

# Recent Economic Developments 137

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Recent Economic Developments is published every half year. The first part includes a macroeconomic review and a fiscal survey. The macroeconomic review describes the main economic developments which occurred during the period covered in the publication, and then focuses on a current economic issue; it is not a wide-ranging description and analysis of current economic developments. The fiscal survey analyzes fiscal developments in light of the budget targets, and from a long term perspective. This is intended to complement, rather than replace, the comprehensive analyses that appear in the Bank of Israel Annual Report. The second part of the publication presents analyses by the Research Department of relevant topics in Israel's economy.

## Part 1: Economic Developments and Fiscal Survey

### Main Economic Developments

The economy grew at an annual rate of 2.8 percent in the reviewed period (October 2013 to March 2014), slightly higher than its growth rate during the previous six months, after adjusting for the effect of natural gas production during the previous period. According to the second estimate of National Accounts data for the first quarter of 2014, growth was slower at the end of the period than at the beginning: GDP grew at an annualized rate of 2.7 percent, and business sector product increased by just 1.5 percent, mainly due to the virtual standstill in private consumption and a decline in investment. With that, other indicators do not point to a slowdown in that quarter. During the reviewed period as a whole, goods and services exports (excluding diamonds) increased at an annual rate of 15.6 percent compared to the previous period, mainly due to growth in global trade. Total goods and services imports to Israel (excluding ships, planes and diamonds) increased at an annual rate of 3.5 percent during the reviewed period, and the average nominal effective exchange rate appreciated by 1.8 percent compared to the previous period.

The labor market continued to show improvement during the period: The labor force participation rate among those aged 25–64 (the principal working ages) increased from 78.8 percent in the previous period to 79.3 percent during the reviewed period, and the unemployment rate declined. Therefore the employment rate among these ages also increased, by 0.9 percentage points compared to the previous period. The growth in employment in the economy as a whole totaled 1.9 percent compared to the previous period, and 1.6 percent in the business sector. The improvement moderated toward the end of the period.

The fiscal adjustment made by the government in the 2013–2014 budget led to a turnaround in the deficit trend, from an increase in the deficit to a decline. The growth in revenue was supported by an increase in the tax rates in mid-2013, and by one-time revenues (such as revenue from taxes on trapped profits), alongside the reining in of the rapid rate of growth in expenditures. The accumulated deficit (excluding the granting of credit) in the 12 months that ended in March 2014—2.7 percent of GDP—was significantly lower than in the 12 months ending in March 2013—4.2 percent. With that, since there was a large contribution to the reduction of the deficit by one-time measures, and since the government decided on programs that will significantly increase its

expenditures and reduce tax receipts to some extent in 2015, policy measures of significant scope will be required in order to meet the deficit target in 2015—2.5 percent of GDP, as set in the law. (More information appears in the Fiscal Survey later in this report.)

In the capital market, the increase in stock indices and in the prices of corporate and government bonds continues. The yield gaps between Israel and the other advanced economies continued to narrow in view of the relative security calm and the decline in the government deficit, and yield spreads between corporate bonds and parallel government bonds continued to decline. The stock indices are at historically high levels, and the P/E ratios on the stock market are higher than the historical averages and similar to those in the other advanced economies.

Inflation moderated during the reviewed period. In the six months that ended in March 2014, prices increased at a seasonally adjusted annual rate of 0.8 percent, compared with a seasonally adjusted increase of 1.8 percent in the previous period. During the entire period, inflation remained in the lower portion of the price stability target range (measured over the previous 12 months). The increase in home prices continued, and home prices at the end of the period were 8.3 percent higher than they were 12 months earlier. The second part of this report contains more discussion of the development of the ratio of home prices and rents to household income. The uncertainty in the housing market increased after the government announced plans to reduce VAT to zero for a significant part of those purchasing their first new home, and it is possible that this uncertainty contributed to the fact that the number of new home purchases declined in April.

During the period, the Bank of Israel's Monetary Committee decided to lower the interest rate for March, and the interest rate currently stands at 0.75 percent. Low inflation and inflation expectations made it possible to reduce the interest rate in order to support growth in the economy, among other things by reducing the gap between the Bank of Israel interest rate and the low interest rates in the other advanced economies, which moderated the pressure for appreciation. During this period, the Bank of Israel purchased \$4.4 billion.

## Policy regarding the development of Israel's sea ports

- It is necessary to immediately begin activity to expand the capacity of Israel's sea ports by constructing one or two terminals, because demand for container services is growing rapidly and the construction of a terminal takes a long time (6–8 years).
- At the current stage of the tenders process, monetary bids for the construction of two terminals with a capacity of 0.8 million TEU each are being examined. These terminals are smaller than the original proposal—two terminals of 1.3 million TEU each—and while this detracts from the additional capacity, it reduces the cost of financing.
- The two veteran ports plus one large terminal with a capacity of 1.3 million TEU are expected to provide a response to demand for container services until 2025. The two veteran ports plus two smaller terminals with a capacity of 0.8 million TEU each, are expected to provide a response to demand until 2026.
- The advantage of one large terminal is in the fact that it will cost less than two small terminals. The advantage of two small terminals is that they will create competition for the two veteran ports, leading to streamlining and improved customer service, the proximity of customers lowers shipping costs, and they have the potential for expansion much more rapidly when necessary.

Israel's ports are operated by two government companies—"Haifa Port" and "Ashdod Port"—and two private companies to operate small ports, "Eilat Port" and "the Israel Shipyards port". There is also a government company for port asset management, maintenance and development (Israel Ports Development and Assets Company – IPC). The Ministry of Transportation's Administration of Shipping and Ports coordinates regulatory powers. Activity at the ports is divided into three main sectors: (a) the containers sector, which generates about 67 percent of revenue of the two large ports—Haifa and Ashdod—while the private companies are not currently active in it<sup>1</sup>; (b) general cargo, including vehicles; and (c) bulk cargo. The containers sector's share of the ports' revenue has for years been in an upward trend (Figure 1), since there is a tendency to move from shipping via conventional ships to shipping via container ships. In view of this increase, the capabilities of Israel's ports to receive container ships has been increased in recent years, and assuming that the ports operate according to accepted standards, their current capacity will enable the handling of

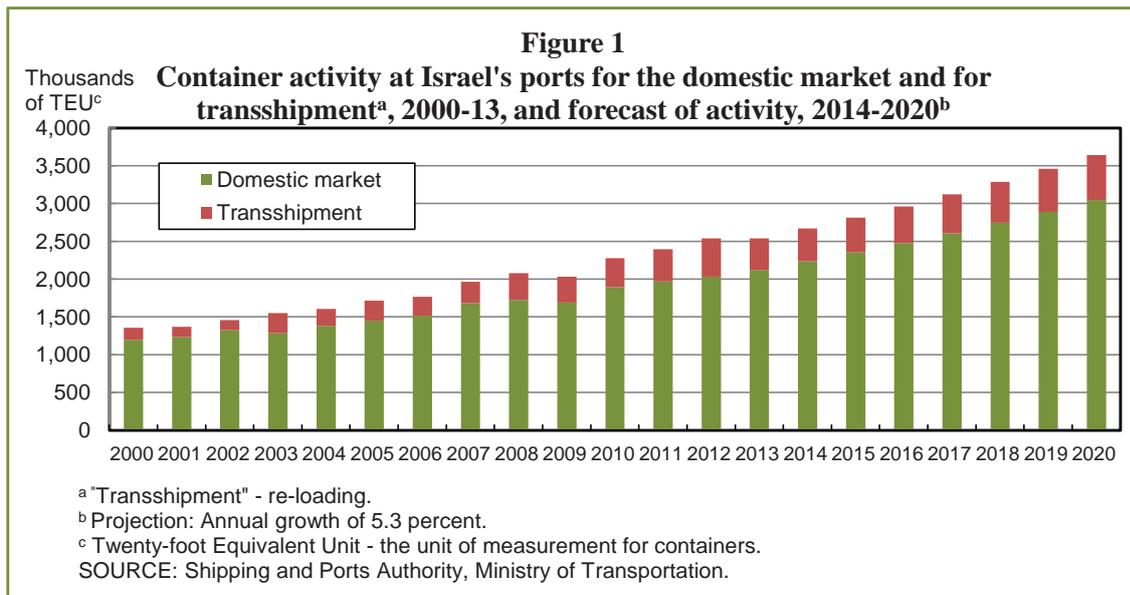
<sup>1</sup> "Eilat Port" is supposed to renew its activity in the sector, and the "Israel Shipyards port" will apparently be starting to operate in it.

3.2–3.4 million TEU per year (twenty-foot equivalent unit, the measurement unit for containers; see Table 1). Since demand is expected to increase, the government decided to construct two new container terminals—the Haifa Bay terminal and the southern terminal at Ashdod—and to operate each one through an entity that is separate from the existing port companies.<sup>2</sup>

The government examined three alternatives. The first was to build two large terminals at the outset, one alongside each veteran port. The second was the build two smaller terminals at first and then to expand them later on into large terminals. The third was to build one large terminal at first, alongside one of the veteran ports, and later to build a second large terminal alongside the other veteran port. As such, the first alternative has one stage, while the other two have two stages, but all of them expand the ports to the same extent by the end of the process. In the end, the government decided upon the second alternative.

On July 3, 2013, IPC published tenders for the construction and operation of the two terminals (with the government reserving the right to construct only one terminal). These terminals will make it possible to receive large container ships and to bring Israel's ports in line with the prevailing global trend of the past few years—increased ship capacities, which lowers shipping costs. The construction tender is currently at the stage where the price bids are being examined. The operations tender is at an earlier stage. Four international operating companies, separate from the veteran port companies, met the benchmark requirements of the prior qualification stage in the tender and passed through to the final stage. In the final stage in another few months, these companies will be required to submit binding price quotes, two of which will be selected—one for each new terminal.

<sup>2</sup> As will be explained below, the construction of the new terminals constitutes a window of opportunity for increasing competition in an industry in which there are, as stated, just two companies in the sector of activity with the most revenue, the containers field. The Director General of the Israel Antitrust Authority ruled that the existing ports are a concentration group, and that the construction of new container terminals alongside the existing ports in Haifa and Ashdod constitutes a window of opportunity for the entry of new competitors into the port services industry and the development of intra-port competition between the existing ports and the operators of the new container terminals. The Director General ruled that the "Ashdod Port" and "Haifa Port" companies would not operate the Haifa Bay port terminal or the South port terminal, and would not expand their operations to any place (other area, terminal or platform) that they are not currently using, until the Haifa Bay and South ports are being operated by new competitors. (The Antitrust Authority, Press Release, November 26, 2011). The Trajtenberg Committee on Economic and Social Change also recommended that a timetable be set for effective intra-port competition within the ports in Israel, and that this could be made possible if the terminals are not operated by the existing port companies.



This article examines the worthwhileness of constructing the new terminals. The first section provides an assessment from the standpoint of the economy as a whole, while the second section deals with how the new terminals are expected to impact ports service prices.

**1. The considerations concerning the allocation of sources in the decision to build the ports**

From the point of view of the economy as a whole, it is desirable to obtain maximum output with minimum expenditure on capital and labor. The planning is based on a discussion of the following questions:

a. Should a new terminal be built? The discussion should assess the costs inherent in building the terminal and compare them to the costs derived from a lower level of service and from the longer wait to receive it.

b. Should two small terminals be built at the outset, as the government decided? Perhaps it would have been preferable to build one large terminal? The discussion should assess the second terminal's contribution to improved service and compare it to the cost of its construction and operation. Included in this should be an assessment of the savings in overland transportation costs as a result of the operation of two terminals, compared to the advantages of scale in operations as a result of concentrating operations in one terminal.

c. Assuming that the government chose to construct one large terminal at the outset, where should it be located—in Ashdod or Haifa? The discussion should assess the characteristics of the customers and select a location that will minimize

the costs of overland transportation between the terminal and the final destinations, including the costs derived from negative external effects of additional congestion on the roads. The terminal's effect on the development of the city, the surrounding area, and the industries using the port services should also be taken into account.

The following is an expanded discussion of each of these questions.

