Chapter 4

Development of Sources of Financing for the Nonfinancial Private Sector

- In 2022, against rising inflation and interest rates in Israel and globally, there were significant declines in the financial asset markets. Equity prices declined sharply, and bond yields of public companies (which constitute approximately half of the economy's business sector debt) rose, resulting in higher costs of debt and capital raising.
- Interest rates on bank credit rose in response to the increase in the Bank of Israel interest rate in the second half of 2022. Interest rates for businesses rose for all business sizes and industries, while interest on credit for households rose with respect to both housing credit and nonhousing credit.
- In 2022, developments in the field of credit were not uniform. In the first half of the year, the sharp increase in the credit balance continued the trend that had begun in 2021, while in the second half of 2022 the credit supply contracted, with a slowdown in the growth rates of bank and nonbank credit to both businesses and households.
- The effect of tighter financial conditions and declining equity prices was evident in the IPO market, where the wave of IPOs that had begun in 2022 was cut off. The economic developments reduced high-tech firms' capital raised from venture capital funds both in and outside Israel.

1. MAIN DEVELOPMENTS

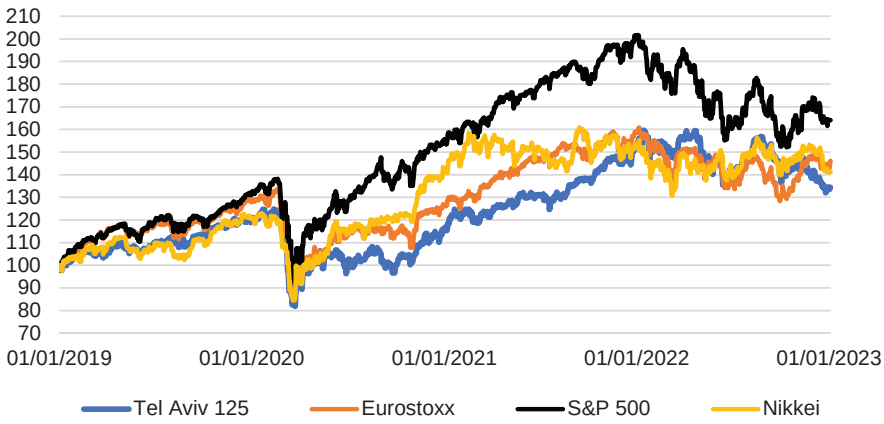
This Chapter describes the main developments in the sources and uses of financing for the Israeli economy in 2022 and links these developments to long-term economic trends. Private debt is used by households and businesses for consumption and investment, which explains its significance for economic activity. In 2022, inflation in Israel increased at an accelerated pace, and the Bank of Israel responded by increasing its interest rate from 0.1 percent in April to 3.25 percent at the end of the year. (For additional information see Chapter 3.) The rapid changes in the Bank of Israel's interest rate translated into an increase in credit suppliers' capital raising costs, which affected the economy's supply of financing sources. Both rising inflation and the monetary policy response, which was reflected in interest rate hikes, were typical of most advanced economies (as described in Chapter C), which triggered tighter financial conditions in Israel and worldwide. Since monetary policy gradually became tighter over the year, its effect on financial aggregates and credit is especially prominent when analyzing the developments during the year. Financial asset markets around the world recorded declines, in view of rising inflation and interest rates, as well as geopolitical concerns due to the Russian-Ukraine war. Israel's capital market also recorded declines in 2022. Equity prices dropped sharply and bond yields of public companies (which account for approximately half of the economy's outstanding business debt) rose, resulting in higher costs of capital raising and credit.

The effect of increasingly tight monetary conditions and declining equity prices (Figure 4.1) was evident in the IPO market, stemming the tide of IPOs that had begun in 2020 and continued strongly in 2021, when 133 new companies issued their shares to the public for the first time (compared to 245 companies in 2019–2020).[1] In addition, venture capital financing, which mainly finances the high-tech sector, contracted. In 2022, total investments in the high-tech sector declined sharply compared to the previous year (which was a record year from a historical perspective), interrupting the upward trajectory of recent years. In contrast to equity financing, there was no change in debt financing in 2022 compared to previous years. Bond issues proceeded, on average, at a similar pace to previous years. One partial explanation may be the high volume of maturities expected in 2023 relative to previous years, which new bond issues were intended to cover.

Increases in the Bank of Israel interest rate, which began in April 2022, were also translated into rising interest rates in the banking sector. Interest rates on loans increased, and interest rates on deposits also increased, but at a slower pace and at lower rates. Nonetheless, even if the pass-through from the monetary interest rate to deposits in Israel was incomplete, it was higher than in most countries, partly due to the Bank of Israel's actions to increase competition and transparency in the banking sector. (For additional information see Box 4.2.) The pass-through from the Bank of

[1] For an analysis of the wave of IPOs and their micro- and macroeconomic effects on the capital market, see Box 4.1 in this chapter.

Figure 4.1
Selected Global Equity Indices (in local currency terms)



SOURCE: Based on stock exchange reports.

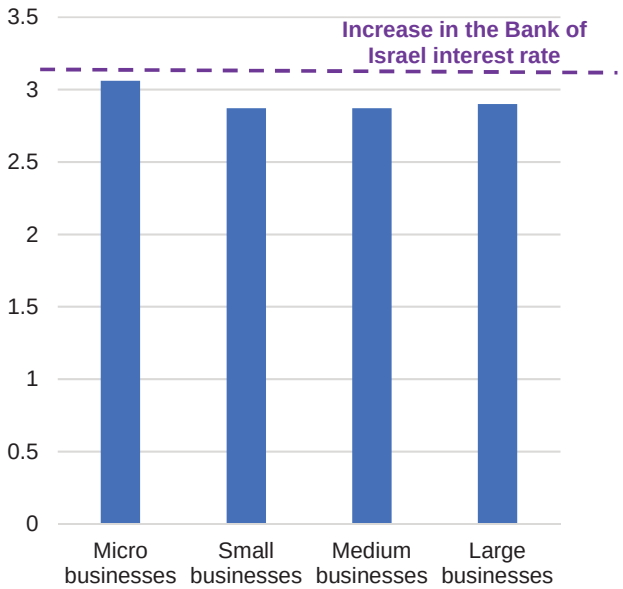
Sharp interest rate hikes by the Bank of Israel were translated into rising interest rates in the bank and nonbank sectors. In view of the rising interest rates, the growth of credit in the bank and nonbank channels slowed in both the business and household segments.

Israel's interest rate to the interest rates on banking credit was high, as illustrated by the increase in interest rates across the board: Interest rates on business bank credit rose for all businesses, irrespective of size, and in all industries, and interest rates on household credit rose for both housing and nonhousing credit. The increase in the interest rates on bank credit for businesses was similar to (and slightly lower than) the rise in the Bank of Israel interest rate, which is evidence of a strong pass-through rate from the monetary interest rate to the interest rates on business credit (Figure 4.2).

Outstanding business sector debt increased by 12 percent this year, while outstanding household debt grew by 11.5 percent— exceeding balances in previous years. Debt to both banks and nonbank lenders increased. The increase in business debt was largely due to bank loans to large businesses, and was concentrated mainly in companies in the construction and real estate industry, in in view of their continued high level of activity throughout 2022. Approximately 25 percent of the business debt is indexed to the CPI and approximately 21 percent is denoted in or indexed to foreign currency (mainly US dollars). The increase in the CPI and the depreciation of the shekel therefore also contributed to the increase in the balance of business sector debt. This increase was relatively rapid in the first half of the year, and slowed somewhat in the second half of the year.

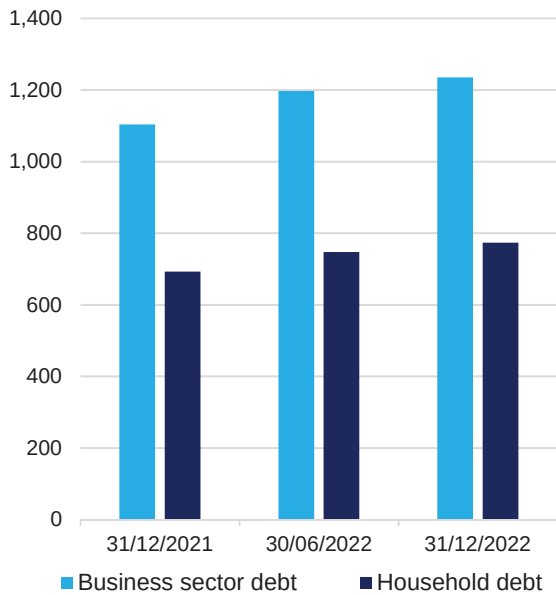
The increase in household debt was mainly due to an expansion of housing credit, and its dynamics over the year mirrored those of business debt: rapid growth in the first half of the year followed by a slower rate of growth in the second half of the year. A major portion of this expansion came from rising prices—32 percent of household debt is indexed to the CPI—although growth of the nonindexed portion of the credit also surpassed the average rate of the previous years.

Figure 4.2
Increase in the Bank Interest Rate to the Business Sector (percentage points)



SOURCE: Based on Banking Supervision Department data.

Figure 4.3
Outstanding Debt by Sector (NIS billion)



SOURCE: Based on Tel Aviv Stock Exchange and reports to the Bank of Israel.

