

D. FOREIGN EXCHANGE ACTIVITY OF THE MAIN SECTORS

In 2023, the shekel weakened against the US dollar by about 3 percent, after weakening by about 13 percent in the previous year. This year's high volatility can be explained mainly by local factors: a rise in uncertainty and in the risk premium of the State of Israel in view of the legislative actions early in the year and the October 7th events and the war in the fourth quarter of 2023. Uncertainty was also reflected in a significant increase in the implied volatility in shekel-dollar options. Globally, a mixed trend was recorded in the exchange rate of the US dollar against the main currencies. In the main sectors' activities in the forex market, the institutional investors increased their exposure to forex and in 2023 purchased USD 12 billion, a move that was also affected by rising equity prices worldwide. In contrast, in 2023 nonresidents continued to sell foreign exchange at large volumes, and increased their exposure to the shekel.

At the outbreak of the war, the Bank of Israel announced a program to purchase up to USD 30 billion in forex, and in this program, for the first time, it sold USD 8.5 billion.

1. Background: Exchange rates and volatility

In 2023, the shekel recorded sharp fluctuations and weakened against the US dollar, the euro and in nominal effective exchange rate terms.

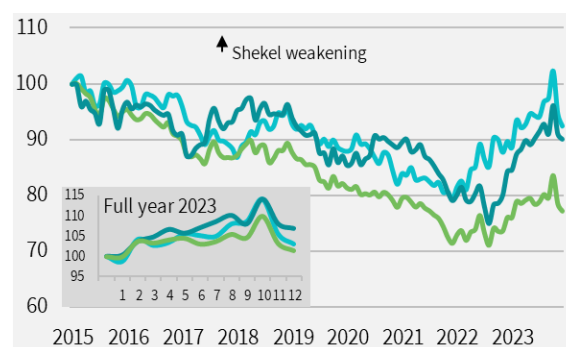
From the beginning of the year to the outbreak of the war, the shekel weakened by about 10 percent, reaching NIS 3.86 per dollar, after weakening by about 13 percent in the previous year.

At the outbreak of the war, the shekel weakened significantly against the US dollar (about 4 percent) and for the first time in a decade crossed the NIS 4 mark. This trend reversed in early November, when the shekel appreciated sharply and returned to levels close to those prevailing early in the year.

Summarizing 2023, the shekel weakened against the US dollar by about 3 percent, to NIS 3.63 shekels per dollar.

In parallel, the shekel continued to weaken against the euro—by 6.9 percent—and in terms of the nominal effective exchange rate, by about¹ by about 1.5 percent

Figure 4.1: NIS/\$, NIS/€, and Nominal Effective Exchange Rate Indices



SOURCE: Bank of Israel.

¹ For an explanation of the nominal effective exchange rate, see "Main Terms" at the end of this chapter.

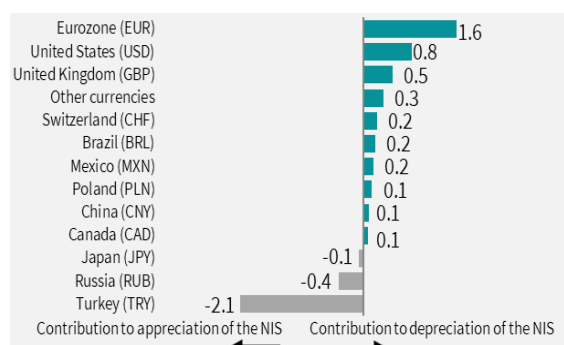
The weakening of the shekel in effective nominal exchange rate terms (1.5 percent) was recorded mainly against the US dollar and against the euro.

The shekel weakened against most of the currencies of the basket of currencies that comprise the nominal effective exchange rate. The most significant contribution to the shekel’s weakening was against the euro, by 1.6 percentage points, and against the US dollar, by 0.8 percentage points.

In contrast, the Turkish lira contributed to the strengthening of the shekel by about 2.1 percentage points.

Figure 4.2: Contribution of the change in various currencies to the change in the nominal effective exchange rate (1.5 percent)

Full year 2023, percent



*The contribution is calculated via the change in the exchange rate of each currency against the shekel, and multiplied by that currency’s weight in the nominal effective index.

