



Bank of Israel

MONETARY POLICY REPORT

Second Half of 2019

52

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According to the Bank of Israel Law, 5770–2010, the Bank of Israel has three objectives: (1) to maintain price stability, as its central goal; it was established that price stability is defined as an annual inflation rate of between 1 percent and 3 percent; (2) to support other objectives of the Government’s economic policy, particularly growth, employment and reducing social gaps, provided that this support shall not prejudice the attainment of price stability; and (3) to support the stability and orderly activity of the financial system. In order to attain these objectives, the Bank of Israel employs various tools, chief among them the decision on the appropriate level of the short-term interest rate. In addition, the Bank may intervene in the foreign exchange market.

Section 55(a) of the Bank of Israel Law, 5770–2010, establishes the publication of this report, which is submitted by the Bank of Israel to the government and the Knesset Finance Committee twice a year. The report surveys the economic developments that took place during the period covered by the report. It also surveys the policy required—in the view of the members of the Bank of Israel’s Monetary Committee, the forum in which monetary policy decisions are reached—to maintain the inflation rate within the range set by the government and to achieve the other objectives of the government’s economic policy. A survey of financial stability appears in the Bank of Israel’s Financial Stability Report for the period covered.

The Monetary Policy Report for the second half of 2019 was prepared by economists in the Research Department, within guidelines set by the Bank of Israel Monetary Committee. This report is based on data that were published up to the interest rate decision reached on January 9, 2020, and thus refers to the CPI through the month of November 2019.

ABSTRACT

Monetary policy: This report reviews monetary policy in the second half of 2019 and the beginning of the first half of 2020.¹ The Monetary Committee kept the interest rate unchanged at 0.25 percent during this time, though in the last months of 2019 it implemented accommodative policy by purchasing a considerable \$3.8 billion in foreign exchange. The Bank also used forward guidance and reformulated it during the period reviewed in accordance with domestic and foreign developments. Early in the half-year, the Committee estimated that the future upward path of interest would be pursued gradually and cautiously, in a way that would support a process at the end of which inflation will stabilize around the midpoint of the target range, and to support economic activity. Over time, however, largely in view of changes in the global economic environment and the inflation environment, the Committee lowered its estimate of the future interest path and even alluded to the possibility of a rate reduction, in parallel with the Committee declaring that additional tools would be used to attain the Bank's targets, if necessary.

Inflation environment: The inflation environment declined during the half-year reviewed. From July, the annual inflation rate slipped below the lower bound of the target after remaining within the target range in the first half of the year. One-year inflation expectations from the various sources also fell below the lower bound, strengthening the assessment that the Bank of Israel interest rate is expected to decline in the coming year. Inflation expectations for more than one year ahead edged down moderately but remained anchored within the target range. From October onward, the downturn in the inflation environment also found expression in a moderation in the rate of increase in the CPI excluding fruit, vegetables, and energy and in additional core-inflation estimates. The decline in the inflation environment was abetted by major downside surprises in the CPI for June and July. According to an analysis by the Research Department, presented to the Committee, the decrease in the inflation environment is traceable not to slackening demand but to supply-side forces.

Real domestic activity: Real activity data released in the period reviewed supported the Committee's assessment that the economy is near full employment and that GDP growth approximates the potential growth rate. Ongoing tightness in the labor market was manifested in brisk upward movement of wages led by the business sector, a high job vacancy rate, and the lowest unemployment rate in Israel's history. Several indicators, however, suggested that the tightness of the labor market slackened somewhat toward year's end.

Fiscal policy: During the half-year reviewed, it became clear that the 2019 fiscal deficit would overshoot the target considerably. The Committee also mulled the acute fiscal uncertainty that is likely to continue well into the future due to the unpredictability of the political situation and the measures that the government, once formed, may take to cope with the large deficit.

Capital market developments: At the beginning of the review period, estimates derived from the Telbor market and professionals' forecasts² suggested that the coming year would see one rate increase if not more. During the period, however, as monetary policy abroad changed direction and Israel's inflation environment declined, the probability of a rate cut in the coming year steadily increased in accordance with the estimates from the two aforementioned sources. As for domestic yields, medium- and long-term government bond yields, both nominal and real, fell during the period reviewed, much as they did abroad, while short-term real yields increased slightly.

The housing market: The data released in the period reviewed showed an upturn in housing-market activity, reflected in a marked increase in transactions, foremost among first-home buyers, and expansion of new mortgage volume in view of the decrease in the weighted interest rate on mortgages. The year-over-year rate of increase in home prices was approximately 1.6 percent in the period reviewed, though data obtained at

¹ Covering decisions that were made on July 8, August 28, October 7, and November 25, 2019, and that of January 9, 2020.

² The reference is to the average of the professionals' forecasts.

the end of the period showed a year over year upturn of 2.6 percent.³ The year over year increase in the Owner-Occupied Housing Services Price Index (rent) slowed somewhat during the period reviewed, from 2.5 percent to 1.9 percent.

The global economy: Actual and expected global economic activity slowed considerably and downward risks accelerated in view of the U.S.–China trade war and Brexit. As a result, there was a turnaround in monetary policy around the world and many central banks, including the Fed and the ECB, lowered their interest rates. The Committee discussed the possible impact of adverse developments abroad on Israeli exports and noted that they carried the potential for adverse impact, particularly if manifested in the high tech industry. At the end of the period reviewed, uncertainty surrounding the balance of risks ebbed as elections in the UK and reports about agreement on the first phase of the U.S.–China trade accord brought the political situation into clearer focus.

Exchange rate: The shekel continued to appreciate against major currencies, as it did in the first half of 2019. Appreciation in nominal effective exchange rate terms came to 8.4 percent in the year to date. The Committee members reiterated that appreciation is the main impediment to the convergence of the inflation rate toward the midpoint of the target range. The Committee also noted that the protracted appreciation of the shekel may impair Israel’s exports in the future. From October onward, against the background of the Bank of Israel’s powerful intervention in the foreign-exchange market, the shekel’s appreciation against the dollar, euro, and in effective exchange rate terms was arrested.

The Research Department staff forecast: The Research Department issued three forecasts during the period reviewed, each corresponding to an interest announcement: in July and October 2019 and in January 2020. In the last-mentioned forecast, the Department estimated GDP growth at 3.3 percent in 2019, 2.9 percent in 2020, and 3.2 percent in 2021. Inflation expectations, excluding taxation and regulation, are 1.0 percent in 2020 and 1.4 percent in 2021. In the Department’s assessment, the monetary interest rate in one year ahead will remain at 0.25 percent or decline to 0.1 percent. Relative to its forecasts in July and October, the Department lowered its inflation and interest outlooks. Although it did not revise its GDP growth forecast for 2019, in the October forecast it reduced the outlook for 2020 by 0.5 percentage points.

³ The home-price survey data are current up to September–October 2019.

MONETARY POLICY AND BACKGROUND CONDITIONS

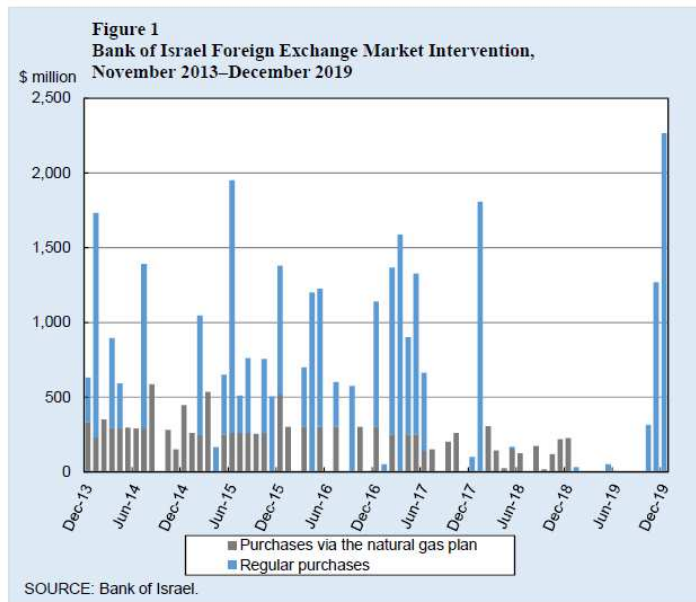
This report reviews monetary policy in the second half of 2019 and the beginning of the first half of 2020.⁴ During this time, the Monetary Committee kept the Bank of Israel rate unchanged at 0.25 percent, the level to which it was raised in November 2018. Concurrently, the Bank continued to use forward guidance—a monetary tool that it has been wielding in recent years to influence the market’s expectations about the future interest path. In light of notable developments in Israel and abroad, the Committee lowered its interest path expectations in order to align the path, in its view, with the convergence of the inflation rate to the midpoint of the target range and to make it supportive of economic activity.