Table 4.1
Distribution of nonfinancial private sector debt, 2020–2022

	End-of-period balance			End-of-quarter balance		
	2020	2021	12/2022	30/06/2022	30/09/2022	31/12/2022
Nonfinancial private sector debt (1+2)	**1,590**	**1,796**	**2,008**	**1,944**	**1,983**	**2,008**
1. Business sector debt	**979**	**1,104**	**1,235**	**1,197**	**1,218**	**1,235**
Credit from the banks	488	573	661	630	644	661
Tradable bonds in Israel	212	235	263	244	260	263
Nontradable bonds and nonbank loans	112	112	117	115	119	117
Domestic nonbank credit	324	348	381	359	378	381
2. Household debt	**611**	**692**	**773**	**747**	**766**	**773**
Housing credit	417	477	542	519	533	542
Nonhousing credit	194	215	231	228	232	231
	Rate of change relative to the previous period (percent)					
	Change during the period			Change during the quarter		
Nonfinancial private sector debt (1+2)	**3.0**	**13.0**	**11.8**	**4.3**	**2.0**	**1.2**
1. Business sector debt	**2.4**	**12.8**	**11.9**	**4.7**	**1.7**	**1.4**
Credit from the banks	6.4	17.4	15.3	4.2	2.2	2.6
Tradable bonds in Israel	3.8	10.8	11.9	4.2	2.2	2.6
Nontradable bonds and nonbank loans	-3.2	0.3	4.5	2.8	6.4	1.4
Domestic nonbank credit	1.3	7.2	9.5	2.9	5.3	0.6
2. Household debt	**4.0**	**13.3**	**11.6**	**3.6**	**2.5**	**1.0**
Housing credit	8.1	14.5	13.6	4.0	2.8	1.7
Nonhousing credit	-5.8	4.8	4.6	1.5	1.5	0.4

SOURCE: Based on Tel Aviv Stock Exchange and reports to the Bank of Israel.

The increase in credit in 2022 was concurrent with an increase in private consumption and a high growth in investments compared to previous years. Apparently the reduced credit supply and the moderation in its growth in the second half of the year had no adverse effect on investment, possibly due to significant private savings accrued in previous years (described extensively in Chapter 2 of this Report) and to companies' relatively high cash and cash-equivalent balances.

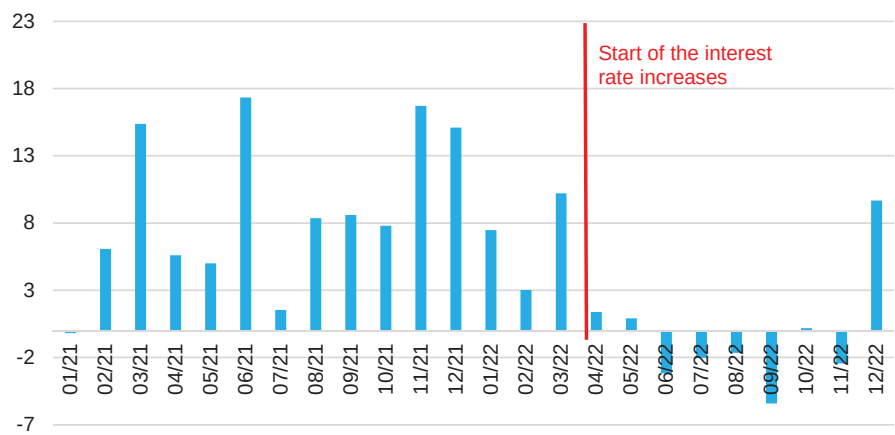
2. RAISING CREDIT

a. Bank Business Credit

In view of rising interest rates, there was net negative performance (credit issued minus repayments) in business credit from banks.

Bank credit to businesses grew by 15 percent in 2022, a rate slightly lower than the previous year, yet high from a historical perspective (compared to an average growth rate of 7.5 percent in the past five years). Here, too, growth was not uniform over the year: After the rapid growth of the previous year (17.5 percent) continued (and even accelerated) in the first half of 2022, growth slowed in the second half of the year, due to the start of interest rate hikes. An analysis of net credit issued (credit granted minus repayments) indicates that positive credit performance was recorded until March, at which point it was replaced by negative net credit granted (Figure 4.4). This change reflected a decline in the pace of lending, rather than an anomalous increase in repayments.[2]

Figure 4.4
Net Borrowing* of Business Sector Bank Credit (NIS billion)

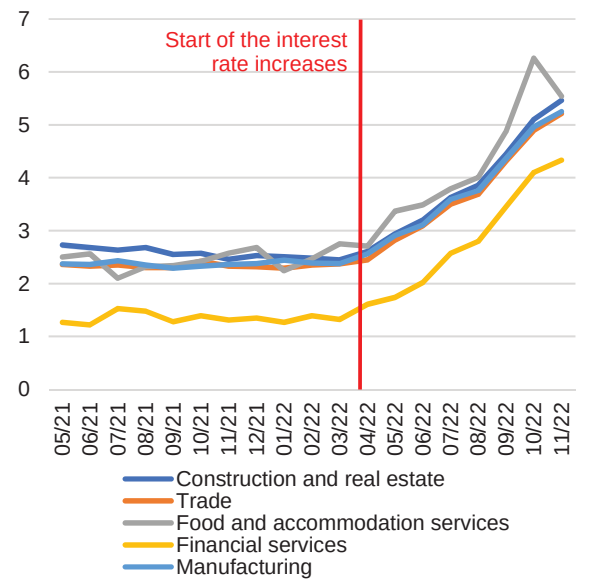


* Borrowing minus repayments.
SOURCE: Based on Banking Supervision Department data.

[2] The credit performance data in Figures 4.3 and 4.10 to not add up to the changes in balances shown in Table 4.1 due to differences in definitions and data measurements. The differences may be due to indexation differentials, exchange rate differentials, accrued interest, etc.

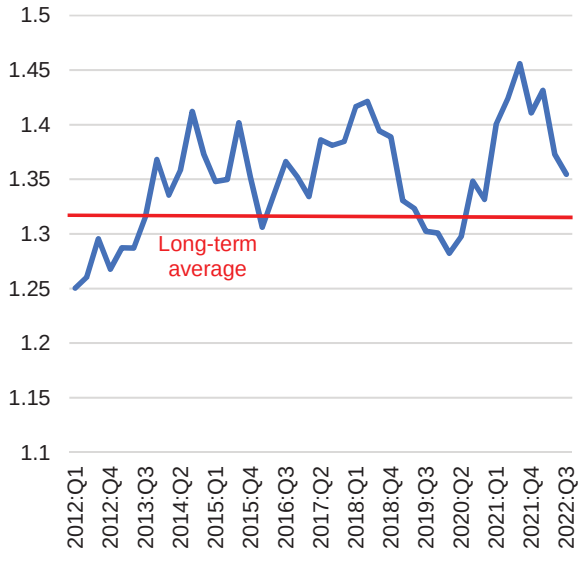
The slowdown in the growth of credit was typical of businesses of all sizes, but was especially prominent in the small and micro business segment. Net negative credit performance coincided with the rising interest rates for businesses in all segments, irrespective of size (Figure 4.5). Despite the contraction of supply, which was reflected to higher interest rates and a decline in credit granted, the Business Tendency Survey did not indicate an increase in the difficulty in obtaining bank credit. Moreover, only one-quarter of the businesses participating in the survey stated that they are significantly dependent on credit and were therefore affected by the increase in interest rates.

Figure 4.5
Interest Rate on Bank Credit by Industry
(percent)



SOURCE: Based on Banking Supervision Department reports.

Figure 4.6
Ratio of Current Assets to Current Liabilities
(median of all public companies)



SOURCE: Based on financial statements of public companies.

Companies can finance their investments by raising debt at the prevailing interest rate or by using the liquidity at their disposal. If a company is cash rich, we can presume that its demand for investment will be less sensitive to interest rates because its financing cost using internal sources is lower than the cost of debt financing. An examination of the current ratio[3] in public companies indicates that for the median company, this component was at a record high in early 2022, and although it declined over the year, it remained slightly higher than the long-term average (Figure 4.6). An industry analysis indicates that several industries typically had a high current ratio by historical comparison. This is especially true of companies in the real estate and construction industry, which accounts for the dominant share of business credit from the banks, and which are among the large and medium-sized companies. This finding may explain the low sensitivity to changes in interest rates.

[3] The ratio of current assets (cash and cash equivalents) to current liabilities.

b. Nonbank business credit

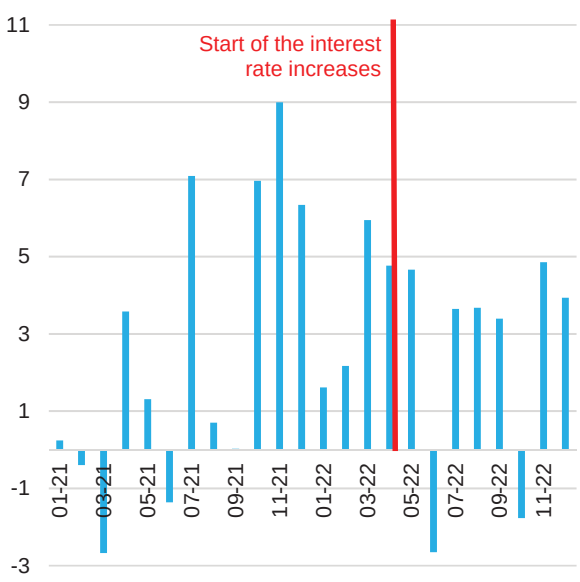
Nonbank credit is obtained through bond issuances, which were the main form of debt financing this year, and through loans from institutional investors, nonbank institutions, and nonresidents. In parallel with the increase in the Bank of Israel interest rate, bond yields rose sharply, similar to the rise in bank credit interest rates.

Bond issuances continued throughout the year, possibly due to the high amount of maturities expected in 2023.

Despite the increase in yields, which raises the cost of debt financing, bond issuances continued throughout the year (Figure 4.7a), in contrast to credit raised through bank and nonbank loans, whose pace slowed (and even declined) in the second half of the year. A partial explanation for the continued activity in bond issuances may be related to the high level of maturities expected in 2023 (Figure 4.7b) relative to maturities in previous years, and the new bond issues were intended to refinance these liabilities. An analysis of expected maturities by industry indicates that the expected maturities in the real estate and construction industry are higher than in other industries, a finding that supports this hypothesis.

