Chapter 2

Aggregate Activity: GDP and Employment

- In 2016, GDP grew by 4 percent—much higher than the 2.5 percent growth rate in 2015. Excluding one-off and transitory factors, the growth rate was 3.7 percent—higher than the approximately 3 percent rate over the four preceding years. The main factor in the improvement was the rise in domestic demand by households.
- The substantial improvement in the terms of trade in 2015, combined with lower prices due to enhanced competition in the consumer sector, resulted in a significant increase in real income. This increase, together with the low interest rate environment and the robustness of the labor market, culminated this year in a marked expansion in many items of private consumption—both current consumption (4.7 percent) and durable goods consumption (20 percent). Particularly notable was the increase in vehicle purchases, partly resulting from bringing purchases forward in anticipation of changes in taxation.
- The expansion in domestic demand also affected investment in fixed capital this year, mainly due to residential construction and purchases of vehicles by companies (in particular leasing companies), and also due to some extent to investment in machinery and equipment in sectors serving the domestic market.
- The employment rate continued to climb this year, with increasing signs that the labor market is near full employment—the unemployment rate fell to its lowest point in several decades, the job vacancy rate and the average number of hours per employee rose steeply, and the prolonged downtrend in unit labor cost of production reversed.
- The rapid growth in demand this year reduced the economy's excess production capacity. This contraction, combined with the improvement in the terms of trade, bolstered the forces exerting pressure toward real appreciation of the shekel in recent years, thus increasing the proportion of domestic demand channeled to imports and reducing the current account surplus.
- The most noticeable weakness in economic growth was in exports, which for the past four years have been growing much slower than formerly, as a result of stagnating world trade and appreciation in the real exchange rate.
- A renewed econometric evaluation shows that a real shekel appreciation has a statistically significant negative effect on the quantity of exports, an effect that reaches a peak after approximately two years.

1. MAIN DEVELOPMENTS AND BACKGROUND CONDITIONS

a. Main developments

The growth rate of gross domestic product (GDP) accelerated from 2.5 percent in 2015 to 4 percent in 2016. After excluding the shifts in the timing of vehicle purchases resulting from anticipated changes in taxation, the growth rate was 3.7 percent, higher than the 3 percent basic growth rate[1] that prevailed during the four preceding years. Economic growth for the past four years, and the acceleration in it this year, were due mainly to growth in domestic demand by households, both directly through an increase in demand for private consumption, and indirectly through growth in investment in residential construction, cars purchased by companies, including leasing companies, and to some extent also through investment by sectors benefiting from greater domestic demand. The increase in household demand was driven by a combination of a number of factors: real income rose because the terms of trade improved substantially, starting in 2015; competition in the consumer sector intensified, driving down consumption prices (see Chapters 1 and 3); monetary policymakers in Israel and worldwide have dictated a low interest rate environment since the outbreak of the global economic crisis; and the government this year increased the structural budget deficit, after several years in which it was reduced.

The expansion of GDP was supported to a great extent by the increase in employment. The employment rate among the prime working ages continued to climb this year, reaching 76.6 percent, with a continued rise in the participation rate and a decline in the unemployment rate, which reached its lowest point in several decades. The signs of tightening in the labor market increased this year: the average number of hours per employee rose, the job vacancy rate increased rapidly, and the nominal wage continued to climb, as inflation declined at the same time. Since growth was based on an increase in the labor force, the increase in average productivity slowed and the cost of labor for the manufacturer accelerated. The ongoing downtrend in labor share was consequently reversed this year. In a feedback loop, the robustness of the labor market enhanced activity, because it contributed to growth in demand for private consumption through both a rise in wage income and an improvement in occupational security.

Turning to the supply side of the economy, the long-term processes reducing the potential growth rate continued. The leading such process is slower growth in the prime working age cohorts and the accumulating signs indicating that important growth drivers in the past—the growth in the participation rate, the decline in the natural unemployment rate, and the increase in the proportion of people with post-secondary education—are beginning to be exhausted. The rapid expansion in demand this year therefore led to a reduction in the economy's excess production capacity. The

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[1] The basic growth rate is the growth rate excluding the direct effect of one-off and transitory factors, including the beginning of natural gas production from the Tamar reservoir (in 2013), Operation Protective Edge (in 2014), and the shift of vehicle purchases to the preceding year as a result of anticipated changes in taxation (in 2015 and 2016).

cyclical advantage accumulated by Israel in comparison with its main trading partners eroded in 2014–15, as some of them began to recover from the severe negative impact suffered at the height of the global crisis. However, the erosion halted in 2016, because Israel grew faster than those countries. For this reason, and because the terms of trade improved to a greater extent than those of the trading partners, the forces exerting pressure towards real appreciation of the shekel against their currencies gained momentum, and the proportion of domestic demand channeled into imports rose.

The main weakness in economic growth remained exports, particularly goods exports, because for the past four years, exports have been growing much more slowly than formerly. The cause of this slowdown has been stagnation in world trade, which has made it difficult for Israeli exports to continue driving growth and detracted from the incentive to make fixed investments in sectors exposed to demand from abroad. Another factor was the ongoing appreciation in the real exchange rate. Since exports were weak, and because the proportion of domestic demand channeled to imports increased, the current account surplus declined to some extent.

The main weakness in economic growth remains exports.

Figure 2.1 shows how the main activity aggregates developed in Israel, compared with the average in the OECD countries, and makes it possible to assess the relative development of GDP and its composition since the outbreak of the 2008 crisis. The graphs clearly show that per capita GDP growth in Israel was less affected by the crisis than the average growth in the OECD countries, because domestic demand (consumption and investment) continued to grow. A particularly notable finding is that fixed capital formation in Israel continued to expand, to a great extent as a result

The composition of demand growth in Israel is different than its composition in advanced economies.

Table 2.1
Indicators of economic activity, 1995–2016

					(annual change, percent)	
	1995-2011	2012	2013	2014	2015	2016
GDP	4.0	2.4	4.4	3.2	2.5	4.0
GDP of OECD countries	2.2	1.3	1.2	1.8	2.0	1.6
Per capita GDP in Israel	1.8	0.5	2.4	1.2	0.5	2.0
Per capita GDP in OECD countries[a]	1.5	0.7	0.6	1.3	1.6	1.1
Exports excluding diamonds and startups	7.6	0.9	2.0	4.7	-2.7	1.4
Domestic uses	3.3	3.7	2.8	4.1	3.9	5.8
Unemployment rate (ages 25-64, percent)	8.5	5.9	5.4	5.0	4.5	4.1
Real wage per employee post	0.8	0.5	0.9	1.1	2.9	2.9
Current account surplus (percent of GDP)	0.5	0.6	3.4	3.9	4.6	3.9
Real effective exchange rate[c]	0.1[b]	5.3	-5.7	-1.3	-0.1	-1.9

[a] Data for 2016 are based on estimates.
[b] The data relate to the years 1999–2011.
[c] An increase refers to depreciation.
SOURCE: Based on Central Bureau of Statistics, OECD, and IMF.

Figure 2.1
Development of Aggregate Activity and the Labor Market in Israel Compared With the OECD Average[a], 2002–16
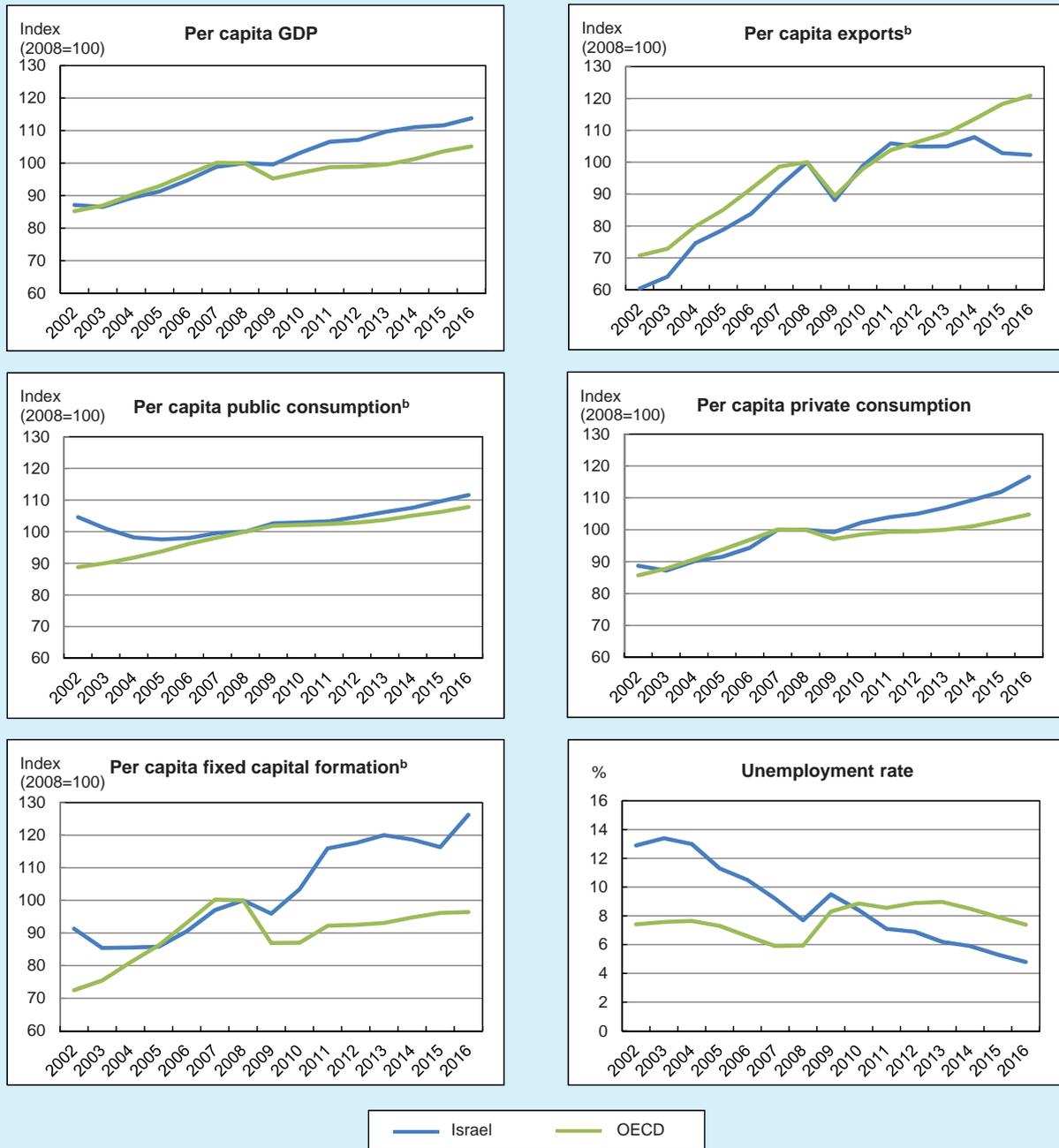
[a] Simple average.
[b] Israeli exports—excluding diamonds and startup companies; Public consumption—excluding defense imports; Fixed capital formation—excluding ships and aircraft.
SOURCE: Based on OECD Economic Outlook (November 2016) and Central Bureau of Statistics.

of residential construction, while investments in the rest of the world stagnated. However, in contrast, Israeli exports lagged behind the OECD average.[2]

Because Israel is overly reliant on growth in domestic uses, and because producing them is more labor-intensive than production for exports, the unemployment rate continued falling almost continuously after the crisis, as it did in the preceding years. In contrast, after the crisis, the unemployment rate in the other OECD countries declined only later and gradually (the average unemployment rate in the OECD is still higher than it was before the crisis).

Taken as a whole, these developments indicate that the economy is in a good macroeconomic position, but there is no assurance that the current growth rate will persist in the coming years. First, growth accelerated, among other things, because consumers brought forward their purchases of vehicles to 2016 because of tax considerations, but this is a transitory contribution. Second, the terms of trade improved this year, and contributed to an acceleration in basic growth. This improvement, however, cannot continue in the long term, and it appears at this stage that it has already come to a halt, due to the rising trend in oil prices. Third, growth in domestic demand has depended for several years on the very low interest rates put in place by monetary policy in Israel and worldwide. There was considerable fiscal expansion again this year, because the government increased the structural deficit in its budget. These policy circumstances, however, are not expected to persist in the long term. Finally, signs are increasing that the Israeli economy has reached an environment of full employment in the labor market, with a rather low surplus in production capability. In addition, the rate of expansion in potential GDP has slowed in recent years, and in the absence of significant policy measures, is projected to continue declining in the coming decade (due to demographic changes taking place in the economy).

