D. FOREIGN EXCHANGE ACTIVITY OF THE MAIN SECTORS

In 2016, nonresidents made net sales of foreign exchange and reduced their exposure to an appreciation of the shekel. In contrast, there were significant net purchases of foreign exchange by the business sector, mainly due to increasing foreign exchange purchases by importers. Institutional investors also made net purchases of foreign exchange assets, at a moderate volume, and increased their exposure to appreciation as a share of their total assets.
In 2016, the shekel strengthened moderately against the dollar, as the dollar strengthened against the major currencies. In terms of the nominal effective exchange rate, the shekel strengthened by a more significant rate.
In parallel with the appreciation of the shekel, the decline in the risk of shekel-dollar exchange rate volatility continued, in contrast with the increase in this risk for other currencies.

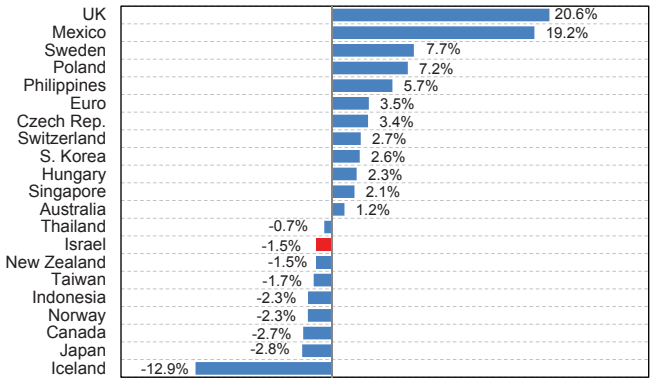
1. BACKGROUND: THE EXCHANGE RATES AND RISK

In 2016, the dollar strengthened significantly against most major currencies, while it weakened moderately against the shekel.

The dollar strengthened by about 21 percent against the British pound this year, against the background of the Brexit vote that took place in June.

Against the background of the elections in the US that took place in November, the dollar strengthened against most major currencies this year, particularly by 3.5 percent against the euro.

Figure 4.1
Change in the US Dollar Relative to Selected Currencies, 2016

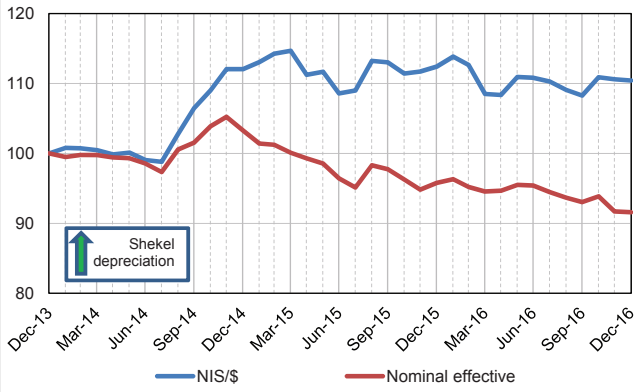


SOURCE: Bank of Israel.

In parallel with the appreciation of the shekel against the dollar and the strengthening of the dollar against the major currencies, the shekel strengthened significantly this year in terms of the nominal effective exchange rate[1].

The shekel strengthened by 1.5 percent against the dollar, in contrast with a moderate depreciation in 2015 (0.3 percent). In terms of the nominal effective exchange rate, the shekel appreciated by 4.8 percent this year, further to appreciation of 7.3 percent in 2015.

Figure 4.2
Shekel/Dollar and Nominal Effective Exchange Rate Indices
(Monthly data, December 2013–December 2016)

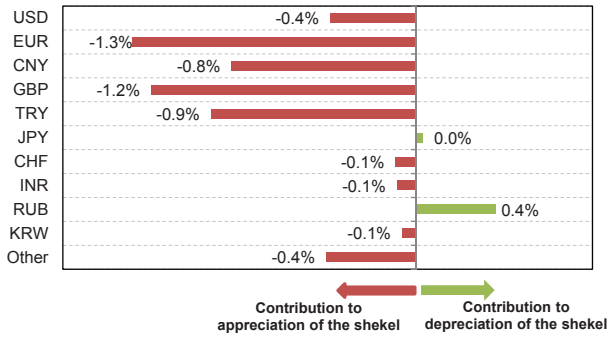


SOURCE: Bank of Israel.

