..

[b] As calculated in the Bank of Israel Research Department (see Box 1 in the Inflation Report for the first quarter of 2010).

SOURCE: Central Bureau of Statistics.

In the labor market as well, there were no noticeable pressures for price increases, continuing the trend that began in the second half of 2011. The development of labor productivity, meaning real product per work hour, is an indication of the development of marginal productivity, which for its part serves as a basis for determining wages.[35] When labor compensation exceeds productivity, the result is pressure for price increases, and vice versa. Since the middle of 2012, the change in labor compensation was lower than the change in productivity, and moderated the price increases (See Chapter 2).[36] Structural factors in the labor market as well—particularly the decline over the past ten years in the structural unemployment rate[37]—contributed to the lack of inflation pressures from the labor market (Chapter 5). This is because, when structural unemployment contracts, it is easier to provide a response to increased demand through increased production by expanding employment.

Figure 3.10
Global Indices of Base Metals, Energy and Food, 2008–13



SOURCE: Based on Bloomberg.

The development of the prices of commodities, which constitute the raw materials for production, has an impact on production costs and through them, on prices in the economy. Against the background of continued moderate economic activity, commodities prices continued to decline in 2013, except for the price of oil (in dollars), which was unchanged at the end of 2013 from the price at the beginning of the year, despite its high volatility (Figure 3.10). The trend of decline in base metal prices that started at the beginning of 2011 continued this year as well, and prices declined to the levels from the first half of 2010. Even though global prices for agricultural commodities declined by 20 percent during the year, and even though the shekel exchange rate appreciated, the domestic food component continued to increase

Global commodity prices continued to decline in 2013, against the background of continued moderate economic activity. The domestic food component continued to increase this year, even though global prices of agricultural commodities declined and the shekel appreciated.

[35] In competitive markets, real labor compensation equals marginal productivity. The labor compensation is equal to the cost of employing workers, and mainly includes wage payments and social benefit deductions.

[36] An analysis of the pressures for price increases from the labor market in recent years appears in the Bank of Israel Annual Report for 2012 (Chapter 3, Section 2b).

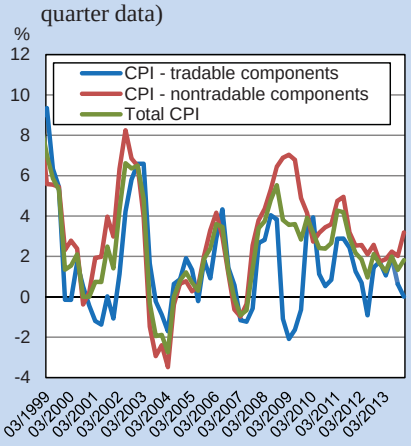
[37] Estimates of the structural unemployment rate in the Israeli economy—both on the basis of a distinction between cyclical factors and structural factors in the labor market and on the basis of an estimate of the NAIRU—showed that the structural unemployment rate declined in the last decade. (NAIRU is the Non-Accelerating Inflation Rate of Unemployment, the unemployment rate consistent with the absence of accelerated inflation.) An analysis of the decline in the structural unemployment rate in Israel appears in: Yakhin, Y. and Presman, N., 2013. "A Flow-Accounting Model of the Labor Market: An Application to Israel." Bank of Israel, Research Department, Discussion Paper. forthcoming, and in Elkayam, D. and Ilek A., (2013): "Estimating the NAIRU Using Both the Phillips and the Beveridge Curves", Bank of Israel, Research Department, Discussion Paper No. 2013.10.

this year, although it moderated toward the end of the year. The appreciation of the shekel and the start of natural gas production led to a decline in the price of fuel for transportation and for manufacturing, but energy prices in Israel did not decline. They increased slightly in 2013, by 1.6 percent, due to a 2011 government decision to smooth out the increase in electricity prices over a number of years.