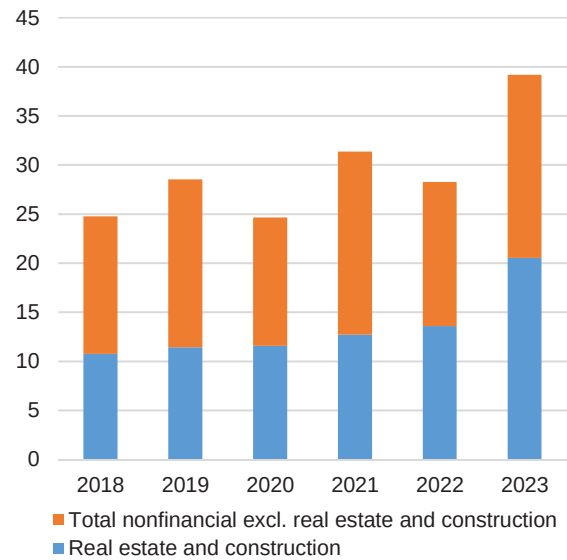
An analysis by industry shows that in several industries, bond issues even increased in comparison to previous years. In 2022, the construction and real estate industry, which accounted for a significant share of all bond issues, raised an average of approximately NIS 2.5 billion per month, compared to a monthly average of approximately NIS 2 billion in the years 2018–2021.[4] An analysis of net issues indicates that in the past

Figure 4.7a
Net Issuances of Corporate Bonds (NIS billion)



SOURCE: Based on Tel Aviv Stock Exchange reports.

Figure 4.7b
Nonfinancial Sector Bond Repayments, 2018–2022 and Expected in 2023 (NIS billion)



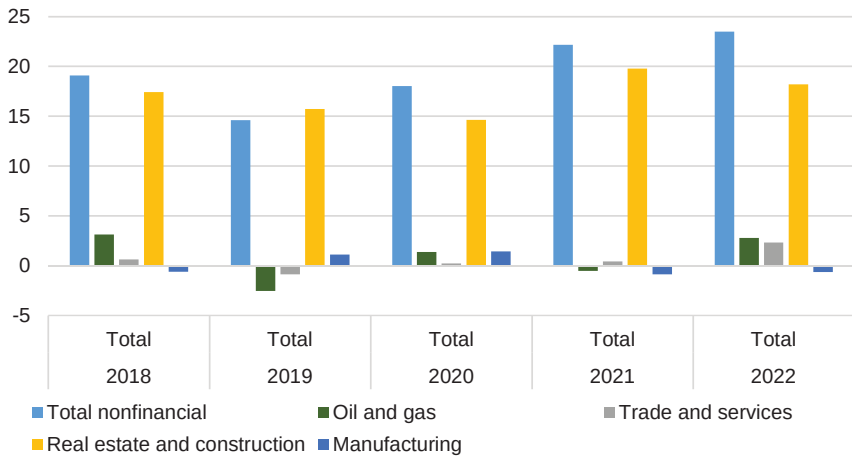
SOURCE: Based on Tel Aviv Stock Exchange reports.

[4] The construction and real estate industry's share of all issues is similar to its share in previous years.

An analysis of net issuances shows that in the past 5 years, the real estate and construction industry was the source of most of the increase in nonfinancial business sector debt.

five years, the construction and real estate industry has accounted for most of the increase in nonfinancial business sector debt (Figure 4.8). The quality of the issues was maintained, with an average of approximately 51 percent of all the monthly issues in 2022 rated AA- or higher, similar to the years 2018–2021 (when the average monthly share of bonds rated AA- bonds was 48 percent).

Figure 4.8
Annual Net Debt Raised in Israel, excl. Financial Companies (NIS billion)

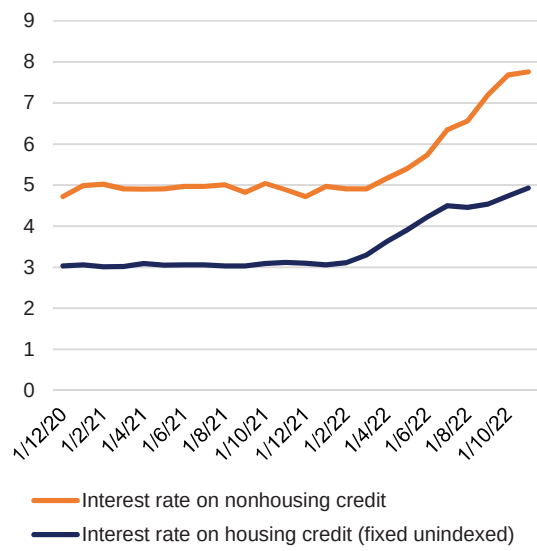


SOURCE: Based on Tel Aviv Stock Exchange reports.

c. Household Debt

Similar to business bank debt, household debt grew rapidly in 2022. While this growth was affected by rising inflation (since approximately one-third of all household debt is indexed to the CPI), the picture remains the same after controlling for inflation. Bank of Israel interest rate hikes increased interest rates on both components of household credit: housing debt and nonhousing debt (Figure 4.9). Due to these interest hikes, the sharp rise in credit in the first half of 2022 was replaced by a slowdown in the growth rate of new credit later in the year, and stability in the final quarter of the year.

Figure 4.9
Interest Rate on Household Credit (percent)



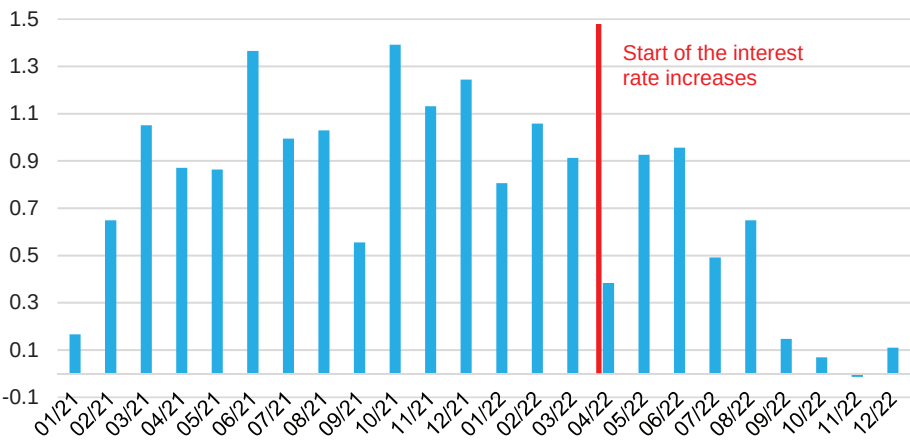
SOURCE: Based on Banking Supervision Department data.

(1) Nonhousing debt

Compared to the changes in business debt, the change in household debt was slower and more moderate. Figure 4.10 shows net consumer bank credit granted, and indicates that its rate of growth slowed in the final quarter of the year. An examination by lenders indicates that the most significant change occurred in the balance of consumer credit from institutional investors, which contracted in the final quarter of 2022.

Household credit granted by institutional investors is typically in large loan amounts taken out against collateral (such as a loan guaranteed by the individual's pension savings) and relatively low interest rates. These loans are typically taken out by borrowers of relatively high socioeconomic status. It is reasonable to assume that, due to their significant volume and relatively low cost, these loans may also be used to supplement financing for the purchase of real estate (See Chapter 4 in the Bank of Israel Annual Report for 2021). The decline in households' credit from institutional investors is consistent with the moderation in new mortgage borrowing (See section on housing debt).

Figure 4.10
Net Borrowing of Nonhousing Bank Credit by Households (NIS billion)



SOURCE: Based on Banking Supervision Department data.

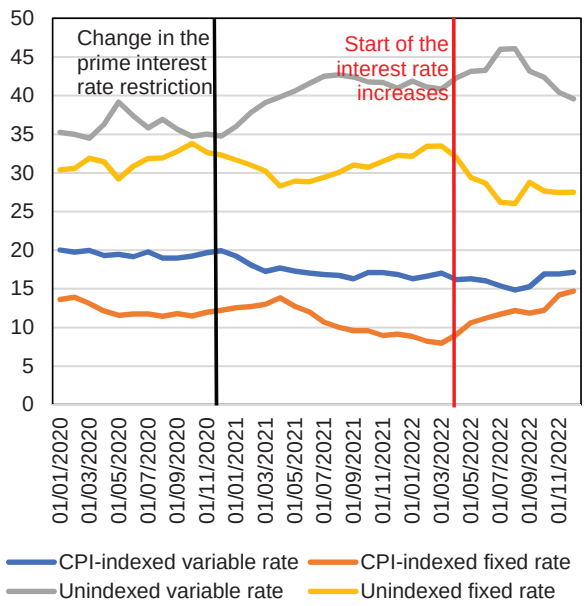
(2) Housing debt

Housing credit increased rapidly at the beginning of the year, and slowed in the second half in view of the increase in interest rates on all tracks.