There is no guarantee that the economy will be able to persist at the current growth rate over time.

b. Background conditions

Background conditions abroad[3]

The development of global growth and world trade this year did not support economic growth. After improving for several years, the growth rate in advanced economies slowed this year, especially in the US (Table 2.2). Growth in world trade was also low, at only 1.9 percent. At the same time, there was continued worldwide discussion of the factors slowing world trade, in addition to slow economic growth.[4] According to a new assessment by the International Monetary Fund,[5] as much as 75 percent of the slowdown in world trade since 2012 is attributable to cyclical factors, principally a global decline in investments. However, there are also structural factors: measures

World trade grew by a slow pace this year.

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[2]   In terms of per capita exports, Israel's underperformance began as early as 2012. In terms of total exports, underperformance began in 2015 (see Section 2c).

[3]   These conditions are discussed extensively in Section 2 of Chapter 1.

[4]   An extensive discussion of the various explanations for weakness in world trade appears in Bank of Israel (2016) Annual Report for 2015, Box 2.1: The Weakness of World Trade.

[5]   See "Global Trade: What's Behind the Slowdown," *IMF World Economic Outlook*, October 2016.

aimed at protecting domestic production have increased in recent years, there has been less liberalization in international foreign trade than in the past, and the expansion process in vertical specialization was exhausted.[6] In addition to the slowing of global activity, uncertainty about future growth and its character increased this year as a result of several significant political events: the UK voted to withdraw from the European Union (Brexit) and there was a change in administrations in the US.

Table 2.2
Global economic developments, 1995–2016

					(annual change, percent)	
	1995–2011	2012	2013	2014	2015	2016[a]
Advanced economies						
GDP	2.4	1.3	1.2	1.8	2.0	1.6
Trade	6.1	1.7	2.7	3.8	4.0	2.0
US						
GDP	2.6	2.2	1.7	2.4	2.6	1.6
Eurozone						
GDP	1.8	-0.9	-0.3	1.1	2.0	1.7
Developing economies						
GDP	6.3	5.3	5.0	4.6	4.0	4.1
Imports	9.3	4.7	4.9	4.0	0.3	1.8
World trade	7.0	2.8	3.5	3.8	2.7	1.9

[a] Data for 2016 are based on estimates.

SOURCE: Based on OECD, BEA, Eurostat and IMF.

Domestic developments this year were impacted by last year's decline in global energy prices.

In mid-2014, global commodity prices began to decline dramatically, particularly energy prices. The decline in the price of oil continued until early 2016, and at its peak exceeded 50 percent. The trend reversed during 2016, but due to the base effects, the average price of a barrel of oil this year was 16 percent lower than in 2015. Furthermore, it is likely that the decline in the prices of imported goods does not immediately affect economic activity, and some of this year's developments were therefore derived from it.

Domestic background conditions

In the past two years, GDP prices have increased by more than consumption prices.

One of the main background conditions for activity over the past two years includes the development of relative prices in the economy, particularly the GDP deflator in comparison with consumption prices. The changes in the GDP deflator reflect changes

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[6] In vertical specialization, the production chain is composed of many stages taking place in different countries. The full value of all transfers of goods between countries is listed in world trade, although each stage contributes only a little to the value added.

in the added value of domestic production resulting from changes in prices, not the quantity of production. Over the past two years, the GDP deflator has increased by a cumulative 4.5 percentage points more than consumption prices, and the ratio of prices reached its highest point in at least 20 years. Thus, real private income—deflated by consumption prices, the prices reflecting the cost of living from the perspective of households—grew 5-6 percent a year in the past two years, and these rates are higher than the rate of expansion resulting only from GDP growth. This also facilitated a rise in real wages (from the employees' perspective), combined with a more modest increase in the cost of labor (from the employers' perspective).

In order to analyze the causes of the rise in the ratio of GDP prices to private consumption prices, the development of prices of the various components of GDP (investment, public consumption, exports and imports[7]) will be examined, and the contribution of the changes in them to this ratio. A statistical examination shows that changes in the economy's terms of trade—the ratio of export prices to import prices— are strongly correlated with the changes in the ratio of GDP prices to consumption prices: they explain over 70 percent of the variance in the annual changes that have occurred since 1995 in the ratio of output prices to consumption prices. The export and import prices (in shekel terms) vary from year to year, to a great extent as a result of changes in the exchange rate, particularly of the shekel against the dollar.[8] Most of the change that resulted from the exchange rate, however, affected export and import prices the same way, and they therefore had only a slight effect on the ratio of output prices to consumption prices. Over the past two years, the changes in import and export prices deviated from the changes resulting from their weighted exchange rate, and thus together they contributed the bulk of the increase in the ratio of GDP prices to consumption prices (Figure 2.2). Import prices (in shekels) declined by approximately 3.6 percent in each of the past two years. In 2015, they fell because of the sharp drop in the global price of oil, and in 2016 because of shekel appreciation, the base effect of the decline in oil prices, and decreases in the prices of other import elements. As to export prices, they rose markedly last year (8.2 percent in services and 2.7 percent in goods), and remained almost unchanged this year. This is an unusual development, given the changes in the weighted exchange rate for export prices (a 3.5 percent depreciation last year and a 2 percent appreciation this year). The background to the increase in export prices is discussed at length in Section 2c.

In the past two years, changes in import and export prices deviated from the changes derived from the exchange rate.

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[7]   In contrast to the other components, an increase in import prices in itself puts downward pressure on output prices.

[8]   For the analysis, we used weighted exchange rates based on the shekel-dollar, shekel-euro, and shekel-pound sterling exchange rates for exports and imports (separately). The weight of each currency was taken from the regression coefficients of the quarterly data from 2003–16, in which the dependent variable is the rates of change in import/export prices in shekels, and the explanatory variables are the rates of change in these three exchange rates; in the equation for imports, we also included oil prices. In the export (import) prices, the weight of the dollar was 69 percent (63 percent) and the weight of the euro was 23 percent (29 percent). The dollar also received a relatively high weight in regressions for data with annual frequency.

Figure 2.2
Rate of Change in the Ratio Between the GDP Deflator and Private Consumption Prices and Contribution of the Various Components[a], 2003–16

Percentage Points
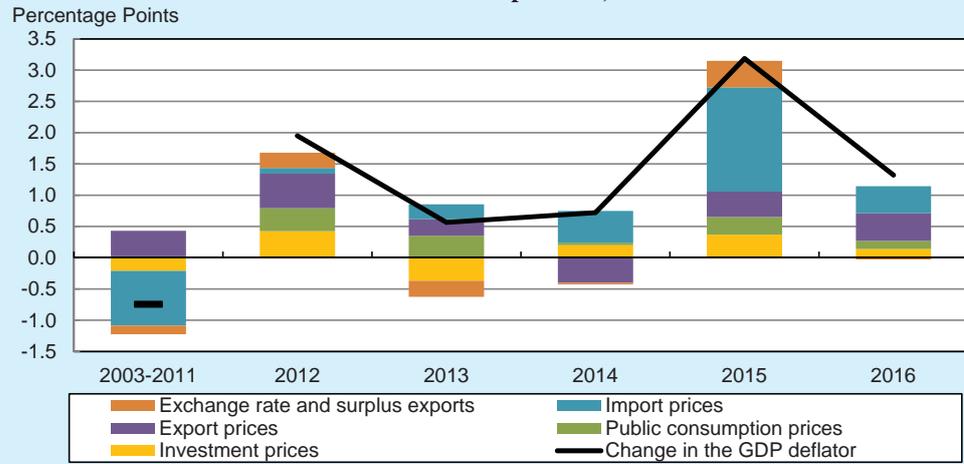
[a] GDP deflator, investment and public consumption are given relative to private consumption prices. Export and import prices are given relative to the weighted exchange rates based on the NIS/$, NIS/€, and NIS/£ exchange rates. The weight of each currency is obtained through a regression of quarterly data from 2003–16, where the dependent variable is the rate of change in import/export prices in shekels, and the explanatory variables are the rates of change in the three exchange rates. We included oil prices in the import equation. The total contributions of export prices, import prices, and the exchange rate and surplus exports approximates the contribution of the terms of trade to the ratio between the GDP deflator and consumption prices.
The difference between (1) the rate of change in the ratio between the GDP deflator and consumption prices and (2) the total contributions is equal to the contribution of the change in the composition of uses.
SOURCE: Based on Central Bureau of Statistics.

Since 2012, private consumption prices have not been increasing as much as those of other uses.

Another factor contributed to the rise in the ratio of GDP prices to consumption prices in recent years, although to a lesser extent than the terms of trade—the downward pressure on prices, especially in the private consumption sector (See Chapters 1 and 3).[9] Figure 2.2 indicates that since 2012, following the social protest, the prices of the other domestic uses (investment and public consumption) have made a positive contribution in almost every year. This means that the prices of the other domestic uses rose more than the prices of private consumption, in contrast to the situation in the group of years before 2012.

The low interest rate of recent years supported domestic demand.

The Monetary Committee continued to dictate accommodative monetary policy. It kept the interest rate near zero, at 0.1 percent, and incorporated forward guidance in the interest rate announcements: the Monetary Committee noted that it assessed that monetary policy will remain accommodative for a considerable time. The real interest rate for the year remained negative, and the long-term (10-year) real return remained low for most of the year, at approximately 0.4 percent. The low interest rate environment prevailing in recent years supported domestic demand by reducing the cost of credit, detracting from the incentive to save and enhancing the "wealth effect"

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[9] These also push down GDP prices, but to a lesser extent than consumption prices, because consumption is only one element in output uses.

among the public by increasing the value of housing and the assets portfolio.[10] While the Bank of Israel continued accommodation through the interest rate, it reduced its foreign exchange purchases aimed at moderating the forces exerting appreciation pressure on the shekel. The volume of these purchases was reduced this year, compared with their volume in the two preceding years (an extensive discussion of monetary policy appears in Chapter 3).

The government elected in mid-2015 operated this year for the first time in the framework of a budget it had approved. Public spending increased this year by a rate similar to the rate of growth in actual GDP and potential GDP—approximately 5 percent (in current prices). An examination of its various parts indicates that public consumption (wage payments, purchases, and public capital depreciation) grew by a more moderate 4.1 percent, and in fixed prices, its growth was lower than GDP growth (Table 2.3). The proportion of spending channeled into public investments grew, however, and these contributed to the rise in fixed capital formation in the economy. In addition to the rise in spending, statutory taxes were cut by 0.3 percent of GDP (corporate taxation and the base effect of the VAT cut in mid-2015). This increased the actual general government budget deficit by 0.5 percent of GDP (to 2.2 percent of GDP this year) and the structural deficit by 0.8 percent of GDP (an extensive discussion of fiscal policy appears in Chapter 6). This array of effects indicates fiscal expansion, which contributed to the growth in domestic demand.

Changes in the environmental tax formula took effect at the beginning of 2015 and 2017, raising the cost of some vehicles. Consumers and businesses therefore brought forward their purchases of vehicles to December 2014 and December 2016, "at the expense of" purchases that otherwise would have been made in early 2015 and early 2017. These timing shifts (fewer purchases in 2015 and more purchases in 2016) contributed at least 1.2 percentage points to import growth and 0.3 percentage points to GDP growth. Israel imports vehicles and does not produce them, but the increase in vehicle purchases nevertheless affects GDP through two channels. The most important of these is indirect taxation on imports (including VAT), which constitutes an average of 40 percent of the price of vehicles. Starting in 2006, the indirect taxes on imports have been considered part of GDP, rather than part of imports, for two reasons. First of all, the indirect taxes are paid by the end consumer (in this case, households), and are not included in the income of other economies (in contrast to the cost of the imported vehicles at the port terminal gate). Second, GDP is supposed to reflect the income of all sectors in the economy, including the government.[11] In addition to taxation, purchases of vehicles also contribute to growth through the profits made by

> Fiscal expansion contributed this year to expansion of domestic demand.

> The public shifted the timing of vehicle purchases due to tax considerations, which contributed to a temporary acceleration in growth.

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[10] Kahn M. and S. Ribon (2014), "The Effect of Home and Rent Prices on Private Consumption in Israel—A Micro-Data Analysis," *Israel Economic Review*, 11(1), pp. 97-144.

[11] The Central Bureau of Statistics changed the definition in order to adapt the calculation of GDP to the prevailing worldwide calculation. Additional details appear on the Central Bureau of Statistics website under the heading, "Changes in the Presentation of the National Accounts, http//:www.cbs.gov. il/hodaot2006n/descriptions/change_na06.pdf.

importers (which are domestic companies) and through marketing and commercial margins related to the sales of vehicles.

It should be noted that even when the element resulting from the timing of taxation is excluded, purchases of vehicles have been increasing persistently by significant rates. This development has been supported in recent years by several cyclical and long-term factors: the low interest rate, appreciation of the shekel against the euro, the growth in real income, the decline in the price of fuel (a complementary product for vehicles), lower taxes on vehicles, and the greater distances of residential areas from city centers.

2. AGGREGATE DEMAND AND USES

a. The composition of foreign and domestic demand

The growth rate of demand accelerated this year primarily due to private consumption.