The exchange rate has an impact on inflation through its effect on the prices of imported products: Import prices are mostly denominated in foreign currency, and exchange rate fluctuations have an impact on the shekel cost which, for its part, affects the price. This price is passed on to the end customer, whether through a direct effect on the final product price or through its effect on the costs of production.[38] According to a Research Department estimate, the transmission from the exchange rate to the Consumer Price Index ranges from 0.1 to 0.35, meaning an appreciation of 1 percent in the shekel reduces consumer prices during the following year by a rate that ranges between 0.1 percent and 0.35 percent, depending on the source of appreciation—an increase in the risk premium, a decline in the spread between the interest rate in Israel and interest rates abroad, or a decline in demand for exports.[39]

Against the background of the decline in commodity prices that took place this year, the dollar prices of production inputs declined, but the dollar price of import products for consumption and investment increased. When the appreciation of the shekel against the dollar, which began in the fourth quarter of 2012, is weighted, the shekel prices of all import products declined this year (Table 3.A.2 in statistical appendix). Another reflection of the exchange rate's impact on prices can be seen in the tradable goods component of the Consumer Price Index. According to Research Department calculations, the share of the nontradable goods component in the Consumer Price Index is about two-thirds, and the housing

Figure 3.11
The CPI and the Tradable and Nontradable Components, 1999–2013 (annual rates of change, end of quarter data)



SOURCE: Based on Central Bureau of Statistics.

[38] Fluctuations in the nominal exchange rate may have an indirect effect on domestic prices on the demand side as well, provided that they are also reflected in the real exchange rate. For example, as a result of a real depreciation, domestic products become less expensive than products from abroad. This strengthens global demand for domestic products and leads to pressure for an increase in domestic prices with an erosion of the initial real depreciation.

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

index constitutes about 40 percent of that.[40] A Bank of Israel Research Department assessment indicates that prices of the nontradable goods component increased at a higher rate than the prices of the tradable goods component starting in mid-2005 (Figure 3.11).[41] In 2013, the price of the nontradable goods component increased by 3.1 percent, while the price of the tradable goods component was unchanged. This development is reflected in the fact that in recent years—and particularly since the start of the crisis—there has been a continued real appreciation. The appreciation of the shekel and the decline of demand abroad explain the decline in prices in the tradable sector, a decline which led to factors of production being expelled from it. In order to allow full employment and to prevent deflation, accommodative monetary policy also increased demand in the nontradable sector.

3. MONETARY AGGREGATES AND THE SOURCES OF CHANGE IN THE MONETARY BASE

a. Monetary aggregates

Interest is the price of money, meaning it is the alternative cost of holding liquidity. Therefore, changes in the interest rate have an impact on the demand for liquidity. When the nominal interest rate is the main tool of monetary policy, the central bank operates so that the money supply is completely flexible and the monetary base is determined by the public's demand for liquidity. It is important to note that the actions taken by the Bank of Israel in relation to the monetary base are not intended to offset an injection or an absorption of liquidity from any particular source. The Bank takes into account total inflows and absorptions that are not in line with the interest rate, and takes action in order that the monetary base demanded by the public is in line with the Bank of Israel interest rate.

The M1 monetary aggregate increased markedly, inter alia due to a decline in deposits in M2 and a transition to M1, against the background of the deterioration in the global crisis that took place at the end of 2008 and the sharp reduction of interest rates.

The M1 monetary aggregate includes cash in the hands of the public and demand deposits, and it increased markedly in 2009, by about 52 percent (Table 3.3). According to an estimate of basic demand equations for the M1 monetary aggregate and its components, during the period between 1998 and 2013[42], the development

[40] The division of the CPI into tradable and non-tradable goods components is based on Ben-Bassat, I.,"Price Indexes for Tradable and Nontradable Goods", Bank of Israel Research Department, Discussion Papers Series 89.11, 1989. An additional calculation of the two components, based on Orfaig, D., "Transmission Channels from the Exchange Rate to the Consumer Price Index: A Micro-Industry View of the Tradable Goods Component of the CPI," to be published, showed similar results. Some of the prices of tradable products are also affected by nontradable factors such as the cost of storage, rent, and shipping.