The main contributions to the change in the nominal effective exchange rate were the strengthening of the shekel against the euro and against the British pound.

The shekel strengthened this year against most currencies in the basket that comprises the nominal effective exchange rate. The shekel's appreciation against the euro, which contributed 1.3 percentage points to the change in the rate, and against the British pound, which contributed 1.2 percentage points, were particularly prominent.

Figure 4.3
Contribution of the Change in the Various Currencies[a] to the Change in the Nominal Effective Exchange Rate, 2016
(Appreciation of 4.8 percent)



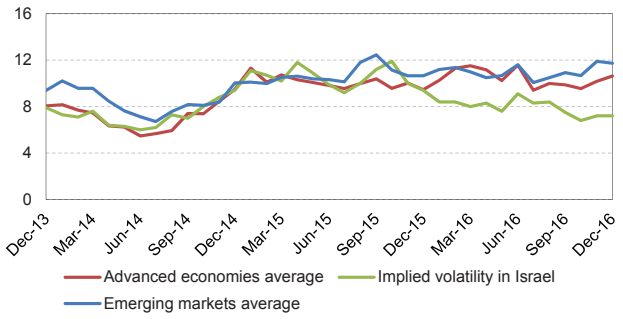
[a] The nine currencies with the highest weight in Israel's trade are specified in the Figure. The others are listed in "Other".
SOURCE: Bank of Israel.

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

In parallel with the appreciation of the shekel, the decline in expected volatility of the shekel exchange rate continued, while the expected volatility indices of most currencies increased.

The average implied volatility[2] in shekel/dollar options declined by about 2 percentage points this year, reflecting low volatility expectations in the shekel exchange rate. Globally, the expected volatility of most exchange rates increased, mainly against the background of the Brexit vote in June and the US elections in November.

Figure 4.4
International Comparison of Average Implied Volatility in Foreign Exchange Options[a]
% (Weekly data, December 2013–December 2016)



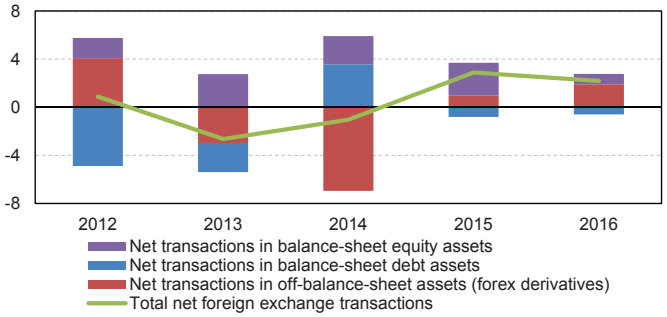
[a] Implied volatility in emerging markets: Mexico, South Korea, Philippines, Poland, Chile, South Africa, Thailand, Hungary, Turkey and Singapore. Implied volatility in advanced economies: Australia, Canada, Japan, UK, Switzerland and eurozone.
SOURCE: Based on Bloomberg data.

2. FOREIGN EXCHANGE PURCHASES AND SALES AGAINST THE SHEKEL

In 2016, nonresidents continued to make net foreign exchange sales and to purchase shekel assets.

The estimate of net investments by nonresidents in shekel assets in 2016 totaled about $2.2 billion, mainly forward transactions for the purchase of shekels (derivatives) and direct investments in equities (equity assets).