*a. Should a new terminal be built?*

The volume of container activity in 2013 reached 75 percent of the joint capacity of the Ashdod and Haifa ports (3.2–3.4 million TEU; see Table 1). The volume of container traffic to the domestic market increased over the past decade at an annual rate of 5.1 percent (Figure 1), similar to transshipment activity. If activity continues to increase at a rate of 5.1–5.3 percent per year<sup>3</sup>, the joint capacity of the veteran ports will be fully maximized in 2019, and perhaps earlier.<sup>4</sup> Since the construction of a new terminal takes at least 6 years, it is necessary to begin activity to increase capacity immediately so that it will be available around 2020.

In this context, it should be noted that the estimation regarding the full use of capacity includes a safety

<sup>3</sup> A slightly higher rate than the current rate, and it is based on evaluations by the Israel Ports Company (IPC, Development of the Ports of the Future", presentation, 2012).

<sup>4</sup> Assuming that activity will grow by 5.3 percent per year, activity will reach maximum capacity of about 3.4 million TEU at the end of 2019. According to other estimations by the IPC, capacity stands at about 3.2 million TEU, and will be fully utilized before then.

Table 1:  
Main indicators of container port activity in Israel

	Ashdod port	Haifa port	Both ports
Port capacity (millions of TEU) <sup>a,b</sup>	1.5-1.4	1.9-1.8	3.4-3.2
Total container activity in 2012 (thousands of TEU)	1,170	1,370	2,540
Import of full containers (thousands of TEU)	534	322	856
Export of full containers (thousands of TEU)	197	294	491
Container transshipment activity (thousands of TEU) <sup>c</sup>	40	480	520
Platform length (km) <sup>d</sup>	1.71	2.08	3.79
Number of employees in 2012	1,295	1,088	2,383
Average annual salary per employee (NIS thousand)	443	458	450
Salary expenses (NIS million)	574	499	1,073
Port income in 2012 (NIS million)	1,115	735	1,850
<i>of which:</i> Income from the containers sector (excluding transshipment) (NIS million)	662	470	1,132
Transshipment income (NIS million)	-	114	114
	South terminal, Stage A <sup>e</sup>	Haifa Bay terminal, Stage A <sup>e</sup>	
Platform capacity, (millions of TEU)	0.8	0.8	
Platform length (km)	0.8	0.8	
Cost of constructing the port (NIS billion) <sup>f</sup>	5.5	5.8	
Timetable to start of operations, assuming the terminals are built simultaneously.	Mid-2021	Mid-2020	

<sup>a</sup> TEU - Twenty-foot Equivalent Unit, the unit of measurement of a container. A double container (40 feet) is calculated at double the weight of a regular (20-foot) container.

<sup>b</sup> Capacity is based on the assessment of the Israel Ports Company (IPC, "Development of the Ports of the Future", presentation from 2012) according to which the ports are operating in the most effective way, for 22.5 hours per day, and the average waiting time is two hours. This assessment may change as a result of changes in the mix of ships arriving at the port.

<sup>c</sup> Transshipment is the offloading of a container from one ship and loading it onto another, usually smaller, ship for offloading at the destination port. Transshipment is counted twice since there are two activities involved (offloading and loading).

<sup>d</sup> The total length of container platforms is just one of the parameters in determining the capacity of the port. Other parameters are the individual length of each platform, the depth of the platform, the quality of equipment, and so forth. Capacity is also affected by the mix of ships arriving at the port.

<sup>e</sup> In the second stage, the new terminals will be expanded to 1.3 million TEU each.

<sup>f</sup> This is an estimate since the construction of the terminals is in the midst of the tenders process and the matter is therefore classified. The cost includes construction of the terminal, paving access roads, construction of the upper structure, and equipment. The estimate does not necessarily reflect the bids submitted to the Israel Ports Development and Assets Company.

SOURCE: Israel Ports Development and Assets Company, Shipping and Ports Authority, and Ashdod Port and Haifa Port corporate financial statements for 2012.

margin. First, the growth rate of activity may slow as the containerization process—the continued growth in the share of goods shipped by containers—is completed. (In the past decade, the rate of growth of handling containers for the domestic market is about 0.7 percentage points higher than that of importing containers and general cargo combined.) Second, some of the capacity of the Haifa port currently serves for transshipment of goods, and this can be diverted to make room for offloading containers for the domestic

market (more profitable activity). However, such a diversion has attendant additional shipping costs: increasing the share of domestic activity at the expense of transshipment is expected to increase shipping costs and duration, since transshipment is a natural part of the activities of shipping companies that operate direct lines to Israel, and harming that may cause them to move the international lines that had been arriving directly to Israel to a different port. That will reduce the direct port calls by the large vessels sailing

the international lines, and expand the reliance on small feeder ships, the latter being more expensive due to double handling.<sup>5</sup>

According to assessments, the cost of constructing the planned (small) terminals ranges from NIS 5.5 to 5.8 billion per terminal.<sup>6</sup> Delaying the construction of a terminal by one year leads to savings of about NIS 160-270 million in financing expenses.<sup>7</sup> However these savings are lower than the costs that would be created by fully exhausting capacity at the ports, due to the delay in the supply of imported goods to the economy, the cost of maintaining inventory, prolonging the waiting time of ships at the entrance to the port, and increased costs of overland shipping (offloading goods at the Haifa port and transporting them relatively far distances to the center of the country)—both direct transportation costs and the negative outside effects such as congestion on the roads and air pollution. Based on the IPC's estimate of demand, it seems that it is proper to advance the expansion of capacity immediately.

*b. Is one large terminal preferable to two small terminals?*

The government decided, as stated, to first build two small terminals, but also considered the possibility of building one large terminal alongside one of the veteran ports in the first stage, using the full platform derived from the planning of the breakwater, and delaying the construction of the second large terminal for a few years. The cost of such a port is about NIS 6 billion, including roads and equipment, its capacity would reach 1.3 million TEU per year, and it would be possible to complete it in about the time frame necessary to complete the small terminals currently planned. Such a terminal would be able to provide a response to demand until 2025, at which time the second terminal would be necessary,

<sup>5</sup> Double handling is the process by which containers are offloaded from the large ships that ship them long-distances, and loaded onto smaller ships that bring them to the final destination. According to an estimate by the Shipping Authority, the cost of the process ranges from \$150 to \$350 per container, and this cost is saved when shipping a container directly to the final destination.

<sup>6</sup> Note 6 in Table 1 provides details of what is included in the costs.

<sup>7</sup> In order to calculate the financing expenses, we used a yield of 2.9 percent. In greater detail, there is a spread of one percent between the yield on government bonds and the yield on CPI-indexed corporate bonds with a high rating (AA+) and long average duration (average for February–April 2014). The yield on CPI-indexed government bonds with an average duration of 15 years is 1.91 percent (average for the months of February–April 2014), leading to a yield-to-maturity on bonds with high rating and average duration of 15 years of 2.9 percent. According to the IPC's assessment, issuing bonds to finance the ports will have a higher cost. The lower bound of financing expenditures was calculated on the assumption that yields would be 2.9 percent, and the upper bound was calculated on the assumption that yields would be 5 percent.

and it would make it possible to delay of construction of the second large terminal by about four years. Even though there are disadvantages to the delay—which will be listed below—there is also an important advantage, since it saves on financing costs.

There are clear advantages to one large terminal, since the cost of the new terminals derives mainly from the construction of a new breakwater, and both the small and large terminals would require the same breakwater. In the case of the small terminals, part of the platform is not developed, and they are planned for completion to 1.3 million TEU around 2027, when the need for additional capacity will be pressing.<sup>8</sup> The extra cost resulting from the construction of two small ports, capitalized to 2014 (before calculating the advantages), ranges between approximately NIS 0.4–0.8 billion in total.<sup>9</sup> This cost of financing is derived from bringing the expenditure forward by a few years, due to the investment in two small terminals rather than investment in one large terminal until demand increases sufficiently to make a second large terminal necessary.<sup>10</sup> An additional surplus cost derives from the surplus expenses derived from the operation of two terminals (mainly from the fixed components of wages, such as for management, and of depreciation).

An additional consideration in favor of constructing one large terminal and delaying the second is that the construction of a terminal requires an irreversible investment, meaning it cannot be realized if the economic conditions change and it becomes clear that it is not worthwhile in its current form. The delay would make it possible to formulate a more intelligent assessment of the pace at which container traffic is expected to increase once the containerization process is complete, and it may save large and irreversible investments.

<sup>8</sup> Assuming that there is no additional capacity in the existing ports.

<sup>9</sup> NIS 0.4 billion—assuming that the interest rate is low (2.9 percent per year) and that the road system around the port makes a contribution of its own, meaning a contribution that is not dependent on the construction of the port. NIS 0.8 billion—assuming that the interest rate is 5 percent per year and that the road system has no independent contribution.

<sup>10</sup> The estimate was prepared based on the following assumptions: The Haifa Bay terminal will be operational in mid-2020, and the South terminal will be operational in mid-2021; the expenditure for building a terminal is paid in full half a year before it is operational; interest for capitalization is 2.9 percent (or 5 percent; see Note 7 above); the cost of roads around the Ashdod port is not counted since it improves transportation in the port area, and it therefore seems that there is no justification for imputing the cost to the construction of the port (alternatively, the cost is counted; see Note 9). The estimate did not take into account the construction of 0.5 million TEU at the Ashdod port in either of the alternatives, but this addition does not materially change the calculations.

In contrast, the construction of two small terminals at the outset has two main advantages. First, they provide a response to the increase in demand without creating extra waiting costs for ships, thereby reducing overland transportation costs to distant destinations. Second, they improve the efficiency of the veteran ports due to the fact that they will be competing with them. However, if the investment focuses on just one terminal, it will reduce the competitive pressure in the parts of the country that are in proximity to the port where no new terminal is built, it will artificially divert cargo to the new terminal, and it will increase the costs to users—particularly exporters—and negatively impact their competitive ability.

A third consideration in favor of building the terminals simultaneously concerns the fact that the complexity of the planning and construction processes—both for the port and for the transportation system underpinning it—increases over time, as density in the area increases. It is therefore better to expand the ports before congestion in the background increases, particularly because it is not clear to what extent it will be possible to ensure building rights over time in an effective manner.

*c. Where to locate one large terminal, in Ashdod or Haifa?*

Had the government chosen to build one large terminal at the outset alongside one of the veteran ports, and to delay the construction of the second large terminal, it would have required the authorities to decide where to locate the first large terminal, in Haifa or in Ashdod. In order to make such a decision, it would have been necessary to clarify the costs of the investment, what additional capacity would have been derived by the construction, how much time would elapse until the terminal was operational and whether this timetable would be consistent with the demand projections, to what extent the terminal would contribute to increased competition between the ports and to their streamlining, what the port customers preferred and what overland shipping costs their preference caused, how the terminal would affect the development of the city and the area, and what other external effects it would have.

According to an assessment by IPC, Ashdod and Haifa are similar both in terms of the cost of construction and in terms of planned capacity.

As to the timetable, in Haifa the new terminal would be operational in mid-2020, and in Ashdod in mid-2021, since there is already a work port in Haifa and one must be built in Ashdod. The capacity of the existing ports will be fully utilized in 2018–2019<sup>11</sup>, even before completion

<sup>11</sup> An explanation of the date of full utilization of capacity appears in Note 4.

of the construction in Haifa. Should it be decided to build the terminal in Ashdod, some of the transshipment activity would be diverted, apparently, to domestic activity (assuming that activity grows at a rate of 5.3 percent per year and the average waiting time is two hours per ship). Lowering transshipments would increase the shipping duration and its costs due to double handling.<sup>12</sup> In addition, if construction is delayed, there would be no surplus capacity.

In terms of customer preferences, there is much higher demand for the Ashdod port, which does not deal with transshipments—a less profitable activity (see Table 1). Basically, the Ashdod port is close to full realization of its potential container activity (1.2 million TEU, while its estimated capacity ranges between 1.4 million and 1.5 million TEU). There is already a direct cost to this today, particularly taking into account the frequent work stoppages at the port. The direct damage derives from the fact that the ships wait at the entrance to the Ashdod port more than at the entrance to the Haifa port, from the fact that the level of service is low, and from the fact that containers are diverted to the Haifa port. (A rough estimate shows that shipping costs to the center of the country are about NIS 10 million per year, and that is without taking into account the negative external effects, including road congestion, air pollution, traffic accidents, and so forth<sup>13</sup>). These costs will increase in parallel with the surplus demand for port services. There are also indirect costs to crowding, such as waiting costs for cargo owners in Israel and abroad, particularly exporters and importers, and costs that result from the fact that the timetables are not reliable and that it is hard to know when the cargo will reach its destination, including costs inherent in the need to maintain large inventories.