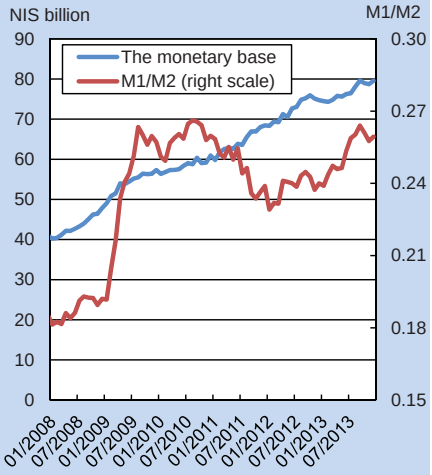
[41] This result is maintained even when assessing the nontradable goods component excluding housing.

[42] The estimate was prepared by the Research Department. The equations were estimated for a log of the real level (CPI-adjusted) in quarterly data. For the three aggregates—cash in the hands of the public, demand deposits and M1—the equations included the aggregate with a lag of one quarter, the log of real GDP level and the log of the 1-year *makam* yield. In addition, the equations included a seasonality dummy variable.

of GDP and of *makam* yields explains the path of M1 development throughout the sample period. The sharp increase in the aggregate that took place in 2009 is mainly explained by the decline in *makam* yields against the background of the reduction in the monetary interest rate.

The outlier increase in 2009 derived mainly from outlier growth in the demand deposits component, while the growth in the cash component was in line with its growth trend. During the examined period, the share of M1 in M2—an aggregate that includes M1 plus unindexed deposits of up to 1 year—increased (Figure 3.12). This increase indicates that the public replaced interest-bearing deposits with demand deposits to a certain extent, due to the low yield on unindexed deposits of up to 1 year, which does not compensate for the loss of liquidity inherent in them.[43] This development is not unique to 2009. Between mid-

Figure 3.12
The Monetary Aggregates, 2008–13
(monthly averages)



SOURCE: Bank of Israel.

Table 3.3
Rate of change in monetary aggregates, 2009–13
(end of period, monthly average, change in percent compared to the same period the previous year)

	1		2	1+2=3	4	5	6	3+4+5+6=7
	Monetary base	Cash held by the public	Current accounts	M1[a]	Short-term deposits[c] up to 3 months	Short-term deposits[c] up to one year	SRO[d]	M2[b]
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	5.9	8.7	7.9	8.5	7.9	8.2
2013	6.5	3.9	22.5	15.3	-1.3	0.3	16.5	6.6
2013								
Q1	8.0	10.8	18.0	15.2	2.3	1.5	19.6	7.8
Q2	4.9	7.3	14.2	11.5	0.3	4.2	14.6	5.6
Q3	5.9	5.8	18.1	13.4	-2.6	7.5	15.9	5.2
Q4	6.5	3.9	22.5	15.3	-1.3	0.3	16.5	6.6

[a] M1 = cash and demand deposits.
[b] M2 = M1+SRO+unindexed deposits of up to one year.
[c] Term deposits.
[d] Self-renewing overnight deposit - a daily liquid deposit.
SOURCE: Bank of Israel and Central Bureau of Statistics data.

[43] Details are presented in Chapter 3 of the Bank of Israel Annual Report for 2012.

2010 and the beginning of 2012, in parallel with the process of raising the interest rate (which began at the end of 2009), the share of M1 in M2 declined. Thereafter, with the reversal of the trend and the process of lowering the interest rate, the share of M1 in M2 again increased, though its rate of change was much more moderate than it was in 2009. This is reflected in a correlation of -0.85 between the Bank of Israel interest rate and the share of M1 in M2 between 2000 and 2014.