Aggregate demand for final uses grew by 5.2 percent this year, after four years of moderate expansion (about 3 percent). The growth rate declined from 2012 to 2015, mainly because the exports component was exposed to the moderate demand abroad (Figure 2.3 and Table 2.3). During these years, the contribution of investment to growth in uses also fell, while domestic demand for private and public consumption continued growing at a steady pace. The growth in demand accelerated this year, above all as a result of faster growth in both the private consumption and the fixed capital formation components. The demand for these uses did not take the place of other uses (public consumption, exports), which maintained approximately the same

Figure 2.3
Total Increase in Uses and Contribution of the Components, 2008–16
(percentage points)
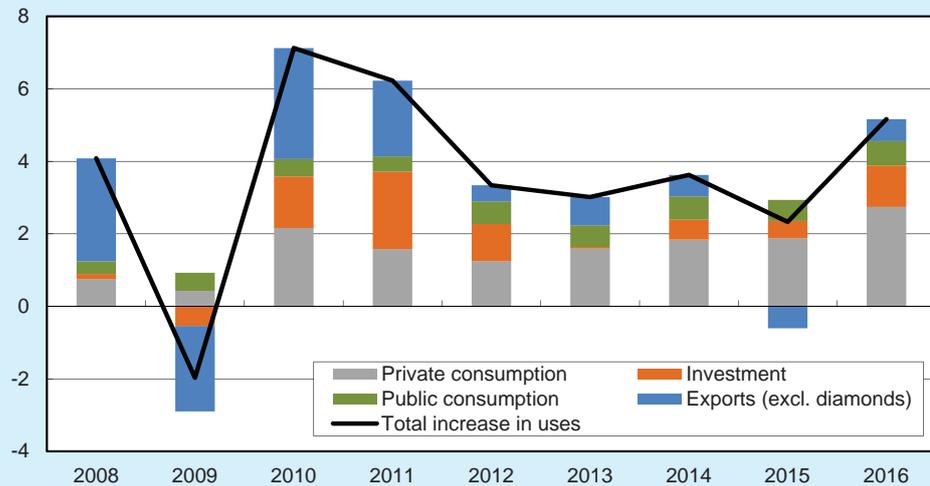
SOURCE: Based on Central Bureau of Statistics.

average growth rate as in the four preceding years. The growth rate of uses was therefore higher than in previous years.

The acceleration of growth in demand was reflected on the sources side in faster growth in both GDP and imports (Table 2.3). It could be said, however, that the composition of demand was tilted toward imports, since growth in imports accounted for about 30 percent of the growth rate in sources this year, even though it constitutes only about 22 percent of them on the average. This is because the economy is close to full employment, and because of the relative decline in prices of imports.

The expansion in GDP and imports did not fully reflect the faster growth in uses, and investment in inventory declined this year by 0.6 percent of GDP. This decline may indicate that businesses were surprised by the high demand, and especially by the jump in private consumption, or that they refrained from expanding their production capacity, whether because they were unable to do so (i.e., lack of excess production capacity), or because they expected the faster growth to be temporary.[12]

> The growth rate of imports was greater than that of total sources.

Table 2.3
Sources and uses, 1995–2016

					(annual change, percent)	
	1995–2011	2012	2013	2014	2015	2016
GDP	4.0	2.4	4.4	3.2	2.5	4.0
Imports (excluding ships, aircraft, diamonds and defense imports)	5.0	5.0	-2.9	4.2	1.4	8.2
Domestic uses	3.3	3.7	2.8	4.1	3.9	5.8
of which: Private consumption	4.1	2.9	3.8	4.3	4.3	6.3
Fixed capital formation (excluding ships and aircraft)	2.6	3.3	4.0	0.8	0.0	10.7
Investment in inventory as a percentage of GDP (excluding diamonds and startups)	0.1	0.5	0.0	0.0	0.4	-0.2
Public consumption (excluding defense imports)	2.2	3.3	3.3	3.3	4.0	3.8
Exports (excluding diamonds and startups)	7.6	0.9	2.0	4.7	-2.7	1.4

SOURCE: Based on Central Bureau of Statistics.

[12] It is also possible that the changes in inventory reflect statistical errors in measuring the various accounting items, and that these errors did not offset each other.

b. Domestic uses

Private consumption

Consumption grew more this year than to the extent corresponding to income and wealth variables.

The pace of growth in private consumption accelerated markedly this year, reaching a high rate of 6.3 percent. As a result, private consumption continued to drive the growth in demand. Impressive growth rates of higher than 4 percent prevailed in almost all consumption items—both goods designated for current consumption and durable goods (Table 2.4). Figure 2.4 displays the actual growth rate in private consumption (in real per capita terms), together with its value as predicted by a statistical analysis of the factors of income and wealth that explain private consumption in Israel.[13] The figure indicates that consumption this year grew beyond the degree corresponding to the increase in the income and wealth variables—an atypical occurrence.[14] The columns in the graph represent the contribution of the various variables to the (forecasted)

Figure 2.4
Growth in Real Per Capita Private Consumption: Actual Value, Fitted alue, and Contribution of the Main Explanatory Variables to the Fitted Value (in annual terms), 1995–2016 (percent)
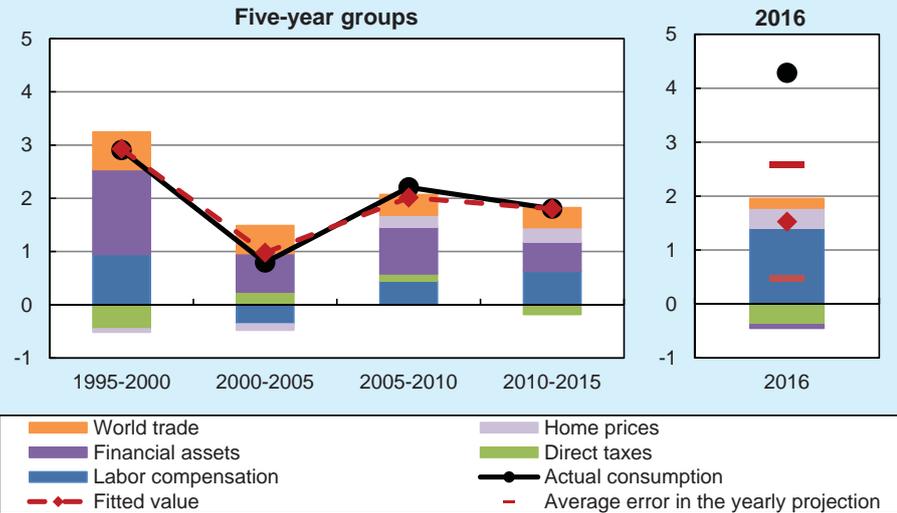
SOURCE: Based on A. Barak (forthcoming), "The Private Consumption Function in Israel," Discussion Paper, Bank of Israel Research Department.

[13] See Barak, A. (to be published), "The Private Consumption Function in Israel," Discussion Paper, Bank of Israel Research Department.

[14] The conclusion that 2016 was an exception cannot be reached from the columns for the preceding years, because they are displayed in groups of five. It can be concluded from the range resulting from the average error in the annual forecast (root-mean-square deviation, RMSE), which we display around the forecast for 2016. The extent to which the actual increase deviates from the forecast is outside the range this year, and the deviation was larger than all the observed deviations in the sample period (i.e., in 1995–2015).

growth in private consumption. The primary contribution was from the rise in the real labor compensation (the statistical analysis showed that the marginal propensity to consume out of labor income was about 0.3). The pronounced decline in the past two years in consumption prices increased the public's purchasing power, even though the average nominal wage in the economy rose only moderately. This development, combined with the continued rise in the employment rate, contributed to an increase of approximately 6 percent in labor compensation and disposable private income (Table 2.4). In addition to the income variables, the continued boom in housing prices also supported the increase in consumption. In contrast to previous years, however, there was no increase this year in the net (per capita) value of the public's financial assets portfolio, which therefore did not contribute to private consumption.

Table 2.4
Domestic demand: Background conditions and main indicators of its development, 1995–2016

						(annual change, percent)
	1995–2011	2012	2013	2014	2015	2016
Private consumption	4.1	2.9	3.8	4.3	4.3	6.3
of which: **Current consumption**	3.6	3.5	2.9	3.2	4.4	4.7
Durable goods consumption	6.1	-2.4	7.0	10.4	0.2	20.0
Gross private disposable income from all sources	3.9	3.6	5.3	4.4	5.2	6.0
Credit to households	7.8[a]	6.2	6.5	6.2	6.6	6.7
Real 1-year interest rate (government bonds, level)	3.6	0.2	-0.3	-0.7	-0.5	-0.1
Value of the public's financial assets portfolio	11.3	7.8	9.0	6.9	4.3	3.6
Consumer Confidence Index	3.8[b]	-3.2	-4.3	2.7	3.4	1.9
Fixed capital formation (excluding ships and aircraft)	2.6	3.3	4.0	0.8	0.0	10.7
Credit to the business sector	6.2[a]	4.8	-1.3	0.7	2.1	3.5
Real 10-year interest rate (government bonds, level)	4.1	2.1	1.7	1.0	0.5	0.4
Purchasing Manager's Index (level)	51.8[b]	43.2	47.2	48.6	50.2	52.3
Change in capital utilization in manufacturing (net balance from the Bank of Israel Companies' Survey)	-2.8	-0.1	-3.2	-2.1	-9.0	1.5
Public consumption excluding defense imports	2.2	3.3	3.3	3.3	4.0	3.8
Total taxes (percentage of GDP)	33.0	29.5	30.1	30.5	30.7	30.6
General government budget deficit	2.9	3.4	3.0	2.3	1.6	1.9
Change in the structural deficit in the government budget		0.5	-0.2	-0.8	-0.6	0.8
Change in the cyclically adjusted deficit		1.9	-0.1	-0.8	-1.2	0.5

[a] The figure relates to the years 2005–2011.

[b] The figure relates to the years 2002–2011.

SOURCE: Based on Central Bureau of Statistics, the "Globes-Smith" Consumer Confidence Survey, the Bank of Israel Companies Survey, and the Purchasing Managers Indices compiled by Bank Hapoalim and the Purchasing Managers Association.

The labor market's resilience and the low interest rate contributed to excess growth in private consumption.

Approximately half of the difference between the actual increase in consumption and the projected increase derived from households increasing their purchases of vehicles to an exceptional degree (see Section 1b). It is possible that the rest of the difference results from economic developments that were exceptional compared with the past, and because the statistical analysis was based on the period beginning in 1995, it did not find that these developments had a significant explanatory effect. These phenomena include, first of all, the solid state of the labor market, as is reflected in the low unemployment rate. This supports occupational security and reduces savings motivated by caution. The second development concerns the very low real interest rate environment in Israel and worldwide. In recent years, this environment has supported a rise in consumption through two channels: (a) it leads to expansion in credit, especially non-housing credit, which grew 6 percent this year; and (b) it maintains the level of demand in the economy, which in turn supports the strength of the labor market and income. The effect of low interest rates on consumption, however, is based on a mechanism that is limited in time: it transfers consumption from the future to the present, and also generates capital gains in the short term (because asset prices rise). In the long term, however, it leaves savers with low returns that will require them to increase their savings (in order to accumulate an adequate old-age pension, for example). It is difficult to determine which stage of this process the economy has now reached.

The private saving ` rate declined only slightly this year.

In general, the analysis shows that the rapid rise in private consumption this year is partly due to transitory factors, and is therefore not likely to persist in the coming years. It has not, however, created conditions for a sharp correction in consumption and GDP in the coming years, because it rests on growth in real income, not just a "wealth effect" or an increase in credit. Accordingly, the rate of private savings declined only slightly this year.

Investment

Gross domestic investment grew by 7.2 percent this year, due to impressive growth of more than 10 percent in investment in fixed assets. To a great extent, this growth reflects the response of firms to increased demand from households for housing, vehicles, and domestic services.

Investment in machinery and equipment expanded in domestic market oriented industries.

Investment in the principal industries, which constitutes approximately two-thirds of fixed investment, expanded by 11.8 percent this year, following four years of negligible growth. This expansion resulted from three main items (Figure 2.5): (a) investment in the new plant of a company in the electronic components industry accelerated in the second half of the year, reflected in massive procurement of imported machinery and equipment. This investment is likely to have the effect of increasing exports and GDP only after the plant begins operating; (b) in accordance with increased demand for vehicles for private consumption, companies this year also increased their procurement of vehicles. Some of this increase was due to procurement of vehicles for business and commercial purposes, but it is likely that a considerable proportion

of it was due to purchases of passenger vehicles by leasing companies designated solely for private consumption;[15] (c) investment in machinery and equipment grew in domestic market-oriented sectors, in which there was a major rise in demand for their output. Expansion was concentrated in the construction industry and the information and communications industry. In contrast to investment in these sectors, investment in the other manufacturing industries has not been growing since 2010–11 (Figure 2.5), indicating that they do not expect global activity to recover quickly, and that machinery and equipment are not creating a constraint on supply in the manufacturing industry. To the extent that manufacturing had to increase its output through the use of capital, it did so this year by increasing utilization, after three years in which utilization declined (Table 2.4). Stagnation in investment is part of a global phenomenon, which is consistent with the very substantial slowing of growth in international trade, and in fact also feeds it.