In its first interest announcement during the period reviewed (July 8), the Committee assessed a gradual and cautious path of rate increases. Its forecast reflected the data available at the time, which showed inflation rising in May and the inflation environment expected to rise toward the midpoint of the target. Data released after the decision was made, however, reflected a significant change of direction in developments since the early-July interest decision: (1) the June CPI, published in mid-July, delivered a major downside surprise and thus contributed to a decline in the year over year inflation rate from 1.5 percent to 0.8 percent; (2) the risks to global economic stability escalated steeply within a relatively short time, bringing on stronger assessments of continued interest rate reductions in the United States as well as further rate reduction in the eurozone for the first time in several years. These estimates were realized on July 31 when the Fed lowered its rate, and the markets’ assessment implied that rate cutting would continue, and on September 12 when the ECB reduced its interest rate; (3) with these developments in the background, the shekel gained further ground against other currencies. In July, the shekel appreciated by 2 percent against the euro and by 1.5 percent in terms of the effective exchange rate. This appreciation, pursuant to a trend that began in the first half of the year, brought cumulative appreciation in effective exchange rate terms to 4.6 percent. In view of these changes, the inflation-environment estimate was adjusted downward, as expressed in the Monetary Policy Report for the first half of the year.⁵

In view of these developments, the Governor announced on July 31 that, in his assessment, no rate increase should be expected for a considerable period. In its interest decision on August 28, the Monetary Committee mirrored the Governor’s statement and explained its assessment that interest was unlikely to rise anytime soon in terms of the downward turnaround in the domestic inflation environment, the enhancement of accommodation by major central banks, the moderation of the global economy, and continued appreciation of the shekel. The Committee even stated that further monetary expansion measures should be foreseen, including additional accommodative tools where necessary. In its October 7 interest announcement, the Committee expressed its view that interest rates might even fall in the coming year and repeated its intention to invoke additional tools, where necessary, to attain the Bank’s objectives. In its interest decision of November 25, the Committee affirmed its use of additional accommodative tools, to the intention of which it had alluded in its two previous announcements. Thus, in fact, the Committee announced the operation of a monetary tool that it had not used since 2018: large-scale intervention in the foreign exchange market as an additional means of accommodation for the attainment of the Bank’s targets. Indeed, in November and December 2019, the Bank of Israel purchased a sizable \$3.5 billion in foreign exchange (**Figure 1**).

⁴ Covering decisions that were made on July 8, August 28, October 7, and November 25, 2019, and that of January 9, 2020.

⁵ In its first-half 2019 report, the Committee noted: “Since the publication of the forecast, there were two developments in relatively significant parameters that impact on it: the CPI for June surprised to the downside, and there was a slight increase in the probability ascribed by the markets to monetary accommodation soon in the US.”



The Committee left the interest rate unchanged during the period reviewed but its members took various positions on the direction and magnitude of the changes that should be made in the interest rate. In the July interest rate decision, four members favored a proposal to leave the interest rate unchanged and one member backed a proposal that the rate be raised to 0.5 percent. In the August decision, the rate was left unchanged by unanimous vote. In October, three members favored a proposal to leave the rate unchanged and two members recommended lowering the rate to 0.1 percent. In the November decision, only one member supported the proposal to reduce the interest rate to 0.1 percent, whereas the others backed a motion to hold the rate where it was. In the January 2020 decision, the breakdown of voting mirrored that in November. Thus, over time, a gradual change occurred in the way the Committee members interpreted economic developments and the interest rate policy that they considered necessary.

In sum, in view of the protracted appreciation of the shekel against foreign currencies, the actual global economic slowdown and expectations of more of the same, and the upturn in risks abroad, and to support the convergence of inflation back to the target, the Monetary Committee decided to expand monetary accommodation in the domestic market, similar to the policy of most countries. The Committee chose to implement this monetary accommodation by purchasing foreign exchange and not by lowering the monetary rate, for two main reasons: (1) its assessment that the array of exchange rates had deviated from the window that, in the Committee’s view, corresponded to the solid economic activity and the price stability; (2) the state of the economy at that time did not warrant monetary accommodation by means of a rate cut because rate-cutting is an across-the-board instrument; foreign-exchange purchases, in contrast, focus directly on supporting those components of economic activity that are susceptible to exchange-rate effects.

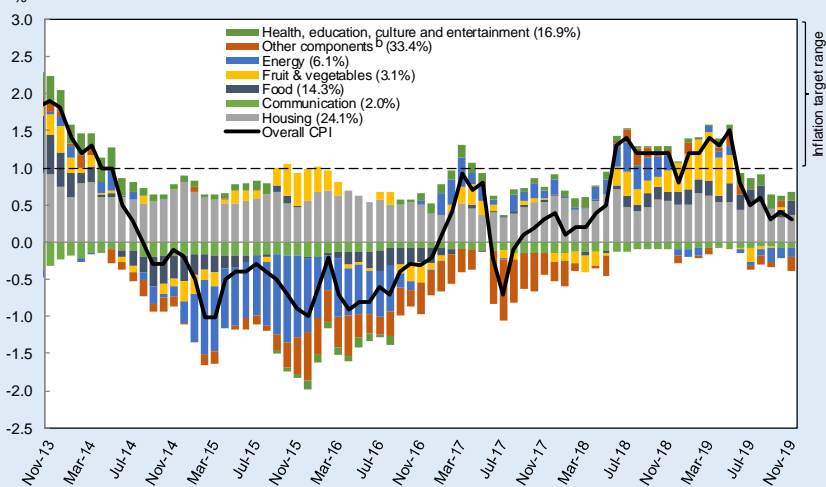
The following main developments were considered by the Monetary Committee in the second half of 2019:

1. The inflation environment

Several indicators pointed to a decline in the inflation environment during the period reviewed. The annual inflation rate remained within the target range between June 2018 and May 2019 (**Figure 2**)⁶ and inflation excluding fruit, vegetables, and energy held steady within the narrow span of 0.9–1.1 percent, near the lower bound of the target (**Figure 3**). One-year inflation expectations derived from the capital markets and those based on professionals’ forecasts, stood at 1.3 percent toward the end of the first half (**Figure 4**), and forward expectations to more than one year ahead were higher, at roughly the midpoint of the target (**Figure 5**).

⁶ With the exception of December 2018, when the annual rate temporarily sank to 0.8 percent.

Figure 2
Contribution of Main CPI Components to Annual Inflation^a,
November 2013–November 2019

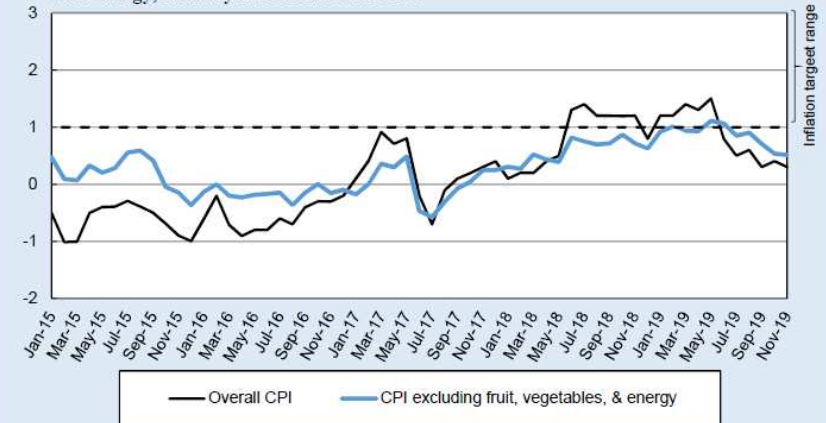


^a The figure in parentheses is the share of the relevant component in the overall CPI (as of 2019).

^b The other components include equipment and household furniture, clothing and footwear, miscellaneous, dwellings maintenance and transportation, excluding the components related to energy prices.

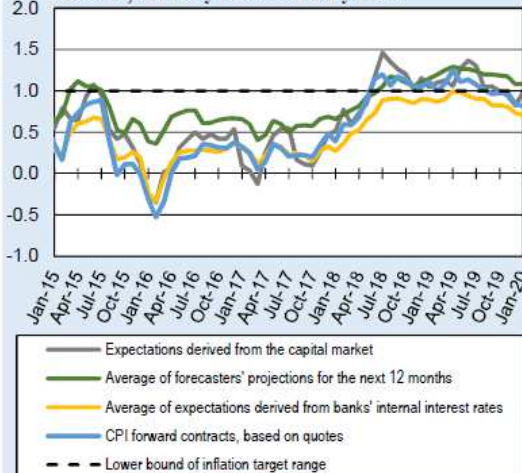
SOURCE: Based on Central Bureau of Statistics.

Figure 3
The Development of the Overall CPI and the CPI Excluding Fruit, Vegetables,
and Energy, January 2015–November 2019



SOURCE: Based on Central Bureau of Statistics

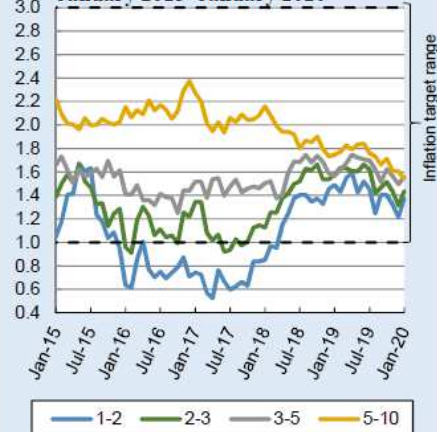
Figure 4
One-Year Inflation Forecasts from the Various
Sources^a, January 2015–January 2020



^a Monthly averages.

SOURCE: Bank of Israel.

Figure 5
Forward Inflation Expectations
Derived from the Capital Market^a,
January 2015–January 2020



^a Monthly averages.