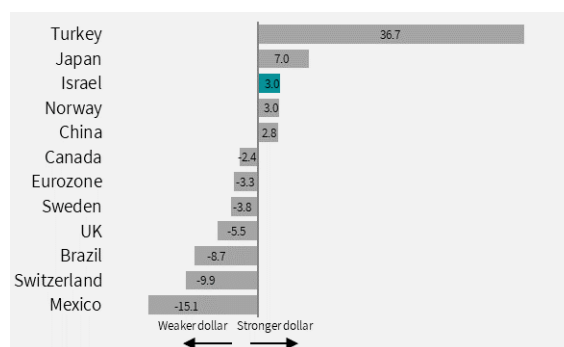
SOURCE: Bank of Israel.

The weakening of the shekel against the dollar coincided with the mixed global trend in the dollar.

In 2023, the US dollar strengthened notably against the Turkish lira by 36.7 percent, against the Japanese yen by 7 percent, and against the shekel by 3 percent, and at the same time weakened against the British pound by 5.5 percent, against the euro by 3.3 percent, and against the Swiss franc by 9.9 percent.

Figure 4.3: Rate of Change of the US Dollar Against the Major Currencies*, 2023

percent



*The figures are calculated based on end-of-day data. The change in the shekel/dollar rate is calculated according to the representative rate.

SOURCE: Based on Bloomberg data.

The weakening of the shekel against the dollar stemmed from local effects that reflect economic uncertainty.

In 2023, the shekel weakened by about 3 percent, due to uncertainty in the domestic economy, which contributed 4.9 percentage points to the weakening of the shekel. Global effects, reflecting the global behavior of the US dollar, contributed about 1.8 percentage points to the strengthening of the shekel this year, mainly toward the end of the year.

High volatility was recorded over the year, especially at the beginning of the fourth quarter, in response to the outbreak of the war: Domestic effects contributed about 4 Percentage points to the weakening of the shekel in October, but this was offset later that quarter.

Uncertainty in the domestic economy was also reflected in a rise in the implied volatility in option prices, in contrast to the global trend³.

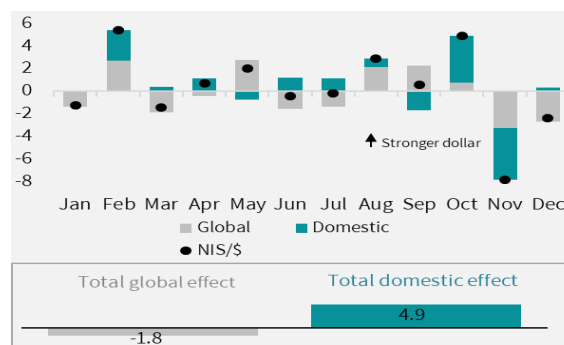
The standard deviation implied in the prices of shekel-dollar options rose beyond the implied volatility in the advanced economies, reaching 10.1 percent at the end of the year, and for the first time since 2008 came close to the implied standard deviation of emerging markets, a trend that began in 2021.

This rise stands out against the decline of about 2 percentage points in the implied volatility in the advanced⁴ and emerging⁵ markets in 2023.

The actual standard deviation fluctuated over the year, but remained at a high level relative to the previous year, similarly to 2022.

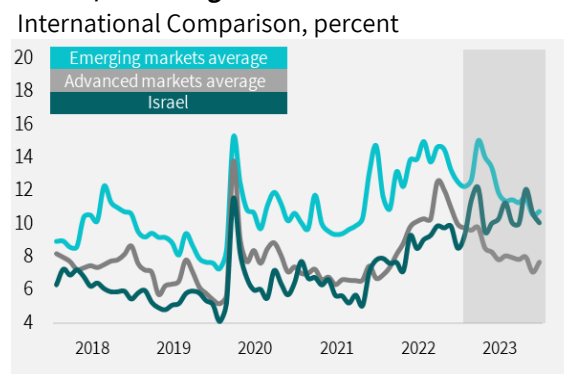
The actual standard deviation of the change in the shekel-dollar exchange rate, which represents the effective exchange rate volatility, was not uniform over the year, yet, similarly to 2022, maintained an average of about 11 percent.

