BANK OF ISRAEL

Financial Stability Report

Jerusalem, June 2019

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Financial Stability Report for the First Half of 2019

The Bank of Israel's Financial Stability Report is published twice a year. In this report, Bank of Israel economists assess the main risks to the financial system, the financial institutions' resilience to their main exposures to those risks, and outline potential financial shocks, while assessing the probability of their occurrence. The assessments and analyses are based on a survey of the developments in the reviewed period, an examination of structural changes, the use of analytic models, and an assessment of the background conditions in the global and domestic economies. The report outlines the effect of the realization of the financial shocks in the short and medium terms, with the objective of increasing policymakers' and the public's awareness of the state of financial stability in Israel, and suitably addressing focal points of risk and exposures in the economy.

1. Executive Summary

The Financial Stability Report for the first half of 2019 evaluates the stability of the domestic financial system by analyzing the financial risks and the resilience of the financial institutions, the business sector and households to these risks. On the basis of these two components, we describe the potential shocks to the economy as a result of different vulnerabilities that are liable to bring about a systemic crisis.

The analysis of the financial risks focuses on the environment in which the financial system operates: macroeconomic activity, the asset markets and the credit markets. The analysis provides a tool for monitoring the development of the various risks facing the financial system (see Chapter 1 and Table 1). The analysis of the resilience of the financial institutions and the activity segments focuses on the banks, the insurance companies, the business sector and households, in view of the exposure of the financial institutions and the various activity segments to the financial risks in the economy (see Chapter 2 and Table 2). Given the financial risks on the one hand and the resilience of the institutions to these risks on the other, we arrive at a subjective evaluation of the likelihood of the realization of possible shocks to the economy that are liable to lead to a system-wide crisis. These are the main focal points of vulnerability in the economy, according to our assessment for the first half of the year (see Chapter 3 and Table 3).[1]

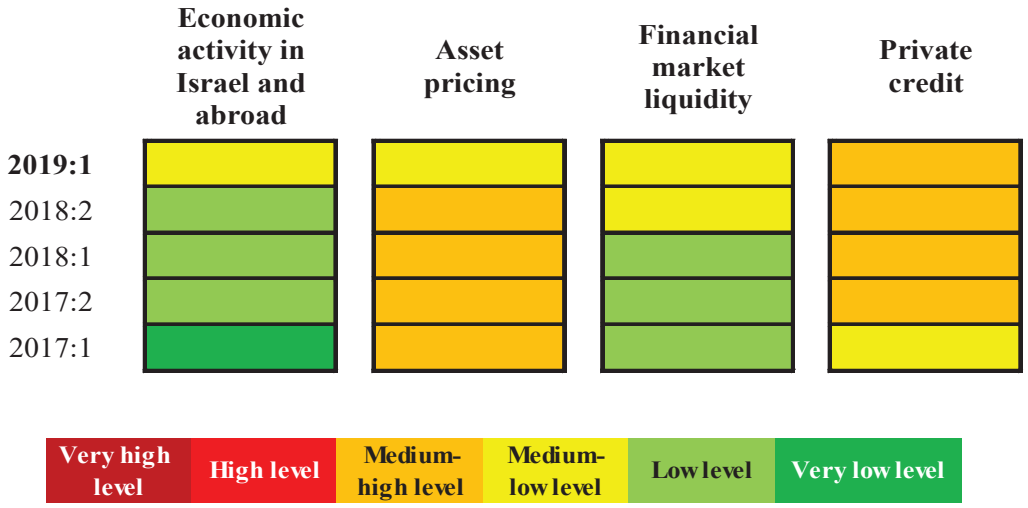
The following are the main developments in the reviewed period:

- The macro picture of the global economy continues to signal moderation in the growth rate and in inflation, and growth forecasts have again been revised downward. The slowdown in global trade continued, and also includes the emerging markets. Therefore, and in view of the growing tension in trade relations, the leading central banks have decided to discontinue the contractionary monetary policy they had adopted during 2018, or alternatively to continue their expansionary policy. The yield to maturity on Treasury Notes, and particularly those with long maturities, declined during the first half of 2019, and the slope of the yield curve, which constitutes a leading indicator of the business cycle, became negative during the period.
- During the first quarter of 2019, the economy grew at a rate consistent with its long-term average, and the indicators of economic activity, including the average wage, support the assessment that the economy will continue to grow at a solid rate in the second quarter as well.
- It appears that financial assets are not overpriced—despite the low interest rate environment that is increasing risk appetite. However, the level of liquidity risk in Israel is not low, in view of the declines in the volume of trade during the reviewed period, which is low relative to other countries, and the high level of holdings of corporate bonds by the mutual funds and other liquid funds.
- The slight drop in home prices in Israel moderated during the reviewed period, alongside the continuing decline in investment in construction. The stability in home prices during the last two years, alongside the continued moderate increase in rents and other indicators, reduce to some extent the concern of price developments that are disconnected from fundamentals.
- The risks in the credit market remained medium-to-high, primarily in view of the continued increase in recent years in credit to the construction and real estate industry as a share of total credit, which is high in comparison to other countries.
- The resilience of the financial institutions, banks, and institutional investors, has increased in recent years with the adoption of global regulation, namely Basel III in the case of the banks and Solvency 2 in the case of the insurance companies. The regulatory measures adopted in recent years to limit risk originating from the mortgage market—which is the main factor in the growing share of credit to the construction and real estate industry—are also contributing to the financial system's greater resilience against shocks in this market.

[1] The report is based on a variety of data with differing frequencies, including: current market data on assets and financial instruments, Central Bureau of Statistics publications, reports of the financial entities in Israel and abroad, the financial statements of public companies for 2018, and other reports published by the companies.

- The average resilience of households is high relative to other countries, although an analysis of the distribution of mortgages by income quintiles indicates a relative increase in loans to the lower quintiles in recent years.
- The average resilience of the public companies in the business sector was maintained in 2018, despite some slowdown in their activity. Although the slowdown was felt primarily among private construction companies, bank credit to these companies increased as a result of regulatory easing, and their leverage increased.

Table 1: Assessment of risks in the financial system's operating environment



The likelihood of potential shocks originating from the financial assets market and the housing market declined in the first half of 2019, since price developments in the financial markets have not deviated from the fundamentals, housing prices have stabilized in the past two years and interest rates are less likely to increase at a faster-than-expected pace. Nonetheless, the financial system's exposure to economic activity is primarily to be found in the real estate market (both residential and commercial). The large volume of credit that the financial system provides to this market constitutes the main risk it faces from real economic activity. The leverage of the construction companies, particularly the relatively small and nonpublic companies, increased during the reviewed period. One of the potential shocks discussed in this report is a sharp and rapid decline in home prices, which will lead to losses in the financial system as a whole and the development of a credit supply constraint in the economy. Nonetheless, this significant exposure is not expected to create a systemic crisis, due to the high resilience of the financial institutions (see Israel's Banking System, 2018). In this report, we are lowering the likelihood of its realization in the short and medium terms due to the significant drop in investment in this industry, but also due to price developments (both rent and home prices) during the reviewed period. In order to maintain the low likelihood of a shock in this market in the long term as well, it is important to maintain investment in the number of building starts at a level that will meet demand and will prevent the renewal of upward pressure on home prices.

The level of the financial system's direct exposure to real economic activity abroad is not particularly high, but the high correlation between the capital markets in Israel and those abroad is liable to create a significant impact on financial asset prices in Israel if a global shock occurs. This effect will primarily be realized by way of the financial

Table 2: Assessment of the financial institutions' and sectors' resilience following exposure to risks

	Summary	Changes/Developments	Importance
Banks	Maintaining the good quality of the credit portfolio while maintaining profit stability	Growth in credit to the housing market, particularly to private construction companies, while their sales declined.	Medium
Insurance companies	The insurance companies are meeting the capital adequancy targets set out in the Solvency II transition directives. Some are already meeting their final targets.	The insurance companies' total aggregate profit declined in 2018, following a decline in asset prices toward the end of the year.	High
Business sector	The business sector's resilience remained strong, except for the trade and services industry and private construction companies.	Growth in bank credit to private companies in the residential construction industry, alongside a marked slowdown in their activities. An increase in risk in the trade and services industry, made more prominent by a worsening of financial ratios and an increase in the likelihood of default.	Medium Medium
Household sector	High financial robustness	Entry of new credit providers - with no information on their activity	Low for the reviewed period

markets and a drop in the desire to take on financial risk. Therefore, the potential of contagion by way of the financial markets remains significant. In addition, the volume of global investment in Israeli companies (private venture capital funds in Israel), and particularly in the communication and computer services industry, also constitutes a channel for exposure. Moreover, changes in the risk appetite of global investors affect asset prices in the various markets in the same direction and therefore a crisis that develops abroad has a significant effect on real activity in Israel.

In addition, we focus on two specific issues in two separate boxes:

Box 1: The Financial Cycle in Israel – This box describes the financial cycle in Israel and the method of estimating it, including an explanation of the importance of the analysis for setting monetary and macroprudential policy. According to the developments in the credit market and in home prices—two factors that explain the financial cycle—it appears that after an extended upward trend in the financial cycle during the last 12 years, the expansion has recently slowed. At the same time, structural changes in the credit market that are currently taking place are likely to extend the duration of the upward segment of the financial cycle.

Box 2: Statistical Models for Monitoring Systemic Risk – This box describes two different models for estimating the intensity of the connectivity among financial institutions in the economy. The intensity of connectivity reflects the mutual dependence between the financial institutions, a dependence that increases in periods of crisis. Furthermore, the results indicate that the relative size of each institution is not the only variable determining its systemic importance.

Table 3: Assessments of the likelihood of shocks that may lead to a financial crisis

	Description of the shock	2018:2
1	A sharp and rapid decline in home prices.	
2	A sharp decline in bond prices in particular, and financial asset prices in general	
3	A worsening of financial conditions: a sharp increase in the interest rate due to worsening economic activity accompanied by an increase in risk	
4	A global shock: a series of ratings declines among companies with low investment-grade ratings.	

Very high level	High level	Medium-high level	Medium-low level	Low level	Very low level

1. The environment in which the financial system operates

In this section, we analyze the financial system's operating environment according to three main sources of risk: the macroeconomic situation in Israel and abroad with a perspective on the financial cycle in Israel; developments in the asset markets (financial and housing assets), including discussion of the liquidity risk in financial assets; and the credit market according to segment. The risks originating from economic activity in Israel are the result of distortions and imbalances in economic activity and in the financial markets in Israel and abroad. The possibility of a sharp correction of distortions that have developed in Israel and/or abroad, amplify the size of the shock that is liable to affect domestic economic activity. Since Israel has a small and open economy, it is exposed to shocks that affect global markets and in particular a slowdown in the growth of world trade. Such a decline would affect the volume of exports and the profitability of the business sector, the vulnerability of which will increase. At the same time, the main contagion potential for the Israeli economy from abroad is by way of the financial markets, particularly by way of the joint trends in financial risk-taking. Although the foreign exposure of Israeli financial institutions is relatively low, the high correlation between capital markets constitutes a main channel by which financial asset prices in Israel are affected. In addition, the activity of companies in the communication and computer services industries (Israeli hi-tech), which are largely financed by global investment funds, is exposed to shocks that affect global markets.

Macroeconomic activity

	2018:2	2019:1
The domestic environment: Real activity, monetary policy, fiscal policy, and country risk. **The global environment.**		

Our assessment is that macroeconomic risk in general increased during the reviewed period, since the risk originating from abroad has risen slightly, while domestic risks have not diminished and may have even increased slightly due to the increasing concerns of the end of the financial cycle and the growth in the government deficit.

Domestic economic activity, particularly in the private sector (businesses and households), is supported by the financial system, which facilitates efficient intermediation between borrowers and lenders. The connection between economic activity and financial activity has become very pronounced in recent years, especially after the last financial crisis. Policy makers in numerous countries are trying to identify their economies' position within the financial cycle and not just within the real cycle. The empirical literature dealing with this new subject of financial cycles emphasizes the reciprocal relationship between the financial cycle and the real cycle, and shows that a slowdown in real activity is more severe when it is correlated with a slowdown in financial activity. Therefore, the identification of the economy's position within the financial cycle, in addition to identifying its position within the real cycle, will provide important information for monetary and macroprudential policy makers in maintaining price stability and reducing the intensity of real economic cycles (see Box 1 for an explanation of the method for identifying the financial cycle).

1.1.1 The domestic environment

The economy continued to grow during the reviewed period at a relatively high rate and in line with its potential rate of growth, led by private consumption and with a tight labor market, with a marked extended upward trend in wages. Nonetheless, in view of the moderation of global activity and the renewed appreciation of the shekel, inflationary pressures in the first half of 2019 did not intensify, and inflation remained in the vicinity of the lower bound of the target range, with increases in the prices of nontradable goods offset by the decrease in prices of tradable goods. The monetary interest rate remained at 0.25 percent, following the 0.15 percentage point increase in November 2018, and expectations in the financial markets point to a continuation of the low interest rate during the second half of 2019, in view of the growing expectation of a cut in the monetary interest rate in the US.

Economic activity in recent years has been characterized by solid growth rates, alongside an upward slope in the financial cycle (as shown and described in Box 1). It appears that following a prolonged positive segment in the financial cycle that has lasted 12 years, there has recently been some moderation in its expansion. At the same time, structural changes in the credit market, as are currently taking place, are likely to extend the upward segment of the financial cycle.

The economic prosperity that has prevailed in recent years, and particularly the high number of one-off tax revenue windfalls, reduced the budget deficit and lowered the debt-to-GDP ratio. However, the ratio did not continue to decline in 2018 and even rose somewhat. The decline indeed supported the reduction of the interest rate on government debt, and was an important factor in the S&P rating agency raising Israel's credit rating to AA- in August (see the discussion in Box 1 of the Financial Stability Report for the first half of 2018). The total government deficit grew at the end of 2018 and at the beginning of 2019, to 3.8 percent of GDP, which exceeds the target set by the government. This significant increase developed in view of the structural deficit created in recent years as a result of tax cuts and the growth in civilian expenditure. This development, which was masked by the large one-off tax revenue windfalls during the 2015–17 period, is liable—if it continues—to deepen the government deficit and increase the government's credit risk. Since the interest rate that the government pays on its debt constitutes the benchmark for all debt in the private sector, it is important that the government continue to maintain budget discipline over time.

1.1.2 The global environment

Following strong growth in 2017 and the first half of 2018, there was a significant slowdown in the global economy in the second half of 2018.[2] Among the main reasons for this were the tension in trade relations between the US and China and the weakness in the domestic sectors in some countries.[3] According to the new IMF forecasts, global

[2] WEO, April 2019.

[3] For example, auto production in Germany, fiscal weakness in Italy, and natural disasters in Japan.

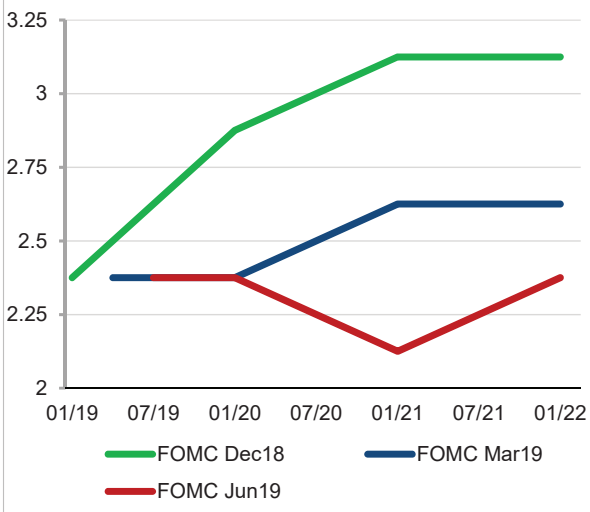
growth in 2019 is expected to be 3.3 percent, a drop of 0.4 percentage points relative to the IMF forecast in its previous report.[4] The reduction in growth forecasts covered almost all countries, and therefore expresses a general global trend, which is expected to particularly affect countries such as Germany, Italy, Canada and Mexico. It should be mentioned that during the reviewed period, global growth forecasts were revised downward by all of the international organizations, including the World Bank, the BIS, the OECD and the WTO.

Moreover, IMF economists point out that the balance of risks to global growth is continuing to tend downward. The main risks mentioned in the report are increased tension surrounding the trade war, a disorderly exit by Britain from the EU, the continued weakness in economic data, the continuing fiscal uncertainty in Italy that may spill over to other countries in Europe, and a return to tight monetary policy in the US.

The growth rate of global trade continued to decline during the reviewed period, both in view of the uncertainty surrounding the trade war between the US and China, as described in the previous report, and in view of the aforementioned slowdown in global growth during the last six months. It should be noted that both the IMF and the WTO significantly reduced their trade growth forecasts for 2019.[5]

In view of the global economic weakness and tensions surrounding trade relations, the Fed is adopting a more dovish monetary policy.

Figure 1
Federal Funds Rate[a] Forecast (Median Dots)
(percent)



[a] The interest rate shown in the figure is the middle of the Fed's forecast range.
SOURCE: Based on Bloomberg.

The IMF also reduced its inflation forecast, primarily in view of declines in energy prices during the reviewed period. The CPI in the advanced economies is expected to drop to 1.6 percent in 2019 (from 1.9 percent in the report from October of last year).

Alongside the lowering of growth forecasts, the IMF believes that global financial conditions remained expansionary, although there was some financial tightening since the last report was issued in October 2018.[6]

Following the sharp price declines in the financial markets at the end of last year, primarily due to the weak macroeconomic data and the tension in trade relations, there has been a significant recovery since the beginning of 2019. The main explanation for this is the change in monetary policy among the central banks, primarily in the advanced economies, which decided not to continue the contractionary monetary policies that had been in place during 2018, or alternatively not to terminate their accommodative policies this year.

At the interest rate meeting in March of this year, in view of the uncertainty in the global economy, the Federal Reserve lowered both its 2-year growth forecast for the US and its forecasts of the interest rate path. At its most recent meeting in June, the Fed again lowered its interest rate forecast, and it is currently also expected to lower the interest rate next year (as can be seen in Figure 1). Furthermore, some members of the Fed support a cut in the interest rate already during the current year. It is worth mentioning that the Treasury Bill market in the US has recorded a sharp drop in yields since the beginning of May, when the US raised its tariffs on imports from China by about $200 billion (from 10 percent to 25 percent), which increased the tension surrounding trade relations between the US and China. In Europe, the ECB announced that despite the signs of recovery, the risks in Europe continue to

4 WEO, October 2018.

5 WEO, April 2019; WTO, April 2019.

6 Global Financial Stability Report, April 2019.

be biased downward, and that a continuation of accommodative monetary policy is necessary.[7] At the same time, the ECB rejected the expectation of an interest rate increase in Europe, at least until the second half of 2020. The central bank of Japan also announced that it would continue its current accommodative monetary policy, at least until the spring of 2020. Therefore, it appears that the sharp declines in the financial markets at the end of 2018, the weakness in the economic data, and the tension in trade relations have led the central banks to change course and to adopt a dovish stance toward the current year, which has been priced in by the financial markets.

On the financial side, the IMF believes that the immediate risks to global financial stability have increased during the reviewed period, although they remain moderate from an historical perspective. In the medium term, the risks to financial stability remain unchanged at a high level, and according to the IMF they are liable to increase. The main reason for this is that despite the tightening at the end of 2018, the financial environment is expected to remain expansionary over time. This will exacerbate the vulnerability of a number of sectors that the IMF has mapped out in its current report, and which will be discussed further in Section 3.4.

The Israeli economy's integration into globalization processes and its greater openness have facilitated the dispersion of risk and the reduced dependency on domestic capital markets, but have increased Israel's exposure to developments in global capital markets. Therefore, although the risks mentioned in this section do not constitute a direct risk to financial stability in Israel, in the event of increasingly negative sentiment in the global markets due to the realization of one of the aforementioned risks, there may be a significant impact on the prices of financial assets in Israel as well. In other words, the potential effect on Israel is expected to appear primarily by way of the financial markets, and will be manifested in investors' reduced willingness to take financial risks, which will bring about a drop in assets prices in Israel as well. This is also the main reason that we are seeing a high correlation between the various equity indices worldwide, particularly in a period of lower risk appetite, when global investors tend to reduce their holdings of risk assets both globally and in their own country.

1.2 The asset market in Israel

	2018:2	2019:1
Financial assets: Equities and government and corporate bonds		
The housing market		

During the first half of 2019, yields to maturity on US Treasury Notes declined, particularly for longer maturities, and the yield curve, which is known in the economic literature as a leading indicator of the business cycle, became flat and even negative during the period. At the same time, the declines in financial asset prices in Israel and worldwide that began at the end of 2018 and continued into January 2019 were replaced by price increases that offset most of the previous declines, and even brought prices close to record levels during the reviewed period, though they were accompanied by high volatility. Corporate bond spreads also narrowed during the reviewed period, but not to the low level prevailing at the end of 2018, apart from spreads in the bank and insurance industry. The intensity of liquidity risk in Israel is not low, in view of the relatively thin trading compared with other countries, the distribution of corporate bond holdings, the growth in passive investment and the expansion of automated trading in recent years.

The slight declines recorded in real estate prices in Israel became more moderate, and towards the end of the reviewed period, prices even began to rise slightly, alongside a prolonged downward trend in investment in

[7] TLTRO III – In its interest rate decision in June, the ECB presented its third loans program, the goal of which is to continue supporting the banking system. The program will begin in September 2019, and the loans will be for a term of two years at an interest rate of 0.1 percent above the MRO rate.

construction.

On the basis of the variety of considerations, our assessment is that the risks in the asset market in general, and particularly in real estate, have declined somewhat, to a low-to-intermediate level.

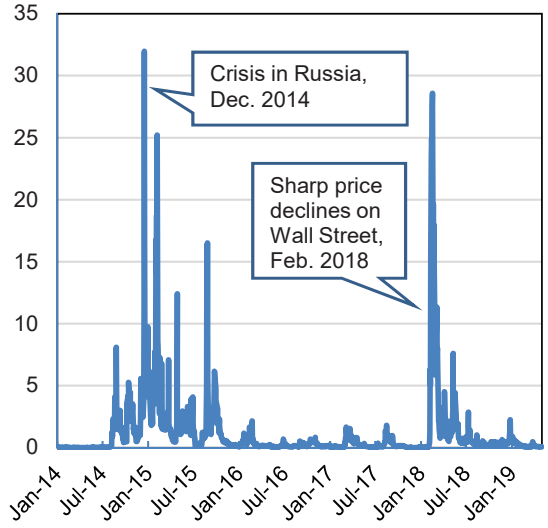
The portfolio of assets held by the public is composed of real and financial assets. The main real asset, at least for households, is residential real estate, while the main financial assets are: government bonds (tradable and nontradable), corporate bonds (tradable and nontradable) and Israeli equities. Housing constitutes about 50 percent of households' asset portfolio and the three types of financial assets together constitute 43.7 percent of the public's financial asset portfolio. We look at developments in the asset markets on a number of levels—valuation, liquidity and distribution of investors in their holdings of the assets—in order to assess the risk of sharp fluctuations in asset prices, which are liable to increase the likelihood of a failure in the financial system.

1.2.1 Financial assets

The Financial Stress Index (Figure 2) is composed of a number of economic and financial indicators from a variety of area in the economy, and provides an aggregate picture of what is happening in the financial markets during the reviewed period.[8] In addition to looking at the events in each market on its own, the index also takes into account the degree of comovement for each of the indicators. A high index value points to negative events that are common to all the financial assets. As the figure shows, the sharp fluctuations in the markets at the end of 2018 were hardly reflected in the Financial Stress Index. The reason is that despite the sharp declines in the equity and corporate bond markets, the other markets (the exchange rate and government bonds) were hardly affected. The differing response and the relatively low correlation between movements in the various markets resulted in a very low stress index. At the beginning of 2019, the index was still at very low values that did not indicate any signs of stress in the financial indices.

The financial stress index is low, and does not show any stress in the markets.

Figure 2
Financial Stress Index,
January 2014–April 2019



SOURCE: Bank of Israel calculations.

Equities

Following sharp price declines in the various equity indices during the last quarter of 2018, the equity indices have been rising since the beginning of the year, although they have not yet reached their levels prior to the sharp declines in the markets (June 16th 2019 as compared to September 1st 2018; Figure 3). Moreover, in comparison to leading global equity indices, the local indices continued to underperform in the reviewed period as well. An examination of the Tel Aviv 90 Index indicates that its underperformance can be attributed to the large companies included in the Tel Aviv 35 Index, while the complementary index (the Tel Aviv 90) outperformed the other indices. The superior performance of the bank shares included in the Tel Aviv 35 contrasts with the underperformance of the other companies included in the index.[9]

At the same time, the level of uncertainty expressed by the implied volatility derived from the various indices rose at the end of the year to levels that are similar to those of leading indices worldwide, but has not yet fallen to its level

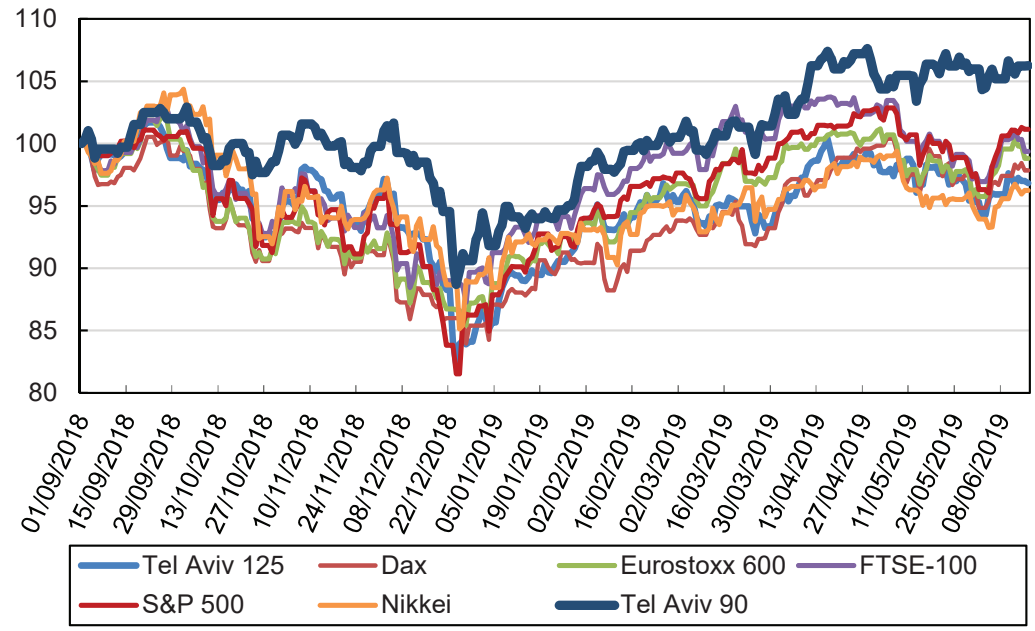
[8] Based on Y. Saadon and M. Graham (2013), "A Composite Index for Tracking Financial Markets in Israel", Discussion Paper Series 2013.01, Bank of Israel Research Department.