The balance of housing debt increased at a high rate at the beginning of the year (further to the marked growth in the previous year) but the increase in mortgage interest rates in the second half of the year dampened this growth and affected all (indexed and unindexed) loan tracks. Interest costs also affected the composition of mortgages, as households began to reduce the variable rate unindexed share of their mortgages. In 2021, the Banking Supervision Department reduced the regulatory

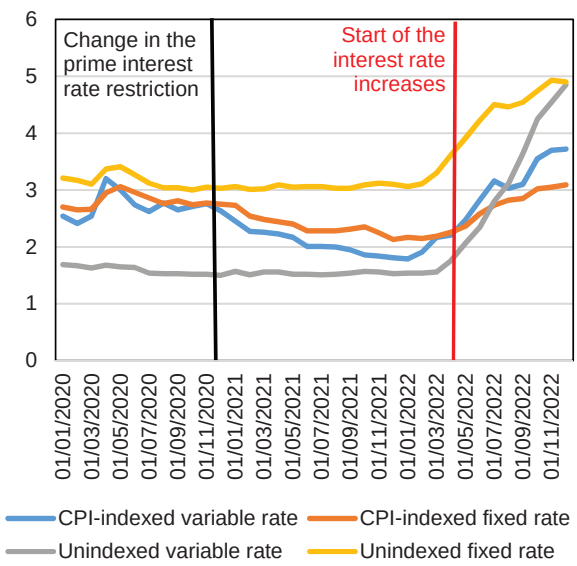
restriction on the percentage of mortgages that can be based on the prime interest rate, allowing the percentage to increase from one-third to two-thirds of a mortgage.[5] This allowed households to assume larger mortgages without increasing their monthly payments (at the interest rates at the time), and households responded by increasing the variable rate unindexed component of their mortgages (which is mainly based on the prime interest rate). However, households did not take full advantage of the relaxed restriction and they increased the share of the prime-based component of their mortgages to approximately 40 percent rather than to the permitted two-thirds (Figure 4.11b). The increase in share of the prime-based component, which continued until the second half of 2022, was halted and even reversed in response to the sharp rise in interest rates (Figure 4.11a). Households also responded to rising interest rates and high housing prices by extending their mortgages and increasing the share of their income devoted to mortgage payments. Segmentation of new mortgages by payment-to-income ratio and term-to-maturity indicates that the share of mortgages with a high payment-to-income ratio (30-40 percent) increased and that the average mortgage amount increased from NIS 890,000 in 2021 (annual average) to approximately NIS 1 million in 2022. The Bank of Israel launched the mortgage transparency reform[6] in 2022, designed to significantly improve customers' ability to compare banks' complex mortgage offers and select the best alternative.

Figure 4.11a
Mix of New Mortgages (percent)



SOURCE: Based on Banking Supervision Department data.

Figure 4.11b
Interest Rate on New Mortgages, by Track (percent)



SOURCE: Based on Banking Supervision Department data.

5 Directive on removing restrictions on the provision of housing loans at variable interest.
6 For additional information on the mortgage transparency reform, see: https://mash-boi.org.il

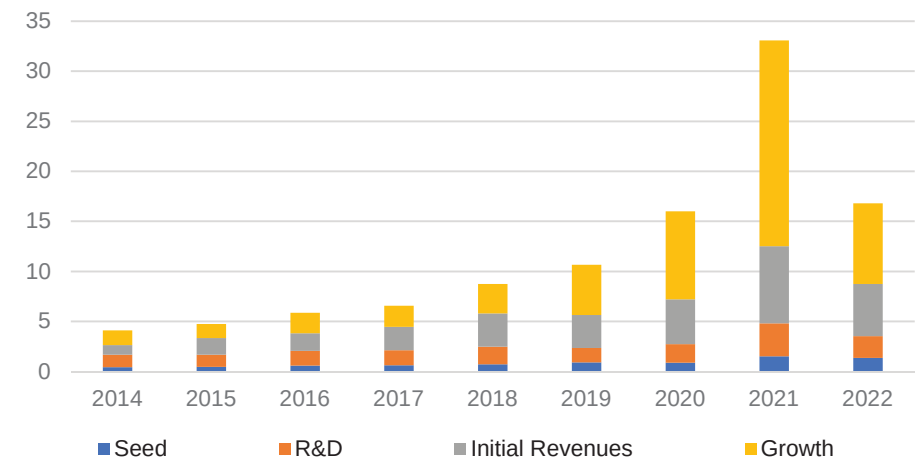
3. RAISING CAPITAL

The unprecedented wave of new issues in the previous two years subsided in 2022. This wave mainly featured young high-tech companies with no record of significant profitability, representing a higher risk than mature companies in traditional industries.

There was a a wave of IPOs on the Tel Aviv Stock Exchange in 2020–2022 that was unprecedented in the previous two decades. During this two-year period, 133 companies held IPOs. Although part of a global pattern of resurgence, activity in Israel was more intense than in other countries.[7] This wave subsided in view of the sharp drop in stock prices, and the TASE completed 2022 with a total number of IPOs slightly below its multiyear average. An examination of the industry composition of these IPOs shows that high-tech companies are prominent, especially early-stage companies that have yet to report significant profits, and which are therefore typically characterized by higher risk than more mature companies in traditional industries (For additional information, see Box 4.1). Stock performance data indicate that IPO shares generally underperform the market; that they make little if any contribution to liquidity and tradability—and consequently also to the TASE's functioning and resource allocation; and that many are subsequently delisted or become shell companies.

Tighter monetary and financial conditions reduced high-tech companies' capital raising from venture capital funds in Israel and abroad, which are the main source of financing for Israel's high-tech sector. After an extraordinary volume of capital raising by Israeli high-tech companies from venture capital funds in 2021, the capital raising activities of these companies dropped to their 2020 level, still higher than the historical average. An analysis of high-tech capital raising from venture capital funds by the stage in the firms' life shows that a significant source of the decline in capital raising activities in 2022 comes from late-stage profit-making companies.

Figure 4.12
Volume of Venture Capital Raised, by Investment Stage (NIS billion)



SOURCE: Based on IVC data.

7 "The percentage of new companies on the TASE is second in the world." TASE publications.

These companies are more sensitive to changes in short-term interest rates, which increased more sharply than the increase in long-term rates.[8] In contrast, long-term interest rates are more relevant for companies in earlier stages (seed and R&D) because these companies expect to generate proceeds only at a later date. In fact, the decline in the capital raising efforts of these early-stage companies was more moderate. For additional information on activities in the high-tech sector, see Chapter 1 of this Report.

BOX 4.1: IPOS AND AFTERMARKET PERFORMANCE

- There was a wave of IPOs on the Tel Aviv Stock Exchange in 2020–2022 that was part of a global pattern of resurgence in IPO activity. Activity in Israel was intense even compared to other countries.
- In the first five years post-IPO, equities issued in the primary market in Israel underperform other equities in the market.
- These equities make a limited contribution to market liquidity and tradability—and as a result, they are not included in TASE indices.

1. Main Findings

There was a wave of IPOs on the Tel Aviv Stock Exchange (TASE) in 2020–2022 that was unprecedented in the preceding two decades. During this two-year period, 133 companies held IPOs. A review of IPOs of new companies over time shows that IPO activity occurs in waves. A period of vigorous IPO activity shifts to a period of limited, even nonexistent, IPO activity. IPO activity is coordinated with market conditions: Activity is strong in a bull market, and decreases in a bear market (Figure 1).

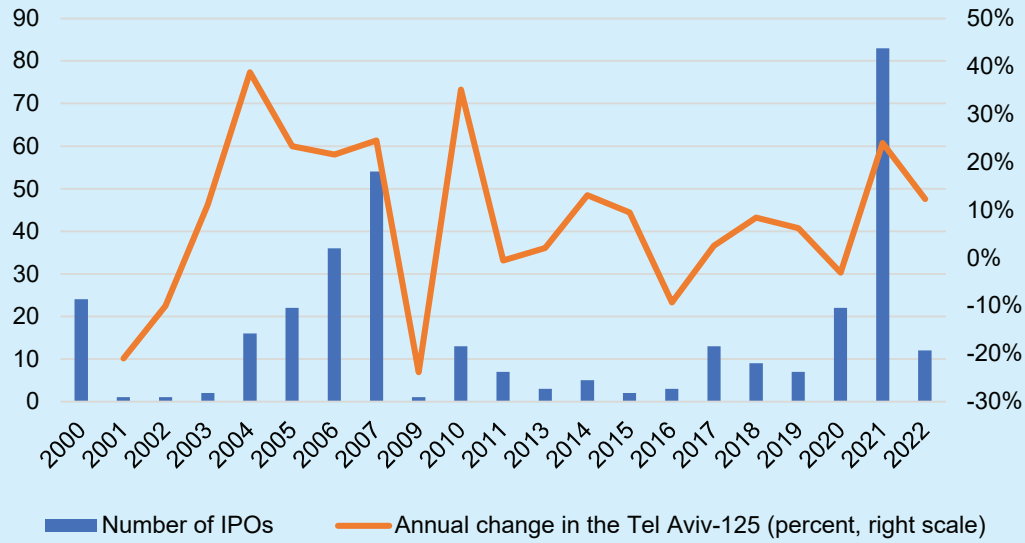
The wave of IPOs in Israel in 2020–2022 coincided with a global surge in IPOs, although activity in Israel was more intense than in other countries.[1] This Box studies the IPOs in the current and previous waves based on various parameters: loss-making IPOs[2] as a share of all issuing companies, and their aftermarket (long-term) share performance. Since companies included in the leading TASE indices are of higher quality (in terms of tradability, floating stock, etc.), we also examined whether companies that hold an IPO during such waves of intense IPO activity are subsequently included in TASE indices.

Findings show that the percentage of loss-making IPOs increases in line with the number of IPOs held in a given period, and that issuing companies (on average) deliver negative excess returns relative to the market. Furthermore, a high percentage of companies that are included in IPO waves are not eventually included in a TASE index.

1 "The number of new companies on the Tel Aviv Stock Exchange is second in the world." TASE publications.
2 Loss-making companies are companies that showed a negative profit in the year preceding their IPO.

8 In 2022, risk-free interest rates increased, which is reflected in the nominal government zero yield curve. The two-year interest rate increased from 0.23 percent to 3.5 percent and the 10-year interest rate increased from 1.44 percent to 3.38 percent.