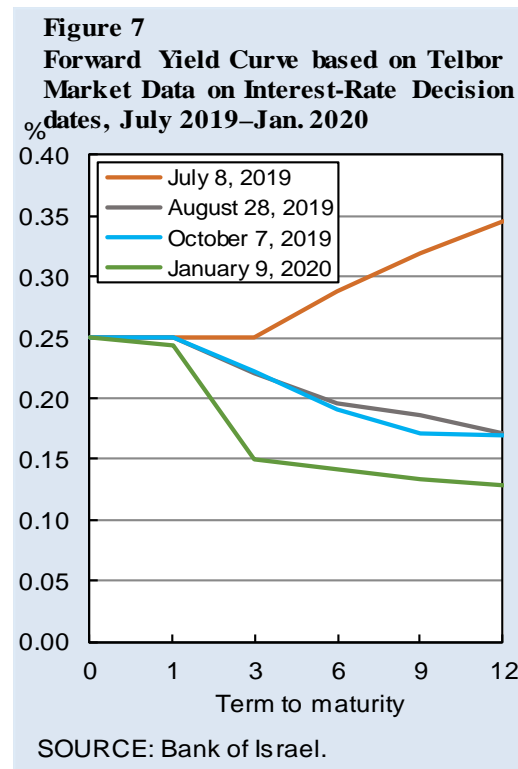
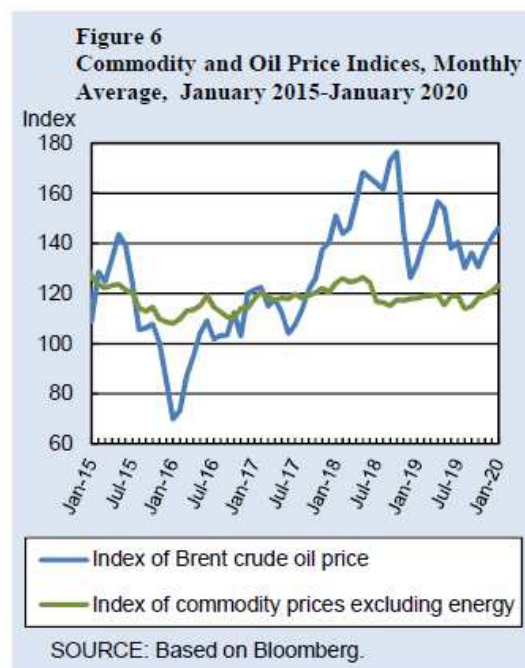
SOURCE: Bank of Israel.

The CPI readings for June and July, released in mid-July and mid-August, respectively, were far below expectations and led to a lower annual inflation rate of 0.8 percent in June, 0.5 percent in July, and 0.3–0.4 percent in the concluding months of the year (**Figure 2**).⁷ The main precipitant of the decrease in annual inflation in the period reviewed was the fruit and vegetables component, the contribution of which zeroed out during the period reviewed after making a positive 0.5 percentage-point contribution to the CPI in the first half of the year, and the energy component, the contribution of which became negative (–0.1 percentage point) after a positive contribution of similar magnitude in previous months. The negative contribution of energy to the CPI derived from a decline in global oil prices (**Figure 6**) but also from by shekel appreciation. The Committee noted that despite the sharp decrease in overall CPI inflation—occasioned, as stated, largely by relatively volatile components (fruit and vegetables, energy)—the inflation rate excluding these components, one of several estimates of core inflation, was stable at around the lower bound of the target from the beginning of 2019 to August. From October on, however, this indicator also declined (**Figure 3**) and additional estimates of core inflation slipped below the lower bound of the target. The decrease in core inflation traces mainly to ongoing shekel appreciation and a moderation in the pace of upturn in housing (rent) prices.

As for prices of nontradable goods, the annual rate of increase tumbled notably toward mid-year and up to September, from an elevated level of 2 percent to 1.3–1.6 percent, followed by a further decline to 1.1–1.3 percent in October–November. The decline was largely the result of a decrease in the contribution of the housing component and the zeroing out of the contribution of fruit and vegetables.

In tradable goods, the annual rate of price increase dropped from around zero in June to –0.7 percent by July and –1.1% toward year’s end, mainly due to falling prices in the energy, food, furniture, and home-appliances components.

The decrease in the inflation environment during the period reviewed also manifested in a slowing of inflation expectations as derived from the various sources (**Figure 4**) and an upturn in assessments that the Bank of Israel would reduce its interest rate in the coming year (**Figure 7**). Thus, one-year inflation expectations derived from the capital market, as well as those of the banks, slipped gradually to 0.8 percent, and the forecasters’ outlooks fell to 1.1 percent—even though these expectations made partial allowance for tax



⁷ The December CPI reading, published on January 15, 2020—after the January interest decision—remained unchanged, bringing inflation in 2019 to 0.6 percent.

increases⁸ and accommodated the assessment, current at the time, that the interest rate would be raised in the coming year.

Forward expectations to medium and long terms also edged downward during the period reviewed, by 0.2–0.3 percentage point on average for all terms (**Figure 5**), but remained anchored within the target range throughout this time. At the end of the year, expectations were 1.3 percent for the second year, 1.5 percent to medium terms, and 1.6 percent in the long term.

2. Real economic activity in Israel

On the basis of data on economic activity released during the period reviewed, the Monetary Committee assessed that the economy is in a state of nearly full employment and noted that GDP growth approximated the 3 percent potential rate. In the Committee’s assessment, the economy remained in a full-employment environment and grew at a pace similar to the past two years, not far from its potential rate (3 percent). The Committee even noted that the solid growth in the economy occurred despite the negative sentiment in the world, but this should be attributed to, among other things, the expansionary fiscal policy and accommodative monetary policy in Israel. Toward the end of the year, the Committee members expressed concern that the growth rate in the coming year will moderate.

According to National Accounts data that became available during the period reviewed, Israel’s GDP grew at a 3.4 percent pace in the first half of 2019 and by 4.1 percent in the third quarter (**Figure 2**). This vigorous performance, however, reflected a steep increase in motor-vehicle imports. In the assessment of the Research Department, growth net of the added value associated with motor-vehicle import activity was more moderate—below 3 percent. The broader macro picture pointed to stable growth: GDP increased by 3.3 percent in the past four quarters ending in the third quarter of 2019, and, in the assessment of the Research Department, by 3.1 percent in 2019. This solid performance was reflected in a 3.6 percent upturn in private consumption, 4.1 percent in exports (net of diamonds and startups), and 4.3 percent in imports (net of diamonds, defense imports, and ships and aircraft). Other uses showed milder upturns—public consumption (net of defense imports) increased by 2.2 percent and fixed investment by 0.7 percent.

Table 1

National Accounts - data available at the time of the interest rate decisions

(seasonally adjusted data, quantitative rates of change compared to previous period, in annual terms)

Decision for the month of		July	August	September	October	November	December	January
GDP	2019:Q1	4.8	5.0	4.7	4.6	4.4	4.5	4.6
	2019:Q2			1.0	1.0	0.6	0.8	0.8
	2019:Q3						4.1	4.0
Business sector product	2019:Q1	5.4	5.7	5.9	5.9	5.7	5.6	5.3
	2019:Q2			0.6	0.7	0.0	0.3	0.4
	2019:Q3						5.0	4.5
Private consumption	2019:Q1	6.6	7.0	5.8	6.0	5.6	5.7	5.5
	2019:Q2			-1.3	-1.1	-0.9	-0.8	-0.3
	2019:Q3						2.8	3.1
Fixed capital formation	2019:Q1	9.8	10.5	10.2	9.1	8.4	4.3	1.9
	2019:Q2			-3.1	-8.0	-7.5	-4.7	-5.1
	2019:Q3						-6.1	-4.3
Exports excluding diamonds and startups	2019:Q1	3.9	3.7	8.3	10.4	10.6	9.6	9.7
	2019:Q2			4.6	13.6	10.0	9.8	10.0
	2019:Q3						-3.6	-5.0
Civilian imports excluding ships, aircraft, and diamonds	2019:Q1	14.6	14.5	9.2	8.6	8.6	8.5	8.2
	2019:Q2			-2.5	-1.7	-1.8	-2.1	-1.5
	2019:Q3						3.6	4.8

SOURCE: Based on Central Bureau of Statistics.

⁸ This is said on the basis of a survey among professional forecasters, in which they were asked about pro-inflation forces in Israel in the coming year.

Services (net of startups) exports and goods (net of diamonds) exports increased briskly by 10 percent and 6 percent, respectively (**Table 1**). However, the slowdown in actual global activity and the major downward adjustment of global activity forecasts, along with the U.S.–China trade war and the uncertainty surrounding the preparedness and timing of Brexit, generated concern among Committee members about the risk of a negative impact on Israeli exports, particularly if the adverse impact is seen in high-tech. Indeed, in view of the standstill in global trade, exports of goods (net of diamonds) contracted, according to the first estimate of data for the third quarter of 2019, by 7.4 percent. The Committee also noted the protracted appreciation of the currency as another possible source of harm to exports. Since the exchange rate affects exports at a lag, the Committee members expect to see its adverse impact on exports in the future.

