



Bank of Israel

Monetary Policy Report

First Half of 2020





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53 July 2020

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To:

The Government and the Finance Committee of the Knesset

Israel's economy, together with the other economies worldwide, is undergoing a shock on a scale that has not been seen for many decades. The health crisis that was brought on by the spread of the coronavirus quickly led to a major economic crisis and required that unprecedented measures be taken by monetary and fiscal policy makers, both in Israel and abroad.

The Bank of Israel's Monetary Committee is closely monitoring the economic developments on an ongoing basis. During February, when it was clear that the virus is spreading to numerous countries, the Committee began to discuss the policy measures required in various scenarios and made known to the public its preparedness to use any policy tools necessary should the virus spread to Israel and to the extent that restrictions placed on the public adversely impact economic activity.

The pace of events was of course very rapid. During the month of March, as the spread of infection in Israel and the rest of the world caused the economic situation to deteriorate and disrupted the financial markets, the Committee held a series of emergency meetings, and subsequently the Bank of Israel put unprecedented measures into operation in order to restore the financial markets to orderly activity and to ease the credit conditions for households, businesses and the government to the extent possible. The Bank of Israel provided liquidity in shekels by means of repo transactions and executed swap transactions in order to provide liquidity in dollars to the financial system. At a later stage, the Bank of Israel initiated a program to purchase government bonds on a scale of NIS 50 billion.

At the beginning of April, even though the monetary interest rate had been very low in recent years, such that already at the onset of the crisis the economy was benefiting from accommodative monetary policy, the Committee decided to reduce the interest rate by 0.15 percentage points, to 0.1 percent. This returned the interest rate to its historically lowest level. In addition, the Committee launched a new program intended to provide banks with an incentive to increase the supply of credit to small and micro businesses. In the beginning of July, in view of the deterioration in the health situation and the concern of a further worsening of the economic situation, the Committee decided to adopt another policy tool that had never been employed previously in Israel—the purchase of corporate bonds in the secondary market at a scope of NIS 15 billion. Additionally, the Committee decided to renew the program to increase the supply of credit to small and micro businesses and to create an infrastructure for increasing the range of assets that the banks could put up as collateral in

the program. Furthermore, during most of the period, the Bank of Israel also operated in the foreign exchange market.

This report describes the developments, the data and the information that was available to the Monetary Committee at each stage and the decisions made by the Committee in order to help the economy and the public endure the Covid-19 crisis with a negative impact that is as small as possible. We emphasize that when we decided on each of the policy measures, we were guided by the need to best serve the interests of the citizens of Israel and to provide the maximum support that monetary policy can achieve during a crisis of such large proportions, whether to ensure the orderly functioning of the financial markets or to ease credit conditions and support the recovery of demand in the economy. The principle that guided us and that continues to guide is that in a crisis of this type it is better for the Committee to take too many measures and that they should be on a larger scale—even if after the fact it becomes clear they were not completely necessary—than to take only modest measures which after the fact would be revealed to have been insufficient and thus to have led to a longer and deeper negative impact. The Bank of Israel will continue to use every monetary tool that the Committee members view to be necessary and appropriate for the Israeli economy during this complex period.

Sincerely,

The Bank of Israel Monetary Committee

Prof. Amir Yaron, Governor of the Bank of Israel

Mr. Andrew Abir, Deputy Governor of the Bank of Israel

Prof. Reuben Gronau, Representative from among the public on the Monetary Committee

Prof. Moshe Hazan, Representative from among the public on the Monetary Committee

Prof. Zvi Hercowitz, Representative from among the public on the Monetary Committee

Prof. Michel Strawczynski, Director of the Research Department

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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 and bond markets.

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.

In accordance with Section 55(b) of the Bank of Israel Law, the current report explains why the inflation rate deviated from the target range determined by the government for more than 6 consecutive months—since the publication of the CPI for June 2019 (on July 15, 2019). The inflation rate during this period declined to below the lower bound of the target range, and the explanations for that are found in Section a below (Monetary Policy and Background Conditions).

The Monetary Policy Report for the first half of 2020 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 July 6, 2020, and thus refers to the CPI through the month of May 2020.

Summary

Monetary policy: This report reviews monetary policy during the first half of 2020 and the beginning of the second half of the year. During the reviewed period, against the background of the major deterioration in economic conditions as a result of the spread of the coronavirus and the measures taken to halt it, the Monetary Committee put into operation a range of tools in order to help deal with the crisis. The main measures taken were intended to ensure the orderly functioning of the financial markets, to enhance the passthrough from the Bank of Israel interest rate to the market interest rates and to ease credit conditions.

Among other things, the Committee implemented programs to purchase government and corporate bonds in the secondary market, and a program for repo transactions with institutional investors, and it also began to execute swap transaction in the foreign exchange market, in addition to the purchase of foreign exchange that it carries out from time to time. The Committee also introduced a new monetary instrument—long-term monetary loans to the banks in order to increase the supply of credit to small businesses. In addition, it reduced the interest rate by 0.15 percentage points to a level of 0.1 percent.

Domestic real activity: During the reviewed period, there was a marked deterioration in the real economy relative to the preceding half year, in view of the onset of the pandemic and the containment measures adopted by the government. The Bank of Israel's assessments during the crisis pointed to a decline in private consumption of around 30 percent relative to the pre-crisis level and the shutdown of about 40 percent of the economy (in terms of GDP). Labor market data published during the period indicate that more than 1 million workers applied for unemployment benefits. National Accounts data published during the reviewed half year indicate that GDP during the first quarter contracted less than initial estimates—by 6.8 percent in annual terms. The decrease in GDP reflected a decline in most uses. Overall, the real developments indicate that the Israeli economy is experiencing a recession that is unprecedented in the State of Israel.

The inflation environment: The decline in the inflation environment, which began already prior to the Covid-19 crisis, continued during the crisis as well. The annual inflation rate remained below the lower bound of the target range during the period being reviewed. One-year inflation expectations from all sources declined—at first moderately, and since March, sharply.

The Monetary Committee assessed that the moderate decline in the inflation environment that occurred at the beginning of the period (prior to the crisis) did not reflect weakness of demand and that to a large extent it was influenced by the appreciation of the shekel and by inflation components characterized by high volatility. At that time, the Committee was of the opinion that annual inflation would decline before rising back to the vicinity of the lower bound of the target range. Due to the spread of the pandemic, the Committee was of the view that there had been a significant decline in the inflationary environment, and that the decline incorporated two opposing trends: there was significant weakness in demand, in Israel and abroad, which was expected to reduce prices; yet in contrast, the adverse impact to the supply chain for various goods was expected to bring about a rise

in prices from the supply side. The Committee felt that the demand forces were dominant and that inflation would continue to fall.

Furthermore, the Committee assessed that it was difficult to interpret the inflation data due to problems in measuring goods and services that are temporarily unavailable due to the restrictions on economic activity and in view of the changes in the consumption patterns of households as a result of the crisis.

The exchange rate: Until March, the shekel continued to appreciate, and strengthened appreciably against most currencies. Following the turmoil in the financial markets, a sharp depreciation occurred in the shekel due to a shortage in dollar liquidity. As a result of the liquidity shortage, the Bank of Israel began to execute swap transactions with the goal of providing the required liquidity, thus leading to a drop in the shekel's volatility and an appreciation of the shekel. Since then, the shekel has returned to its pre-crisis level.

Some of the Committee members were of the opinion that if the shekel stabilizes at that level, it will weigh on a recovery in exports and on the return of inflation to within the target range. During most of the surveyed period, the Bank of Israel continued to purchase foreign exchange, apart from during the period characterized by a shortage in dollar liquidity and a rapid depreciation.

The global economy: During the reviewed period, world trade data declined sharply. International institutions and investment banks expected global output to shrink, but were uncertain as to how much. The slowdown in global activity and in world trade led to a decline in commodity prices—with the price of oil reaching a new low relative to recent years and then partially recovering. As a result of the spread of the pandemic worldwide, many countries decided to adopt various monetary tools. Thus, many central banks initiated or expanded asset purchase programs and reduced their policy rate. In parallel to the monetary measures, many governments expanded their public expenditure and provided support for the extending of credit to the business sector. At the time of the May interest rate decision, the Monetary Committee continued to assess that the risks to the global economy remained significant, and in particular, the risk of a second wave of the pandemic.

Financial market developments: With the onset of the global crisis and the spread of the coronavirus worldwide, equity prices in Israel and worldwide declined sharply. The nominal and real yields on government bonds for the medium and long terms fell at the beginning of the half year, in line with the global trend. As a result of the turmoil in the financial markets in March, yields rose sharply but since then have corrected. According to the data as of the end of the period being reviewed, they have returned to the vicinity of the levels at the beginning of the year.

After the halt in issuances in the corporate bond market in March, there was a recovery in April and May. Bank credit grew during the crisis and the activity of state-guaranteed credit funds led to a drop in the average interest rate charged to small businesses. Prior to the interest rate reduction in April, and throughout the period, expectations based on the Telbor market and the professional forecasters' projections reflected a belief that policy would be even more accommodative in the future. In other words, there is a positive probability of an interest rate reduction. According to the

most recent data, the expectations in the markets imply a high probability of an additional reduction in the interest rate during the coming year.

Fiscal policy: In the beginning of the half year, the deficit contracted due to, among other things, the budget restraint resulting from operating under an interim budget. Since then, the trend has reversed and the deficit has risen sharply, as a result of the fiscal measures that were declared by the government following the spread of the pandemic and the limitations that were imposed on movement and economic activity. According to the Research Department's staff forecast, the deficit at the end of 2020 is expected to be roughly 12 percent of GDP, an increase of about 8 percentage points relative to last year.

The Committee assessed that the current level of the real interest rate enables the government to finance the deficit on convenient terms. Furthermore, as long as the deficit is a direct result of the crisis, the financial markets will allow the government to continue financing it, even if it grows somewhat as a result of the additional policy steps to encourage growth and productivity.

The housing market: The data available to the Committee members at the time of its decisions during the period did not yet reflect the effect of the crisis. The data available at those points in time indicated that activity was at a high level—home prices were increasing, alongside a high and stable level of housing transactions. Looking forward, there was uncertainty with regard to trends in the construction industry and in the housing market. In the short term, a decrease in housing stock is possible due to the delays in the issuing of permits, financing constraints, or a shortage in workforces and raw materials. In contrast, a drop in demand is possible in view of the rise in unemployment, uncertainty regarding employment, and the expectation of a drop in the rate of increase in wages or even a decline in wages. The initial estimate for April indicates a decline in the volume of transactions. A similar picture emerges from mortgage data, which indicates a drop in mortgage closures in April and May.

The Research Department's staff forecasts: The Research Department published four forecasts during the period being reviewed in parallel to the interest rate announcements – in January, April, May and July. The forecast changed notably during the period, in view of the spread of the coronavirus and the preventative measures adopted in Israel and worldwide.

In January, the forecast was that inflation in 2020 would be 1 percent and would continue to converge in the direction of the inflation target range in 2021. With respect to economic activity, some slowing in growth was expected as a result of the continuing slowdown in world trade and the reduction in the 2020 budget.

The forecast in April was revised markedly downward in view of the spread of the pandemic. The economy was expected to contract considerably in 2020 and subsequently was expected to recover rapidly in 2021. Regarding the unemployment rate, it was expected to gradually decline and would return to its low pre-crisis rate by the end of 2021. Inflation in 2020 was expected to be negative and in 2021 it was expected to approach the lower bound of the inflation target range.

In the updated forecast in May, the rapid removal of restrictions led to an upward revision of the growth path for 2020—a smaller contraction, of 4.5 percent. There was a downward revision regarding the recovery process, with a growth rate of 6.8 percent in 2021. The revised forecast for unemployment was 5.5 percent. As with the other changes in economic activity, expected inflation for 2020 was revised upward somewhat and for 2021 was revised downward.

In contrast, the growth path in July was revised downward in view of the increase in the rate of infection, which in turn led to a delay in the forecasted return of the economy to routine. The May and July forecasts for the interest rate in one year remained unchanged (0.0–0.1 percent).

Monetary policy and background conditions

This report reviews the monetary policy during the first half of 2020 and the beginning of the second half.¹ Against the background of the marked deterioration in economic conditions during the reviewed period due to the spread of the virus and the steps taken to prevent it, the Monetary Committee made use of a range of tools to help deal with the crisis. The main steps taken were meant to ensure the continued orderly activity of the financial markets, to enhance the passthrough from the Bank of Israel interest rate to market interest rates and to ease credit conditions. During the first half of 2020, the Committee launched a program for the purchase of government and corporate bonds in the secondary market; a program of repo transactions² with institutional investors; and the initiation of swap transactions in the foreign exchange market, in addition to foreign exchange purchases carried out from time to time. In addition, the Committee introduced a new monetary tool—long-term monetary loans to the banks in order to increase the supply of credit to small businesses, and it reduced the interest rate by 0.15 percentage points. For a description of the policy measures adopted in Israel during the reviewed period, including limitations on movement and activity, as well as steps and activities in monetary and fiscal policy areas and in financial regulation, please see the Appendix to the report.

Within the framework of the first interest rate decision during the reviewed period (on January 9th), the Committee reiterated its assessment that in view of the economic conditions it would be necessary to leave the interest rate at its current level for a prolonged period or to reduce it in order to support a process at the end of which inflation will stabilize around the midpoint of the target range.³ At that time, the data available to the Committee showed that inflation in Israel remained low, at about 0.3 percent, which was similar to the average during the second half of 2019. The Committee members were of the opinion that inflation was expected to return to the lower part of the target range within a year. In contrast, the economic indicators continued to point to a solid growth rate, near the economy's long-term rate, and the labor market remained tight.

¹ The decisions in 2020 were made on January 9th, February 24th, April 6th, May 25th and July 6th.

² As part of these transactions, loans are provided against collateral in the form of bonds.

³ At that point, the Bank of Israel interest rate was 0.25 percent.

The picture was mixed with respect to global economic activity. Though activity continued to slow, the Committee's assessment was that the risk of significant deterioration had declined in view of the progress in negotiations between the US and China and the outcome of the UK elections. As part of that interest rate decision, most of the Committee members were of the view that the interest rate should be left unchanged, in view of the solid real economic activity and the low inflation rate.⁴ Some of them even stated that there might be a need to adopt a more accommodative monetary policy at a later stage. In contrast, one of the Committee members voted for reducing the interest rate to 0.1 percent. He assessed that the cumulative appreciation of the shekel is weighing on economic activity and is acting to reduce the already low level of inflation. He added that the slowing of global economic activity is a major risk to the economy which, together with the expected effect of fiscal contraction in Israel, requires a more accommodative policy.

In the February interest rate decision, the uncertainty increased against the background of the global spread of the coronavirus, though international organizations assessed that the spread would halt within a few months and the overall effect would be limited. Apart from current data from the financial markets and some of the forecasts, the data available to the Committee were for the fourth quarter of 2019 and January 2020, and therefore they did not reflect the effects of the spread of the virus. In that decision, most of the Committee members assessed that the interest rate should be left unchanged.⁵ The data available to them indicated that the economy was continuing to grow at close to its potential rate, the labor market remained tight and inflation remained low. They continued to believe that inflation would converge to the lower bound of the target range in about a year. The same Committee members added that in view of the inflationary environment and the risk to economic activity due to the spread of the coronavirus, the Bank of Israel would continue to intervene in the foreign exchange market as necessary or it would use other tools in order to enhance the extent of monetary accommodation. In contrast, one Committee member, who was in a minority position, was in favor of reducing the interest rate to a level of 0.1 percent, in view of the same considerations that he expressed in the January interest rate decision. He added that he did not rule out the possibility that it would be necessary to reduce the interest rate to below 0.1 percent.

The crisis that began in March due to the continuing spread of the coronavirus in Israel and worldwide and the steps taken to prevent it led to a change in the macroeconomic picture. Following the weekly discussion of the Monetary Committee at the beginning of March, the Committee released a special declaration which stated that as of now there is no evidence of a major macroeconomic downturn in Israel and it emphasized that the level of the interest rate at the time, together with the policy of purchasing foreign exchange, is providing the necessary support for the economy. However, the Committee members emphasized that if there would be a deterioration in economic or financial conditions, the Committee would activate the range of tools available to them at any time if necessary. At that point, the Bank of Israel believed that the crisis would lead to a decline of 0.7 percentage points in GDP growth and the forecast reflected a rapid return to the growth path that

⁴ For that interest rate decision, the Committee remained understaffed with only five members.

⁵ The Committee was fully staffed for this interest rate decision, following the appointment of the Director of the Research Department as a regular member of the Committee.

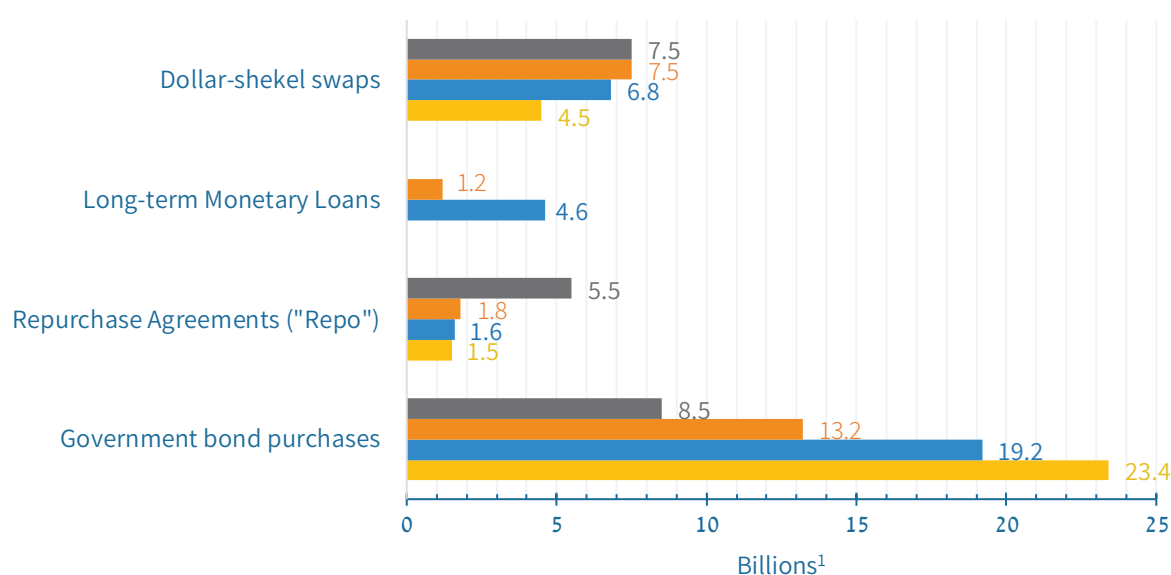
prevailed prior to the crisis. Nonetheless, the Bank of Israel made it clear in a number of its publications that this is a dynamic event and there is a high level of uncertainty as to the future spread of the virus and regarding the implications for economic activity, both in Israel and worldwide. The Bank of Israel stated that the uncertainty was the result of three factors: (1) the intensity of the spread of the virus to additional countries, as well as the extent of its spread in Israel; (2) the intensity of preventative measures to be adopted in Israel and in other countries and the economic implications of those measures; and (3) the duration of the event.