The interest rate reductions in 2013 supported the continued growth of means of payment (M1), and its pace of growth this year (15.2 percent) was higher than in the three previous years (Table 3.3).

b. The sources of change in the monetary base

The segment of liquidity which is directly affected by the Bank of Israel is the monetary base, meaning the total amount of banknotes and coins in circulation and demand deposits of commercial banks at the Bank of Israel.[44] The supply of liquidity is completely flexible at the interest rate level set by the Monetary Committee. In other words, for a given interest rate level, the Bank of Israel absorbs liquidity from the markets or injects liquidity to the commercial banks in order to supply the demand for the monetary base in line with the Bank of Israel interest rate. This is because the monetary base is affected by flows that are not under the Bank of Israel's control, such as government accounts, and by flows that are under its control, such as foreign exchange and bond purchases that serve to achieve the various policy goals. The Bank of Israel adjusts the monetary base to the interest rate that it sets by way of interest-bearing deposits of the banks, which are issued to them in tenders and are not included in the monetary base[45], and by way of issuing *makam*. Government activities also affect the monetary base, since the government's accounts are managed at the Bank of Israel (pursuant to the Bank of Israel Law).

Government activities are included in the main factors that affected the monetary base prior to the 2008 crisis (Table 3.4). From 2008 until the middle of 2011, the Bank of Israel purchased foreign exchange and was required to sterilize the effects of its own activities on the monetary base. In 2009, it also had to sterilize the effects of government bond purchases. The purchases injected tens of billions of shekels each year into the market, and without absorbing that liquidity, there would have been increased pressure for the short-term interest rate to decline to a level lower than that set by the Bank of Israel. In 2009 and 2011, most of the absorption was done through bank deposits, and in 2010 it was done through issuing *makam*. Between the middle of 2011 and the second quarter of 2013, the Bank of Israel avoided intervention in the financial markets through asset purchases. In April 2013, the Bank of Israel resumed its interventions in the foreign exchange market, and it offset the effects on the interest

[44] Demand deposits of the public are also part of liquidity in the economy, but the Bank of Israel has only an indirect effect on the volume of such deposits, by way of the reserve requirement imposed on the commercial banks.

[45] Because they are not recognized for the purpose of meeting liquidity requirements.

Table 3.4
Sources of change in the monetary base, 2009–13

(NIS billion)

	2009	2010	2011	2012	2013	2013 Q1	2013 Q2	2013 Q3	2013 Q4
1. Injections from the government and the Jewish Agency	-14.20	1.42	-2.14	-9.13	-10.45	-12.01	-10.52	-0.57	12.65
of which: the government	-14.95	0.60	-2.61	-9.67	-10.45	-12.01	-10.52	-0.57	12.65
2. Foreign exchange conversions[a]	78.22	43.06	15.90	-0.23	19.19	0.10	9.01	4.97	5.11
of which: Bank of Israel	77.41	43.75	16.17	0.00	19.04	0.00	8.99	4.95	5.10
3. Total (1+2)	64.02	44.48	13.76	-9.36	8.74	-11.91	-1.51	4.40	17.76
4. Bank of Israel injections	-58.85	-32.96	-7.50	10.05	-2.41	17.05	0.95	-6.22	-14.20
of which: Monetary loan	0.42	-0.42	0	0	0	0	0	0	0
Makam	4.96	-47.27	16.65	8.15	-6.35	-3.49	-2.54	-0.63	0.32
Swap	0	0	0	0	0	0	0	0	0
Bank term deposits	-63.19	13.13	-27.63	-1.00	2.00	20.00	3.00	-6.00	-15.00
Interest[b]	0.42	1.25	2.89	2.30	1.22	0.40	0.34	0.26	0.22
Bond purchases	18.00	0	0	0	0	0	0	0	0
Repo	-2.01	0	0	0	0	0	0	0	0
5. Total change in the monetary base	5.14	11.51	6.08	0.75	6.44	5.34	-0.87	-1.53	3.50

[a] This item includes, among other things, receipts (payments) in foreign exchange that the Bank of Israel and the government receive from (transfer to) the private sector, for instance income tax. These payments do not change the monetary base. They appear in the section on government injections and in this section, with the opposite sign.

[b] Excluding *makam*.

SOURCE: Bank of Israel Accounting Division.