[9] An examination of the industry indices shows that the pharmaceutical shares are not the only reason for the underperformance of the Tel Aviv 35 Index, since the yield of this index excluding the pharmaceutical shares was also relatively low.

prior to the sharp declines in the markets (Figure 4).

The financial ratios and fundamental multipliers for the most part do not indicate an overvaluation of shares. The P/E ratios of the Tel Aviv 35 and 125 indices (Figure 5) are relatively low, and the equity multipliers of the Tel Aviv 35, 90 and 125 indices, which are calculated as the ratio of the companies' market value to equity, are in the vicinity of 1.4, which is below their long-term averages. An examination by industry shows that the capital multipliers of traded companies in all the industries are in the vicinity of their long-term average, and if there are outliers then they in fact tend to be below the long-term average. In contrast, the return on equity for the various indices is relatively high. The return on equity for the companies included in the Tel Aviv 90 remains at the high level that has characterized it for the last two years, while the Tel Aviv 125 and Tel Aviv 35 have renewed their growth following a number of years of poor performance due the losses recorded by the large pharmaceutical companies. The risk premium on shares included in the main indices, which is calculated as the difference between the annual return on the index and the yield on 10-year government bonds, is relatively high (Figure 6) which is another indication of the low likelihood that equities are overpriced.

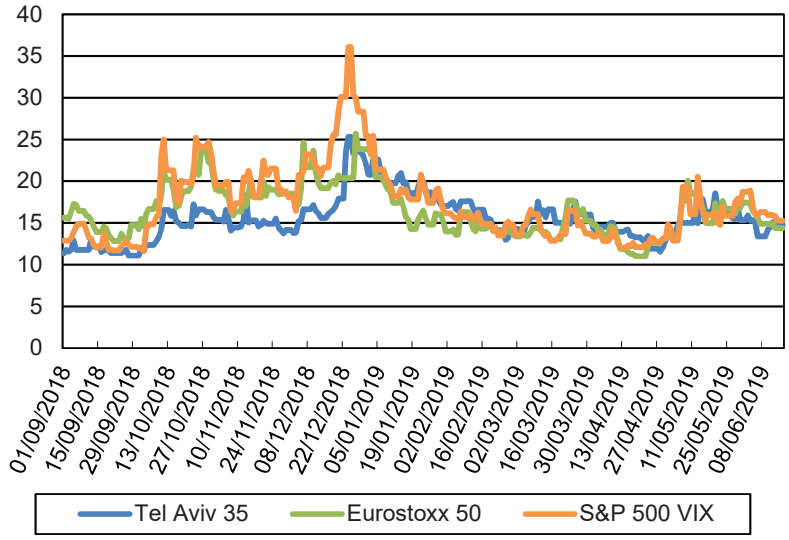
Figure 3
International Comparison of Equity Indices, 2018–19 (in dollar terms)



SOURCE: Based on Bloomberg.

Following a sharp increase at the end of 2018, the implied volatility of the Tel Aviv 125 declined, but stabilized at a slightly higher level.

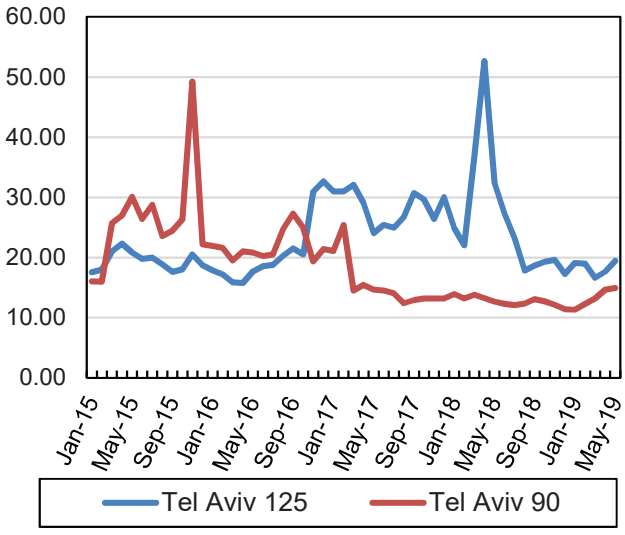
Figure 4
The Implied Volatility Derived from Options on the Equity Indices in Various Countries, 2018–19 (monthly average)



SOURCE: Bank of Israel calculations.

Initial evidence of the unlikelihood that stocks are overpriced: The P/E ratio remains stable and relatively low.

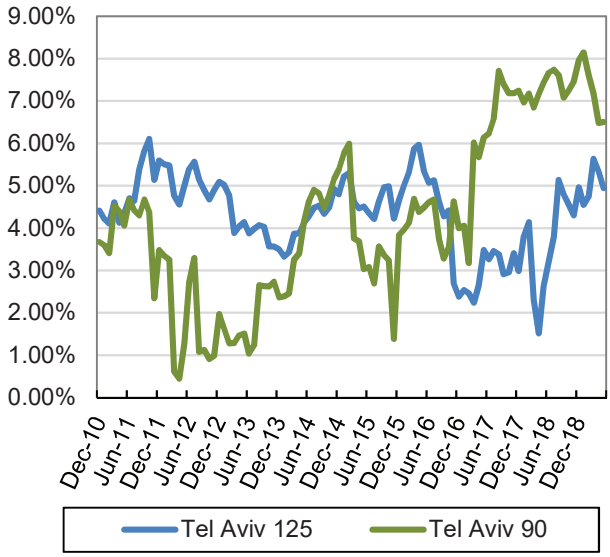
Figure 5
The P/E Ratio of Companies in the Main Indices on the Tel Aviv Stock Exchange, 2015–19



SOURCE: Based on Tel Aviv Stock Exchange.

Additional evidence of the unlikelihood that stocks are overpriced: The risk premium demanded on the equity market remains relatively high.

Figure 6
The Real Risk Premium Demanded in the Equity Market, 2011–18



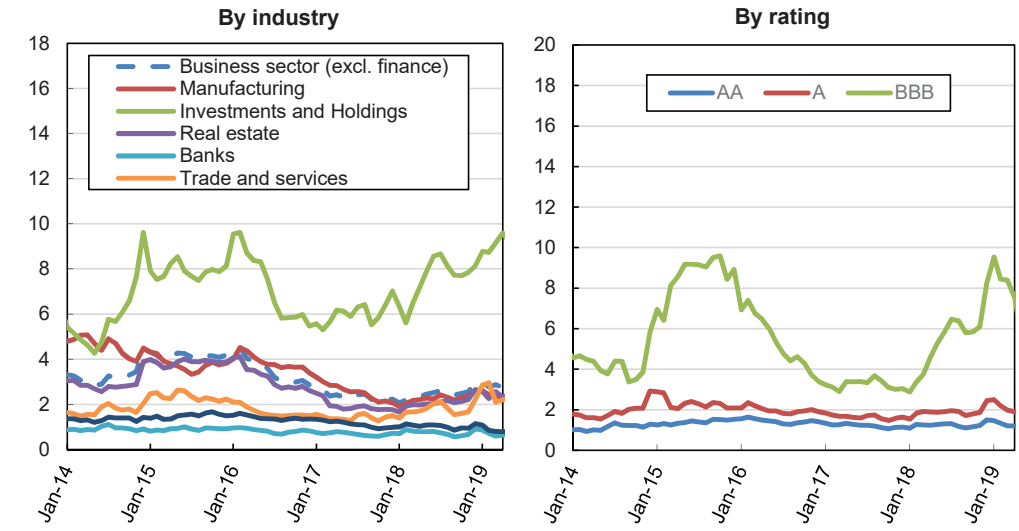
SOURCE: Based on Tel Aviv Stock Exchange.

Government bonds

The General Government Bond Index has risen by 4.4 percent since the beginning of the year, led by the index of bonds with relatively long periods to maturity (5–10 years). The yield to maturity of 10-year unindexed government bonds stood at 1.7 percent (on June 16th), after having reached 2.4 percent in the final months of 2018. The yield on US Treasury Notes for the same period was 2.1 percent, such that the gap between government bonds in Israel and the US remains negative.[10] In contrast, the gap with respect to the yields on other government bonds that are considered to be risk-free—those of Germany—is 2 percent (the yield on German government bonds is 0.2 percent).

Corporate bond spreads during the reviewed period are slightly higher than they were in 2018.

Figure 7
The Weighted Average Spread Between Yields on CPI-Indexed Corporate Bonds and Yields on Parallel Government Bonds, by Industry and Rating, February 2010–April 2019
(excluding structured and convertible, monthly data)



SOURCE: Bank of Israel calculations.

Corporate bonds

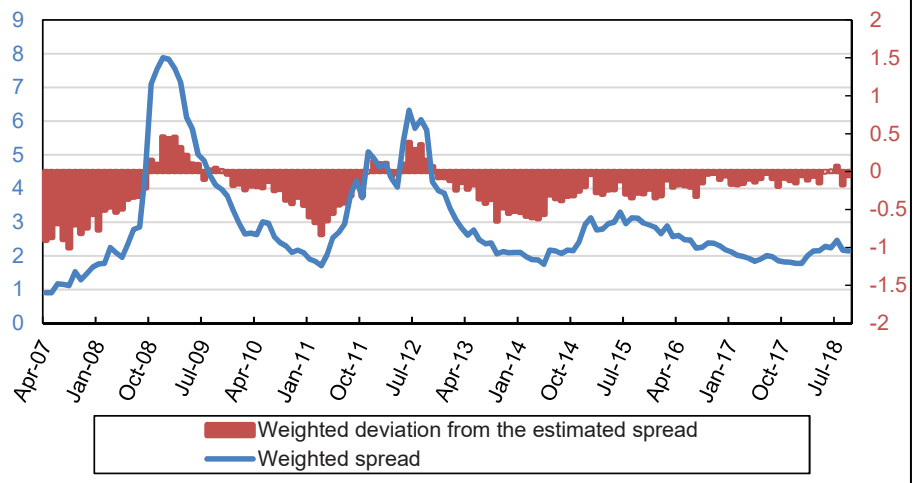
The various corporate bond indices were also influenced by the high market volatility during the final months of 2018, and their values fell sharply. However, in early 2019, as volatility became more moderate, the indices again rose and are currently at a higher level than they were prior to the sharp declines (Figure 7). The situation is similar in the bond spreads for all industries (apart from insurance and finance), except for bonds issued by companies in the commerce and services industry, and even more so for companies in the investment and holdings industry, in which the spreads remained relatively high (although the number of series in this industry is small). There was greater variance with respect to ratings: Higher-rated bonds (A and AA) returned to a level similar to what preceded the volatility in the markets, while the spreads on BBB-rated bonds started to rise as early as the beginning of 2018, and are currently at a level higher than their long-term average, although the number of series with this rating is low. This result apparently reflects a better differentiation between bonds of different risk levels and, accordingly, it appears that the possibility of an underpricing of risk has declined significantly. It is also worth mentioning that the outlier development in the investment and holdings industry and in the BBB rating is largely due to the small number of bond series in these indices.

[10] There is also a negative gap between the yields of indexed bonds but it is only -0.3 percent, such that the negative gap is not the result of different inflation expectations.

In order to statistically test whether risk is underpriced[11], we estimated an equation that connects the spread on each bond with a number of groups of explanatory variables that, according to the literature, influence the spread. These include characteristics of the bond, characteristics of the issuing company and characteristics of the economic environment.[12] After estimating the relationship, we looked at the predicted spread according to these same factors, where the difference between the actual spread and the predicted spread according to the model constitutes an indicator of over- or underpricing of risk. Thus, if the difference is negative, risk is underpriced, and if it is positive there risk is overpriced. Figure 8 shows the average deviation for each month.[13] The graph shows that during periods of sharp increases or decreases in spreads, there is increased likelihood of over- or underpricing, respectively, of risk. In any case, an examination of the bond market as a whole indicates that this concern does not currently exist.

The corporate bond spread deviation from the estimated spread according to the pricing model is close to zero, which seems to indicate that corporate bond risks are not underpriced.

Figure 8
The Weighted Corporate Bond Spread and the Average Deviation from the Estimated Spread, Apri 2007–September 2018
(excluding bank and insurance company bonds, monthly data)



SOURCE: Bank of Israel calculations.

[11] It is possible to replace the term "underpricing" with "risk appetite" and instead of a decline in underpricing, one could instead refer to a decline in risk appetite. Even though the terms are of course related, when we use the term underpricing we assume that there is some objective valuation of risk, meaning the possibility that a particular bond will default (and what the rate of repayment will be if a failure occurs), and that investors may agree to pay more than the price derived from the risk level (or less in the case of overpricing of risk) for a similar level of risk according to prevailing market conditions. This is also the assumption underlying the test we carried out.

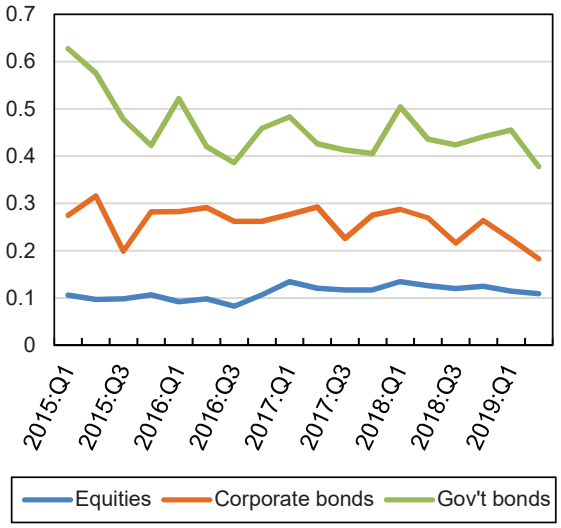
[12] Based on current work being done in the Research Department. The dependent variable is the logged spread and the explanatory variables related to the bond are: duration (or the term to maturity), indexation type, rating, and type of lien. The explanatory variables for the company are: industry, total assets (and total assets squared), total liabilities in bonds, leverage, the interest coverage ratio, return on equity, and the share's standard deviation during the last 90 days. The variables related to the economic environment are: the volatility of the Tel Aviv 125 Index, the real annual interest rate, the slope of the real yield curve (10-year yields relative to one-year), the gap between the capital adequacy of the banking system and the ratio required by the Supervisor of Banks, and a fixed effect at the level of the company. This estimation only included commercial companies (excluding banks and insurance companies), and investment-grade bonds with a duration of more than 6 months and without excessive values in the spreads. The results are not sensitive to the addition of various variables (such as liquidity variables). The standard deviations are not subject to heteroscedasticity or serial correlation. The explanatory power of the model is adj R^2=0.63. Even though the valuation of the various parameters is the result of investor activity, the fact that there is variation over time, both in the explanatory variables and the dependent variables, makes it possible to determine the average valuation and to use it to test whether, given the average valuation of the parameter, the overall valuation of risk is high or low.

[13] Gilchrist and Zakrajšek (2012) carry out a similar analysis and call the average deviation an "Excess Bond Premium" (EBP). They show that EBP leads real business cycles. Barnea and Menashe (2015) calculate the EBP for Israel and find a similar result; see: E. Barnea & Y. Menashe (2015), "Bank Strategies and Credit Spreads as Leading Indicators for Real Business Cycle Fluctuations", Bank of Israel Discussion Papers Series 2015.07, Bank of Israel Research Department; S. Gilchrist & E. Zakrajšek (2012). "Credit Spreads and Business Cycle Fluctuations", *American Economic Review*, 102(4), 1692–1720.

The share of bonds issued by foreign companies continued to shrink, similar to the trend observed since the beginning of 2018. From January to May 2019, bond issues totaled only NIS 890 million, which represents a monthly average of NIS 178 million. This is in contrast to a monthly average of NIS 640 million in 2018. Similarly, the share of foreign bonds is also shrinking in the construction and real estate industry, which declined from 20.7 percent in mid-2018 to 17.9 percent in June 2019. The change in trend is a result of both the drop in the value of foreign bonds and an increase in their spreads on the one hand and a net decline in the number of traded bonds and in their total nominal value on the other. Therefore, it can be said that investors are currently differentiating between foreign and domestic bonds, while taking into account the excess risk of the former over that of the latter, particularly in view of the recent realizations of these risks in the case of foreign bonds.

The ratio between daily turnover and average market capitalization indicates a slow decline in liquidity in the three main financial instruments.

Figure 9
The Ratio between Daily Turnover and Market Capitalization—Equities, Government Bonds and Corporate Bonds, 2015–19 (quarterly data)



SOURCE: Bank of Israel calculations.

Trading liquidity

Apart from the current developments in financial asset prices, another important aspect of asset valuation and the assessment of their stability is the liquidity situation of each asset. Liquidity in the markets allows investors to manage their securities portfolio in an optimal manner and with negligible cost, which is primarily reflected in the ability to buy and sell securities without the transactions having a significant influence on prices. When the cost is not negligible, and particularly when the cost is higher on trading days when uncertainty is increasing, investors will seek to reduce the value of their assets and compensate themselves for the high costs of trading by demanding a liquidity premium.

The liquidity situations of each type of security surveyed above can be compared by examining the ratio of trading volume to market capitalization, which is referred as the turnover rate (Figure 9).[14] The graph shows a high level of variance between the different types of securities, and in all cases there is a visible downward trend in the liquidity situation, primarily in government and corporate bonds (which is even more pronounced over a longer period).

The liquidity of equities is also low compared to other countries.[15] Moreover, passive investment in Israel, as in many other advanced economies, constitutes one of the main channels for investor activity in the equity market and asset trading on the stock market. Passive investments are reaching significant levels, particularly among the smaller equities included in the index (Figure 10). The graph shows that the share of passive investments is liable to reach 30 percent of total trading of equities included in the Yeter 60 Index.[16] Inasmuch as passive trading is concentrated in thinly traded shares, the magnitude of the changes in asset prices will be greater. Automated trading (algorithmic trading) also increases the intensity of fluctuations, as shown in the literature and as described in detail in Box 3 of the Financial Stability Report for the second half of 2018.

Government bonds have low liquidity relative to those of other countries (Figure 11), although an important development that is likely to influence their liquidity is the expected inclusion of government bond series in the World Government Bond Index (WGBI) in September 2019. The inclusion was made possible by the fulfillment of

[14] Although this index provides only a partial indication of the liquidity situation, it is nonetheless an important index for international comparisons.

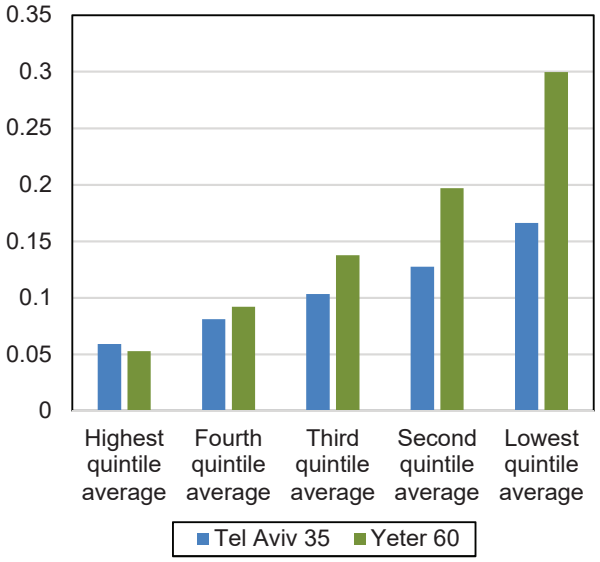
[15] See the discussion in the Financial Stability Report for the second half of 2018.

[16] On certain trading days during the month, total passive trading in small shares relative to the rest of the shares in the index reaches over 40 percent.

two criteria set by the FTSE: an investment rating of higher that A- and a debt size (for the first time) of more than $50 billion. It is important to emphasize that the inclusion of Israel's government bonds will automatically lead to higher demand from the managers of global investment funds that track this index. At the same time, the inclusion of the bond series in the WGBI, given the natural turnover rate of these series, is liable to result in larger fluctuations in their prices, particularly in trading periods characterized by growing uncertainty.

The rate of passive investment is particularly high for infrequently traded equities.

Figure 10
Trading of an Equity Through an ETF Compared with Total Trading of the Equity, February–July 2018 (periodic average, by quintile)

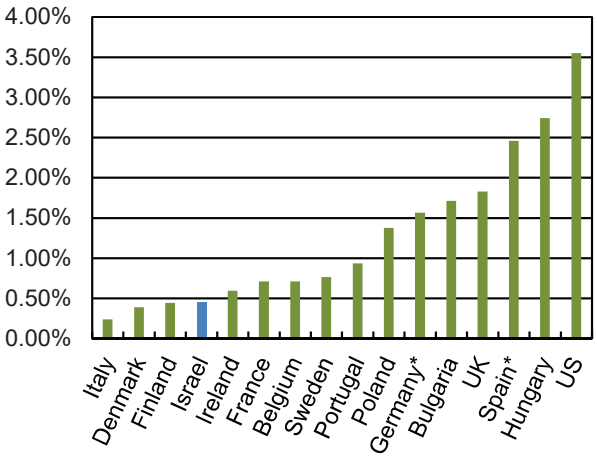


* The equities included in the indices are divided into five groups by turnover, with the lowest quintile containing the least-traded equities in the index.

SOURCE: Bank of Israel calculations.

Israeli government bonds have low liquidity by international comparison.

Figure 11
The Ratio between Turnover and Market Capitalization of Government Bonds, Selected Countries, 2018 (yearly average, daily terms)



Note: Bulgaria, Ireland and Hungary have relatively little issued government debt, so this index may be downward biased. However, the turnover rate over the years in those countries is not excessively volatile. The calculation for Israel includes only tradable government bonds.
* Data for Germany and Spain are 2017 data.

SOURCE: AFME for European countries, and reports by the central banks.

Liquidity risk of financial assets traded on the stock market – tracking their co-movement

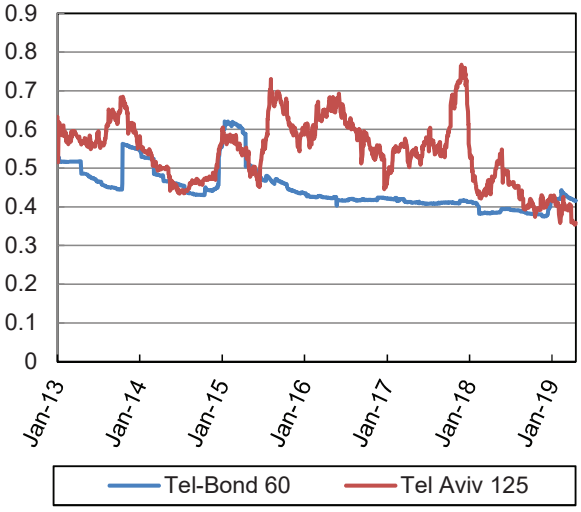
An increase in the proportion of passive instruments (such as ETFs) in securities trading increases the comovement of asset prices included in those instruments. The common trend that is created due to the trading in securities only because they are included in a particular index increases the intensity of movements in those securities, amplifies the fragility of the market, and may even create a liquidity risk premium that reduces the value of the assets. At the same time, the possibility of a large fluctuation in trading due to an algorithmic failure by one of the trading robots (quote generators) is not insignificant in Israel, since there are still no protective mechanisms in stock market trading like those in many other stock markets. Further, algorithmic trading constitutes a significant proportion of trading on the stock market (see the Financial Stability Report for the second half of 2018, Box 3 on algorithmic trading and Box 4 on passive investments). These two important developments boost the overall liquidity risk in the stock market.

In order to examine the developments in joint volatility of asset prices included in the main indices, namely the Tel Aviv 125 and the Tel Bond 60, we revised the best estimate for each asset included in the index. The estimate is based on the Capital Asset Pricing Model (CAPM) and reflects the sensitivity of financial asset prices

relative to the asset index (the market portfolio).[17] After calculating the standard deviation of the beta estimates for all of the assets included in the index over time, it is possible to test the changes in the quality of trading and the stability of asset prices, particularly during periods of increasing uncertainty. If the standard deviation, which reflects greater joint volatility, is lower, trading will be more fragile and liquidity risk will increase. As Figure 12 shows, the standard deviation indeed has fallen over time, and continued to do so during the reviewed period. This indicates that the liquidity risk in stock market trading has increased.

The standard deviations of the beta estimator for the securities included in the Tel-Bond 60 and the Tel Aviv 125 are in a downward trend, and indicate increasing liquidity risk.

Figure 12
Standard Deviations of the Beta Estimator for Securities Included in the Tel-Bond 60 and the Tel Aviv 125, Daily Average, 2013–19



SOURCE: Bank of Israel calculations.

The distribution of securities holdings

The distribution of securities holdings may affect the degree to which shocks are reinforced during a crisis. The longer the investor's holding period is, the less correlated his trading decisions will be with market sentiment, perhaps even negatively correlated. In contrast, the actions of an investor who holds for the short term will tend to be correlated with market sentiment, i.e. he will sell when the market is dropping and buy when the market is rising. Therefore, the identity of the holders of securities is important in evaluating the intensity and duration of shocks.

According to the aforementioned division, it can generally be said that mutual funds have a shorter investment horizon[18] than pension funds, banks and insurance companies. However, it is not possible to unambiguously categorize foreign investors and the public (households and commercial enterprises). With respect to provident funds (pension and severance funds) and advanced training funds, the proportion of their liquid liabilities has increased significantly in recent years, and in March 2019 it reached over 70 percent of their total liabilities (NIS 330 billion). In contrast, these funds have liquid assets against only about 38 percent of this amount, such that in order to meet their commitments in a stress event, nonliquid assets may also be sold, including equities and bonds. Therefore, we have also treated these amounts as sources for short-term investment.[19]

Based on this classification, we examined the proportion of short-term investors in the holdings of each of the abovementioned three assets: government bonds, equities and corporate bonds (Figure 13). The figure shows that the proportion of short-term investors is largest in the case of corporate bonds and has risen consistently since mid-2016. Therefore, the risk of the reinforcement of shocks for this type of security is the largest, relative to government bonds and equities.

