

D. FOREIGN EXCHANGE ACTIVITY OF THE MAIN SECTORS

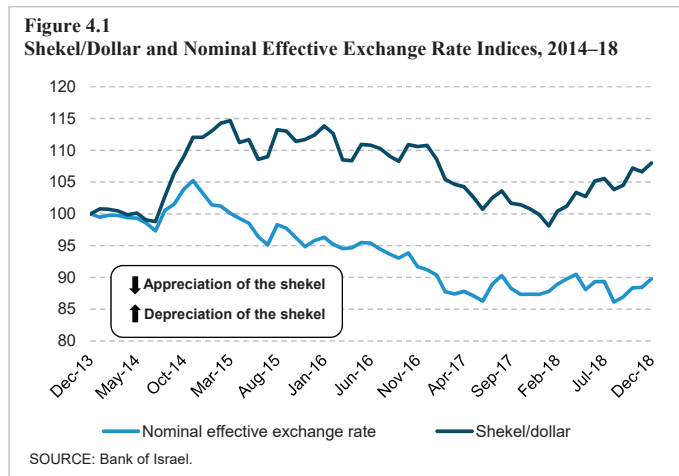
In 2018, the shekel weakened against the dollar in parallel with the significant strengthening of the dollar against the major currencies. Most of the shekel’s depreciation was in the first half of the year and in the fourth quarter. In terms of the nominal effective exchange rate, which represents the currencies of Israel’s main trading partners, the shekel weakened by a more moderate rate, mainly from September onward.

In 2018, there was a particularly prominent transition to net foreign exchange purchases by of significant volume by institutional investors and the financial sector, against continued foreign exchange sales by nonresidents. The activity of all the sectors in foreign exchange trading expanded, mainly in the second half of the year. The business sector continued to make net foreign exchange purchases, combining increased net purchases by importers and lower net sales by exporters.

1. BACKGROUND: THE EXCHANGE RATES AND RISK

The shekel weakened by 8.1 percent against the dollar in 2018, compared with appreciation of 11.1 percent in the previous two years. The shekel also weakened against the nominal effective exchange rate, mainly in the fourth quarter of the year.¹

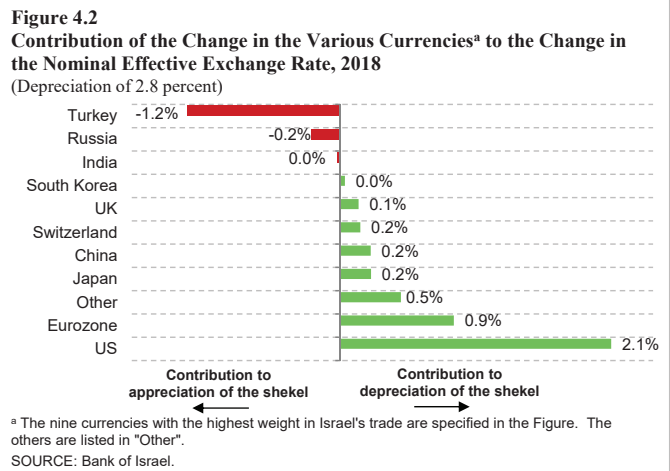
The shekel declined by 2.8 percent against the currencies of Israel’s major trading partners (which are weighted to obtain the nominal effective exchange rate), compared with appreciation of 4.4 percent in 2016 and 4.2 percent in 2017.



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

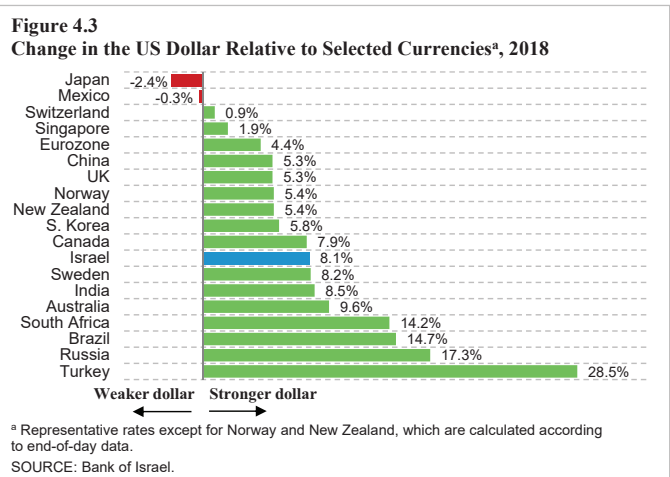
The shekel weakened against most currencies in the basket that comprises the nominal effective exchange rate.