The interventions in the foreign exchange market and, to a lesser extent, the decline in banks' deposits with the Bank of Israel, constituted a large injection into the monetary base. In contrast, government deposits with the Bank of Israel and the increase in the balance of issued *makam* offset some of the injection.

rate of these purchases. By the end of the year, the Bank of Israel had purchased $2.92 billion in total. In addition, the Bank of Israel purchased a cumulative $2.1 billion up to the end of the year as part of the program to offset the effects of natural gas production on the exchange rate—a program it announced in May. The interventions in the foreign exchange market constituted a large injection into the monetary base, and to a lesser extent, the decline in banks' deposits with the Bank of Israel also constituted a large injection. In contrast, government deposits with the Bank of Israel, and the increase in the balance of issued *makam* (Table 3.4), offset some of the injection, and by the end of the year, the monetary base had increased by about NIS 6 billion.

Box 3.1

Price Setting in Israel—A Microeconomic Analysis

The dynamics of price updates, particularly the measure of their rigidity, are important both in analyzing the characteristics of inflation in the economy and in analyzing monetary policy's ability to influence economic activity. The more inelastic prices are—meaning the slower they react to various shocks, particularly to changes in monetary policy—the more the effect of shocks on real economic activity grows. This is because real variables (such as the real exchange rate) are important in determining real economic activity, and their level also depends on prices levels, the adjustment of which to the new situation is not immediate, but only after some time.

A study examining the characteristics of the adjustment of the prices included in the Consumer Price Index was based on the most detailed data collected by the Central Bureau of Statistics (CBS) regarding all of the prices of all the products and services which are measured for the purpose of compiling the Consumer Price Index, during the period from January 1999 to June 2011.[1]

The study found that prices in Israel are characterized by moderate rigidity, and that an average of 6–9 months elapses between price updates (Figure 1). Similar findings were obtained in other countries with a low inflation environment that is similar to that in Israel.[2] The average size of a change in the price of a product or service, when it is made, is 3.5 percent. Price declines constitute about one-third of the changes, and their average size is about 10 percent, similar to the average size of the price increases.[3]