Figure 1
Quantity of IPOs by Year, 2000–2022

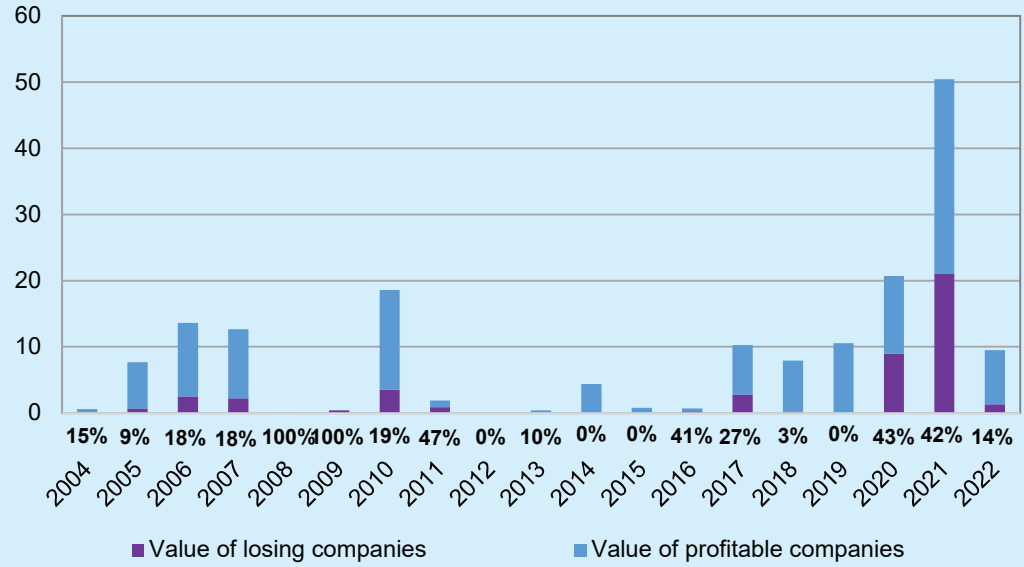


SOURCE: Based on Tel Aviv Stock Exchange reports.

2. Characteristics of IPO Waves

Based on the sample we examined (2000–2022), IPOs on the TASE occurred mainly in two waves. The first wave occurred in 2004–2007 and was interrupted in view of the Great Financial Crisis. The second wave occurred in 2020–2022, as the economy exited from the COVID-19 crisis. Activity in 2021 was unusually intense from the perspective of the past 20 years. This second wave was interrupted in 2022, as global financial conditions worsened and significant interest rate hikes were announced in Israel and around the world. An analysis of the characteristics of the companies in these two waves reveals several differences. The second IPO wave featured an unusually high percentage of loss-making companies compared to IPOs in previous years (Figure 2). One possible explanation is the composition of the companies. Issuers in the earlier IPO wave were mainly trade and service companies, while the second wave was primarily comprised of high-tech companies, which accounted for the majority (75 percent) of the loss-making companies in this wave. Profitless high-tech companies are considered to be relatively high-risk companies. They are typically early-stage companies that have yet to show profits, and therefore the uncertainty surrounding their future operations is greater than that concerning profit-making companies. As a result, the second IPO wave was characterized by a higher level of risk than the first wave.

Figure 2
Market Capitalization of Issued Companies Divided into Losing and Profitable Companies, 2004–2022 (NIS billion)



The purple color indicates losing companies (in the year prior to IPO) as a share of all companies issued in that year. **Market capitalization** is as of the last business day of the year.

SOURCE: Based on Tel Aviv Stock Exchange reports.

a. Aftermarket performance

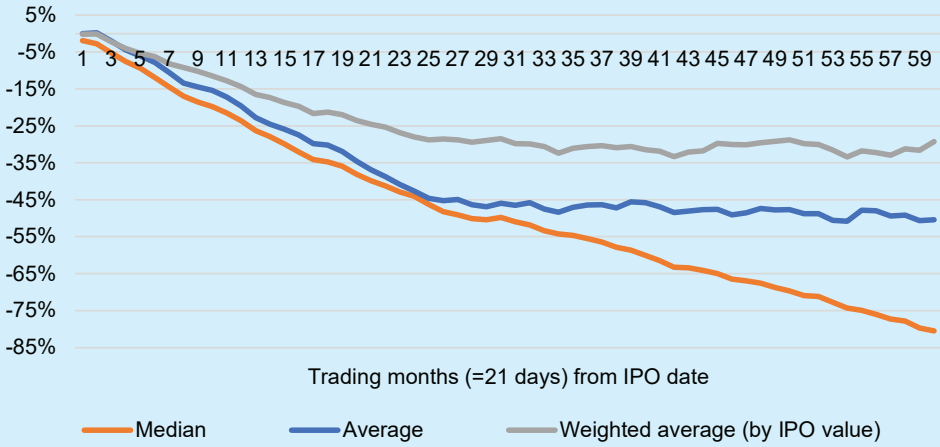
Studies on post-IPO performance showed that post-IPO shares generally underperform, which is reflected in negative excess returns relative to the market in general, and specifically compared to companies with a similar market value in the same industry.[3] In this Box, we calculated the cumulative excess returns (minus the returns on the TA 125 index) from the date of the IPO (Figure 3). These calculations show that their (median) cumulative returns become more negative over time, which implies that these companies deliver worse returns than the market after their IPO.[4] To address the fact that IPOs are not distributed uniformly over time, but instead occur in waves, for each issue year we calculated returns for a holding period of 36 trading months.[5] The results are presented in Figure 4, which shows that in most of the years examined, these shares underperformed, even during periods of strong IPO activity (the waves in 2004–2007 and the year 2020, which was part of the wave of 2020–2022).

[3] Coakley et al., 2008; Ritter, 1991; Ritter and Welch, 2002.

[4] Because companies may be delisted over time for various reasons, our calculation assumes that the money invested in delisted companies is reinvested uniformly in the shares of companies that continue to trade.

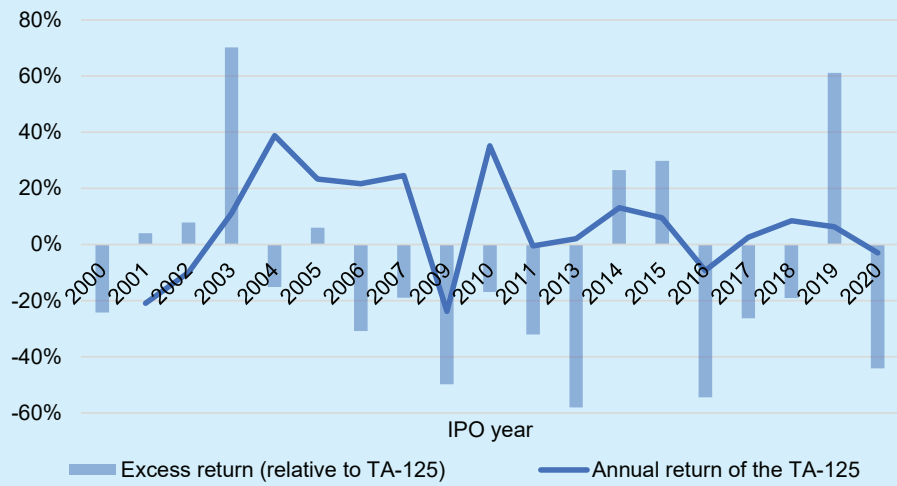
[5] A trading month is defined as 21 trading days. As a result, 36 trading months covers a period of approximately two calendar years.

Figure 3
Cumulative Excess Return on IPOs from Date of Issue (percent)



The cumulative return is calculated as the aggregate of monthly returns. The excess return is calculated as the difference between the cumulative return on a share and the cumulative return of the Tel Aviv 125 in the same period.
SOURCE: Based on Tel Aviv Stock Exchange reports.

Figure 4
Excess Return on IPO Holdings After 36 Trading Months, 2000– 2020
(percent)

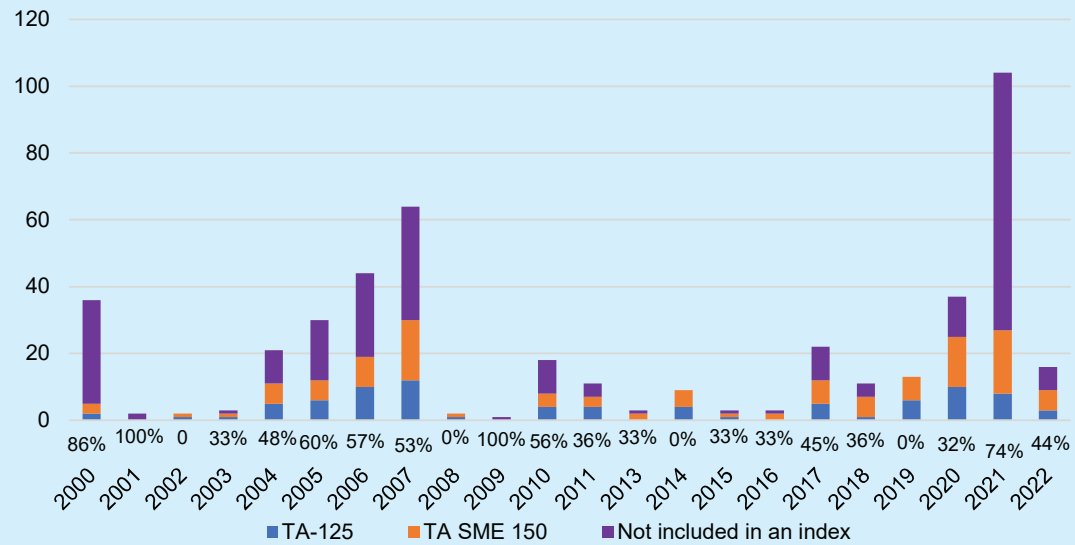


The return is calculated as the rate of change between the share price in the first trading month and its price in the 36th trading month. Trading month = 21 days.
SOURCE: Based on Tel Aviv Stock Exchange reports.

b. Inclusion in TASE indices

Trading frequency is a key factor in determining the quality of the secondary market on the TASE. The fact that most of the activity on the TASE is concentrated in a small group of companies that are included in its leading indices, while the remaining listed companies typically have lower trading volume, underscores the importance of a share's inclusion in these indices. Therefore, one criterion that may be used to examine the development of an issuing company is its inclusion in a TASE index. Inclusion in an index signifies success in two respects. First, inclusion in an index is conditional on criteria such as market cap, float amount[6], and tradability, which are determined by the TASE. As a result, joining a key index signals that the company meets the TASE's requirements and is considered a quality company. Second, inclusion in an index directs investors' attention to the company, which helps its business operations and future capital raising rounds, and even increases the trading volume of its shares. For these reasons we examined the percentage of issuing companies that were included in the TA 125 index[7] (formerly, the TA 100 index) as a benchmark of relatively large companies, and in the TA SME 150 index[8] as a

Figure 5
Tel Aviv Stock Exchange IPOs by Entry to Indices



SOURCE: Based on Tel Aviv Stock Exchange reports.