In terms of shipping expenses, Ashdod has an advantage, since it is closer to the center of the country, which saves overland transportation costs. 62 percent of import containers are offloaded at Ashdod (Table 1 contains details of full import containers), even though it should be provided service to 68 percent of full containers entering Israel in view of its proximity to the center of the country.<sup>14</sup>

<sup>12</sup> Section (a) includes a full description of the process that leads to increased shipping expenses.

<sup>13</sup> 62 percent of full containers are offloaded at Ashdod (534,000), compared to 68 percent expected according to the distribution of population and income. As such, 50,000 containers were diverted from Ashdod to Haifa. The cost of the extra shipping from Haifa to the center of the country is about NIS 200 per container (for a total of NIS 10 million), and on the assumption that some of the containers return to Haifa empty, the cost is even higher.

<sup>14</sup> This assessment is based on how the population and its purchasing power are distributed in the geographic area, as well as on the fact that the Ashdod port is closer to the areas south of Netanya.

Another advantage enjoyed by the Ashdod port involves its streamlining potential, which is greater than that of the Haifa port, since it is less efficient than the Haifa port (according to efficiency indices by the Shipping Authority).<sup>15</sup> Construction a private terminal close to one of the existing ports will require the veteran port to maximize the potential of the capital and workers available to it, and this streamlining is one of the important benefits that the construction of a new port will generate for the economy.

The development of a port is accompanied by considerations that are difficult to quantify in economic terms, including the port's effect on the development of the city and the periphery. By way of illustration, the establishment of a new terminal in Haifa would make it possible to move the old fuel port, to build an innovative, safe fuel platform, and to realize the urban renewal plan for the lower city of Haifa with the help of the "waterfront" plan and a port for passenger ships.<sup>16</sup>

When choosing the location of the port, consideration should also be given to a variety of additional considerations, including the complexity of statutory planning of the port and of the transportation systems (roads / railways), the rear of the port, its flexibility for future development, the balance of risks during emergencies, security, labor relations, the operation of ship traffic in the port's waterways, the attractiveness of transit cargo traffic (transshipment from ship to truck and transport of the cargo to a different country), engineering risks and environmental quality. As far as is known, there are no material differences between Haifa and Ashdod in these respects.

Taken together, the considerations therefore indicate that there are significant economic advantages to the decision to build two small terminals in the first stage (instead of one large terminal), and these advantages were decisive over the disadvantage of the higher direct cost.

## 2. How will the new terminals affect competition between the ports and the price of their services?

Factories in the north and south of the country are, to a great extent, captive consumers of the Haifa port and the Ashdod

<sup>15</sup> Due to the preferable location of the Ashdod port and its specialization in profitable cargo such as vehicles, it is more profitable than the Haifa port. Its profitability may have blunted its need and desire to streamline and made it possible for the port to be managed with a "soft" budget limit. In contrast, the Haifa port is less profitable, and therefore has a much greater incentive to streamline.

<sup>16</sup> Urban Building Plan 13/3/a is in the approvals process in the planning boards.

port, respectively, because overland transportation of goods to and from the farther port has high attendant costs. In other words, the high costs of transportation make each port a regional monopoly. This argument is made stronger by the fact that most of the container ships calling in Israel call at both the Ashdod and Haifa ports.<sup>17</sup>

An assessment of the level of competition between the two ports using a model in which they decide simultaneously on the price of service<sup>18</sup> shows that the level of prices obtained depends on the cost of overland transportation and the distribution of container destinations through the geographic area: Where most of the cargo is destined for the periphery—south of Ashdod and north of Haifa—each port becomes a regional monopoly and there is a markup, because the high costs of shipping make it less worthwhile to use the more distant port. However, to the extent that a large portion of the cargo is destined for the area that is within equal distance of the two ports, there will be competition between the two ports and their markup will be negligible.

We carried out a simulation with the aim of examining how the new terminals would affect competition between the ports. For the purpose of the simulation, we estimated the geographic distribution of the destinations or points of departure of the containers. The estimation was made according to a weighting of four variables that affect container traffic—population, wage income, industrial production, and industrial exports. The distribution of containers throughout the geographic area gives an advantage to the Ashdod port, which is closer to 64 percent of the containers' destinations or points of departure.

If a new terminal is built in Ashdod, alongside the veteran port, and is operated by one private operator (for a total of two operators in Ashdod and one in Haifa<sup>19</sup>), and if the new terminal is more efficient than the veteran one, it will reduce the markup<sup>20</sup> of the veteran port. Opening the terminal will lower the veteran port's price, which will be equal to the marginal cost. The markup of the veteran port in Ashdod will be reduced to zero. However, the price at the veteran port in Haifa will increase, unless price controls are continued. This is because the Haifa port, assuming that it must charge

<sup>17</sup> The Haifa port was the point of departure for 60 percent of ships calling at the port of Ashdod, and the Ashdod port was the point of departure for 57 percent of the ships calling at the port of Haifa.

<sup>18</sup> The analysis was carried out using the Bertran model.

<sup>19</sup> There is a similar analysis for a case where it is decided that the sole terminal will be built in Haifa.

<sup>20</sup> To be more precise, the return on capital and on labor, and not the profit. This is because surplus economic profit is founded on the assumption that wags are competitive—and it is not clear that such a situation currently exists at the sea ports.

its customers a uniform price, will concede competition in the central region and will concentrate on the northern district and the Haifa sub-district, and will enjoy the status of a monopoly there. If there is effective control over prices at Haifa, the price there will be set in accordance with the controls, and the price at Ashdod will decline.

If two new terminals are constructed, alongside the existing ports in Ashdod and Haifa, and each of them has one private operator (for a total of two operators in Ashdod and two in Haifa), it will reduce the monopolistic powers of the veteran ports in Ashdod and Haifa. The price in Haifa and in Ashdod would decline to the marginal cost of the veteran port in Haifa and in Ashdod respectively, and the average price at the ports will decline. The market analysis of the existing ports will depend on the extent to which they succeed in streamlining.

The results of the simulation indicate that opening just one terminal will lower the average price by a moderate rate, and will cause pressure for increased prices at the veteran port that does not have a new terminal alongside it. This will require the authorities to continue with price controls. Opening two terminals, in Ashdod and Haifa, will intensify competition and will lower the cost at both veteran ports.

Stronger competition can also contribute to lower overland transportation costs. Since the expected price in Haifa is equal to the price in Ashdod plus shipping costs, the new train station that will soon begin operating at the Ashdod port and will reduce the cost of overland transportation from Ashdod northwards could have prevented a rise in prices of port services in the Haifa area even had it been decided to build only one terminal.

This analysis shows that the decision to construct two competing terminals instead of one large terminal is expected to also make a positive contribution to competition in the industry. This contribution to competition will reduce the need for price controls in order to protect the periphery in the area in which a terminal is not built, and it will strengthen competition in the center of the country.

Even though the results of the simulation indicate that the new terminals may contribute to competition, it is important that the regulators also relate to issues that the simulation ignored, particularly the possibility of friction in the market structure (such as long-term contracts between shipping companies and the ports), a potential cartel, and even illegal conspiracy between the various operators. These may delay competition, thereby also delaying the decline in prices in

the short term.<sup>21</sup> As such, it is important that regulators make sure that such arrangements are not created during the period that will elapse before the new terminals open.

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<sup>21</sup> A discussion on the topic appears in the box on reforms in the cellular communications field, Bank of Israel Annual Report for 2012, pp. 65-69.

**Preliminary estimates ahead of the 2015 budget, and fiscal trends for the remainder of the decade**

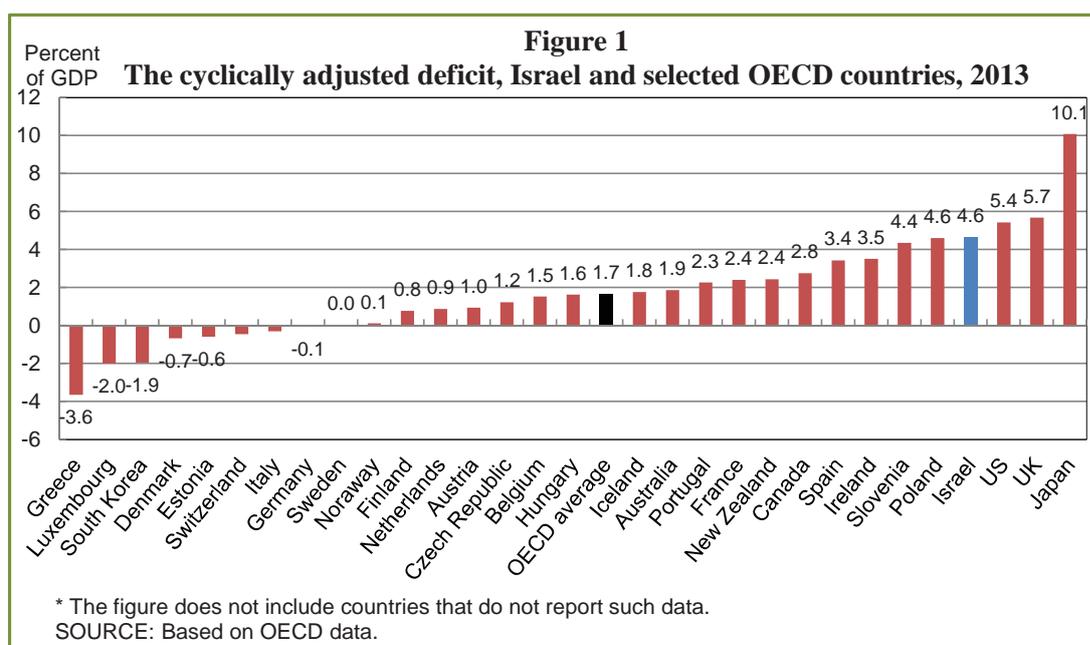
- The fiscal adjustment in the 2013–14 budget led to a reversal of the increase in the deficit, restored the credibility of the government’s commitment to the declining deficit path, and contributed to a decline in interest rate spreads between Israel and other advanced economies.
- There is great importance to continuing the reduction of the deficit in accordance with the framework set by law, because, given the economy’s cyclical position, the current level of the deficit remains high in international comparison, and does not allow an extended decline in the debt to GDP ratio.
- In order to meet the deficit target for 2015, a total of about NIS 18 billion in fiscal measures—reducing expenditures as well as steps to increase revenues—will be required.
- The level of the expenditure ceiling for 2015 will be affected to a large extent—more than NIS 4.5 billion—by the legal determination of whether a price adjustment is required, in respect of the gap between the development of prices in the past two years and the 2013–14 budget forecast.
- The expected government expenditures based on programs already approved are markedly higher than the expenditure ceiling—if a price adjustment is carried out the gap is about NIS 12 billion, and if not, the gap is about NIS 7 billion.

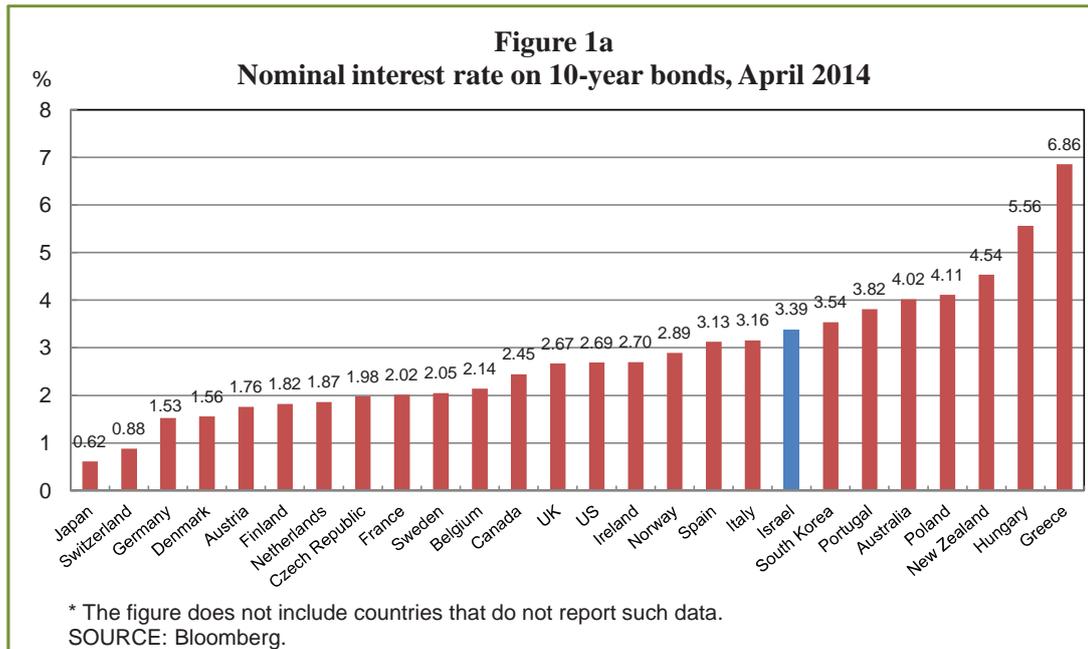
- Increasing expenditures in line with the ceiling will require policy actions to raise revenues—by about NIS 6 billion if a price adjustment is carried out, and about NIS 11 billion if not.