The main contributing factors to the depreciation against the nominal effective exchange rate were the weakening of the shekel against the dollar, which contributed 2.1 percentage points to the depreciation, and against the euro, which contributed 0.6 percentage points. In contrast, the shekel strengthened by about 23 percent against the Turkish lira during the year, which offset 1.2 percentage points from the depreciation against the nominal effective exchange rate.



The weakening of the shekel against the dollar in 2018 mainly reflected the strengthening of the dollar worldwide.

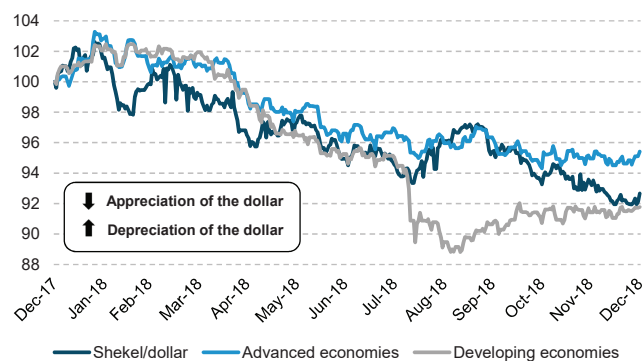
The dollar strengthened against the major global currencies, including by 4.4 percent against the euro, 5.3 percent against the pound sterling, and 0.9 percent against the Swiss franc. The strengthening of the dollar by about 28.5 percent against the Turkish lira was prominent. In contrast, the dollar weakened by 2.4 percent against the Japanese yen.



The shekel’s depreciation against the dollar was similar to the depreciation of the currencies of developing economies² against the dollar.

The dollar strengthened by about 8.3 percent against the currencies of developing economies, in contrast with a weakening of about 6 percent against them in 2017. Against currencies of advanced economies³, the dollar strengthened by a lower rate, about 4.6 percent, after having weakened by about 11 percent in 2017.

Figure 4.4
Cumulative Change vis-a-vis the Dollar, 2018 (index)



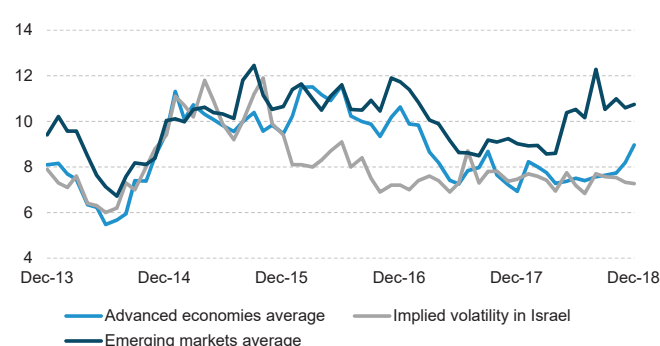
SOURCE: Bank of Israel.

The implied volatility⁴ of options on the shekel exchange rate and currencies of the advanced economies⁵ remained low this year.

The implied volatility of options on the shekel exchange rates was 7.3 percent at the end of 2018, similar to the rate at the end of 2017, reflecting expectations of low volatility.

In contrast, the expected volatility in the emerging markets increased in 2018⁶.

Figure 4.5
International Comparison of Average Implied Volatility in Foreign Exchange Options, 2014–2018 (Weekly data, percent)



SOURCE: Bank of Israel.

² The developing economies that were included: China, Taiwan, Hong Kong, Ukraine, Malaysia, India, Mexico, Russia, Brazil, and Turkey.

³ The advanced economies that were included: Sweden, Canada, Japan, UK, Australia, Switzerland, Singapore, South Korea, and the eurozone.