[6] Float amount is the number of shares registered for trade in the hands of the public (total outstanding shares minus shares held by parties at interest).

[7] The TA 125 index includes the 125 shares from the Rimon database with the highest market cap. The Rimon database comprises shares that meet several conditions: a minimum of 30% of the shares is held by the public, a minimum average market cap of public holdings is approx. NIS 100 million, minimum tradability (average daily trading volume) of approx. NIS 50,000 in the past half year.

[8] The TA SME 150 index includes the 90 shares with the lowest market cap in the TA 125 index, and the 60 shares with the highest market cap in the Rimon database that are not included in the TA 125 index.

benchmark of small companies. The findings, shown in Figure 5, indicate that both IPO waves had a high percentage of companies that were not successful in joining one of these indices in the post-IPO period. It is nonetheless important to note that it typically takes a company an average of 4.35 years of trading (the median figure is 3.54 years) before it is included in the TA 125 index, and 5.28 years (the median figure is 2.46 years) to be included in the TA SME 150 index. Therefore, in this respect, it is too early to assess the success of the companies that held an IPO in the second wave.

REFERENCES

Coakley, J., L. Hadass, & A. Wood (2008). "Hot IPOs Can Damage Your Long-Run Wealth!" *Applied Financial Economics*, 18(14): 1111–1120.

Ritter, J. R. (1991). "The Long-Run Performance of Initial Public Offerings," *The Journal of Finance*,46(1): 3–27.

Ritter, J. R. and I. Welch (2002). "A Review of IPO Activity, Pricing, and Allocations," *Journal of Finance*, 57(4): 1795–1828.

BOX 4.2: THE PASS-THROUGH FROM MONETARY POLICY TO INTEREST ON DEPOSITS IN ISRAEL

- The increase in the interest rate on deposits in the past year only partially reflected the increase in the Bank of Israel interest rate, although the pass-through increased significantly in the final months of 2022. Incomplete pass-through was not exclusive to Israel, although the pass-through in Israel was higher than in most advanced economies.
- An empirical study of the pass-through from monetary policy to the interest rate on deposits in 30 OECD countries over two decades found that the pass-through tends to be especially weak in low interest rate environments. High liquidity surpluses and a concentrated banking system are also associated with low pass-through.
- Some of the differences between Israel and other countries, including the growth in pass-through in the final quarter of the year, may be explained by reduced liquidity and the return to a high interest rate environment, as part of a restrictive monetary policy, together with actions by the Bank of Israel to make it easier to compare bank interest rates, and a dynamic public discourse on this issue.

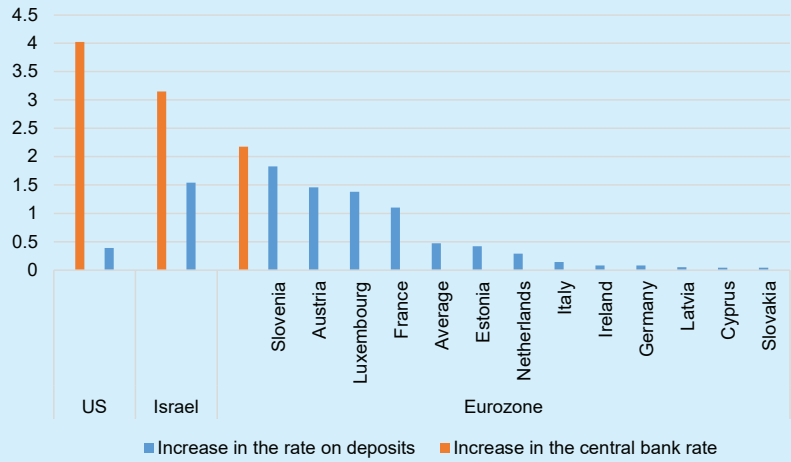
1. Background

In many countries, central bank interest rate increases in 2022 were only partially rolled over (passed through) interest rates on bank deposits. For example, Figure 1 shows the partial pass-through to interest rates on deposits in the US, the EU, and Israel, between January and December 2022—the change in central bank interest rate alongside the change in the average interest rate paid to households for new deposits of up to 3 months.[1] This Box examines several factors that potentially affect the pass-through from the central bank rate to the rate paid on bank deposits, and focuses on the effects of a low interest rate environment and banking system features, such as concentration and surplus liquidity, on the pass-through.

According to Figure 1, the pass-through from the central bank rate to the rate on deposits was close to 50 percent. In the US, the pass-through was a mere 9 percent, and in Europe the average pass-through was 21 percent. Only Slovenia, Austria, and Luxemburg had higher pass-throughs than Israel for this category of deposits during this period. The pass-through in Israel increased significantly over the course of the year. Figure 2 shows the cumulative change in the average deposit interest rate alongside the cumulative change in the Bank of Israel interest rate, and the ratio between them from April 2022 to December 2022. is the Figure clearly shows that the deposit rate increased more rapidly than the Bank of Israel interest rate. In the first four months of monetary interest rate hikes, the cumulative increase in the deposit interest rate was only about 25 percent of the cumulative increase in the Bank of Israel rate, but four months later the pass-through reached almost 50 percent.

[1] The interest rate on deposits is influenced by the time to maturity (the deposit interest rate is generally higher as time to maturity increases), the interest track and linkage, and occasionally by the deposit amount. Because the Bank of Israel rate reflects the short-term risk-free interest rate, we focused on the pass-through to interest rates on relatively short deposits of up to 3 months.

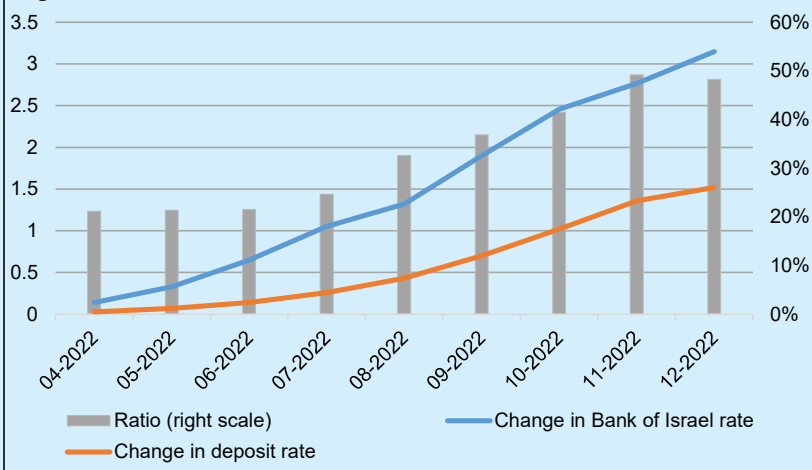
Figure 1
Change in the Interest Rate on Deposits vs. Change in the Central Bank Interest Rate, January–December 2022 (new deposits of up to 3 months, percentage points)



The change between the average central bank interest rate during the month and the interest rate on deposits in selected countries between January and December 2022. **In Israel** - The average interest rate for new unindexed fixed-rate term deposits of up to three months, total banking system, for households excluding private banking. **In the US** - The average interest rate for new fixed-rate 3-month CDs in all activity segments (households and businesses). **In Europe** - The average interest rate for new deposits in the household segment, redeemable at notice, up to three months). For eurozone countries not shown there are no available data on deposits of this type.

SOURCE: Bank of Israel, FRED, ECB.

Figure 2
Cumulative Monthly Change in the Interest Rate on Deposits and in the Central Bank Interest Rate, and the Ratio Between Them, April–December 2022



The average Bank of Israel interest rate in each month, and the average interest rate on new unindexed fixed-rate term deposits of up to 3 months, total banking system, households excluding private banking.

SOURCE: Bank of Israel.

2. Factors Affecting Pass-Through and the Situation in Israel

In this section we review three major factors that potentially affect the intensity of the pass-through from the policy rate to the rate on deposits. For each factor, we examined the situation in Israel and its potential effect on pass-through.

a. "Return to normal" – Weak pass-through in low interest rate environments

Short-term interest rates showed a significant global decline in recent years, and became negative in many economies. When central banks' interest rates declined to zero, the spread between the interest rate on deposits and the central bank rate was reduced because the banks did not apply negative interest rates to customers' deposits. Indeed, many studies from around the world found that in a low interest rate environment, changes in short-term market interest rates have a relatively weak impact on banks' interest expenses.[2] For this reason, the incomplete pass-through from the rising central bank interest rate to the rate on deposits may reflect a return to the same positive spread that existed before the zero-interest period.

Figure 3 presents the average interest rate on deposits of up to three months in Israel alongside the Bank of Israel interest rate, for the period from January 2004 to December 2015.[3] It is evident that the interest rate spread tends to diminish when the Bank of Israel interest rate approaches the zero lower bound (e.g., in 2009 and from 2015). These figures imply that historically, a decline in the central bank interest rate to a near-zero environment is associated with a diminishing spread in Israel as well, and that the opposite is also true: When the policy rate returns to a "normal" environment, the spread between it and the rate on deposits widens.