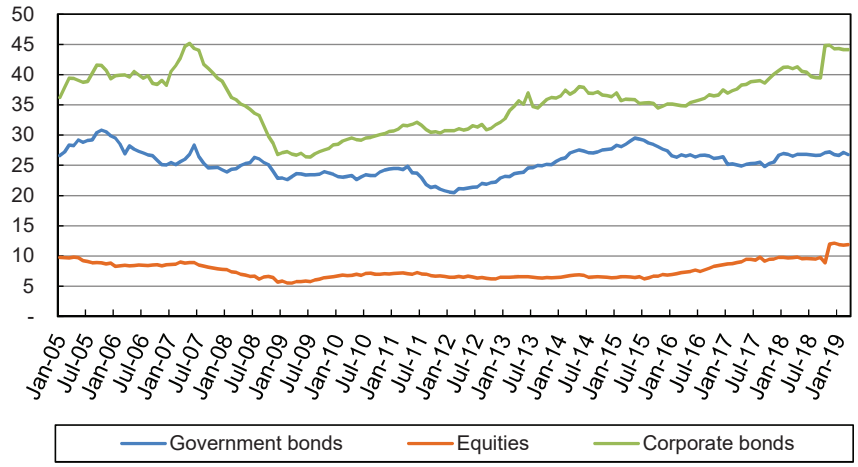
[17] The more sensitive the assets included in the index are to the index, the higher the joint volatility is, and the beta estimates will approach the value of one (whether from above or below). The calculation of each beta estimate is based on at least 90 consecutive trading days.

[18] Of course, the investment horizon of households that invest by way of mutual funds is heterogeneous. However, in contrast to the other types of institutional investors, shorter investment horizons are certainly more common. Similarly, in the context of shock reinforcement, mutual funds were indeed found to contribute to increasing deviations from correct valuation, both upward and downward (see F. Akbas, W. J. Armstrong, S. Sorescu, & A. Subrahmanyam, 2015, "Smart Money, Dumb Money, and Capital Market Anomalies", *Journal of Financial Economics*, 118(2): 355–382.

[19] It is worth mentioning that the trends presented in the following graph are identical even if they don't include the rate of provident fund and the liquid advanced training fund holdings.

The rate of corporate bond holdings by investors with a short investment range is in an upward trend, and may provide a channel for the intensification of shocks.

Figure 13
The Rate of Corporate Bond, Government Bond, and Equity Holdings by Investors with a Short Investment Range, January 2005–February 2019



Note: Investors with a short investment range = mutual funds + the liquid portion of the liabilities of advanced training and provident funds. In October 2018, ETFs joined mutual funds, so there is a jump in the rate of holdings in that month. ETN (the instrument that became ETFs) holdings were not included in the calculation prior to that, so the values in the period preceding October 2018 should be viewed as an underestimate of holdings by investors with a short investment range.

SOURCE: Bank of Israel calculations.

1.2.2 Housing

The upward trend in home prices was halted in the second half of 2018, and some price declines were even observed. Since the last index published (for March 2019) was positive, the annual change in home prices stabilized at about one percent. However, rent rose by 2.6 percent (March 2019 compared to March 2018), such that the ratio between the two indices—the higher the ratio, the greater the fear of overvaluation of home prices—declined to its level from the end of 2015 (Figure 14). Thus, as already mentioned, the concern that homes are valued beyond their reasonable price diminished somewhat, and the fear of explosive behavior in home prices similarly decreased.[20]

Another index of the valuation of housing is calculated by means of the number of salary years needed to purchase a home according to the average wage per salaried position. This index fell consistently during the past year, due both to the growth in the average wage per salaried position and the stagnation in home prices. The index, which currently stands at 12.5 years, is about 12 percent lower than its high value at the end of 2017 (Figure 15). Nonetheless, the index is about 28 percent higher than its long-term average (9.8 years).[21]

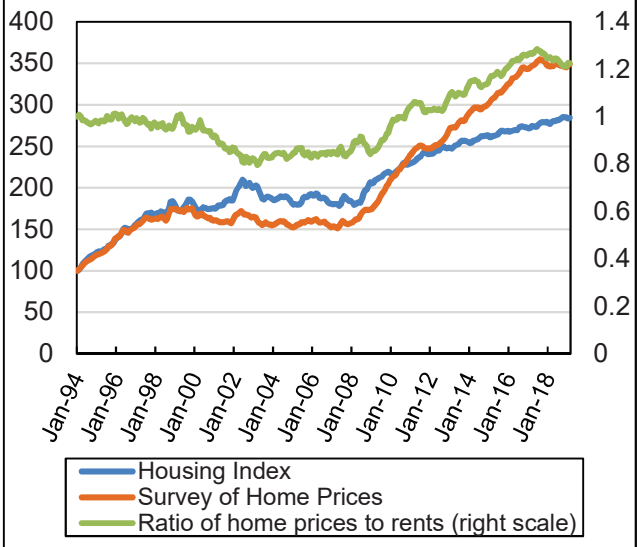
Looking forward, the two most important factors that are likely to affect home prices are the ratio of demographic demand to supply in the residential market, and the level of the interest rate on mortgages, which is influenced by, among other factors, the monetary interest rate, long-term yields on government bonds, and the global interest rate environment, which remained low in the reviewed period. The supply of housing, as measured by the number of residential housing completions, is at a higher level than in previous years. But looking forward, the number of housing starts has been in a downward trend for the last two years, which is liable to result in a relative shortage in housing. This situation is also reflected in the index of investment in residential construction, which indicates

[20] The index is based on the ratio between home prices and the housing (rent) index. See I. Caspi (2015), "Testing for a Housing Bubble at the National and Regional Level: The Case of Israel", Discussion Paper Series 2015.05, Bank of Israel Research Department.

[21] It is worth mentioning that the ratio of the average price of a home to net household income has risen, but by a more moderate rate, due to the reductions in the income tax and the increase in labor force participation in Israel.

The stability in home prices and the increase in rents led to a decline in the ratio between them.

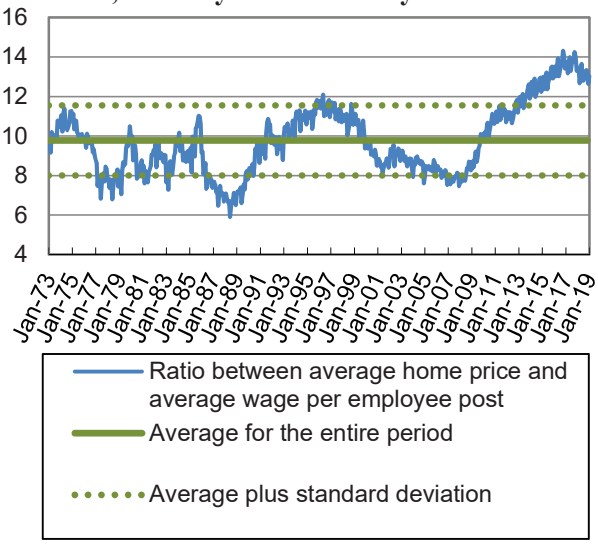
Figure 14
Survey of Home Prices, Housing Index (rents), and the Ratio of Home Prices to Rents, January 1994–January 2019



SOURCE: Bank of Israel calculations.

The number of wage years necessary to purchase a home declined.

Figure 15
Number of Wage Years Necessary to Purchase a Home[a], January 1973–January 2019

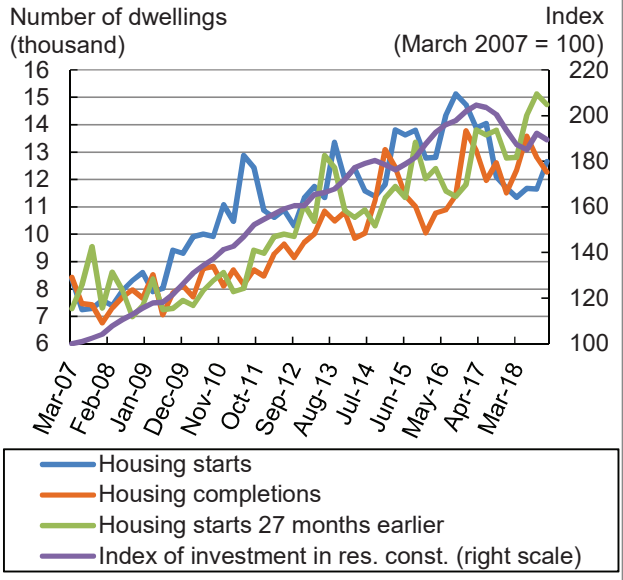


[a] According to the average wage per employee post and the average home price.

SOURCE: Bank of Israel calculations.

The number of housing starts has again increased in recent months, but remains relatively low.

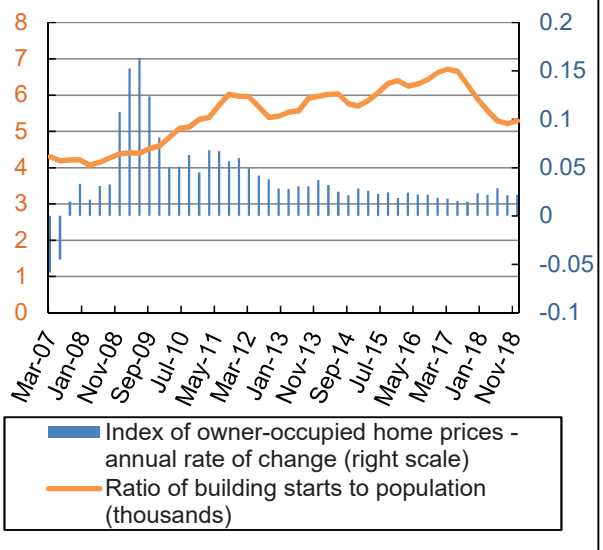
Figure 16
Housing Starts and Completions, March 2007–December 2018



SOURCE: Based on Central Bureau of Statistics.

The decline in building starts in recent years may lead to a renewed increase in home prices.

Figure 17
Ratio of Building Starts (sum of past 4 quarters) to Population, and the Index of Owner-Occupied Home Prices, March 2007–December 2018



SOURCE: Based on Central Bureau of Statistics.

a significant decline during the past two years (Figure 16). As a result of the decline in housing starts, the ratio between housing starts and the total population has also declined, an indicator that supports the possibility of a shortage in housing and a renewal of the upward trend in home prices (Figure 17). Therefore, in our estimation, the chances of a sharp drop in home prices have declined.

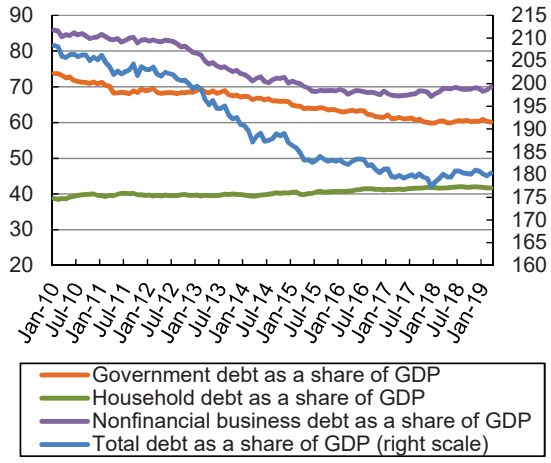
1.3 The credit market

	2018:2	2019:1
The business sector		
The household sector		

The debt to GDP ratio continued to rise at a moderate pace during the reviewed period, reaching 180 percent of GDP. This follows a downward trend in recent years, which lasted until the end of 2017 (Figure 18). Although relative to other countries, the debt to GDP ratio—and particularly the ratio of household credit to GDP—remains low, the growth in credit is concentrated in the construction and real estate industry which increases the likelihood that any difficulties encountered by the industry will affect the entire economy. As a result of changes in the legal environment in which credit providers in Israel operate, the continuing low interest rate environment, and the effect of the numerous reforms to encourage competition in the credit market, credit risk is liable to increase in the long term.

The ratio of debt (and its various breakdowns) to GDP increased in the reviewed period, mainly due to business credit.

Figure 18
Ratio of Total Debt and its Segments to GDP, January 2010–March 2019 (percent)



SOURCE: Bank of Israel calculations.

Most of the credit to the private sector—businesses and households—is provided by the banks and the insurance companies by means of direct loans to households and businesses and by means of the purchase of bonds issued by the business sector.

The financial system continued to increase its exposure to mortgages and to the construction and real estate industry during the reviewed period. In the banking system, this exposure reached more than 50 percent of total credit. The institutional investors also increased their exposure to mortgages and to the construction and real estate industry by way of the credit channel, reaching about 6 percent of the total loans they provide (Figure 19).[22] The institutional investors' exposure to the housing market is primarily derived from their holdings of bonds issued by construction and

[22] In order to calculate the institutional investors' exposure by way of the credit channel, we calculated the ratio between (1) the total housing loans they have provided to households, the syndication portfolios they purchased and their holdings of tradable and nontradable bonds issued by Israeli companies in the construction and real estate industry (according to the Central Bureau of Statistics classification) and (2) the total loans they have provided. This estimate is downward biased since the Bank of Israel does not possess full information on the direct loans provided by the institutional investors to the construction and real estate industry.

real estate companies, usually without collateral, but also from direct loans to these companies and the purchase of syndication portfolios that are based on the bundling of mortgages from the banks' balance sheets.

The number of nonbank credit providers in Israel has increased in recent years and total nonbank credit has grown significantly during this period. Until 2016, these entities were not supervised by a regulator. The Supervision of Financial Services Law (Regulated Financial Services), 5776–2016 introduced a licensing obligation, and nonbank credit providers must now be licensed by the Capital Market, Insurance and Savings Authority. The Authority is currently developing regulations for the activity of these entities and for the gathering of data. There are currently 156 credit provision licensees in the Authority's database, and 51 of them have an expanded license that permits them to lend more than NIS 25 million. There are also about 700 companies that have requested a license and have not yet received one (even though they are already providing credit).[23]

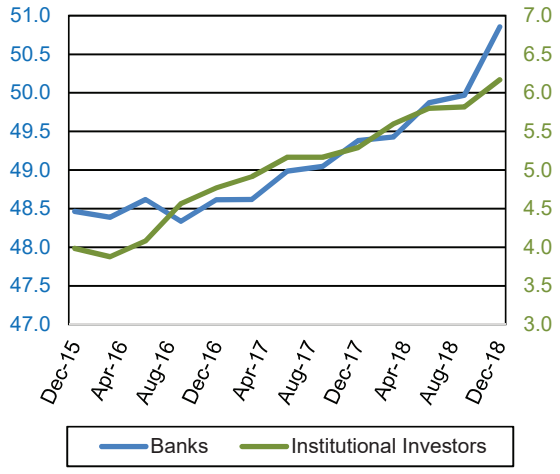
In accordance with the Credit Data Law, 5776–2016, the Bank of Israel has created a central credit data register of households in Israel. The banks began reporting to the system in the first quarter of 2019, and other credit providers have joined them. Once the main nonbank credit providers join the reporting system, it will include sufficient information to evaluate the credit risk of households, which will complete the information on the activities of nonbank credit providers that have begun operating in the household sector.

1.3.1 Credit to the business sector

Business sector debt grew by about 7.4 percent (about NIS 63 billion) in 2018, which is higher than its growth rate in recent years. A significant portion of the increase (about 2 percentage points) is explained by the depreciation of the shekel. The growth in business sector debt continued into the first quarter of 2019, by 2.8 percent adjusted for the appreciation of the shekel. Bank debt as a share of total business sector debt remained at 48 percent. Business sector debt as a percentage of business product remained low relative to other countries[24] (about 94 percent at the end of 2018 and virtually unchanged since the end of 2017). Our assessment is that part of the explanation for the low business debt to GDP ratio stems from the long-term increase

The banks and institutional investors continued to increase their exposure to real estate through the credit channel.

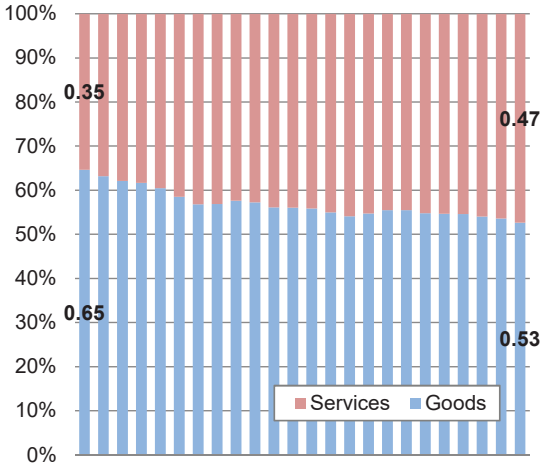
Figure 19
Credit to Real Estate as a Share of Total Credit Provided by the Banks and Institutional Investors, December 2015–December 2018



SOURCE: Bank of Israel calculations.

The services industries' share of business sector product has grown over the years, at the expense of the goods industries.

Figure 20
The Goods and Services Industries as a Share of Business Sector Product, 1995–2018



SOURCE: Based on Central Bureau of Statistics.

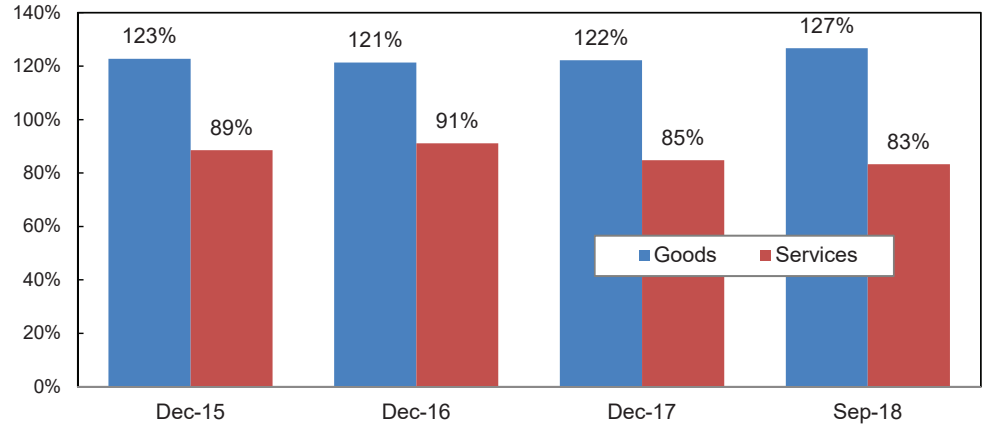
[23] Of the companies registered, only 11 are public and therefore publish financial statements, while one is a subsidiary of a public company. Total credit provided to the business sector was about NIS 4.3 billion in December 2018. The credit provided by two of the companies (Albar, a public company, and Mimun Yashir, a subsidiary of the public company Bituah Yashir) that provide loans to households, totaled NIS 2 billion.

[24] For further details, see Chapter 4 of the Bank of Israel *Annual Report* for 2018.

of the service industries' share of business sector product in Israel, at the expense of the goods industries (Figure 20). Since the service industries are characterized by low levels of credit, we see that the goods industries have a significantly higher ratio of business debt to business output, a trend that is increasing, alongside the downward trend in the services industries (Figure 21). The services industries, and particularly the technological industries, obtain financing primarily by means of venture capital funds and less by taking on liabilities. This is partly explained by the fact that companies in the technological industries do not have sufficient tangible assets that can be used as collateral for loans, and most of their assets are intangible, which, for the most part, cannot serve as collateral.

The goods industries are characterized by a significantly higher level of business debt relative to business product, a trend that is growing alongside a declining trend in the services industries.

Figure 21
Business Sector Debt, by Goods and Services Industries[a], as a Share of Business Sector Product, December 2015–September 2018



[a] Business sector product according to goods and services industries is separated in accordance with the Central Bureau of Statistics 2011 GDP Industrial Classification. The following is the separation:
Goods - Agriculture, Forestry and Fishing; Mining and Quarrying Excluding Diamonds; Manufacturing; Electricity Supply; Water Supply, Sewerage, and Waste Management; Construction; Wholesale and Retail Trade, and Repair of Motor Vehicles; Transportation and Storage, Postal and Courier Activites; and Accommodation and Food Services.
Services - Information and Communication; Financial and Insurance Services; Real Estate Activities; Professional, Scientific and Technical Services; Administrative and Support Services; Arts, Entertainment, and Recreation; and Other Services.
Business sector debt is separated along the same lines. Out of total business sector debt, there is a sum of about NIS 85 billion in loans from institutional investors that is unclassified, and is included under goods (in accordance with the findings discussed in Chapter 4 of the Bank of Israel Annual Report for 2018).

SOURCE: Based on Central Bureau of Statistics.

The main development in total debt from the end of 2017 until the end of 2018, in terms of both percent and quantity, occurred in the manufacturing and production industry (about NIS 18 billion representing an increase of 16 percent) and in the construction industry (about NIS 10 billion representing an increase of 12 percent). The increase in credit to the construction industry is due to the growth in bank credit to the industry following some easing of regulations (as described below). The growth in credit to the construction industry comes on the heels of a slowdown in the growth of real business product in this industry to a level of 2 percent (as compared to an average of about 6 percent during the last two years and an average of about 5.4 percent during the last decade), even though its share of business product remained unchanged relative to last year.

Bank credit and its quality

Bank credit to the business sector grew by 7 percent (about NIS 29 billion) in 2018, compared to 3.5 percent in 2017. This trend continued in the first quarter of 2019, when it grew by 2.5 percent (6.5 percent in the past 12 months). About half of the growth in the credit provided by the five large banks during 2018 was to large businesses, and a significant portion of that went to the construction and real estate industry, which is explained by an easing of industry liability constraints for the construction industry, as mentioned above.

An analysis of the indices of bank credit quality[25] for 2012, 2017 and 2018 (Table 4) shows that on an aggregate level, the improvement in credit to the business sector continued, such that as of the end of 2018 problematic and impaired debt to this sector was at an historically low level. On the other hand, in the manufacturing industry (which accounts for about 11.5 percent of the credit provided by the five large banks) there was a deterioration in all credit quality indices in 2018, which may indicate a higher level of credit risk in this industry. The communication and computer services industry was among those characterized by relatively low credit quality. While some of the indices in these industries showed improvement in 2018, it is worth mentioning that these industries account for a small share of bank credit (2.5 percent), even though their share of business sector product is high (13 percent). This is partially explained by the fact that the companies in these industries obtain financing from venture capital funds.

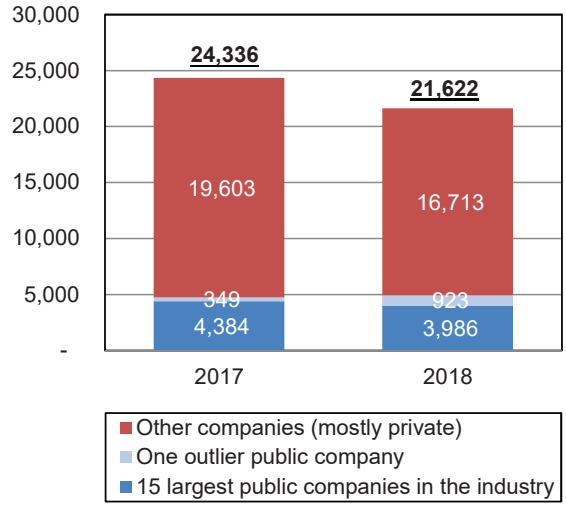
Bank credit to the construction industry

The indices of bank credit quality (Table 4) for the construction industry point to an improvement in 2018, with low ratios relative to previous years and to other industries. Nonetheless, the increase in bank credit to the construction industry comes against the background of an extended slowdown in the housing market and in the growth of business product in this industry. The increase in credit was driven by the regulatory easing approved by the Banking Supervision Department in the context of off-balance-sheet credit (Sales Law guarantees) after the banks reached the industry liability limit.

The slowdown in the housing market in 2017[26] continued with greater intensity in 2018. The drop in housing starts (of about 10.4 percent in 2018) alongside a decline in new home sales (of about 11 percent) are evidence of a significant slowdown in the activity of residential construction companies, a trend that continued into the first quarter of 2019. Data on the new home sales in 2017–18 by the 16 largest public companies (Figure 22) show a significant drop in the sales, primarily among private companies and the smaller public ones.

New home sales declined in 2018, felt mainly among private residential construction companies.

Figure 22
New Home Sales, 2017 and 2018



SOURCE: Based on Central Bureau of Statistics and published financial statements.

[25] This analysis presents a broad picture of the companies that obtained credit (private and public; small, medium-sized and large), which can provide an indication of which industries have a higher default probability.

[26] For further details, see the Bank of Israel *Annual Report* for 2017 and the box in the Financial Stability Report for June 2018 entitled "The Financial Stability of the Residential Construction Companies".

Table 4: Quality indices of balance sheet credit to the business sector, by industry (CBS classification), the five large banking groups, 2012, 2017, and 2018

	Industry's share of business sector product	Credit to the industry as a share of total balance-sheet credit to the business sector	Ratio of credit loss allowance to total balance-sheet credit to the industry			Problematic credit as a share of total balance-sheet credit to the industry			Impaired credit as a share of total balance-sheet credit to the industry		
			31/12/2012	31/12/2017	31/12/2018	31/12/2012	31/12/2017	31/12/2018	31/12/2012	31/12/2017	31/12/2018
Trade	15.6%	18.1%	2.0%	2.2%	2.0%	5.9%	4.4%	3.6%	3.0%	1.5%	1.3%
Construction	8.6%	17.0%	1.8%	1.1%	1.0%	13.3%	4.5%	3.3%	9.5%	2.2%	1.6%
Financial services	24.3%	13.5%	2.5%	1.0%	0.8%	6.4%	1.3%	1.0%	4.8%	0.8%	0.8%
Real estate activity		13.4%	1.6%	1.2%	1.1%	6.8%	2.7%	2.6%	5.7%	2.1%	1.8%
Manufacturing and production*	19.8%	11.5%		2.0%	2.3%		5.7%	6.2%		2.3%	2.5%
Business and other services	9.1%	6.4%	1.4%	1.4%	1.5%	2.8%	1.7%	1.9%	1.8%	0.8%	1.0%
Transport and storage	5.0%	4.6%	1.8%	0.9%	1.0%	12.2%	3.0%	2.8%	3.4%	1.1%	1.1%
Public and community services		4.6%	0.6%	0.7%	0.7%	3.5%	1.1%	1.1%	2.6%	0.5%	0.5%
Hospitality, food and beverage services	Together with business and other services	3.5%	1.3%	1.0%	1.3%	9.8%	5.1%	4.7%	8.1%	3.0%	2.4%
Communications and computer services	13.0%	2.5%	1.1%	3.0%	3.3%	6.0%	7.7%	4.4%	3.3%	6.0%	3.4%
Electricity*, gas and air conditioning supply	2.2%	1.7%		0.4%	0.3%		3.9%	3.7%		2.9%	2.6%
Water supply*, sewage services, and sanitation		1.0%		1.8%	2.2%		18.6%	18.0%		1.1%	0.3%
Agriculture	1.9%	1.3%	1.6%	1.7%	1.3%	5.5%	3.4%	3.7%	2.8%	1.5%	1.1%
Mining and quarrying*	Together with manufacturing	0.9%		0.7%	0.7%		0.7%	0.5%		0.7%	0.3%
Total business sector	**100.0%**	**100.0%**	**1.8%**	**1.4%**	**1.4%**	**7.7%**	**3.8%**	**3.3%**	**4.8%**	**1.8%**	**1.5%**

* In the manufacturing and production, mining and quarrying, water supply, and electricity supply industries, details of bank debt for 2012 were not provided.