Active investment in residential buildings, which constitutes about one-third of fixed investment, grew this year by its highest rate in five years—8.6 percent—after growing by a moderate 2 percent in 2015, and by 6.5 percent in 2012–14. This year's growth was a result of an increase in the annual number of building starts from about

Investment in residential buildings grew this year at the fastest rate in 5 years.

Figure 2.5
Total Increase in Fixed Capital Formation and Contribution of Components, 2008–16
(percentage points)

SOURCE: Based on Central Bureau of Statistics.

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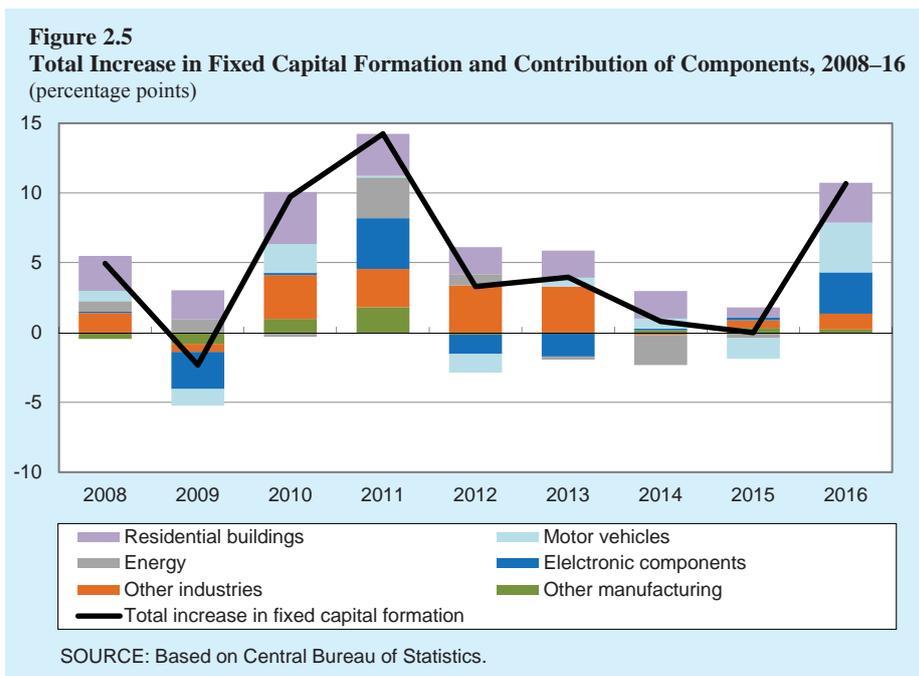
[15] When households lease vehicles, the lease is recorded in private consumption according to its current usage value. When companies, including leasing companies, sell used vehicles to households, the transaction is recorded as a negative investment in fixed assets, and also as private consumption of a vehicle.

47,500 apartments in 2013–14 to 52,000 in the past two years[16] (a detailed description of the housing market appears in Chapter 9).

Investment in (residential and non-residential) construction increased construction sector product (added value) by 5.1 percent this year. Its direct contribution to GDP growth[17] amounted to 0.3 percentage points, similar to its average contribution in 2008–13 (Table 2.5)—a contribution that helped to limit the adverse impact to growth caused by the global crisis.[18] In 2008–13, however, the contribution was divided equally between investment in residential construction and investment in other construction work. This year, 85 percent of the contribution came from the increase in residential construction activity. Furthermore, if the indirect contribution is taken

<div style="color: #5a9bd4; text-align: right;">The construction industry contributed about 0.5 percentage points to GDP growth this year.</div>

Table 2.5
Investment in construction, the industry's output and its contribution to GDP growth, 1997–2016

(annual change, percent)

| Period | GDP | Annual average growth | | | Contribution of construction to growth | | Share of construction in GDP[c] |
		Construction industry output	Investment in residential construction	Investment in other construction	Direct[a]	Total[b]	
1997–2007	3.9	-0.1	-1.9	3.0	0.0	0.0	4.2
2008–13	3.6	7.5	8.8	8.9	0.3	0.6	5.3
2014–15	2.8	1.8	4.3	-1.2	0.1	0.2	5.2
2016	4.0	5.1	8.1	2.1	0.3	0.5	5.3

[a] The direct contribution to growth is equal to the growth rate of the construction industry's output multiplied by its share in GDP at the end of the previous period.

[b] Estimated total contribution to growth is equal to the direct contribution multiplied by 1.7.

[c] End of period.

SOURCE: Based on Central Bureau of Statistics.

into account, the estimated contribution of the industry to growth increases to 0.5 percentage points (of which 0.4 percentage points are from residential construction). The indirect contribution takes into account that companies in the construction industry buy intermediate inputs from other industries that also generate added value for the economy. These are mainly manufacturing industries (production of metal products and production of rubber and plastic products) and the trade and professional

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[16] Central Bureau of Statistics data indicate that housing starts totaled 52,400 units in 2016. However, based on past experience, it is likely that this number will be revised slightly upward over the coming year. See "Significant Revisions in Estimating Housing Starts," an excerpt from Bank of Israel (2017) "Fiscal Survey and Selected Research Analyses".

[17] This is derived from the growth of output in the industry and its weight in total GDP.

[18] See Bank of Israel (2015), "The Construction Industry and its Contribution to Growth," *Recent Economic Developments (140)*, April–September 2015.

services industries (architecture and engineering).[19] When the industrial production index designated for construction inputs is examined, it is found to have grown by an average of 3.5 percent a year since 2012, while total industrial production has stagnated. It should be noted that demand for construction of housing also contributes to aggregate activity through demand for complementary products for housing (including furniture and electrical appliances), and through marketing activity at the end of the production chain. It is difficult, however, to quantify this contribution.

c. Global demand and exports

Exports (excluding diamonds and startups) grew by 1.4 percent this year. Growth in exports has moderated in recent years (in comparison with the years before 2012), and as shown by Figure 2.3, this slowing explains a large proportion of the moderation in the growth of aggregate demand since 2012. To a great extent, the slowing of export growth was affected by the only moderate increase in world trade due to the prolonged global crisis (see Section 1.b and Box 2.1 in the Bank of Israel Annual Report for

The slowdown in exports was impacted by world trade growing at only a moderate rate.

2015). Figure 2.6 indicates that from the outbreak of the crisis until 2014, Israeli exports followed the development of world trade, and increased to a larger extent than imports by OECD countries. Weakness in export growth last year greatly outstripped the weakness of world trade, and exports grew this year at a similar rate.

In the end, the economy's prosperity from exports depends on its value, regardless of whether it increases as a result of a rise in quantity or price. In contrast to the quantitative perspective described above, an examination of the value of exports[20] shows that between the outbreak of the crisis and 2014, the cumulative increase

Figue 2.6
World Trade, Imports to OECD Countries, and Exports from Israel (Goods and Services), 2008–16

Volume index (2008=100)

Exports from Israel[a]
World trade
Imports to OECD countries
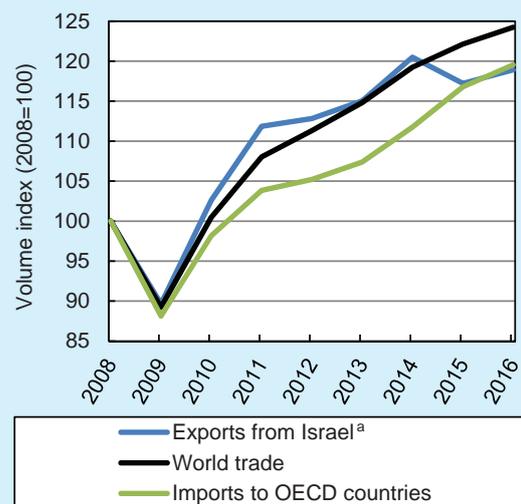
[a] Excluding diamonds and startup companies.
SOURCE: Based on Central Bureau of Statistics and OECD.

Excess increase in prices of Israeli exports led to excess increase in the value of exports.

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[19] The input-output tables for 2006 show that total output in the construction industry (including intermediate inputs and imports) is 2.3 times the added value in the industry, and the total added value in the industry (taking into account the average added value in sectors supplying intermediate inputs to the construction industry) is 0.73. The product of these two amounts shows that the industry's total contribution to growth is 1.7 times the estimate for its direct contribution.

[20] Value of exports: exports in current prices, deflated by the Consumer Price Index. Deducting the Consumer Price Index is designed to show how exports improve the purchasing power of the domestic consumer, and to facilitate an international comparison.

Figure 2.7
Real Effective Exchange Rate and Export Indices in Current Prices, Adjusted for CPI, Israel and OECD Countries[a], 2008–16

Index
(2008=100)
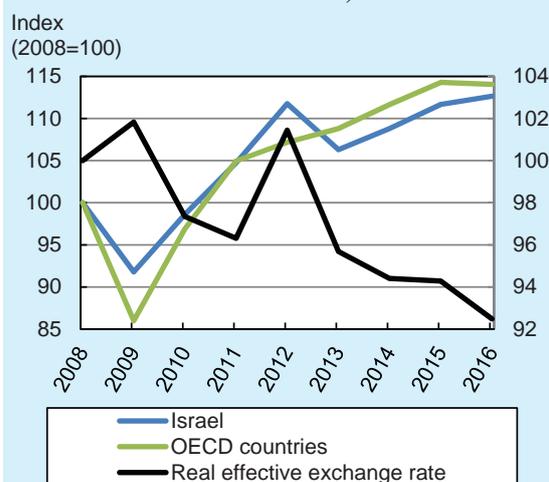
[a] Israel - excluding diamonds and the sales of startup companies. OECD - weighted average.
SOURCE: Based on Central Bureau of Statistics and OECD Economic Outlook (November 2016).

in exports was about 2.5 percent less than the average in advanced economies (Figure 2.7).[21,22] The real exchange rate appreciated by about 6 percent during this period, and the labor market tightened appreciably. In complete contrast to quantitative exports, however, there was an excess increase (compared to OECD countries) in the value of Israeli exports over the past two years, and this rise occurred among other things as a result of an excess increase in the prices of Israeli exports[23]—a development that was made possible by the unique character of the goods exported by Israel, certainly in the services category, because this enables Israeli exporters to set prices in the global markets. It is possible that the rise in prices is partly due to the loss of profitability in previous years, and that it contributed to the improvement in the terms of trade and in real income (see Section 1b). At the same time, however, it explains part of the slowdown in quantitative exports. This array of factors constitutes part of the process of returning to equilibrium: economies that were affected only slightly by the global crisis, of which Israel is one, grow less during the period of recovery from the crisis, and the process is facilitated by an appreciation in the real exchange rate, which detracts from the growth of exports. The findings reported in Box 2.1 show that starting in 1995, real shekel appreciation led to a drop in quantitative exports with an average lag of two years (2013 and 2014 featured shekel appreciation). Another explanation of the excess increase in prices in Israel is that Israeli exports are more dollar-oriented than Israeli imports, and the same is probably true of the exports of other advanced economies: while the effective exchange rate appreciated over the past two years, the

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[21] Since 2008, the year in which the main shekel appreciation took place, a larger gap emerged, 8.5 percent.
[22] Figure 2.1 displays the development of per capita quantitative exports. It shows that between 2008 and 2014, Israeli per capita quantitative exports grew less than the average in advanced economies. An examination of quantitative exports (i.e., not per capita) shows that up until 2014, their growth exceeded the average in the OECD countries by about 2.5 percent.
[23] The excess increase in the value of exports took place partly because the inflation rate in Israel was particularly low. Over these two years, the nominal value of Israeli exports rose at the same rate as the average in advanced economies, but at a slower rate in the preceding years.

shekel depreciated last year against the dollar by a steep 8.6 percent, and appreciated only slightly against the dollar this year.[24]

Goods exports (excluding diamonds), which account for approximately 60 percent of Israeli exports, have been the main weak point in economic growth in recent years. There was almost no growth in manufacturing exports between 2012 and 2014, and even a decrease in the past two years. Actually, since 2012, exports of goods from Israel have grown at a slower pace than that from most OECD members and 2016 was no exception to this pattern (Figure 2.8). An examination by technological intensity indicates that the slowdown that began in the past three years in the growth rate of productivity, exports, and the number of employees was particularly prominent in the high-tech and medium high-tech industries (the lower part of Table 2.6). Furthermore, it appears that the weakness of exports is more a feature of relatively large exporters: there was almost no decline in the simple average of growth rates in exports among a sample of exporting companies[25] over the past two years, while the growth rate of the total value of exports clearly fell (Figure 2.9).