Figure 4.4: Change in the NIS/\$ Exchange Rate by Domestic and Global Effects², 2023
percent



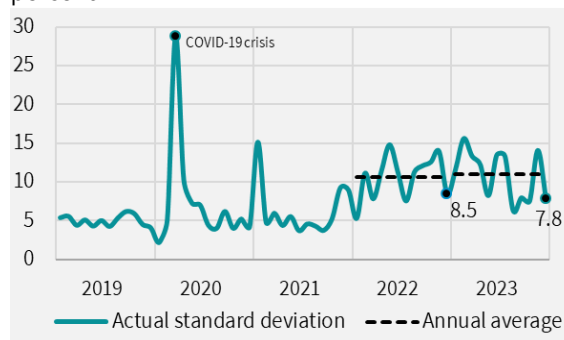
SOURCE: Based on Bloomberg data.

Figure 4.5: Standard Deviation of the Change in the NIS/\$ Exchange Rate
International Comparison, percent



SOURCE: Bank of Israel.

Figure 4.6: Actual standard deviation⁶ of the change in the shekel/dollar exchange rate
percent



SOURCE: Bank of Israel.

² The global effect reflects the relative change of the US dollar against 19 currencies that constitute about 90 percent of the total trading volume against the dollar, with the weight of each currency determined in accordance with its relative trading volume against the dollar. The difference between the global effect and the change in the shekel/dollar rate constitutes the domestic effect.

³ For an explanation of implied standard deviation (ISD), see Main Terms in this chapter.

⁴ The developed markets included here are Australia, Canada, Japan, UK, Switzerland, and the Euro Bloc.

⁵ The emerging markets included here are Mexico, South Korea, Philippines, Poland, Chile, South Africa, Thailand, Hungary, Turkey, and Singapore.

⁶ The actual standard deviation is calculated for the last 20 trading days on an annualized basis.

2. Activity of the main sectors in the foreign exchange market

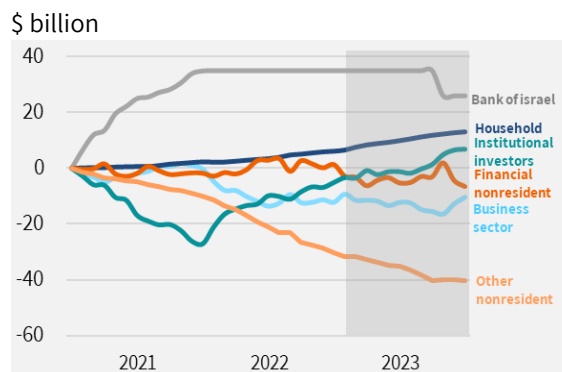
This year, foreign currency purchases were led by the institutional investors; For the first time, the Bank of Israel sold foreign currency as part of its policy steps adopted in response to the events of October.

In 2023, the institutional investors made net foreign currency purchases of about USD 12 billion, following foreign currency purchases of about USD 22 billion in 2022. In 2023, households increased their foreign currency purchases, which totaled about USD 7 billion, net, mainly through credit card companies.

In response to the outbreak of the war, the Bank of Israel announced a program to sell up to USD 30 billion in foreign currency, of which it sold USD 8.5 billion. In contrast, foreign exchange was purchased both by nonresidents in the financial sector and by the institutional investors.

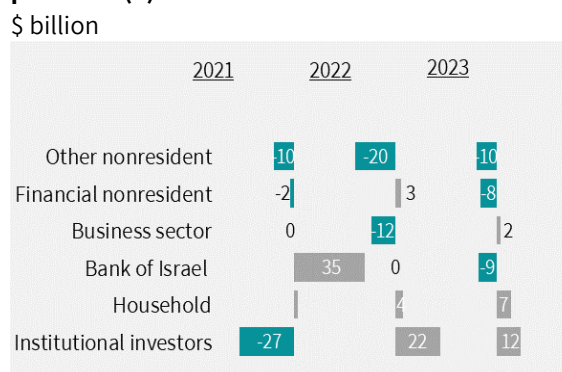
In summary, in 2023, nonresidents continued to sell foreign currency at a similar volume as in previous years, about USD 18 billion, net.

Figure 4.7a: Estimated Net Cumulative Foreign Exchange Purchases (+) of the Main Sectors



SOURCE: Based on reports to the Bank of Israel by financial institutions and business firms.

Figure 4.7b: Estimate of net foreign exchange purchase (+) in the main sectors



SOURCE: Based on reports to the Bank of Israel from financial institutions and corporations.