SOURCE: Based on Central Bureau of Statistics and published financial reports.

In parallel to the slowdown in the housing market, balance-sheet bank credit to the construction industry grew and the financial statements of the five large banks for 2018 indicate that a significant portion was provided to the residential construction industry.[27] According to the financial statements of three out of the five banks, about 40 percent of the credit was provided for the purchase of land and the rest—about 60 percent—was provided for construction activity.

However, it is worth mentioning that balance-sheet credit constitutes only one component of total bank credit to the residential construction industry. Another component, which supplements balance-sheet credit, is Sales Law guarantees (off-balance-sheet credit) that is provided to homebuyers. Thus, when a residential construction company obtains credit from a bank to accompany a project, it is usually in the form of a line of credit that can be used by the construction company as the project progresses. In addition, the bank serves as a guarantor to homebuyers for the cash flow paid to the construction company for their home, in case the construction company fails to provide the home to the buyer. The cash flow to the construction company from the homebuyers reduces the company's need to use the entire line of credit allocated to it to finance the progress of construction, but in parallel a off-balance-sheet guarantee is created, which is attributed as an off-balance-sheet liability of the lending bank.

The regulatory easing for the construction industry reduced the conversion coefficient of the Sales Law guarantee for homes under construction[28], and enabled the banks to essentially increase their balance-sheet credit at the expense of their off-balance-sheet credit.

An analysis of all the factors pointing to a slowdown in the activity of the residential construction companies and the differentiation between the two main factors that make up total credit (Figure 23) indicates that the balance-sheet increase in credit to the construction industry is primarily due to the shift of off-balance-sheet credit to balance-sheet credit, and is only partially designated to finance a future increase in the activity of the construction companies (the portion used for the purchase of land).

Furthermore, an analysis of the liabilities of the public companies indicates that bank credit did not increase significantly among these companies. It can herefore be concluded that the growth in balance-sheet bank credit was directed to private companies whose activities contracted, and that it was largely intended to replace the cash flow from homebuyers in view of the drop in new home sales.

As such, the growth in balance-sheet bank credit to the construction industry, which was a result of the loosening of regulatory limits, can be said to have increased the leverage and the risk level of the companies to which it was channeled, and allowed them to cope with the slowdown in sales, among other things.

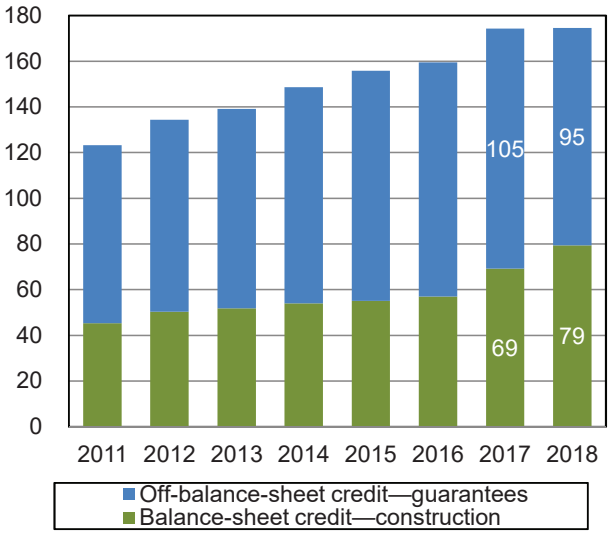
Another indication of the increase in leverage can be seen from total bank credit to the construction industry, adjusted for the Index of Home Prices (Figure 24). Although the growth in bank credit is due to the increase in home prices—since 2011, total credit adjusted for the index remained relatively unchanged—the deviation to above the average during 2017–18 indicates that the growth in balance-sheet credit is accompanied by some decline in the level of collateral that will be available to the banks.

[27] It is worth mentioning that this disclosure is not according to the uniform reporting requirements of the Banking Supervision Department, and is therefore not uniform. In order to analyze and understand the trend, we consolidated the data according to the relevant information provided in the disclosure.

[28] The conversion coefficient relates to the manner in which bank credit risk due to homebuyer guarantees is calculated. The coefficient is multiplied by the amount that the bank is guaranteeing, and is calculated as part of the bank's credit risk, making it relevant for the industry liability limit. In November 2018, the Banking Supervision Department published a revision of Proper Conduct of Banking Business Directive 203, according to which the conversion coefficient for credit due to the guarantee of a homebuyer's investment, which is provided according to the Sales Law, would be reduced from 50 percent to 30 percent if the home had not yet been delivered to the buyer.

Balance-sheet bank credit to the construction industry increased after the shift of off-balance-sheet credit due to regulatory easing, following the slowdown in activity in the industry.

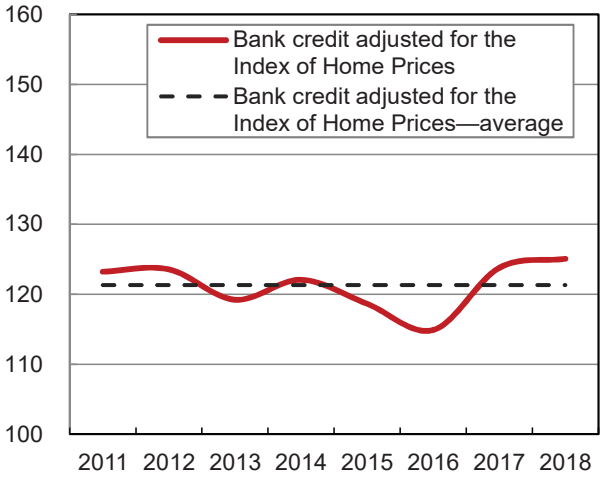
Figure 23
Bank Credit to the Construction Industry, 2011–18 (five large banks, NIS billion)



SOURCE: Published financial statements.

Total bank credit to the construction industry, adjusted for the Index of Home Prices, has remained relatively stable since 2011.

Figure 24
Bank Credit to the Construction Industry, Adjusted for the Index of Home Prices, 2011–18
(five large banks, NIS billion)



SOURCE: Based on Central Bureau of Statistics and published financial statements.

Nonbank credit

Nonbank credit to the business sector can be divided into three main groups: direct loans from institutional investors, direct loans from nonbank and noninstitutional credit providers (including credit card companies that were recently separated from the banks), and corporate bonds.

The mix of the institutional investors' loan portfolio is conservative and is not characterized by any major risks (see Chapter 4 of the Bank of Israel *Annual Report* for 2018). Thus, about 87 percent of the loans provided are investment grade or higher, about half are provided as part of a consortium (95 percent of which are investment grade) and 94 percent are backed by collateral. Most of the loans that were identified were provided to infrastructure companies and renewable energy companies, many of which were subsidiaries or conduit companies of public companies.

The credit provided by nonbank and noninstitutional entities (the volume of which is based on estimates) is analyzed indirectly since they are financial intermediaries that obtain credit from the banks or from the public (by means of corporate bonds) and provide credit for the activity of businesses. This type of credit is categorized under the financial services industry.

The corporate bond market

In this section, we will primarily analyze corporate bonds, excluding those of foreign companies, but including those issued by the banks and insurance companies.

As of the first quarter of 2019, the balance of corporate bonds (in terms of adjusted value) increased by about NIS 24 billion (about 7.4 percent) relative to the end of 2017, a significant increase compared to the average increase during the last five years (about NIS 12 billion) and compared to the increase in 2017. This increase came from the oil and gas companies (about NIS 4 billion); the construction and real estate companies (about NIS 9.5 billion), the main part of which was provided to two government companies that issued bonds in significant amounts during the

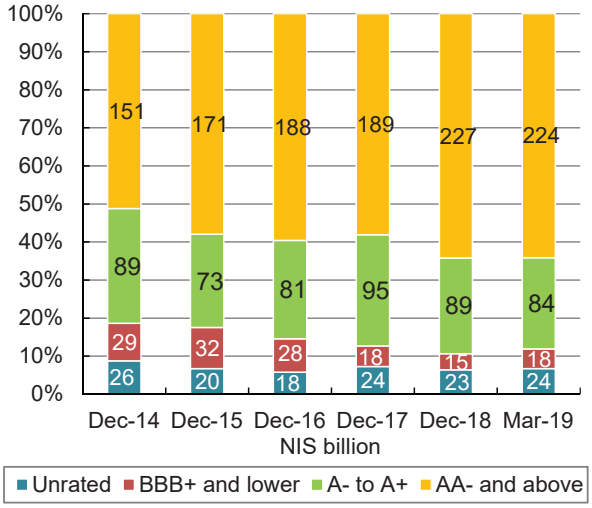
first quarter of 2018 and are categorized in that industry; and the banks (about NIS 8 billion) which returned to issuing bonds, in contrast to the significant decline in 2017. In other words, most of the growth during this period was due to the highest rated companies, as can be seen in Figure 25.

If we ignore the government companies, the data indicate that in 2018 there was a slowdown in the issue of bonds, following a period of growth since 2012 (Figure 26). Nonetheless, in the first quarter of 2019 the growth in corporate bond issues returned to its quarterly average level of recent years. The data on net issues (minus expected redemptions) by the business sector (excluding banks and insurance companies) indicate that in 2018 a larger portion of the issues were intended for the recycling of debt (about 72 percent) than in the previous two years (68 percent in 2017 and 67 percent in 2016). In other words, a smaller portion was intended to finance growth in the companies' real activity.

Another element that is related to the issue of bonds is the decline in the share of bond issues backed by a fixed collateral. From 2015 to 2017 there was a marked increase in this share, but starting in 2017 it declined significantly (Figure 27). The explanation lies in the increase in issues by

Most of the increase in the balance of corporate bonds relative to the end of 2017 has come from companies in the highest rating group.

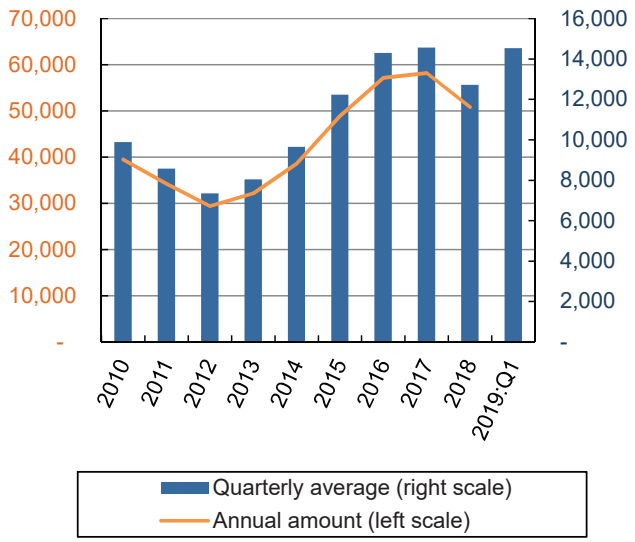
Figure 25
Bond Balances by Rating, December 2014–March 2019



SOURCE: Bank of Israel calculations.

Bond issuances slowed in 2018, following growth since 2012, but returned to previous years' levels in the first quarter of 2019.

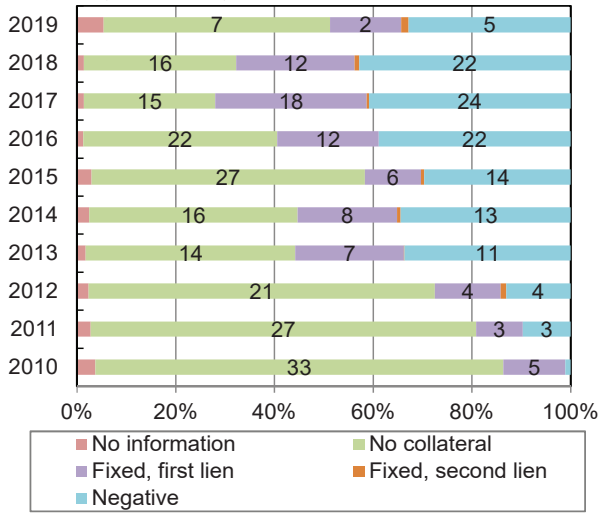
Figure 26
Bond Issuances, Excl. Foreign and Government Companies, 2010–2019:Q1 (NIS thousand)



SOURCE: Bank of Israel calculations.

There has been a downward trend in the issuance of unsecured bonds since 2010. Most of the decline is due to an increase in bonds secured by a negative lien. In parallel, there has been a significant decline since 2017 in the issuance of bonds secured by a fixed collateral.

Figure 27
Corporate Bond Issuances, by Collateral, 2010–2019:Q1 (NIS million)



SOURCE: Bank of Israel calculations.

the banks, which are usually not backed by a lien. There was also a fairly pronounced downward trend in bond issues without collateral between 2010 and 2018, which may indicate a decline in their level of risk. Nonetheless, most of the drop is due to an increase in bonds that are backed by a negative lien, which means that the levels of risk are not unambiguously lower.

1.3.2 Credit to households

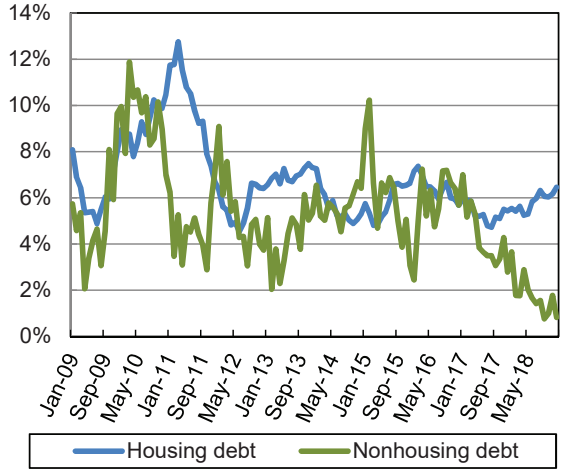
Total household debt reached about NIS 562 billion in March 2019, following an increase of 4.9 percent in 2018, which is somewhat lower than in previous years (5.1 percent in 2017 and 6 percent in 2016). Nonhousing debt increased by 1.5 percent in 2018, which is significantly less than in previous years (3.7 percent in 2017 and 6.2 percent in 2016), while housing debt grew by 6.8 percent in 2018, which is higher than in 2016 (6 percent) and in 2017 (5.9 percent) (see Figure 28 and Table 5).[29]

The household debt to GDP ratio reached 42 percent in 2017 (an increase from 38 percent since 2008, after the ratio remained unchanged in the previous decade). However, this ratio is still low relative to other countries (Figure 29). It is worth mentioning that while housing debt relative to GDP is lower than in other countries, this is not the case for nonhousing debt (15 percent, which is similar to the international average).[30]

Household credit is obtained from five sources: the banks, the credit card companies, the institutional investors, the government and noninstitutional credit providers. At this stage, the Bank of Israel does not have periodic data on the amount of credit provided by noninstitutional entities, and even though it is apparently growing rapidly it is estimated to be only a few billion shekels. The following analysis relates to the total credit from the first four sources. The banks provide the large majority of credit to households (85–89 percent on their own and 4 percent by way of the credit card companies with a bank guarantee), both for housing (94 percent) and for nonhousing (80 percent) credit. The credit provided to households by the institutional institutions remained at a low level in 2018 (5.1 percent of total household credit), although as in previous years it grew rapidly (20 percent in 2018, 40 percent in 2017 and 53 percent in 2016). Similarly, credit provided to households by the credit card companies without a bank guarantee is growing, though at a slower rate than in previous years (7.5 percent in 2018, 16.3 percent in 2017 and 19.4 percent in 2016).

Housing debt continued to grow rapidly in the past two years, while nonhousing debt grew significantly less than in previous years.

Figure 28
Households' Housing and Nonhousing Debt, Rate of Change in Past 12 Months, January 2009–December 2018



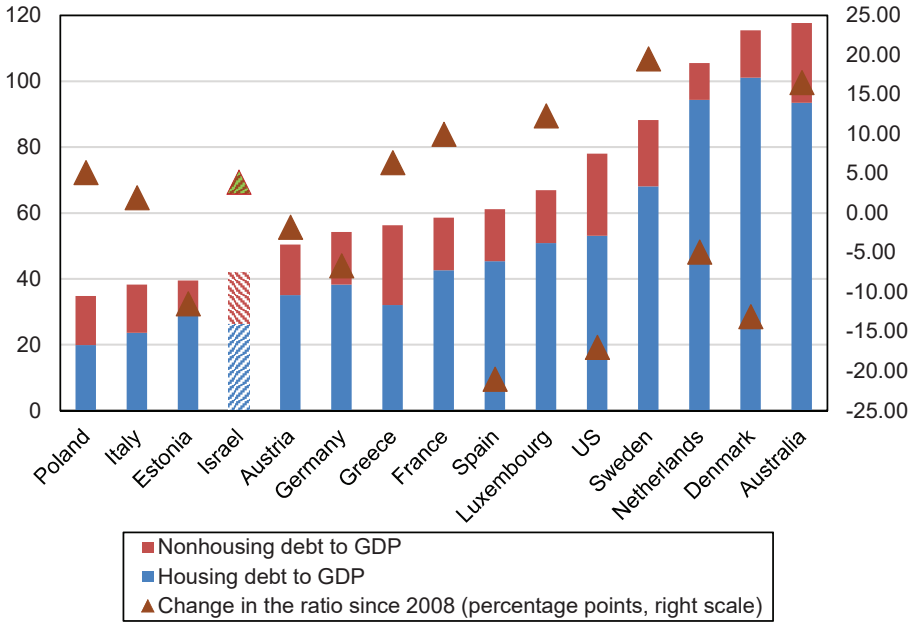
SOURCE: Bank of Israel calculations.

[29] The trends in housing debt and nonhousing debt observed in 2018 may have been the result of substitution by households between the two types of debt. For further details, see Chapter 4 of the Bank of Israel *Annual Report* for 2018.

[30] Comparing the growth rates of household debt and disposable income shows that debt grew at a similar and slightly faster rate than disposable income in recent years, except for 2018.

Household debt as a share of GDP remains stable and low by international comparison. While housing debt as a share of GDP is lower than abroad, the same is not the case for nonhousing debt.

Figure 29
Household Debt to GDP Ratios, International Comparison, December 2017



SOURCE: Based on OECD.

2. Resilience by institution and sector

As a result of tighter supervision of the financial institutions, which is based on global regulations—Basel III in the case of the banking system and Solvency 2 in the case of the insurance companies—capital buffers have been increased significantly, according to the risk level of each financial institution. Something else that can be viewed as a global phenomenon is that the capital requirements imposed on the large banks (those which are generally defined as being large enough to create systemic risk) have risen the most. They are now required to maintain larger capital reserves than the small banks, such that the likelihood of a specific failure is even smaller. Furthermore, most of the banks in Israel, as in other countries, have issued CoCo bonds, which have a loss-absorbing mechanism that contributes to the stability of the issuing bank.[31] Thus, during the reviewed period, 16 additional series of bonds were issued, constituting more than 10 percent of the total bonds issued by the banks.

It is important to note that these developments greatly increase the financial institutions' resilience to systemic crises and reduce the likelihood of a liquidity crisis. At the same time, CoCo bonds increase the level of connectivity in the financial system, which is an indicator of the potential for contagion among the various financial entities. Connectivity in the system may lead to a situation in which significant capital losses for one financial entity could paralyze the financial system as a whole, enabling a localized crisis to quickly spill over into the capital market and even into the real economy. History shows that a real crisis that results from a crisis in the financial system is deeper and lasts longer. The systemic risk from such a spillover emphasizes the importance of constantly monitoring the

[31] When a bank experiences a crisis and the mechanism is activated, some or all of the liabilities to the bondholders are erased in one way or another. The reduction in liabilities leads to a parallel increase in the bank's equity. This increase in equity, which is accomplished in parallel or close to the time of the deterioration in the bank's situation, can strengthen the bank's ability to meet its obligations and the public's faith in that ability. For further details, see the Banking Supervision Department press release of November 18, 2015.

Table 5: The rate of change in household[a] debt balances, 2012–18

(NIS billion, current prices, end of period)

	2012	2013	2014	2015	2016	2017	2018	2018
	Rate of change compared with the corresponding period of the previous year							Debt level (NIS billion)
Private disposable income[b]			5.2	3.9	5.1	1.9	7.4	
Total household debt[c]	6.2	7.1	5.9	6.5	6.1	5.1	4.9	557.0
by source:								
Banks	7.4	8.6	6.6	7.4	5.1	4.2	4.2	496.0
of which: Housing	9.5	9.5	7.9	9.6	5.6	5.3	6.9	339.0
Nonhousing[d]	4.0	6.1	4.3	3.4	4.0	1.9	-0.6	158.0
Institutional investors	10.2	12.3	17.8	29.1	53.2	40.0	20.2	28.6
of which: Housing[e]	19.0	12.0	-3.6	18.5	131.3	58.1	15.4	13.5
Nonhousing	7.9	9.8	31.1	35.6	20.0	26.0	24.8	15.1
Credit card companies[f]	6.1	9.2	18.9	18.6	19.4	16.3	7.5	20.0
Gov't: Earmarked credit[g]	-9.4	-10.0	-11.2	-26.0	-10.9	-12.2	-8.5	11.8
of which: Housing	-15.2	-12.0	-16.5	-30.8	-16.8	-12.1	-9.2	7.9
by use:								0.0
Total housing debt	7.0	7.7	5.7	7.1	6.0	6.0	6.8	360.0
Total nonhousing debt	5.0	6.1	6.4	5.4	6.3	3.7	1.5	197.0

[a] Nonbusiness individuals.

[b] The sharp fluctuations in private disposable income in 2017–18 are due to tax payments that were brought forward due to a temporary tax benefit to parties at interest in companies that had withdrawn dividends, and one-time capital gains tax in respect of the sale of "MobilEye".

[c] Excluding credit from nonresidents, due to lack of data.

t intended for home purchases but were secured by a home.

[e] Mortgage-backed loans. Until August 2013, the figure did not distinguish beween mortgage-backed loans to households and to businesses. In August 2013, a distinction was made and the data were revised retroactively, which transferred some of the balance to business sector debt.

[f] Credit under the responsibility of the credit card companies (credit under the responsibility of or guaranteed by the banks is included in data on banks.

[g] Government loans to borrowers generally pass through the banking system, which serves as a pipeline for the transfer of payments. The main part is loans from the government, but these items also include employers' loans to workers (who are not part of the government or local authorities), which we cannot separate.

SOURCE: Bank of Israel calculations.

level of connectivity in the financial system. Table 2 presents 2 indicators that estimate the intensity of the connection between the financial institutions in the economy. These estimates, like those presented in previous reports, point to a relatively low connectivity level. One of them pointed to some increase in 2018, although it did not reach a high level from an historical perspective.

One of the main connectivity channels within the financial system is by way of loans between financial institutions, as well as reciprocal bond and equity holdings. This channel increases the level of connectivity in Israel, mainly as a result of the sale of banking system loan portfolios to institutional investors and the growth in institutional investments in the bank shares. Therefore, the risk of one financial entity going bankrupt is liable to put the others at risk.[32]

Another channel for connectivity within the financial system is primarily the result of overlapping bond portfolios. (For further details, see Box 2 in the *Financial Stability Report* for the second half of 2017.) As in the case of loans to common borrowers, institutional investors also hold assets of common borrowers, whether in nostro or in profit-sharing funds. In recent years, the financial entities have reduced the similarity in the composition of each of their exposures to the large borrowers, such that the level of connectivity through this channel is relatively low and did not undergo any significant changes during the reviewed period.

The average resilience of households is high relative to other countries, although an analysis of the distribution of mortgages by income quintile indicates that in recent years there has been a relative increase in loans held by the lower quintiles. The average resilience of the public companies in the business sector, which is also high, was maintained in 2018, despite some slowdown in their activity. At the same time, there was also a slowdown in the activity of private construction companies, even though bank credit to these companies has grown as a result of the easing of regulations, meaning that the leverage of these companies has essentially risen, weakening their resilience.

2.1 The banks

The banking system in Israel continued to maintain its resilience and to strengthen its stability in 2018, while continuing to adjust to the changing business environment, and particularly to technological changes, increasing competition, and reforms. The changes in the business environment in which the banks operate have introduced and intensified new risks beyond the traditional financial risks. Against this background, the main risks to the banking system have changed in recent years: There has been a downward trend in financial risks as a result of numerous policy measures introduced by the Banking Supervision Department, including an increase in the capital and liquidity ratios. At the same time, operational risks such as cyber risk, technological risk, business model risk, and conduct risk have been growing. In view of the unique characteristics of these emerging risks, it is difficult to fully identify them and, in particular, it is difficult to quantify them and to estimate their expected damage or the likelihood of their realization. The risks arising from the new business environment pose a major challenge to the banks and require the adjustment of not only the management of these risks and the tools for their management, but also the banks' operating methods and business models.

Furthermore, in recent years compliance risks and risks from cross-border activity have been realized. This is because some of the banks have had to deal with investigations and fines by the American authorities due to past activity (primarily up to 2012) involving tax evasion by foreign clients who made deposits with the banks in Israel or their foreign branches. This has adversely affected the results of two of the banks this year. Also this year, the Banking Supervision Department carried out a macroeconomic stress test for the banking system according to international standards and based on a uniform scenario. The goal of the test was to verify that even in an extreme macroeconomic event the banks would be able to absorb the resulting losses without endangering their stability and the public's deposits. The results of the test provide additional evidence of the resilience and stability of the banking system.