Figure 4.5
Estimate[a] of Nonresidents' Net Transactions in Balance-Sheet[b] and Off-Balance-Sheet Shekel Assets, 2012–16
(Transactions carried out during the period, $ billion)



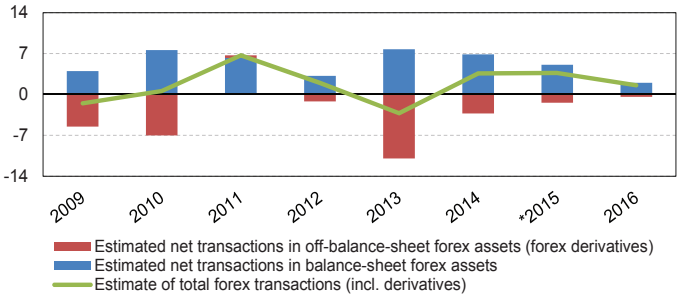
[a] Based on reported transaction data and on an estimate based on balance differentials.
[b] Equity assets: direct investments and financial investments in shares. Debt assets: bonds, *makam*, deposits and financial loans.
SOURCE: Bank of Israel.

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

In contrast to nonresidents, institutional investors made net purchases of foreign exchange. However, the volume of their investments in foreign exchange assets this year was much lower than the volume in previous years.

The volume of investments in foreign exchange assets totaled about $2 billion, and was mainly concentrated in the first quarter of the year. In parallel, the institutional investors partly hedged their foreign exchange investments through net sales of foreign exchange through derivative instruments totaling about $0.4 billion, further to sales in the previous four years.

Figure 4.6
Estimate of Institutional Investors' Net Balance-Sheet and Off-Balance-Sheet Foreign Exchange Transactions, 2009–16
(Transactions carried out during the period, $ billion)



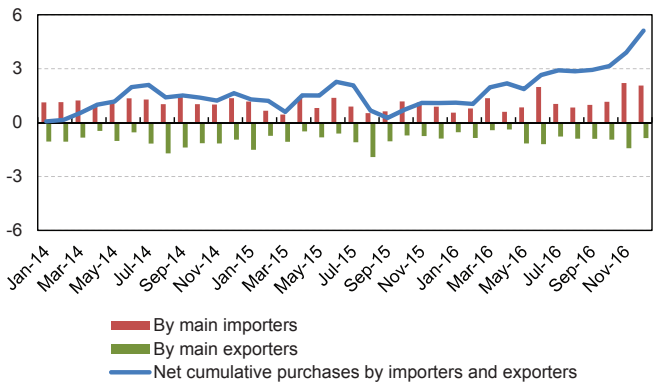
* In January 2015, some of the reporting entities adopted a different method of calculation for the forex derivatives item, which makes it impossible to calculate the changes between the balance at the end of January 2015 and the balance for previous periods. The Figure therefore shows the transactions for February to December 2015.

SOURCE: Bank of Israel.

In 2016, the business sector increased its foreign exchange purchases compared with 2015.

Against the background of the increase in goods and services imports this year, mainly vehicle imports, there was a marked increase in foreign exchange purchases by import companies, with a more moderate decline in foreign exchange sales by export companies.

Figure 4.7
Cumulative Foreign Exchange Purchases (+) by the Large Import and Export Companies
(Monthly data, January 2014–December 2016, $ billion)



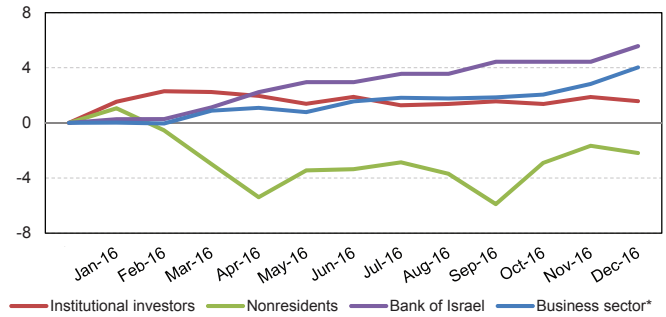
SOURCE: Bank of Israel.