⁴ For an explanation of implied volatility in options, see Main Terms at the end of this section.

⁵ The advanced economies that were included: Australia, Canada, Japan, UK, Switzerland, and the eurozone.

⁶ The emerging markets that were included: Mexico, South Korea, Philippines, Poland, Chile, South Africa, Thailand, Hungary, Turkey, and Singapore.

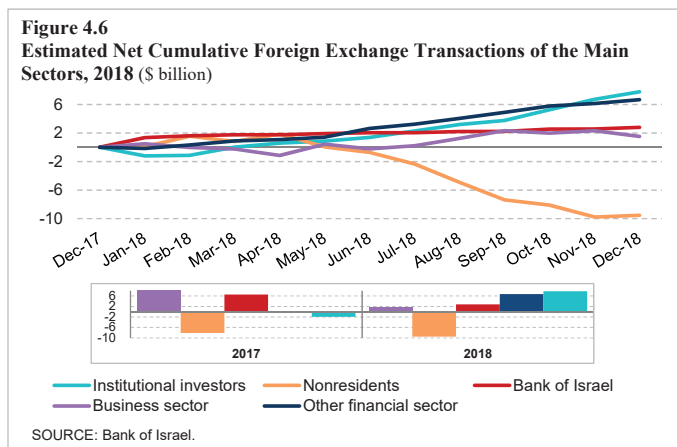
2. FOREIGN EXCHANGE ACTIVITY OF THE MAIN SECTORS⁷

The main segments of the foreign exchange market in 2018 featured net foreign exchange purchases (shekel sales) by institutional investors and the other financial segment⁸ against net foreign exchange sales (shekel purchases) by nonresidents.

The institutional investors made net purchases of foreign exchange totaling \$7.8 billion, compared with foreign exchange sales of about \$2 billion in 2017.

The other financial segment, which made negligible net purchases of foreign exchange in 2017, purchased a more significant volume of \$6.7 billion in foreign exchange in 2018.

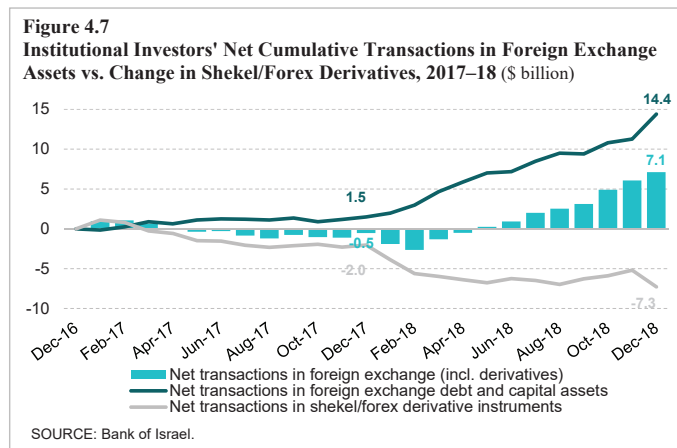
In contrast, foreign exchange sales by nonresidents totaled \$9.5 billion, similar to previous years.



2.1 Institutional investors

Institutional investors' investments in foreign exchange assets totaled \$7.7 billion in 2018.

The volume of net investments in foreign exchange capital assets and debt assets by the institutional investors totaled about \$12.9 billion in 2018, and was spread throughout the year. In order to minimize their exposure to foreign exchange, the institutional investors made net sales of foreign exchange through derivative instruments totaling about \$5.3 billion, mainly in the first half and fourth quarter of the year.



⁷ For further details regarding definitions, terms, and explanations, see “Database on Shekel/Forex Market Activity” in Chapter 2 of this publication.

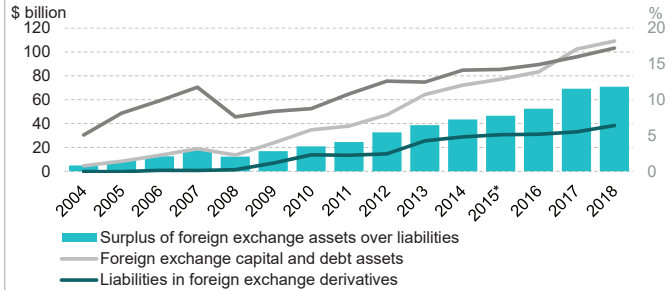
⁸ The financial companies excluding the banking system and excluding the institutional investors.