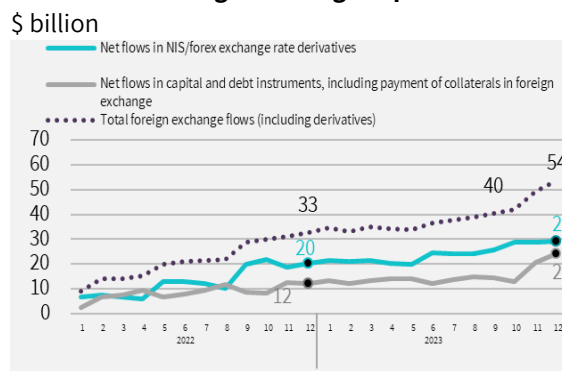
2.1 The institutional investors

The institutional investors purchased assets in foreign currency⁷ and reduced hedges.

Following 2022, the institutional investors purchased capital assets and debt assets in (or linked to) foreign currency in the amount of about USD 9 billion. They also purchased foreign currency in the amount of about USD 12 billion through derivative instruments.

Total movements reflecting exposure to foreign currency totaled about USD 19 billion, of which about USD 14 billion was in the last quarter of the year, with the outbreak of the war.

Figure 4.8: Cumulative net flows in financial institutions' foreign exchange exposure.



SOURCE: Bank of Israel data.

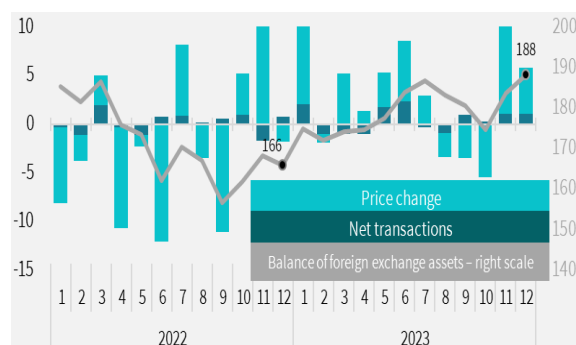
*Net flows in capital and debt instruments include shekel assets indexed to foreign currency

⁷ Forex assets include assets linked to foreign currency.

A sharp rise in prices in global markets and in foreign exchange purchases by the institutional investors increased the book balance of the main forex assets⁸.

The balance of the institutional investors' main forex assets increased in 2023 by about USD 22 billion, reaching USD 188 billion. The major part of this increase, about USD 17 billion, stemmed mainly from rising equity prices abroad.

Figure 4.9: Balance of institutional investors' main foreign exchange assets
\$ billion



SOURCE: Bank of Israel.

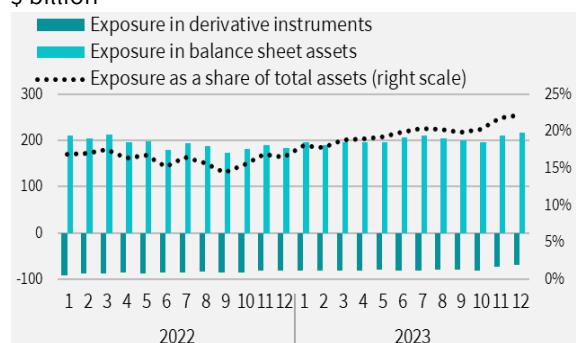
The growth in the balance of foreign currency assets was reflected in a rise in institutional investors' foreign currency exposure

The institutional investors' balance of foreign currency exposure in balance-sheet assets increased in 2023 by about USD 33 billion, reaching about USD 216 billion at end December.

At the same time, the institutional investors reduced their hedges on their foreign currency assets by about USD 12 billion.

The increase in the balance of balance-sheet assets and the decline in the balance of liabilities through derivative instruments was reflected in an increase of about 6 percentage points in the share of foreign currency exposure out of the total asset portfolio managed by the institutional investors, to 22 percent.

Figure 4.10: Institutional Investors' Exposure to Foreign Exchange Assets
\$ billion

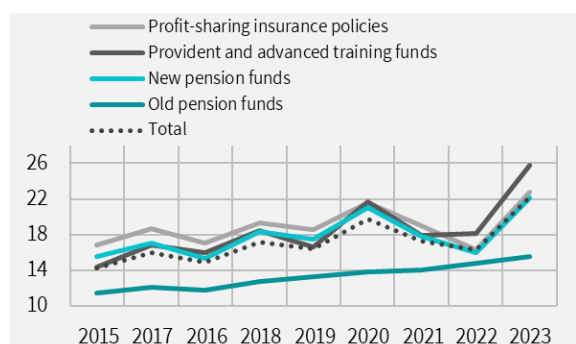


SOURCE: Bank of Israel.