By mid-March, the economic picture had changed radically. The Monetary Committee began putting various monetary tools into operation to help the economy endure the crisis (Figure 1). Most of the initial measures taken by the Monetary Committee were part of unscheduled decisions and were adopted primarily in order to deal with the failure in the financial markets.

The first decision was made on March 15th. On that date, the Monetary Committee announced a program of repo transactions in view of the increased volatility in the financial markets. The main goal of the program was to increase liquidity in the financial markets and to support their orderly functioning and in particular the normal functioning of the bond market. As part of these transactions, loans were provided to institutional investors⁶ against collateral in the form of bonds. In the first stage, it was permitted to provide collateral in the form of government bonds or *makam* only. In addition to this program, the Committee also decided to use an additional tool, namely the purchase of government bonds in the secondary market. The Bank of Israel declared that it would operate in the open market and would purchase government bonds of various types and various durations. It was emphasized that the purchases would be carried out as necessary in order to ensure a functioning market; however, the scope of the planned purchases was not announced. This step was intended to strengthen the passthrough from the Bank of Israel interest rate to the longer-term interest rates (for further details on the effect of the bond purchases, see Box A.1 in this report). The scope of the bond purchase program as of the end of March was NIS 8.5 billion and that of the repo transaction program was NIS 5.5 billion.

⁶ Pension and provident funds, mutual funds and insurance companies.

Figure 1
Bank of Israel's Actions During the Crisis
 Month-end Balance, March 2020-June 2020



¹The amounts are given in NIS, other than dollar-shekel swaps, which are in dollars.

SOURCE: Bank of Israel.

Due to the severe shortage in dollar liquidity, the Bank of Israel announced on the next day (March 16th) that it would begin to carry out swap transactions in the shekel-dollar market with domestic banks, with the goal of providing the liquidity that was lacking. The dollar liquidity distress developed in numerous markets around the world and was the result of the sharp declines on equity markets worldwide, which forced investors with a high exposure to foreign currency derivatives to sell assets in order to buy dollars and meet margin calls. In the first stage, the transactions were limited to a week; however, on March 18th, the program was expanded with the scope of activity being increased to up to \$15 billion and the possibility of carrying out longer-term transactions. The balance of swap transactions at the end of March was \$7.5 billion. In parallel to this program, the Bank of Israel declared that transactions would continue as long as pressure in dollar liquidity remains high. Note that the foreign exchange reserves, which have been growing in recent years, are at a high level, which has made it easier to execute such policy. On March 23rd, the Committee decided to launch a detailed program to purchase government bonds in the secondary market in the amount of NIS 50 billion. The Committee explained that the purchase program is intended to affect the long-term segment of the yield curve, with the goal of reducing the cost of credit for companies and households in Israel, in view of the decline in their incomes and their liquidity difficulties. The program is intended to moderate the sharp volatility in bond yields as a result of the liquidity distress.

In view of the economic situation in Israel, and in contrast to some of the other central banks, such as the Fed, the Monetary Committee decided not to change the central bank interest rate in an unscheduled decision. The Committee was of the view at that point that the level of the monetary interest rate was already low and that the main factor that led to the increase in the cost of credit was developments in the bond markets. In the scheduled interest rate decision in April, the situation had already changed and if during March it appeared that the crisis was primarily the result of supply constraints and that there was still hope that the health crisis would end quickly and with it the economic distress, at the beginning of April it had already become clear that this is a prolonged situation. It had also become clear that demand would be affected by the drop in household incomes and the adverse impact on the values of financial assets. Accordingly, the Monetary Committee decided to reduce the interest rate to 0.1 percent in the April decision. The Committee members were of the opinion that the various measures taken by the Bank of Israel up to that point had reduced the intermediate and long-term interest rates; however, since a large number of households and businesses were also exposed to short-term interest rates, it was deemed necessary to reduce the monetary interest rate.

Although this was only a modest measure, the Committee's assessment was that it would ease the situation for many borrowers in the economy whose loans are linked to the prime rate of interest and that this step reflects the commitment of the Committee to use any possible tool in order to support the economy. The decision was approved with a majority of five to one, with the minority voter advocating that the interest rate be reduced to zero. He claimed that the scale of the crisis and the negative impact on employment called for a lower interest rate.

In the April interest rate decision, the Committee adopted a new monetary tool, namely monetary loans to the banks with a three-year term and a fixed interest rate of 0.1 percent. The main purpose of this new tool was to increase the supply of credit to small and micro businesses. It was also intended to ensure that the low level of the interest rate is reflected in the price of loans to those sectors as well. The provision of the monetary loans was conditioned on the volume of credit extended by the banks to these sectors. The program was intended to last until the end of May and to reach a total volume of NIS 5 billion. In addition, the Committee expanded the program for repo transactions that began in mid-March, such that corporate bonds could also serve as collateral.

In the April interest rate decision, the Committee also decided to further clarify its forward guidance. The Committee made clear that it would expand the use of the existing tools, including the interest rate tool, and would operate additional ones, to the extent that the crisis lengthens and it is necessary to achieve the monetary policy goals and to moderate the negative economic impact created as a result of the crisis. Also in the case of that decision, most of the data available to the Committee was updated only up until January or February and therefore did not reflect the extent of the economic ramifications caused by the spread of the coronavirus. Therefore, the Committee's discussion and decisions were made based on the data from the financial markets and in particular the unprecedented drop in equity prices, the qualitative information from the business surveys carried out by the Central Bureau of Statistics and the Bank of Israel and the quantitative assessments of the effect of health related restrictions on the contraction of activity in the various

industries. The Committee decided to emphasize in its declarations that in making its decisions it had also taken into account the possibility of a more pessimistic scenario than the baseline scenario presented by the Research Department and the support for demand that would be needed in the economy after the removal of the health restrictions.

In the May interest rate decision, the Monetary Committee kept the interest rate unchanged at 0.1 percent and the voting pattern remained unchanged. The Committee members who voted to keep the interest rate unchanged stated that the low interest rate, together with the other monetary tools being used by the Bank of Israel, are providing support for convenient credit conditions all along the curve. In contrast, the Committee member who supported a reduction of the interest to zero claimed that an interest rate of less than 0.1 percent is more appropriate, due to the scale of the crisis and the exceptional adverse impact on employment. At the time of the May interest rate decision, a severe negative impact on real economic activity was apparent. However, it was less severe than the initial forecasts made by the Bank, with National Accounts data for the first quarter indicating a sharp contraction in GDP of 7.1 percent in annual terms.⁷ Furthermore, at the time of the decision, the forecasted shutdown of the economy, which at the peak was estimated at 36 percent, had shrunk to 19 percent as a result of the loosening of limitations. In addition, the situation of the real economy based on rapid economic indicators pointed to a recovery in some sectors, although their level of activity remained relatively low.

In the Monetary Committee discussion that took place in the beginning of July—the final one during the reviewed period—a rise in infections was apparent and a deterioration in the economic situation was expected. Therefore, the Committee decided to introduce three additional policy tools in order to achieve an even more accommodative policy and to strengthen further the passthrough of monetary policy, as well as to ease the credit conditions in the economy. The Committee launched a NIS 15 billion corporate bond purchase program, and renewed the program of long-term monetary loans provided to the banks at a fixed interest rate of 0.1 percent against bank credit provided to small and micro businesses.⁸ In addition, the Bank of Israel announced that it would begin working on an operational and legal infrastructure that would allow the banks to expand the range of assets that they can provide as collateral against the long-term monetary loans, such that low-liquidity collateral could also be used.

Apart from the abovementioned tools, the Bank of Israel continued to purchase foreign exchange during the period being reviewed, which totaled about \$10.8 billion (Figure 2).⁹ Note that the purchase of foreign currency was discontinued during the period in which there was a severe

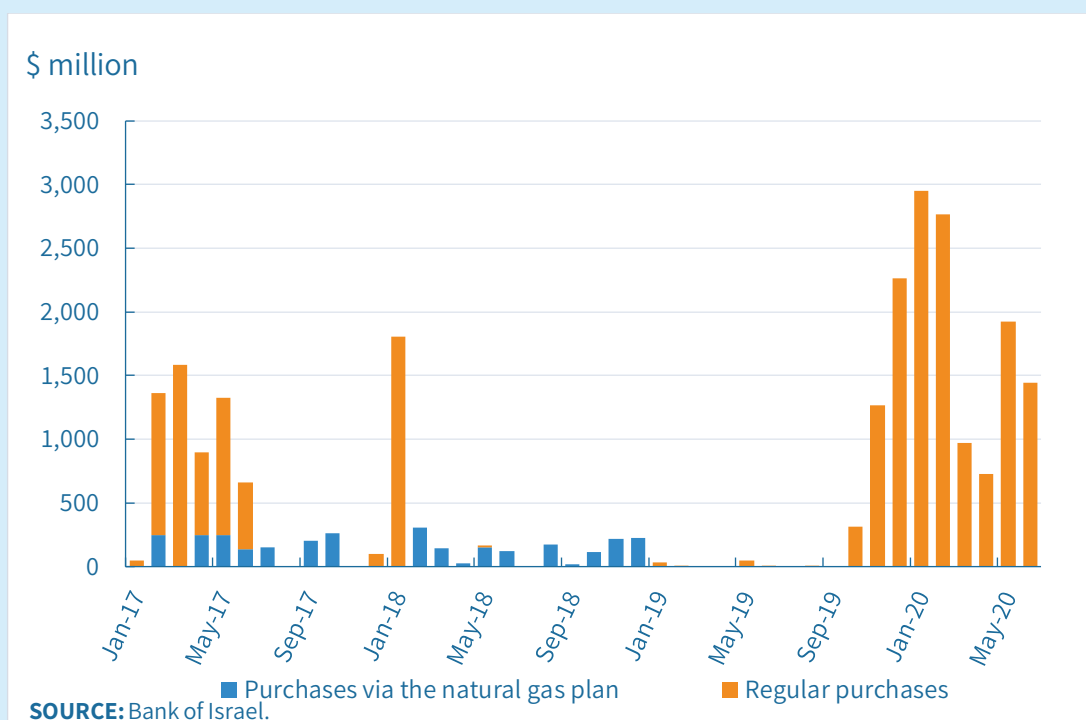
⁷ The Bank's initial forecast in view of the economic shutdown predicted a contraction of about 5 percent in quarterly terms.

⁸ The original program ended as planned in May, after loans with a value of NIS 4.6 billion had been provided.

⁹ This amount does not include the swap transactions. In March and April, these transactions totaled about \$7.5 billion. During May and June, the Bank absorbed dollar credit in the amount of \$700 million and \$2,300 million, respectively.

shortage of dollar liquidity, during which swap transactions were facilitated with the primary goal of supporting the basic level of the shekel.

Figure 2
Bank of Israel Foreign Exchange Market Intervention
January 2017–July 2020



It is worth noting that apart from the monetary tools employed by the Committee during this period, the Banking Supervision Department at the Bank of Israel carried out a number of complementary measures. Thus, it issued a series of regulatory easings that were intended to provide the banks with the business flexibility needed to provide services to the public and in particular the extension of credit. One of the main measures was the scaling back of regulatory capital requirements by one percentage point, with the goal of encouraging the banks to offer credit and to ensure their ability to do so. In addition, a framework of payment deferrals was adopted for households and small businesses that had suffered the effects of the coronavirus pandemic.

In sum, and in view of the slowdown in global and domestic economic activity as a result of the coronavirus pandemic, the Committee decided during the half year being reviewed to adopt an even more accommodative monetary policy. The Committee members assessed that monetary policy should focus on support for the orderly functioning of the capital market and in particular the functioning of the markets for government and corporate bonds, as well as the need to help improve the economic situation of households and businesses. Most of the tools adopted by the Committee focused directly on assistance to those areas of economic activity that were in distress, and in particular monetary policy was aimed at increasing liquidity in the financial markets, strengthening

the passthrough to longer-term yields and easing credit conditions, or in other words reducing the cost of credit and increasing its supply for industries that had encountered credit rationing.

The main information available to the Monetary Committee during the first half of 2020

1. Real activity in Israel

During the period being reviewed, there was a marked slowdown in real economic activity as a result of the spread of the coronavirus and the preventative measures adopted by the government in order to minimize the spread. At the beginning of the period, the Committee was of the opinion that the economy would continue to grow at its potential rate (about 3 percent), that economic growth was balanced and that the labor market remained tight. According to National Accounts data published during the period being reviewed, GDP grew during the second half of 2019 by 3.5 percent, similar to the annual growth rate in 2019 (Table 2). The solid growth in 2019 was reflected in an increase of 3.9 percent in private consumption, 5.7 percent in exports (excluding diamonds and startups), 4.5 percent in imports (excluding diamonds, defense imports, ships and aircraft) and 3.5 percent in public consumption (excluding defense imports). The increase in fixed capital formation was more moderate at 1.2 percent.

During the month of February, as a result of the spread of the coronavirus, uncertainty increased with respect to Israel's rate of growth. However, the Committee members assessed at that time that the probability of there being a major downturn in macroeconomic activity is low. This was based on the benchmark scenario assumed by forecasters at most of the international economic institutions at that time. As part of that scenario, it was expected that the spread of the virus would be halted in coming months and that it would not spread to additional countries. Furthermore, it was assessed that no major preventative measures were necessary. The Committee members did feel that there may be some adverse impact on certain industries, such as construction and tourism. Furthermore, the Committee members assessed that the fundamental economic conditions put Israel in a good position relative to other countries. However, the marked deterioration in the situation in March led to a downward revision of the forecasts. Thus, on March 12th, it was decided to close schools in Israel and on March 22nd an emergency situation was declared in the economy, which was subsequently tightened even further.

At the time of the April interest rate decision, the Committee focused on the picture emerging from the qualitative information provided by the companies surveys of the Central Bureau of Statistics and the Bank of Israel and quantitative forecasts made at the Bank with respect to the effect of the health restrictions on economic activity in Israel. This was because most of the real economic data available to the Committee still did not reflect the widespread economic effects from the pandemic, since most of the data related only to January and February.¹⁰ The assessments pointed to a drop in

¹⁰ Except for data from the financial markets and some of the forecasts.

private consumption of 27 percent relative to before the crisis, a shutdown of 37 percent of economic activity (in terms of output) and a contraction of about 5 percent in the first quarter of 2020 relative to the fourth quarter of 2019 (in quarterly terms). Furthermore, the data from the labor market for March showed that about a million workers had applied for unemployment benefits, an increase of 850,000 relative to February. About 90 percent of them were placed on unpaid leave (in accordance with government policy) and the share of job seekers was about 24 percent of the workforce. An analysis by industry showed that the shutdown was even worse in low-wage industries, such that the ability of the workers in those industries to endure a long shutdown was relatively limited. Looking ahead, the Committee estimated at that time that the contraction in economic activity would continue at least during the second quarter and that the economy could be expected to contract by a rate of 5.3 percent in 2020 and to grow by 8.7 percent in 2021. According to the forecast, the rate of unemployment was expected to decline gradually and to return to its pre-crisis level only at the end of 2021.

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)

Date of interest rate decision		09/01	24/02	06/04	25/05	06/07
GDP	2019:Q3	4.0	4.5	4.0	4.1	4.1
	2019:Q4		4.8	4.2	4.6	4.6
	2020:Q1				-7.1	-6.8
Business sector product	2019:Q3	4.5	5.8	5.1	5.2	5.2
	2019:Q4		5.6	5.0	5.5	5.5
	2020:Q1				-9.1	-8.5
Private consumption	2019:Q3	3.1	2.7	2.6	2.4	2.4
	2019:Q4		10.0	9.5	10.4	10.4
	2020:Q1				-20.3	-20.2
Fixed capital formation	2019:Q3	-4.3	-1.4	-0.7	-0.6	-0.6
	2019:Q4		8.7	5.3	7.3	7.3
	2020:Q1				-17.3	-20.7
Exports excluding diamonds and startups	2019:Q3	-5.0	-3.4	-3.7	-3.7	-3.7
	2019:Q4		5.0	9.8	9.8	9.8
	2020:Q1				-0.5	2.9
Civilian imports excluding ships, aircraft, and diamonds	2019:Q3	4.8	4.5	5.2	5.2	5.2
	2019:Q4		12.7	17.5	17.5	17.5
	2020:Q1				-36.1	-32.1

SOURCE: Based on Central Bureau of Statistics.