The increase in institutional investors' investments in foreign exchange assets was reflected in an increase of about 1.2 percentage points in their rate of exposure to foreign exchange, to a rate of 17.2 percent of their assets.

The balance of institutional investors' capital and debt assets in foreign exchange increased by about \$6.8 billion, to \$109.1 billion, mainly through their investments in shares abroad.

Institutional investors' surplus of assets over liabilities in foreign exchange increased in 2018, to about \$71 billion.

Figure 4.8
Institutional Investors' Surplus of Foreign Exchange Assets (+) Over Liabilities and Exposure to Foreign Exchange, 2004–18

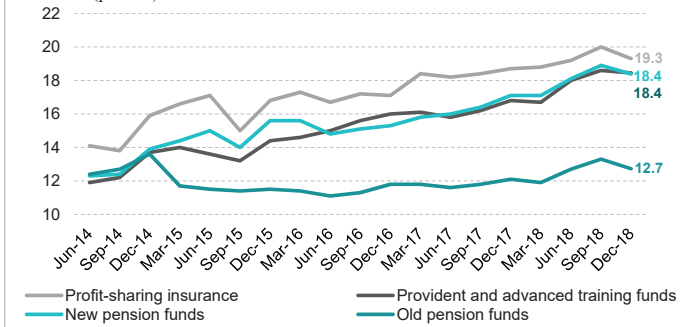


* In January 2015 some of the reporting entities adopted a different calculation method for the forex derivatives item, which makes it impossible to compare the balance at the end of January 2015 to the balances for previous periods.
SOURCE: Based on reports from the institutional investors.

The increase in exposure to foreign exchange was a feature of all institutional investors.

The insurance companies had the highest rate of exposure to foreign exchange—about 19 percent at the end of the year (an increase of 0.6 percentage points from the beginning of the year). The new pension funds and the provide and advanced training funds had exposure rates of about 18 percent, and the old pension funds maintained the lowest exposure rate to foreign exchange—about 13 percent.

Figure 4.9
Institutional Investors' Exposure to Foreign Exchange, by Type of Investor, 2014–18 (percent)



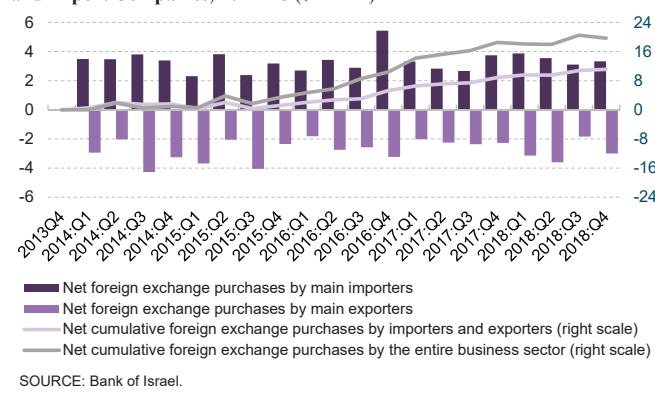
SOURCE: Bank of Israel.

2.2 The business sector

The business sector made net purchases of foreign exchange in 2018, further to its activity in 2017.

Net foreign exchange purchases by the main import companies totaled about \$13.8 billion in 2018, due to the continued increase of goods and services imports. In the second half of the year, there was a marked decline in foreign exchange sales by the main export companies, due to the decline in goods exports. Their foreign exchange sales totaled about \$11.6 billion in 2018.