The rise in exposure to foreign currency characterized all the institutional investors.

In 2003, institutional investors overall increased the foreign currency exposure of their managed portfolios to about 22 percent. Especially prominent were the provident funds and advanced education funds, which increased their foreign currency exposure by about 8 percentage points, to about 26 percent.

Figure 4.11: Institutional Investors' Exposure to Foreign Exchange
Percent



SOURCE: Bank of Israel.

⁸ The balance of the main forex assets includes equities, bonds, and investment funds.

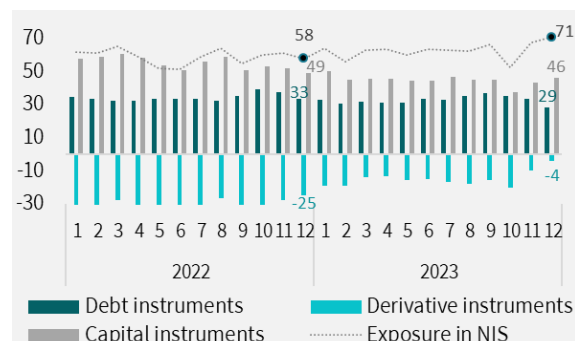
2.2 Nonresidents

Nonresidents also increased their exposure to the shekel⁹, mainly through derivative instruments.

Nonresidents' exposure to the shekel increased in 2023 by about USD 13 billion, and totaled USD 71 billion at the end of the year: an increase of USD 21 billion by reducing commitments to sell shekels through derivative instruments, and a decline of USD 3 in capital instruments and of 4 billion in debt instruments, due to declining prices in the domestic market and a weakening of the shekel.

Figure 4.12: Balance of nonresidents' exposure to the shekel in debt instruments, capital instruments, and derivatives

\$ billion



SOURCE: Based on reports to the Bank of Israel by financial institutions and corporations.

This year, nonresidents reduced their investments in shekel-denominated capital and debt¹⁰ instruments and sold foreign currency, mainly through derivative instruments.

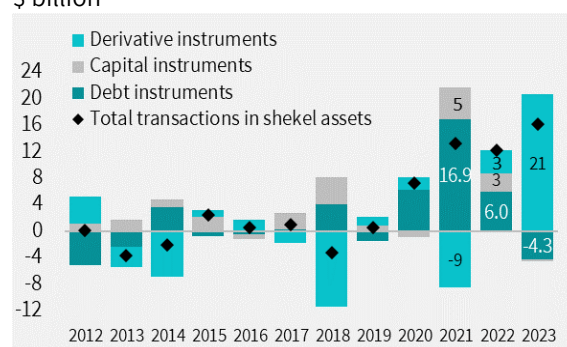
Nonresidents sold foreign currency totaling USD 16 billion, net, through derivative instruments.

In 2023, nonresidents' investments in government bonds in the amount of USD 4.7 billion were offset in entirety by sales of Makam in the amount of USD 10 billion.

Nonresidents' investment in capital instruments¹¹ was negligible this year.

Figure 4.13: Nonresidents' Estimated Net Transactions in Debt, Capital, and Derivative Instruments

\$ billion



SOURCE: Based on reports to the Bank of Israel by financial institutions and corporations.

⁹ See an explanation in Sources of Data and Main Terms at the end of this chapter.

¹⁰ Debt instruments: bonds (excluding institutional bonds traded on the institutional Retzef system), Makam, deposits, and loans that are not from parties at interest.

¹¹ Investment in equities includes direct investments and financial investments

2.3 The business sector¹²

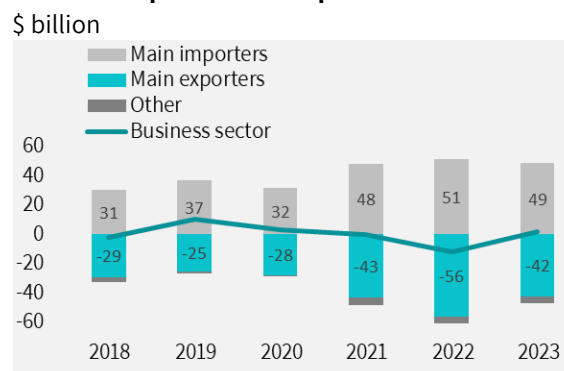
The major import and export companies made net foreign exchange purchases.