Table 2
Development of GDP, imports and uses

(seasonally adjusted data, quantitative rates of change compared to previous period, in annual terms)

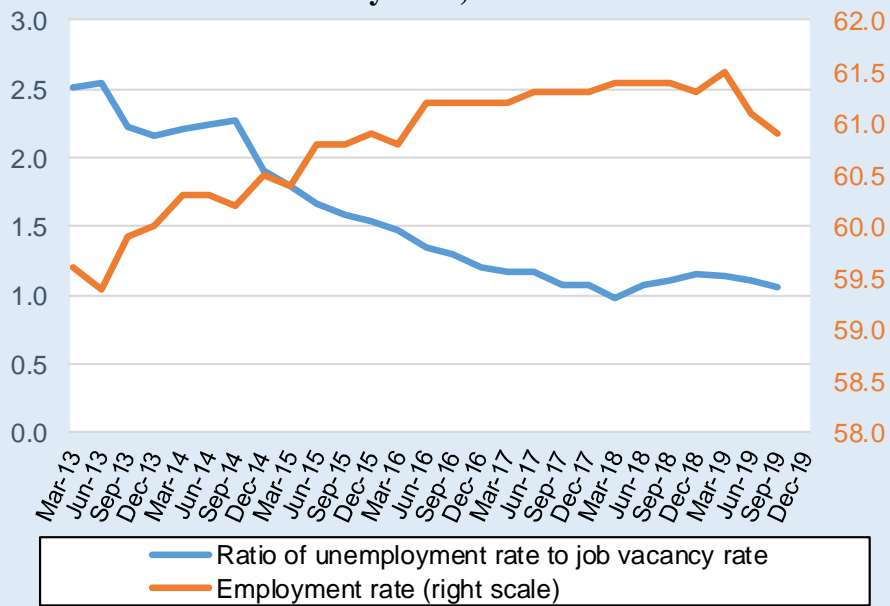
	2017	2018	2019	2018:Q2	2018:Q3	2018:Q4	2019:Q1	2019:Q2	2019:Q3
GDP	3.6	3.4	3.3	1.4	2.9	3.9	4.6	0.8	4.0
Business sector product	3.8	3.7	3.5	0.9	1.9	5.3	5.3	0.4	4.5
Imports excluding defense, ships, aircraft and diamonds	7.1	5.1	4.3	3.6	-4.6	6.9	8.2	-1.5	4.8
Private consumption <i>of which</i> : private consumption excluding durable goods	3.4	3.7	3.9	-0.8	2.9	6.5	5.5	-0.3	3.1
Public consumption <i>of which</i> : public consumption excluding defense imports	3.4	4.0	4.1	-11.3	11.1	-1.3	0.6	12.6	5.4
Gross domestic investment <i>of which</i> : in fixed assets	5.4	3.2	0.9	16.1	-27.5	27.0	9.5	-28.2	36.6
Exports excluding diamonds <i>of which</i> : exports excluding diamonds and startups	4.3	4.8	0.3	-3.9	-4.4	9.9	1.9	-5.1	-4.3
	5.9	5.7	5.2	-1.1	12.9	-3.5	19.0	4.2	-11.2
	6.2	5.1	4.7	-6.2	6.1	1.1	9.7	10.0	-5.0

SOURCE: Based on Central Bureau of Statistics.

The unemployment rate among prime working ages continued to fall, settling at a historical low of 3.5 percent at the end of the period reviewed. Concurrently, the job vacancy rate (demand for labor) was high at 3.5 percent. The labor market remains tight; this was reflected in the low ratio of the unemployment rate to the job vacancy rate, which has been stable at close to 1 since 2017 (**Figure 8**). The tightening of the labor market is also expressed in the high employment rate (62 percent) and in wage growth led by the business sector and evident in most industries, causing the share of wage in GDP to rise. Thus, nominal and real wages in the business sector increased in the past four quarters⁹ by 4.2 percent and 3.1 percent, respectively, resembling the annual average rate of increase in recent years (**Figure 9**). Further evidence of the tightness of the labor market is the low rate of people working part-time involuntarily (1.5 percent of the labor force), falling numbers of despairing workers, and the small proportion of jobless persons who sought work for more than half a year. Toward the end of the period reviewed, there were indications of a mild decrease in the tightness of the labor market: the employment rate declined to 61 percent (**Figure 8**) and the rate of wage growth slackened slightly (**Figure 9**).

⁹ Third quarter of 2019 against third quarter of 2018.

Figure 8
The Employment Rate and the Ratio of the Unemployment Rate to the Job Vacancy Rate, March 2013–December 2019



SOURCE: Based on Central Bureau of Statistics.

Figure 9
Nominal and Real Wages in the Business Sector: Rate of Change vs. Corresponding Period in the Previous Year, 6-Month Moving Average, Seasonally Adjusted, December 2014–December 2019

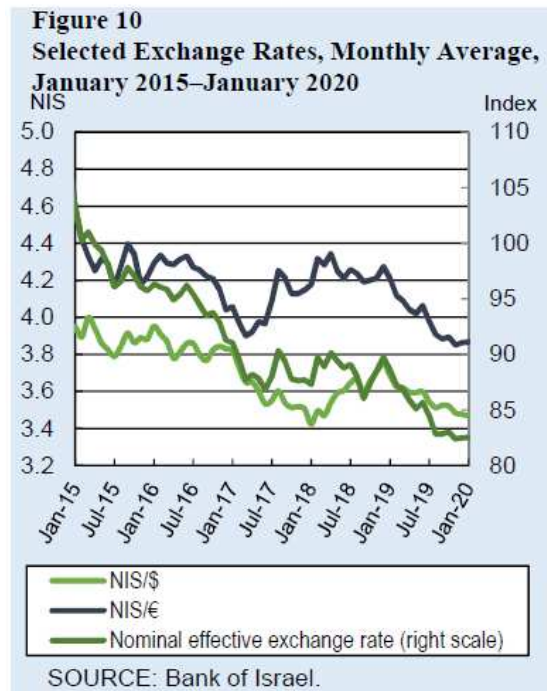


SOURCE: Based on Central Bureau of Statistics.

3. The shekel exchange rate

Shekel appreciation in terms of the effective exchange rate began in the first half of the year and continued in the second half of 2019. Following the marked appreciation in the first half of 2019, the shekel gained 4 percent in terms of the effective exchange rate, 4 percent against the US dollar, and 5 percent against the euro in the review period, bringing annual total effective appreciation to nearly 8 percent. This was the main factor that kept the inflation rate from converging to the target (**Figure 10**).¹⁰

Between July and September, the shekel cumulatively appreciated by 3.4 percent in terms of the effective exchange rate, by 2.2 percent against the US dollar and by 4.6 percent vis-à-vis the euro, in cumulative terms. The appreciation was milder in October–December, at 0.3 percent, 1.5 percent, and 0.3 percent, respectively. In the Committee’s assessment, the vigorous appreciation in 2019 traces to the relatively auspicious state of the Israeli economy and the continued increase in the current account surplus to \$4 billion.¹¹ Among the precipitants of appreciation was a change in global interest rates, as major central banks reduced their rates while the Bank of Israel left its rate unchanged. An additional important factor behind the appreciation is the announcement in September 2019 of Israel’s inclusion in the WGBI¹² global bond index effective April 2020. Although the announcement had been expected, the decision to integrate Israel into the index of CPI-indexed instruments as well came as a surprise and contributed to appreciation in September.



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4. The global economy

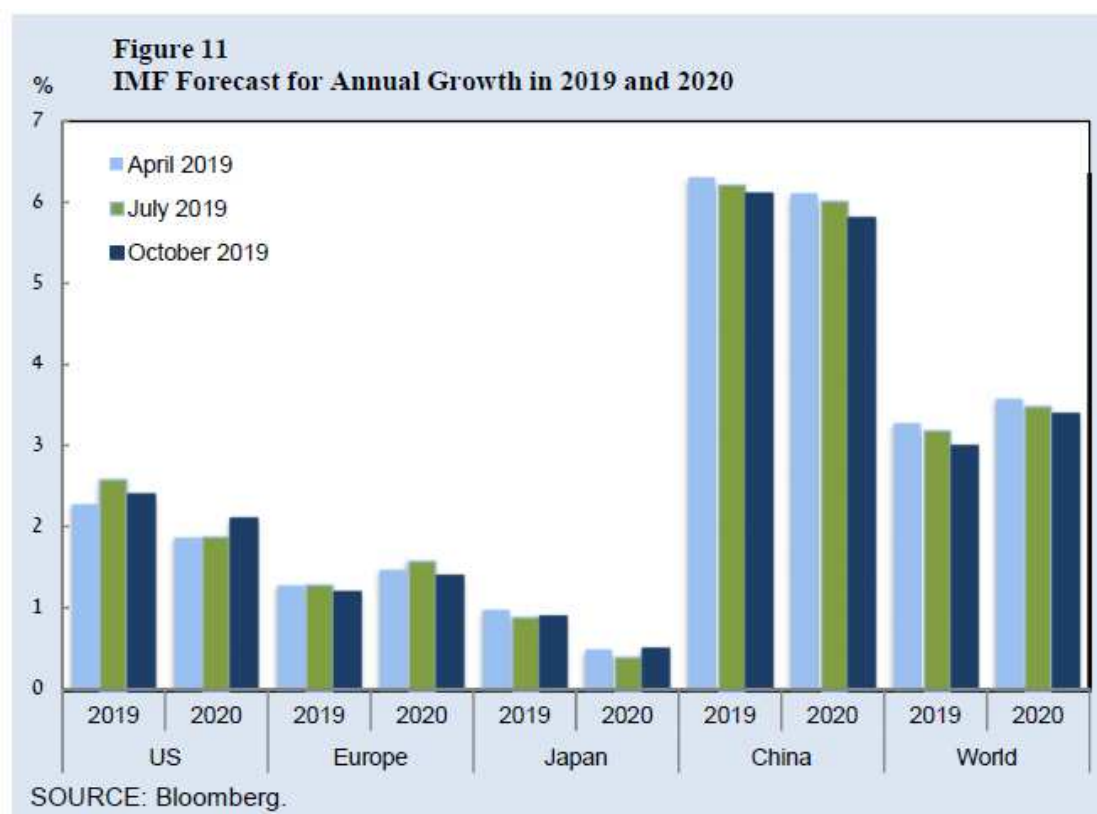
The growth rate of global economic activity continued to slow, prompting international agencies to continue to revise their growth forecasts downward; the balance of risks to activity also accelerated in a downward direction in view of the U.S.–China trade war. Toward the end of the period reviewed, global economic sentiment improved against the background of a mild decrease in uncertainty about the trade war and Brexit. In the period reviewed, the IMF continued to lower its 2019 and 2020 GDP growth forecasts for advanced and developing economies, pursuant to an adjustment in the same direction in the first half of 2019 (**Figure 11**). The global growth outlooks for 2019 and 2020, released in October, were the lowest since the global financial crisis more than a decade ago. The IMF’s world trade forecasts for these years were adjusted downward as well. The revision for 2019 was steeper (–2.9 percentage points) than that for 2020 (–0.7 percentage point). The OECD also lowered its forecasts for 2019–20 and emphasized that the U.S.-China trade war was amplifying global uncertainty. In the OECD’s assessment, the trade war is liable to find expression in a major decrease in business sector investment in the U.S., the eurozone, Japan, and China, and also in a downturn in world trade.¹³