Summing up the activity of the main sectors in the foreign exchange market, net foreign exchange sales by nonresidents, and net foreign exchange purchases by the other sectors, are prominent.

Nonresidents' sales of foreign exchange were concentrated in the first third of the year.

In 2016, the Bank of Israel continued its net purchases of foreign exchange, in accordance with its policy of recent years.

Figure 4.8
Estimated[a] cumulative foreign exchange transactions of the main sectors
(January 2016–December 2016, $ billion)



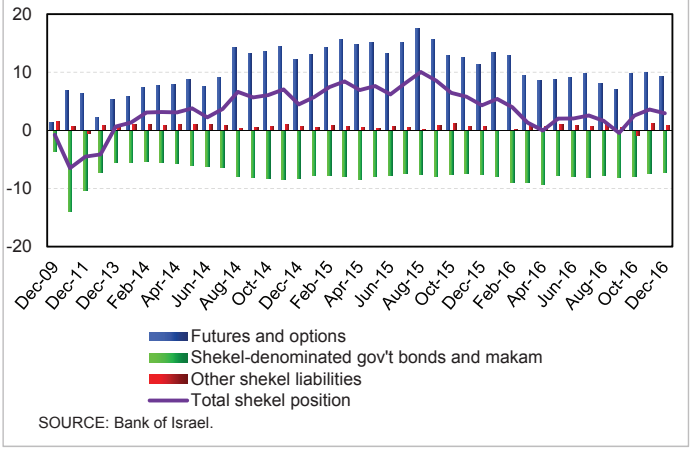
[a] Based on reported transaction data and on an estimate based on balance differentials.
* The main importers and exporters in the economy.
SOURCE: Bank of Israel.

3. EXPOSURES TO THE EXCHANGE RATE BY SECTOR[3]

In 2016, nonresidents' exposure to appreciation of the shekel through debt instruments declined, and remained low throughout the year.

The decline in nonresidents surplus shekel liabilities in debt instruments ($1.4 billion), which began in mid-2015, took place mainly through a decline in the balance of forward transactions to sell the shekel.

Figure 4.9
Nonresidents' Surplus Liabilities (+) of Shekel and Derivative Debt Instruments (Monthly data, December 2009–December 2016, $ billion)



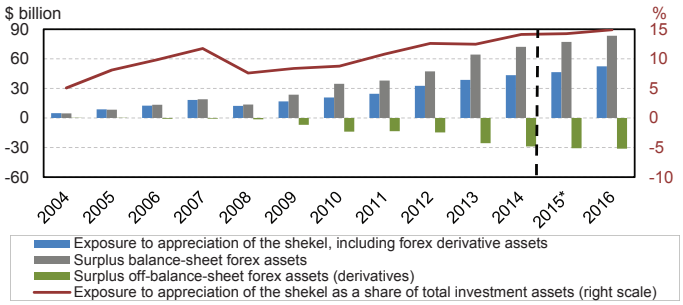
SOURCE: Bank of Israel.

[3] See definitions and explanations of exposures to changes in the exchange rate, at the end of the section.

Institutional investors' outstanding exposure to appreciation of the shekel increased this year, as did exposure to foreign exchange as a share of their assets.

The balance of institutional investors' foreign assets increased by about 12.7 percent, due to a combination of investments in foreign exchange assets and price increases on foreign markets. At the same time, the balance of their shekel assets increased more moderately, leading to an increase (of about 0.7 percentage points) in their exposure to appreciation of the shekel as a share of total assets, to 14.9 percent.