Exports of business services—about a third of Israeli exports[26]—grew by an impressive 6.1 percent this year. This is approximately the average growth rate of exports of business services over the past five years. Furthermore, as shown by Figure 2.8, Israel's services exports outperformed both exports from the US and average exports by OECD countries. Exports of business services grew primarily as a result of services related to high technology, especially software services and research and development. These segments feature uniqueness and high added value, and are therefore less sensitive to global business cycles than goods. It is possible that the continued expansion of these services and the continued expansion of activity by startups in Israel[27] weigh on manufacturing exports by using up the limited supply of skilled labor force in technology-intensive sectors. Looking ahead, it can be said that

> Manufacturing exports contracted in the past two years.

> Training a skilled workforce will help to maintain the competitiveness of Israeli exports.

[24] There is an almost complete correlation between the changes in the shekel prices of exports of services and the shekel-dollar exchange rate. The dollar prices of services exports are measured by international prices—the prices of imports and exports of services in the US and the producer prices indices there—and their adjustment to shekels is through the shekel-dollar exchange rate. There are, however, exporters of services operating in Israel whose income depends on salary expenses in shekels, and is independent of international prices. In this case, due to the depreciation in the shekel-dollar exchange rate, measuring the increase in prices (in shekels) (while actual income in shekels does not change) creates a misleading picture of an increase in price combined with a drop in quantity. It is possible that this bias explains why quantitative expansion in exports of services unexpectedly came to a halt last year, while the prices of these exports rose steeply.

[25] The sample included companies with annual sales turnovers of over $50 million, or whose balance of financial assets abroad was over $20 million, and which reported their foreign currency activity to the Bank of Israel. The value of exports in this sample constitutes 50-60 percent of Israel's total exports. The simple average does not take into account the size of the companies; it gives them all equal weight.

[26] The main elements of the "business services" category analyzed here include software services, research and development services (excluding the sale of startups), shipping and transportation services, professional services (in law, accounting, the sciences, technology, management, and support), wholesale trade services, supplementary services provided by manufacturing industries, financial services, and other services.

[27] Investment in startups increased by an aggregate 0.4 percent of GDP over the past two years.

Figure 2.8
Goods and Services Exports from Israel, the US, and the OECD Countries, 2005–16

Volume Index (2007:Q1=100) — **Goods exports[a]**

Volume Index (2007:Q1=100) — **Services Exports[b]**
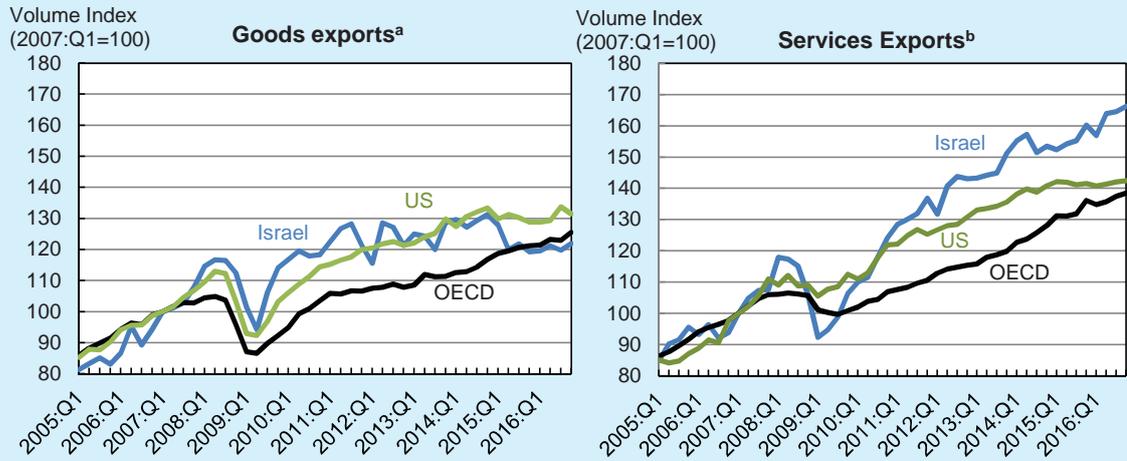
[a] Israel - excluding diamonds.
[b] Israel - excluding the sale of start-up companies.
SOURCE: Based on Central Bureau of Statistics and OECD.

Figure 2.9
Change[a] in the Total Value of Exports of the Companies Reporting to the Bank of Israel[b] and the Simple Average Rate of Change in All Companies, 2011–16

Rate of change in the total value of company exports
Simple average of rates of change in all companies
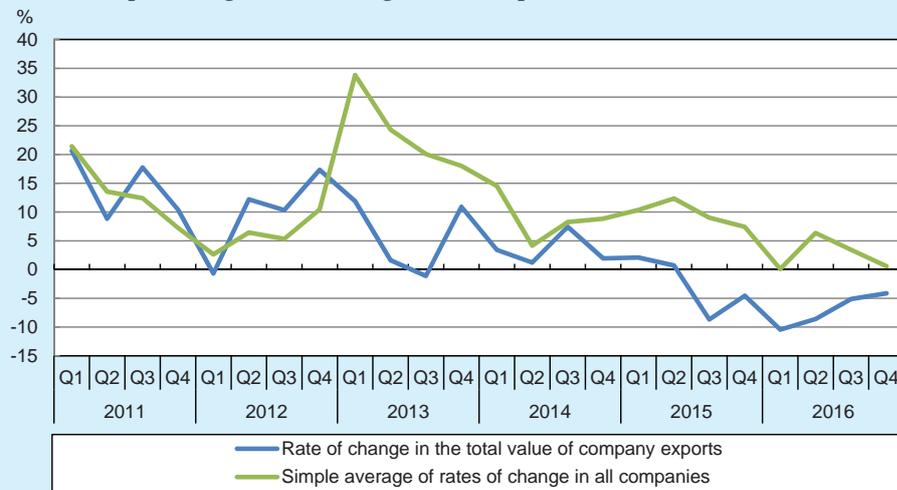
[a] Quarter compared with the same quarter in the previous year, current dollar values
[b] The value of exports by these companies is about 50-60 percent of the total value of Israel's exports.
SOURCE: Bank of Israel direct reporting system.

Table 2.6
Indices of manufacturing activity by technological intensity

	Total	High	Medium-High	Medium-low	Low
	(100 percent)	(44 percent)	(16 percent)	(20 percent)	(21 percent)
Rate of change: 2016 vs 2015, percent					
Production	-0.3	-4.9	1.4	3.5	5.5
Export revenue (fixed prices)	-5.7	-6.8	5.1	-15.4	-1.7
Number of employees	0.2	-1.1	0.4	-0.8	2.1
Work hours per employee	-0.2	0.0	0.4	-0.9	-0.1
Real cost per work hour	3.0	3.0	1.3	5.3	3.1
Average change 2013–2016, minus average change 2007–12, percentage points					
Production	-3.5	-7.8	-2.8	-0.8	2.1
Export revenue (fixed prices)	-4.5	-9.0	-2.1	3.5	-0.2
Number of employees	-0.9	-2.7	-1.8	-0.9	1.0
Work hours per employee	0.4	0.7	0.4	0.5	0.1
Real cost per work hour	1.0	1.7	-0.1	1.4	1.9

SOURCE: Based on Central Bureau of Statistics.

the constraint on the supply of a skilled workforce for technology industries may make it difficult for exports to grow at a high rate, even when global demand for their output expands rapidly. Enlarging the pool of the skilled workforce—in the medium term by training professionals and in the long term through education at the early stages—will help maintain the Israeli economy's competitiveness, and even increase it.

3. MACROECONOMIC DEVELOPMENTS IN THE LABOR MARKET

In 2016, demand for labor continued to increase, and even accelerated. The total labor input rose by 3.8 percent, higher than the rate in the preceding years (Table 2.7). The employment rate rose slightly this year, and the unemployment rate continued to fall (Figure 2.10), but it appears that this aspect of the increase in the labor input has been nearly exhausted. As a result, the total number of employed (including non-Israeli workers) grew by 2.4 percent this year, and a substantial proportion of the increase in the demand for labor found a response through a rise in the number of work hours per employee. Furthermore, the increase in the real cost of labor and the job vacancy rate continued, indicating that employers were having difficulty recruiting employees.

In the background of the increased demand for labor is the change in the composition of economic activity. While the output of tradable industries (manufacturing) is stagnating as a result of weakness in exports, the output of labor-intensive, domestic demand-dependent industries (trade, business services, construction, transport and communications—Table 2.8) is growing. This change is reflected in the number

Expansion of demand for labor continued and even strengthened in 2016.

Expansion can be seen in labor intensive industries.

Figure 2.10
Unemployment and Employment Rates in the Prime Working Ages (25–64), 2006–16
(percent)

Employment rate

Unemployment rate

SOURCE: Based on Central Bureau of Statistics.
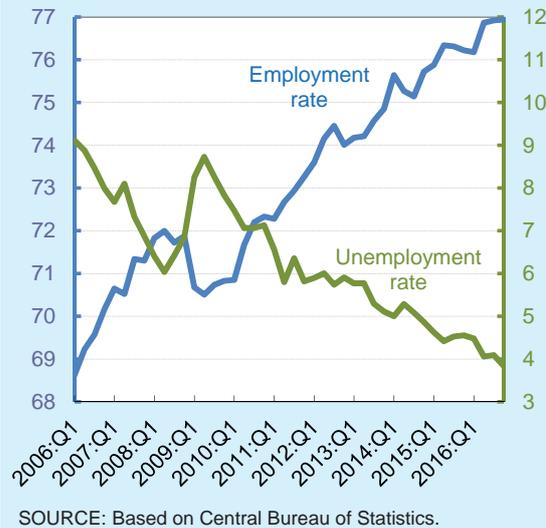
The labor supply expanded at a lower pace than in previous years.

of employee posts in the trade, business services, and construction industries, which continued to grow steadily at a high rate (3.3 percent) this year.[28] In addition, employment also expanded in public services sectors through various forms of employment: the government sector, private nonprofit organizations,[29] households, and companies (Figure 2.11).

The labor supply continued to expand this year, but at a lower rate than in the preceding years. In continuation of the 2015 pattern, the labor force[30] of Israelis in the prime working ages (25–64) grew by 1.6 percent this year (amounting to approximately 50,000 people), lower than the average rate of increase in 2011–14 (2.3 percent) and in the preceding decade (2.7 percent). The slowdown in comparison with the preceding decade is a result of slower growth in the population in the prime working age group: 1.5 percent, almost 1 percentage point less than the growth in the preceding decade. This is a reflection of a long-term demographic process in the Israeli economy, whereby the cohorts leaving the 25-64 age range are large in comparison with the cohorts remaining within the range. Although the growth rate of the working age population declined to 1.4 percent as early as the beginning of the current decade, the labor force continued to expand rapidly until 2014, reflecting a rapid increase in the labor force participation rate—an indication of an increase in the labor supply. This rise in supply continued this year, but at a lower rate than in the previous years: the participation rate among the prime working age brackets rose by only 0.1 percent this year, compared with an average yearly rise of 0.6 percent in 2011–14. In previous years, several structural factors contributed to increased participation in the labor force, including more education and the ongoing effect of the rise in the retirement age, a measure that raised the rate of labor force participation among people in the

[28] The increase in the number of employee posts in this group of industries remains approximately the same even if the business services sector is excluded because it is also dependent on demand abroad.
[29] This includes private nonprofit institutions operating mainly in education, health, art, entertainment, and leisure. These account for approximately 200,000 employee posts, about 20 percent of the total number of posts in public services.
[30] Participants in the labor force—a group that includes all the employed and unemployed (individuals searching for work and not finding it), but does not include people in the working age bracket neither working nor searching for work.

Table 2.7

Principal labor market data, 1995–2016

					(annual change, percent)	
	1995–2011	2012	2013	2014	2015	2016
Population in the prime working ages (25–64)	2.4	1.1	1.3	1.8	1.4	1.5
Labor force participation rate in the prime working ages (level)		78.7	78.8	79.5	79.8	79.9
Employment rate in the prime working ages (level)		74.0	74.5	75.5	76.2	76.6
Unemployment rate in the principal working ages (level)		5.9	5.4	5.0	4.5	4.1
Employed persons (Including non-Israelis)	2.7	3.1	2.7	2.8	2.3	2.4
of which: Employed in the business sector	2.7	2.7	1.9	2.4	1.7	2.8
Employed in the public services	2.7	4.0	4.3	3.7	3.5	1.4
Total work hours (including non-Israelis)	2.9	2.6	2.1	2.1	2.3	3.8
of which: Total work hours in the business sector	2.7	3.1	1.9	1.7	2.0	4.0
of which: Total work hours in the manufacturing industry		2.6	0.5	0.3	0.3	1.0
Total work hours in the public services	3.4	0.8	2.8	3.3	3.3	2.9
Hours per employed person (including non-Israelis)	0.1	-0.5	-0.6	-0.7	0.1	1.4
of which: Hours per employed person in the business sector	0.0	0.4	-0.1	-0.7	0.3	1.2
Hours per employed person in the public services	0.6	-3.1	-1.5	-0.3	-0.1	1.5
Nominal wage per employee post	2.5[a]	2.2	2.5	1.6	2.2	2.3
Real wage per employee post	0.3[a]	0.5	0.9	1.1	2.9	2.9

SOURCE: Based on Central Bureau of Statistics.