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 Q4	2019 Q1	2019 Q2	2019 Q3	2019 Q4	2020 Q1
GDP	3.6	3.4	3.5	3.7	4.9	1.3	4.1	4.6	-6.8
Business sector product	3.8	3.7	4.0	4.4	6.2	1.1	5.2	5.5	-8.5
Imports excluding defense, ships, aircraft and diamonds	7.1	5.1	4.5	6.8	8.2	-1.4	5.2	17.5	-32.1
Private consumption	3.4	3.7	3.9	6.7	5.7	-0.3	2.4	10.4	-20.2
of which: private consumption excluding durable goods	4.5	3.5	3.7	6.2	1.1	7.7	0.0	5.9	-14.6
Public consumption	3.4	4.0	3.6	0.8	-1.1	13.0	4.4	0.1	-10.8
of which: public consumption excluding defense imports	4.5	4.5	3.5	-3.2	1.2	8.8	3.6	6.5	-11.2
Gross domestic investment	5.4	3.2	1.8	26.8	11.1	-27.8	37.5	6.0	16.5
of which: in fixed assets	4.3	4.8	1.2	9.7	1.5	-4.1	-0.6	7.3	-20.7
Exports excluding diamonds	5.9	5.7	6.1	-4.1	19.6	5.5	-10.0	8.1	1.3
of which: exports excluding diamonds and startups	6.2	5.1	5.7	0.4	10.3	11.4	-3.7	9.8	2.9

SOURCE: Based on Central Bureau of Statistics.

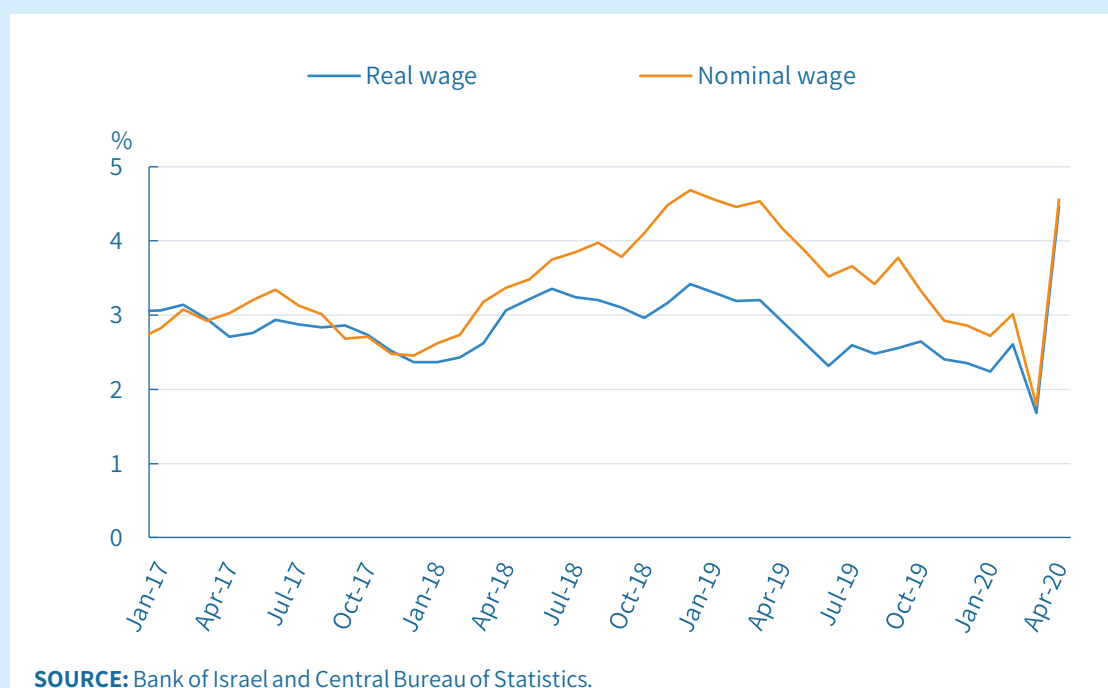
A full lockdown was imposed during the Passover holiday, and following that, there was a gradual lifting of the limitations imposed by the government on movement and activity. The estimates of the scale of the shutdown in mid-May declined to 19 percent of economic activity (in terms of output), a drop of about 15 percentage points relative to the peak of the shutdown. While at the end of April, the number of requests for unemployment benefits had skyrocketed to 1.15 million workers, the Israel Employment Service data indicated that 141,000 had returned to work in May, prior to the interest rate decision. This is in comparison to the addition of 41,000 new jobseekers. Furthermore, real-time surveys by the Central Bureau of Statistics showed that the proportion of active workers had risen by 10 percentage points to 71 percent.

At the end of May, the first estimate of the National Accounts data was published for the first quarter of 2020, according to which GDP had contracted less than the initial estimate—by 7.1 percent in annual terms. The contraction in GDP reflected a drop in most of the uses: 20.3 percent in private consumption, 16.3 percent in fixed capital formation (excluding ships and aircraft) and 10.7 percent in public consumption (excluding defense imports). Exports (excluding diamonds and startups) contracted by only a moderate rate (0.5 percent).

In May, the estimates of the Bank of Israel pointed to a somewhat more moderate contraction for 2020 relative to the estimates made in April, in view of the rapid lifting of limitations, at a rate of 4.5 percent versus 5.3 percent. However, the estimates implied that a slow recovery was expected in 2021, in view of the revised estimate of social distancing limitations that would remain in place in the economy (6.8 percent versus 8.7 percent).

In June, the second National Accounts estimate was published and showed that GDP in the first quarter of 2020 had contracted somewhat less than the first estimate (6.8 percent) and the trends in uses did not show any major change, except in the case of exports which was revised upward and grew by 2.9 percent relative to the previous estimate, which had shown a moderate decrease. Looking forward, the Committee was of the opinion that the real economic trends indicate that the Israeli economy is in an unprecedented recession and there exists a high level of uncertainty with respect to the pace of recovery.

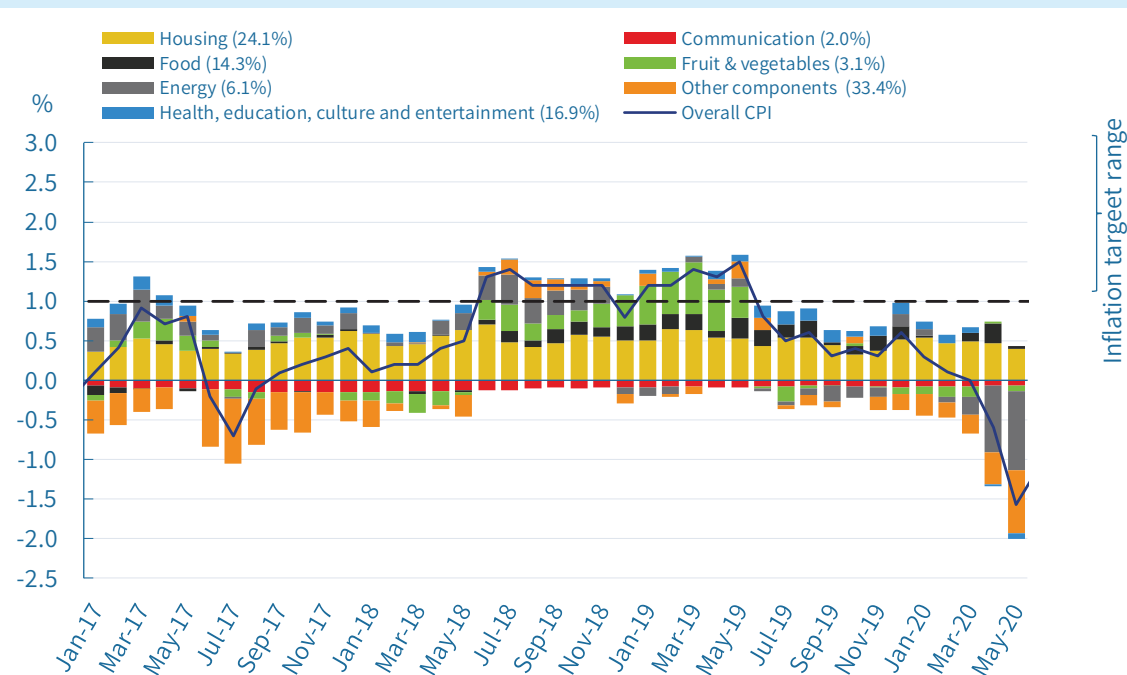
Figure 3
Nominal and Real Wages in the Business Sector: Rate of Change vs. Corresponding Period in the Previous Year, 6-Month Moving Average, Seasonally Adjusted
 January 2017–April 2020



2. The inflation environment

The decline of the inflation environment, which began even prior to the coronavirus crisis, continued during it as well. The annual inflation rate remained below the lower bound of the target range during the period being reviewed. While annual inflation had stabilized around the lower bound of the target range for about a year during 2018–19, it began to decline at the end of the second half of 2019, a trend that continued during the period being reviewed (Figure 4). The expectations for 12-month inflation from all sources declined during the period being surveyed, at first moderately and then sharply from March onward (Figure 5). The Committee assessed that the moderate decline in the first part of the period did not reflect weakness in demand and that to a large extent it was the result of the appreciation of the shekel and components that were particularly volatile, such as energy and fruit and vegetables. At the time, the Committee assessed that annual inflation was expected to decline before rising to the vicinity of the lower bound and that the inflation risks tended to the downside.

Figure 4
Contribution of Main CPI Components to Annual Inflation^a
January 2017–May 2020



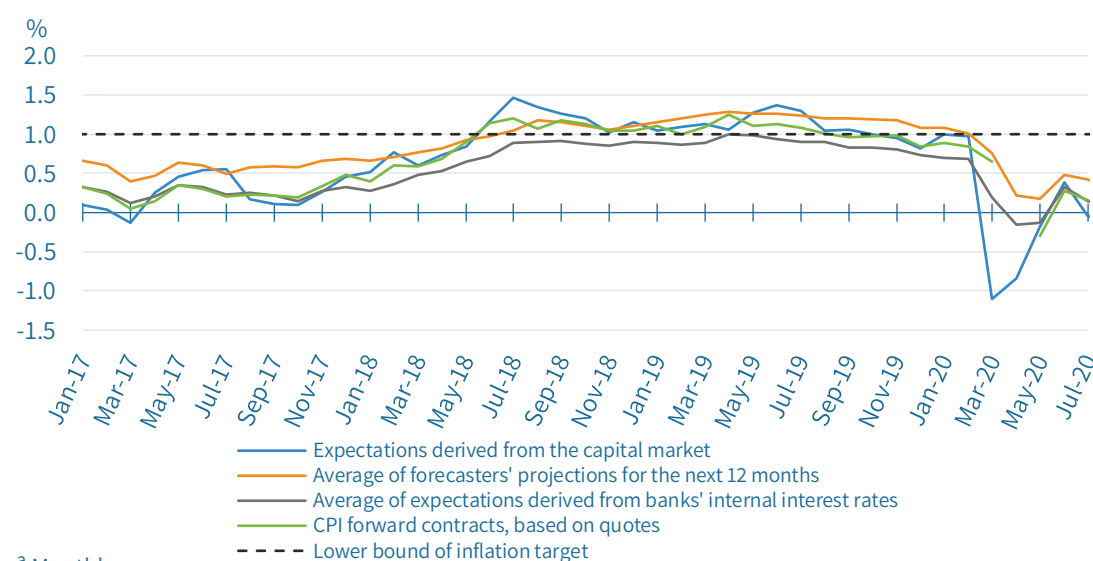
^a The figure in parentheses is the share of the relevant component in the overall CPI (as of 2019).

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

SOURCE: Central Bureau of Statistics.

As a result of the spread of the coronavirus pandemic, the Committee assessed that there is a marked decline in the inflation environment, with the decline incorporating two opposing trends: there is marked weakness in demand, in both Israel and other countries; while in contrast there has been an adverse impact on the supply chain for various goods, which is expected to raise prices from the supply side. In particular, energy prices had dropped by tens of percent, due to the lack of consensus among the major oil producers to cut production (Figure 6). The Committee assessed that the forces on the demand side are dominant and that inflation will continue to decline. Furthermore, the Committee was of opinion that in coming months it will be difficult to interpret the inflation data, as a result of the problems in measuring the goods and services that are temporarily unavailable due to the limitations on activity and in view of the changing patterns of consumption by households as a result of the crisis, which are not reflected in the basket of goods used to calculate the CPI (for further details, see Box A.2 in this report).

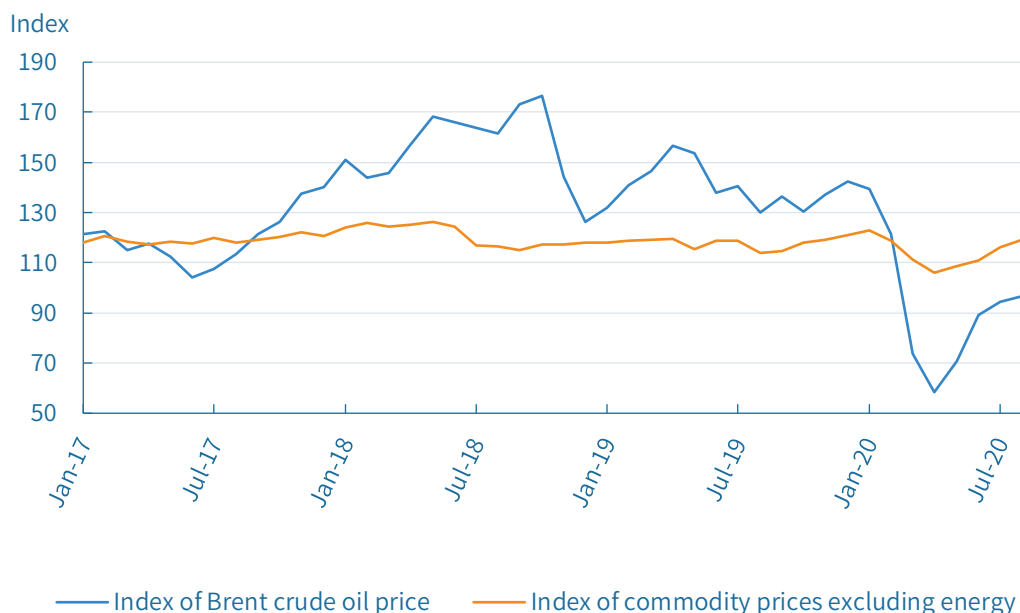
Figure 5
One-Year Inflation Forecasts from the Various Sources^a
January 2017–July 2020



^a Monthly averages.

SOURCE: Bank of Israel.

Figure 6
Commodity and Oil Price Indices, Monthly Average,
 January 2017-July 2020 (Base 2009=100)



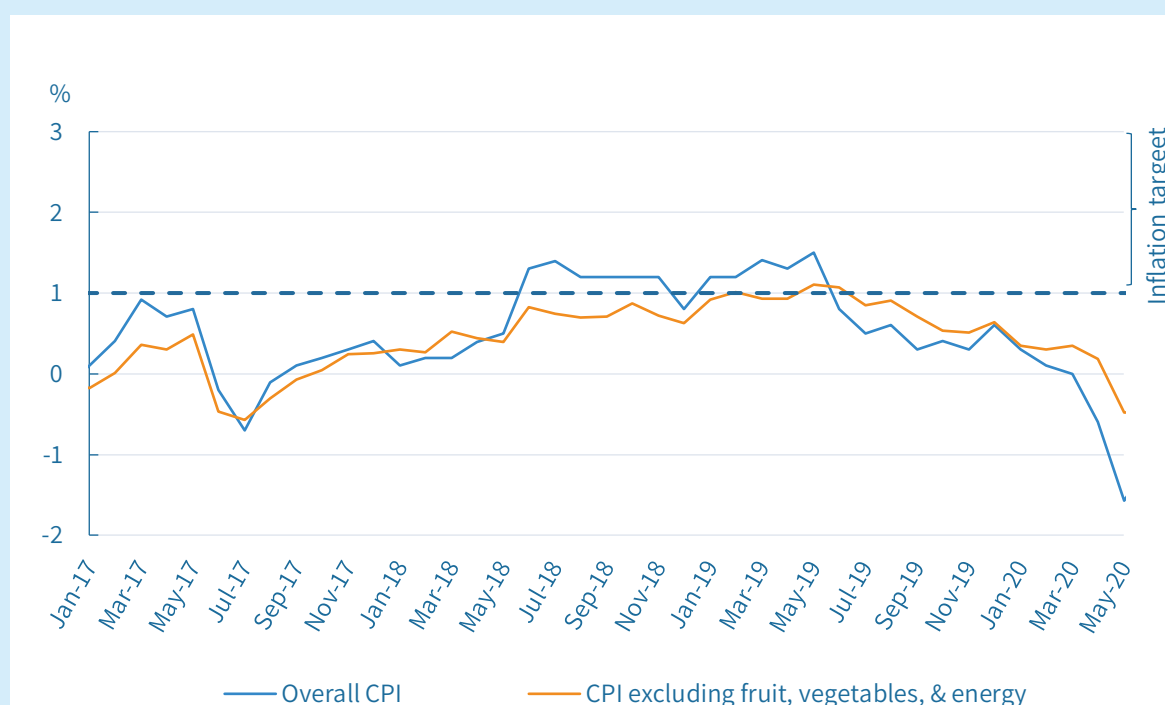
SOURCE: Bloomberg.

Annual inflation is in a low and positive environment, similar to that before the period being reviewed, from July 2019 until January 2020 (0.3–0.6 percent). Since then, inflation has continued to decline, at first to a level close to zero and in April it declined sharply and into negative territory. It reached a low of -1.6 percent in May, its lowest level since March 2004. The drop to negative levels was primarily the result of the energy component of the index and the sharp decline in oil prices worldwide of about 60 percent from the beginning of the reviewed period and up to the average in April. An analysis of the partial price indices, which serve as estimates of core inflation, indicated that during the period there was a moderate and consistent decline in the inflation environment, which was a continuation of the trend that began in mid-2019, and in May those indices showed a sharp decline (as did the general CPI) (Figure 7). The most recent data indicates a stronger inflation environment relative to what is indicated by the general CPI (-0.5 percent to -0.8 percent).