[32] The banks' holdings of the stocks and bonds of the institutional investors and other banks are relatively small. However, we do not have information with respect to institutional investors' nostro holdings of the stocks and bonds of the banks and other institutional investors.

2.1.1 Capital adequacy and the leverage ratio

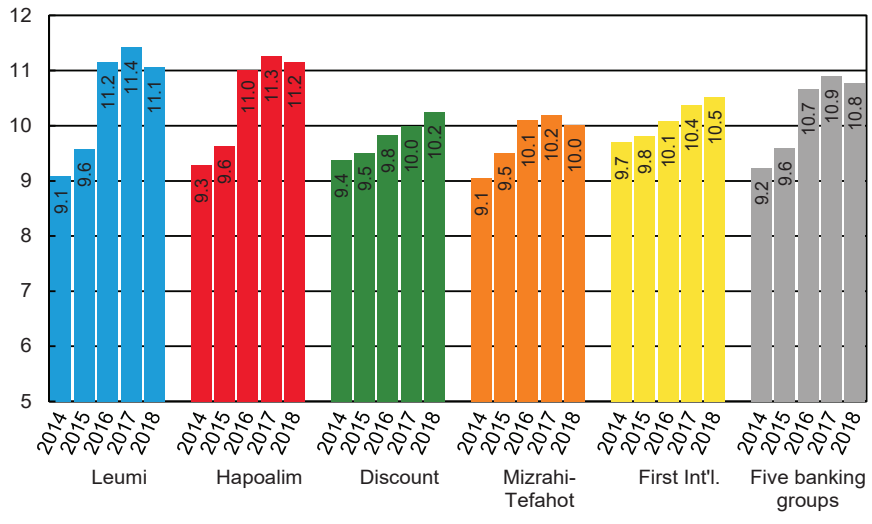
All of the Israeli banks continued to meet the minimum capital requirements set by the Banking Supervision Department (Figure 30). Meeting the capital targets was achieved gradually over a number of years, and was accompanied by a series of supervisory measures that worked to improve the quality and quantity of the capital base. The capital base was built up based on accumulated profits and was supported by, among other things, the restrictions imposed by the Banking Supervision Department on the distribution of dividends by the banks during this period.

The Common Equity Tier 1 Capital ratio for the five large banking groups remained stable this year at 10.8 percent (compared with 10.9 percent last year). This stability is taking place in view of the erosion of its value in the three largest banking groups (Leumi, Hapoalim and Mizrahi-Tefahot) and the further increase in its value among the others (Discount and First International). The improvement in the quality and volume of capital in recent years, and the convergence of the banks to the capital targets, led the Banking Supervision Department this year to ease the restrictions it had imposed on the distribution of dividends, and to allow the banks to increase the payout ratio from total net profit, including by means of share buyback. As a result, the Common Equity Tier 1 Capital of the large banks increased at a lower rate than the average for the last three years. With respect to the denominator, there was a noticeable increase in the quantity of credit risk weighted assets (by about 5 percent). This was the result of both an increase in the supply of bank credit and the banks' increased exposure to corporations, including companies in construction and real estate (which are weighted by a higher risk weight). The continuing trends in the housing market, which led to an additional increase in housing credit, also played a role (for further details, see Section 1.3). The increase in the volume of risk weighted assets was slightly offset by two measures taken by the Banking Supervision Department: the reduction in the credit conversion coefficient on guarantees to ensure the homebuyers' investments, and a measure to help first-time homebuyers fully exploit their ability to purchase a home. (For further details, see *Israel's Banking System* – 2018.)

The leverage ratio remained stable this year and its value for the five large banking groups stood at about 6.8 percent, which is higher than the requirement imposed by the Banking Supervision Department (5 percent for the banks as a whole and 6 percent for the two largest banks).

All Israeli banks meet the supervisory capital targets.

Figure 30
Common Equity Tier 1 Capital Ratios[a], the Five Banking Groups, 2014–18
(percent)



[a] In Basel III terms (Common Equity Tier 1 capital ratio) in accordance with the transition directives.
SOURCE: Based on published financial statements and reports to the Banking Supervision Department.

2.1.2 The stress scenario to test the resilience of the banking system

This year, the Banking Supervision Department again carried out a stress test on the basis of a uniform scenario, with the goal of testing the banking system's resilience to shocks. The scenario, which starts in January 2019 and ends in December 2021 (i.e. a period of three years), involved a domestic shock against a background of major geopolitical events that are reflected in a contraction of all components of GDP and an increase in unemployment, while the global economy returns to a stable path. As a result, the Bank of Israel raises the interest rate substantially while there is a concurrent sharp drop in home prices. The shock has a significant impact on both the real side and the financial side of the economy. The results of the test show that the scenario has a major impact on the banking system, and some of the banks even record losses during the scenario. Nonetheless, a scenario of this type is not expected to impair the resilience or stability of the banking system. Furthermore, the capital adequacy ratio of the banks is not expected to fall below the minimum level required by the Banking Supervision Department should a stress scenario be realized.

Thus, should the stress scenario be realized, the average Common Equity Tier 1 Capital ratio in the banking system is liable to decline from about 11.0 percent in 2018 to about 10.3 percent in 2019.[33] Even though the capital ratio for the entire banking system is not significantly affected during the scenario, the size of the effect varies across the banks. The bank affected the most experiences a decline in the capital ratio to 7.2 percent. With regard to the banks' profitability, the banking system is expected to be significantly affected in this scenario, although the hike in the interest rate is expected to moderate the effect in view of its positive impact on net interest revenues. Nonetheless, about half of the banks suffered losses, at least in the first year of the scenario. The return on equity (ROE) in the banking system is expected to drop from about 7.2 percent at the beginning of the scenario to about 2.3 percent at the end, and here too there is a high degree of variance among the banks. The main losses due to the stress scenario are in the credit portfolio, totaling about NIS 12.2 billion on average per year, or about 1.2 percent of the portfolio.

These results reflect the direct impact to the system due to credit and market risks, but they do not take into account other effects, such as low liquidity, damage to reputation, and feedback effects. It is important to note that the results do not take into account actions that might be taken by the executives of the banks in response to the crisis. For further details on the results of the stress test, see *Israel's Banking System* – 2018.

2.2 The insurance companies[34]

The aggregate profit of the insurance companies declined sharply in 2018 to about NIS 1.1 billion, a drop of about 60 percent relative to the previous year. The drop in total profit, together with the increase in the companies' equity, was reflected in a drop in the return on equity, from 9.5 percent in 2017 to 7.4 percent in 2018 (Figure 31).

The drop in profitability is primarily the result of a sharp decline in profits from investments, from about NIS 28 billion in 2017 to NIS 4.3 billion in 2018 (Figure 32).

An analysis of profits from investments in 2018 by quarter shows that the significant drop in profits occurred primarily as a result of investment losses of about NIS 12 billion in the fourth quarter of the year (Figure 33).

The negative return on assets against yield-dependent liabilities was also reflected in a drop of about 30 percent in the insurance companies' revenues from management fees, which was due to the noncollection of variable management fees.[35] In contrast, the increase in the insurance companies' revenues from underwriting activity

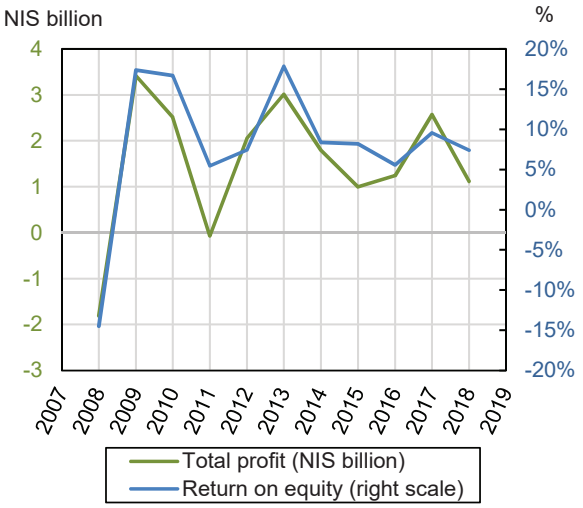
[33] The year in which the average capital ratio in the banking system reaches its lowest level in the scenario.

[34] The data and the analysis in this section relate to the five largest insurance companies in the economy and are correct as of December 2018, unless otherwise stated.

[35] For the management of assets in profit-sharing policies issued between 1991 and 2003, the insurance company is entitled to fixed management fees of up to 0.05 percent per month from accumulated assets, and variable management fees of up to 15 percent of the real return obtained after deducting the fixed management fees. In the case of a loss, the insurance company cannot collect variable management fees until the cumulative loss is covered.

The insurance companies' total aggregate profit declined sharply in 2018.

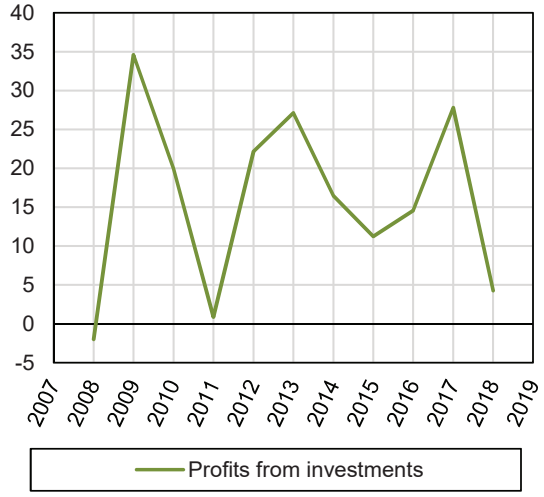
Figure 31
The Insurance Companies' Return on Equity and Total Profit, 2008–18 (annual data)



SOURCE: Based on the insurance companies' financial statements.

The decline in profitability is mainly due to a decline in profits from investments.

Figure 32
The Insurance Companies' Profits from Investments, 2008–18 (annual data, NIS billion)



SOURCE: Based on the insurance companies' financial statements.

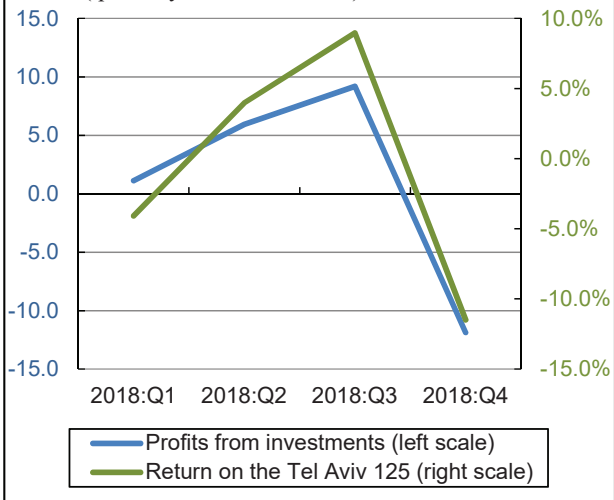
positively affected the results for 2018. Thus, revenues from retention premiums[36] rose by 6 percent. Another positive effect on profitability in 2018 was the upward shift in the risk-free interest rate curve, which is used to evaluate the adequacy of the reserve put aside by the insurance companies, and as a result of which a significant decrease in insurance liabilities was recorded.

In view of the large impact of investment profits on the profitability of the insurance companies, we examined the composition of investments in the insurance companies' nostro portfolio. The analysis showed that about 53 percent of their investments in the nostro portfolio are concentrated in assets with relatively low risk, namely government bonds, deposits and current accounts (Figure 34).

On June 1st 2017, the Capital Market Commissioner published a circular that includes instructions for the implementation of an economic repayment ability regime for the insurance companies, based on a Solvency 2 directive. The circular includes transition instructions regarding the implementation of the directive's instructions, according to which the insurance companies are to gradually increase the ratio of recognized capital to required capital—according to

The decline in insurance companies' profits from investments took place mainly in the last quarter of 2018.

Figure 33
Insurance Companies' Profits from Investments, and the Return on the Tel Aviv 125 Index in 2018 (quarterly data, NIS billion)

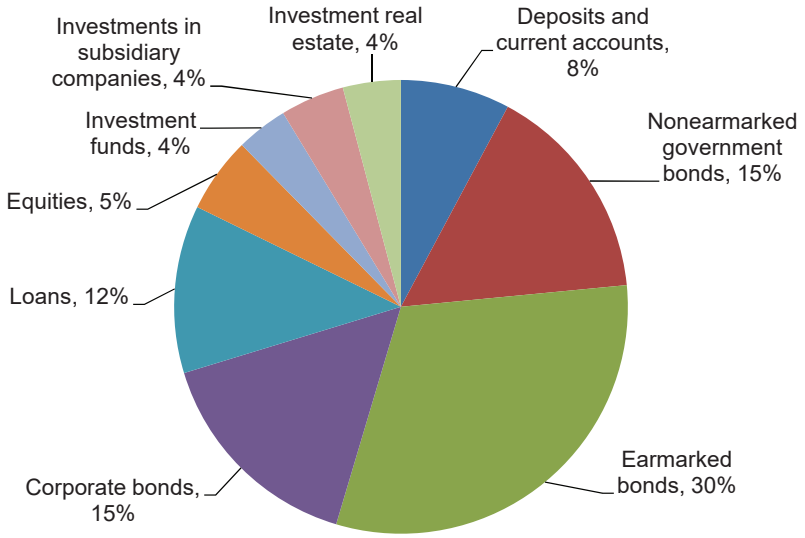


SOURCE: Based on the insurance companies' financial statements.

[36] Revenue from premiums minus payment to secondary insurers.

Most investments in the insurance companies' nostro portfolio are in relatively low-risk assets.

Figure 34
Composition of Assets in the Insurance Companies' Nostro Portfolio, September 2019



SOURCE: Based on the insurance companies' financial statements.

milestones—over the coming years. Starting on December 31, 2024, the insurance companies will need to show a ratio of recognized capital to required capital of at least 100 percent. As of the end of 2017, the insurance companies had met the transition instructions of the Solvency circular, such that their recognized capital was 65 percent of capital requirements, and most of them have already met the directive's final targets.

The insurance companies' aggregate repayment ability ratio, which is calculated as the ratio of total capital to required capital, without taking into account the transition instructions, stood at 106 percent at the end of 2017, which was similar to its level at the end of 2016. The ratio calculated according to the transition instructions fell from 179 percent at the end of 2016 to 170 percent at the end of 2017. The relatively low profitability of the insurance companies in 2018, alongside the expansion in underwriting activity and the distribution of dividends totaling about NIS 500 million, is likely to have an adverse effect on the revised ratio as of the end of 2018. In contrast, capital totaling about NIS 2.3 billion raised by the insurance companies in 2018 in order to meet the Solvency targets[37] is likely to have a positive effect on the ratio at the end of 2018.

The insurance companies provide credit to various entities in the economy. A scenario in which credit risk is realized among various borrowers, particularly when credit is provided as part of the nostro portfolio, is liable to adversely affect the profits of the insurance companies. A negative scenario in a particular industry will likely lead to credit losses that will increase with that industry's share of the credit provided by the insurance companies. In actuality, most of the credit risk—about 63 percent—is the result of the insurance companies' exposure to government bonds. An analysis of the companies' exposure to segments other than government bonds shows that about 10 percent of the credit in the insurance companies' nostro portfolio is concentrated in construction and real estate companies, and another roughly 10 percent is concentrated in the banks (Figure 35). Thus, it appears that the share of credit

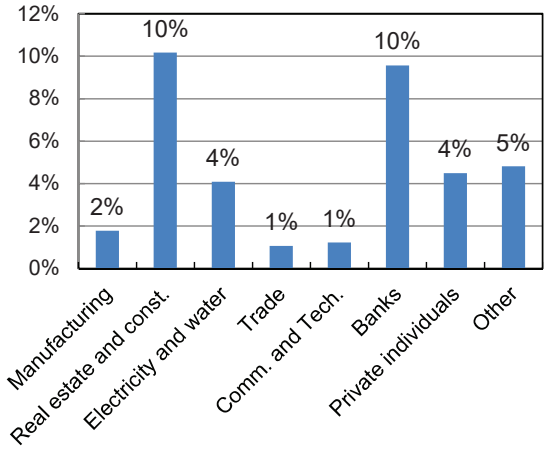
[37] For further details on Solvency 2, see the *Financial Stability Report* for the second half of 2015.

provided by the insurance companies to construction and real estate companies is not excessive.

The financial stability of the insurance companies is also liable to be affected by the quality of their boards of directors. Specifically, controlling shareholders may exploit their position in order to maximize their benefit at the expense of the company's other stakeholders in a way that could even threaten the company's financial resilience. The board of directors is responsible for overseeing the activity of the controlling shareholders and ensuring that they act to maximize the value of the company for all its shareholders. The importance of the board of directors as a supervisor in financial companies is even greater.[38] This is because the controlling shareholders in these companies have a greater incentive to exploit the companies' resources for their personal benefit. This is partly due to their complex business structure, which in turn creates a high level of information asymmetry (Andres and Vallelado, 2008) and high leverage, since the controlling shareholders bear only part of the losses if the company experiences financial difficulties but will reap a much larger portion of the profits if the company is successful.

Credit in the insurance companies' nostro portfolio is concentrated among companies belonging to the real estate industry and banks.

Figure 35
Distribution of Insurance Companies' Credit Risk Among Various Non-Government-Bond Segments, December 2018



SOURCE: Based on the insurance companies' financial statements.

In view of the importance of the board of directors as a supervisor of the activity of the executive and the controlling shareholders in insurance companies, the outgoing Capital Market Commissioner issued a circular in August 2018 on the structure and activity of the board of directors in an institutional entity[39], which includes, among other things, instructions that are meant to increase the independence and expertise of boards of directors.[40] Furthermore, we analyzed the structure of the insurance companies' boards of directors in 2010 and 2017[41], and examined the changes in indices that reflect these two elements over time. The analysis is based on a corporate governance quality index developed by the Bank of Israel Research Department, which is mainly intended to measure the quality of corporate governance in nonfinancial companies.[42]

[38] It is worth mentioning that in addition to the board of directors, the activity of the insurance companies, controlling shareholders, and executives is also supervised by the designated regulator in this industry.

[39] The circular (in Hebrew) can be accessed at: https://www.mof.gov.il/hon/documents/%D7%94%D7%A1 %D7%93 %D7%A8%D7%94-%D7%95 %D7%97%D7%A7%D7%99%D7%A7%D7%94/mosdiym/memos/h_2018-9-1.pdf

[40] Increasing the independence and expertise of boards of directors has been the objective of many legislative measures adopted around the world, such as SOX in the US and Amendment 16 to the Companies Law in Israel. Amendments of this type have included, among other things, instructions related to the structure of the board of directors and its committees, including the number and proportion of independent directors and of directors with financial/accounting education. On the assumption that the independence of the board of directors indeed reflects an improved ability to supervise the controlling shareholders and the executive, it would be expected that companies with a more independent board of directors would have higher market value and improved performance. However, empirical studies that attempted to determine whether there is a positive correlation between the proportion of independent directors and the company's performance produced ambiguous results (Adams, Hermallin and Weisback, 2010). Moreover, the existence of a positive correlation between the independence and expertise of the board of directors and the company's performance does not necessarily imply a causal relationship between them, since it is possible that an unobserved variable is influencing both the quality of the board of directors and the company's performance.
The small number of insurance companies in the Israeli market does not enable us to use statistical methods to test the correlation between the various characteristics of the board of directors and the performance variables or the companies' level of risk.

[41] In general, the composition of the insurance companies' boards of directors changes relatively slowly over time. Therefore, we chose to compare the composition of the insurance companies' boards of directors in 2010 and 2017.

[42] In progress: "Measuring Corporate Governance Quality in Concentrated Ownership Firms".

Figure 36 shows the average proportion of insurance company directors who are also controlling shareholders[43], the proportion of directors who are connected to a controlling shareholder (those that are not controlling shareholders themselves but are employed in managerial positions in other companies owned by the controlling shareholder), and the proportion of directors who are officers in the insurance company itself. The graph shows that over the years, there has been a moderate increase in the degree of independence of the insurance companies' boards of directors. Thus, the proportion of directors who are controlling shareholders has fallen by 4 percentage points; the proportion of directors who are dependent on a controlling shareholder fell by 6 percentage points; and the proportion of directors who serve in managerial positions in the insurance company fell by 5 percentage points (to 0 in 2017).

Figure 37 shows that the level of financial and legal expertise among insurance company directors improved during the reviewed period. Thus, the proportion of directors with a degree in Economics increased by 5 percentage points; the proportion of directors with an Accounting education increased by 7 percentage points; and the proportion of directors with a legal education increased significantly by 8 percentage points. Moreover, a more precise analysis shows that the main increase in the proportion of skilled insurance company directors was among skilled external directors.

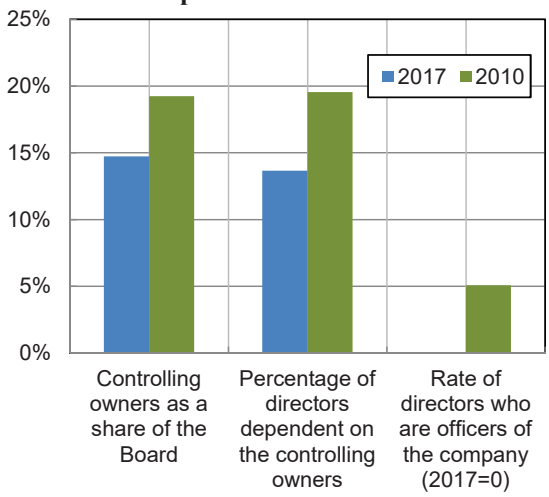
The above analysis indicates that during the reviewed period, there was a moderate increase in the degree of independence and level of expertise of the insurance companies' boards of directors.

The first quarter of 2019

The total aggregate profit of the insurance companies in the first quarter of 2019 stood at NIS 1.3 billion, compared to NIS 24 million in the parallel period in the previous year. The growth in total profit was primarily due to a large increase in the aggregate profit from investments, which stood at about NIS 16 billion compared to about NIS 1.1 billion in the first quarter of 2018. The growth in profit from investments was also reflected in an increase of about 64 percent in management fees collected by the insurance companies in the first quarter of 2019 (NIS 1.8 billion compared to about NIS 1.1 billion in the first quarter of 2018).

Directors' independence at the insurance companies has improved somewhat in recent years.

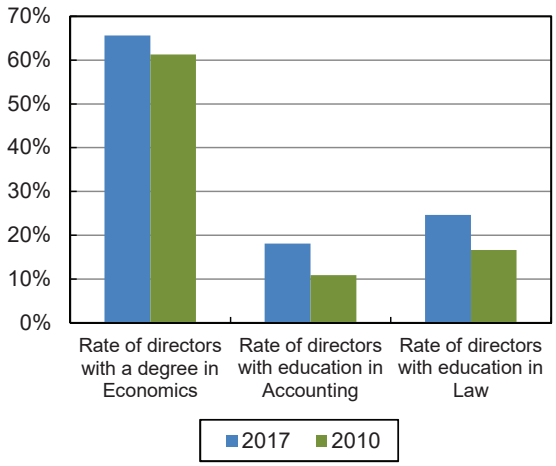
Figure 36
Variables for Measuring Insurance Company Directors' Independence



SOURCE: Based on the insurance companies' financial statements.

The percentage of insurance company directors with financial and legal skill has increased somewhat.

Figure 37
Variables for Measuring the Financial and Legal Skill of Insurance Company Directors



SOURCE: Based on the insurance companies' financial statements.

[43] Including relatives of the controlling shareholder.

2.3 The business sector

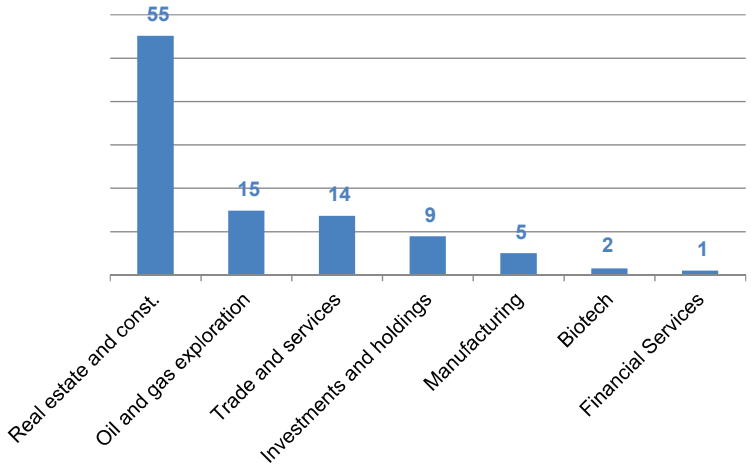
Real business sector product increased by 3.4 percent in 2018, which is somewhat less than the previous year and the average in recent years. This may be evidence of a certain slowing of growth in the business sector.

The financial stability of the business sector is analyzed primarily on the basis of the financial statements of public companies. Although this is a small number of companies relative to the total in the economy, they account for a significant share of business sector debt. According to the balance of liabilities of reporting companies (not including banks and insurance companies), they are jointly responsible, including consolidated companies, for financial debt[44] of about NIS 445 billion, which represents about 48 percent of the business sector's total debt. The construction and real estate industry accounts for more than half of the total debt (Figure 38).

In order to evaluate the financial stability of the public companies (by industry), we examined selected financial ratios according to four categories: leverage, liquidity, repayment ability, and profitability.

The real estate and construction industry is responsible for more than half of total public company debt.

Figure 38
Industry's Financial Debt as a Share of Public Company Debt, December 2018 (stock exchange industrial classification, percent)



SOURCE: Based on reports by the public companies.

Leverage

A comparison of the 2018 leverage ratios[45] to 2017 (Table 6) shows an improvement in most industries, apart from hi-tech (biomed and technology). The latter typically have a particularly low level of balance-sheet assets, as most of their assets, such as human capital and R&D, being intangible and are generally not included in the company's balance sheet. Therefore, the increase in leverage may indicate an increase in their risk. However, they account for only a small share of financial debt (Figure 38), so an increase in their level of risk is not an indication of increased risk in the financial system as a whole. In the trade and services industry, there was a particularly large increase in the leverage ratio in 2018, although it is possible that the source for this was related to the early adoption of the IFRS 16 accounting standard by a number of companies.[46] (For further details, see Section 2.3.1.)