Figure 4.10
Cumulative Foreign Exchange Purchases (+) by the Large Import and Export Companies, 2014–18 (\$ billion)



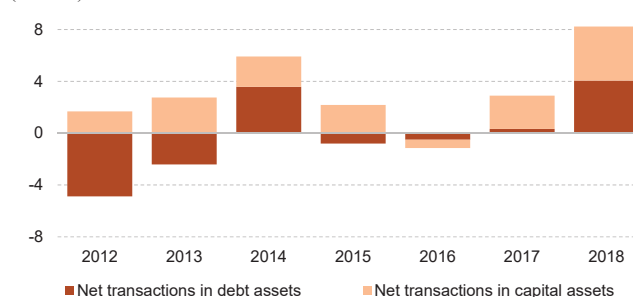
2.3 Nonresidents

Nonresidents' purchases of shekels were reflected in the purchases of shekel assets on the stock exchange. Nonresidents' estimated net investments in capital and debt assets totaled about \$8.2 billion in 2018.

Investments in debt assets⁹ totaled \$4.1 billion in 2018. Of that, investments totaling \$1.6 billion in government bonds and \$1.5 billion in *makam* were most prominent.

Investments in capital assets¹⁰ totaled \$4.2 billion in 2018, of which about

Figure 4.11
Estimate^a of Nonresidents' Net Transactions in Shekel Assets, 2012–18 (\$ billion)



^a Based on reported transaction data and on an estimate based on balance differentials.
SOURCE: Bank of Israel.

⁹ Debt assets: bonds, *makam*, deposits, and financial loans.

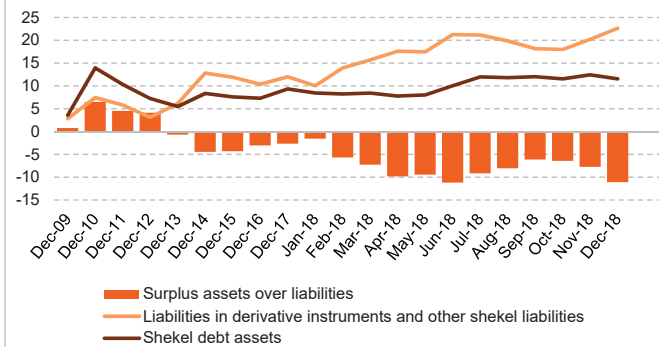
¹⁰ Capital assets: direct investments and financial investments in shares.

The surplus of nonresidents' shekel assets over liabilities declined during the year, to -\$11.1 billion, which means an increase in their exposure to an appreciation of the shekel.¹¹

Nonresidents increased their short-term shekel debt assets during 2018, to \$11.5 billion.

In parallel, nonresidents increased their shekel liabilities through derivative instruments¹² to \$22.6 billion.

Figure 4.12
Nonresidents' Surplus Shekel Assets (+) over Liabilities in Debt and Derivative Instruments, 2009–2018 (\$ billion)



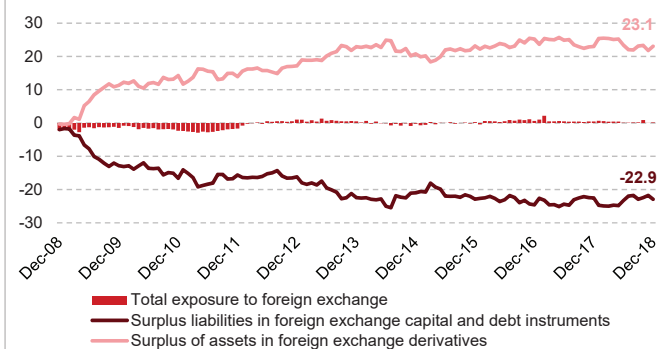
SOURCE: Bank of Israel.

2.4 The banking system¹³

The banking system maintain near zero exposure to foreign exchange.

The banking system's balance of assets in foreign exchange derivative instruments remained stable, at \$23.1 billion at the end of 2018. The system's surplus of liabilities in foreign exchange capital and debt assets also remained stable, at \$22.9 billion.

Figure 4.13
Banks' Surplus Foreign Exchange Assets (+) over Liabilities and Total Exposure to Foreign Exchange, 2008–18 (\$ billion)



SOURCE: Bank of Israel.

¹¹ For an explanation, see the list of main terms at the end of this section.