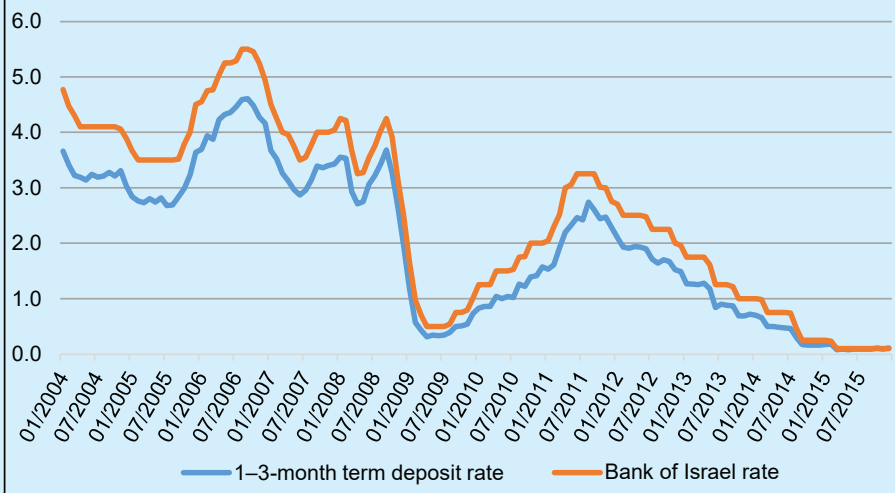
Figure 4 also illustrates the inverse association between the interest rate and the spread between the rate on deposits and the Bank of Israel rate. The negative linear relation in interest rate environments below 2 percent is especially prominent. When interest rates rise above 2 percent, the association remains negative yet is weaker, with greater distribution, which reflects increasing pass-through in high interest rate environments.[4]

[2] See for example: S. Claessens, N. Coleman, and M. Donnelly (2018). "'Low-For-Long' Interest Rates and Banks' Interest Margins and Profitability: Cross-Country Evidence," *Journal of Financial Intermediation*, 35: 1–16; N. Segev, S. Ribon, M. Kahn, and J. De Haan (2021). "Low Interest Rates and Banks' Interest Margins: Does Deposit Market Concentration Matter?" Discussion Papers Series 2021.16, Bank of Israel Research Department.

[3] The Figure does not continue after 2015 due to a change in the reporting instructions for deposit interest rates. We do, however, note that over the majority of the period from 2016 to April 2022 the deposit interest rate, like the Bank of Israel interest rate, was near-zero.

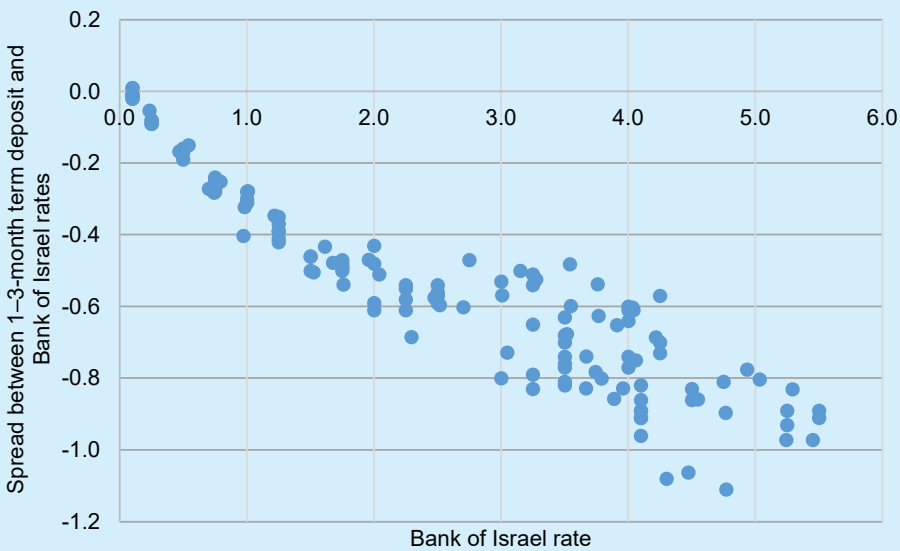
[4] Linear trajectories that are not shown in this figure indicate a slope of -0.3 in an interest rate environment below 2 percent and of -0.12 in an interest rate environment above 2 percent.

Figure 3
Average Interest Rate on Term Deposits and Bank of Israel Interest Rate, January 2004–December 2015



The Bank of Israel interest rate is the aveage daily rate in each month. The term deposit rate is the rate on unindexed fixed rate deposits of 1–3 months for the general public, total banking system.
SOURCE: Bank of Israel.

Figure 4
Ratio Between the Bank of Israel Rate and the Interest Rate Spread, January 2004–December 2015



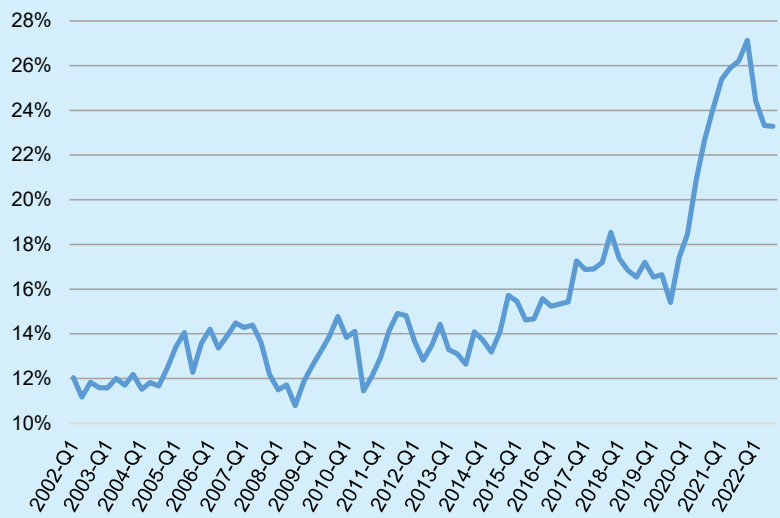
The average Bank of Israel interest rate in each month minus and the interest rate on new unindexed fixed-rate term deposits of 1–3 months, for the general public, total banking system.
SOURCE: Bank of Israel.

b. Surplus liquidity

The expansion of central banks' balance sheets since 2008 (and more intensely in view of the COVID-19 crisis) during an extended period of near-zero interest rates led to a significant increase in the reserves held by commercial banks. For example, Figure 5 shows the ratio between the banks' cash and deposits at the Bank of Israel and the total assets of the entire banking system, from 2002:Q1 to 2022:Q3.

A large liquidity surplus may reduce banking corporations' demand for deposits, thereby weakening the pass-through from the central bank interest rate to the deposit interest rate. This was the case at the beginning of the current series of interest hikes, when liquidity was at a peak. This figure also shows the decline in liquidity in 2022 in view of rising interest rates and restrictive monetary policy.[5] The decline in surplus liquidity in 2022 was also reflected in a decline in the banking system's liquidity coverage ratio, which returned to its precrisis level in the second half of 2022.[6] Although liquidity remains historically high, the growth in pass-through may have been caused by the rapid decline in liquidity and by the partial return of regulatory liquidity ratios to their precrisis levels.

Figure 5
Cash and Bank Deposits as a Share of Total Assets, Total Banking System, 2002:Q1–2022:Q3 (quarterly data)



SOURCE: Based on periodic reports from the banking system.

[5] Among other factors, the expansion of *Makam* issues (see Chapter 3 in this Report) contributed to the decline in liquidity rates.

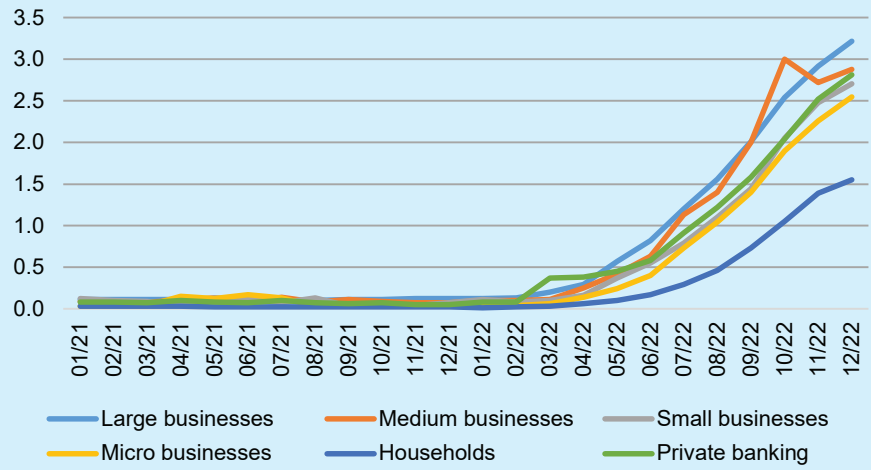
[6] For details on the calculation and the erosion of the liquidity coverage ratio, see p. 43 of the Survey of the Banking System, First Half of 2022.

c. Market power

Banks may generate value by selling product bundles to depositors, such as consumer credit and mortgages. Therefore, even banks that enjoy an adequate quantity of liquid assets and/or stable liabilities might be concerned by customers switching to other banks that pay higher interest on deposit. Banks' desire to maintain their customer base and/or attract new customers may therefore incentivize them to offer improved terms, including more attractive deposit interest rates. However, if increased deposit interest rates do not induce higher bank transition rates, this channel will weaken, and the pass-through from the policy rate to the deposit interest rate will also weaken.

The importance of this mechanism is illustrated in the differences in pass-through rates across activity segments, as shown in Figure 6. This Figure shows that the increase in the deposit interest rate was greater in the business sector than in the household sector. As noted above, the deposit interest rate is influenced by numerous factors including time to maturity, the interest track, and the deposit amount, and the differences between the sectors may therefore also reflect differences in the features of their respective deposits.[7] Still, it is reasonable to assume that the difference in deposit interest rate growth between sectors is also due to business customers' bargaining power and awareness, which exceeds those of households. For example, it is conceivable that business customers habitually compare prices and are more sensitive to differences in the terms offered

Figure 6
Average Interest Rate on Term Deposits of Up To 3 Months, by Segment, January 2021–December 2022 (monthly data)



The average interest rate on new unindexed fixed-rate term deposits of up to 3 months, total banking system.
SOURCE: Bank of Israel.