¹⁰ Possible effects of exchange-rate changes on inflation, as depending on the various shocks that the economy experiences, are discussed at length in the box below.

¹¹ This relates to the third quarter of 2019.

¹² World Government Bond Index.

¹³ To view the estimates of impairment to activity related to the trade war, see the OECD report published on September 19, 2019.



Brexit uncertainty fueled uncertainty about the real global situation as implementation of the scheme was postponed several times to an unknown date, if ever. At year's end, the results of the British elections made an early 2020 Brexit more probable.

There was a turnaround in monetary policies abroad during the period reviewed. The US Federal Reserve kept the federal funds target rate unchanged at 2.25–2.5 percent in the first half of 2019 after raising it four times in 2018. Its decision to leave interest unchanged, the Fed emphasized, was predicated on the strength of the US economy and an inflation environment near the 2 percent target. Toward the end of the first half, as the global picture worsened and pro-inflation forces in the US were weak, the Fed reduced its interest rate for the first time in several years—by 0.25 percentage point in late July and by the same increment in September and again in October. In December, it held the rate steady at 1.5–1.75 percent.

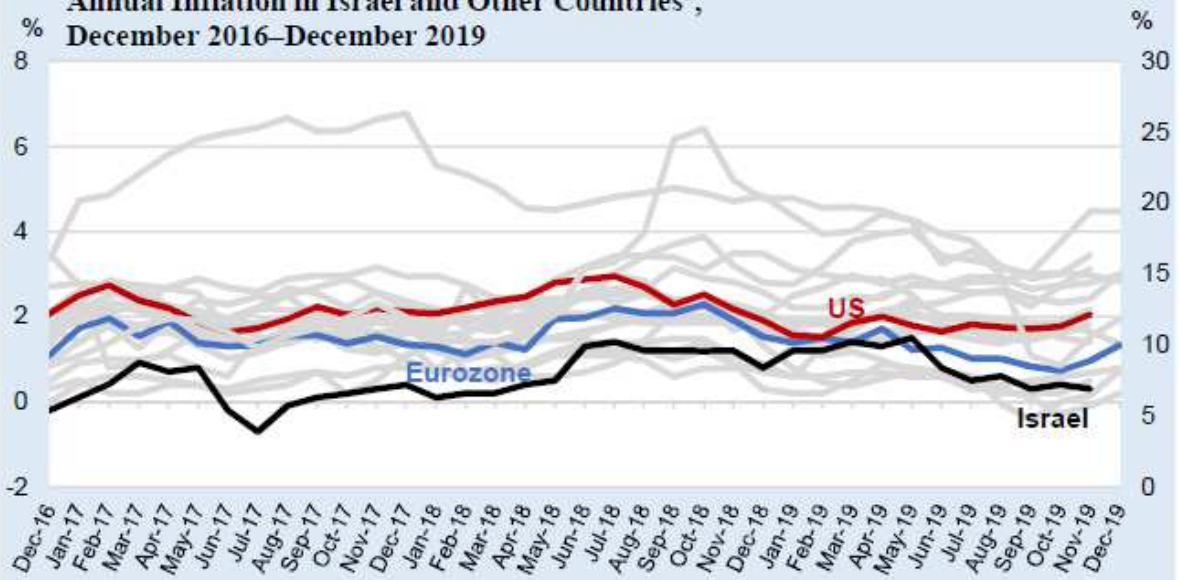
Eurozone monetary policy also turned around in the second half of 2019. Up to and including July, the interest rate was unchanged and no change was expected until the first half of 2020 at the earliest. In its September interest decision, however, the ECB reduced its interest rate on commercial banks' deposits from (–0.4%) to (–0.5%), announced a €20 billion per month purchasing program starting in November 2019, and announced that the interest rate was unlikely to change and might even fall unless inflation returns to the vicinity of 2 percent. No change in eurozone interest was made in October.

In view of the slowdown in real global activity and the sizable increase in downside risk and low inflation rates in some countries (**Figure 12**), many central banks further enhanced their monetary accommodation and reduced their monetary interest rates (**Figure 13**).

At the end of the period reviewed, assessments of markets around the globe indicate that rate-cutting in the US¹⁴ and Europe was exhausted for the time being. Behind these estimates is a slight reduction of risk of a serious deceleration brought on by an escalation of the US–China trade war and from a “hard Brexit”.

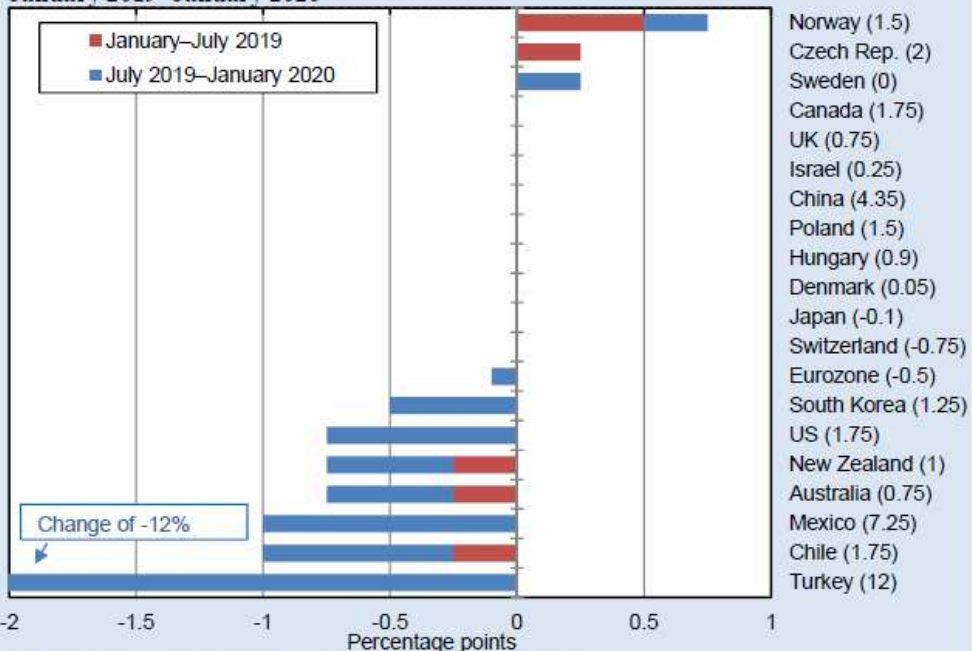
¹⁴ The Fed's messages in late 2019 implied that no further interest changes should be foreseen absent a major change in the economic environment.

Figure 12
Annual Inflation in Israel and Other Countries^a,
December 2016–December 2019



^a Eurozone, US, Switzerland, Sweden, Denmark, Norway, Czech Republic, South Korea, Canada, UK, New Zealand, Israel, Japan, Chile, Poland, Hungary, Australia, Mexico, China, and Turkey (right scale).
 SOURCE: Bloomberg.