This year, the major export companies made net foreign currency sales in the amount of USD 42 billion, compared to net foreign currency sales in 2022, which totaled the more significant amount of USD 56 billion, due to the anomalous depreciation of the shekel in 2022 .

At the same time, the major import companies continued to purchase foreign currency, but on a smaller scale than last year (USD 49 billion, net) .

Net activities of the major import and export companies in 2023 totaled about USD 7 billion.

Figure 4.14: Net Foreign Exchange Purchases by the Main Importers and Exporters¹³



SOURCE: Based on reports to the Bank of Israel by financial institutions and business firms.

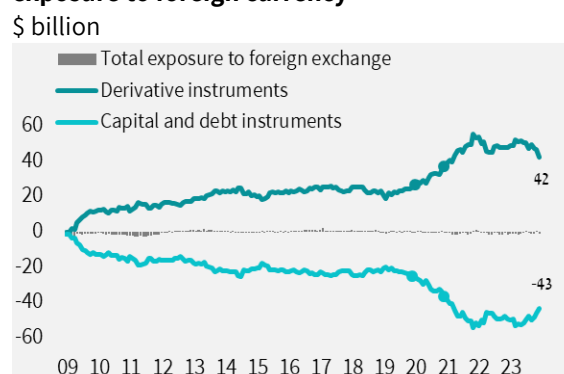
2.4 The banking system¹⁴

The banking system's liabilities in capital and debt instruments declined, as did its assets in derivative instruments. Exposure to foreign currency remained negligible.

From the beginning of 2023, the banks' surplus of liabilities in capital and debt instruments in foreign currency declined by about USD 6 billion, to about USD 43 billion .

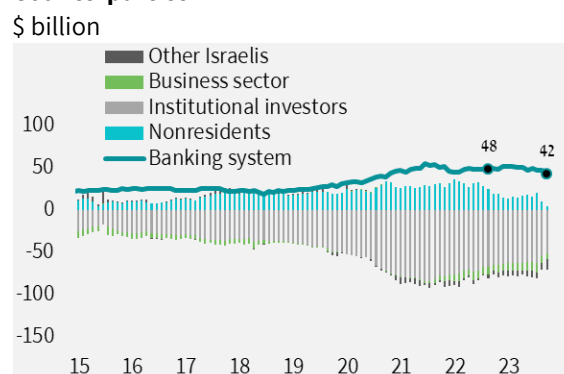
At the same time, the banking system reduced its assets in derivative instruments in foreign currency by about USD 6 billion, to about USD 42 billion at the end of the year. The banking system's major counterparty was the institutional investors, which increased their liabilities in derivative instruments in foreign currency by about USD 16 billion, to about USD 52 billion.

Figure 4.15a: Balance of net foreign currency assets of the banking system and scope of exposure to foreign currency



SOURCE: Based on reports to the Bank of Israel by financial institutions and corporations.

Figure 4.15b: The Banking System's Foreign Exchange Derivative Assets vis-à-vis Counterparties



SOURCE: Based on reports to the Bank of Israel by the banking system.

¹² The business sector includes all nonfinancial companies in Israel, including import and export companies.

¹³ The importing/exporting groups were retroactively updated according to ML methods.

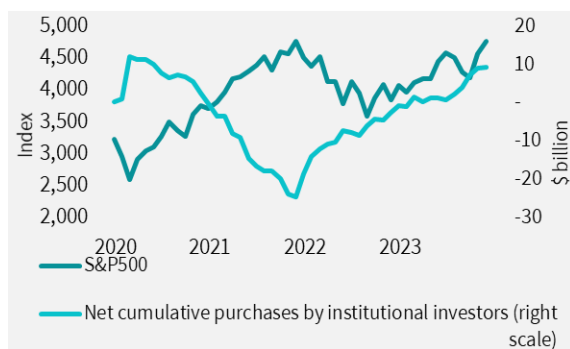
¹⁴ The local banking corporations.

A CLOSE LOOK AT THE FOREIGN CURRENCY MARKET

By end 2022, there was a negative correlation between the institutional investors' net cumulative foreign currency purchases and equities indices abroad. When equities indexes abroad rise, the institutional investors make net sales of foreign currency, and vice versa.