**1. Introduction**

From the middle of 2013, the government budget deficit has been declining, reflecting to a large degree the effects of the fiscal consolidation plan which the government implemented alongside the approval of the 2013-14 budget. The plan included an increase in tax rates and a moderation of the increase in expenditure. The deficit in 2013 totaled 3.2 percent of GDP, lower than the deficit of 3.8 percent of GDP in 2012, and the cumulative deficit in the 12 months ended in April 2014 was 2.5 percent of GDP, compared with 4.2 percent of GDP in the 12 months ended in April 2013. Furthermore, actual deficit data do not reflect the full extent of the fiscal adjustment which was carried out, since without the adjustment the deficit was expected to increase markedly due to various expenditure programs approved by the government and lower tax revenues.

The success of the program restored the credibility of the government’s commitment to the declining deficit path set in 2009, which is expected to reduce the debt to GDP ratio to about 60 percent by the end of the decade. The strengthened credibility also contributed to the notable decline in the same period in the yield spreads between Israel and other advanced economies and thus to a decline in the interest payment burden in the coming years. With that, since a significant portion of the revenues which contributed to reducing the deficit were





one-off revenues, and since based on most estimations the current output gap in Israel is low (the economy is near full employment), the level of the structural deficit remains too high to allow an extended decline in the debt to GDP ratio. An international comparison of the cyclically adjusted deficit (Figure 1) indicates that this deficit is high relative to deficits in most other advanced economies. Moreover, Israel's cost of financing the deficit, as reflected in the interest rates on long-term bonds, is also relatively high compared with other advanced economies (Figure 1.A). Therefore, maintaining fiscal credibility presents the government with substantial budgetary challenges.

After an extended decline in the past decade, the share of taxes in GDP increased slightly in 2013, and the share of public expenditure in GDP stabilized at around 39 percent (Table 1); both shares are low compared with most of the advanced economies. The ratio of public debt to GDP declined slightly and its level is low compared with most advanced economies.<sup>1</sup> The share of primary civilian expenditure in GDP stabilized in recent years at a very low level compared with other advanced economies, despite the decline in the share of total public expenditure, due to the extended decline in the ratio of defense and interest expenditure to GDP. Toward the end of 2013, when it became clear that the level of expenditure expected in 2014 was lower than originally budgeted, the government cancelled the plan to raise tax rates in 2014, deferred part of the increase in National

Insurance fees, and reduced the expenditure ceiling for 2014 by an amount equal to the estimated loss of revenues, NIS 3.75 billion.<sup>2</sup> At the same time, the government and the Knesset changed the expenditure rule in a manner that will reduce the increase in public expenditure for the years 2015 and onward.<sup>3</sup>

After these changes, the expected deficit for 2014 is close to the target set by the government, 3 percent of GDP, assuming full performance of the budget. Tax revenues are expected to increase by about 5.5–6.0 percent in real terms, compared with 2013, due to a large extent to the increase in tax rates in the middle of 2013. The ratio of public debt to GDP is not expected to change significantly this year. With that, in the past two years, many changes have been made in tax rates and tax regulations in Israel which affect various companies, and the exceptional global interest rate environment provides an incentive for financial transactions that may have a significant impact on tax revenues in a given year. Therefore, the long-term relationship between tax revenues and real macroeconomic variables may be more volatile over the short term than previously. Additionally, the volatile environment is also reflected in notable changes in quarterly National Accounts projections, which may increase the volatility of tax estimates which are based on them.

<sup>1</sup> An international comparison of main aggregates was presented in the previous edition of Recent Economic Developments—number 136, (2014) Bank of Israel.

<sup>2</sup> The decline reduces the budget base for coming years as well.

<sup>3</sup> For further detail, see Chapter 6 of the Bank of Israel Annual Report for 2013.

Table 1  
Main budget aggregates, 2000–13

(National Accounts definition)

	2000–07 average	2008	2009	2010	2011	2012	2013
Total public revenues	42.3	38.6	38.6	35.7	36.7	35.4	36.2
Total taxes	34.4	31.9	29.7	30.5	30.7	29.5	30.3
Total public expenditure	45.3	40.7	41.0	40.1	39.4	39.2	39.4
Defense expenditure	7.5	6.4	6.1	5.9	5.7	5.6	5.5
Primary civilian expenditure	32.8	30.8	31.4	30.9	30.8	30.8	31.1
Overall deficit of the general government	3.0	2.1	5.3	3.6	2.7	3.9	3.2
Public debt (gross) <sup>a</sup>	86.8	72.9	75.3	71.5	69.7	68.2	67.4

<sup>a</sup> Net of local authorities' debt to the government.

SOURCE: Based on Central Bureau of Statistics.

The change in the fiscal rule which sets the expenditure ceiling reduced the permitted increase in government expenditures in 2015, following the reduction of the expenditure base itself from 2014 which was intended to allow the cancellation of tax increases. The new rule establishes that the real increase in government expenditures will be in accordance with the population growth rate in the preceding 3 years (1.8 percent over the determining years for 2015) plus the ratio of 50 (reflecting the long term target debt to GDP ratio) to the debt to GDP ratio in the last known year (67.4 percent at the end of 2013). Based on this calculation, the permitted real increase in the 2015 budget is 2.6 percent, which means an addition of NIS 8 billion (Table 2). With that, the real rate of increase in the government budget is adjusted each year (or every 2 years, when two-year budgets were administered) for the gap between the price forecast used in preparing the previous budget and actual prices in that year.<sup>4</sup> The significance of this adjustment, if implemented, is that the real increase in the 2015 budget will be only 1.1 percent, or NIS 3.3 billion. However, this year there is a legal question whether the price adjustment is required, since the government switched to a new expenditure rule and therefore it is not a routine update of the budget based on an existing rule.

Although the price adjustment in the 2015 budget is large compared to previous years, inter-alia because the 2013–14 budget is a two-year budget, significant price adjustments were necessary in past years as well. This process, which is implemented after the approval of the budget by the government, is a necessity as long as government budgets

are based on a price forecast which varies from year to year, due to the concern that the projection will be used as a tool to increase or decrease the real budget.<sup>5</sup> Since the average rate of inflation over the past decade is in the middle of the target range set by government, because in Israel there is not a systematic gap between the rate of increase of public consumption prices and the CPI, and since annual changes in the CPI in any case are not considerably relevant to the government's expenditure path, the time has come to switch to adjusting the expenditure ceiling each year on the basis of the midpoint of the inflation target range.<sup>6</sup> Such a move would save the need for retroactive adjustments of the expenditure ceiling, without exposing the process of setting budget prices to manipulations.

## 2. Calculation of expenditure ceiling for 2015

A comparison of the expenditure ceiling to expenditure projections derived from the current level of expenditure, the added cost deriving from the plans approved by the government and by Knesset legislation, and from the effect of various demographic and economic trends, indicates that such projections are significantly higher than the ceiling. One of the reasons for the gap is that some of the measures adopted by the government in order to reduce expenditures in 2014 are nonrecurring, and added to that are an increase in the education budget based on previous decisions and the

<sup>5</sup> That is, that the price forecast will not be "inflated" so that expenditure is increased by more than permitted. The current mechanism guarantees that in such a case the government will need to reduce the budget in the following year in accordance with the deviation of the forecast from the actual increase in prices.

<sup>6</sup> For a detailed discussion see Chapter 1 of the Bank of Israel Annual Report for 2013.

<sup>4</sup> In the 2015 budget, it is the difference between the increase in prices in 2013 and 2014 and the forecasts in the two-year budget approved in July 2013.

**Table 2**  
**Calculation of expenditure ceiling for 2015**

		(NIS billion)
1	Expenditure ceiling in 2014 budget (net, including credit)	319.3
2	Reduction of base, in line with government and Knesset decisions <sup>a</sup>	3.8
3	Base for calculating expenditure ceiling for 2015 (1–2)	315.5
		(Percent)
4	Real rate of growth of expenditures, based on the rule	2.6
5	Price adjustment <sup>b</sup> (8+9-6-7)	-1.4
6	Budget's inflation forecast for 2013	1.7
7	Budget's inflation forecast for 2014	2.3
8	Actual inflation in 2013	1.5
9	Inflation currently forecast for 2014	1.1
10	Real growth rate for 2015 budget, including price adjustment	1.2
		(NIS billion, 2014 prices)
11	Addition to 2015 budget, with price adjustment (3*10)	3.6
12	Addition to 2015 budget, without price adjustment (3*4)	8
13	Expenditure ceiling for 2015, with price adjustment	319.1
14	Expenditure ceiling for 2015, without price adjustment	323.5

<sup>a</sup> Decisions to reduce the expenditure ceiling in parallel with reductions in income tax and National Insurance fees

<sup>b</sup> The gap between the annual average increase in prices in 2013-14 and the budget's forecast.

broad transportation infrastructure investment plan. To the extent that a price adjustment, as described above, is not carried out, the gap between expenditure estimates and the ceiling is assessed at about NIS 7 billion, and if the price adjustment is carried out it will grow to more than NIS 12 billion. This gap is calculated based on conservative assumptions that 1) defense expenditure in 2015 will be in accordance with the multiyear framework approved by the cabinet in parallel with the approval of the budget for 2013–14 by the government, and that such a framework will include the government's expenses related to the agreement to consolidate and privatize Israel Military Industries; 2) that the law for implementing the long school day will be postponed again, 3) the Alaluf Committee recommendations for examining welfare policy will not have significant budget consequences in 2015, 4) that new wage agreements will not be signed in 2015 that will increase real public sector wages beyond that of regular wage creep<sup>7</sup>, and 5) there will not be significant budget costs in 2015 from the reform in the Israel

Broadcasting Authority and the crisis at Hadassah Medical Center. In contrast, the analysis assumes that several budget items in which expenditure was lower than budgeted in recent years will continue to be budgeted at similar sizes, so that they will allow at least partial offsetting of the possible additions.

The gap between the cost of programs approved by the government and the expenditure ceiling ahead of the 2015 budget is smaller than the one faced by the government when approving the 2013–14 budget. Nonetheless, it is a large gap compared with the previous years. This gap reflects to a large extent the tension between the endeavor to maintain the tax burden—and consequently the expenditure level—low, and the desire to provide a response to various social and economic needs, reflected in government decisions and in legislation requiring an increase in expenditures. With that, the lack of systematic monitoring of the gap between the cost of programs approved by the government and the expenditure ceiling set by the fiscal rule also contributes to the creation of the gap. As a result, various plans approved by the government are not implemented, in whole or in part, and it also creates uncertainty and planning difficulties in the government ministries, in households and businesses, which are affected by these programs. To avoid a repeat of the

<sup>7</sup> Wage creep in the public sector increases real wages by almost 1 percent per year and is responsible for two-thirds of the total increase in wages in the public sector—Mazar, Yuval “The Development of Wages in the Public Sector and Their Connection with Wages in the Private Sector”, Discussion Paper Series, 2014, Bank of Israel.

process which led to the current problem, it is important that the government soon adopts an effective system to control the framework of its expenditures in the coming years, which will monitor its expenditure commitments and require an immediate reaction to the development of deviations from the expenditure ceiling for coming years.<sup>8</sup>

The deficit ceiling set by law for 2015 is 2.5 percent of GDP, and based on estimates derived from the Bank of Israel Research Department's tax model<sup>9</sup>, policy measures to increase revenues or to reduce expenditures to below the ceiling will be required in order not to deviate from that level. The size of the required measures depends on whether a price adjustment will be made when calculating the expenditure ceiling. If the adjustment is made, and the expenditure increase will moderate by NIS 12 billion compared with the present estimation, the deficit is expected to be 3.0 percent of GDP, and the additional revenues that will be required in order not to deviate from the deficit ceiling will be about NIS 6 billion, an addition that reflects, among other things, revenue losses of more than NIS 2.5 billion related to the government decision to set a VAT rate of 0 percent on most first-time homebuyers, which is expected to be implemented by the beginning of 2015. If a price adjustment is not made, and the increase in expenditure is only moderated by NIS 7.3 billion, the deficit is expected to increase to 3.4 percent of GDP, and the additional revenues required will reach more than NIS 10.5 billion. The combination of required adjustments in order not to deviate from the deficit ceiling is thus about NIS 18 billion, which is 1.6 percent of GDP.