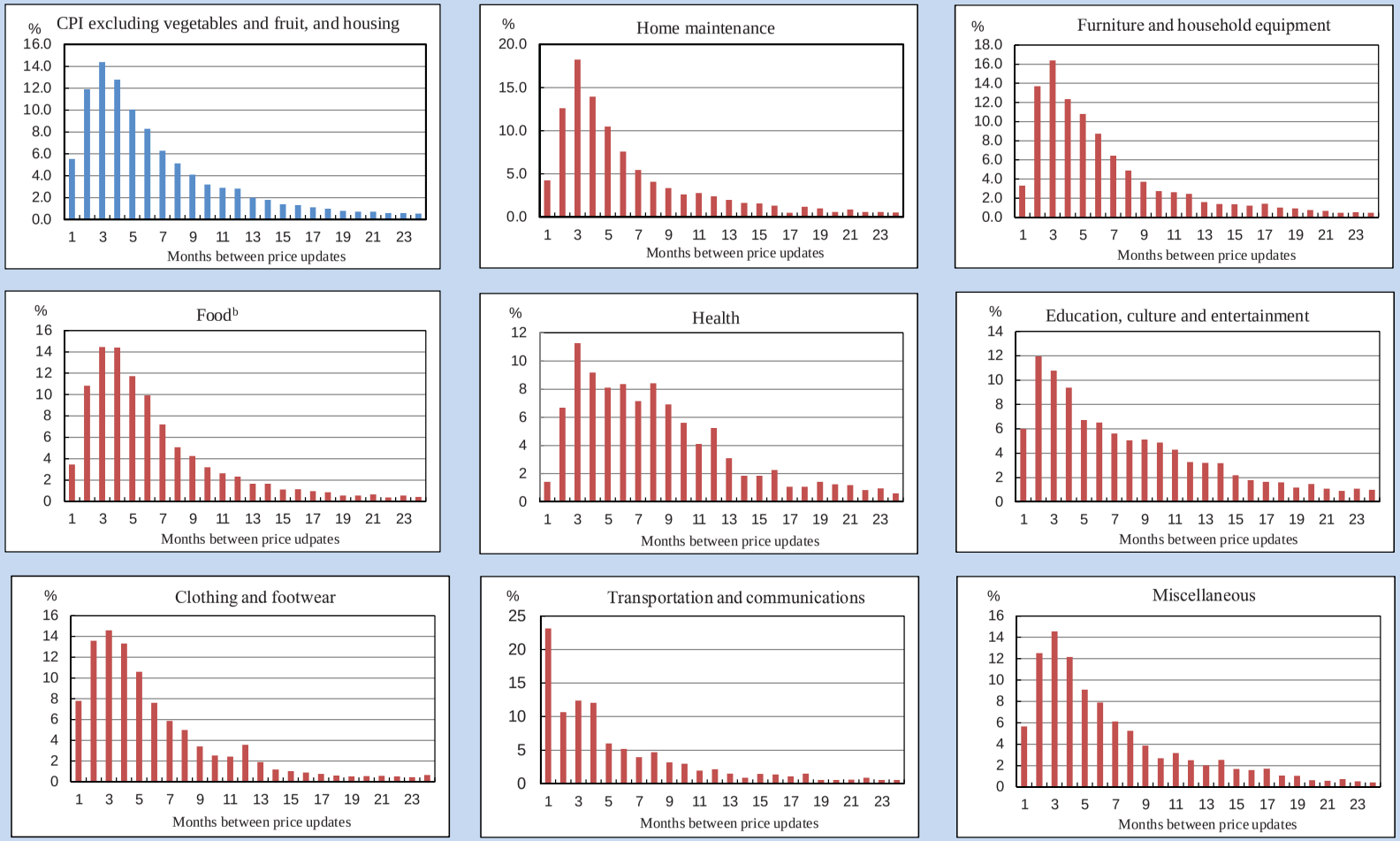
A prominent characteristic is the significant variance in the behavior of prices of products from various groups: The prices of tradable products are changed more frequently than the prices of non-tradable products; the prices of services are changed, on average, after a longer period than other prices; and particularly prominent is the frequent change in the prices of

[1] Sayag, D. and Ribon, S. (2013), "Price Setting Behavior in Israel—An Empirical Analysis Using Microdata", Discussion Papers Series 2013.07, Bank of Israel Research Department. The data in the study do not include information on fruit and vegetable prices or the prices of the housing component in the CPI, which are based on rental prices.

[2] See Alvarez, et al. (2006), "Sticky Prices in the Euro Area: A Summary of New Micro Evidence", *Journal of the European Economic Association* 4(2-3). This article reviews a large number of studies conducted as part of the Inflation Persistence Network, a project established by the European Central Bank (ECB) in the previous decade in order to assess the persistence of inflation. A broad discussion of the issue also appears in the review chapter written by Klenow and Malin (2011), "Microeconomic Evidence on Price Setting", in *Handbook of Monetary Economics*, Vol. 3A, Friedman, B.M. and Woodford, M. (eds.) North-Holland. The authors note there that prices in the US are updated more frequently than prices in Europe, mainly because there are more temporary price changes in the US.

[3] The product of the average frequency multiplied by the average rate of change is not identical to the average of the product of the frequency of change multiplied by the size of change of the products in the index, and therefore is not comparable with the average rate of change in the Consumer Price Index. In addition, as opposed to the calculation by the Central Bureau of Statistics, the study does not relate to changes in the effective cost of the product as a result of sales promotions that are not directly reflected in the price (such as increasing the packaging volume or an additional product for free), so the size of the calculated price changes is biased upwards.

Figure 1: Distribution of the Duration Between Price Updates in the CPI and in its Components[a]



[a] CPI - excluding vegetables and fruit, and housing; Distribution - excluding the top 5 percent.
[b] Excluding fruit and vegetables.