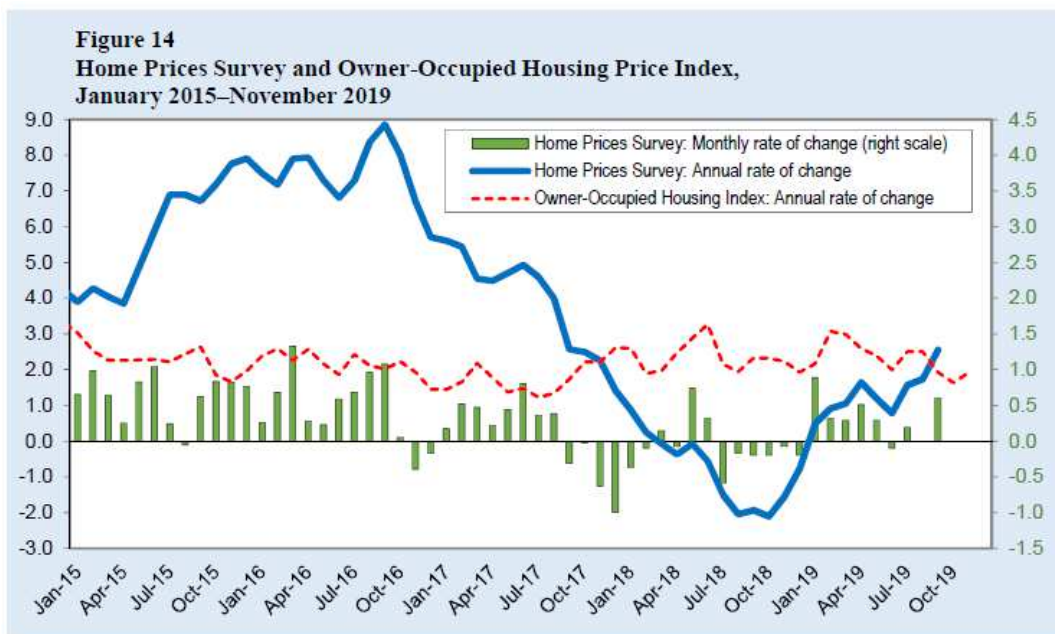
Figure 13
Changes in Central Banks' Interest Rates in Israel and Other Countries,
January 2019–January 2020^a



^a In parentheses: Central banks' interest rates at end of 2019.
 SOURCE: Bloomberg.

5. The housing market

In the period reviewed, there was an upturn in housing-market activity, reflected in the first half of 2019 in a strong upturn in transaction volume and increases in new housing loans and home prices. The declines in home prices in the second half of 2018 halted in early 2019 and switched to a moderately positive annual rate (0.8 percent) at the beginning of the period reviewed. According to the second-half data, the annual pace of increase in home prices climbed to 2.6 percent (**Figure 14**).¹⁵ Concurrently, until the beginning of the half-year reviewed, the Carman data¹⁶ showed a sharp increase in the number of transactions (moving average of the last six months) among all classes of homebuyers but most conspicuously among those buying their first homes. The third-quarter 2019 data showed a mild moderation in transactions by investors and home upgraders, but transactions among first-home buyers continued to rise, resulting in an increase in total home sales.



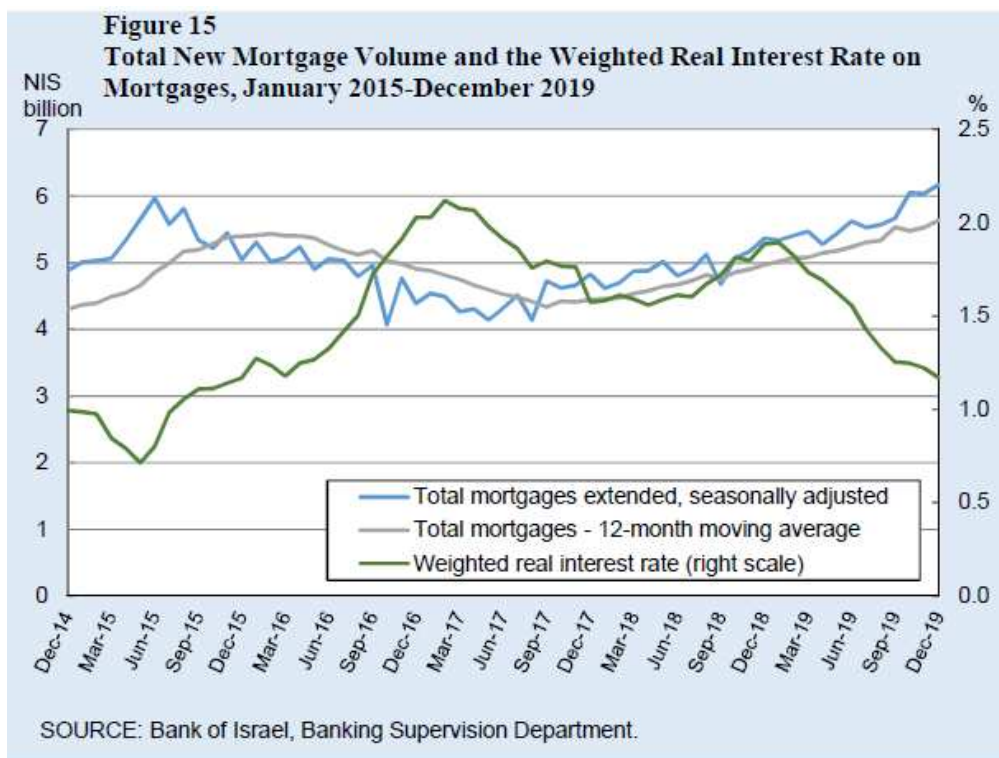
The Carman data for first-home buyers (moving average of the last six months) show that most of the upturn occurred in purchases of new dwellings. Accordingly, the share of new dwellings in total first-home purchase transactions climbed from 45.8 percent at the beginning of the period reviewed to 51 percent at its end. Among first-home purchasers, transactions under the Buyer's Price program increased perceptibly, to around 50 percent of new-dwelling purchases.

The weighted interest rate on mortgages continued to decline markedly, foremost due to declining real long-term interest. Thus, the average interest rate on such loans dropped from 1.9 percent at the beginning of 2019 to 1.6 percent at the end of the first half of the year and to 1.2 percent in the second half (**Figure 15**).

The upturn in housing transactions and the decline in mortgage interest rates also found expression in an increase in new mortgage volume, from NIS 5.6 billion per month at the beginning of the period reviewed to NIS 6.2 billion at the end (seasonally adjusted), and in an increase in takeup of housing loans in the preceding twelve months, from NIS 5.2 billion (monthly average) at the beginning of the period reviewed to NIS 5.6 billion (monthly average) at the end of the period (**Figure 15**).

¹⁵ Home Price Survey data up to August 2019.

¹⁶ Carman is a real-estate prices database, an information system that the Israel Tax Authority uses to document and process property-transaction data.



The year over year rate of increase in the Owner-Occupied Housing Services Price Index (rent) began the period reviewed at a steep 2.5 percent, matching its pace in the first half of the year, but moderated to 1.9 percent at its end (Figure 14).

6. Fiscal policy

In 2019, the probability of a large deficit, in the vicinity of 4 percent of GDP, came into sight, and fiscal uncertainty escalated due to uncertainty surrounding the political situation and the measures that the government, once formed, might take to deal with the growing deficit.

The sizable 2019 budget deficit reflects a structural deficit that has been increasing in recent years, mainly due to rapid growth in permanent government expenditure.

The fiscal uncertainty was manifested throughout the half-year in two main respects: (1) the timing of the formation of a government and the onset of decision-making; (2) the types and magnitude of the measures that the future government, once formed, might take to cope with the large deficit. These lack of clarity on these issues created considerable uncertainty about the impact of future fiscal policy on domestic inflation and real activity because the government will have to act, in the first half of 2020 at the very least, on the basis of an interim budget (allowing one-twelfth of the previous year's expenditure each month) that will have a dampening effect on economic activity.

7. Capital-market developments

According to estimates based on the Telbor market and the professional forecasters, the probability of a rate cut in the coming year increased during the period reviewed. In July, estimates from both sources pointed to the probability of an interest rate increase in the coming year (Figure 7). Thus, the Telbor forward rate to 9–12 months ahead was 0.35 percent on average, reflecting a 70 percent probability of a 0.25 percentage-point rate hike within a year. The professional forecasters' interest-rate outlook to one year ahead started July at 0.5 percent, but edged downward during the month and closed in on the Telbor-based estimates. Both sources' forecasts were consistent with the Monetary Committee's expectation of gradual and cautious rate increases.

From July 31—when the Governor stated that interest was unlikely to rise for a considerable period—to the middle of August, the Telbor-based estimates were revised downward and indicated no change in the Bank of Israel rate in the coming year. The average forecasts of the professional forecasters also declined gradually,

indicating, ahead of the end-of-August interest decision, no change in the interest rate in the coming year. However, given the major surprise to the downside in the July CPI, published in mid-August, and the turnabout in monetary policy abroad, the Telbor-based estimates between mid-August and the interest decision on August 28 reflected a 50 percent probability of a 0.15 percentage-point rate cut within half a year. (The forward rate to 6–9 months ahead stood at 0.18 percent.) This estimate remained in effect until the interest decision on October 7 (**Figure 7**), in which the Committee stated for the first time that the interest rate might even fall. With this announcement in the background, the Telbor-based estimates dropped again, foreseeing a rate cut earlier than had been thought before. The result derived from this was a 50 percent probability of a 0.15 percentage-point reduction within the coming three months and a certain rate cut three months farther out. (The 3–6 month forward rate was now 0.1 percent.) The professional forecasters also lowered their outlooks, projecting a 0.15 percentage-point rate cut within a year. After the November 25 interest rate announcement, both sources' one-year-ahead interest rate forecasts rose slightly. This adjustment may have originated in the Bank of Israel's resumption of foreign-exchange purchases in October, which signaled to the public that monetary accommodation from then on would be applied mainly in this manner and not by rate-cutting.