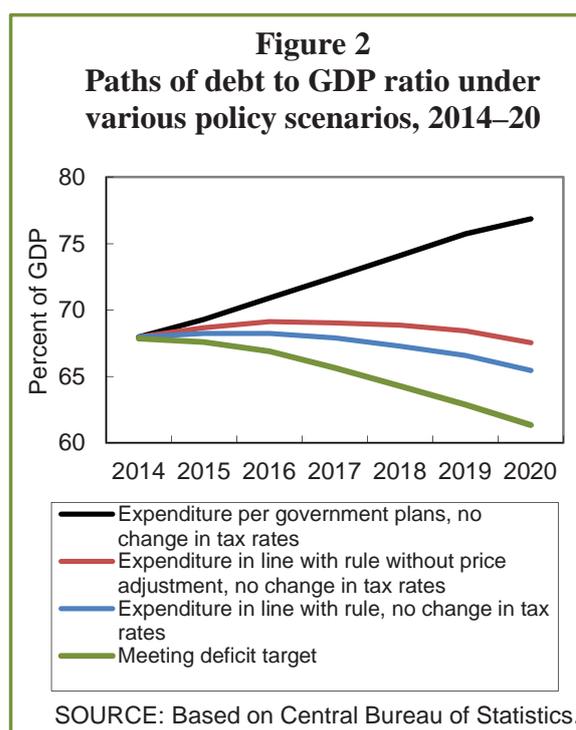
### 3. Forecast and scenarios for 2015–20

The deficit and expenditure ceilings set by law are multiyear and are intended to create a stable framework which allows government planning of its expenditures and tax rates over time, along with support for macroeconomic stability. Beyond the above analysis, which examined the development expected in 2015, it is therefore important to examine their effects on fiscal policy over the rest of the decade. This analysis is presented under the assumption that

<sup>8</sup> A discussion of the way that a lack of monitoring increases in government programs affects missing fiscal targets appears in Brender, Adi, "If You Want to Cut, Cut, Don't Talk: The Role of Formal Targets in Israel's Fiscal Consolidation, 1985–2007", *Israel Tax and Economics Quarterly*, 33:129, May 2009, pp. 33–37. For documentation of the deviations from the deficit targets, see Chapter 6 of the Bank of Israel Annual Report for 2012.

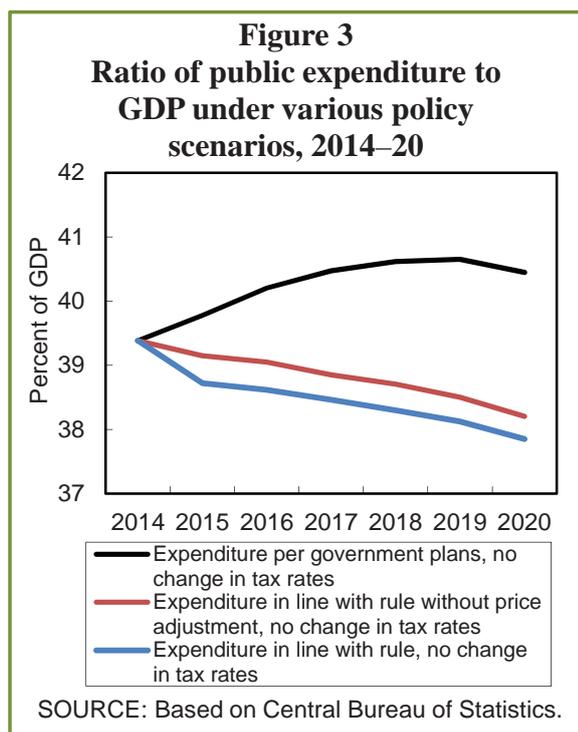
<sup>9</sup> A detailed description of the tax model appears in Brender, A. and G. Navon (2010), "Predicting Government Tax Revenues and Analyzing Forecast Uncertainty," *Israel Economic Review*, vol. 7 No 2, 81–111. The forecast for 2014 and 2015 is also based on the Research Department's macroeconomic forecast which was published at the end of March 2014.

the economy's growth rates from 2016 and onward will be, on average, 3 percent per year, a growth rate which takes into account the demographic changes occurring in Israel.<sup>10</sup> Based on the analysis, meeting the deficit target will allow the government to gradually reduce the debt to GDP ratio to about 60 percent in 2020 (the green line in Figure 2). However, meeting the expenditure ceiling without measures to increase revenues (including in 2015) will keep the debt to GDP ratio in coming years at its current level, in particular in a case in which no price adjustment is made in 2015 (the red line in Figure 2).



Based on the expenditure rule, the expenditure ceiling is expected to increase at an average annual rate of 2.5 percent. The impact of this framework is an extended decline in the share of public expenditure in GDP which by 2020 will reach more than 1.5 percentage points compared with 2013–14 (the blue and red lines in Figure 3). In order to realize this decline, the government will need to significantly reduce the expenditure programs, which it decided upon, in the years after 2015 as well, even if the entire adjustment in the 2015 budget will be based on permanent measures. The size of the additional adjustment required in 2016 is NIS 6 billion, and in 2017 an adjustment of another NIS 5 billion

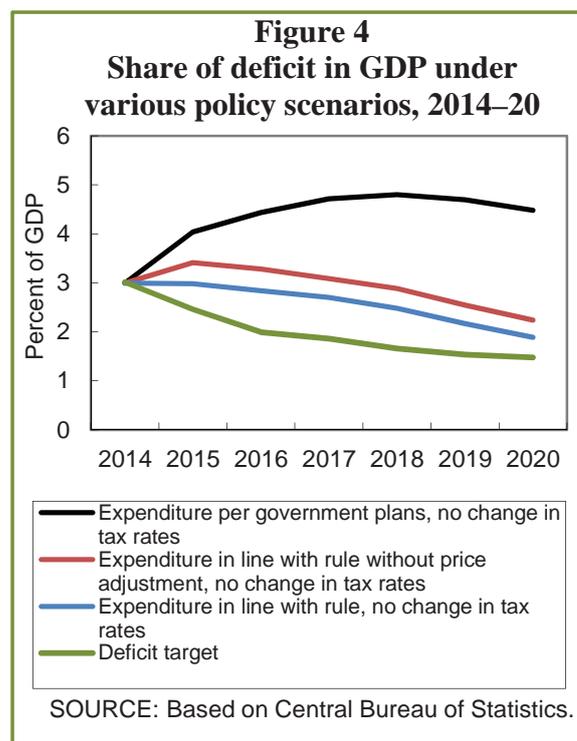
<sup>10</sup> A discussion of the factors affecting the change in Israel's long-term growth rate appears in Chapter 1 of the Bank of Israel Annual Report for 2011.



will be required (assuming that the adjustment in 2016 will also be permanent). This gap reflects the basic dynamic of the various items in the state budget such as education expenses, some National Insurance allowances, and health expenditures—which accounts for most of the increase allowed under the expenditure rule—along with decisions on the multiyear framework of defense expenditures adopted in 2013 and the multiyear investment plan in transportation infrastructure. In addition, the framework reflects the effects of a projected gradual increase in global interest rates over the rest of the decade.<sup>11</sup> The framework is presented by the black line in Figure 3, and the gap between it and the blue or red lines represents the size of the adjustment (in percent of GDP) that will be required in order not to deviate from the expenditure ceiling. It is important to note that this framework assumes that the government will not decide on any additional expenditure until the end of the decade without reducing another expenditure item by a parallel amount.

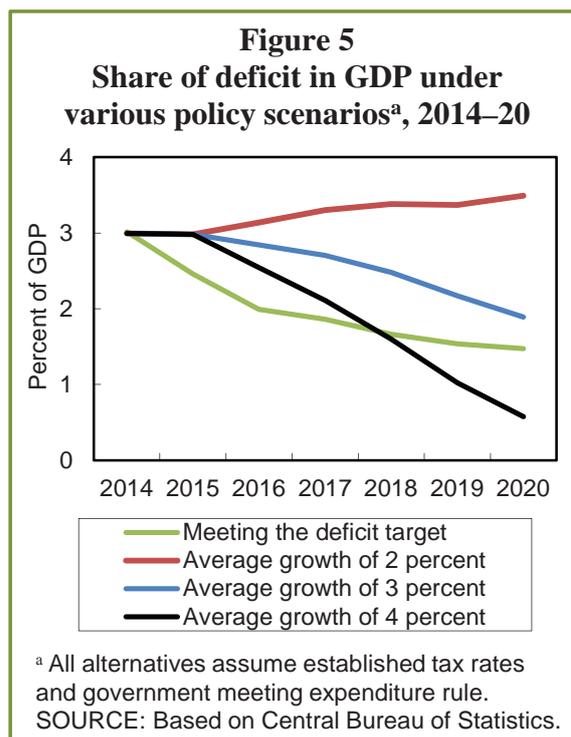
<sup>11</sup> An increase in the interest rate on the public debt resulting from macroeconomic developments in Israel and worldwide is moderated in this analysis due to the effect of a reduction in the debt to GDP ratio on the risk premium of public debt in Israel. In policy frameworks and scenarios in which the debt ratio increases, interest expenses increase accordingly. For a discussion of the effect of fiscal policy on interest, see Ber, Brender, and Ribon (2005), “Are Fiscal and Monetary Policies Reflected in Real Yields? Evidence from a Period of Disinflation and Declining Deficit Targets”, *Israel Economic Review*, Vol. 2, No.2, 15–44.

The Deficit Reduction Law sets declining targets: from 2.5 percent of GDP in 2015 to 2 percent of GDP in 2016 and to 1.5 percent of GDP in 2019 (the green line in Figure 4). Assuming that government expenditures increase in line with the expenditure rule, and that the required adjustments will be implemented in order not to deviate from the deficit ceiling in 2015, revenues will need to be increased by about NIS 4 billion in order to reduce the deficit in 2016 to the ceiling of 2 percent of GDP (the gap between the blue and red lines from the green line in Figure 4). The gap between the black line and the green line in Figure 4 reflects the total adjustments required each year—on the revenues and expenditures sides—in order not to deviate from the deficit ceiling.



Meeting the deficit ceiling also has a marked impact on the interest payments that the government will need to pay in the future. For example, interest payments estimated for 2020 under the policy framework in which the expenditure ceiling is maintained throughout the period (without price adjustment in 2015) and without measures on the revenue side beyond existing legislation are about NIS 4.5 billion greater compared with the framework of meeting the deficit target. This gap highlights deficit reduction’s important contribution to making budgetary resources available over the long term, over and above its contribution to reducing the economy’s risk premium.

The analysis above is very sensitive to assumptions of the future growth rate of the economy. The present estimation was based on very similar assumptions to those of the OECD and other entities covering Israel’s economy, but there is still some uncertainty regarding them. An analysis of how the deficit path will be affected by a framework in which the government meets the expenditure ceiling but does not increase revenues indicates that if growth will be 4 percent per year, on average, the government will be able to meet the reduced deficit targets beginning in 2018 (the black line in Figure 5). In contrast, a decline in the assumed growth rate to an average of 2 percent is expected to lead to a gradual increase of the deficit (the red line in Figure 5) and to a concurrent increase in the debt to GDP ratio to over 70 percent of GDP.