The decline in the inflation environment during the period being reviewed was also reflected in the drop in expectations from the various sources. Thus, 1-year inflation expectations from all sources fell by a percentage point or more at the beginning of the crisis and afterward they rose, but in June there was another reversal in the trend and since then expectations have been characterized by a downward trend. According to the most recent data, 1-year expectations remained low relative to

the beginning of the period being reviewed and ranged from 0.1–0.5 percent.¹¹ Forward expectations of inflation derived from the capital market showed similar trends (Figure 8). In the most recent data, the 1-year forward expectations for 1 year from now through 2 years from now were estimated to be 0.4 percent, and the 1-year forward expectations for 2 years from now through 3 years from now were somewhat above 1 percent. During the period being reviewed, the forward expectations for the medium and long term (5–10 years) remained anchored within the price stability target range, despite the sharp decline in the inflation environment in the short run.

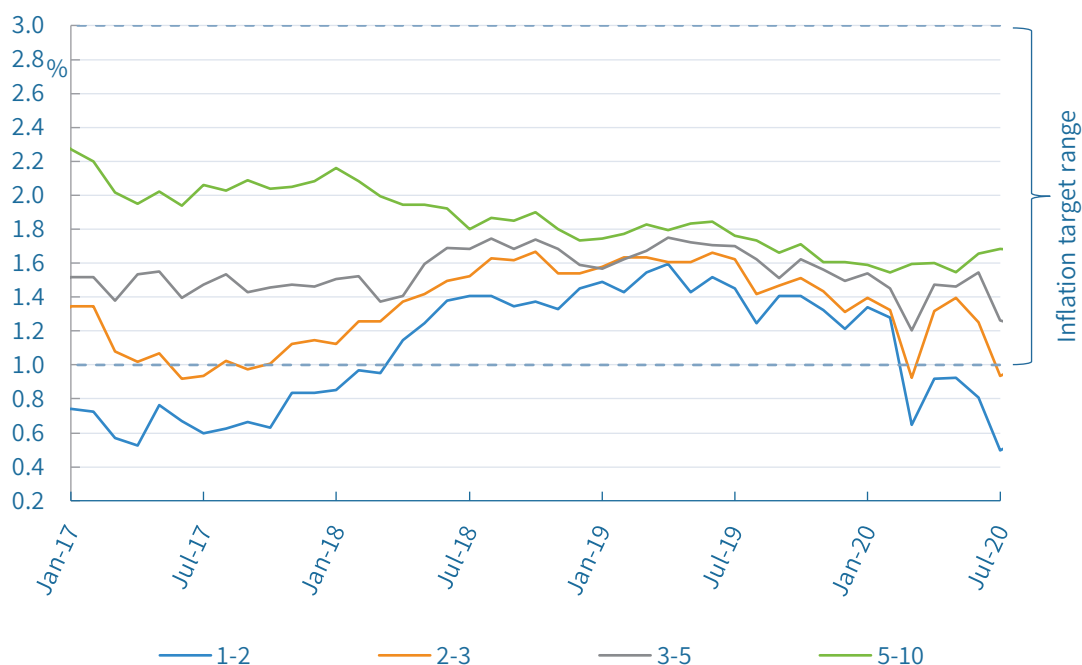
Figure 7
The Development of the Overall CPI and the CPI Excluding Fruit, Vegetables, and Energy
 January 2017–May 2020



SOURCE: Central Bureau of Statistics.

¹¹ The inflation expectations from the capital market also include an inflationary risk premium that can be either positive or negative. Similarly, there may be a bias due to differences in the liquidity premiums between nominal and real bond yields.

Figure 8
Forward Inflation Expectations Derived from the Capital Market^a
 January 2017–July 2020



^a Monthly averages.

SOURCE: Bank of Israel.

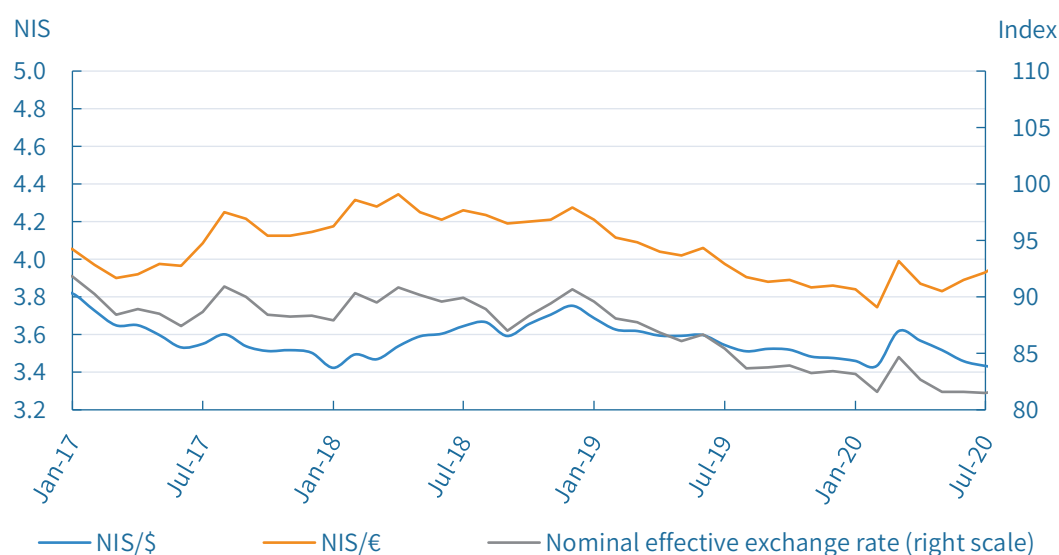
3. The exchange rate

Up until March, the trend of appreciation in the shekel continued and the shekel strengthened noticeably against most currencies. After the shock in the financial market, there was a sharp depreciation due to the severe shortage in dollar liquidity. As a result, the Bank of Israel began to execute swap transactions with the goal of providing the necessary liquidity, a move that reduced volatility and strengthened the shekel. Since then, the shekel has returned to pre-crisis levels.

In the early stage of the coronavirus crisis, the shekel was characterized by a trend of appreciation, which hindered the return of inflation to the target range. From the beginning of the period being reviewed until the interest rate decision at the end of February, the shekel strengthened by about 3 percent in terms of the nominal effective exchange rate, by about 4 percent against the euro and by about 1 percent against the dollar (Figure 9). However, as the pandemic spread in Israel and worldwide, the trend reversed and a period of anomalous volatility in the exchange rate began, primarily in view of the liquidity distress in the foreign exchange market and the sharp declines in equity markets worldwide, as well as the policy steps taken by central banks in other countries, and in particular, the asset purchase programs.

At the peak in mid-March, the shekel had depreciated by about 10 percent relative to its level at the beginning of the period being surveyed. Against this background, the Bank of Israel began executing swap transaction in the shekel-dollar market with the goal of providing the missing liquidity, and since then volatility has dropped off and the shekel has strengthened, returning to its pre-crisis level. The Committee assessed that to the extent that the shekel stabilizes at this level, it will weigh on the recovery of exports and the return of inflation to within the target range. As a result, for most of the period being reviewed the Bank of Israel intervened in the foreign exchange market, apart from the period of the severe shortage of dollar liquidity and the rapid depreciation.

Figure 9
Selected Exchange Rates, Monthly Average
January 2017–July 2020



SOURCE: Bank of Israel.

4. The global economy

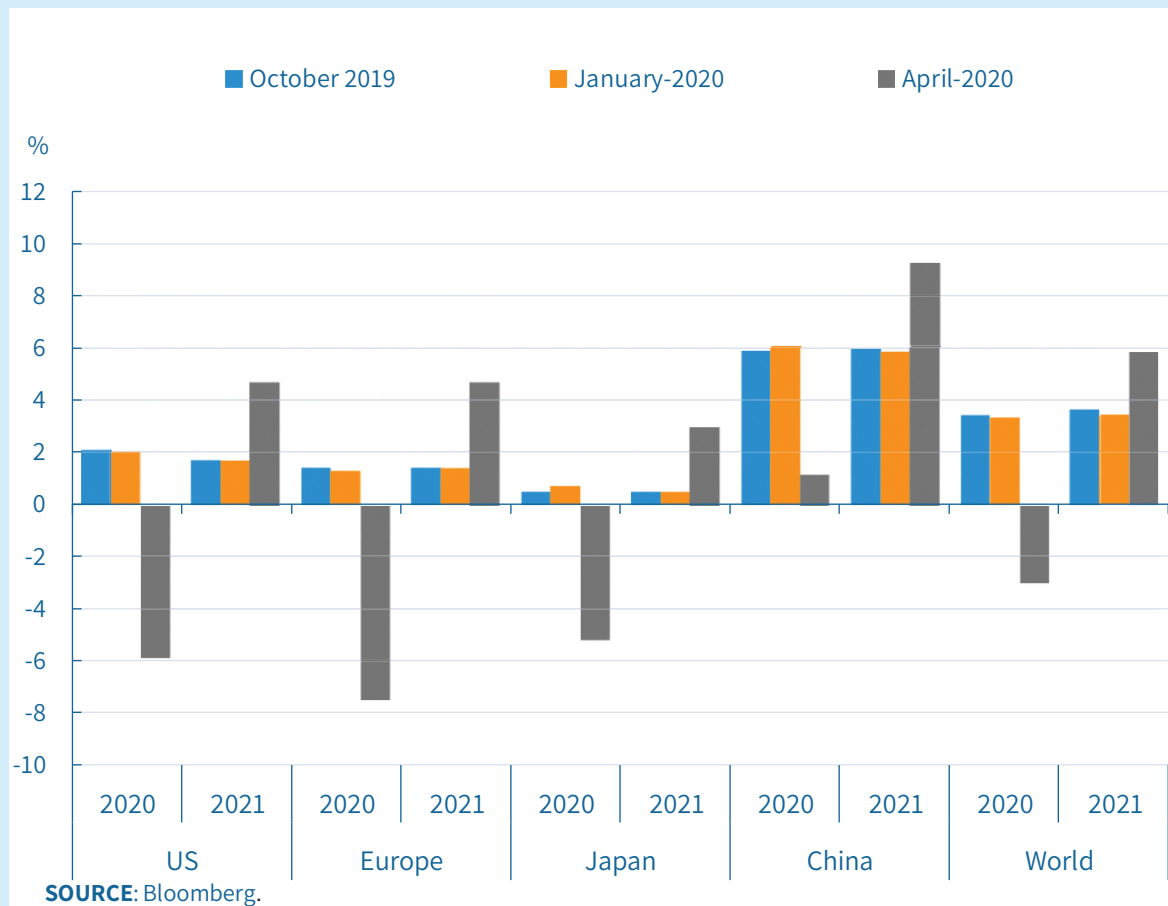
During the half year being reviewed, the data for global economic activity and global trade were characterized by a sharp downturn. The international institutions and investment banks expected a contraction of global output but there was uncertainty with respect to its scale. The data at the beginning of the year indicated a low rate of growth in Europe and negative growth in Japan, while the US economy showed strength. Looking forward, the IMF forecast in January expected low growth in 2020 in Europe and Japan (1.3 percent and 0.7 percent, respectively). The forecasts for the US and China were higher (2 percent and 6 percent, respectively). The trade data for the advanced economies showed sharp declines, a continuation of the prolonged trend since 2018.

At the time of the April interest rate decision, and in view of the spread of the coronavirus pandemic, global economic activity declined and sentiment indicators pointed to a contraction in the activity of the advanced economies. In contrast, indicators for China showed a gradual recovery in economic activity. The improvement in China occurred against the background of a slowdown in the spread of the coronavirus and the lifting of limitations. The forecasts of the international institutions in April expected negative growth for 2020 in most economies. The IMF expected growth of negative 5.9 percent in the US, negative 7.5 percent in Europe, and negative 3 percent worldwide. The growth forecast for China was revised downward, calling for positive growth of only 1.2 percent, compared to 6 percent in January. The slowdown in economic activity and trade led to declines in commodity prices, and the price of oil reached a new low relative to previous years. The price of Brent crude oil dropped to only \$19 per barrel, less than one-third the price at the beginning of January.¹²

At the time of the May interest rate decision, the Monetary Committee continued to assess that the risk to global economic activity remained significant and in particular the risk of a second wave of the pandemic. In addition, the Committee was of the opinion that the tension between the US and China and the risks in Europe were weighing on the potential for recovery. According to the revised IMF forecast in June, the growth forecast was revised downward for most of the major economies. Thus, the growth forecast for 2020 for the US and the world was revised downward by about 2 percentage points and for Europe it was revised downward to an even greater extent—by about 3 percentage points. However, forecast growth in China was revised by only a moderate amount. The picture for 2021 is mixed: growth in the US was revised downward somewhat, but the revisions for Europe and China were on a larger scale—upward for Europe and downward for China.

¹² Some of the price decline occurred because the major oil producers could not come to a consensus on cutting production.

Figure 10
IMF Forecast for Annual Growth in 2020 and 2021

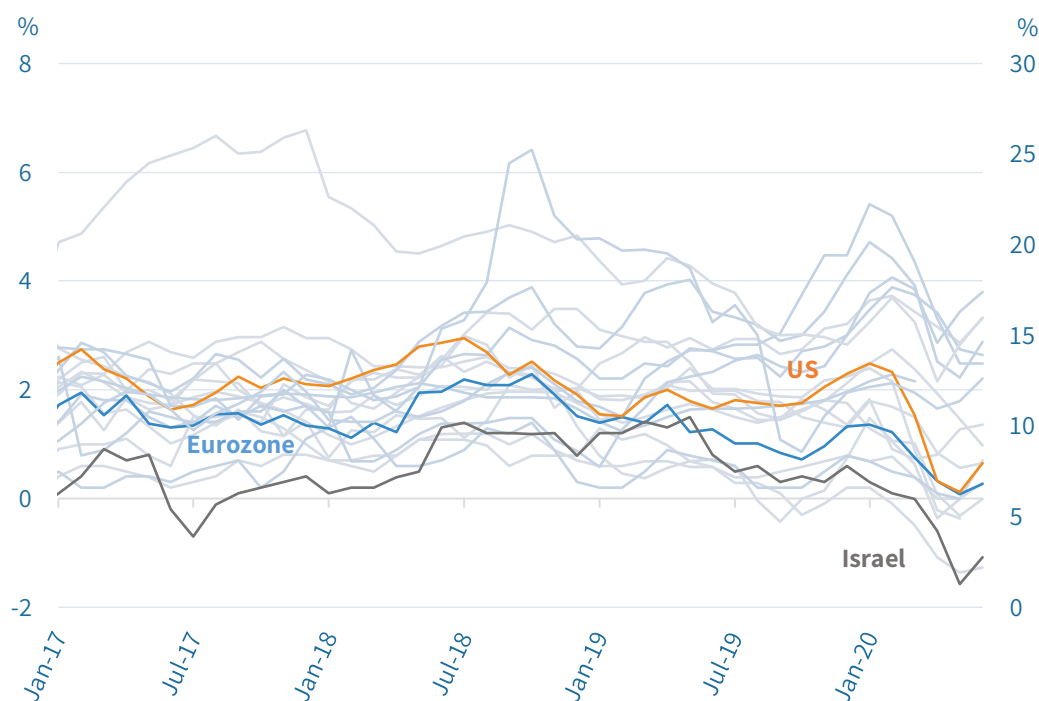


As a result of the spread of the pandemic worldwide, many countries decided to employ various monetary tools. The central banks initiated an even more accommodative monetary policy and adopted measures to increase liquidity, including interest rate reductions and asset purchase programs. The Fed reduced the interest rate by 1.5 percentage points in two stages and the Bank of England reduced its interest rate by 65 basis points to 0.1 percent, its lowest level ever. Figure 12 presents the changes in the interest rate carried out by selected central banks during the period being reviewed.

Apart from the interest rate tool, the Fed adopted an even more accommodative monetary policy by means of new asset purchase programs, including a program to buy government bonds on a scale of at least \$500 billion and mortgage-backed securities (MBS) in the amount of at least \$200 billion. At a later stage, the Fed announced additional programs, such as a program to purchase corporate bonds in the primary and secondary markets; a program to acquire commercial paper; and a program to acquire asset-backed securities (ABS). While the ECB did not reduce its interest rate

during the period, it initiated and expanded programs for the purchase of government and corporate bonds in the amount of €1,470 billion. In parallel to the monetary measures, many governments expanded fiscal spending and in particular provided compensation to households and companies and supported the providing of credit to the business sector.

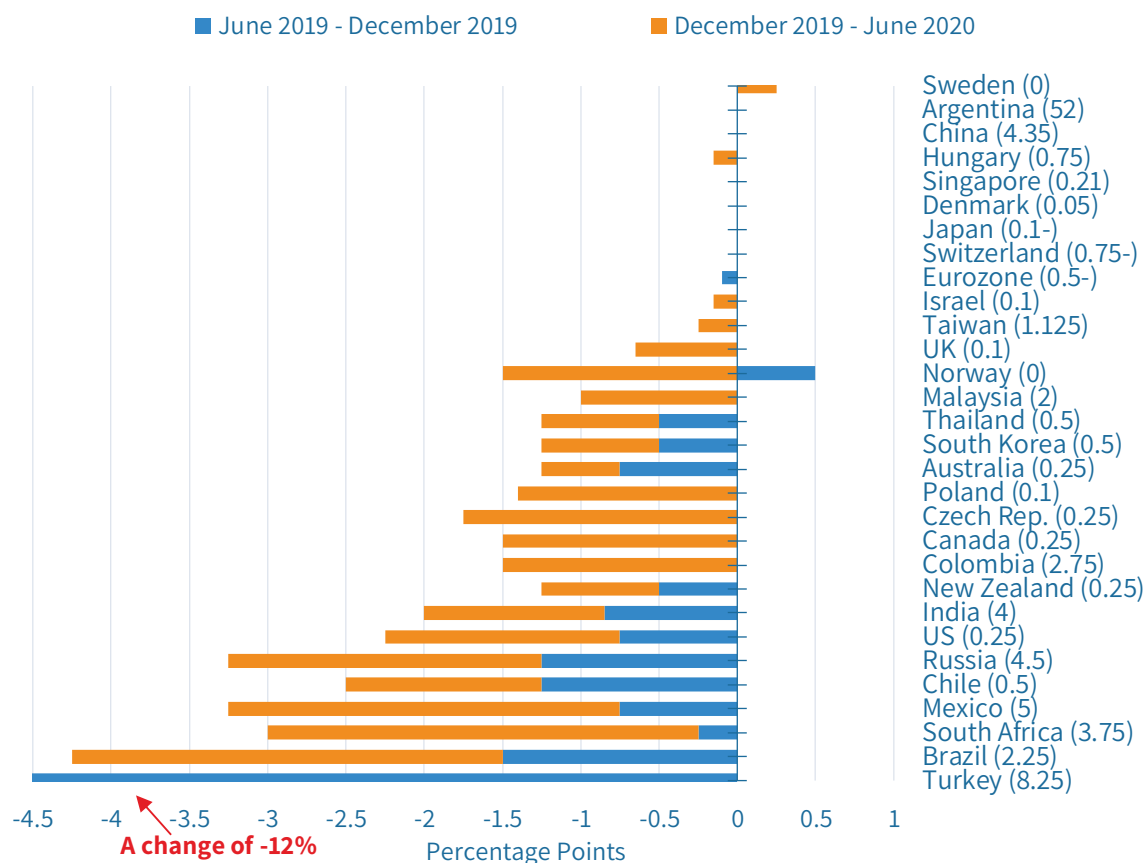
Figure 11
Annual Inflation in Israel and Other Countries^a
 January 2017–June 2020



^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 12
Changes in Central Banks' Interest Rates in Israel and Other Countries
 June 2019–June 2020^a



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

SOURCE: Bloomberg.