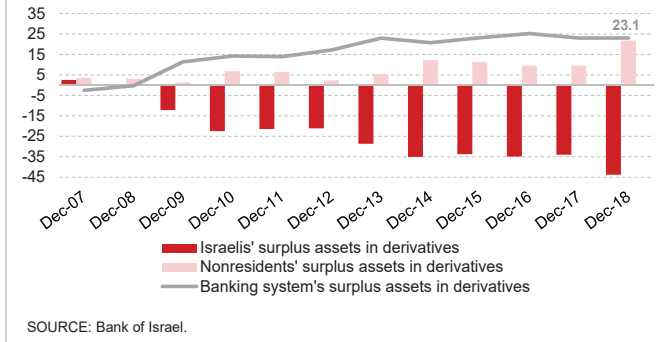
¹² Derivative instruments: futures and options transactions.

¹³ The domestic banking corporations.

The banking system's surplus of assets in foreign exchange derivative instruments is due to the banks' activity vis-à-vis Israelis and nonresidents.

Israelis, mainly the institutional investors and the other financial segment, increased their surplus liabilities in foreign exchange derivative instruments (meaning they will pay foreign exchange in the future) to \$43.8 billion. In contrast, nonresidents significantly increased their surplus assets in foreign exchange derivative instruments (increased their surplus shekel liabilities, meaning they will receive foreign exchange in the future) to \$21.8 billion.

Figure 4.14
The Banking System's Surplus Foreign Exchange Assets (+) over Liabilities in Derivative Assets Compared with Counter-Sectors, 2008–18 (\$ billion)



ZOOM IN

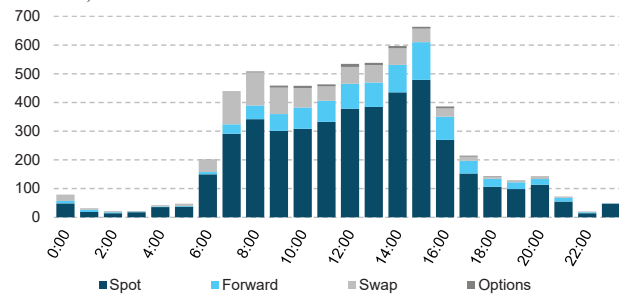


AN UP-CLOSE LOOK AT

THE VOLUME OF FOREIGN EXCHANGE TRANSACTIONS

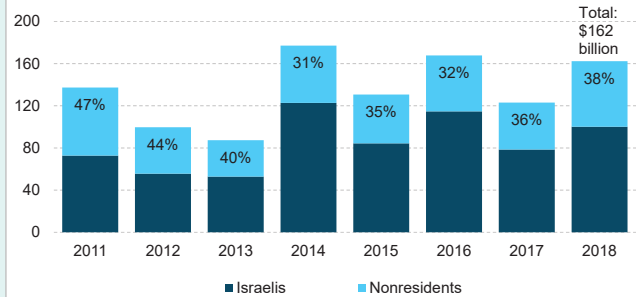
In 2018, most transactions were made between 12:00 and 15:00 Israel time.

Figure 4.15
Daily Average Number of Transactions by Instrument and Time of Execution, 2018



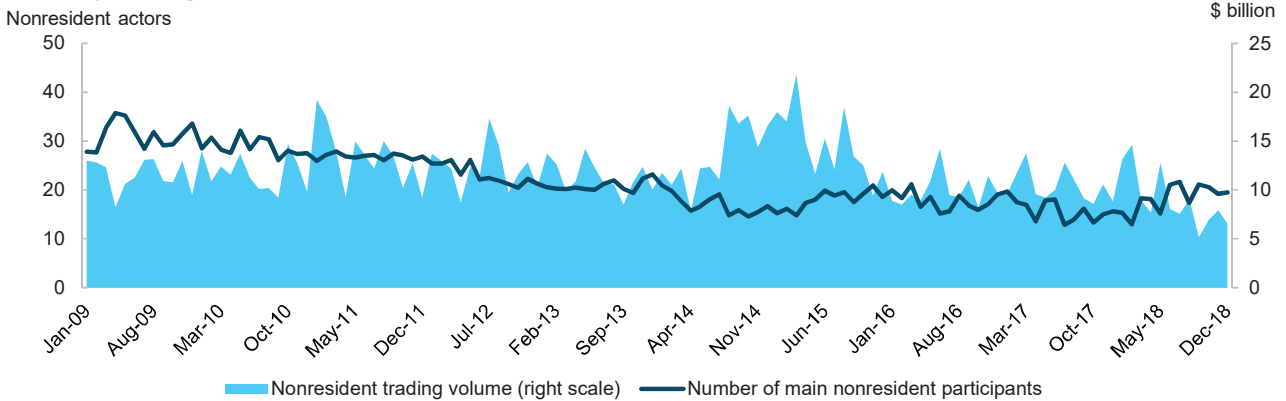
In 2018, nonresidents accounted for 38 percent of total foreign exchange trading volume.