## Statistical Tables

**Table 1.1 National Accounts, 2013-2014**  
(percentage change in annual terms, at constant prices, seasonally adjusted)

	2013 <sup>a,b</sup>	Change from previous quarter					Year-on-year change <sup>b</sup>	
		2013				2014	2013	2014
		Q1	Q2	Q3	Q4	Q1	Q4	Q1
GDP	3.3	2.2	4.4	2.0	3.2	2.7	3.7	3.4
Business-sector product	3.4	2.3	5.2	1.2	2.5	1.5	3.6	3.0
Private consumption expenditure	3.5	4.9	5.4	3.9	1.6	-0.6	3.9	2.6
Gross domestic investment	0.4	-13.0	2.4	15.5	-11.3	12.0	1.9	4.0
Fixed investment	1.2	6.6	5.2	12.3	4.1	-14.3	7.7	2.8
Goods and services exports								
excl. diamonds	0.2	14.1	6.4	-31.8	59.1	4.3	6.8	5.0
Goods exports <sup>c</sup>	-1.7	13.9	-6.4	-6.8	23.9	16.5	8.2	4.9
Services exports <sup>c</sup>	6.2	17.4	24.1	-28.0	22.4	12.9	6.4	8.2
Goods and services imports								
excl. diamonds <sup>d</sup>	-2.9	2.2	3.0	7.7	0.4	5.7	3.0	6.0
Goods imports <sup>e</sup>	0.5	14.1	9.0	13.6	2.4	-6.2	11.4	5.0
Services imports <sup>e</sup>	-3.5	-3.8	-9.9	0.3	1.9	53.8	-4.9	11.5
Public sector consumption	3.2	-4.7	8.8	5.2	3.2	2.2	3.9	5.0
Public consumption excluding								
defense imports	3.1	-3.2	8.3	2.9	3.6	2.5	4.0	4.8
Domestic use of resources	2.7	0.5	5.0	7.4	-2.5	2.6	3.1	3.4

<sup>a</sup> Compared with previous year.

<sup>b</sup> Unadjusted data.

<sup>c</sup> New calculation - excluding subsidies.

<sup>d</sup> Excluding defense imports, ships and aircraft.

<sup>e</sup> New calculation - excluding taxes.

SOURCE: Based on Central Bureau of Statistics data.

Table 1.2 Indicators of Business Activity, 2013-2014  
(percentage change, in annual terms, seasonally adjusted)

	Change from previous month						October-March		
	2013			2014			Change from previous period	Year-on-year change <sup>a</sup>	Last month for which data available*
	Oct	Nov	Dec	Jan	Feb	Mar			
Composite State-of-the-Economy index	0.3	0.2	0.2	0.2	0.2	0.0	1.2	2.9	March
Large-scale retail trade	3.9	-3.4	1.5	-0.9	0.3	0.5	0.1	-1.7	March
Industrial production (excl. diamonds)	4.8	-0.3	1.7	0.1	1.8	-4.1	4.3	4.7	March
Index of trade revenue	0.7	0.4	-0.4	1.9	-0.8	-2.1	1.5	4.8	March
Index of trade and services revenue	0.8	0.4	-1.2	3.1	-0.5	-0.8	1.9	4.9	March
Index of services exports	1.9	0.4	4.0	5.8	-3.2	3.5	7.0	10.8	March
Tourist arrivals	6.4	3.1	0.2	-1.8	2.2	3.6	2.8	5.3	March
Residential construction									
Starts	-4.3	13.8	-14.5	-6.5	1.2	6.9	-6.3	-12.8	March
Completions	14.6	-31.3	4.0	11.7	-12.3	-22.5	-4.9	4.7	March
ILA land permits (units) <sup>a,b</sup>	1,597	3,380	2,849						January
Climate indices based on Business Tendency Survey <sup>c</sup>									
Assessment of present activity: total business sector	0.27	0.27	0.27	0.29	0.32	0.28			March
Assessment of present activity: manufacturing industry	0.25	0.25	0.26	0.28	0.32	0.29			March
Assessment of present activity: services industry	0.28	0.28	0.26	0.30	0.34	0.30			March
Assessment of future activity: total business sector <sup>d</sup>	0.26	0.23	0.22	0.23	0.24	0.28			March
Business Climate Index (total business sector)	0.26	0.23	0.24	0.23	0.29	0.27			March

<sup>a</sup> For monthly indicators, when the last month for which data is available is March, the previous comparison period is April–September; when the last month with data available is February, the comparison period is April–August; when the last month with data available is January, the comparison period is April–July. When the last month with data available is December, the comparison period is April–June. For indicators produced quarterly, the comparison is to the last complete quarter in the previous period reviewed.

<sup>b</sup> Unadjusted data.

<sup>c</sup> Land transactions authorized by the Israel Lands Administration in the relevant period.

<sup>d</sup> Figures are in terms of monthly growth of business product and refer to the month in which the survey was conducted.

<sup>e</sup> Expectations are attributed to the middle of the three month period following the survey.

SOURCE: Based on Central Bureau of Statistics and Ministry of Construction and Housing data.

Table 1.3 Indicators of Labor Market Developments, 2013-2014

(percentage change, seasonally adjusted)

	2014:Q1 (thousand)	Percent change from previous quarter					October-March		
		2013				2014	Change from previous period	Year-on- year change <sup>a</sup>	Last month for which data available*
		Q1	Q2	Q3	Q4	Q1			
Civilian labor force	3,745.6	0.4	0.4	0.5	0.4	1.1	1.1	2.3	March
Israeli employees	3,528.2	0.8	0.2	1.3	0.7	1.1	1.1	3.2	March
<i>of which</i> : in public services	1,243.9	2.6	-0.1	2.2	-0.1	1.2	1.2	3.5	March
in business sector	2,283.9	-0.2	0.2	0.7	1.1	1.1	1.1	3.1	March
Foreign workers and Palestinians (unadjusted)	318.0	2.5	0.5	1.5	1.1	0.8	0.8	4.0	March
Average hours worked weekly per Israeli employee	36.1	0.3	2.8	-3.6	2.8	-0.6	-0.6	3.3	March
Weekly labor input in business sector (incl. foreign workers and Palestinians)	110,914.7	-0.5	1.4	0.4	3.7	0.7	0.7	6.0	March
<i>of which</i> : Israelis	96,452.1	-1.1	1.5	0.4	4.0	0.6	0.6	6.4	March
Weekly labor input in public services (Israelis)	32,178.5	1.9	2.3	0.8	3.9	0.1	0.1	7.6	March
Unemployed	217.4	-4.9	2.4	-10.1	-3.7	1.8	1.8	-10.5	March
Job seekers		-0.9							January
Claims for unemployment benefits	87.7	1.8	5.1	1.8	4.4	-1.5	4.5	12.3	March
Balance of Employment <sup>b</sup>		0.8	0.8	1.2	0.1				December
Job vacancies <sup>a</sup>	62.8	-0.8	-2.9	-1.0	-3.6	0.3	-3.9	-2.9	March
	NIS								
Real wage per employee post <sup>c</sup>		-0.6	0.7	0.0	-0.2	0.1	-0.2	0.1	March
In public services		0.0	0.7	0.4	-0.5	0.9	0.2	1.1	March
In business sector		-0.6	0.3	-0.1	-0.5	0.9	-0.1	-0.3	March
Nominal wage per employee post <sup>c</sup>	9,080.9	-0.1	1.1	0.6	0.1	0.2	0.5	1.7	March
In public services	8,789.5	0.4	1.1	1.1	-0.1	0.7	0.8	2.7	March
In business sector	9,208.5	-0.3	0.9	0.3	0.3	-0.1	0.4	1.3	March
Unit labor cost		0.7	-1.3	-0.5	-0.2				December
		Percent, seasonally adjusted							
Participation rate		63.7	63.7	63.7	63.7	64.1			March
Employment rate		59.5	59.4	59.9	60.0	60.4			March
Unemployment rate		6.6	6.7	6.0	5.8	5.8			March
Depth of unemployment <sup>d</sup>		26.6	26.4	18.5	21.4	23.1			March

\* For monthly indicators, when the last month for which data is available is March, the previous comparison period is April–September; when the last month with data available is February, the comparison period is April–August; when the last month with data available is January, the comparison period is April–July. When the last month with data available is December, the comparison period is April–June. For indicators produced quarterly, the comparison is to the last complete quarter in the previous period reviewed.

<sup>a</sup> Unadjusted data.

<sup>b</sup> Posts filled minus terminations of employment, as a percentage of the total number of employees in businesses in the Employers Survey Sample. The calculation is made by the Bank of Israel.

<sup>c</sup> Including foreign workers and Palestinians. Seasonally adjusted data.

<sup>d</sup> Percent of unemployed seeking work for more than six months (unadjusted).

SOURCE: Central Bureau of Statistics Labor Force Survey, except for data on Israelis, non-Israelis, and labor input in the business sector, and total Israelis employed, which are the Central Bureau of Statistics (CBS) National Accounts estimates; job seekers, which are derived from the Israeli Employment Service; claims for unemployment benefits, which are derived from the National Insurance Institute; job vacancies, which are derived from the CBS Survey of Job Vacancies, and the Balance of Employment, which is derived from the Ministry of Industry, Trade and Labor's Employers Survey.

Table 1.4 Government Budget Performance, 2013-2014

							October-March				
	2013 <sup>a</sup>	Change from previous quarter					Change from previous period	Year-on-year change	Last month for which data available*		
		2013				2014					
	Q1	Q2	Q3	Q4	Q1						
Domestic deficit, as percent of GDP	-2.2	-0.9	-1.1	-0.9	-5.8	0.5			March		
Total deficit excluding credit, as percent of GDP	-3.1	-1.9	-2.1	-1.4	-7.1	-0.1			March		
Deviation from domestic budget path, excl. credit extended: <sup>b</sup>											
						(NIS billion)					
Revenue	0.0	-3.0	2.7	4.4	0.0	0.5	0.5	3.5	March		
Expenditure	-0.8	-2.3	-4.7	1.1	-0.8	0.2	1.0	2.6	March		
Deficit	2.4	-0.7	7.4	3.4	2.4	0.3	-2.0	1.0	March		
Total deficit excluding credit	-33.0	-4.8	-5.5	-3.8	-19.0	-0.2	-9.9	4.4	March		
						Real change year-on-year (percent)					
						2013					
						2014					
						Oct	Nov	Dec	Jan	Feb	Mar
Government domestic revenues excluding credit		-1.6	20.6	8.8	13.0	14.3	10.2		10.6	March	
Government tax revenue		3.7	16.1	8.3	12.4	9.9	11.4		10.4	March	
<i>of which</i> : income tax, net		17.5	17.7	19.1	12.3	16.7	18.0		16.7	March	
VAT, gross		1.2	15.6	4.8	9.4	5.9	8.3		7.7	March	
Government expenditure excluding credit		4.3	6.9	6.1	4.2	3.4	8.7		5.7	March	
National Insurance allowances		5.0	-3.8	-2.8	-0.7	-0.2	-0.2		-0.5	March	
<i>of which</i> : Unemployment benefit		12.6	11.2	0.5	11.5	4.3	5.5		7.4	March	
Income support <sup>c</sup>		4.1	-0.2	-15.3	2.9	-0.5	0.8		-1.8	March	
Payments to the National Insurance Institute by the public		8.3	4.1	2.6	6.7	1.6	5.7		4.8	March	

\* For monthly indicators, when the last month for which data is available is March, the previous comparison period is April–September; when the last month with data available is February, the comparison period is April–August; when the last month with data available is January, the comparison period is April–July. When the last month with data available is December, the comparison period is April–June. For indicators produced quarterly, the comparison is to the last complete quarter in the previous period reviewed.

<sup>a</sup> Compared with previous year.

<sup>b</sup> The path is determined in accordance with the deficit ceiling. The figures compared with the previous period and with the corresponding period are differences.

<sup>c</sup> Not including income support in old-age and survivors' pensions.

SOURCE: Based on Ministry of Finance and National Insurance Institute data.