5. Developments in the financial markets

The spread of the coronavirus led to a severe shock in the financial markets in Israel and worldwide. In response, many central banks, including the Bank of Israel, initiated various asset purchase programs in order to restore liquidity in the markets and support their orderly functioning.

At the beginning of the period being reviewed, prior to the outbreak of the crisis, equity markets in Israel and worldwide were on a downward trend. In February, there was a correction in the markets and it appeared that they did not reflect an expectation that a health crisis would develop in the advanced economies. The shock in the global markets during March led to major declines in Israel's equity market as well, in which the indices declined steeply by about 30 percent. Since then, there

has been a recovery in equity markets and most of the indices have partially offset the declines. The events in the domestic bond markets were similar—a sharp increase in yields with the onset of the crisis and a drop in yields when the Bank of Israel began to intervene in the market.

Nominal and real yields declined at the beginning of the period being reviewed, a continuation of the trend that began at the end of 2018. The declines occurred in parallel to the global trend that occurred during most of the period, although also during the second half of 2019 when yields rose worldwide. The downward trend accelerated in February, in parallel to global yields and in view of the spread of the virus worldwide and the expectation of even more accommodative monetary policy. However, there was a turnaround at the beginning of March. Prior to that, nominal and real 10-year yields in Israel declined by about 0.5 and 0.4 percentage points, respectively, relative to the beginning of the period. As a result of the turmoil in the markets, yields in Israel rose sharply, as in the case of other countries. The difference between the highs and lows in Israel during March were 1.0 and 0.7 percentage points for 10-year and 5-year nominal yields, respectively.¹³ The differences between the real yields were even larger – 1.6 and 1.9 percentage points between the highs and the lows for 10-year and 5-year yields, respectively. The sharp increase in government bond yields was accompanied by a parallel and even larger increase in corporate bond yields, or in other words there was a widening in corporate bond spreads. Since the peak in March, yields began a downward trend as the result of the numerous monetary measures adopted in Israel and worldwide and the halting of the trend of mutual fund withdrawals, which at the peak reached NIS 8 billion per day. According to the most recent data, yields returned to pre-crisis levels. Following the stagnation in corporate bond issues in March, the volume of issues increased in April and May.

¹³ According to the Bank of Israel's nominal zero-coupon yield curve (daily data).

Table 3
Developments in the Domestic Asset Markets
(rates of change)

	01/20	02/20	03/20	04/20	05/20	06/20
Yield to maturity (monthly averages, percent)						
3-month makam	0.2	0.2	0.2	0.1	0.1	0.0
1-year makam	0.2	0.1	0.2	0.1	0.0	0.0
Unindexed 5-year notes	0.5	0.4	0.6	0.5	0.4	0.3
Unindexed 20-year bonds	1.6	1.5	1.7	1.7	1.6	1.5
CPI-indexed 1-year notes	-0.8	-0.8	1.3	1.0	0.2	-0.3
CPI-indexed 5-year notes	-0.9	-0.9	0.0	-0.4	-0.6	-0.8
CPI-indexed 10-year notes	-0.6	-0.6	-0.1	-0.4	-0.5	-0.6
Yield spread between government bonds and corporate bonds rated AA (percentage points)	1.0	1.1	2.4	1.9	1.6	1.8
Stock market (rate of change during the month)						
General shares index	1.5	-5.2	-17.7	11.4	-1.6	-4.8
Tel Aviv 35 Index	0.5	-5.3	-17.0	7.2	-0.7	-5.2
Foreign exchange market (rate of change during the month)						
NIS/\$	-0.2	0.6	2.8	-1.8	0.1	-1.0
NIS/€	-2.0	0.5	2.1	-2.4	1.2	0.8
Nominal effective exchange rate	-1.1	-0.2	0.5	-1.6	0.3	-0.3

¹ The calculation for CPI-indexed bonds is based on fixed-rate bonds, excluding convertible and structured bonds, with a yield of up to 100 percent and a term to maturity of more than 6 months.

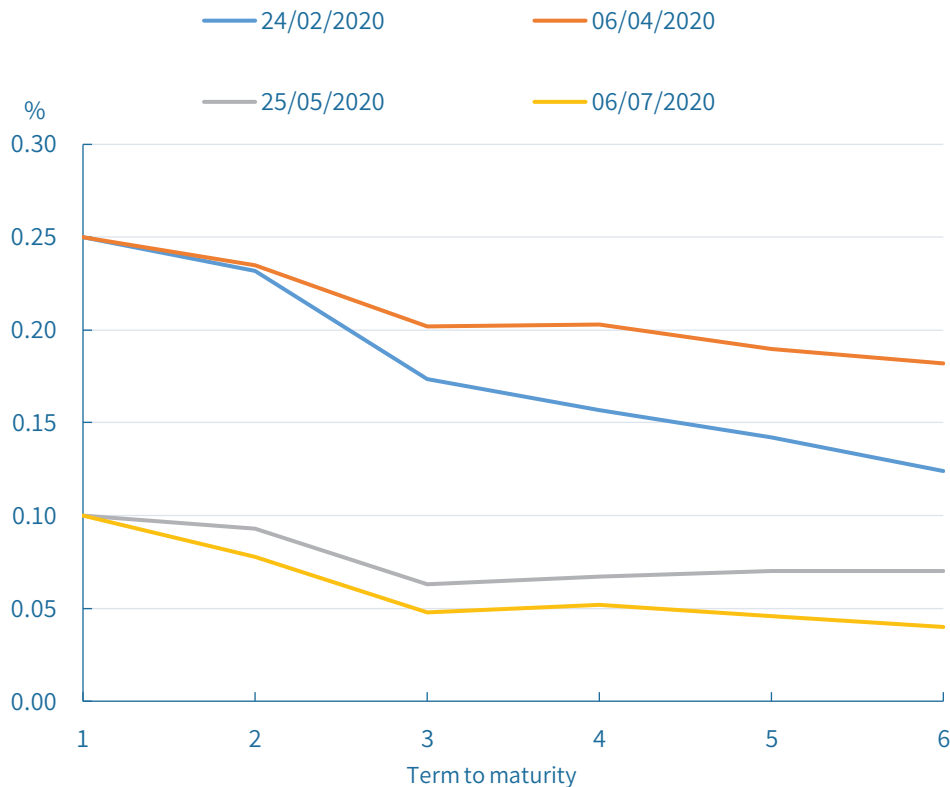
SOURCE: Bank of Israel.

Bank credit grew during the crisis and the activity of the state-guaranteed credit funds led to a decline in the average interest rate paid by small businesses. The growth of bank credit during the crisis was led by the business sector and housing credit (mortgages), while consumer credit shrank. The activity of the state-guaranteed credit funds led to a decline in the average interest rate paid by small businesses, although the volume of credit to this segment decreased. The drop in the volume of credit is apparently due to factors on the demand side, in view of the drop in economic activity, and on the supply side, in view of the increased risk of businesses in affected industries. Nonetheless, there is evidence of excess demand for loans among small businesses, as reflected in the number of requests for bank credit and their size relative to the amounts that have been approved as part of the state-guaranteed credit fund programs. During the crisis, the banks permitted deferral of loan repayments for several months and between March and mid-June the

banks deferred payments for more than half a million businesses and households, in the amount of NIS 6.8 billion.

Prior to the interest rate reduction in April and throughout the reviewed period, the estimates from the Telbor market and the professional forecasters reflected an expectation of more accommodative policy in the future, namely a positive probability of an interest rate reduction. Following the reduction in April, there were stronger expectations of a more accommodative policy and the most recent data indicated a high probability of an additional interest rate reduction in the coming year. At the beginning of 2019, the average expectation of the professional forecasters and Telbor market data reflected an expectation of less accommodative monetary policy (Figure 13). During 2019, expectations were gradually revised downward and in August they implied an expectation of no change in the interest rate initially, and subsequently a probability of a cut during the coming year. At the beginning of the period being reviewed, the expectations from the Telbor market implied a probability of more than 80 percent for an interest rate reduction to 0.1 percent and the average of the forecasters implied a complete probability of a reduction. At the beginning of March, with the spread of the coronavirus and the shock in the financial markets, the Telbor market reflected an expectation of an even more accommodative policy – a monetary interest rate of below 0.1 percent. However, later in March the estimates were revised upward, apparently in view of the fact that the Bank of Israel had chosen to leave the interest rate unchanged and to utilize other monetary tools. In the April interest rate decision, the Committee reduced the interest rate to 0.1 percent, and at that time the market did not expect a reduction. Thus, the Telbor market data implied a probability of only 10 percent of a reduction at that time and a probability of 30 to 40 percent of a reduction in the May decision. Following the April decision, the expectations of a more accommodative monetary policy grew stronger. According to the most recent data from the Telbor market and the professional forecasters, there is a high probability of a reduction in the interest rate during the coming year.

Figure 13
Forward Yield Curve based on Telbor Market Data on Interest Rate Decision Dates
 February 2020–July 2020



SOURCE: Bank of Israel.

6. Fiscal policy

The deficit shrank at the beginning of the period being reviewed, due to, among other things, the budget restraint that resulted from the interim budget that was in place. Since then, there have been additional elections, a new government was established, and in March the trend reversed and the deficit grew sharply as a result of the spread of the coronavirus and the limitations imposed on movement and activity, as well as the fiscal measures declared by the government. According to the Research Department's forecast, the deficit was expected to reach about 12 percent of GDP by the end of 2020. At the end of 2019, the deficit was 3.7 percent of GDP. At the beginning of January, the cumulative deficit over the preceding 12 months contracted markedly to 3.2 percent of GDP. The sharp drop primarily reflected the exit from the calculation of January 2019, which was characterized by low revenues and high expenditures. The large drop in expenditure in January 2020 relative to the previous January (of 10.3 percent) was partially due to

the budget restraint that resulted from the adoption of the interim budget (which allocates 1/12 of the previous year's budget to each current month).

At the end of February, the deficit continued to decrease and reached a level of 3.1 percent of GDP. However, despite the continuing budget restraint, which was the result of the interim budget, the deficit rose sharply to 4 percent of GDP in March. The increase can be explained by, among other things, the steps initiated by the Israel Tax Authority in response to the spread of the coronavirus (deferral of tax payments and accelerated tax rebates) and by the decline in tax revenue as a result of the economic slowdown (such as the decrease in the value of imports and the drop in fuel consumption). The deficit also continued to rise also in April and May (to 4.8 percent and 6 percent of GDP, respectively). The increase was due to the loss of revenue as a result of the economic slowdown and the growth in expenditure as a result of the automatic stabilizers and the implementation of measures declared by the government in order to deal with the coronavirus crisis, which have a price tag of about NIS 60 billion.

According to the Research Department's forecast, the expected growth in government expenditure and the decline in tax revenues would result in a particularly large deficit, totaling about 12 percent of GDP in 2020, and accordingly the debt-to-GDP ratio is expected to grow to 75 percent by the end of the year. The Committee is of the opinion that the low level of the real interest rate is enabling the government to finance the deficit on convenient terms. The Committee also assesses that as long as the deficit is a direct result of the crisis, the financial markets will allow the government to continue financing it on convenient terms and even to increase the deficit somewhat if the funds are used to finance measures that encourage growth and productivity.

7. The housing market

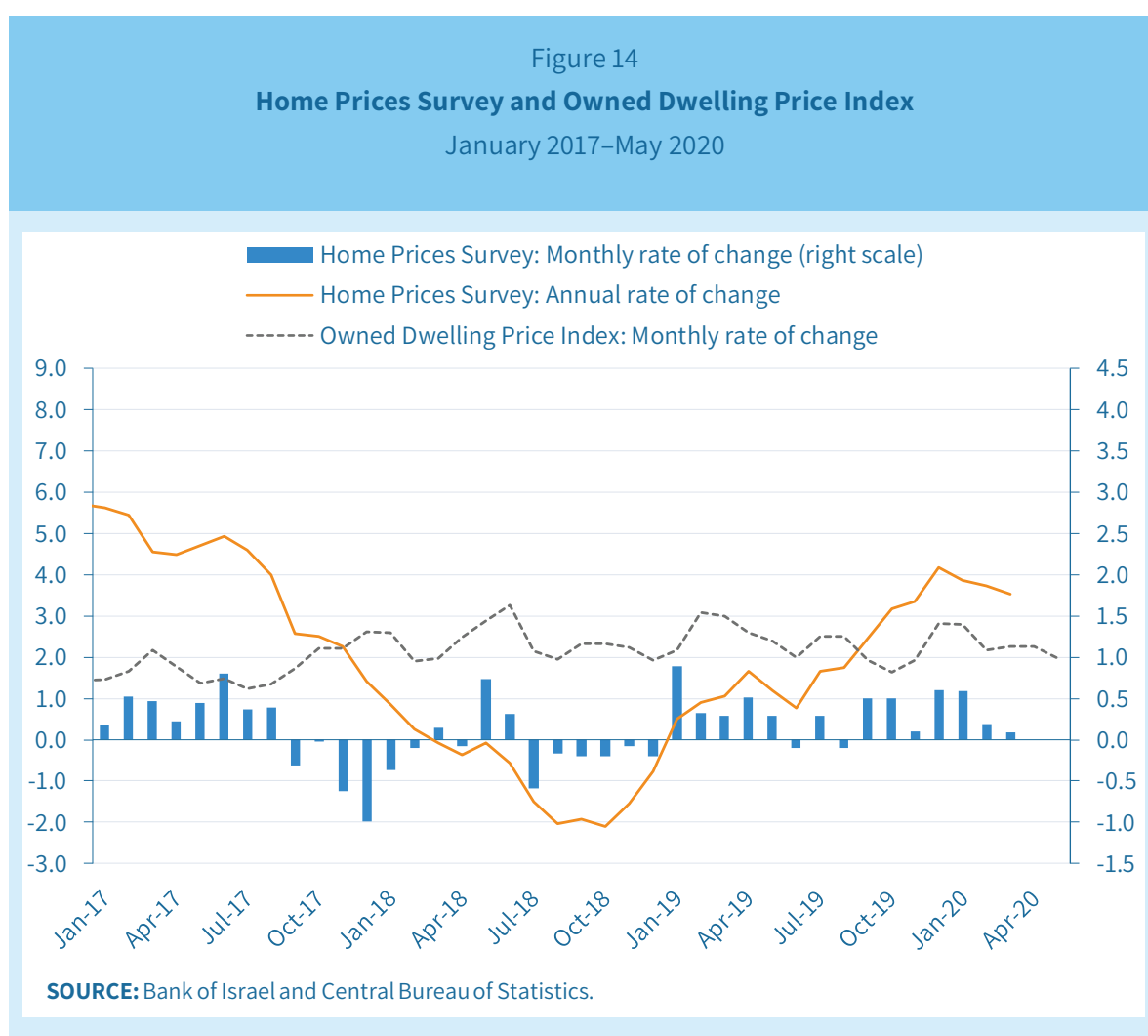
Most of the data from the housing market that were available to the Committee members at the time of their decisions during the period being reviewed (except mortgage data) did not yet reflect the effects of the coronavirus pandemic. The data pointed to a high level of activity—an increase in home prices alongside a high and stable level of transactions.

An upward trend in the number of housing transactions began in the last quarter of 2018. The trend stabilized in the first quarter of 2019 at a higher level of about 8,000 transactions per month (a 6-month moving average), which is similar to the data that was available to the Committee in the May interest decision (March data). The stability in the number of transactions was characteristic of all types of buyers (first-time, homeowners upgrading to a different home, and investors). However, the estimate for April pointed to a drop in the number of transactions. The decline among first-time buyers was especially noticeable.

The rate of increase in home prices accelerated during the second half of 2019 and it remained high and stable at the beginning of the first quarter of 2020, with a year over year increase of 3.5 percent in March (Figure 14). During the period being reviewed, the annual rate of increase in the Owned Dwelling Services Index (rent) fluctuated around its average in recent years. At the end of 2019 and the beginning of 2020, the rate of increase was somewhat higher and was estimated at about 2.8

percent. However, it moderated subsequently and stabilized at an annual rate of increase of 2.0–2.3 percent.