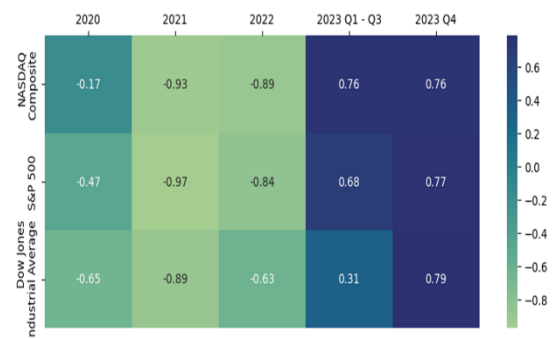
In 2023, this correlation became positive: The institutional investors continued to purchase foreign currency for their investments abroad and increased their exposure to foreign currency while equities indices abroad rose.

Figure 4.16: net cumulative foreign exchange purchases by institutional investors and the S&P 500 Index



SOURCE: Based on Bloomberg, reports to the Bank of Israel by institutional investors and corporations.

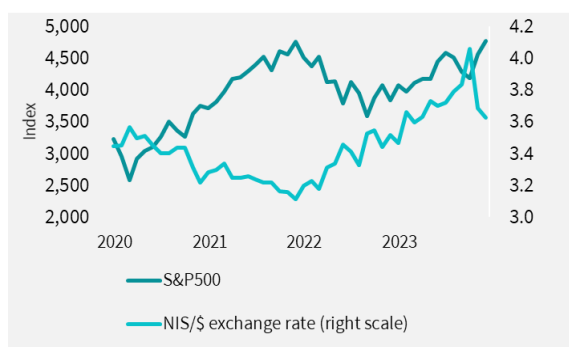
Figure 4.17: The coefficient between institutional investors' net foreign exchange purchases and equity indices abroad



SOURCE: Based on Bloomberg, reports to the Bank of Israel by institutional investors and corporations.

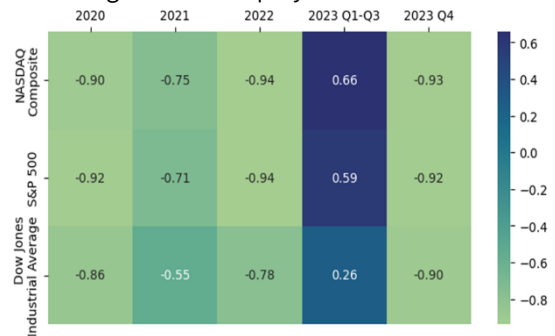
At the same time, until 2022, a similar negative correlation was recorded between the dollar/shekel exchange rate and equities indices abroad. In early 2023, this correlation became positive, as did the correlation between the institutional investors' forex purchases and equities indexes abroad. Upon the outbreak of the war, the exchange rate once again became negatively correlated with equities indexes abroad.

Figure 4.18: The NIS/\$ exchange rate and the S&P 500



SOURCE: Based on Bloomberg, reports to the Bank of Israel by institutional investors and corporations.

Figure 4.19: The coefficient between the NIS/\$ exchange rate and equity indices abroad



SOURCE: Based on BIS and reports to the Bank of Israel by the financial institutions and business firms.

Main indicators in the foreign exchange market

	level				change			
	2020	2021	2022	2023	2020	2021	2022	2023
Actual volatility of the shekel/dollar exchange rate (moving 20-day average, percent)	4.3%	9.00%	8.50%	7.80%	0.2	4.7	-0.5	-0.7
Implied volatility of shekel/forex OTC options (percent)	6.4%	7.80%	8.50%	10.10%	1	1.41	0.72	1.54
Shekel/dollar representative exchange rate	3.22	3.11	3.52	3.63	-6.90%	-3.30%	13.20%	3.10%
Shekel/euro exchange rate	3.94	3.52	3.75	4.01	1.50%	-10.70%	6.60%	6.90%
Dollar/euro exchange rate	1.22	1.13	1.07	1.11	-8.80%	-7.20%	-5.80%	3.70%
Yen/dollar exchange rate	103.08	115.1	131.95	141.48	-5.00%	11.70%	14.60%	7.20%
Nominal effective exchange rate (01.01/2015 = 100)	77.87	71.35	76	77.14	-5.20%	-8.20%	6.50%	1.50%
Average daily trading volume - conversions, swaps and OTC options (\$ million) ¹⁵	8145	9601	10418	10318	18.84%	17.88%	8.51%	-0.96%
Nonresidents' share of trading volume	40.30%	46.50%	41.40%	45.10%	5.9	6.2	-5.1	3.7
Nonresidents' surplus of shekel assets (\$ billion)	36	67	58	71				
Institutional investors' surplus of foreign exchange assets (\$ billion)	120	128	102	147				
The banking system's surplus of foreign exchange assets (\$ billion)	-0.7	1.1	-2	-1.3				
Net foreign exchange purchases by institutional investors (\$ billion)					-2	-28	21.5	12
Net foreign exchange purchases by main exporters ¹⁶ (\$ billion)					-28	-43	-56	-42
Net foreign exchange purchases by main importers ¹⁶ (\$ billion)					32	48	51	49