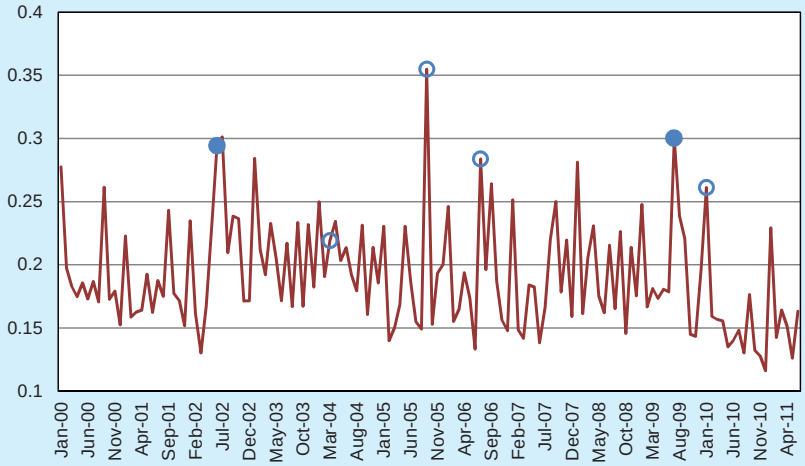
energy products—once every four months on average—because this change includes the update of vehicle fuel prices, which is generally done on a monthly basis.

The detailed data made it possible to also examine the differences in behavior between different points of sale. The comparison relates only to the food component, since only in this case are similar products sold in different types of stores. It was found that at neighborhood grocery stores, an average of 10 months elapses between price changes, while the average change is an increase of 5 percent. The average time at marketing chains is half as long—only about 5 months—and the average change is an increase of 2.5 percent. It is reasonable to assume that this derives from the fact that the costs of the change are lower for the marketing chains, since the chains enjoy the benefit of size, and perhaps also use more advanced technologies in order to update the prices.

During the study period, there were 6 changes in the VAT rate: It was reduced four times (March 2004, September 2005, July 2006 and January 2010), and raised twice (June 2002 and July 2009). The study examined whether (a) a shorter period of time between price updates, and (b) a change in the size of the updates can be identified in response to these VAT changes. For this purpose, equations assessing the chances that a change in price (the "hazard function") and equations assessing the factors explaining the size of the price changes were estimated. The study found that changes in the VAT rate shorten the duration between price changes in some of the CPI components, and that changes in VAT have a significant effect on the size of the change only on the most elastic prices.

Figure 2 outlines the share of prices that change every month, and shows that the share ranges from 15 percent to 30 percent. The study found that at times of increases or reductions in the VAT rate (the circles in the figure), the share of price updates increases, although similar update shares also appear in months when no change in the VAT was made. The examination showed that an increase in the VAT rate increases the share of prices changing during that month by 0.25 percentage points, while a reduction in the VAT rate increases the share of prices changing by only about 0.12 percentage points.

Figure 2: Monthly Frequency of Price Changes (weighted by product)[a]



[a] The empty circles indicate months in which there was a decline in the VAT, and the full circles indicate months in which there was an increase in the VAT.

Table 3.A.1
Monetary policy measures 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		
			Increase	Keep 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[a]	-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
March-13	No change	1.75	0	5	1
April-May-13	No change	1.75	0	6	0
May-13[b]	-0.25	1.5	0	0	6
June-13	-0.25	1.25	0	1	5
July-13	No change	1.25	0	6	0
August-13[c]	No change	1.25	0	5	0
September-13	No change	1.25	0	5	0
October-13	-0.25	1	0	2	3
November-13[a]	No change	1	0	5	0
December-13	No change	1	0	5	0

[a] In parallel with the Monetary Committee's interest rate decision for November, the Supervisor of Banks limited the LTV ratio of new housing loans.

[b] A discussion beyond the normal schedule. In addition, the Committee decided to begin a foreign exchange purchasing program to offset the effects of natural gas production.

[c] Between the interest rate decisions for August 2013—March 2014, there were five members of the Monetary Committee.With the appointment of the Deputy Governor in March 2014, there are once again six members of the Committee.

SOURCE: Bank of Israel.