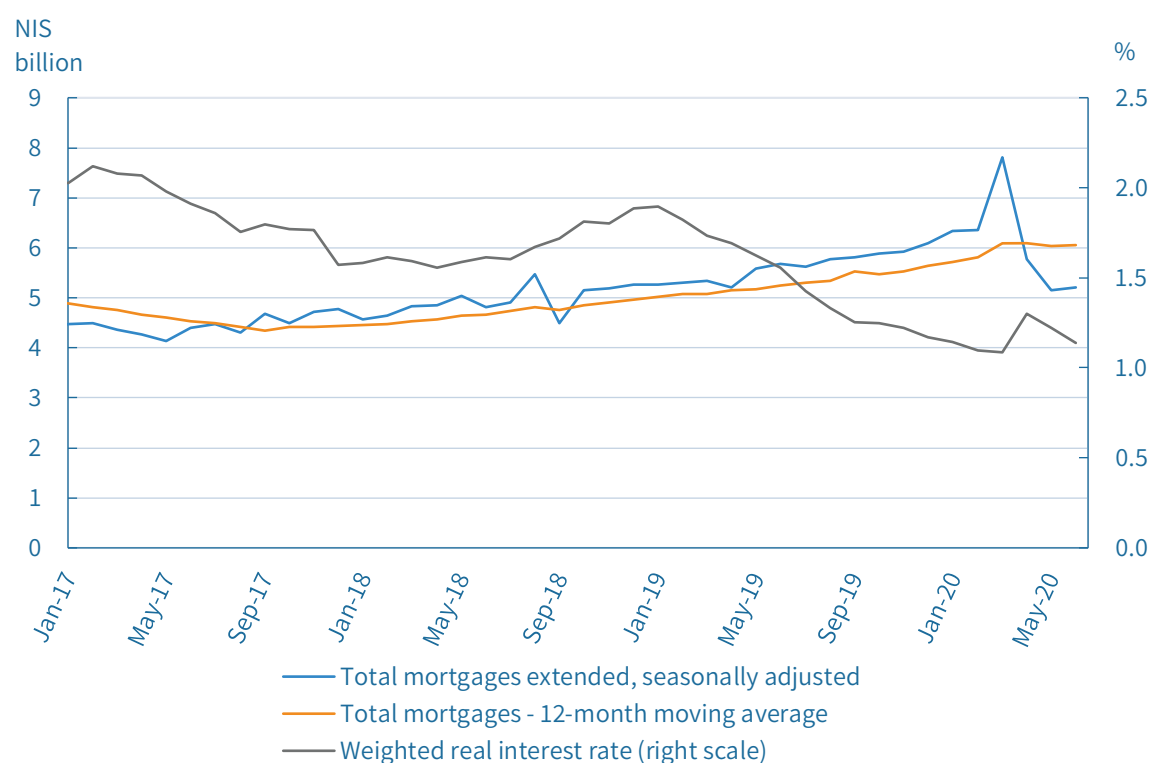
Looking forward, there is uncertainty regarding developments in the construction industry and the housing market, primarily in view of the coronavirus crisis's effect. It may be that in the short term the stock of homes will drop due to delays in the issuing of permits, difficulties in financing or the shortage in work force and raw materials. However, in contrast, there may be a decline in demand due to the increase in unemployment, employment uncertainty and expectations of a decline in the rate of increase in wages or even a decrease in wages.



First signs of developments from the coronavirus crisis, apart from the decline in the number of transactions in April, can be seen in mortgage data. During the period being surveyed and up to the outbreak of the coronavirus pandemic, the increase in new mortgage volume continued (Figure 15). In March, there was a sharp rise in mortgage volume, from NIS 6.4 billion to NIS 7.9 billion, apparently because borrowers chose to take advantage of the interest rates agreed upon prior to the crisis. In contrast, there was a sharp decline in mortgage closures in April due to, among other things, the

limitations on movement and activity. On an annual basis, and according to the most recent data for May, there was a high and stable level of new mortgages (about NIS 6 billion), a trend that began in March. The stability in mortgage volume during March and April occurred in parallel to some increase in the weighted real interest rate by 0.2 percentage points, to 1.3 percent, while in May there was some correction downward.

Figure 15
Total New Mortgage Volume and the Weighted Real Interest Rate on Mortgages
 January 2017-June 2020



SOURCE: Bank of Israel, Banking Supervision Department.

8. The Research Department's macroeconomic forecast

The Research Department published four forecasts during the period reviewed, together with the interest rate announcements, namely in January, April, May, and July 2020 (Table 4). The forecast in May was an unscheduled revision due to the crisis. The forecast changed significantly during the period being surveyed as a result of the spread of the coronavirus and the preventative steps taken. In January, the Research Department's macroeconomic forecast projected inflation in 2020 of 1 percent, which would rise to 1.4 percent in 2021. With respect to real economic activity, some slowdown was expected in 2020 growth as a result of the drop in world trade and the budget

reductions that were expected at that time. GDP was expected to grow by 2.9 percent in 2020 and by 3.2 percent in 2021.

There was a large downward revision in April, in view of the spread of the coronavirus pandemic in Israel and worldwide and according to the forecast's baseline scenario, according to which the limitations imposed up to that point would not be made more stringent and that the main limitations would be gradually lifted by the end of June. According to the forecast, the Research Department expected that the economy will shrink by 5.3 percent in 2020 and will grow by 8.7 percent in 2021. With respect to unemployment, it was expected to decline gradually, such that by the end of 2021 the unemployment rate would return to its low pre-crisis level. According to the April forecast, and in light of the government's budget plan to deal with the crisis and the expected drop in revenues as a result of the economic slowdown, it was expected that the deficit would increase in 2020 to a level of about 11 percent of GDP. In addition, the forecast expected that the debt to GDP ratio would rise to about 75 percent.

The changes in the economic environment led to a revision of the inflation forecast as well and in particular as a result of the sharp decline in prices of oil and other commodities, the increase in unemployment and its effect on wages, and the possible moderation in the rate of increase in rents. Inflation in 2020 was expected to be at a level of about negative 1 percent. Inflation in 2021 was expected to approach the target range, in view of the expectations of a recovery during the third quarter of 2020. The interest rate forecast was revised downward somewhat relative to the January forecast. According to the April forecast, the interest rate in 1 year was expected to be 0.1 percent or zero.

In the updated forecast in May, some of the main assumptions underlying the Research Department's benchmark scenario were revised, in particular the assessment of the pace at which limitations would be lifted, which was more rapid than expected in the April forecast. Accordingly, the growth path for 2020 was revised upward, with the expectation of a smaller contraction of 4.5 percent. Yet at the same time, there was a downward revision of the future recovery process, with growth in 2021 estimated at 6.8 percent. The revised estimate expected a more prolonged recovery, primarily due to the effect of the soft social distancing limitations (such as the Purple Shield). The revised forecast for unemployment expected a rate of 5.5 percent at the end of 2021, an increase of 1.5 percentage points relative to the April forecast. As in the case of changes in economic activity, the expected inflation rate for 2020 was revised upward somewhat, and downward for 2021. The forecast for the interest rate remained unchanged.

There was another major revision of the Research Department's macroeconomic forecast in July as a result of the increase in infection rates, which in turn led to a delay in the forecast return of economic activity to routine, and due to global developments. The forecast for growth for 2020 was revised downward by 1.5 percentage points and for 2021 it was revised upward to 7.5 percent. The reduction of the forecast of GDP for 2020 was seen in all the uses, apart from public consumption, in view of the additional fiscal measures taken to encourage economic activity and employment. The revised forecasts expect a slower recovery in the labor market—an increase of one-half of a percentage point in the unemployment rate in the final quarters of 2020 and in 2021. Expected

inflation was revised downward by close to one percentage point for 2020 and was left unchanged for 2021.

In addition to the forecast, the Research Department also presented the main risks to the staff judgment-based forecast. The April, May and July forecasts emphasized the high level of uncertainty as a result of the global and domestic crisis and in particular its unprecedented scale and unique characteristics. The April forecast stated that a delay of one month in the lifting of limitations relative to the benchmark scenario, and a further contraction of 15 percent in world trade, would lead to a larger contraction in GDP for 2020 (8.8 percent compared to 5.3 percent) and would add 2 percentage points to the average rate of unemployment in 2020. Similarly, the May and July forecasts stated that in a scenario of a second wave of infection during the final quarter of the year, there is expected to be a larger decline in economic activity of about 9 percent and an increase of 2.5 percentage points in the unemployment rate in the final quarter of 2020.

Table 4
Research Department Forecasts
(rate of change in percent, unless otherwise noted)

Forecast for the years		2020				2021	
Date of forecast	10/19	01/20	04/20	05/20		01/20	04/20
GDP ¹	3	2.9	-5.3	-4.5		3.2	8.7
Inflation ²	1.1	1.0	-0.8	-0.5		1.4	0.9
Bank of Israel interest rate	0.1-0.25	0.1-0.25	0-0.1	0.1-0.25		0.1-0.25	0-0.25
Date of forecast	10/19	01/20	04/20	05/20			
Inflation in the coming year ³	1.2	1.0	-0.5	0.1			
Interest rate one year from now ⁴	0.1-0.25	0.1-0.25	0-0.1	0-0.1			

¹ Average CPI inflation in the last quarter of the year compared with the average in the last quarter of the previous year.

² Year-end.

³ In the four quarters ending in the same quarter the following year.

⁴ In the same quarter the following year.

SOURCE: Bank of Israel.

9. Expected inflation and growth

At the beginning of the period being reviewed, the Committee discussed the expected trajectory of inflation and estimated that the low level of inflation was not the result of weak demand but rather temporary shocks, primarily on the supply side. The Committee assessed that inflation will return to the lower part of the target range within about a year. Since the outbreak of the coronavirus pandemic the picture has changed radically. Economic activity has been notably adversely impacted

and inflation has continued to moderate. Looking forward, the Committee members are of the view that, in agreement with the Research Department's forecast, the convergence of inflation to the target range will be slower than predicted prior to the crisis. The Committee expects that during 2021 inflation will approach the lower bound of the target range but will remain below it, which is in agreement with the expectations derived from the capital market.

With respect to growth, the Committee members are of the opinion that in view of the increased level of infections, economic activity will slow significantly in 2020 and unemployment will remain high. The Committee expects that there will be an improvement in the economic situation in 2021, but that unemployment will remain higher than its pre-crisis level.

The Committee members stress that due to the coronavirus pandemic there is a high level of uncertainty with regard to future inflation and growth, since the global and domestic crisis is unprecedented in its scope and characteristics. Similarly, it is difficult to estimate its economic effects and their intensity accurately. Future developments are dependent on, among other things, the possibility of a slower or faster recovery. The Committee will continue to monitor developments in the domestic and global economies and will adopt the policy measures that are needed to support the real economy, stability in the financial markets and the return of inflation to the vicinity of the midpoint of the target range.

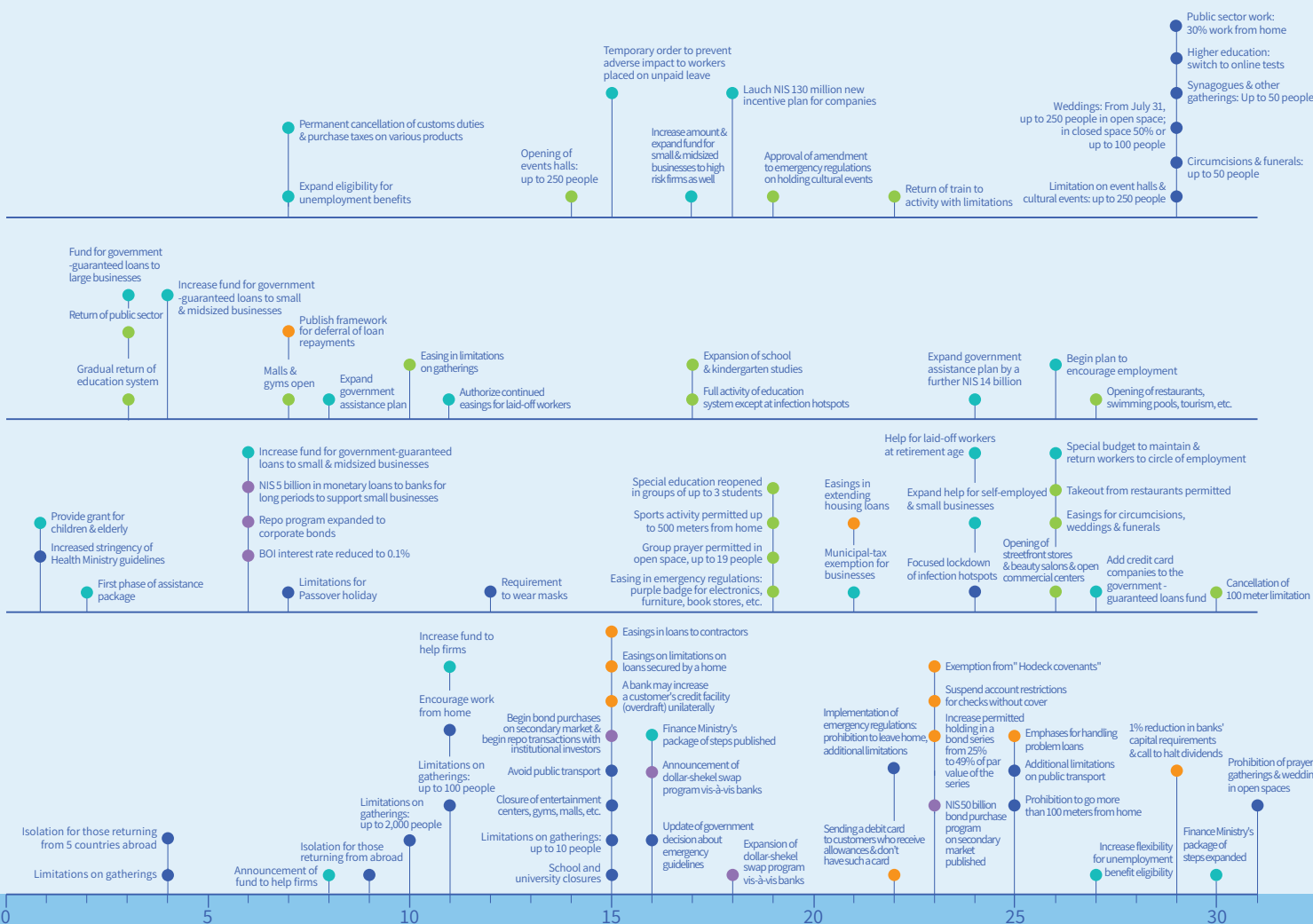
Table 5
The inflation and interest rate environment
(monthly average)

	01/20	02/20	03/20	04/20	05/20	06/20
Inflation environment (percent)						
Monthly change in CPI	-0.4	-0.1	0.4	-0.3	-0.3	
Forecasters' predictions of monthly CPI (average of forecasts prior to publication of CPI)	-0.3	-0.1	0.3	-0.4	0.1	
12-month change in CPI	0.3	0.1	0.0	-0.6	-1.6	
One-year inflation expectations derived from the capital market	1.0	1.0	-1.1	-0.8	-0.2	0.4
Forecasters' one-year inflation predictions	1.1	1.0	0.8	0.2	0.2	0.5
Inflation expectations for various terms						
Forward inflation expectations for the short term (from the end of the first year through the end of the third year)	1.4	1.3	0.8	1.1	1.2	1.0
Forward inflation expectations for the medium term (from the end of the third year through the end of the fifth year)	1.5	1.5	1.2	1.5	1.5	1.5
Forward inflation expectations for the long term (from the end of the fifth year through the end of the tenth year)	1.6	1.5	1.6	1.6	1.5	1.7
Interest rates and interest rate differentials						
Bank of Israel interest rate	0.25	0.25	0.25	0.16	0.10	0.10
Real interest rate derived from the zero curve	-0.83	-0.8	1.3	1.0	0.2	-0.3
Short-term interest rate differential between Israel and the US	-1.50	-1.50	-0.52	-0.09	-0.15	-0.15
Short-term interest rate differential between Israel and the eurozone	0.25	0.25	0.25	0.16	0.10	0.10
Forecasters' predictions of change in the Bank of Israel interest rate (average of forecasts prior to the decision)	0.0	0.0	-	-0.1	0.0	-
Telbor interest - 3-month forward rate in 9 months	0.2	0.2	0.1	0.1	0.1	0.1
Forecasters' predictions of the interest rate a year hence	0.1	0.1	0.1	0.1	0.1	0.1
Nominal long-term interest rate differential between Israel and the US	-0.9	-0.7	0.1	0.2	0.1	0.0
Real long-term interest rate differential between Israel and the US	-0.6	-0.5	0.0	0.1	0.0	-0.1

¹ 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.

● Movement and activity limitations ● Movement and activity easings ● Monetary policy ● Fiscal policy ● Financial regulation



Box A.1

The effect of the Bank of Israel's intervention in the government bond market at the peak of the coronavirus crisis¹

Highlights

- In the beginning of the health crisis that hit Israel and the rest of the world, there were massive withdrawals in Israel's capital market from government bond funds at institutional investors' funds and at mutual funds in particular.
- In that situation, temporary "price pressures" developed, as market participants required a premium to buy the government bonds. Evidence of this can be seen in the gradual reversal of prices to the levels of early March toward the end of the month.
- Using daily mutual fund data as an estimate for these flows shows that not all the transitory increase in yields can be attributed to the price pressures of the government bond mutual funds or to the change in yields abroad, and that it probably also derived from other frictions in this market and/or from changes in information regarding the state of the economy and risk premiums.
- It is reasonable to assume that the Bank of Israel lowered the premium to investors who wanted to sell the bonds in the market by effectively becoming a liquidity provider in the secondary market.
- The analysis shows that the Bank of Israel's main impact on yields was at the time of the announcement on March 23 of its undertaking to purchase NIS 50 billion of government bonds. This outcome is consistent with an examination conducted at the Bank regarding the Bank of Israel's intervention in the government bond market in 2009.
- Indirectly, the Bank of Israel most probably reduced the costs of issuing government bonds, companies' costs of issuing corporate bonds, and households' costs of raising funds during that period.
- As of the publication of this report, government bond yields have returned to their pre-crisis level. In addition, on July 6, the Bank of Israel announced a \$15 billion corporate bond purchase program in the secondary market. This program is expected to improve the liquidity in the government bond market as well in a case of another liquidity crisis in the future.

¹ This box was written by Daniel Nathan, with thanks to Yitzchak Shizgal and Yuval Levin for their considerable help in preparing the box, and Dafna Koby for her assistance processing intraday data, and Research Department colleagues for their comments.