The improvement in the leverage ratios is evidence of the growing use by public companies of internal sources of financing (analyzed in detail in Chapter 4 of the Bank of Israel *Annual Report* for 2018). However, despite the

[44] Not including credit from foreign banks and foreign bonds.

[45] Long-term leverage – total liabilities divided by total assets; and the ratio of financial debt to CAP (financial debt + equity).

[46] Excluding these companies, there does not appear to be a major deterioration in the leverage ratios.

Table 6: Weighted average of leverage ratios, 2017–18 and average of past five years

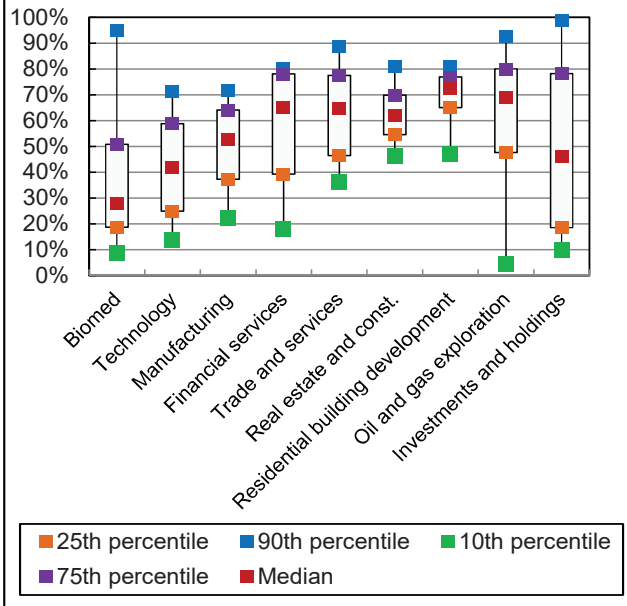
	Long-term leverage			Financial debt to CAP		
	5-year average	2017	2018	5-year average	2017	2018
Trade and services	0.81	0.81	0.84	0.72	0.70	0.74
Construction and real estate	0.63	0.61	0.61	0.57	0.57	0.56
Residential construction	0.78	0.76	0.75	0.70	0.69	0.68
Manufacturing	0.57	0.61	0.55	0.42	0.45	0.40
Investment and holdings	0.79	0.79	0.77	0.67	0.63	0.66
Oil and gas exploration	0.68	0.73	0.69	0.64	0.69	0.63
Technology	0.61	0.65	0.65	0.34	0.42	0.44
Financial services	0.68	0.87	0.62	0.64	0.42	0.45

SOURCE: Based on published financial statements.

improvement, it appears that many industries are characterized by high average leverage. Nonetheless, according to the median and the distribution of leverage (Figure 39), the construction and real estate industry (including residential construction companies) and the trade and services industry typically have higher levels of leverage than other industries, such that their distributions are more concentrated around a high level of leverage.

Leverage in the real estate and construction and trade and services industries is concentrated at higher rates than in the other industries.

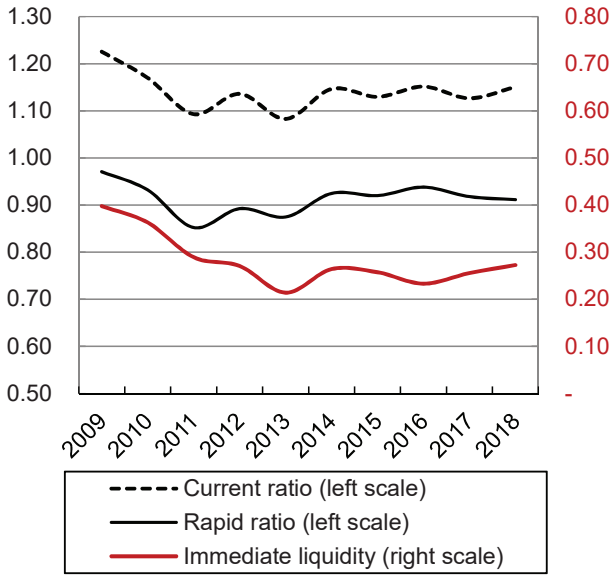
Figure 39
Distribution of Public Company Leverage by Industry, December 2018



SOURCE: Based on reports by the public companies.

The liquidity of companies at the aggregate level was maintained in 2018, and in some companies it improved.

Figure 40
Liquidity Ratios of Public Companies at the Aggregate Level, 2009–18



SOURCE: Based on published financial statements.

Table 7: Weighted average repayment ability and profitability ratios, 2017–18, average of past three and five years

	Coverage ratio				Return on Equity			
	Average of past five years	Average of past three years	2017	2018	Average of past five years	Average of past three years	2017	2018
Investment and holdings	2.50	2.78	2.57 ▲	3.65	0.14	0.15	0.15 ▲	0.21
Oil and gas exploration	3.42	3.01	4.40 ▼	1.74	0.23	0.24	0.34 ▼	0.19
Trade and services	2.59	2.24	3.49 ▼	0.32	0.10	0.07	0.16 ▼	-0.10
Manufacturing	5.17	5.34	5.76 ▲	6.06	0.11	0.13	0.15 ▲	0.14
Construction and real estate	2.76	2.90	3.09 ▼	2.42	0.08	0.09	0.10 ▼	0.07
Residential construction	3.05	3.14	3.62 ▼	2.89	0.11	0.12	0.12 ▼	0.10
Financial services	14.22	16.83	18.52 ▲	16.20	0.12	0.11	0.12 ▼	0.11
Technology	-3.59	-0.50	-5.57 ▲	1.70	-0.12	-0.09	-0.26 ▲	-0.03

SOURCE: Based on published financial statements.

Liquidity

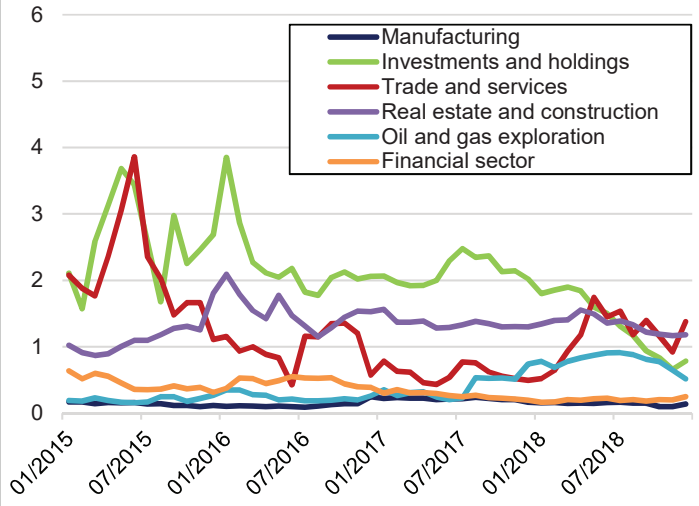
An examination of the balance-sheet liquidity ratios[47] shows that the companies' aggregate level of liquidity was maintained in 2018 (Figure 40), and for some of them it even improved. Nonetheless, the ratio of cash flow from current activity to sales indicates a deterioration in most of the industries. A possible explanation is that in parallel to the drop in cash from sales, the companies' investments declined on an aggregate level. This is another fact that may be evidence of a moderate slowdown among public companies.

Repayment ability and profitability

In order to analyze the companies' repayment ability, we used financial ratios that measure the repayment ability of companies in an industry (interest coverage ratio, the ratio EBITDA to financing expenses, and the ratio of cash flow from current activity to financing expenses), and an additional ratio that is meant to indicate the number of years in which the company will be able to repay its debt (net financial debt divided by EBITDA). The main development in these ratios during 2018 is the deterioration in the trade and services industry, as can be seen from the coverage ratio and the negative return on equity in 2018 (Table 7). It should be mentioned that there was also a deterioration (in repayment ability and profitability) in the construction and real estate industry

The expected default frequency (EDF) did not materially change in 2018, other than a slight increase in the trade and services industry.

Figure 41
Expected Default Frequency (EDF) in Selected Stock Exchange Industries, Weighted Average, 2015–18 (percent)



* In 2015, an outlier observation of one company in the investments and holdings industry was deleted.

SOURCE: Bank of Israel calculations.

[47] The current ratio – current assets divided by current liabilities; the quick ratio – current assets minus inventory, divided by current liabilities; the immediate liquidity ratio – cash and short-term investments divided by current liabilities.

(together with residential construction), although it was less significant. Other industries that experienced a drop in profitability include oil and gas exploration and financial services, although this did not threaten their stability, as can be seen from the repayment ability ratios.

In summary, there was a slowdown in business sector activity, both with respect to product and with respect to investments by public companies, in parallel to the drop in profitability in a number of industries. However, the financial stability of most of the industries has not been affected at this stage, such that the default probability in most industries has not changed significantly. This is evident from both the EDF indicator (Figure 41), which remained low, and the number of companies with a going concern note in their financial statements. Nonetheless, there have been negative developments in the trade and services industry from the perspective of stability, in view of the deterioration[48] in most of their financial ratios and some increase in the EDF in 2018.

2.3.1 Adoption of the IFRS 16 accounting standard on leasing

Starting with the financial statements for the first quarter of 2019, public companies are obligated to adopt the new IFRS 16 accounting standard in regard to their leasing activities (there are companies that did so even earlier). The standard, which has far-reaching implications for the financial statements, was the result of a joint effort by international standards institutions (the FASB and the IASB), with the goal of replacing the previous standard on this issue (IAS 17). The standard essentially requires that leasing and rental contracts that were defined according to the previous standard as operational leasing[49] be included within a company's balance sheet. According to the previous standard, operational leases were outside the balance sheet.

As a result of the implementation of the new standard, companies that adopt the international standard are required to measure future leasing or rental expenses specified in the contracts on present value basis, and to record an intangible asset in their balance sheet (right of use) on the asset side with a corresponding financial liability (on the liabilities side) that is identical to or larger than the asset.[50] The result is a negative effect on the companies' leverage.

Another effect is on operating profitability and thereby on EBITDA (earnings before interest, taxes, depreciation and amortization), which is an important economic indicator. This effect is due to the manner in which leasing expenses are recorded. Until now, leasing was recorded as an operating expense, but now it will be recorded as a depreciation expense and a financing expense (which are neutralized in EBITDA).[51] Essentially, operating profitability and EBITDA will increase in most cases, but at the same time profit before taxes and net profit will be reduced at the beginning of the leasing period (financing expenses and depreciation expenses together will be larger than the leasing expense recorded up till now).

The standard will also affect the statement of cash flow, which is no less important. This effect is due to the fact that until now the leasing expense reduced cash flow from current operations. After the adoption of the standard, a leasing expense will, as mentioned, not be recorded, and in its place there will be a depreciation expense, which does not affect the cash flow from current operations (since it is not a cash expense), as well as a financing expense. Essentially, current cash flow will increase at the expense of cash flow from financing activity.

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[48] However, it is worth mentioning that a number of the companies that were examined adopted the IFRS 16 accounting standard early. As a result, there was a deterioration in their financial ratios, which affected the industry's aggregate financial ratios. Yet, even excluding those companies, there was still a deterioration in the trade and services industry in 2018, although the influence of the adoption of the standard multiplied the effect.

[49] For example, a rental contract of more than one year for a store in a mall.

[50] At the beginning of the leasing period, a right of use asset will be equal to the liability. As time progress, in most cases the liability will be greater than the asset due to the different amortization method. Thus, the asset is amortized according to its remaining economic life (usually in a straight line calculation) while the liability is amortized according to the effective interest rate method, such that in general the amortization of the asset is larger than that of the liability.

[51] In this context, it is worth mentioning that the American accounting standards (GAAP US) did not fall into line with the international standards (IFRS), and specified that the adoption of the standard would only influence the balance sheet but not the P/L or the cash flow statement.

Table 8: Effect of the standard on selected financial ratios (industry average, percentage points)

	Biomed	Investments and holdings	Oil and gas exploration	Technology	Trade and services	Real estate and construction	Financial services	Manufacturing	**Total / Average**
Number of companies that published quantitative disclosure	13	16	7	36	59	20	10	50	**211**
Change in leverage	5.0	3.8	4.4	4.7	7.2	0.6	2.7	4.1	**4.8**
Change in debt to CAP	9.3	6.2	10.1	9.6	15.9	1.4	3.8	6.4	**9.4**
Change in ROE	0.1	-0.8	-4.5	-0.3	-1.8	0.0	-0.2	-0.4	**-0.9**

SOURCE: Based on published financial statements.

Therefore, we can conclude that there will be a broad overall effect on the financial statements and on many financial ratios. In order to understand the possible effect, we gathered the information provided in the relevant disclosure regarding the effect of the standard from the companies' financial statements as of December 31st 2018. Thus, 211 out of 415 companies (not including foreign companies, banks and insurance companies) that published financial statements and did not implement the standard early, provided quantitative information on the effect of the standard. (The rest of the companies wrote that the effect is not expected to be significant, or they did not provide a quantitative estimate.) Table 8 presents the expected effect of the implementation of the standard[52] on selected financial ratios at the industry level.

The table shows that the effect of the implementation of the standard on the financial ratios cuts across all of the industries, except for construction and real estate. In certain industries, the effect is likely to be very large, particularly in the commerce and services industry where the effect is the largest due to the rental agreements to which these companies are committed. The most dramatic effect shown in the table is on the leverage ratio, which is used as a measure of risk. However, it is important to mention that there are many other financial ratios (some of which also serve as financial covenants for the companies' loan terms) that are likely to be affected, and that are not presented in this table. These include the ratio of financial debt to EBITDA, the ratio of EBITDA to financing expenses, the interest coverage ratio, and others.

The new accounting standard constitutes an additional phase in the transition from traditional accounting to economic accounting, and in some ways corrects a distortion of the International Accounting Standards Board. At the same time, it is likely to generate economic and business changes in public companies, alongside the flow of new information to the market that is likely to shed additional light on the valuation of risk in these companies.

2.4 Households

The balance sheet of households' assets and liabilities in Israel for 2017 shows that they had a low average rate of leverage. The balance sheet of households' assets and liabilities[53] makes it possible to examine the total liabilities of households in Israel relative to their total financial and real assets. In addition, it is possible to use the balance sheet to carry out a comparison of Israel's leverage ratios to those of other developed countries.

The ratio of liabilities to assets remained unchanged in 2017 relative to previous years and stood at about 8 percent (compared to 14.4 percent in the US and 17 percent in Britain[54]). The ratio of debt to financial assets in Israel stood at 17 percent in 2017 (an increase from 16 percent in the previous two years and compared to 18 percent in the

[52] In other words, if the companies had already implemented the standard in 2018.

[53] The data on the liabilities of households and the value of their real estate assets and vehicles were obtained from Bank of Israel calculations. The data on financial assets is taken from the Central Bureau of Statistics national balance sheet, which is updated only up to 2017. The households' balance sheet is therefore as of that year.

[54] Source: Data on Britain – Bank of England Financial Stability Report; data on the US – from the Federal Reserve website.

Table 9: Israeli households' aggregate balance sheet, 2017

Real assets	NIS billion	Percent of total assets	Annual rate of change	Household liabilities and net worth	NIS billion	Percent of total liabilities and net worth	Annual rate of change
Real estate	3,425	51		Mortgages	337	5	6%
Vehicles	122	2	9%	Consumer credit	194	3	4%
Total real assets	**3,547**	53	4%	**Total liabilities**	531	8	5%
Financial assets	NIS billion	Percent of total assets	Annual rate of change				
Cash and deposits	595	9	18%				
Securities excluding shares	237	4	-3%				
Shares	438	7	-10%				
Mutual funds	240	4	-6%				
Insurance reserves[a]	1,468	22	27%				
Various payables/receivables	149	2	10%				
Total financial assets	**3,127**	47	12%	Equity[b]	6,143	92	
Total assets	**6,674**	100	7%	**Total liabilities and equity**	**6,674**	100	

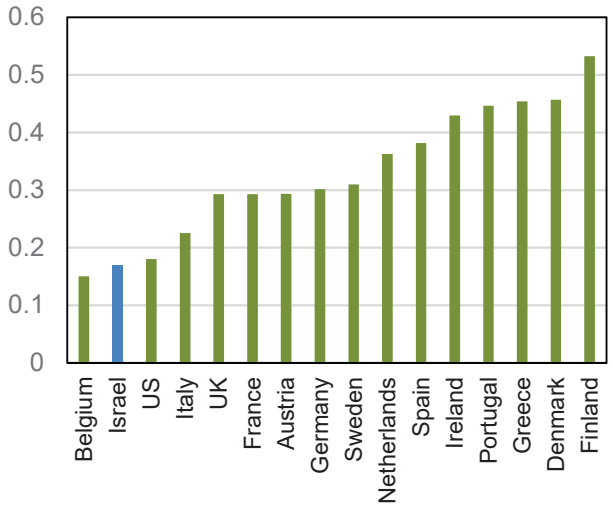
[a] Includes life insurance, provident funds, pension funds, and advanced training funds.

[b] Net worth = total assets minus total liabilities.

SOURCE: Based on Central Bureau of Statistics.

On average, Israeli households are less leveraged than those abroad.

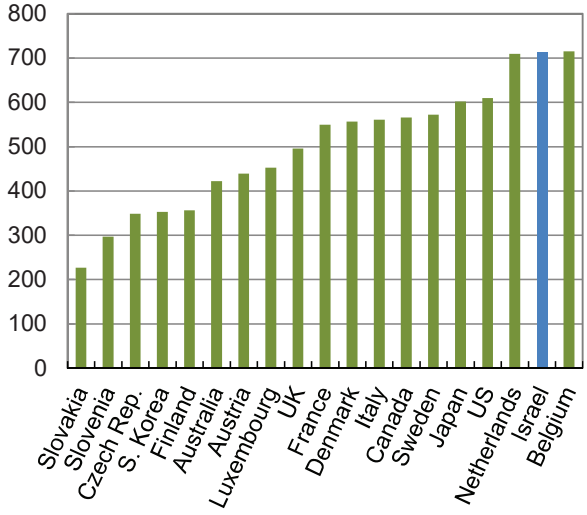
Figure 42
International Comparison of the Ratio of Debt to Financial Assets, 2017



SOURCE: Based on OECD.

The overall financial strength of Israeli households is high by international comparison.

Figure 43
International Comparison of Net Household Worth (Equity) Relative to Disposable Income, 2017 (percent)



SOURCE: Based on OECD.

US and 29 percent in Britain. For an international comparison of this ratio, see Figure 42), and the ratio of mortgage debt to real estate assets in Israel stood at about 10 percent in 2017 (which remained unchanged relative to 2016 and compares to 45 percent in the US and 24 percent in Britain). The analysis indicates that households in Israel are less leveraged on average than in other countries.

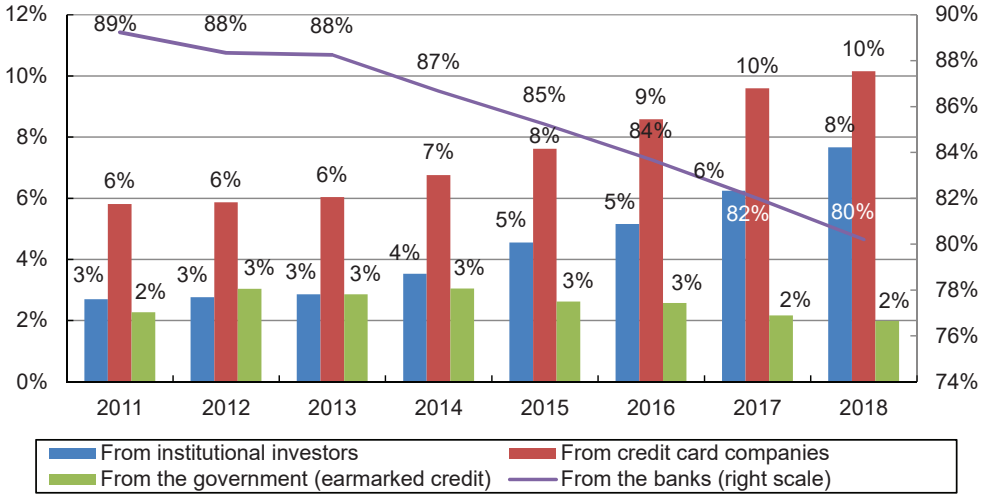
An international comparison of the ratio of household equity to disposable income (Figure 43) shows that households in Israel are at the upper end of the distribution. In other words, the overall financial resilience of households in Israel is high relative to other countries. The comparison was carried out using average figures, and does not reflect the risks arising from the overall distribution of households.

2.4.1 The distribution of nonhousing debt and overdrafts

Following the reforms to increase competition in the nonbank credit market in recent years, there has been a change in the distribution of households' sources of nonhousing credit. While the banks' share of the nonhousing credit market has declined in recent years, credit card companies and institutional investors have increased their share (Figure 44).[55]

While the banks' share of the household nonhousing credit market has declined in recent years, the share held by the credit card companies and institutional investors has grown.

Figure 44
Distribution of Nonhousing Credit to Households by Sources, December 2011 to December 2018 (percent)



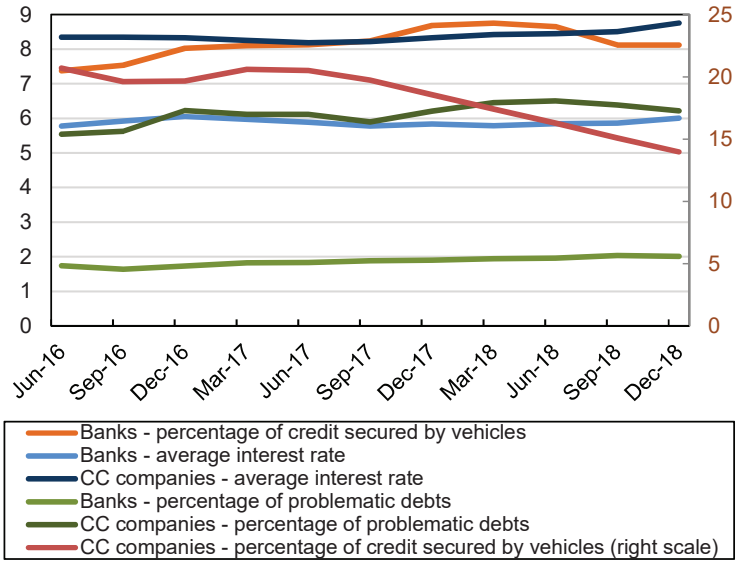
SOURCE: Bank of Israel calculations.

With respect to the risk characteristics of nonhousing credit provided by the banks, there has been an increase in the average term to repayment of this credit (from 4.4 years at the beginning of 2016 to 5 years at the end of 2018) and a slight increase in the interest rate. In addition, there has been a decline in total nonhousing credit provided by the banks, concurrently with an increase in the proportion of credit provided with a vehicle as collateral (Figure 45). Similarly, Figure 45 shows a drop in the proportion of credit with a vehicle as collateral provided by the credit card companies, alongside an increase in the average interest rate on this type of credit and some increase in the rate of problematic debt.

[55] It should be mentioned that the analysis does not include the noninstitutional credit market, for which we do not have full information. For further information, see Section 1.3.

The risk characteristics of nonhousing credit from the banks and credit card companies are increasing.

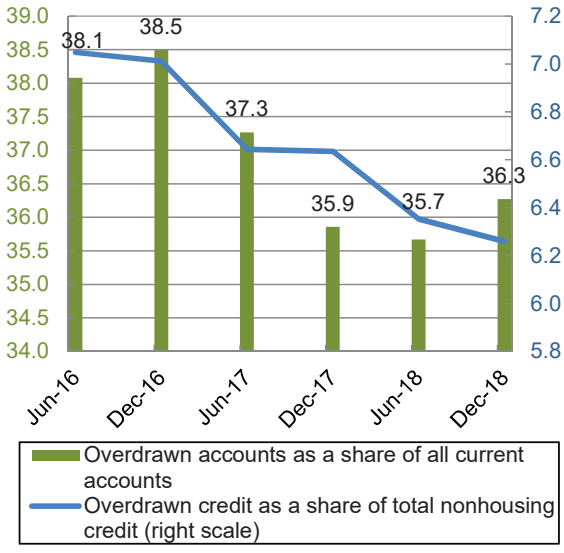
Figure 45
Characteristics of Nonhousing Credit from the Banks and Credit Card Companies, June 2016 to December 2018 (percent)



SOURCE: Bank of Israel calculations.

The number of accounts in overdraft and the rate of overdrawn credit are declining over time, but the rate of overdrawn households is high.

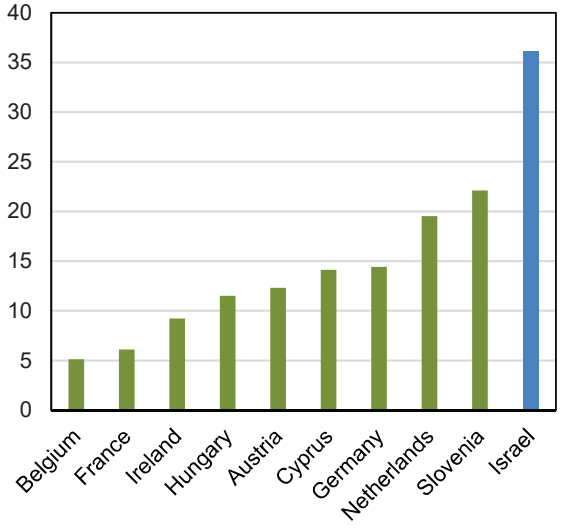
Figure 46
Rate of Overdrawn Accounts and Credit, June 2016 to December 2018 (percent)



SOURCE: Banking Supervision Department.

The rate of overdrawn household accounts in Israel is high by international comparison.

Figure 47
Rate of Overdrawn Accounts, International Comparison, June 2016 (percent)



SOURCE: Based on Household Finances and Consumption Survey.

Nonhousing household debt in Israel is largely composed of loans taken for a number of years. However, a certain proportion of that nonhousing debt is essentially in the form of an overdraft of the household's current account. As of 2018, households pay an average interest rate of 7.5 percent on an overdraft.[56] Banking Supervision Department data indicate that as of the end of 2018, 36.3 percent of all current accounts were overdrawn[57] (a decline from 38.1 percent during the first half of 2016; see Figure 46).