Table 2.8

Change in output of principal industries, 1995–2016

					(annual change, percent)		
	Share of total output (2016)[a]	1995–2011	2012	2013	2014	2015	2016
Total		4.0	2.4	4.4	3.2	2.5	4.0
Public services	16.0	2.1	2.9	1.8	2.8	2.7	3.4
Business sector	71.0	4.4	2.1	5.0	3.1	2.3	4.2
Manufacturing, mining and quarrying	12.3	4.0	2.0	-0.7	1.2	1.6	1.0
Trade	11.3	4.9	2.2	3.6	3.1	3.4	6.0
Business services	18.3	4.2	4.0	5.4	5.6	3.1	4.8
Construction	5.9	2.5	6.6	7.7	1.7	2.0	5.1
Transport and Communication	13.6	6.1	5.9	7.9	5.5	5.0	7.0
Agriculture	1.2	4.0	-3.3	-2.6	-4.8	-5.4	3.4
Water and Electricity[b]	1.8	4.8	-41.4	63.1	0.1	2.8	4.0

[a] In addition to output of public services and business sector product that appear in the table, total output also includes housing services output.

[b] The sharp fluctuations in the water and electricity industry in 2012 and 2013 derive from the cessation of the import of natural gas from Egypt in 2012 and its replacement with the import of expensive fuels, and by the start of the production of natural gas from the Tamar reservoir beginning in 2013. Note that these are changes in the added value of the industry and not in electricity production.

SOURCE: Based on Central Bureau of Statistics.

Figure 2.11
Employee Posts in the Manufacturing Industry, the Trade, Business Services, and Construction Industries, and the Public Services Industry[a], 2000–16

Index
(2005=100)

[a] The trade, business services and construction industries include the following sub-industries: wholesale and retail trade and vehicle repairs; professional, scientific and technical services; administrative and support services; accomodation and food services; and construction.
The public services industries include: local administration, public administration and defense, and National Insurance; education; and human health and social work.
Years prior to 2005 are based on the old industry classification (1993 industry classification).
SOURCE: Based on Central Bureau of Statistics.

55–64 age bracket. This year, in contrast, these factors did not boost the labor force participation rate significantly.[31] It is possible that the waning of these factors explains why the increase in the participation rate slowed. In contrast to previous years and despite the government's policy of increasing the labor force participation rate among groups with low participation rates—Arab women[32] and ultra-Orthodox men,[33] there was almost no increase in participation in the labor force among these groups this year. These trends are worrying, given the projected increase in their proportion of the population. As to the supply of labor from non-Israelis (Palestinians and foreigners), the Central Bureau of Statistics estimates show that their numbers remained stable.

There were increased signs that growth in demand for workers is weighing on expansion of supply.

Signs multiplied this year indicating that the rise in the demand for workers is outstripping the increase in the supply (as mentioned, this has slowed). As was the case in 2015, the unemployment rate declined and the job vacancy rate rose in 2016 (Figure 2.12). The job vacancy rate rose from 2.8 percent in 2014 to 3.9 percent in 2016, and the number of vacant employee posts soared 48 percent. An examination of this increase by occupation shows that it encompassed a broad range of occupations: the increase reached double-digit percentages in all nine groups of occupations. The increase was especially steep (57 percent) among intermediate occupations[34] (artisans

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[31] Women and men in the 64-69 age bracket did increase their rate of participation in the labor force, however, jointly accounting for 15% of the increase in the labor force among people over age 15—triple their share in the population.

[32] The participation rate among Arab women this year (35.0 percent) was higher than the rate a decade ago, but there has been no appreciable additional improvement in the past four years.

[33] According to the definition of ultra-Orthodox used by the Central Bureau of Statistics, the participation rate among ultra-Orthodox men aged 25–64 reached 50.8 percent this year, compared with 50.5 percent last year and an average of about 40 percent in the preceding decade.

[34] Occupations that are neither academic nor unskilled.

Figure 2.12
Job Vacancies as a Share of Employee Posts Held by Israelis in the Business Sector, by Industry Group[a], 2000–16[b]
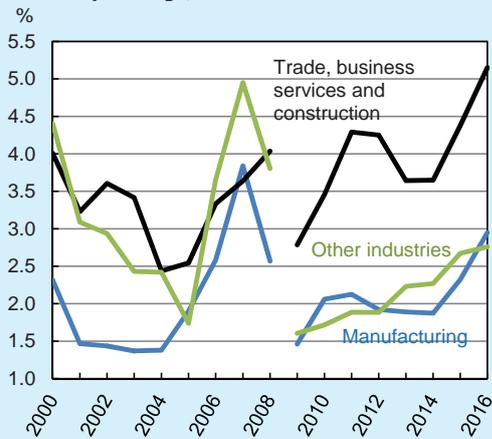
[a] The trade, business services and construction industries include the following sub-industries: wholesale and retail trade and vehicle repairs; professional, scientific and technical services; administrative and support services; accomodation and food services; and construction.
The other industries include: electricity and water, transport, communications, finance and insurance, education, health and community services.
[b] From 2009, the figure is based on the Central Bureau of Statistics Job Vacancy Survey. In previous years it is based on non-concatenated figures from the Ministry of Economy and Industry Employers Survey.
SOURCE: Based on Central Bureau of Statistics and Ministry of Economy and Industry.

and operators of facilities and machinery); this group accounted for a quarter of the increase in job vacancies in the economy (double the proportion of these occupations in total employment). The increase in available jobs in these occupations was concentrated in the construction, retail, and low technology manufacturing industries,[35] and corresponds with the increase in demand in industries serving the domestic market. There was also a strong rise in available jobs for unskilled workers (52 percent, about 12 percent of the total increase in job vacancies—double the proportion of these occupations among employed workers), mainly in industries supplying domestic demand. These high rates indicate that employers have had difficulty over the past two years in recruiting workers for jobs necessary in order to supply domestic demand.

The most significant growth over the past two years in the number of job vacancies was in the construction industry (89 percent, 20 percent of the total growth), and in addition to the occupations mentioned above, it also included engineering technicians and engineers. When the technological occupations are examined in general, it is found that during these two years, there was considerable growth in the number of available jobs (about 40 percent, up to 10 percent of total growth in the economy), but their proportion was less than the proportion of the intermediate occupations. Furthermore, most of the increase took place last year, and it therefore appears that the constraint of the employees in these areas did not worsen this year (further analysis of job vacancies appears in Chapter 5).

The increase in the excess demand for labor was also answered this year through a considerable rise—about 1.4 percent—in the average number of hours per employee (Table 2.7). The increase took place in most industries, and again stood

The labor constraint in technology sectors did not worsen this year.

[35] We do not have figures for sub-industries. However, according to the character of the occupations in which the number of available jobs rose (processors of food, producers of wood products and clothing items, handicrafts and printing workers, operators of stationary facilities and machinery, assemblers, drivers, and operators of other devices), it can be assumed that they are low-tech industries.

Figure 2.13
Unit Labor Cost^a , Labor Productivity, and Labor Cost^b, 2006–16

Index
(100=2010)

The real cost of labor increased this year from the perspective of manufacturers and employees.

─── Unit labor cost
─── Labor productivity
─── Labor cost
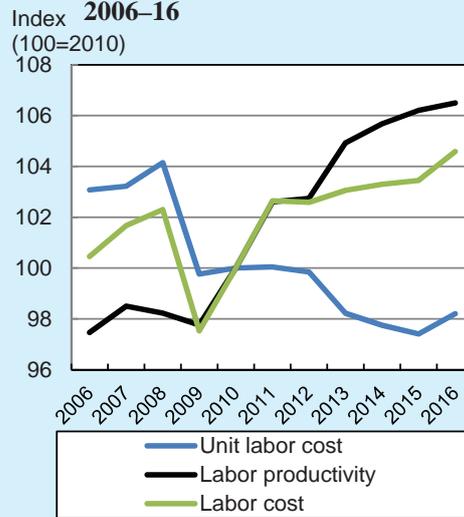
a Total cost of labor, in current prices, relative to GDP in current prices.
b Net of GDP price index.
SOURCE: Based on Central Bureau of Statistics.

out in the domestic-oriented industries (hospitality and food services, trade, construction, transport, education, the arts, and entertainment and leisure). The change in the composition of industries did not affect the change in the average number of hours per employee.

In recent years, the excess demand for employees has begun to be reflected in a rise in wages. The pace of the increase in the nominal wage, 2.3 percent, is not particularly high, and is not accelerating. Taking into account the drop in consumer prices, however, the increase in the real wage is substantial: 2.9 percent (annually) over the past two years. The tightening in the labor market also began to affect the cost of labor from the producers' perspective, although the increase is still not severe. The share of wages in GDP[36] has been on a downtrend for many years, due to numerous global and domestic causes. The pace of this decrease already slowed two years ago (from 2014), and the cost rose by 0.8 percent this year, returning to its level of 2013. While the pace of the decrease moderated starting in 2014 as a result of the slower increase in labor productivity, the cost accelerated this year (in comparison with the two preceding years) as a result of an increase in the real wage from the producers' perspective. As noted, this was not due to a steeper increase in the nominal wage; it resulted from a slower rise in the GDP deflator (note that output prices are still rising faster than consumer prices). Supplying the demand for labor by means of increasing the number of hours worked, among other things, contributed to a renewed rise in per employee GDP, but it was accompanied by an exceedingly small increase in labor productivity (Figure 2.13).[37]

[36] The proportion of wages in GDP (sometimes also called the "real unit labor cost") reflects what proportion of the domestic added value is paid directly or indirectly for labor. The rest of GDP is channeled into payments to capital and to entrepreneurs' profits.
[37] Chapter 5 discusses of the development of wages in recent years at greater length.

4. SUPPLY AND EQUILIBRIUM

a. Potential output and the sources of growth

According to the production function approach—on which the following analysis is based—potential output is defined as the output that would have been achieved in a hypothetical equilibrium in which the utilization rate of all factors of production is similar to the long-term average, and does not create pressures on prices and wages. Accordingly, the output gap reflects the deviation of actual output from its potential.[38] The rate of increase in potential output is derived from the multiyear growth trends in the various factors of production—physical capital, labor, and human capital— and from the average increase in total factor productivity, which is the result of technological improvements and other structural improvements.

Calculations based on this approach show that the rate of growth of potential output was about 3.1 percent in 2016, lower than the average rate in 2012–14 (Table 2.9).[39] The growth rate fell gradually in 2012–14, due to the development of the potential labor input and the stock of physical capital. As to the **labor input**, the slowing in potential growth is explained by the faltering in the upward trend in the rate of participation in the labor force (Table 2.7) and the near-exhaustion of the downtrend in the natural unemployment rate that began a decade ago: in the three years between 2012 and 2014, the estimate for NAIRU[40] declined by 0.7 percentage points each year, while it fell by 0.4 percentage points at most in the past two years.[41]

The standstill in fixed capital formation is gradually eroding the growth rate of the stock of physical capital, and for the first time in several years, it was less than the rate

The rate of potential growth is declining gradually.

[38] Actual GDP being lower than potential GDP (i.e., the output gap is negative) is referred to as "excess production capacity."

[39] The average potential growth rate in 1995–2011 was approximately 4 percent. The subsequent decline is a result of the slowdown in the population growth in the prime working age brackets and the gradual exhaustion of the increase in the average number of years of education—an increase that made a substantial contribution to growth until the late 1990s. Today, the proportion of people in Israel with post-secondary schooling is particularly high, but there is definitely potential for an increase in human capital through an improvement in the quality of education. See Argov, E. (2016), "The Development of Education in Israel and its Contribution to Long-Term Growth," Discussion Paper, Bank of Israel Research Department.

[40] The natural unemployment rate—the Non-Accelerating Inflation Rate of Unemployment (NAIRU), calculated according to Elkayam D. and A. Ilek (2013), "Estimating the NAIRU Using Both the Phillips and the Beveridge Curves", Bank of Israel, Research Department Discussion Paper No. 2013.10.