A. Background

The goal of this box is to analyze the development of government bond yields in Israel from the beginning of the crisis in March 2020 through the middle of April 2020, a period when there was “calm” in the government bond markets. From the beginning of the health and economic crisis that occurred at first abroad and then in Israel, massive withdrawals were seen in March from government bond funds, which at times serve as a safe haven for investors.

Because of the large amount of money managed by the institutional investors and the scope of the withdrawals, it is reasonable to assume that it had a great impact on the liquidity in the government bond market, particularly when taking into account that these entities, as of December 2018, hold approximately 65 percent of the tradable government bond inventory. In addition, daily data from government bond mutual funds show that the withdrawals included CPI-indexed as well as unindexed government bonds, from which there were cumulative withdrawals of approximately NIS 7 billion.²

To understand the effect of such massive withdrawals on the government bond market and the impact of the Bank of Israel, I will use daily data on withdrawals from government bond mutual funds. As noted, there were also notable withdrawals from government bond funds at other institutional investors' funds, but we do not have daily data for them. Second, mutual funds are one of the largest holders of government bonds (holding about 10 percent of total tradable debt). Therefore, the withdrawals from the mutual funds will serve us in this research as a proxy for all the public's daily withdrawals from institutional investors.

B. Mutual funds' activity in March 2020

Mutual funds had a major role in the crisis, and they made up a significant part of the trading volume in the government bond market,³ as they reached 14 percent of total daily trading in unindexed bonds and 32 percent of CPI-indexed bonds. To compare, from the middle of 2008 through the end of 2017,⁴ the mean was 3.5 percent and the standard deviation was 3.6 percent of unindexed bonds, and the mean was 6.2 percent and the standard deviation was 6.3 percent of CPI-indexed bonds. As such, it was a span of over two standard deviations. Therefore, it can be said that the total withdrawals were a considerable shock to liquidity in the government bond market.

An analysis of mutual funds' flows also indicates that the major part of the massive withdrawals occurred between March 8 and March 18, 2020, with the withdrawals ceasing

² The monthly correlation of net new investment into mutual funds from 2010 through February 2020 is the largest with net new investment of provident funds, with a coefficient of 0.8. The correlation with pension funds is smaller, at 0.1.

³ I assume here that the withdrawals from bond mutual funds led to them selling government bonds. This assumption is correct for index tracking funds. However, non-tracking mutual funds have more flexibility in that they can wait to sell, assuming that they have cash. With that, in view of the massive scope of the sales, it is difficult to believe that they did not sell government bonds.

⁴ Turnover data that we have are only updated to the end of 2017.

toward the end of the month. Against the background of the withdrawals, there was also a considerable increase in yields in the government bond market (Figures 1 and 2). Note that on March 15, the Bank of Israel began to intervene in that market. At 8:42 in the morning, before the opening of trade on the stock exchange, it announced that it would purchase government bonds on the secondary market (though it did not specify quantities or period), and that it would carry out repo transactions with government bonds as the security vis-à-vis financial institutions. The goal of the plan, as noted by the Bank of Israel, was to moderate the anomalous volatility and to increase the liquidity in the financial markets.⁵

Based on media assessments, the amounts of the intervention were significant on those days.⁶ However, the figures show that the yields continued to rise despite these steps by the Bank. On March 23, at 15:05, (1 hour and 5 minutes after the declaration by the US Federal Reserve regarding the purchase of government bonds), the Bank of Israel announced that it would purchase government bonds on the secondary market at a scope of NIS 50 billion.

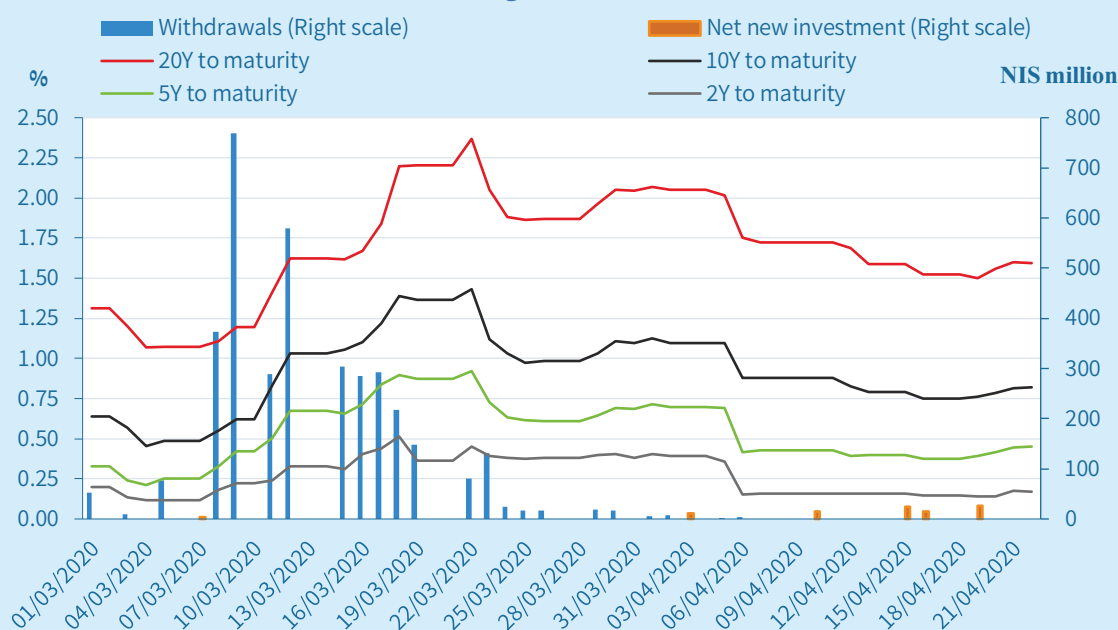
⁵ For the complete press release, see

<https://www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/15-03-2020.aspx>.

⁶ Based on Bank of Israel publications, from March 15th through the end of the month, it purchased approximately NIS 8.5 billion in government bonds, and received government bonds worth NIS 5.5 billion as securities for repo transactions. See:

<https://www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/7-4-2020.aspx>.

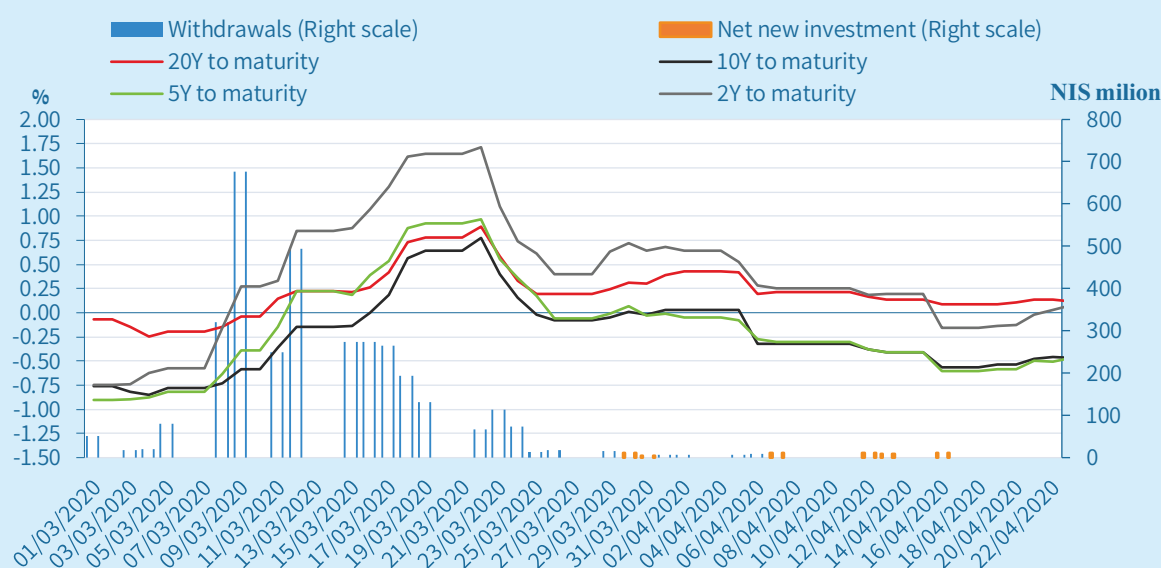
Figure A.1.1



SOURCE: Based on Israel Securities Authority

Figure A.1.1 presents the nominal yields on Israeli government bonds from the zero curve, for 4 terms to maturity—2, 5, 10, and 20 years, from March 1, 2020 to April 22, 2020. It also shows the redemptions (blue columns) and issues (orange columns) on the secondary scale.

Figure A.1.2



SOURCE: Based on Israel Securities Authority

Figure A.1.2 presents the real yields on Israeli government bonds from the zero curve, for 4 terms to maturity—2, 5, 10, and 20 years— from March 1, 2020 to April 22, 2020. It also shows the redemptions (blue columns) and issues (orange columns) on the secondary axis.

It can be seen that the announcement on March 23 had the desired effect on the market, as yields reversed. In its announcement,⁷ the Bank emphasized that the goal of the plan was “to influence bond yields in the market along the entire unindexed and indexed curves, and to

⁷ <https://www.boi.org.il/en/NewsAndPublications/PressReleases/Pages/22-3-20a.aspx>.

lower the costs of longer-term credit for firms and households, as a complementary tool to the short-term interest rate policy”.

As noted, it can be said that the market endured a liquidity shock in which a notable portion of investors wanted to sell government bonds. The market continued to function so that every buyer had a seller. If so, who purchased the bonds? The professional literature on the issue, such as Grossman and Miller (1988) and Duffie (2010), teaches us that for market participants (generally dealers) to “absorb” the supply shock, they will demand a premium.⁸ In addition, the more the quantity increases and the less competitive the market is, in terms of the number of dealers active in it, the larger the premium will be.

Later on, the price is expected to gradually return to its level⁹ before the supply shock (all else being equal), as investors who were not active in the market before the shock enter the market gradually and agree to buy the asset because they will profit from part of the liquidity premium.

As noted, Figures A.1.1 and A.1.2 show the yields from the zero-coupon curve for several maturities ranges during the examined period. The picture conveyed is of an increase in yields with a gradual decline afterward, which is consistent with the theory and strengthens the hypothesis that the dominant phenomenon is of a liquidity shock. Likewise, a more dramatic increase can be seen in real yields, which is consistent with the CPI-indexed bond market being less liquid, which also led to distortions in inflation expectations (very negative inflation expectations).

C. Measuring the impact of the Bank of Israel’s steps

The theoretical literature shows that one channel through which the Bank of Israel acts is essentially as a liquidity supplier and therefore, a priori, one hypothesis is that it lowered the premium paid by investors to sell the asset when the Bank of Israel was active in the market. It can be assessed that without the intervention, the yields would have risen even higher. As we do not know the counterfactual scenario, I attempted to examine the claim using the following exercise. First, a regression was run of total net new investment (contributions minus withdrawals) for all the nominal (real) bonds against the change in weighted nominal (real) yield from January 1, 2017, through February 26, 2020 (a pre-crisis period), at a daily frequency. Because yields in Israel are impacted considerably by yields in the US and Europe, I added to the regression as a control variable the change that occurred that day in US and German yields.¹⁰ In addition, because the changes in yields in March were anomalous, it is reasonable

⁸ See also similar literature on the issue of the effect of sentiment on US equity prices in Ben-Rephael, Kandel, and Wohl (2012).

⁹ Obviously it depends on that they did not enter significant other new markets that would change the fundamental price of the asset.

¹⁰ Zero coupon yields in the US can be found on the Federal Reserve website:

<https://www.federalreserve.gov/data/nominal-yield-curve.htm> <https://www.federalreserve.gov/data/tips-yield-curve-and-inflation-compensation.htm>

to assume that their effect on yields was not linear. Therefore, I estimate the regression so it will include nonlinear factors in the effect of yields in the US and Germany on Israel.¹¹

First, the results¹² show that the yields in the US and Germany are in fact correlated with yields in Israel. There is also a negative correlation between flows into government bond mutual funds and yields and a nonlinear effect of yields abroad on local yields. In the second stage, I compared the fitted yields from the regression estimated for unindexed and CPI-indexed yields, respectively, (to examine what would have happened if the Bank of Israel had not intervened), and the actual yields. The results show that until March 12, the period before the Bank of Israel's intervention, the model provides a fairly good explanatory ability regarding the expected development of the nominal yield, while after March 12, a gap opens up (the actual yield increased more than expected), most probably deriving from additional factors, such as a change in the information set of the economic situation or changes in the risk premium, so that a considerable gap remained. All this is against the background of beginning the intervention by the Bank of Israel.

The picture conveyed by CPI-indexed bonds is similar, though here the model provides greater explanatory ability for a longer period, and the gap that opens up from the middle of March is bigger. Despite these results, it is difficult to believe that the Bank of Israel did not act as a liquidity supplier and moderated the increase in view of it having intervened at large amounts relative to trading volumes beginning on March 15. Therefore, it is more plausible that the increase that was larger than expected according to the regression derived from changes in the risk premium or from a change in the information set that market participants had.

An exception is March 23, when a marked decline that is not in line with the forecast can be seen. The “immediate suspect” is the Bank of Israel, which at 15:05 announced that it would purchase government bonds at a scope of NIS 50 billion. However, here too it can be claimed that it is again a change that is not related to the Bank of Israel's announcement, such as the Federal Reserve's announcement that same day. With that, it would be difficult to be convinced that the change in yields occurred in a small window in which the Bank of Israel announced the government bond purchase plan, a plan whose goal was to supply liquidity to the market.

To examine this, I looked at the intraday price data of two government bonds (CPI-indexed and unindexed) that were closest to 10 years to maturity (Figure 3) from 13:45–15:15, at 1-minute intervals. The results do in fact show that the effect on prices was immediately after the Bank of Israel's announcement, with the CPI-indexed bond price rising in the 15 minutes after the announcement by about 0.5 percent and the unindexed bond price rising by about 1 percent. It can also be seen that the market responded as well to the Federal Reserve's announcement

¹¹ Other variables that I added are the change in the VIX in Israel, the flows to the overall mutual fund market, and the flows with a lag to government bond funds.

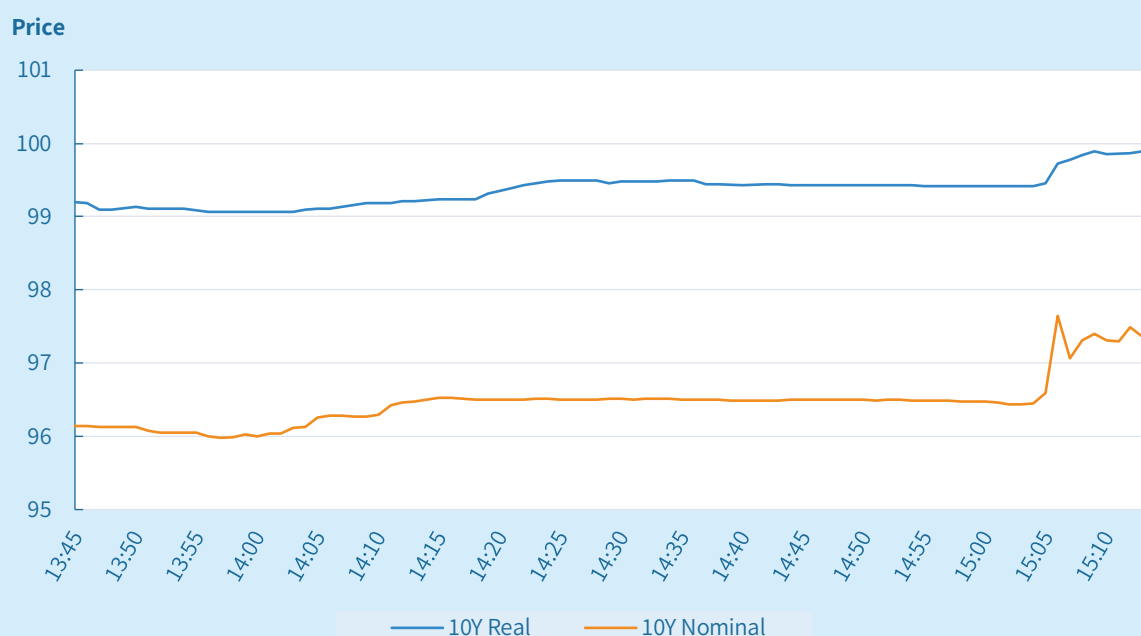
¹² For an expanded discussion of the estimation results, see:

<https://www.boi.org.il/he/NewsAndPublications/PressReleases/Pages/3-6-2020A.aspx>

with price increases, though less powerful ones—about 0.2 percent in CPI-indexed bonds and 0.5 percent in unindexed bonds. As noted, at 14:00 the Federal Reserve intervened in the US government bond market and caused prices to increase in the US and in Israel, so that not all the price increases (declines in yield to maturity) can be attributed to the Bank of Israel’s announcement. With that, looking at intraday data and the regression results show that the Bank of Israel’s effect can be identified on March 23—the change in US bond prices cannot explain all the changes in yields that occurred in Israel.

It is also interesting to note that a similar result was obtained in an internal examination by the Bank of Israel in 2009 regarding the Bank’s intervention in the government bond market in February 2009. It was found then that the announcement about the Bank of Israel’s undertaking to buy government bonds at a scope of NIS 25 million was the entire effect on yields, with the actual purchases afterward not having a significant effect.

Figure A.1.3



SOURCE: Based on Israel Securities Authority

Figure A.1.3 presents intraday data on prices of the 2 government bonds (CPI-indexed in blue, and unindexed in orange) closest to 10 years to maturity (CPI-indexed government bond security number 1157023 and unindexed government bond security number 1160985). The time interval chosen is 1 minute, from 13:45 until 15:15. The prices were taken from several quotes of the stock exchange. The price is the best average price offered, and the price asked is the best.