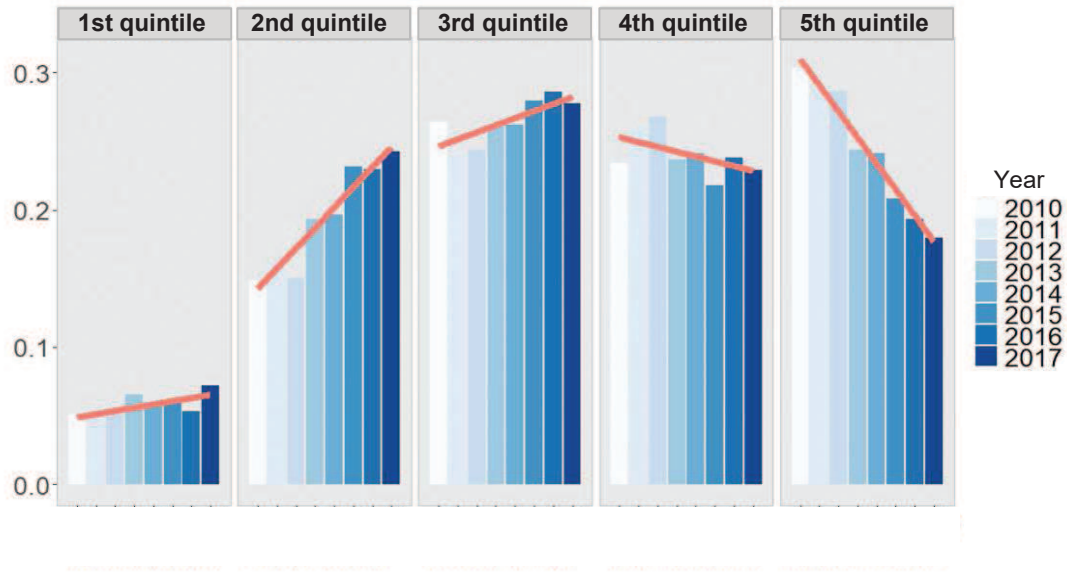
The proportion of overdrawn accounts is high relative to other countries (Figure 47).[58] The credit provided by means of an overdraft accounts for 6.3 percent of total nonhousing credit, a decline from 7.1 percent in 2018. In other words, although the quantity of overdrawn accounts and the proportion of credit provided by means of overdraft have declined over time, a large proportion of households are still in overdraft.

2.4.2 A disaggregated analysis of new mortgages according to income quintiles

This section discusses systemic risks that are liable to emerge from the household sector. In particular, we will examine whether there are certain income quintiles among households in Israel that are at greater risk of default in the case of unemployment or recession.[59]

The lowest three quintiles' share of new mortgages has increased over the years.

Figure 48
Distribution of New Housing Credit by Income Quintile, 2010–17



SOURCE: Bank of Israel calculations.

[56] This estimate is based on Bank of Israel data on the effective average cost of credit in overdrawn current accounts, without differentiating between the business sector and households.

[57] This estimate only includes bank accounts with a credit facility, which may lead to upward bias in this figure.

[58] It is worth mentioning that it is the practice in other countries to use credit card facilities as a substitute for overdrafts. In Israel, the interest rate on credit card facilities is higher than the rate on overdrafts.

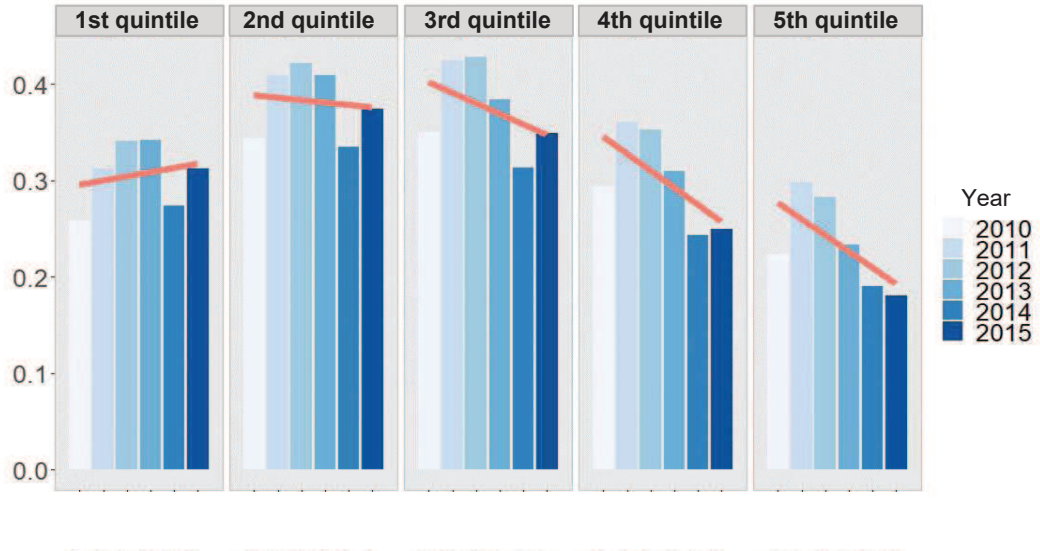
[59] As part of the stress tests of the banking system in Israel, the Bank of Israel gathers disaggregated data on new mortgages taken out each year by households in Israel (according to Banking Supervision Department reporting requirements). This disaggregated database contains detailed information on all housing loans provided between 2010 and 17. Households were divided in each year according to income quintiles (based on Central Bureau of Statistics net income quintiles for households with a salaried head of the household).

With respect to changes in the distribution of housing credit provided to households in Israel according to the Central Bureau of Statistics income quintiles for each year between 2010 and 17[60], Figure 48 shows that the share of the lowest three quintiles' share of new mortgages has risen over time. In contrast, the fourth and fifth quintiles' share of new mortgages has declined over time. Thus, the total credit provided to the upper quintile fell from 30 percent in 2010 to 18 percent in 2017.[61] The shift of housing credit from higher income earners to lower income earners was apparently due to the various housing programs aimed at low-income households and programs to encourage investors to leave the housing market. While this phenomenon has positive social implications, in that households in the lower deciles receive more housing credit than in the past, from the perspective of financial stability there is a concern that the housing credit portfolio is now riskier, with a larger share held by households with a greater risk of default in the case of recession and unemployment.

With respect to risk indices in the mortgage market according to income quintile, the proportion of households with

The percentage of households taking out loans with repayment periods of more than 25 years has declined in all income quintiles other than the lowest.

Figure 49
Percentage of Households that Took out Loans with a Repayment Period of More than 25 Years, by Income Quintile, 2010–15



SOURCE: Bank of Israel calculations.

a loan-to-value (LTV) ratio of more than 60 percent has fallen over time in all the income quintiles. The proportion of households with a mortgage payment-to–income (PTI) ratio of over 40 percent has also fallen over time in all the income quintiles. This is due to the macroprudential limits imposed by the Banking Supervision Department, which have constrained these indices over the years. Nonetheless, the analysis indicates that one-third of households in the

[60] Starting in 2015, there was a change in the definitions of borrowers' income. Until then, the calculation of income included the expenditure on other loans, while subsequently only loans with more than 18 months left to maturity were included. Similarly, the banks fully recognized the income of new participants in the loans and of guarantors, while following the change, they recognized only 50 percent. It may be that as a result of the change in definitions on the margins, there is a different classification of borrowers according to income quintile after 2015.

[61] Similar results were obtained in terms of the number of housing loans.

lowest two income quintiles spend more than 30 percent of their income on mortgage payments.[62]

Figure 49 shows the proportion of households that took out a mortgage with a repayment period of over 25 years. For all income quintiles—apart from the bottom one, which accounts for only a small proportion of housing loans—there has been a decline in the proportion of households taking out a mortgage with a repayment period of more than 25 years. In contrast, in the bottom quintile there was an increase in this proportion.[63] This is apparently the result of the increase in home prices and various programs in the housing market that have encouraged low-income earners to enter the housing market.[64] It is worth emphasizing that more than 30 percent of households in the lowest quintile take out a mortgage with a redemption period of more than 25 years. In the case of a recession and unemployment, there is a greater default probability for this quintile, particularly if they are accompanied by an increase in the mortgage interest rate.[65]

3. Possible shocks to the financial system

Section 1 surveyed the main risks during the reviewed period, including from an historical perspective, and Section 2 describes the resilience of the financial institutions and the main industries to the main risks. On this basis, this Section describes four major focal points of vulnerability that are liable to lead to a realization of shocks that will bring on a systemic crisis in the economy. Three of the focal points are subject to internal risks in the economy, while the fourth is subject to global risks and the global exposure of the economy.

3.1 The housing market – a sharp and rapid decline in housing prices

The housing market constitutes a major focus of vulnerability for the economy, primarily due to the significant increase in home prices from 2007 to 2017 (which totaled more than 120 percent in nominal terms), in parallel to the growth of mortgages, both in volume and number; the high leverage taken on by the construction companies as a result of the low interest rates; and the rigidity of housing supply, which, in spite of the initiatives taken by the government to increase construction activity, has not managed to meet the growth in demand. All of these factors violate the equilibrium in the housing market, and have caused prices to deviate upward from what the long-term fundamentals should dictate. As this deviation grows, so does the likelihood of a sharp correction in prices.

The financial system continued to increase its exposure to mortgages and to the construction and real estate industry during the reviewed period, further to the growth in exposure in recent years. This exposure of credit to the construction and real estate market is high relative to other countries, and constitutes the main risk to the credit market (see Figure 50). Therefore, a sharp and rapid drop in home prices will lead to losses in the financial system as a whole, and a credit supply constraint is liable to develop in the economy. At the same time, this major exposure is not expected to create a systemic crisis, in view of the high level of resilience among the financial institutions (see *Israel's Banking System – Annual Survey*, 2018).

Moreover, households' high exposure to the housing market from an historical perspective (see the *Financial Stability Report* for the second half of 2018) indicates that since 2007, there has been a high demand for housing among households as a supplement, or even a substitute, for long-term financial savings, which have provided low

[62] It is worth mentioning that according to Bank of Israel data, the PTI ratio for the average new mortgage fell from 31 percent at the beginning of 2012 to 25 percent in 2017. The estimate of average LTV fell from 55 percent to 51 percent during the same period.

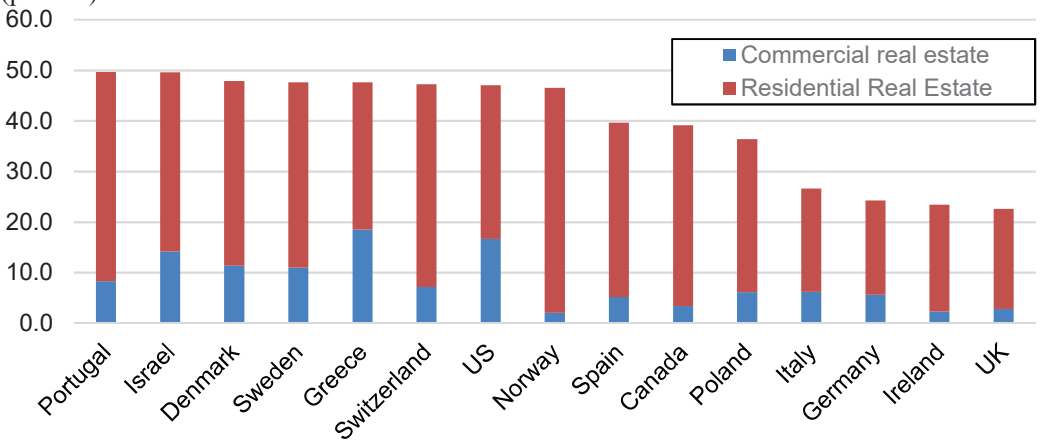
[63] It is worth mentioning that according to Bank of Israel figures, the estimated repayment period for the average new mortgage rose from 20 years in 2012 to 21.5 years in 2017.

[64] In addition, it is possible that the macroprudential PTI limit induced households in the lowest quintile to spread their loan out over a longer period.

[65] The Banking Supervision Department carried out a stress test that included sharp increases in unemployment, home prices, and the Bank of Israel interest rate. The realization of the scenario would negatively affect borrowers, such that the rate of failure among mortgage holders reaches a peak of 5 percent in the scenario, which translates into about 42 thousand borrowers (further details will be published in *Israel's Banking System – Annual Survey*, 2018).

Credit for mortgages and to the real estate and construction industry as a share of total bank credit is high by international comparison.

Figure 50
Commercial* and Residential Real Estate Loans as a Share of Total Loans, 2017
(percent)



* Loans collateralized by commercial real estate, loans to construction companies, and loans to companies active in the development of real estate.
SOURCE: Based on International Monetary Fund.

yields. Therefore, if home prices fall sharply, in addition to the credit losses that are liable to be experienced by the financial institutions in Israel, households are liable to reduce their current consumption and thus create an additional channel for the contraction of economic activity in general.[66]

The variety of considerations indicate that although the financial system has continued to increase its exposure to the housing market, the likelihood of a sudden drop in housing prices in the short term has declined significantly. Evidence of this is the trend in housing prices, which have not exhibited explosive behavior for more than a year, and the fact that building starts are low relative to the economy's needs. In order to maintain the low likelihood of a shock in this market in the long term, it is important to maintain a level of investment such that housing starts will meet demand and not exert upward pressure on housing prices.

3.2 The financial assets market – a sharp decline in the prices of bonds and of all financial assets

Toward the end of 2018, the Bank of Israel raised the monetary interest rate, although it still remained low, since inflation had become entrenched only in the vicinity of the lower bound of the inflation target. The low interest rate and yield environment is causing financial asset prices to rise, primarily bond prices at this stage, due to the search for higher yield and the resulting increase in risk appetite. With the persistence of low interest rates, the effect on financial asset prices has been reinforced, which has increased the likelihood of a shock if interest rates and yields rise appreciably. Furthermore, the increase in the government deficit and/or greater geopolitical tension are liable to generate a reassessment of credit risk, and a deterioration in macroeconomic conditions will amplify the decline in financial asset prices. The realization of such a shock will slow private consumption, increase financing costs, and undermine current activity in the business sector. In this way, the drop in financial asset prices will spill over into real economic activity.

In view of the potential realization of such a shock, it is important to examine the distribution of financial asset holdings by the various types of investors, particularly the public's level of holdings—both directly and through

66 M. Kahn and S. Ribon (2013). "The Effect of Home and Rental Prices on Private Consumption in Israel – A Micro Data Analysis", Discussion Papers Series 2013.06, Bank of Israel Research Department.

the mutual funds—since these holdings are subject to relatively sharp fluctuations under increased uncertainty. The value of the corporate bond market continued to grow during the reviewed period, to about NIS 350 billion, while the public increased its share of outstanding bonds. During the reviewed period, therefore, holdings by way of the mutual funds reached historically high levels, increasing the likelihood that a shock of similar size to those that occurred in the past will lead to a sharper decline.

Moreover, since the Israeli public has increased its scope of passive investment, and since algorithmic trading has become even more common, there would be a sharper increase in liquidity risk during a crisis, and the pace of price declines is likely to increase, deepening the shock.

In view of the persistence of the low interest rate environment, and since yields to maturity on government bonds remained low relative to other countries during the reviewed period, the likelihood of a sharp decline in bond prices in Israel, together with the prices of other financial assets, remains intermediate to high. Nonetheless, according to the spectrum of considerations, it appears that although the public is highly exposed to financial assets, particularly corporate bonds, and although liquidity risk remains high, we believe that the likelihood of the realization of a shock has declined somewhat. The main reason for this is the moderation of the risk of a rapid rise in the interest rate, as occurred prior the sharp declines in global markets in late 2018. Since there is a strong connection between asset valuation and the interest rate environment, the likelihood of a realization of this shock has declined somewhat, at least in the short-to-medium term, although it remains at an intermediate to high level.

3.3 Private debt – a deterioration in financial conditions

This focus of vulnerability is the result of two main factors. The first is the low interest rate in the economy over a long period and the concentration of credit in the real estate market (mortgages and credit to construction companies and real estate activity). The second is the reforms initiated by the government in recent years to encourage competition in the credit market, and the resulting increase in nonbank credit providers' share of credit to households and to the business sector. If the private sector finds it difficult to meet its commitments—whether due to an increase in the interest rate on debt or as a result of an economic recession (a drop in demand and an increase in unemployment)—we will see the effect first and foremost in the area of nonhousing credit to households (since it is provided without collateral and covenants and at a variable interest rate). Furthermore, households and the business sector will in this situation find it difficult to meet their commitments, and in the case of a deterioration in financial conditions this may create pressure to sell homes that are encumbered to the banks. Such an event will have a major effect on the housing market and will amplify the shock to the economy as a whole.

It is important to emphasize that the private debt to GDP ratio is not increasing at a particularly high rate, and is still low relative to other countries. However, the stress test carried out by the Banking Supervision Department shows that some of the banks will experience losses. This situation is liable to significantly increase the risk of all the financial institutions, and may quickly expand to other branches of the economy, particularly those that rely on short-term debt for their continued activity. Furthermore, in view of the numerous reforms implemented in the economy in recent years, and the appearance of new credit providers, which have expanded the possibilities for obtaining financing, it may be that the aggregate risks that we know about do not completely reflect all of the risks that are currently developing.

In view of the spectrum of considerations, we believe that the likelihood of such a shock remains basically unchanged, at a low-to-intermediate level. Nonetheless, the volume of credit may continue growing as a result of the low interest rates and increased competition among credit providers, and it may reinforce this focus of vulnerability, particularly if the credit is channeled to the lower income deciles. Moreover, the changes in the legal environment in which credit providers operate—which relate to the collection of debt, primarily that provided without collateral or covenants—are liable to increase the risk taken on by households and expand the potential for credit losses among borrowers.

3.4 The global environment – lowering of credit ratings among low investment grade companies

As mentioned in Section 1.1.2, IMF economists have noted a number of major short-term risk factors that are liable to bring about a change in positive investor sentiment and a tightening of global financial conditions. These include a sharper than expected slowdown in global growth, monetary tightening by the central banks, and an increase in political risk emerging from the trade war between the US and China or due to a no-agreement exit by Britain from the EU.[67]

The concerns of the IMF and other international organizations regarding a sharper than expected slowdown in growth or a change in positive investor sentiment for other reasons have led the various organizations to look at which sectors or countries would be most affected by this scenario. This is particularly so since most countries are at an advanced stage of the business cycle, and since global financial asset prices have basically returned to the high levels from prior to the sharp declines at the end of last year.

In the event of a tightening of financial conditions, the IMF points to four areas that would be particularly vulnerable under present conditions, whether as a result of a crisis or a change in investor sentiment.[68] These include companies in the developed markets, where high debt levels and deteriorating debt quality present a serious weakness; the fiscal deficits in some of the eurozone countries, which may lead to large losses in the financial sector as well[69]; imbalance in the financial system in China, which makes it difficult for China to implement an expansionary and growth-oriented policy; and finally, the flows of foreign capital into the emerging markets from investment in various indices[70], the scope of which has grown significantly during the past decade.

As in the previous report, during the reviewed period important international organizations have emphasized the first weak point described by the IMF, namely the high level of leverage and the low quality of debt in the business sector. According to IMF data, since the global financial crisis (GFC) in 2008, the inventory of bonds rated BBB, which is the lowest investment grade rating, has quadrupled. In the event of a series of rating reductions, these companies will become unrated (HY – high yield) and suffer a significant negative impact as a result, both due to higher fundraising costs, and because their base of investors will shrink. The IMF mentions notes that the increase in leverage is a global phenomenon that is the result of an extended period of near-zero interest rates.

According to data presented in the BIS Quarterly Review[71], companies with a BBB rating have increased significantly as a share of all rated companies, to about 30 percent in Europe and about 50 percent in the US. At the same time, the report shows that the search for yield since the GFC has led many investors, particularly those who are obligated to hold investment grade companies, to significantly increase the proportion of BBB-rated companies within their portfolios. The BIS also warns that if economic conditions worsen for one reason or another, there may be a trend of ratings reductions in the business sector and those investors will have to reduce their exposure to companies that are currently rated BBB. In this scenario, we expect sharp declines in financial asset prices, which will lead to a tightening of the global financial environment.

In February of this year, the OECD also published a position paper that examined the corporate bond market, with

67 WEO, April 2019.

68 GFSR, April 2019.

69 A sharp rise in yields in the government sector as a result of fiscal difficulties will in turn lead to major losses among the banks and insurance companies, since they hold government bonds in their bond portfolios.

70 Since investors of this type do not necessarily monitor the economic conditions of the country but rather only a general index, this creates the risk that when a change in sentiment occurs, these global investors will withdraw their money from the developing countries more suddenly than has occurred in the past.

71 *BIS Quarterly Review*, March 2019.

emphasis on the development of risk.[72] According to the OECD data, global corporate debt issued by nonfinancial companies has doubled in real terms since the GFC, reaching $13 trillion in 2018.[73] Researchers have pointed to a number of trends during this period that increase the risk in the corporate bond market, including the significant increase in the issue of bonds with the lowest rating (namely BBB) at the expense of higher ratings; a decline in the quality of total debt (both rated and unrated) to below BBB+ over a period of nine consecutive years; and the reduced usage of contractual protection of bondholders who own unrated bonds (a decline in financial standards). In addition, the OECD reported that during the next three years companies are expected to repay or recycle a total of $4 trillion in debt (almost the size of the entire FED balance sheet), following a period in which the volume of new issues fell sharply and the volume of new issues of unrated bonds became negative, an indication of reduced risk appetite among investors. The foregoing emphasizes the vulnerability of the corporate bond market in the event of a realization of one of the risks.[74]

Finally, the FED's financial stability report published in May of this year emphasized that the high level of debt among the more leveraged companies in the US is expected to cause a major deterioration in the economic situation if a crisis occurs on the basis of one of the aforementioned risks. (However, on its own it is not expected to bring about an economic crisis).

In view of the foregoing, we believe that the high global debt levels and the drop in the quality of the debt remained the major risk to the financial stability of the global economy during the reviewed period. As such, in the event of a series of ratings reductions as a result of the realization of one of the risks mentioned at the beginning of the section, the drop in global financial asset prices will be very sharp, and will lead to a significant tightening of the global financial environment.

In our assessment, a tightening of this kind is likely to trickle down to the Israeli market, primarily by way of the financial channel. Although the Israeli market and Israeli financial institutions have low direct exposure to the focal points of risk identified by the financial organizations, a major decline in the prices of debt assets worldwide is expected to create negative sentiment in the markets, which will also have a negative effect on the prices of financial assets in Israel. The reason for this is expected to be a concomitant decline in risk appetite among Israeli investors who also invest globally. As is well known, a decline in financial asset prices is likely in turn to have a negative impact on the situation of both companies and households, and will lead to a slowdown in economic growth.

[72] S. Çelik, G. Demirtaş, and M. Isaksson (2019). "Corporate Bond Markets in a Time of Unconventional Monetary Policy", OECD Capital Market Series, Paris.

[73] The report is based on a database of 85,000 bonds issued by nonfinancial corporations in 114 countries between 2000 and 2018.

[74] The main risks mentioned by the OECD include a major slowdown in global growth, a change in monetary policy by the central banks, and continued growth in government holdings of corporate bonds.

Box 1: Identification of the financial cycle

1. Introduction

The financial crisis of 2007–9 demonstrated the extent to which a financial crisis can affect real economic activity. The crisis demonstrated that real economic activity is interconnected with financial activity, and that this can affect the depth and intensity of the business cycle. Therefore, researchers have begun to identify the cyclical behavior of financial activity (the financial cycle), sometimes using similar methods to those used to estimate the business cycle (the real cycle). The main idea behind this effort is to identify the economy's position within the financial cycle alongside its position in the real cycle, with the goal of correctly managing macroprudential policy. Essentially, to the extent that developments in the financial system provide information on expected developments in macro conditions (as a result of the reciprocal relationship between financial and real activity), attention should also be devoted to these developments in setting monetary policy.

2. Defining the financial cycle

The approach in the literature that characterizes developments in the financial system as a "financial cycle" is relatively new and involves a particularly challenging task. There is still no agreed-upon definition of a "financial cycle", nor is there a uniform methodology for estimating it. A number of attempts have been made to identify the financial cycle (including at the Bank of Israel—this box presents that model and its results) and we can learn from the most commonly used methods of analysis.

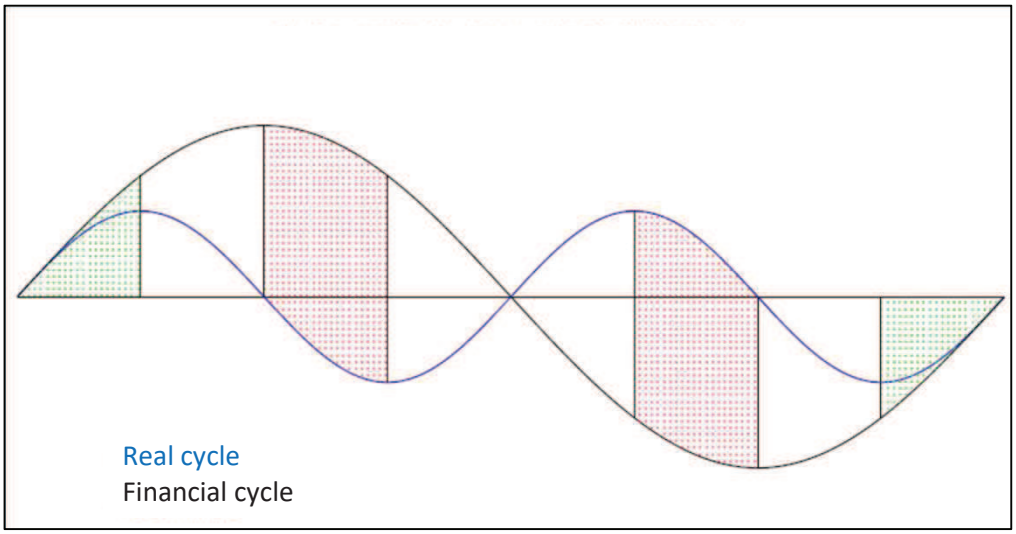
The idea behind the financial cycle is to identify the cyclical behavior of financial activity. Accordingly, the financial cycle is defined in this document as "deviations from the long-term trend of a group of variables that are important to financial stability", a definition that is relatively common in the literature. The definition first requires the choice of the relevant variables and after that the choice of method to identify deviations from the trend. Following the literature, a number of estimates were looked at to identify the financial cycle, including private credit, home prices, share prices, and the slope of the real yield curve. However, apart from private credit and home prices, the other estimates were found to change at a different (short) frequency, and do not therefore contribute to the identification of the financial cycle. Therefore, the following variables were chosen: total private credit (business sector and household debt) and home prices (represented by the index of owner-occupied home prices).