[41] The continued drop in the past two years was obtained in the model only because inflation in the Consumer Price Index declined, despite the low unemployment rate. At the same time, because inflation measured by the Consumer Price Index declined, partly as a result of growing competition in the consumer sector – a variable that the model does not present directly – and because the estimates for other prices, such as output prices and wages, did not fall over the past two years, there is room to hypothesize that the NAIRU fell over the past two years at an even more moderate rate.

Table 2.9
The supply of output, 1995–2016

(annual change, percent)

	1995–2011	2012	2013	2014	2015	2016
Gross Domestic Product	4.0	2.4	4.4	3.2	2.5	4.0
of which: Business sector product	4.4	2.0	5.0	3.1	2.3	4.2
Public services output	2.1	2.9	1.8	2.8	2.7	3.4
Stock of physical capital of the business sector	5.8	4.8	4.6	4.3	3.6	3.1
Labor force	2.5	3.2	2.0	2.7	1.8	2.1
Total hours worked	2.7	3.1	1.9	1.7	2.0	4.0
Total factor productivity	0.7	-1.4	2.2	0.5	-0.2	0.5
Output per work hour (nominal)	4.9	3.2	5.3	1.2	4.0	0.9
Labor compensation per hour worked (nominal)	4.4	3.1	2.3	1.7	3.5	2.3
Real unit labor cost	-0.5	-0.1	-2.8	0.5	-0.5	1.3
Potential output[a]	4.0	3.9	3.7	3.7	3.5	3.1
Output gap[a] (level)	0.0	-0.7	-0.2	-0.7	-1.6	-1.1

[a] Estimate. Potential output is equal to the output in a hypothetical equilibrium in which capacity utilization of all factors of production is similar to the long term average and does not create price or wage pressures. The output gap reflects the extent to which actual GDP deviates from potential output. The change from year to year in the output gap is not the same as the difference between actual growth and potential growth as there are gaps between the quarterly and annual National Accounts data.

SOURCE: Based on Central Bureau of Statistics.

This year the expansion of capital stock slowed the growth in production capacity.

of increase in GDP (Table 2.9)—in other words, the expansion in the stock of capital this year was a drag on the increase in the economy's potential production capacity.[42]

After retreating last year, total factor productivity rose by 0.5 percent this year, similar to the average in 2012–14 and lower than the historical average of 0.7 percent (Table 2.9).The decline in total factor productivity growth has been affected in recent years by the proximity to full employment and the expansion in activity in sectors featuring relatively low productivity. When the employee posts and wage data[43] are analyzed according to sectors, it is found that the changes in the economy's composition by sectors have lowered the (cumulative) increase in average wages by 0.7 percentage points (see Chapter 5).[44] This is because construction and hospitality and food services, sectors in which the average wage is low, increased their share at the expense of manufacturing, a sector that features high wages.

[42] The capital stock is not measured directly; it is calculated using the perpetual inventory method: historical investment data are accumulated, while taking into account the life span of each type of investment and the rate of economic depreciation for it. It is possible that an upward bias exists in the data for the capital stock if the lifespan of fixed investments has declined in recent years.

[43] The wage data constitute an approximation for productivity at equilibrium.

[44] The contribution of the changes in the industry composition is based on the assumption that there are fixed wage differentials between the sectors.

b. Equilibrium and the output gap

Since the rate of increase in actual GDP was 4.0 percent this year, outstripping the 3.1 percent growth rate in potential GDP, the excess production capacity accumulated since the outbreak of the crisis contracted, and may even have turned to excess demand (Table 2.9). The assessment that excess production capacity was accumulated in the earlier years—in other words, some of the factors of production (employees and the capital stock) were utilized at lower than average intensity—was consistent with the following phenomena: a low inflationary environment prevailed in the economy; investments did not grow, even though the real interest rates were low; the unit labor cost did not increase, despite low unemployment, and the volume of imports grew relatively moderately, which supported a larger surplus in the current account. Since some of these phenomena were reversed this year (investments accelerated, the unit labor cost rose, and the volume of imports increased), it is possible that the economy has developed excess demand, or at least, the excess production capacity is not large. Excess production capacity obviously varies among industries. It can be assumed that it is typical of manufacturing goods that do not involve advanced technology, because of the stagnation in global demand and appreciation in the real shekel exchange rate. In contrast, however, it may also be assumed that in the high technology sectors—industry, services, and startups—a shortage of personnel at the highest level of expertise is a constraint on the ability to expand rapidly. Expansion in domestic demand oriented industries—such as services, trade, and construction—were driven in recent years by both the expansion of supply factors (i.e., greater participation in the labor market and pressure to cut prices and profit margins in the consumer sphere) and expansion in demand for consumption (among other things, as a result of the low interest rate environment in Israel and worldwide and the growth in real income). The workforce that supplied this demand was not necessarily skilled, but it appears that the potential growth in this pool declines as the employment rate rises. This combination of factors led to a rise this year in the real wage, the job vacancy rate, and the number of work hours per employee. The increase in the number of hours was reflected as well in a decline in productivity. The economy also switched from stagnation to growth in investments in machinery and equipment, and the downtrend over the past two years in the capital utilization rate came to a halt.

The excess production capacity in Israel is probably relatively low, compared with the global surplus, and especially in comparison with the excess in other advanced economies. Israel was affected only slightly by the crisis that began in 2008 and peaked in 2012, and the negative impact resulted mainly from a drop in real global demand for Israeli exports. The accommodative response in monetary policy, the flexibility of the labor market, and the realization that the financial system in Israel was successfully handling the crisis led to acceleration in domestic demand. In recent years, it has offset a considerable proportion of the global effects of the crisis. An improvement in the terms of trade during the past two years has also had the effect of contributing to the acceleration in private consumption. The result has been that the output gap in Israel widened less than the gap in the advanced economies (Figure 2.15).

It is possible that the economy switched to excess demand.

The output gap in Israel expanded less than the gap in advanced economies.

c. The current account and the real exchange rate

The current account surplus balances domestic investment with national savings (which is composed of public savings as well as private savings by households and the business sector). National savings dipped slightly this year, following some fall in private savings (Table 2.10). The decrease in private savings was very moderate, even though the increase in private consumption accelerated, because the rise in income accelerated—due among other things to an improvement in the terms of trade (see Section 1b).[45] The ratio of investment to GDP rose this year, following several years of stagnation. A large proportion of investment came from imports (see Section 2b).

Developments in savings and investment this year were reflected this year in a decline in the current account surplus, following several years of continual growth, resulting, among other things, from the beginning of the production of natural gas from the Tamar reservoir in 2013 and the general drop in the prices of energy and commodities that occurred between mid-2014 and early 2016.[46] The reduction in the current account surplus resulted from a decrease in the surplus of exports (especially in the goods account).[47] The surplus of exports (in current prices) declined this year, and the rising trend in it since the beginning of the preceding decade was reversed (Figure 2.14). It should be noted, however, that if the changes in the terms of trade are excluded, the volume based exports surplus[48] has been falling since 2014. This process reflects the gap between global and domestic demand—global demand is weak, while domestic demand

Figure 2.14
Terms of Trade and Goods and Services Exports, 2000–16

% of GDP
Index 2010=100

Excess exports–excluding volatile items and fuels, fixed prices*
Excess exports–total, current prices
Terms of trade (right scale)

*Volatile items and fuels includes: ships and aircraft, defense imports, diamonds, startups' sales, and fuels.
SOURCE: Based on Central Bureau of Statistics.

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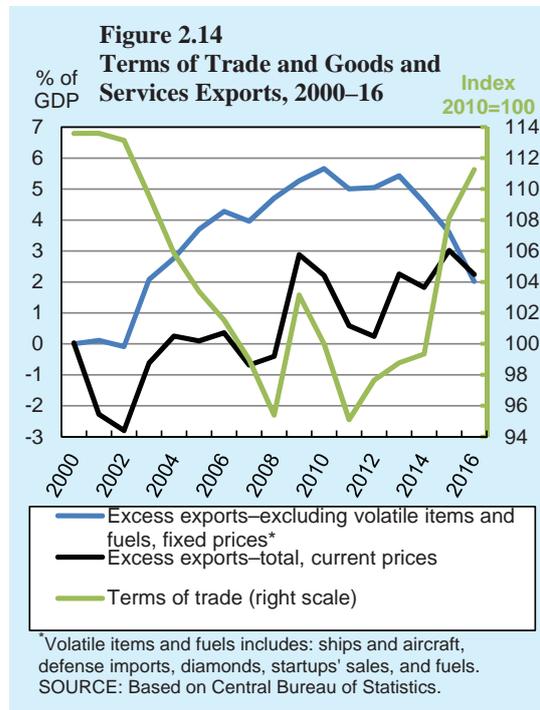
[45] Chapter 7 discusses at further length the long-term factors affecting Israel's savings, investment, and current account surplus.

[46] How the drop in energy prices affected the current account and the economy in general is discussed in Chapter 7 of the Bank of Israel Annual Report for 2015 (2016).

[47] The primary income account (net income from overseas factors of production) contributed little to an increase in the surplus, while the current transfers account did not change.

[48] The volume based exports surplus analyzed here is given in 2010 prices, and items of macroeconomic magnitude—such as ships and airplanes, defense imports, diamonds, sales of startups, and fuels—have been deducted from it, because exceptional developments in them are usually not due to the macroeconomic factors whose effect is being analyzed here.

Table 2.10
Savings, investment and the current account, 1995–2016

						(percentage of national income)
	1995–2011	2012	2013	2014	2015	2016
Gross national savings	21.8	21.8	23.1	23.5	24.2	24.0
of which: Public	0.4	-0.7	-0.2	0.3	0.6	0.6
Private	21.4	22.6	23.3	23.2	23.6	23.4
Gross investment	21.3	21.2	19.8	19.7	19.6	20.1
of which: In principal industries	14.8	14.4	13.6	12.8	12.4	13.3
of which: General government's investments	2.2	1.7	1.8	1.9	1.5	1.7
In housing	5.7	6.3	6.5	6.6	6.5	6.7
In inventory	0.8	0.5	-0.4	0.3	0.8	0.1
Net current account	0.5	0.6	3.3	3.8	4.5	3.8
of which: Balance of goods and services	-1.4	0.2	2.2	1.8	3.0	2.2
Net income account	-2.7	-2.7	-1.9	-1.1	-1.4	-1.3
Net current transfers	3.7	2.3	2.7	3.0	2.7	2.7
Terms of trade[a]	-0.6	2.7	1.2	0.6	8.9	2.9
Real effective exchange rate[a,b]	0.2[c]	5.3	-5.7	-1.3	-0.1	-1.9

[a] Percent change in annual terms.

[b] An increase refers to depreciation.

[c] The figure relates to the years 1999–2010.

SOURCE: Based on Central Bureau of Statistics.

continues to grow—and the effect of shekel appreciation. It also reflected a decrease in excess domestic production capacity and the improvement in the terms of trade—processes that caused a surge in imports to Israel. This phenomenon—the effect in which changes in quantitative trade, especially the import component, at least partially offset in the current account changes in the terms of trade—was typical of many countries in recent decades.[49]

Since 2008, the ongoing current account surplus, combined with the relatively small excess production capacity, has created continual pressure towards making Israel expensive in the world—i.e., real shekel appreciation. Israel's effective real exchange rate (in terms of the Consumer Price Index) appreciated by 10 percent immediately with the outbreak of the 2008 crisis. In the ensuing years until 2011—the year in which Israel's advantage in the output gap reached a peak, of almost 4 percent—the shekel continued to appreciate at a more moderate pace averaging 1.2 percent a year. This appreciation constituted part of the economic process balancing between the levels of activity in various countries. As long as the world did not recover from the crisis, however, shekel appreciation had the effect of importing global weakness to the Israeli economy. Although shekel appreciation has an immediate negative impact on export profitability, and makes imports more worthwhile, various rigidities and frictions bring

The real appreciation forces strengthened this year, particularly at the end.

[49] See Adler, G., N. Magud, and A. Werner (2017), "Terms-of-Trade Cycles and External Adjustment," IMF Working Paper 17/29.