Figure 4.10
Institutional Investors'[a] Surplus Foreign Exchange Assets (+) and Exposure to Foreign Exchange, December 2004–December 2016

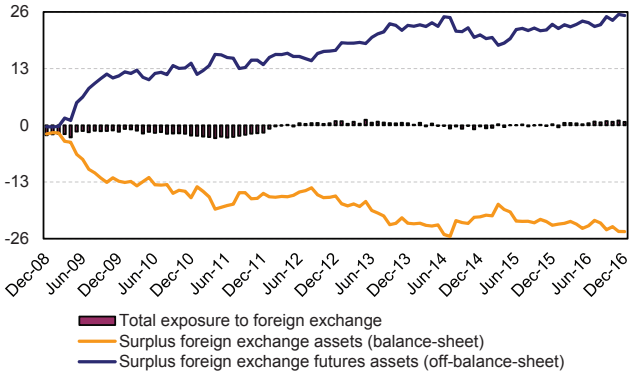


[a] Including provident funds and advanced training funds, pension funds, and "profit-sharing" insurance companies.
* In January 2015 some of the reporting entities adopted a different calculation method for the forex derivatives item, which makes it impossible to compare the balance at the end of January 2015 to the balances for previous periods.
SOURCE: Based on reports from the institutional investors.

The banking system maintained low exposure to appreciation of the shekel.

The banking system's off-balance-sheet assets in foreign exchange (financial derivatives) increased during the year by $2 billion, and was mostly offset by a parallel increase in surplus balance-sheet liabilities ($1.5 billion).

Figure 4.11
Banks' Surplus Foreign Exchange–Balance Sheet and Off-Balance-Sheet Assets (+) and Total Foreign Exchange Exposure, December 2008–December 2016 ($ billion)



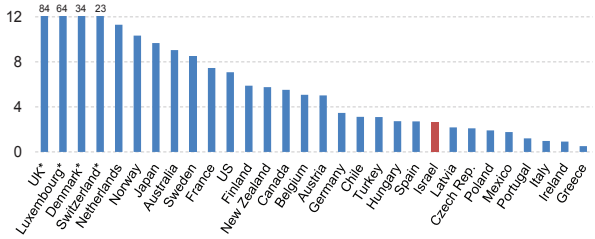
SOURCE: Based on the banks' nonconsolidated monthly balance-sheet figures.

ZOOM IN

THE VOLUME OF FOREIGN EXCHANGE TRANSACTIONS

Average daily trading volume in the foreign exchange market as a share of GDP in 2016 was lower in Israel than in most OECD countries.

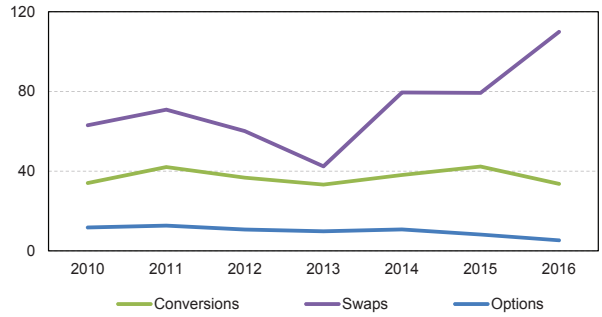
Figure 4.12
Average Daily Trading Volume in the Foreign Exchange Market as a Share of GDP in the OECD, April[a] 2016 (percent)



[a] Once every three years, the BIS conducts a survey of the commercial banks around the world regarding trading data for April of that year, and publishes the data for that month as a representative month.
* For reasons of graphic presentation, the X scale is shown up to 12. The figures for the UK, Luxembourg, Denmark and Switzerland are listed above the graph.

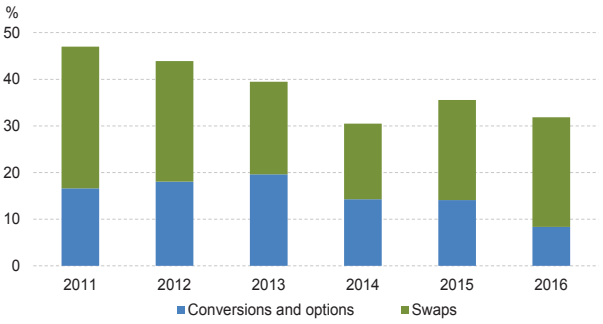
In 2016, the volume of swap transactions increased while the volume of conversion transactions declined slightly.