Figure 4.16
Nonresidents' Share of Total Foreign Exchange Trading Volume, 2018 (monthly average)



In 2018, nonresidents trading volume declines, and the number of nonresident participants increased, which is typical of a concentrated open market.

Figure 4.17
Nonresidents' Trading Volume and Number of Nonresident Participants Accounting for More than 80 Percent of Monthly Trading Volume, 2009–18



SOURCE: Based reports by the banks.

Main indicators in the foreign exchange market

	Level ^a					Change				
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018
Actual volatility of the shekel/ dollar exchange rate (moving 20-day average) ^b	9.4%	5.1%	7.2%	4.8%	4.9%	5.9	-4.3	2.1	-2.4	0.1
Implied volatility of shekel/ forex OTC options ^b	9.4%	9.4%	7.2%	7.5%	7.1%	1.5	-0.3	-2.2	0.3	-0.4
Shekel/dollar representative exchange rate	3.89	3.90	3.85	3.47	3.75	12.0%	0.3%	-1.5%	-9.8%	8.1%
Shekel/euro exchange rate	4.73	4.25	4.04	4.15	4.29	-1.2%	-10.1%	-4.8%	2.6%	3.4%
Dollar/euro exchange rate	1.22	1.09	1.05	1.20	1.15	-11.8%	-10.4%	-3.3%	14.1%	-4.4%
Yen/dollar exchange rate	119.49	120.41	117.00	112.55	109.87	13.8%	0.8%	-2.8%	-3.8%	-2.4%
Nominal effective exchange rate (January 1, 2010 = 100)	92.75	86.02	81.89	78.40	80.61	3.3%	-7.3%	-4.8%	-4.3%	2.8%
Average daily trading volume - conversions, swaps and OTC options (\$ million)	6,375	6,382	7,277	6,636	7,956	45.1%	0.1%	14.0%	-8.8%	19.9%
Nonresidents' share of trading volume ^b	30.5%	35.4%	31.7%	36.2%	38.3%	-9.0	5.1	-3.7	4.5	2.1
Nonresidents' exposure to the exchange rate (\$ billion)	-4.5	-4.3	-2.9	-2.8	-5.8					
Institutional investors' exposure to the exchange rate (\$ billion)	43.4	46.5	52.4	69.2	72.5					
The banking system's exposure to the exchange rate (\$ billion)	-0.2	0.3	0.8	0.5	0.2					
Foreign exchange purchases by institutional investors (\$ billion)						3.6	3.7 ^c	1.6	-2.2	7.8
Foreign exchange purchases by main exporters (\$ billion)						-12.5	-13.8	-10.4	-8.9	-11.6
Foreign exchange purchases by main importers (\$ billion)						14.1	11.9	13.9	12.5	13.8

^a Level at the end of the period.

^b The changes shown in the right-hand panel are in percentage points.

^c In January 2015, some of the reporting entities adopted a different method of calculation for the forex derivatives item, which makes it impossible to calculate the net transactions in foreign exchange assets (forex purchases) for that month. Forex purchases for 2015 therefore do not include that month.

SOURCE: Bank of Israel.

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 a 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 regarding nonresidents' holdings of Israeli financial assets.

Exposure to the exchange rate and derivatives

- **Exposure to the exchange rate** (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, and 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**¹: 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.

¹ For more information on effective exchange rates, see: <http://www.boi.org.il/en/Markets/ExchangeRates/Pages/efectinf.aspx>