Nominal and real yields on government bonds for medium and long terms declined in the beginning of the half-year reviewed in line with the global trend, but they continued to decline throughout the half year in contrast to the rest of the world, where yields rose. Domestic nominal short-duration (up to 2 year) yields declined moderately by 0.2 percentage points, while yields for medium to long terms to maturity (3–5 years) and long terms to maturity (more than 5 years) declined more notably, by 0.4 and 0.7 percentage points, respectively. Real yields for medium and long terms also lost ground, by 0.1 and 0.5 percentage points, respectively. Real yields for short terms actually rose slightly, by 0.2 percentage points. The steepest decline on the nominal curve compared with the real curve reflects a decrease in inflation expectations to all terms. At the end of the period reviewed, nominal yields for short, medium, and long terms were 0.2 percent, 0.4 percent, and 1.0 percent, respectively, and real yields to corresponding durations were (–0.9%), (–1.0%), and (–0.5%).

The decline in nominal and real yields for medium and long terms at the beginning of the reviewed period in Israel occurred against the background of falling yields in the US, in Europe, and in other countries, occasioned *inter alia* by the slowdown in actual and expected global activity and an increase in downward risks to future activity. However, toward the end of the period reviewed, in view of some decline in risks of a notable slowdown, yields around the world increased, while in Israel yields continued to decline.

8. The Research Department's staff forecast

The Research Department published three forecasts during the period reviewed, each together with interest rate decision announcements—in July and October 2019 and in January 2020 (**Table 3**). In its early July forecast, the Department assessed that the full-employment environment would continue in 2019 and 2020, as would GDP growth at around the potential rate—3.1 percent in 2019 and 3.5 percent in 2020. The Department expected the labor market to remain tight in the coming two years, likely reflected in wage growth and therefore supportive of the convergence of inflation to the midpoint of the target range. Based on this estimate, inflation¹⁷ in 2020 was projected to be 1.6 percent. The Research Department expected the monetary interest rate to rise to 0.5 percent during the third quarter of 2019 and to continue heading upward gradually, to 1 percent by the end of 2020 (**Table 3**).

¹⁷ Inflation in the Research Department's forecasts is calculated as the average CPI in the quarter relative to the average CPI four quarters back—unlike the standard calculation, in which the index in a given month is set against the index twelve months back.

Table 3
Research Department Forecasts

Forecast for the years	2019				2020				2021
	04/19	07/19	10/19	01/20	04/19	07/19	10/19	01/20	01/20
Date of forecast	04/19	07/19	10/19	01/20	04/19	07/19	10/19	01/20	01/20
GDP	3.2	3.1	3.1	3.3	3.5	3.5	3	2.9	3.2
Inflation ^a	1.5	1.6	0.6	0.4	1.6	1.6	1.1	1.0	1.4
Bank of Israel interest rate ^b	0.5	0.5	0.25	0.25	1.0	1.0	0.1-0.25	0.1-0.25	
Date of forecast	04/19	07/19	10/19	01/20					
Inflation in the coming year ^c	1.3	1.4	1.2	1.0					
Interest rate one year from now ^d	0.5	0.75	0.1-0.25	0.1-0.25					

^a Average CPI inflation in the last quarter of the year compared with the average in the last quarter of the previous year.

^b Year-end.

^c In the four quarters ending in the same quarter the following year.

^d In the same quarter the following year.

SOURCE: Bank of Israel.

In the forecast published in October, no change in the GDP growth rate in 2019 was expected (3.1 percent) but the outlook for 2020 was adjusted downward by 0.5 percentage points, to 3 percent. This reflected the Department's assumptions about the measures that the government would probably take to reduce the deficit—on both the expenditure side and the tax-revenues side—and the lowering of the forecast for global imports in view of the US–China trade war. Given the abrupt change in the CPI data described above, the Department also reduced its 2020 inflation outlook, projecting inflation at 1.2 percent, down 0.4 percentage points from the July forecast. The adjustment was made, as stated, mainly due to surprises to the downside in the June and July CPIs and ongoing currency appreciation. The reassessment of the inflation environment pushed the interest forecast down as well: the Research Department estimated that the interest rate will not change or will decline to 0.1 percent in the coming year. The main factors behind the lowering of the interest-path forecast were the lowered inflation outlook and the upturn in expectations of monetary accommodation abroad.

In the forecast published in January 2020, the GDP growth outlook was reduced slightly by 0.1 percentage point (to 2.9 percent) and the first forecast for 2021 was included, projecting GDP growth at 3.2 percent. The inflation estimate for 2020 was reduced slightly by 0.2 percentage points, to 1 percent, and for 2021 it is expected to increase to 1.4 percent. In the Department's assessment, interest will either hold steady in the coming year or fall to 0.1 percent.

Along with each of its judgment-based forecasts, the Research Department presented main risks to the forecast of both domestic and foreign origin.

9. The expected inflation and growth paths

In its discussions of the expected inflation path, the Committee agreed that the low inflation rate probably originates not in sluggish demand (given that the economy is near full employment, the labor market is tight, and private consumption and exports are growing solidly) but in ongoing appreciation and in supply-side shocks: declining oil prices and the continued upturn in competition that has been typical of the economy in recent years.

Looking ahead, the Committee members assess, in accordance with the Research Department's forecast, that inflation will return to within the target range in the second half of 2020, though there is high uncertainty about the future inflation path. The uncertainty has many causes, including the development of the exchange rate, inflation and activity abroad, and oil and commodity prices. In the Committee's assessment, too, the upturn in domestic competition and the expansion of retail Internet purchases are creating downward pressure on prices, and the extent to which this process, which has characterized recent years, has already exhausted itself or will continue to pressure prices down is unclear. An increase in indirect taxes to cut the deficit, if the government implements one, will have a one-off effect on prices but is unlikely to affect the inflation path.

In its reference to economic activity, the Committee assessed at the end of the reviewed period that the growth rate is expected to moderate in 2020, as a result of the expected fiscal contraction and the slowdown in world trade. In terms of risks to economic activity, the main cause of domestic uncertainty is the fiscal policy measures that the future government will adopt, at an unknown time. Worldwide, there is some decline

in the magnitude of the uncertainty regarding the U.S.–China trade war and Brexit. However, in view of the actual and expected slowdown worldwide and the decline in scope of world trade, there is a risk of negative impact on the scope of Israeli exports, especially if it makes itself felt in high-tech.

The Committee will continue to monitor domestic and global economic developments and adopt the requisite policy measures to support the convergence of inflation to the midpoint of the target range and to support real activity.

Table 4
Developments in the Domestic Asset Markets

	(rates of change)					
	07/19	08/19	09/19	10/19	11/19	12/19
Yield to maturity (monthly averages, percent)						
3-month makam	0.3	0.2	0.2	0.2	0.1	0.2
1-year makam	0.3	0.2	0.2	0.2	0.1	0.1
Unindexed 5-year notes	0.8	0.5	0.5	0.5	0.5	0.5
Unindexed 20-year bonds	2.5	2.0	2.1	1.9	1.9	1.7
CPI-indexed 1-year notes	-1.0	-0.8	-0.9	-0.8	-0.8	-0.7
CPI-indexed 5-year notes	-0.7	-0.9	-0.9	-1.0	-0.9	-0.8
CPI-indexed 10-year notes	-0.1	-0.5	-0.4	-0.5	-0.4	-0.5
Yield spread between government bonds and corporate bonds rated AA (percentage points) ^a	1.0	1.1	1.1	1.1	1.0	1.0
Stock market (rate of change during the month)						
General shares index	1.1	-2.5	3.5	2.9	3.3	-0.7
Tel Aviv 35 Index	1.7	-3.8	3.4	2.4	2.9	-1.1
Foreign exchange market (rate of change during the month)						
NIS/\$	-1.9	1.0	-1.5	1.3	-1.5	-0.6
NIS/€	-4.0	0.1	-2.5	3.5	-2.9	1.4
Nominal effective exchange rate	-2.7	-0.4	-1.4	2.6	-2.1	0.6

^a The calculation is based on fixed-rate, CPI-indexed bonds, excluding convertible and structured bonds, with a yield of up to 100 percent and a term to maturity of more than 6 months.

SOURCE: Bank of Israel.