Figure 2.15
The Spread between the Output Gap in Israel and the OECD Average, and the Real Exchange Rate, 2000–16
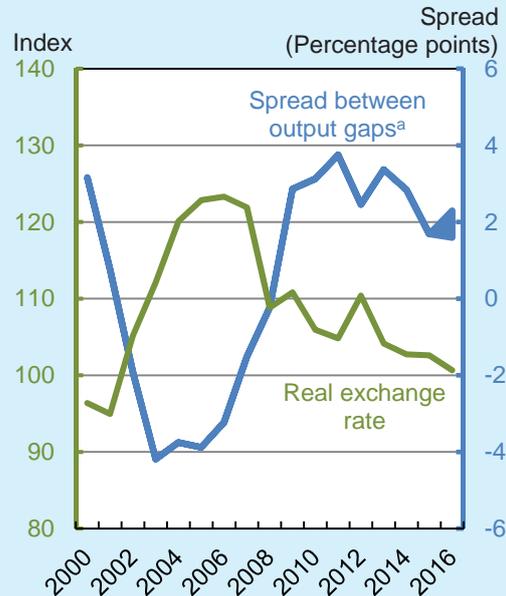
a In 2016 there is a range as the Bank of Israel assesses that the gap will be revised, as Israel's growth data (4%) is greater than the estimates from November 2016 (3.3%).
SOURCE: Based on OECD Economic Outlook (November 2016), Bloomberg, and Central Bureau of Statistics.

its effect on the volume based export surplus (and through it on excess production capacity) to a peak only two years later (see Box 2.1). Indeed, Israel's advantage in the output gap has been declining since 2012 (there was a one-time increase in the gap in 2013 with the beginning of natural gas production from the Tamar reservoir). This decline, together with the foreign exchange purchases by the Bank of Israel, did moderate the forces pushing in the direction of real appreciation of the shekel: in 2012–15, shekel appreciation averaged only 0.5 percent.[50] This year, especially toward the end of the year, the real forces exerting appreciation pressure on the shekel became stronger, because the terms of trade improved, and because the strong increase in domestic demand halted the narrowing of the gap in surplus production capacity, so that the annual appreciation was 1.9 percent (Table 2.10 and Figure 2.15).

[50] Following prolonged shekel appreciation, a substantial depreciation developed in the second half of 2014 that was probably affected by short-term financial forces, not real forces. Shekel appreciation resumed during 2015 and offset this depreciation, and the real exchange rate returned to approximately the same level as before the depreciation.

Box 2.1

The exchange rate's effect on exports

Since 2008, the Israeli economy has been exposed to a prolonged appreciation of the shekel. This box examines the connection between the real exchange rate and exports, particularly since the beginning of the 2008 financial crisis, and also examines what industries are particularly sensitive to changes in the exchange rate. This analysis will help evaluate the extent to which the appreciation has weakened exports, and to what extent it is expected to weaken them in the future.

The appreciation of the shekel lowers the profitability of exports, since some of the exporters' expenses (such as wages) are denominated in shekels in the domestic market while their income is denominated in foreign exchange. Shrinking profitability may lead to a decline in supply, thus reducing the volume of exports, and may have a negative impact on employment. Moreover, if firms stop exporting due to temporary exchange rate shocks, they may have difficulty returning to the markets when the terms improve—due to the costs of leaving and entering markets—which would lead to long-term damage.

Studies conducted around the world in the past[1] concluded that a depreciation of the local currency has a positive impact on exports, but assessments regarding the intensity of that effect varied from study to study. Studies in Israel generally found that a depreciation (appreciation) of 1 percent expands (contracts) export volumes by about 0.2–0.3 percentage points.[2]

Identifying how the exchange rate affects exports is no simple task, since the changes in the two variables affect each other: A real depreciation has a positive effect on exports, while an increase in exports leads—for different reasons—to a real appreciation, since the increase in the current account surplus increases the supply of foreign exchange. If these two effects take place simultaneously, the correlation between the exchange rate and exports is undetermined. However, it is reasonable to assume that changes in the current account and in capital movements have a rapid effect on the foreign exchange market, while the exchange rate's effect on the quantity of exports is mainly with a lag.[3]

This assumption is essential in identifying the causal connection between the real exchange rate and exports, and it forms the basis of the examination presented here. If it is not valid, biased coefficients will be obtained in the regression, and this is particularly the case for the coefficient representing the exchange rate's lagged effect on exports. Another assumption at the basis of the analysis is that, in addition to the observed variables controlled for in the equation, including world trade, there are no unobserved variables that affect both exports and the exchange rate in parallel. In this case as well, biased coefficients will be obtained in the regression if the assumption is not valid. In view of the possibility that our assumptions are not fully valid, we must be cautious in giving a causal interpretation to our findings concerning the link between the exchange rate and exports.

[1]   Baldwin and Krugman (1989); Das (2007); Pradhan (2011); IMF (2015); Leigh et al. (2017).
[2]   Sofer (2005); Lavi and Friedman (2007); Bank of Israel (2009).
[3]   A slight and temporary appreciation is not expected to have a significant effect on the quantity of exports, but mainly on profitability. But it is likely that a significant and prolonged effect on profitability will lead to a quantitative impact, and we will therefore observe a lagged effect.

We estimated the elasticity of the export volume relative to the real exchange rate through regressions that use annual data from 1995 to 2015, while controlling for global demand (world trade) and the terms of trade (export prices divided by import prices)[4]—a variable that reflects the changes in the costs of imported raw materials, which affect the costs of production for export, and therefore also export supply. However, since a reverse effect—from exports to the terms of trade through export prices—is also possible, we used the terms of trade variable with a lag of one year.

In addition to the average elasticity in the economy, we also estimated the elasticity in six manufacturing industries that export most of their output (textiles, rubber and plastic, pharmaceuticals, electronics, chemicals, and machinery and equipment), and in the services industry (while distinguishing between business and tourism services). In order to examine the link between the exchange rate and the volume of exports (as opposed to its monetary value), we divided the industry export data by the export prices by industry.[5] We used two indices alternatively for the exchange rate: the real effective exchange rate (the ratio between the Consumer Price Index in Israel and the weighted average of the CPIs in the trading partners) and exchange rates adjusted for each industry (the industry export prices, translated into shekels, deflated by the general GDP deflator). While the exchange rates based on industry export prices better reflect the relevant price ratio for each industry, there are two problems inherent in them. First, the measurement of exports prices is of limited quality. In the manufacturing export price index, there is no proper control over the quality of the products, and the composition of products may also have an effect on it. In the services industries, there is a structural difficulty in distinguishing between quantity and price. Second, the industry price is also affected by technological changes and cost changes, which are expected to lower prices and thereby lower the industry exchange rate and increase the quantity exported (increase in supply). In other words, a negative correlation is created between exports and the industry exchange rate. In addition, since the security situation[6] has a very significant effect on tourism exports, we added a dummy variable for years in which the security situation worsened (1996, 2001, 2002, 2006, 2009, 2012, 2014).[7]

The basic regression equation we estimated is: (1) $\Delta X_{i,t} = \beta \Delta e_{i,t-j} + \gamma \Delta WT_t + \delta \Delta TT_{t-1} + \varepsilon_{i,t}$

where: $X_{i,t}$ represents the export volume of industry i in year t; $e_{i,t-j}$ represents the real exchange rate (as stated, we alternatively used the real effective exchange rate and the industry exchange rate) with a lag of j years; WT_t represents global demand (world trade in goods for manufacturing industries, world trade in goods and services for the services industry); TT_{t-1} represents the terms of trade with a lag of one year, where we used the rates of change between years (a yearly model)— Δ; and $\varepsilon_{i,t}$ represents a random disturbance.

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[4] Due to data availability constrictions, we used the same data regarding global demand and terms of trade for all industries.
[5] For manufacturing, we used foreign trade data, and for services we used National Accounts data.
[6] See Sharabany (2014).
[7] We included the effect of the dummy variable only in the examination concerning the tourism industry.

We estimated Equation (1) in two regression frameworks. The first includes a panel of eight industries, over a period of 19 years.[8] The weight of each industry in the regression is determined by its average weight in total exports analyzed here. The second framework includes specific equations for each industry following the SUR method[9], which takes into account the fact that the equations are dependent on each other.[10]

Table 1

Elasticity of Exports Relative to the Exchange Rate with a 2-Year Lag

	Weight in total exports[a], %, 2016	Elasticity relative to the real effective exchange rate		Elasticity relative to the industry exchange rate[b]	
		Panel[c]	SUR	Panel[c]	SUR
General	73.9	0.579**		0.332**	
Electronics (high)	15.7	0.715***	0.601	0.650***	1.111**
Pharmaceuticals (high)	5.1	1.381***	0.910	-0.105	-0.765
Chemicals (mixed-high)	10.2	0.634***	1.303**	0.923***	1.330***
Machines and equipment (mixed-high)	4.4	1.099***	0.875**	0.797***	0.618
Rubber and plastics (mixed-low)	2.8	0.605***	0.666*	0.947***	0.923***
Textile (low)	1.0	0.423**	0.503	0.169*	0.302
Services	28.3	0.311*	0.190	0.321***	0.320***
Tourism services	6.0	0.210	-0.392	-0.109**	0.276

Data are annual and represent the average rate of change compared with the rate in the previous year (1996–2015).

The parentheses represent the technological intensity of the industry. There is no classification for services and tourism services.

There are 8 industries and 136 observations.

[a] Exports excluding diamonds: The total does not equal 100 percent because it takes into account only the main export industries. The numbers represent percent of total exports.

[b] In order to calculate the industry exchange rate, we took the industry export price, divided it by the GDP deflator, and multiplied that by the shekel-dollar exchange rate.

[c] The industry exchange rate is taken from the equation that includes variables for the interaction between the industry and the exchange rate, and the general estimate is taken from the equation that includes a general variable for the exchange rate only.

* 10 percent significance level; ** 5 percent significance level; *** 1 percent significance level.

SOURCE: Based on Central Bureau of Statistics, OECD, and IMF.

[8] The regression assumes fixed effects for each of the industries, which fixes the marginal effect of each industry separately, thereby making it possible to distinguish the existing differences between industries in the average rate of increase of exports.

[9] Seemingly Unrelated Regressions.

[10] Furthermore, we added a dummy variable for one outlier export observation (in 2000, the electronic industry increased the quantity of exports by 70 percent). Excluding this dummy variable, higher elasticities are obtained relative to the exchange rate, particularly in the electronics industry.

In estimating the equations, we included the changes in the real exchange rate with a lag of two years, assuming that the exchange rate does not affect exports within one year.[11] In estimating the first framework—the overall estimate of all industries included in the model excluding the unique elasticity of each industry—we found a positive and significant link between exports and the real exchange rate (both effective and industry) with a lag of two years: a depreciation of 1 percent increases the volume of exports by about 0.3–0.6 percent after two years (Table 1). Furthermore, a positive but insignificant connection was found with a lag of one year. The lag in the effect may be a result of the fact that agreements between exporters and foreign entities are based on long-term contracts, covering approximately two years in advance. Moreover, in this range, there are hedging transactions against the exchange rate.[12] We therefore focused on the exchange rate with a lag of two years. When conducting the examination through a variable for the interaction between the period following the global financial crisis (2009–2015) and the change in the industry exchange rate, we found that there is no significant change in the effect.

The unique link between the exchange rate (with a lag of two years) and exports of the various industries was estimated, as stated, through two regression frameworks: fixed effects based on panel data, and SUR. The results of the regressions are presented in Table 1, and show that in most industries, the exchange rate has a positive and significant effect on exports. The two estimation methods produce similar results in most industries. The results also show that the manufacturing industries, other than pharmaceuticals, are affected by the exchange rate more than the services and tourism industries. In the manufacturing industries, the average effect is about 0.8 percent, while in business services it is about 0.3 percent. In tourism—an industry that is very exposed to changes in the security situation—the coefficient is lower, and in most estimations it is not significant.[13]

Among the manufacturing industries, the mixed-technology industries are more affected by changes in the exchange rate, and their elasticity is close to one, similar to the findings in Bank of Israel (2009). The results in the pharmaceuticals industry vary in accordance with the exchange rates used in the examination: The real effective exchange rate produces a positive coefficient that is close to 1, while the industry exchange rate produces a negative and non-significant coefficient. This may be a result of technological changes that took place in the industry during the sample period, creating a negative correlation between the industry exchange rate and exports.

In order to examine the robustness of the results, we conducted a few examinations, with the findings remaining as they were[14]: The elasticity of exports relative to the exchange rate is positive, slightly higher

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[11] When estimating the overall export equation using the exchange rate with no lag, it obtains a negative and significant coefficient, which is consistent with the possibility that exports affect the exchange rate. We first estimated the equations using lags of one and two years, and then using only lags of two years.

[12] The appreciation survey conducted by the Manufacturers Association for 2010 found that 81 percent of manufacturers carry out hedging transactions, and among the large exporters, the rate is even higher, at 93 percent.

[13] Sharabany (2014) found that the elasticity of exports relative to the real exchange rate is negatively dependent on the level of terrorism. It is 0.3 when there is a high level of terrorism, and close to 1 when the level of terrorism is low.

[14] Among other things, we estimated a sample that includes only the years 2003–15; equations where we deleted one year each time; equations where we deleted certain industries each time; we used an interaction variable for the tourism industry with no lag; and we used the rate of change in the fourth quarter relative to the fourth quarter of the previous year.

than the results that were obtained in the past, reaching peak strength with a lag of two years. These findings are also true when examining each industry separately, and are particularly the case in mixed industries.

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