Figure 4.13
Monthly Average Volume of Transactions in the Foreign Exchange Market by Instrument, 2010–16 ($ billion)



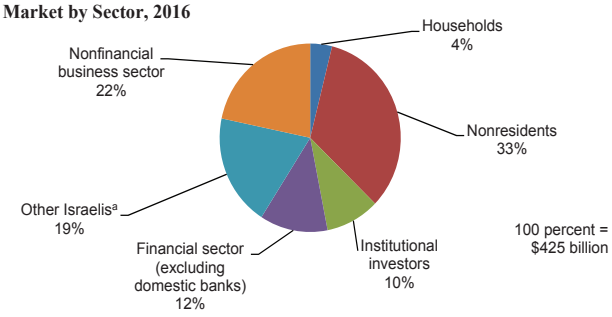
In 2016, nonresidents accounted for 32 percent of total trading volume in foreign exchange.

Figure 4.14
Nonresidents' Relative Share of Total Trading Volume
(Total trading volume in 2016 was $1,797 billion)



In 2016, about half of the volume of transactions in the foreign exchange market (excluding swaps) was carried out by nonresidents and the nonfinancial business sector.

Figure 4.15
Volume of Transactions (Excluding Swaps) in the Foreign Exchange Market by Sector, 2016



[a] Including non-profit organizations, the government, branch customers and unclassified customers.

SOURCE: Based on BIS data and reports by the banks.

Main indicators in the foreign exchange market

	Level[a]					Change				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
Actual volatility of the shekel/dollar exchange rate (moving 20-day average)[b]	5.5%	3.5%	9.4%	5.1%	7.2%	-0.1	-2.0	5.9	-4.3	2.1
Implied volatility of shekel/forex OTC options[b]	9.4%	7.9%	9.4%	9.4%	7.2%	-1.8	-1.5	1.5	-0.3	-2.2
Shekel/dollar representative exchange rate	3.73	3.47	3.89	3.90	3.85	-2.3%	-7.0%	12.0%	0.3%	-1.5%
Shekel/euro exchange rate	4.92	4.78	4.73	4.25	4.04	-0.3%	-2.8%	-1.2%	-10.1%	-4.8%
Dollar/euro exchange rate	1.32	1.38	1.22	1.09	1.05	2.0%	4.6%	-11.8%	-10.4%	-3.3%
Yen/dollar exchange rate	86.16	104.98	119.49	120.41	117.00	11.2%	21.8%	13.8%	0.8%	-2.8%
Nominal effective exchange rate (January 1, 2010 = 100)	97.22	89.80	92.75	86.02	81.89	-0.7%	-7.6%	3.3%	-7.3%	-4.8%
Average daily trading volume - conversions, swaps and OTC options ($ million)	5,223	4,393	6,375	6,382	7,277	-23.8%	-15.9%	45.1%	0.1%	14.0%
Nonresidents' share of trading volume[b]	43.9%	39.5%	30.5%	35.6%	31.9%	-3.1	-4.4	-9.0	5.1	-3.7
Nonresidents' exposure to the exchange rate ($ billion)	4.1	-0.7	-4.5	-4.3	-2.9					
Institutional investors' exposure to the exchange rate ($ billion)	32.7	38.7	43.4	46.5	52.4					
The banking system's exposure to the exchange rate ($ billion)	1.0	0.5	-0.2	0.3	0.8					
Foreign exchange purchases by institutional investors ($ billion)						2.0	-3.2	3.6	[3]3.7	1.6
Foreign exchange purchases by main exporters ($ billion)						-8.5	-9.3	-12.5	-13.8	-10.4
Foreign exchange purchases by main importers ($ billion)						15.5	12.6	14.1	11.9	13.9

[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.

MAIN TERMS

- **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 volatility in the exchange rate 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