**Table 1.6 Selected Price Indices, the Effective Exchange Rate, Nondirected Bank Credit, Interest Rates, Yields, and the Share Price Index, 2013-2014**  
(rates of change, percent)

	Change from previous month						October-March		
	2013			2014			Change from previous period	Year-on-year change	Last month for which data available*
	Oct	Nov	Dec	Jan	Feb	Mar			
CPI	0.3	-0.4	0.1	-0.6	-0.2	0.3	-0.5	1.3	March
Consumer price index, seasonally adjusted	0.3	0.0	0.1	-0.2	0.0	0.2	0.4	1.3	March
Price index of owner-occupied homes <sup>a</sup>	0.4	1.5	1.0	1.1	0.7	0.7	5.5	8.3	March
General share-price index <sup>b</sup>	1.6	4.6	-0.9	1.1	4.9	2.8	14.8	6.8	March
Real effective exchange rate <sup>c</sup>	0.3	-0.5	-0.7	-0.6	1.3	-0.4	-1.5	-7.9	March
Nominal effective exchange rate	0.5	-0.8	-0.5	-1.1	0.7	-0.7	-1.8	-7.5	March
Nondirected bank credit	0.5	0.0	0.5	-0.3	0.2	-0.3	1.2	1.9	March
Effective interest rate in daily deposit auction <sup>b</sup>	1.0	1.0	1.0	1.0	1.0	0.8	1.0	1.9	March
Yield to maturity on 5-year notes <sup>b</sup>	0.1	-0.2	-0.2	-0.2	-0.3	-0.5	-0.2	0.4	March
Risk premium <sup>b,d</sup>	-12.4	-2.4	-8.3	-7.6	-0.5	-6.1	-18.1	-31.8	March
<b>CPI</b>	<b>1.8</b>	<b>1.9</b>	<b>1.8</b>	<b>1.4</b>	<b>1.2</b>	<b>1.3</b>	<b>0.3</b>	<b>1.6</b>	<b>March</b>

\* For monthly indicators, when the last month for which data is available is March, the previous comparison period is April–September; when the last month with data available is February, the comparison period is April–August; when the last month with data available is January, the comparison period is April–July. When the last month with data available is December, the comparison period is April–June. For indicators produced quarterly, the comparison is to the last complete quarter in the previous period reviewed.

<sup>a</sup> Not part of the CPI.

<sup>b</sup> Daily average over the month.

<sup>c</sup> The real effective exchange rate is the weighted geometric mean of the exchange rate of the shekel against 28 currencies, representing 38 of Israel's main trading partners (weighted by the extent of Israel's trade with those countries), adjusted for the difference between the rate of inflation in Israel and the rates of inflation in those countries.

<sup>d</sup> As measured by 5-year credit-default-swaps (CDS). Calculated as the difference in basis points.

<sup>e</sup> Year-on-year period change.

SOURCE: Based on Central Bureau of Statistics data.

Table 1.7 Indicators of Economic Development in Advanced and Developing Economies<sup>a</sup>  
(annual change, percent)<sup>b</sup>

		2012	2013	2014 Projection	2015 Projection
World GDP		3.2	3.0	3.6	3.9
	Advanced economies	1.4	1.3	2.2	2.3
	Emerging and developing economies	5.0	4.7	4.9	5.3
World trade		2.8	3.0	4.3	5.3
	Advanced economies				
	Imports	1.1	1.4	3.5	4.5
	Exports	2.1	2.3	4.2	4.8
	Emerging and developing economies				
	Imports	5.8	5.6	5.2	6.3
	Exports	4.2	4.4	5.0	6.2
Commodity prices (\$)	Oil <sup>c</sup>	1.0	-0.9	0.1	-6.0
	Nonfuel	-10.0	-1.2	-3.5	-3.9
Inflation (CPI)	Advanced economies	2.0	1.4	1.5	1.6
Short-term interest rate (%) <sup>d</sup>	Dollar deposits	0.7	0.4	0.4	0.8
	Euro deposits	0.6	0.2	0.3	0.4
Unemployment rate	Advanced economies	8.0	7.9	7.5	7.3

<sup>a</sup> According to the World Economic Outlook, Israel is classified as an advanced economy. The advanced economies include the industrialized countries and some emerging markets.

<sup>b</sup> Except for unemployment and interest rates (percent).

<sup>c</sup> The average price of a barrel of U.K. Brent, Dubai and West Texas Intermediate crude oil in 2013 was \$104.07, excluding freight costs. Estimated price for 2014 is \$104.17 and for 2015, \$97.92.

<sup>d</sup> Six-month Libor rate for US dollar deposits, and three-month Libor rate on euro deposits.

SOURCE: World Economic Outlook (IMF), April 2014.

## Part 2: Broader Review of Selected Issues

### Housing affordability: Home prices and rents across districts in Israel, 2004–12

- The ability to rent a home, relative to household income, was not lower in 2012 than in 2004. Although rent increased from 2008 and reduced rental affordability, this reduction counterbalanced the improvement that had previously occurred.
- The ability to purchase a home declined markedly between 2004 and 2012, primarily in the Jerusalem and Tel Aviv districts, increasing only in Haifa.
- The most expensive home prices and rents are in the Tel Aviv district. However, the lowest affordability of buying or renting a home is in the Jerusalem district, which has the highest prices relative to household income. In contrast, in the Haifa district, affordability is highest even though it is not the district with the lowest home prices, because household incomes there are high relative to home prices.

#### 1. Introduction

The increase in home prices has led to public discourse on the issue of housing affordability, which was also reflected in the social protest of 2011 and in the Trajtenberg Committee for Economic and Social Change. The fact that housing is a basic product with high weight in total expenditure (25.3 percent in Israel in 2013) and low adjustment flexibility—meaning that quite a long period elapses until the household adjusts its residence and its lifestyle to changes in home prices and rents—has contributed to the liveliness of the debate. Moreover, the increasing home prices mainly harm the population that does not own a home: While homeowners are to a great extent protected from it, renters are exposed to it, and thereby to a decline in their ability to afford housing.<sup>1</sup>

This survey analyzes the change that has taken place in housing affordability during the current wave of price increases. Since there is a gap in income, rents, and home prices between the various districts of the country, each one of them is analyzed separately. It should be emphasized that this analysis relates to the entire population, and not to

<sup>1</sup> Particularly when the rental market is similar to the Israeli market, meaning that it is a free market and contracts are signed for short periods. An ordered market in which contracts are long-term also provides renters with some protection.

social housing programs (such as public housing), which are generally associated with the low income deciles.

The basic idea behind the notion of affordability is that housing expenditure should constitute a reasonable share of the household's income such that the household's ability to purchase other basic products will not be seriously harmed. However, in order to break this idea down into details, a series of complex questions should be answered, including: (a) What is a reasonable level of housing—taking into account the physical quality of the home, household density (area per number of individuals in the household), and the quality of services provided in the residential area—and what are the other basic products. These two questions are essentially normative. (b) What income do we consider—net income, or gross income?<sup>2</sup> Household income, or the income of the head of household?<sup>3</sup> Total income, or income from labor?<sup>4</sup> (c) Is the dwelling rented or owned? (d) It is clear that “affordability” is a relative term, but can a benchmark in any case be defined, such that beyond it housing is not attainable (just as crossing the poverty line means that a person is poor)? All of these questions can also be broken down into many secondary questions.<sup>5</sup> However, housing affordability can also be analyzed without responding to these questions, if we focus on how it develops over time.

There are various definitions of “affordability” in the literature, but in practical terms, the various institutions define home-purchase affordability in terms of years of

<sup>2</sup> This question arises, for instance, in the context of international comparisons, since there are differences between the various countries in the tax rates and in government support of various products, such as health care and education.

<sup>3</sup> The income of a household may change as a result of additional members joining the labor force, as a result of support and transfer payments, and so forth. In contrast, the income of the head of household may change as a result of an increase in wages.

<sup>4</sup> Total income relates also to income from capital, from pensions and provident funds, and from transfer payments. These sources of income are irrelevant to many parts of the population, such as young renters. Therefore, we sometimes want to know that affordability is, taking into account only income from labor.

<sup>5</sup> A broad discussion of these issues can be found in: Robinson, Mark, Grant M. Scobie and Brian Hallinan – RSH (2006), “Affordability of Housing: Concepts, Measurement and Evidence”, New Zealand Treasury WP 06/03 (March).

income required to purchase a home<sup>6</sup>, and rental affordability in terms of rent as a share of household income: Rent is affordable when the rental price does not exceed 30 percent of income.<sup>7</sup> The analysis below also uses these definitions. A further definition is based on the mortgage payment to household income ratio, but in order to use it, changes in the interest rate, in the loan period and in the down payment must be considered. In this context, it should be noted that when the definition of affordability relates to the purchase a home (as opposed to renting), it also includes savings, and not just housing services. The following analysis does not use the latter definition.

As to the data, average home and rent prices, by district, are taken from quarterly publications by the Central Bureau of Statistics.<sup>8</sup> We also use data on rents published annually by the Central Bureau of Statistics in the Expenditure Survey. Income by district is taken from the Household Expenditure Surveys prepared by the Central Bureau of Statistics for 2004–12.<sup>9</sup> However, there was a change in the survey's data in 2012, and it is therefore not possible to compare some

of them to data from previous years.<sup>10</sup> For this reason, we present data for 2011, in addition to 2012, when relating to individual years. For the cross-district analysis, we use net, rather than gross, income, because that is the income that represents the ability to purchase or rent a home.

## 2. The general picture: affordability relative to salary per employee post and relative to household income

Figure 1 shows rental affordability. Based on wage per employee post, affordability increased until 2008, and then declined, and in 2012, it was lower than in 2004. In other words, rents increased more than wage per employee post. Home purchase affordability deteriorated even more, and in order to purchase an average home in 2012, about 2.5 additional years of work for an average employee was needed compared to 2004 and to 2008 (Figure 2).

However, there are a number of disadvantages in assessing affordability based on income per employee post: (a) This income relates to gross, rather than net, wages; (b) the post may be part-time, and when an employee works at a number of part-time jobs, the salary per employee post data skew income from labor downwards; (c) this income does not include income that is not from labor; and (d) since housing is consumed by the household, it is worth assessing housing affordability with respect to household income. These disadvantages are significant because tax rates and government transfers were reduced between 2004 and 2012, the labor force participation rate increased, and the unemployment rate declined.

When examining rental affordability with respect to gross household income (rather than gross income per employee post), a significantly different picture emerges, even though its trends are similar (Figure 1): Until 2008, rent as a share of income declined from 19 percent to 16 percent. Since then, there was a deterioration, but the share in 2012 (20 percent) is only slightly higher than it was in 2004. In other words, the deterioration in affordability since 2009 counterbalanced the improvement that had taken place previously. This comes into sharper focus when assessing trends in affordability with respect to net household income: Even though rents

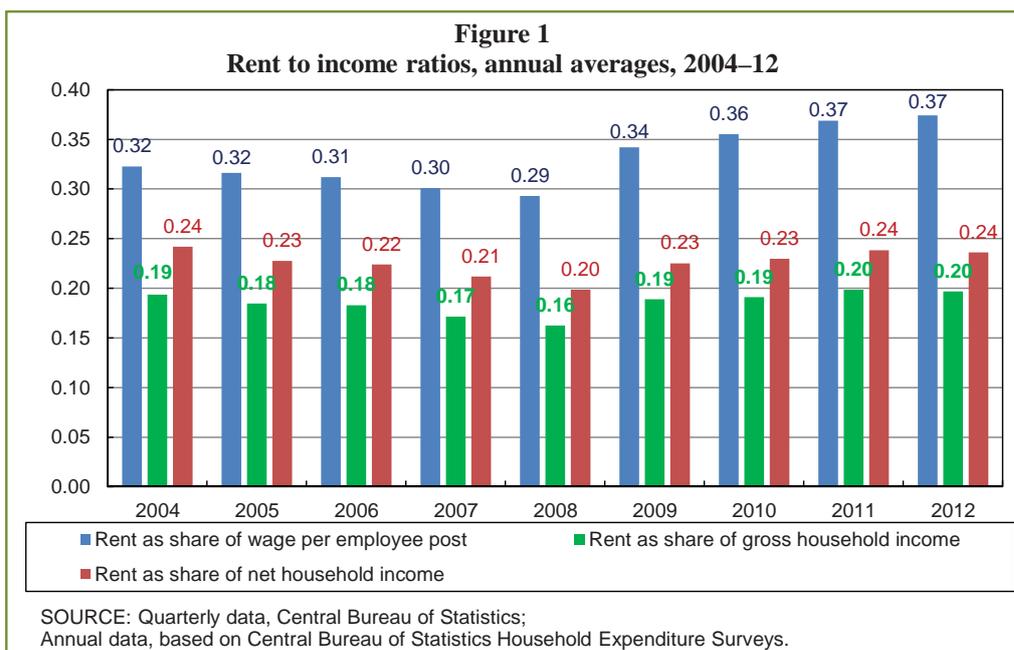
<sup>6</sup> According to the Harvard University Joint Center on Housing, a purchase is affordable if up to 3 years of income are required. If 3-4 years of income are required, there is a moderate lack of affordability. If 4-5 years of income are required, there is a serious lack of affordability, and if more than 5 years of income are required, there is an extreme lack of affordability. However, according to this definition, most metropolitan areas in the world belong in the extreme lack of affordability category.