¹⁵ The trading volume of the domestic banking corporations, excluding domestic branches of foreign banks.

¹⁶ Retrospectively restatement of the importer/exporter group based on ML methods.

DATA SOURCES AND MAIN TERMS



The Bank of Israel Information and Statistics Department manages a database of activity in the foreign exchange market. The Department gathers data and information on a daily basis from financial intermediaries in Israel and abroad regarding shekel-forex transactions, and processes them into a detailed high-quality dataset that provides a broad picture of the foreign exchange market. The data are received from domestic banking corporations, domestic financial institutions, and foreign banks. In addition, this section makes use of reports by the institutional investors to the Ministry of Finance and the Bank of Israel, reports from the banking system to the Banking Supervision Department, and reports from banks and other financial intermediaries to the Bank of Israel.

Exposure to the exchange rate and derivatives

Exposure to the exchange (or exposure to foreign exchange)

is the monetary amount at risk in a case of changes in the shekel exchange rate vis-à-vis foreign currencies. In terms of Israelis and the various sectors in the Israeli economy, this amount is estimated in this chapter by the surplus of their foreign exchange assets over foreign exchange liabilities (denominated in and indexed to foreign exchange). In terms of nonresidents, this amount is estimated by calculating the surplus of their shekel assets over shekel liabilities. An Israeli is exposed to appreciation of the shekel when he holds a surplus of foreign exchange assets (positive), and is exposed to a depreciation of the shekel when he holds surplus foreign exchange liabilities (negative asset surplus). Nonresidents' exposure works in the opposite direction.

Foreign exchange assets include: **balance-sheet assets** such as cash and deposits in foreign currency and foreign currency government and corporate bonds (generally foreign), and **off-balance-sheet assets**, meaning the open balance in transactions in **derivative financial instruments** (hereinafter: DFIs) for the purchase of foreign exchange against shekels, such as forward transactions and options (tradable and nontradable). Similarly, foreign exchange liabilities include **balance-sheet liabilities** such as foreign exchange loans, **off-balance-sheet liabilities**, meaning the open balance in DFI transactions for the sale of foreign exchange against shekels. Nonresidents' assets and liabilities in shekels are defined similarly.

Many Israelis, led by institutional investors, hold foreign assets as part of an investment policy of diversification of their asset portfolio and its risks. Such holdings, of foreign assets only, expose them to appreciation of the shekel. In order to minimize this exposure, they sell foreign exchange in DFI transactions (referred to as "**hedging**"). Exporters and importers are exposed to changes in the exchange rate due to their commercial activity—in opposite directions—and protect themselves through DFI transactions. Other Israelis, such as financial companies, may manage exposure to the shekel exchange rate with the intention of profiting from changes in the rate, by purchasing and selling foreign exchange against shekels in the present (spot) and in the future through DFI transactions. The nonresidents sector is comprised of various companies and individuals with activity in shekels and a similar variety of motives

Implied volatility in foreign exchange options represents the expected volatility in the exchange rate. Assuming that the options market is efficient and that actors in the market price the options based on the Black-Scholes model, the implied volatility should include all the relevant information regarding future volatility of the exchange rate. It therefore serves as a market estimate of exchange rate volatility during the period remaining until the options expire.

The nominal effective exchange rate An index that reflects the relative price of the shekel vis-à-vis a basket of currencies. The weight of each currency in the index reflects its importance in Israel's foreign trade. The index is calculated as the geometric average of the shekel's exchange rate against 26 currencies representing the 33 countries that are Israel's major trading partners.