The deviations from the long-term trend were identified using a filtering method that eliminates the changes at frequencies that do not characterize the financial cycle for each of the chosen estimates, a method called the Band Pass Filter.[1] In order to identify the trend, it is necessary to decide on the desired range of frequencies that preserves all of the fluctuations found within it while all the rest are moderated.[2] The result obtained is the identification of cyclical behavior (deviations from the average) in the defined range. It is worth mentioning that the method does not enable reliable identification at the ends of the band, and results based on the most recent observations should be treated with caution. Similarly, it should be recalled that the filter works to remove the long-term trend in order to identify deviations from the trend, but if a structural change occurs that leads to a change in the trend itself, this is liable to hinder the identification of the trend and deviations from it.

[1] The intuition behind the method is to eliminate noise (changes at a high frequency) and the long-term trend (changes at a low frequency), such that what is left over are cyclical deviations from the long-term trend at the desired frequency. The use of this method to identify the financial cycle is well-established in the literature; see for example Meller and Metiu (2017).

[2] Following the findings of Danieli (2016), a range of frequencies of between 32 and 80 quarters was chosen.

Figure 1
The Relationship between the Financial Cycle and the Real Cycle



Drehmann et al. (2012) looked at a number of possible financial variables for seven countries (Australia, Germany, Japan, Norway, Sweden, the UK, and the US) and arrived at the conclusion that the most informative variables are credit to the private sector and home prices. In order to identify deviations (from the long-term trend) the researchers used a Band Pass Filter.[3]

Borio (2014) claimed that the most important variables for describing the financial cycle are total credit to the private sector and home prices, and that the cycle can be fully identified using these two variables. His work indicates that the high point of the financial cycle usually occurs near the time of a financial crisis (events characterized by systemic risk in the banking system). He concluded that the combination of the credit gap (the deviation of the credit to GDP ratio from its trend) and the asset price gap can be used to provide an early warning of financial distress.

Grinderslev et al. (2017) analyzed a sample of 17 developed countries. Like the commonly reported findings in the literature, they considered two frequencies: a short frequency (which characterizes real cycles) and an intermediate frequency (which characterizes financial cycles). The researchers defined the benchmark range for short frequencies as 8 to 44 quarters[4] and the benchmark range for intermediate frequencies as 44 to 120 quarters. They chose bank credit and home prices in order to identify the financial cycle, arguing that those variables are appropriate for identifying the intermediate frequencies that are typical of the financial cycle. They considered additional variables such as share prices, yields, and spread, but concluded that they do not contribute to identification at intermediate frequencies.

Their work identifies the financial cycle in Denmark and looks at the interaction between financial variables and GDP. According to the results, GDP, home prices, and bank credit are correlated, and the fluctuations in GDP and home prices precede the fluctuations in credit by 8 quarters.

Danieli (2016) adopted the methodology of Drehmann et al. (2012) and estimated the financial and real

[3] In addition to other methods that produced results consistent with those of the Band Pass Filter.

[4] The threshold of 44 quarters is higher than that commonly found in the literature (i.e. 32 quarters). The researchers claimed that widening the filter range improves the correlation between the real cycle obtained and the output gap as estimated by the IMF.

cycles for the Israeli economy. The estimation of the cycles in Israel is challenging for a number of reasons: First, there is a lack of long-term data, such that the sample period used is only 88 quarters (1992–2014). As a result, the filter range for the financial cycle was defined as 16–80 quarters. The narrowing of the filter range is consistent with the approach of Drehmann et al. (2012). Even after this adjustment, the range of frequencies is still relatively broad (since the average length of a financial cycle in the literature is 64 quarters). Second, the development of the nonbank credit channel in Israel since the early 2000s—which today accounts for a significant share of the credit market—has led to a major structural change in Israel that may influence the character of the financial cycle and complicate the identification process.

The findings show that the intermediate component of the financial cycle is highly important in the Israeli economy (even though in Israel the intermediate term was, as mentioned, defined differently). The research finds that the financial cycle in Israel is shorter and less volatile than those in most of the countries in Drehmann et al. (2012)'s sample. This finding was attributed to the prominent bank crises in the sample countries after 1985, and points out that in Germany, which went through a single bank crisis, the financial cycle has similar characteristics to those of the financial cycle in Israel. In contrast to the methodology of Drehmann et al. (2012), who used only bank credit, home prices, and share prices, Danieli (2016) also included government bond yields and the risk premium on government bonds in the system of variables needed for the identification of the cycle.

This box identifies the financial cycle in Israel on the basis of an updated sample for the period from 1992:Q3 to 2018:Q4, and thus expands on the work of Danieli (2016). Since the lack of long-term data is one of the major limitations in identifying the financial cycle in Israel, the expansion of the sample improves the analysis. Like the definition used by Borio (2014) (as opposed to Danieli (2016)), the variables used here to identify the financial cycle are credit and home prices[5], in view of the consensus in the literature that these variables represent the elements of the financial system that are relevant in the identification of the financial cycle.[6]

3. The financial cycle's importance to financial stability

The literature on financial cycles (Borio, 2014 and Drehmann et al., 2012) emphasizes the interactions between the financial cycle and the real cycle, and argues that situations of slow growth in real activity (lower than the long-term average) will be more severe when correlated with a slowdown in financial activity. Therefore, if the position within the financial cycle can be identified in addition to the position within the real cycle, it will add important information for managing both macroprudential policy and monetary policy (where the identification of the position within the financial cycle is likely to provide information on the expected developments in macro conditions). The interaction between real and financial activity is described schematically in Figure 2.

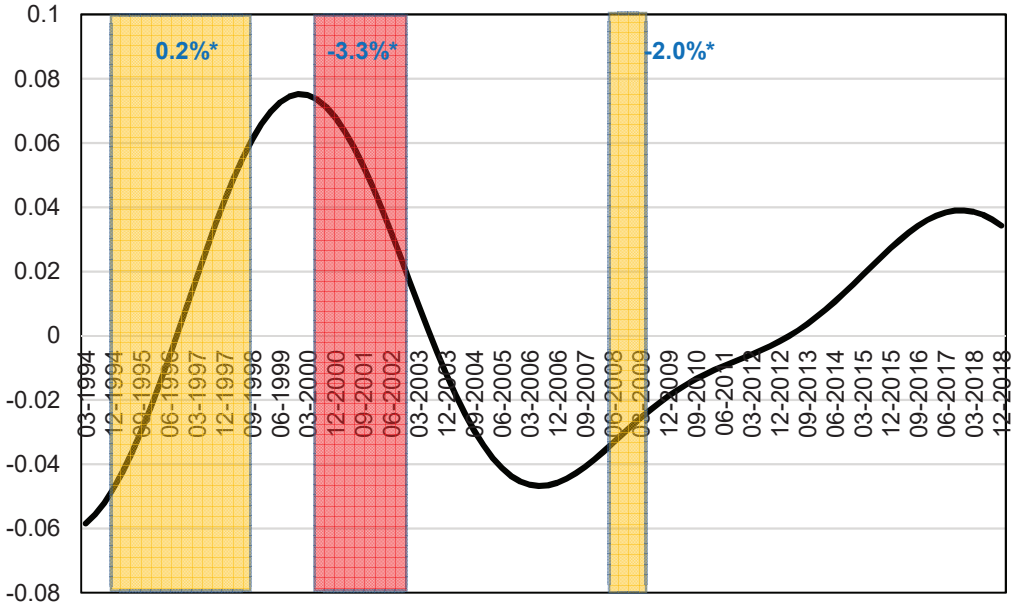
Figure 2 shows that the reciprocal relationship between the financial and real cycles is characterized by four main scenarios: a situation in which the cycles are correlated, meaning they both increase from the low point to the high point or descend from the high point to the low point relative to the long-term average, versus a situation in which the cycles are opposite (one is falling from the high point to the low point while the other is rising from the low point to the high point). If the cycles reinforce one another, then a situation of comovement between them is liable to be dangerous. In a period where the real cycle is in recession (a descent from the high point to the low point), contraction in the financial cycle is liable to deepen the real recession and thus slow

5 Among other things, due to the financial system's high level of exposure to home prices.

6 A test in which share prices and the slope of the yield curve were included showed that they do not improve the ability to identify the cycle.

The financial cycle in Israel affects the intensity of the real cycles.

Figure 2
The Financial Cycle (log, in real terms, normalized to 2001:Q1)



* Rate of change in per capita GDP (in annual terms).
SOURCE: Bank of Israel calculations.

economic growth. In the event that the real recession is characterized by "overheating" (an ascent from the low point to the high point), financial expansion is liable to intensify the adverse effect on the efficiency in the allocation of sources thus harming future growth. Based on this description, the identification of the financial cycle (in parallel to identifying the real cycle) will contribute to identifying situations in which deviations of both cycles from the trend reinforce one another and are likely to reduce growth over the business cycle.

4. Using the financial cycle in order to set countercyclical capital buffers

The Basel Committee on Banking Supervision issued guidelines in December 2010 for the implementation of a new macroprudential policy tool: countercyclical capital buffers. The idea behind this buffer is to require banks to maintain a cyclical capital ratio, that is, a high ratio during expansionary periods, which can be reduced in recessionary periods in order to mitigate the credit supply constraint in those periods. The use of an countercyclical capital buffer requires the identification of the financial cycle, which underlines the importance of trying to identify it from both an historical perspective and in real time.[7]

5. Identifying the financial cycle in Israel

This analysis is an extension of previous ones at the Bank of Israel that attempted to identify the financial cycle (see, for example, Danieli, 2016). The characterization of the financial cycle shows that it was in an

[7] In practice, one of the possible results of implementing anti-cyclical capital buffers is to moderate the financial cycle by requiring cyclical capital ratios. This result makes clear the importance of identifying the financial cycle and analyzing the mutual relations between it and real activity.

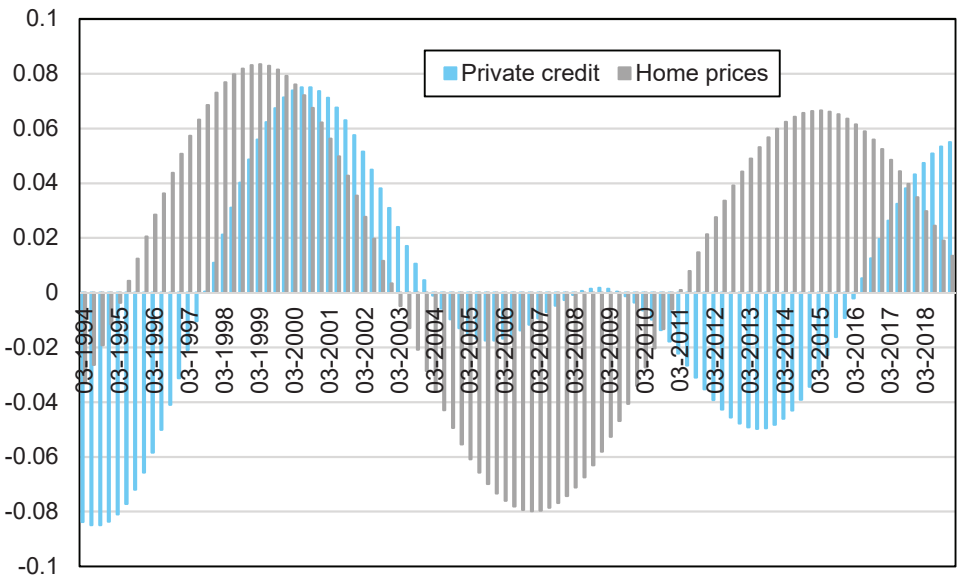
expansionary phase until 1999:Q4, and in a contractionary phase subsequently, until 2006:Q2. Since then the cycle has been in an expansionary trend, which has apparently moderated recently. The most recent observations indicate the possibility that a financial contraction is beginning. Nonetheless, it should be emphasized that the method does not enable reliable identification from the most recent observations and results based on the most recent observations should be treated with caution. Similarly, it should be remembered that the filter works to eliminate the long-term trend in order to identify deviations from it, but if there is a structural change that led to a change in the trend itself, then this is liable to complicate the identification of the trend and the deviations from it.

In order to analyze the reciprocal relationship between financial and real activity, we made use of the results of Djivre and Yakhin (2011), who described the characteristics of Israel's real business cycle. The goal is to determine whether it is possible to classify the severity of a real recession by its correlation with the financial cycle. They identified three recessionary periods (as do Flug and Strawczynski, 2007), which are shown in color in Figure 2. Two of the three recessions (1995:Q4–1999:Q1 and 2008:Q2–2009:Q1) are correlated with a financial expansion and are shown in yellow. These are expected to be less severe than a recession that is correlated with a financial contraction. The other recession (2000:Q4–2003:Q2) was correlated with a financial contraction and is shown in red. It would be expected to be more severe than the other recessions. It appears that the classification obtained is consistent with the fact that the recession marked in red (from 2000:Q4–2003:Q2) was indeed a more difficult period for the Israeli economy.

Figure 3 presents a decomposition of the financial cycle according to the contribution of each of its components. Credit and home prices generally work in the same direction, but with different timing. It appears that credit operates with somewhat of a lag relative to home prices, a finding that is consistent with those

The home prices component precedes the private credit component in the financial cycle.

Figure 3
The Components of the Financial Cycle (log, in real terms, normalized to 2001:Q1)



SOURCE: Bank of Israel calculations.

of Grinderslev et al. (2017). It can be seen that each of the variables makes a significant contribution to the development of the financial cycle. It appears that the decline in home prices in 2001 led to a contraction in the financial cycle, while their upward trend led to an expansion in the financial cycle. It is important to emphasize that the analysis of leads and lags is only with respect to timing and does not imply a causal relationship.

Conclusion

This box deals with the identification of the financial cycle in Israel. It expands the sample period and thus improves upon previous work in this field. The analysis of the reciprocal relationship between real and financial cycles shows that a recession that was correlated with financial contraction was deeper than other recessions (which were correlated with financial expansion). An examination of the most recent period[8] shows that the expansion of the financial cycle that began in 2006:Q2 has moderated.

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[8] As reflected in the data as of the period for which the identification was carried out.

Box 2: Statistical models for monitoring systemic risk

As part of the effort to track the development of systemic risk, the Bank of Israel monitors various indicators that serve as a kind of "dashboard" for the identification of systemic risk. This dashboard consists of both raw indicators and the outputs of complex statistical models, which were developed worldwide and are applied—with the necessary modifications—to the financial system in Israel. This box presents two such models and their results.

CoVaR (Conditional Value-at-Risk)

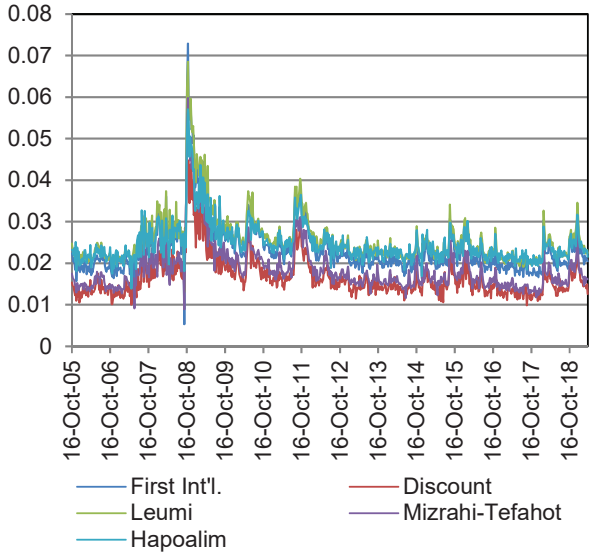
This model was developed by Adrian and Brunnermeier (2016), and is used to estimate the strength of the connection between various financial institutions within the financial system, in the case of a stress event. This technique is an extension of Value at Risk (VaR), which uses risk management to forecast the expected loss for a certain term and a certain level of likelihood, where the conditional stresses that the focus is not on the independent risk of a financial institution but rather on this risk given that a different financial institution is in distress. The index therefore relates to the connection between two institutions, although it can be expanded to analyze how the financial system as a whole would be affected by the fact that a particular financial institution is experiencing a stress event.

This index does not constitute a leading indicator of a crisis. Rather, it enables a real time examination of each financial institution's relative contribution to systemic risk (or to the risk of a different financial institution), thus making it possible for supervisors and policy makers to increase the focus of their efforts if there is a problem.

The model is estimated using data on the yields of the shares of financial institutions. The estimation is carried out using percentile regression, an econometric method that tests the connection between two variables. However, contrary to a regular regression, in which we estimate how the average of the dependent variable is explained by some explanatory variable, in this type of regression we estimate how some percentile (for example, the 95th percentile) of the dependent variable is explained by the explanatory variable. Using the percentile regression, we estimate how a stress event (namely, an event that is likely to occur in only 5 percent of the circumstances) in the financial system as a whole is dependent on what happens in a particular financial institution, and particularly on the extent to which there has been a stress event in that financial institution. The greater the effect, the larger the contribution to systemic risk that we attribute to that financial institution.

Each bank's contribution to systemic risk reflects not only its size.

Figure 1
The [delta-CoVaR] of the Five Large Commercial Banks in Israel, October 2005–April 2019 (weekly)



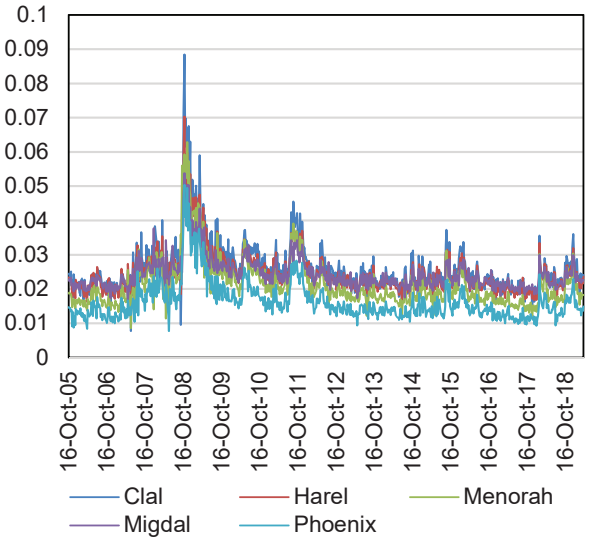
SOURCE: Based on Tel Aviv Stock Exchange.

We implemented the aforementioned model for the five large banks, where the events are defined as the weekly yield on the shares of each of the institutions. In the role of the "financial system", we used the Tel Aviv 90 Index (formerly the Tel Aviv 75 Index), since it does not include most of the banks. The output of the model, as mentioned, is the change in the value of the financial system's stress event (that is, the change in the weekly yield in the event of a stress event), conditional on a stress event occurring in a particular financial institution (that is, a sharp drop in the value of its shares). This is referred to in short as [delta-CoVaR]. The results are presented in Figure 1.

The figure shows that in all of the systemic events (the 2008 crisis, the sovereign debt crisis in 2011, etc.) the contribution of all of the banks to systemic risk rises, and in general there is a very high correlation between the [delta-CoVaR] values of each bank. Nonetheless, the difference between the banks raises an important point. In theory, it would have been expected that the contribution to systemic risk be proportional to the size of the bank. However, the two indices ([delta-CoVaR] and market value) seem to show that that relationship is not absolute. Thus, for example, during most of the period, Bank Discount made the smallest contribution to systemic risk, even though its market value during most of the period was third in size. In contrast, the First International Bank was the smallest of the five banks during the entire period and nonetheless its contribution to systemic risk was usually third in size.

The insurance companies' largest contribution to systemic risk is apparently due to their large volume of activity in the equities market.

Figure 2
The [delta-CoVaR] of the Five Large Inusrance Companies in Israel, October 2005–April 2019
(weekly)



SOURCE: Based on Tel Aviv Stock Exchange.

Similarly, we calculated the [delta-CoVaR] for the five largest insurance companies (Figure 2).[1] Since the concepts are identical, we can compare this index for the insurance companies with the index for the banks. Both the average and the standard deviation of the [delta-CoVaR] are higher in the case of the insurance companies. This may be because the insurance companies hold a very high proportion of shares within their assets (primarily in profit-sharing portfolios), which would naturally make their contribution to systemic risk, which is calculated on the basis of share indices, higher.

Indices of the banking system's stability (the CIMDO approach)

As in the case of the previous index, this approach also attempts to estimate the mutual effects of one financial institution on another. However, the statistical approach in this index looks at the whole financial system as a portfolio of correlated assets (namely, the banks). Therefore, the performance of the "asset portfolio" is dependent not only on each financial institution separately but also on the correlations between their performances. Since the purpose of this tool is to estimate systemic risk, we are particularly interested in potential negative stress events in the "portfolio", the mutual dependence between the financial institutions,

[1] More precisely, the (public) holding companies of the insurance companies.

and understanding how this dependence creates a channel through which a shock to one financial institution is liable to affect another and possibly the entire system.

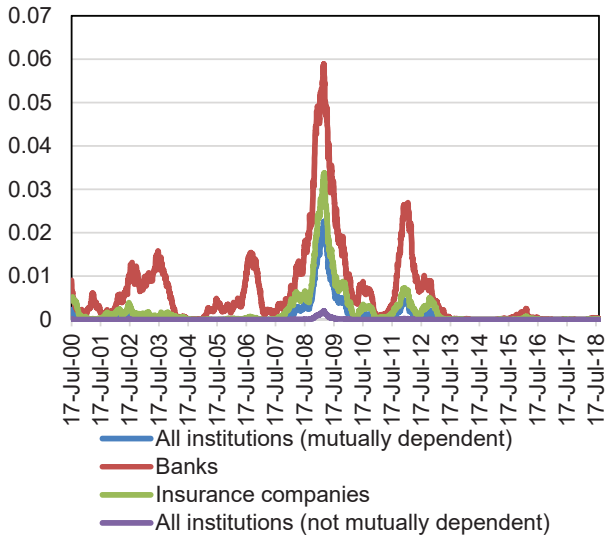
The data required to use this tool are the yields on the shares of each financial institution. The threshold for defining a stress event is the first percentile of the rates of change of all the shares over all the years, and the likelihood of the occurrence of such an event is estimated over a moving period of 125 days. Based on the assumed form of the distribution of share returns and the use of an algorithm that identifies the mutual dependency between the share returns of the various financial institutions[2], it is possible to derive the form of the joint distribution of the share returns.

This distribution is the basis for a large variety of probabilities of stress event occurrences. Beyond the unique probability for each financial institution, it can also be used to calculate a series of systemic risk indices. For example, it is possible to calculate the probability that a stress event in a particular financial institution will spill over to create a stress event at another financial institution, the probability that a number of financial institutions will fail simultaneously, the probability that at least one additional financial institution will be adversely affected if a particular financial institution is in distress, the number of financial institutions that will be adversely affected if one financial institution is in distress, and so forth.

We implemented this methodology for the five banks and the five insurance companies and derived a large number of systemic risk indices. For example, Figure 3 presents the joint likelihood of the collapse of the entire banking system (namely, that the returns on the shares of all the banks and insurance companies

The mutual dependence between insurance companies and banks raises the likelihood that both types of institutions will encounter simultaneous stress scenarios.

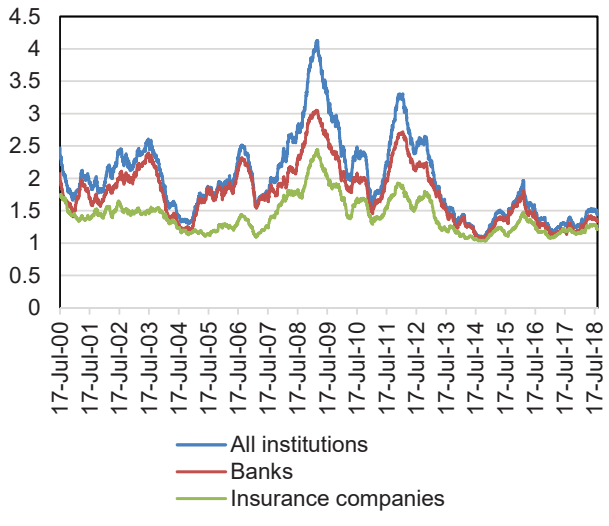
Figure 3
The Joint Likelihood of a Stress Scenario, by Type of Institution (Banks and Insurance Companies), 2000–19



SOURCE: Based on Tel Aviv Stock Exchange.

The mutual dependence between banks is higher than between the insurance companies, so a stress scenario at one bank will lead to more banks encountering a stress scenario.

Figure 4
The Number of Institutions that will Encounter a Stress Scenario if One Institution Does So (Banks and Insurance Companies), 2000–19



SOURCE: Based on Tel Aviv Stock Exchange.

[2] The method is called Consistent Information Multivariate Density Optimization and was developed and applied by Segoviano and Goodhart (2009) and Basurto and Espinoza (2017).

simultaneously cross a particularly extreme negative value). The graph shows that the risk of the banks was higher than that of the insurance companies throughout the reviewed period, particularly at the height of the 2008 financial crisis and during the European debt crisis (mid-2011). Similarly, it appears that the likelihood of the realization of a systemic stress event among the banks is higher than among the insurance companies. The blue line represents the joint dependency between the two types of institutions, namely the likelihood that all of them will fail simultaneously given the mutual dependency between the two types of institutions. In contrast, the purple line represents the likelihood of the same thing happening in the event that there is no mutual dependency between the two types of institutions. Thus, if the blue line is higher than the grey it can be concluded that there is indeed a mutual dependence between the two types of institutions and that this is manifested primarily in crisis periods.

To complete the picture, we ask what would happen if a stress event occurs that brings about the collapse of one financial institution: How many financial institutions will collapse in its wake? Here too (Figure 3) we see a similar path with the same difference between the two types of institution. Thus, the realization of risk among banks has a larger impact on the rest of the banks, and during the financial crisis if one bank had collapsed another three would have collapsed along with it, while the collapse of one insurance company would have dragged two other insurance companies with it. This result, like the preceding one, is evidence that connectivity and contagion exist on a larger scale in the banking system than among the insurance companies, at least according to share movements.

Another result derived from the model is the mutual effect that one financial institution has on another. At the financial institution level, it is possible to derive for each period which financial institution is the most contagious and which is the most vulnerable. The most contagious financial institution is the one for which every one of the other financial institutions has the highest (average) probability of being infected by it, and the most vulnerable financial institution is the one with the highest (average) probability of being infected if each of the other institutions (separately) is negatively affected.

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