[7] Although the figure compares unindexed fixed-rate deposits of up to three months for all sectors, it is reasonable to assume that the deposits made by businesses are larger than those of households, the banks' business customers therefore benefit from higher interest rates on deposits.

to them, including differences in bank deposit interest rates. In addition, it is possible that the large revenues that businesses generate for banks, through their ongoing operations, makes them attractive customers, which increases businesses' bargaining power.

3. An Empirical Model – Change in Pass-Through Over Time in OECD Countries

The analysis in the previous section points to at least three mechanisms that can explain the weak pass-through from the central bank rate to the deposit interest rate that was recorded globally, including in Israel: a low interest rate environment, surplus liquidity, and market power. In this section we present a simple empirical analysis to examine whether these factors are indeed associated with pass-through intensity, based on two decades of bank data from OECD countries.

For this study we used data from the Fitch Connect database, which provides data on the balance sheets of banks around the world, and specifically in the OECD countries. The data include 144,216 observations for 9,828 banks in 30 countries between 2004 and 2019.[8] The empirical method is based on the estimation of a simple panel data regression with fixed effects for time and bank, which examines the association between the annual change in the short-term market rate and the change in the effective interest rate on a bank's liabilities:[9]

$$(1) \quad \Delta Y_{i,t} = \alpha_i + \gamma_t + \Delta r_{i,t} + \varepsilon_{i,t}$$

where $\Delta Y_{i,t}$ is the change in the effective interest at bank *i* between year *t* and year *t-1*, and $\Delta r_{i,t}$ is the change in the short-term market rate in the same period in the bank's operating country.[10] γ_t ו α_i and are fixed variables for bank and time, respectively.[11]

To examine the effect of interest rate, liquidity, and market power, we estimated the basic regression, including interactions between several variables. To assess the effect of a low interest rate environment we added a dummy variable that takes a value of 1 when the interest rate is below 1.25 percent.[12] In addition, to examine the effect of liquidity and concentration in the

[8] Eight OECD countries are excluded from the estimation due to a lack of data: Iceland, Estonia, Hungary, Turkey, Japan, Luxembourg, Chile, and Cota Rica.

[9] The effective interest rate is defined as total interest expenses divided by total interest-bearing liabilities. The use of this interest rate does not take into account differences in types of liability, but it is very common in the literature. See, for instance, J. A. Lopez, A. K. Rose, and M. M. Spiegel (2020), "Why Have Negative Nominal Interest Rates had Such a Small Effect on Bank Performance? Cross Country Evidence", *European Economic Review,* 124: 103402; A. Kang-Landsberg and M. Plosser (2022), "How Do Deposit Rates Respond to Monetary Policy?" *Liberty Street Economics,* November 21, 2022, Federal Reserve Bank of New York.

[10] Due to the differences between countries' definitions of "the central bank interest rate" and according to the literature, we use the short-term interest rate published by the OECD (see https://data.oecd.org/interest/short-term-interest-rates.htm).

[11] Following Lopez et al. (2020), who used a similar database to examine how negative interest rates affect banks' profitability, the basic regression does not include additional control variables. Nonetheless, the results are robust to the inclusion of lagged bank-level control variables of one period.

[12] The interest rate level that represents a low interest rate environment was selected according to the literature. For example, see the references in footnote 3, as well as C. Borio and L. Gambacorta (2017), "Monetary Policy and Bank Lending in a Low Interest Rate Environment: Diminishing Effectiveness?" *Journal of Macroeconomics*, 54: 217–231.

banking system, we also added interactions with the reserve to asset ratio in each bank and the Herfindahl–Hirschman index (HHI), which captures the concentration of the banking system.[13]

Table 1 presents the results of the regression estimate. The table presents only the coefficient of the change in interest rates and the interaction coefficients in order to focus on each variable's effect on the basic association between the short-term market interest rate and the banks' interest expenses.[14] The table is divided into columns, and in each column we added one of the variables that potentially affects pass-through intensity. The final column shows the results of the regression model that includes all the variables, which allows us to isolate the effect size of each variable. The table offers several insights. First, the basic association between the short-term market interest rate and the banks' interest expenses is positive and statistically significant, as expected. We stress that since the interest rate is calculated on the basis of the banks' total interest expenses relative to their liabilities, the association is influenced by the composition of those liabilities, and especially by their time to maturity (effectively, this is the percentage of deposits renewed during the year).[15] It is therefore important to view these primarily as theoretical results that offer an overall indication of the direction of the variables' effects and the relationship between them, and not as a precise predictor of pass-through intensity.

A low interest rate environment weakens the pass-through rate, which is evident from the negative coefficient of the interaction between the low interest rate dummy variable and the change in the short-term interest rate. It does appear that the relation between the short-term interest rate and the deposit interest rate tends to be stronger when the banking system is less concentrated, and for banks that hold less liquidity, which is reflected in the negative coefficient of the interaction term between these variables and the change in the short-term interest rate. The regression thereby indicates that structural features of the banking system, such as concentration, may affect the pass-through (which may be weakened by high concentration) and that dynamic factors that are affected by a restrictive monetary policy may also affect the pass-through (which may be weakened by a transition to a non-zero interest rate environment and decline in liquidity). In view of the historical data, the weak pass-through rate at the beginning of the recent series of interest rate hikes is not surprising, and may primarily reflect a return to pre-zero-interest-rate spreads and a reduction in surplus liquidity.

A comparison of the end-of-2021 data for banks in Israel and other countries in the sample indicates that the banking system in Israel was characterized by very high reserve ratios (the top decile of the distribution) and high concentration (the top third of the distribution). Because all the countries in the sample started their current series of interest hikes from a similar near-zero

[13] The HHI is calculated for the entire banking system each year. The index calculated by squaring the market share of the deposits in each bank, and then summing the resulting numbers.

[14] The remaining variables, such as HHI, the reserve ratio, and the dummy variable for low interest rate were calculated as part of the regression estimation but are not shown. HHI and the reserve ratio are continuous positive variables smaller than 1.

[15] Although the fixed variable for each bank should reduce the effects of the fixed differences across the banks, it is possible that in at least some of the banks experienced a change in the type of their financing sources over the period. Moreover, the data are annual and it is reasonable to assume that a significant portion of the deposits will renew each period, which should also reduce this bias.

interest rate environment, the starting point of the banking system in Israel at end 2021 apparently cannot explain the relatively high pass-through rate in 2022. We may therefore assume that the differences between countries are due to two possible factors. First, it is possible that the regression variables improved more rapidly in Israel than in the rest of the world. For example, liquidity ratios may have declined more rapidly in Israel.[16] Second, it is possible that the pass-

Table 1:
Results of the regression estimation

	Change in the effective interest rate on all liab			
	(1)	(2)	(3)	(4)
Change in short-term interest rate	0.2914***	0.2963***	0.3048***	0.2998***
	0.0059-	0.0062-	0.0047-	0.0053-
Change in short-term interest rate * low interest payments		-0.1491***		
		0.0103-		
Change in short-term interest rate * HHI			***0.1788-	
			0.0585-	
Change in short-term interest rate * reserves to assets ratio				***0.2511-
				0.049-
Bank fixed effect	V	V	V	V
Time fixed effect	V	V	V	V
Number of observations	144,216	144,216	144,216	144,216

This table shows the results of the estimation of Equation 1. Column (1) shows only the link betwe the short-term interest rate and the effective interest rate on liabilities. Column (2) shows the coe interaction with a dummy variable that obtains the value 1 in years in which the short-term interest r 1.25 percent. Column (3) shows the coefficient of the interaction with the deposit concentration which obtains a value of between 0 and 1 (median is 0.04). Column (4) shows the coefficient of with each bank's reserves to assets ratio, which obtains a value of between 0 and 1 (median is 0.03 shows the results when all additional variables are added to the regression together. An OLS estima and time fixed effects. The dependent variable is the change in the effective interest rate on all li annual interest expenses divided by the average interest-bearing liabilities). Standard deviations of g appear in parentheses. The sample period is 2004–2019. ***p<0.01; ** p<0.05; * p<0.1

[16] We could not test this hypothesis because balance sheet data as of end 2022 were not available for the vast majority of the banks in the sample.

through rate in Israel was strengthened through other variables that were not included in the regression. For example, the vigorous debate in the media on deposit interest rates, alongside the Bank of Israel's actions to increase the public's awareness of differences in interest rates between banks and improve the transparency of banks' interest rate data, contributed to competitive pressure and strengthened the pass-through, beyond the effects of the changes that occurred in the above explanatory variables.

4. Conclusion

The increases in the Bank of Israel's interest rate in 2022 were accompanied by a pass-through to the deposit interest rate that was partial yet higher than in other developed countries, and even increased in the final months of 2022. This Box examined several factors that may affect the pass-through and therefore may offer a possible explanation for differences in the pass-through between countries and for the changes in the pass-through intensity in Israel over time.

We found that the weak pass-through at the beginning of the current round of interest rate hikes can be explained by a return to the spreads that existed before the near-zero interest rate era, and by the large liquidity surplus in the banking system, among other factors. After leaving the near-zero interest rate environment and declining liquidity ratios, the pass-through began to increase. The analysis indicates that the differences between countries may also be due to these factors. For example, in Europe, the central bank started raising its interest rate at a later stage and interest rates remain relatively low. Consequently, the weak pass-through in Europe may reflect the effects of the transition from a near-zero interest rate environment. In contrast, interest rates in the US increased even more strongly than in Israel, but the liquidity surplus in the US banking system at the end of 2022 was significant.[17]

The analysis in this Box also shows the effect of the structural factors that characterize the banking system—especially concentration and competition—on the pass-through. It is conceivable that some of the actions to increase competition this year, such as increasing the public's ability to compare interest rates by increasing the transparency of banks' interest rates, as well as the vigorous public and media debate on this topic, also contributed to the increase in pass-through over the year.

[17] See for example: A. Kang-Landsberg and M. Plosser, (2022), "How Do Deposit Rates Respond to Monetary Policy?" *Liberty Street Economics,* November 21, 2022, Federal Reserve Bank of New York..