Table 5
The inflation and interest rate environment

	(monthly averages)					
	07/19	08/19	09/19	10/19	11/19	12/19
Inflation environment indicators (percent)						
Monthly change in CPI	-0.3	0.2	-0.2	0.4	-0.4	
Forecasters' predictions of monthly CPI (average of forecasts prior to publication of CPI)	0.1	0.1	-0.1	0.4	-0.2	
12-month change in CPI	0.5	0.6	0.3	0.4	0.3	
One-year inflation expectations derived from the capital market	1.3	1.0	1.1	1.0	0.9	0.8
Forecasters' one-year inflation predictions	1.2	1.2	1.2	1.2	1.2	1.1
Inflation expectations for various terms^a						
Forward inflation expectations for the short term (from the end of the first year through the end of the third year)	1.5	1.3	1.4	1.5	1.4	1.3
Forward inflation expectations for the medium term (from the end of the third year through the end of the fifth year)	1.7	1.6	1.5	1.6	1.6	1.5
Forward inflation expectations for the long term (from the end of the fifth year through the end of the tenth year)	1.8	1.7	1.7	1.7	1.6	1.6
Interest rates and interest rate differentials:						
Bank of Israel interest rate	0.25	0.25	0.25	0.25	0.25	0.25
Real interest rate derived from the zero curve	-0.99	-0.8	-0.9	-0.8	-0.8	-0.7
Short-term interest rate differential between Israel and the US	-2.24	-2.00	-1.89	-1.73	-1.50	-1.50
Short-term interest rate differential between Israel and the eurozone	0.25	0.25	0.25	0.25	0.25	0.25
Forecasters' predictions of change in the Bank of Israel interest rate (average of forecasts prior to the decision)	0.0	0.0	-	0.0	-0.1	-
Telbor interest - 3-month forward rate in 9 months	0.3	0.2	0.2	0.1	0.1	0.1
Forecasters' predictions of the interest rate a year hence	0.4	0.3	0.2	0.2	0.1	0.1
Nominal long-term interest rate differential between Israel and the US	-0.5	-0.5	-0.5	-0.7	-0.8	-0.9
Real long-term interest rate differential between Israel and the US	-0.4	-0.5	-0.5	-0.7	-0.6	-0.6

^a Inflation expectations are measured by the difference between yields on local currency unindexed and CPI-indexed bonds. These expectations include an element of risk premium, which increases with the length of the term to which the expectations relate.

SOURCE: Based on Central Bureau of Statistics data and private forecasters' reports.

Box

Based on materials presented by the Research Department to the Monetary Committee as part of the discussions on the interest rate decision

How the connection between the exchange rate and inflation depends on the source of the change in exchange rate

Changes in the exchange rate can markedly impact the development of important macroeconomic variables, such as inflation and GDP. Therefore, it is important to understand the connection between developments in the exchange rate and developments in various macroeconomic variables, particularly in regard to inflation, which is a main target of monetary policy and is very dependent on exchange-rate developments. For this reason, the Research Department attempts to assess, as part of its quarterly staff forecast, how the developments in the exchange rate are expected to impact on Israel's economy. For example, the Department aims to answer questions such as, "The shekel appreciated by X percent in the quarter. Assuming that it remains at that appreciated level, what is the expected effect of the appreciation to date on inflation going forward?", or, "How will inflation be impacted if in the future there is a depreciation of X percent?"

This box presents estimates of the effect of changes in the exchange rate on inflation and other main variables, based on a structural model—the Research Department's DSGE model.¹⁸ The use of a structural model makes it possible to examine the mechanisms through which a change in the exchange rate impacts the main economic variables while referring to the source of the shock that led to a change in the exchange rate and to the response of the other economic variables in the model. The main point seen from the analysis is that the correlation (both the direction and the size) of inflation with the exchange rate depends on the economic factor that led to a change in the exchange rate.¹⁹

Table 1 presents the effects of changes in the exchange rate as estimated in the Research Department's DSGE model. The table presents the response of main variables in the Israeli economy to various shocks—that is, to exogenous changes in the economic environment, all of which serve as a source for appreciation of the shekel.

1. **A decline in the risk premium** of the shekel increases the relative attractiveness of holding shekel-denominated assets, and therefore acts to increase demand for shekels, and to appreciate the shekel.
2. **A decline in the level of competition** in the Israeli economy, reflected in producers charging higher prices for their products, acts to increase inflation and hence to increase the interest rate in the model, which leads to an appreciation.²⁰

¹⁸ The Research Department's DSGE model is a structural model estimated for Israel's economy and is in ongoing use for various analyses as well as for building the Research Department's quarterly forecast, which is published quarterly with the interest rate decision. A working paper on the DSGE model—MOISE: A DSGE Model for the Israeli Economy (Discussion Paper 2012.06)—is available on the Bank of Israel website (www.bankisrael.org.il).

¹⁹ Note that the connection between the exchange rate and inflation can also be examined through other analytical frameworks. One of the accepted methods is estimating a single equation in which the dependent variable is the change in the inflation rate, and the independent variables are the change in the exchange rate with a lag, as well as a group of control variables. The coefficient of the change in the exchange rate describes the connection between the change in it and in inflation, given the other variables included in the equation and the shocks that actually occurred. An estimation of regressions of this type relating to the Israeli economy is presented in Selected Research and Policy Analysis Notes, February 2019—"Exchange Rate Pass-Through to Prices", by Michael Kozin. Some disadvantage of the single equation approach is that the connection estimated does not reflect the full causal effect of the exchange rate on inflation.

²⁰ Although in recent years it appears that there has been an increase in the level of competition, a decline in competition is presented here as a theoretical shock in order to remain consistent with the other shocks that act toward appreciation of the shekel. Note that while in the model changes in the level of competition cause the interest rate to change, in reality it is possible that the Bank of Israel would only react to a small extent, if at all, depending on the extent to which it assesses that these changes will impact in a prolonged manner on inflation.

3. **An increase in preferences (demand) for domestic product**, reflected in a larger share of the public’s total demand being supplied by domestic production and less by imports, which leads to an increase in activity and therefore to an increase in the interest rate in the model, and to an appreciation. This appreciation is also supported by the current account surpluses that this shock creates, as a result of the decline in imports.
4. **An increase in demand for consumption and investment**, which leads to an increase in activity and inflation and hence to an increase in the interest rate in the model, and to an appreciation.

We set the magnitude of the above shocks so as to lead in all cases to an appreciation of 1 percent over the course of the year following the shock.^{21,22}

Table 1
The estimated impact of an appreciation of 1 percent in the DSGE model²³
 (percentage points)

Cause of appreciation	Size of the shock in standard-deviation terms ²⁴	Inflation (over the course of the year following the shock)	Interest rate 1 year after the shock	Export growth (average in the year following the shock)	GDP growth (average in the year following the shock)
Risk premium (declines)	0.4	-0.2	-0.2	0	0
Competition (declines)	1.3	+0.5	+0.3	-0.1	-0.2
Preference for domestic product (increases)	0.8	0	+0.1	-0.1	+0.4
Domestic demand (increases)	0.6	+0.1	+0.2	-0.1	+0.3

The first row in the table describes the ramifications of a decline in the risk premium of the shekel. This shock is generally considered as reflecting an increase in demand for shekels, for exogenous reasons, such as an increase in investors' interest in investing in the shekel, which is now viewed as safer. As this is an exogenous shock that directly impacts only the exchange rate, it is appropriate for answering what the impact of changes in the exchange rate itself are on the other variables in the economy. Therefore, such a shock has a particular

²¹ The exercise assumes that the appreciation occurs in a gradual manner—a quarter percentage point in each of the 4 quarters.

²² In reality it is likely that there is a difference in the magnitude of the impact of depreciation as opposed to appreciation, a finding that was indicated for Israel as well (see Selected Research and Policy Analysis Notes, February 2019—“Exchange Rate Pass-Through to Prices”, by Michael Kozin). A limitation of the DSGE model is that it is linear and therefore does not allow a different impact for an increase in the exchange rate as opposed to a decrease.

²³ The model includes a large number of shocks, only some of which are presented in the table. The shocks that are presented are responsible for a notable portion of the development of the exchange rate in the past decade.

²⁴ This column presents the change in the exogenous variable that creates an appreciation of 1 percent, in terms of the standard deviation of that shock (in absolute value). The larger the number presented is, the less common the shock required to lead to an appreciation of 1 percent is. To illustrate: the probability that a shock to the risk premium occurs (first row) that leads to appreciation of at least 1 percent, is 35 percent, while the probability that a shock to competition occurs (second row) that leads to appreciation of at least 1 percent, is 10 percent. (The calculation is based on a normal distribution of the shocks in the model.)

importance in understanding the connection between the exchange rate and the other variables. An appreciation that derives from such a shock causes—according to the DSGE model—only a moderate decline in the inflation rate, as in the model the interest rate responds by decreasing in order to moderate the decline in inflation.²⁵ If the interest rate would not decline, a moderate decline in activity would be seen as well.

The main conclusion is that the correlation between the exchange rate and inflation and the other variables is not fixed, but rather depends on the basic economic factor to which they are responding. As can be seen in the table, even the signs of the correlation can be different. For example, in a case in which competition declines, domestic producers raise their prices, so the inflation rate increases. As a result of the increase in inflation, the domestic interest rate increases and therefore there is an appreciation of the currency. That is, in this case, the appreciation of the shekel is actually accompanied by an **increase** in inflation, and the change in the exchange rate is itself already a result of another shock, the decline in competition, and of policy response to the shock. The notable differences in the response of the various variables to appreciation of a similar magnitude make it clear that in order to assess what will happen to inflation in view of some change in the exchange rate, it is necessary to understand what the source of the change is. This task can clearly be challenging—only rarely is it clear precisely what the economic change that led to the appreciation is. The Research Department's DSGE model, as noted, is one of the tools through which this question can be examined.

²⁵ The interest-rate response to a change in the exchange rate acts on inflation and thus contributes to the overall impact of the exchange-rate change on inflation. In contrast, in a single-equation estimation that includes the interest rate as a control variable, the estimated connection between the exchange rate and inflation would not reflect the impact via the interest rate channel. That is, simple regressions generally provide an estimate that should be considered as the correlation between the exchange rate and inflation (given the control variables) while at times we actually are interested in an estimate of the full causal effect of the exchange rate on inflation.