Note that in this analysis, I focused on only 1 channel through which the Bank of Israel operated—the supply of liquidity. The Bank of Israel apparently had an effect through other channels on prices in the government bond market, such as reducing the cost of financing the government debt. From March 16 through April 21, 2020, the Israeli government raised on the domestic market NIS 5.3 billion in unindexed bonds and NIS 1.3 billion in CPI-indexed bonds.¹³

¹³Note that the Government of Israel also raised large sums of money on the international bond markets.

As noted, the secondary market serves as a benchmark for the initial offerings market and if there is a notable increase in yields, it will be reflected in lower prices in the primary market in which the government will issue bonds. Similarly, the Bank of Israel also affected indirectly on the corporate bond market and on households' costs of raising funds, by reducing the government yields that serve as a benchmark for the interest rates in those markets. Another channel through which the Bank of Israel affected the market is through investors' expectations, by moderating the concerns of investors who did not redeem their money from such funds that there would not be a severe liquidity problem in the market if they too would want to redeem their monies. It is essentially similar to a run on the bank. If investors are concerned that they would not be able to redeem their money if they are not first to do so, most investors will attempt to redeem their money (see, for example, Goldstein, Jiang and Ng, 2017). It could be that this is the reason that the withdrawals did not continue after March 23—the date on which the Bank of Israel undertook to purchase government bonds at a scope of NIS 50 billion.

From a long-term perspective, as of the publication of the Monetary Policy Report, government bond yields returned to their pre-crisis level and since then there has not been evidence of a liquidity problem in the market. In addition, the Bank of Israel took further steps to ensure that market liquidity will not be adversely affected in the future, as in the beginning of July, the Bank announced a NIS 15 billion program to purchase corporate bonds on the secondary market. The declared goal of the program is the continued orderly activity of the corporate bond market. Indirectly, this activity may also lead to future liquidity in the government bond market not being markedly adversely impacted, as in the case of an additional market shock, mutual funds will be able to sell corporate bonds in addition to government bonds, and thus reduce the liquidity premium that they have to pay on government bonds.

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Box A.2

Inflation during the Coronavirus Pandemic: Challenges in Measurement and Interpretation¹⁴

Highlights

- The coronavirus pandemic is presenting numerous challenges in the measurement and interpretation of inflation.
- Phenomena such as changes in the composition of the representative consumption basket, missing components, a decline in the quality of the goods consumed, and changes in purchasing methods are distorting the official inflation data and thereby interfering with the ability to interpret them.
- As a result of the aforementioned phenomena, the official inflation figures published by the Central Bureau of Statistics are biased downward relative to the inflation rate that is relevant to economic policy makers.
- The trends in the core indices, in the index weighted by the current consumption basket and in inflation expectations may provide a more balanced picture of the basic inflation rate in the economy.

A. Introduction

Inflation is calculated as the rate of change over time in the cost of a fixed basket of goods.¹⁵ Apart from its importance as the Bank of Israel's primary target, the inflation rate serves as an important economic indicator that helps to understand the situation of the economy and the source of shocks to it. In particular, changes in inflation during normal times hint at the shocks being experienced by the economy. For example, a decline in economic activity and in inflation are an indication of a decrease in aggregate demand, while a drop in economic activity alongside a rise in inflation are an indication of problems on the supply side. This characterization assists monetary policy makers in responding optimally, by stimulating demand in the first case or by adopting a neutral policy or even a contractionary policy in the second.

¹⁴ Yitzchak Shizgal and Itamar Caspi.

¹⁵ In practice, the composition of the basket changes over time as a result of several factors, including changes in consumption habits, changes in relative prices and the disappearance or entry of goods. However, the conventional working assumption of statisticians who are responsible for measuring inflation in Israel and other countries is that these changes occur with a low frequency and therefore the weights of the basket are updated only once every few years. In Israel, the basket is updated every two years, with the last update occurring in 2019.

The outbreak of the coronavirus pandemic has led to two main problems that interfere with the ability to interpret the rate of inflation. First, the crisis has led to major shifts in consumption habits as expressed by changes in the composition of the basket and in relative prices, as well as the methods of purchasing and the quality of goods and services. Second, there has been a significant decline in the availability of some of the CPI components, to the point of complete disappearance due to restrictions imposed by the government.¹⁶ As will be seen below, these phenomena apparently result in biases in the official inflation data and significantly reduce the usefulness of using that data as an indicator of the balance between aggregate demand and supply in the economy. This problem is expected to continue as long as the crisis does. In this box, we will describe the main measurement problems facing the Central Bureau of Statistics (CBS) and the solutions it has implemented, as well as the resulting difficulty in interpreting the official inflation data for use by policy makers.

B. Challenges in measuring inflation during the crisis

The approach of the CBS in dealing with the measurement problems that have appeared during the crisis is similar to those used by parallel organizations, such as Eurostat, which has adopted three guidelines in the gathering of price information during the coronavirus crisis.¹⁷ The first is to leave the weights attached to the various components unchanged. In other words, the weights are fixed from the beginning of the year (or the beginning of the previous year in the case of Israel where they are updated every two years), and they should remain so also during the coronavirus pandemic. The second is that all of the sub-components should be measured, even if some of the categories that make them up include goods and services not currently available in the markets. The prices of those goods are calculated by imputation. The third guideline is that missing prices will be obtained from alternative sources, such as Internet sites, wherever possible.

As in the rest of the world, the spread of the coronavirus in Israel, alongside the social distancing measures, have gradually led to a significant decline and even a complete halt in the consumption of various goods and services. At the height of the crisis, there were five consumption groups that were primarily affected: travel abroad (4 percent of the CPI); dining out (3.3 percent); social events and celebrations (1.5 percent); sports events, theater, cinema and the like (0.9 percent); and expenditure on vacations in Israel (0.8 percent). Thus, in calculating the CPI for March 2020, the CBS divided the problematic components into three categories: items that were not measured (flights, accommodation abroad and social events which account for about 5.6 percent of the CPI), items that were measured only on the basis of the first two weeks of the month (accommodation and vacations, performances and movies and dining out which account for about 5 percent of the CPI) and the rest of the index's affected components, i.e., all the rest of the goods and services that are fixed in nature, such as housing.

¹⁶ In addition, there is an operational difficulty in sending CBS surveyors to points of sale, whether because of manpower problems or due to the restrictions. This is a problem in other countries as well.

¹⁷ Eurostat: Methodological note. Guidance on the Compilation on the HICP in the Context of the COVID-19 Crisis. April 3, 2020.

With respect to the latter, a full survey was carried out during the first half of the month, while during the second half, the survey covered about 65 percent, due to the gradual closing of retail outlets and places of entertainment and services.

With respect to the imputation of prices of goods and services that were no longer available, a document of the CBS that was attached to the announcement of the CPI for March stated that the general recommendation for dealing with missing observations is to work “from the bottom up”: In the first stage, the rate of change is estimated according to the change in prices of similar goods and services. If there are none, the estimation should be carried out according to the change in prices in consumption groups higher up in the pyramid of the basket of consumption.¹⁸

Overall, in March the proportion of the basket that was imputed due to a lack of data was 5.6 percent. At the height of the crisis, in April and May, the proportion of unmeasured components rose to about 8 percent of the CPI; with the opening of the economy the proportion declined and it is estimated that in June this rate will be only 4.8 percent. Note that this is a relatively low level compared to other countries. For example, in the eurozone the weight of imputed components was 32 percent in April and 22 percent in May, and in the UK, imputed components had a weight of 23 percent in the index for April.¹⁹

Alongside the measurement problems, the coronavirus crisis has also led to major changes in the composition of the consumption basket. In addition to the disappearance of some components, as mentioned above, there have also been changes in the rate of expenditure on the components that remained available for purchase. Overall, there is no official information on the current weight of household expenditures and therefore it is difficult to estimate the composition of the updated basket. Nonetheless, we can arrive at a reasonable estimate of the changes in the consumption basket with the help of data on credit card expenditure, which includes a categorization of expenses that partially matches the CPI’s components.²⁰ A prime example of the change in consumption patterns is the credit card expenditure on gasoline, which has plummeted with respect to both its absolute level and its proportion within total expenditure during the quarantine, and the sharp drop in the rate of expenditure on dining out, which was partly offset by the growth in the proportion of expenditure on food purchases. However, in contrast, the proportion of expenditure on rent has risen substantially as a result of the drop in expenditure on the basket as a whole, while the expenditure on rent was unchanged.

¹⁸ An example of goods whose price is imputed from similar goods or a similar consumption group during normal times is seasonal fruits, such as grapes during the winter, which are calculated according to the fresh fruit category.

¹⁹ For further details, see <https://ec.europa.eu/eurostat/web/hicp/methodology>.

²⁰ See “Revised data on changes in credit card purchases as a result of the coronavirus pandemic.”

C. What does inflation actually measure during the coronavirus pandemic?

In view of the problems and solutions presented in the previous section, the question then becomes what the inflation rate published by the CBS is measuring during the months following the outbreak of the pandemic, and how relevant is it to the inflation target that guides the Bank of Israel's actions? The answer to this question is largely dependent on how long the pandemic and the changes in the components and composition of the consumption basket persist. Before answering this question, it is worth presenting three different definitions of inflation, which differ in how they relate to the weights of the consumption basket and the way in which the prices of the missing components are measured:

1. **Official** Inflation: This measures the changes in prices in terms of the fixed basket prior to the crisis, which includes the imputation of prices for missing goods or services (this is the inflation rate that the CBS measures and publishes).
2. **Current** Inflation : This measures the change in prices in terms of the prices of the current basket, or in other words, the basket that weights the prices of goods and services which consumers purchase according to the composition of the actual basket each month.
3. **Basic** Inflation: This measures the change in prices of the pre-crisis fixed basket, where a shadow price is attributed to items that were not measured. A shadow price is defined as the maximal price that consumers would be willing to pay for an additional unit of a good whose supply is limited.

Table A.2.1 summarizes the various definitions of inflation and the basic assumptions in calculating them.

Table A.2.1. Various definitions of inflation during the coronavirus crisis and the basic calculations

Inflation	Weights	Treatment of missing components	Notes
Official	2019	Imputation	This is the inflation rate that the CBS publishes.
Current	Current	Not included in basket	Cannot be calculated due to missing data on weights of current consumption.
Basic	2019	Shadow price	Cannot be calculated and therefore is unobservable.

Under the assumption that the effect of the coronavirus crisis on the composition of the consumption basket is temporary, basic inflation (which is unobservable) can be used as a starting point for policy makers. The reason for this is that under the assumption that the basket is stable, official inflation and current inflation will eventually converge to basic inflation. Thus, on the assumption that there will be no major changes in the composition of the consumption basket after the end of the crisis, the rate of change in the general index between the first month after the end of the crisis and the last month prior to the beginning of the crisis will reliably reflect inflation during the period of the crisis. This conclusion is

essentially the motivation behind the CBS's guideline and that of other statistical bodies abroad regarding the maintenance of a fixed basket composition during the current period.

Nonetheless, it is difficult to currently estimate the extent to which the shift in consumption patterns will persevere and even more so how the consumption basket will look at the end of the crisis. While many of these changes in expenditure patterns are reversed with the reopening of the economy, it is not impossible that some of them will persist. To the extent that a large proportion of the changes in consumption patterns do persist, then current inflation will become more important and will eventually become basic inflation following the crisis, or in other words that which is calculated on the basis of the current basket of consumers, since it better reflects the actual change in prices.

D. Possible biases in the official inflation figures

(i) Missing prices

The imputation of missing prices carried out by the CBS means that official inflation is calculated in practice without those items (i.e., their contribution to the index is zero by definition). For example, until the restrictions are removed, it is almost impossible to travel abroad. As a result, there is no price that can be measured (and the quantity consumed is zero by definition), and therefore a change in price cannot be calculated. Imputing the travel abroad component in the general index is equivalent to calculating an "index without travel abroad". Imputation of this type creates a distortion in comparing indices over several months and relative to the previous year. This distortion is less significant for March since the imputed components were not expected to have a significant influence on the index. However, in April, for example, when imputation of this type encompassed about 8 percent of the index, the distortion becomes more significant.

In addition, the non-inclusion of goods and services that were not consumed, as a result of the crisis, is likely to bias official inflation downward relative to basic inflation (i.e., inflation in terms of the original pre-crisis basket, which, as mentioned, is unobservable). This constraint on the purchase of a particular good or service can be interpreted such that its "shadow price", i.e., the maximal price that the consumer is willing to pay for an additional unit of a good or service in limited supply, is, in approximation, infinity. Therefore, under this assumption, official inflation, which imputes the prices of the missing goods, will be biased downward relative to basic inflation (with 2019 weights). Nonetheless, and as pointed out in Section B, it is likely that the bias due to the imputation of prices is relatively small in Israel, due the relatively low weight of the actual imputed index, which is no larger than 8 percent.

(ii) Changes in the composition of the basket

As a result of the shift in the composition of the consumer basket, official inflation, which, as mentioned, is based on a fixed basket, becomes a less precise measure of current inflation, namely inflation which is actually "felt" by households. To the extent that households spend less on components whose price decreases (such as gasoline) and more on components whose price has risen (or remained unchanged), so official inflation will be lower than current

inflation. Thus, for example, due to the maintenance of the fixed weights of the basket of current inflation, the large drop in the rate of expenditure on gasoline is not expressed in the contribution of that item to the general index, which was significant during the period and which primarily reflected the changes in the price of oil. Thus, the decline in the price of gasoline that was reflected in the CPI was felt to a lesser extent by consumers, since they consumed less gasoline. In parallel, the total expenditure on rent remained similar even after the crisis and therefore the rate of expenditure on it rose significantly, as did its contribution to current inflation.

(iii) Changes in quality

Another phenomenon observed during the crisis is a drop in the quality of services consumed, which is not always taken into account in standard measurements. The change observed during the current period is related to the health risks accompanying the purchase of certain goods and services in the index. Thus, for example, it is reasonable to assume that the quality of a meal in a restaurant, of a social event or of a vacation for the average consumer is lower today than prior to the coronavirus pandemic, due to the health concerns currently accompanying any activity of this type. A situation in which the price of a meal at a particular restaurant remains unchanged relative to the period prior to the crisis essentially reflects a drop in the effective price, on the assumption that the health risk and the accompanying inconvenience (maintaining social distancing, measuring one's temperature and wearing a mask) reduces the enjoyment from consuming the meal for the average customer. Also in this instance, the difficulty in adjusting for a decrease in quality in real time leads to a downward bias in the measured price.

(iv) Changes in consumption habits

The coronavirus crisis has also been accompanied by changes in consumption habits, which are also likely to result in a biased measurement of inflation. A situation in which consumers switch to buying in more expensive groceries near their homes rather than larger and cheaper supermarkets outside the city because of health concerns, will bias the index downward. Similarly, the transition from purchasing in cheaper supermarkets outside the city and from dining in a restaurant to ordering takeaway is likely to increase the total cost of purchasing a good or service due to the cost of delivery. This phenomenon is likely to bring about a downward bias in inflation, to the extent that the change is not reflected in the CBS sampling methodology.

Another example of changes in consumption patterns is related to the increase in online purchases, whether due to government restrictions or to the public's health concerns and its avoidance of crowds. The extent of the measurement bias in this context will depend on whether the rise in online ordering persists but is not taken into account in the price sampling methodology. Thus, in the case that online prices behave differently than store prices, with respect to both their level and their frequency of updating, then relying on store prices in order to calculate the index is liable to create distortions with regard to the actual price changes experienced by consumers. Thus, for example, in the case that prices on an Internet site are

lower than those in a store, there will be an upward bias in official inflation. In contrast, in the case that the cost of delivery increases the cost of the ordered good, there will be a downward bias.

E. Potential solutions to the problem of bias

A potential solution for dealing with the aforementioned change in composition is to focus on adjusted indices. Thus, for example, focusing on a CPI without energy neutralizes, at least in part, the problems of measuring the energy component. Removing additional problematic components will also likely improve the situation, although it is likely to be more complicated. Thus, for components such as clothing and footwear, for which there was a significant drop in sales (apparently online sales have not come close to offsetting the drop in sales in the stores), it is unclear whether using an index that does not include clothing and footwear is the correct solution since these goods are still sold online, although the weight of the component in the consumption basket is low relative to its official weight in the index (which is apart from the aforementioned difficulty, in comparing the prices for sales only in stores to a month that includes only online sales).

Although removing components from the index correspondingly increases the weights of all the other components, which partially reflects the changes in the current basket, at the same time the relative weight of each component with respect to components that were measured remains fixed. Alternatively, it is possible to track the core statistical indexes, such as the index of median inflation which adjusts for outlying fluctuations in a limited number of components.

One of the potential solutions for dealing with the changing composition of the basket is the updating of the index weights such that they will reliably reflect the changes in the cost of the consumption basket during the pandemic. Thus, for example, Diewert and Fox (2020) claim that the lack of a continuous update for changes in the consumption basket, primarily in periods of quarantine in which there is less availability in many components of the index, will lead to a downward bias in the measurement of inflation. They recommend the use of continuous expenditure surveys in order to document the changes in the basket and to correct for measurement bias. The problem with this solution is that in most countries the data from expenditure surveys are published with a low frequency and therefore cannot be used on a continuous basis in order to update the index weights. In Israel, for example, the Household Expenditure Survey is published annually.

In the economic literature, there are suggestions for dealing with missing data from the current basket by means of alternative real-time data on the composition of household expenditure. Thus, for example, Cavallo (2020) uses aggregate data on total credit and debit card expenditure in the US in order to calculate the changes in the consumption basket and then to calculate the rate of current inflation for a dynamic consumption basket. According to what is claimed above, he finds that current inflation is higher than official inflation. In a further test as part of that same research, he arrived at similar findings for 10 out of 16 additional countries

while for the remaining six the reverse was found, namely inflation according to the new basket was lower than official inflation.

Finally, it is possible to deal with the measurement problem by tracking inflation expectations in the intermediate and long term, namely during the period after the crisis, when the representative consumption basket will stabilize. Although it is difficult to use expectations data to determine what the representative basket will be in the future, and in particular which changes will persist and which will not, the rate of expected change of this basket provides evidence, at the end of the day, of the inflation target's credibility.