<sup>7</sup> There are those who define this as 30 percent of gross income in the four lowest income deciles, and there are those who define it as 30 percent of household income without noting whether it is gross or net income. However, these definitions are also problematic, since a household from the highest decile can spend even 50 percent of its income on housing without having a negative impact on its ability to consumer the other products. See RSH (2006).

<sup>8</sup> These quarterly data on rent and home prices by district are not hedonic.

<sup>9</sup> The data on household income are taken from the expenditure surveys. They relate to localities containing more than 10,000 residents, and do not include non-Jewish localities. The graphs reflect the income data for all ages, which are lower than the data for the 25–54 age group. Overall reported monetary income relates to both gross and net income, and there are details regarding the sources of gross income from labor, from capital (including from renting out a residence), from pensions and provident funds, and from support and transfer payments. However, there are no reports regarding net income from labor. In order to derive this, we deduct total taxes and compulsory payments, which are also reported in the expenditure surveys, from gross labor income.

<sup>10</sup> The change was made together with the change in labor force surveys, which became monthly rather than quarterly, and which also currently measure the general labor force rather than the civilian labor force, in accordance with the principles of the International Labor Organization (ILO). Including soldiers in the labor force increased the number of work hours and the number of wage earners in a household. With that, there was no change in household income, since soldiers' income was also registered in the previous surveys. See "Household Expenditure Survey, 2012 Data", Appendix: "Changes made to the Household Expenditure Survey as of 2012", Central Bureau of Statistics.

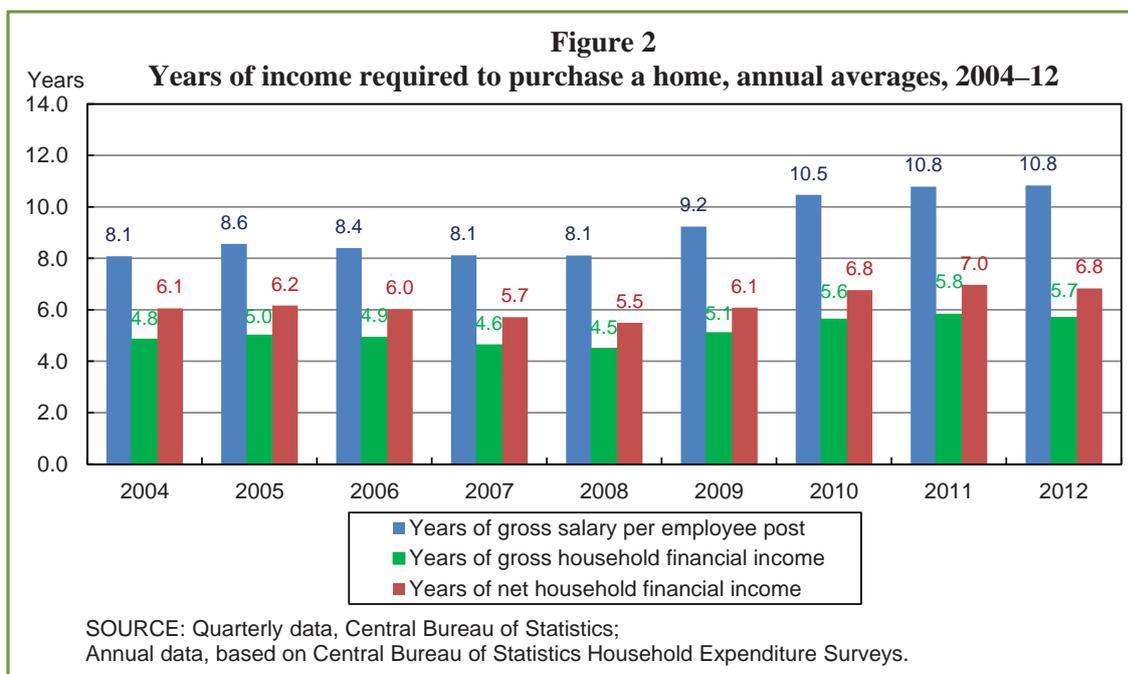


increased since 2008 (see Table 1 below), the level of the ratio in 2012 was no higher than it was in 2004.

Home purchase affordability, however, deteriorated compared to 2004 according to all income definitions (Figure 2). In other words, home prices increased more than income, and more years of income are required in order to purchase a home. Based on net household income, an additional 0.7 years of income are required in order to purchase a home. We emphasize that this test takes into account only income,

and ignores changes in the cost of financing the purchase—the interest rate, the down payment and the size of the mortgage necessary to finance the purchase, the loan period to maturity, and so forth. By way of illustration, when the interest rate declines (increases), it lowers (increases) the cost of a mortgage and expands (contracts) the possibility of purchasing a home with a given income.

Since there are marked differences in the cost of housing in various districts of the country, and since the mobility



of residents between districts is limited, it is interesting against this general background to analyze affordability in six districts in the country based on net household income. These income data are taken from the Expenditure Survey and include income from labor and other income. For the purpose of district comparison, we can ignore changes in the cost of financing, because these are common to all districts. In Section 3, we will focus on housing affordability by way of rents (rental affordability), and in Section 4, we will focus on housing affordability by way of home purchases (home purchase affordability). Later on, we will explain why household income increased more than wages per employee post.

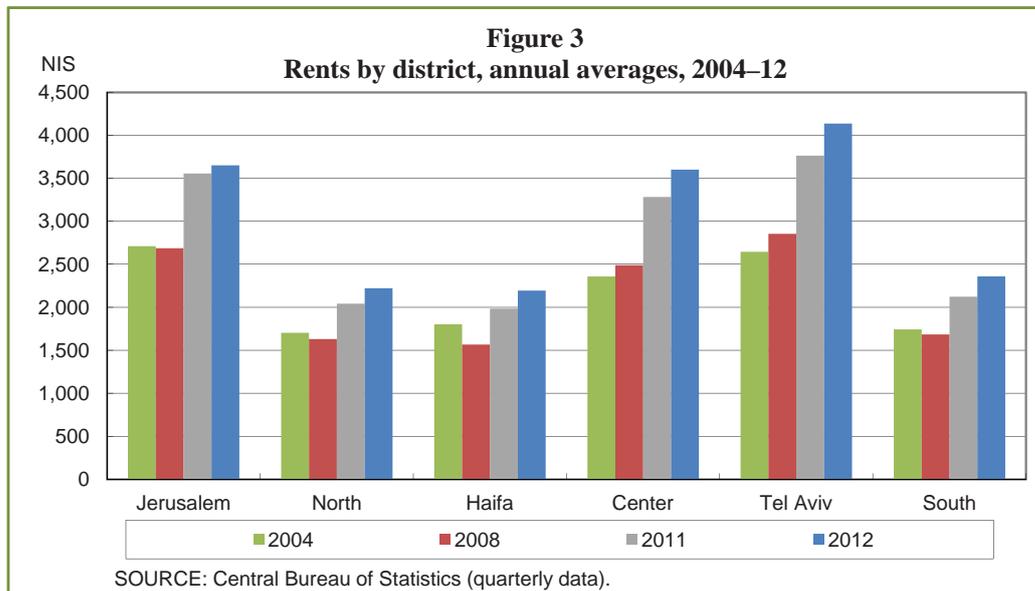
### 3. Housing affordability by way of renting a home: an analysis by district

#### 3.1 Rental affordability by net household income

Figure 3 shows monthly rents by district in nominal terms for the years 2004, 2008, 2011 and 2012.<sup>11</sup> The figure shows that between 2004 and 2008, rent was stable in general: It increased to a certain extent only in the Tel Aviv and Center districts, was unchanged in Jerusalem, and declined somewhat in Haifa and the periphery (North and South districts). The figure also shows that in 2004, Jerusalem was the most expensive district, but that Tel Aviv overtook it

later on. Between 2008 and 2012, there was an increase in all districts of the country, and the Tel Aviv district became the most expensive.

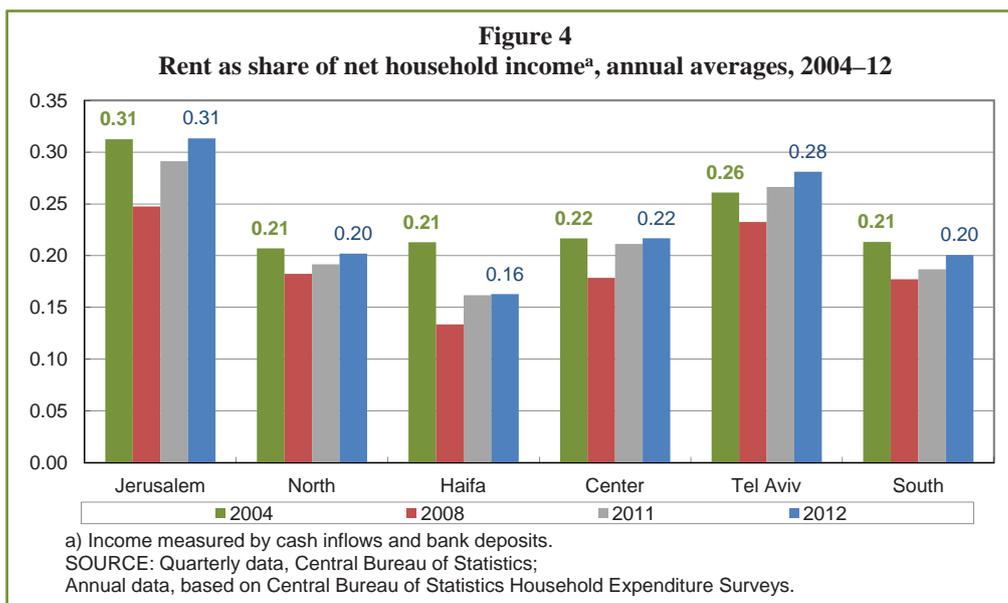
Figure 4 shows the ratio between the average rent in a district and the average net monetary household income<sup>12</sup> (from all sources) of households in each district. In all districts, housing was more affordable in 2008 than it was in 2004, and in all districts housing was less affordable in 2012 than it was in 2008. However, a comparison of 2004 with 2012 shows that the ratio increased only in Tel Aviv, while it was unchanged in Jerusalem and the Center, and lower in the other districts. In other words, even though nominal rents have increased since 2004, the ability to afford housing did not decline in any district other than Tel Aviv. This conclusion is strengthened when assessing the average rent relative to median net monetary income (not shown). The figure further shows that the Jerusalem district has the lowest affordability (most difficult to rent a home) even though it is not the district with the highest rental prices, because income in the district is relatively low. Affordability in the Haifa district was the highest, and was the most improved compared to 2004. A similar picture (not shown) is also obtained by a calculation according to the average ratio (as opposed to the ratio of the averages) between rents and the household's monetary income.<sup>13</sup>



<sup>11</sup> We selected 2004 as the base year due to data limitations: The Central Bureau of Statistics has been issuing Expenditure Surveys since 1997, but the data on rents have existed only since 2003. We chose to include 2008 because the current wave of housing price increases began in that year.

<sup>12</sup> Monetary income does not include imputed income such as housing services and vehicular use, and constitutes about 90–95 percent of the income including imputed income.

<sup>13</sup> In order to calculate the ratio of the averages, the average numerator and the average denominator are calculated separately, and the ratio between them is then calculated. In order to calculate the average of the ratios, the quotient for each household is calculated separately, and an average is then taken of all of them.

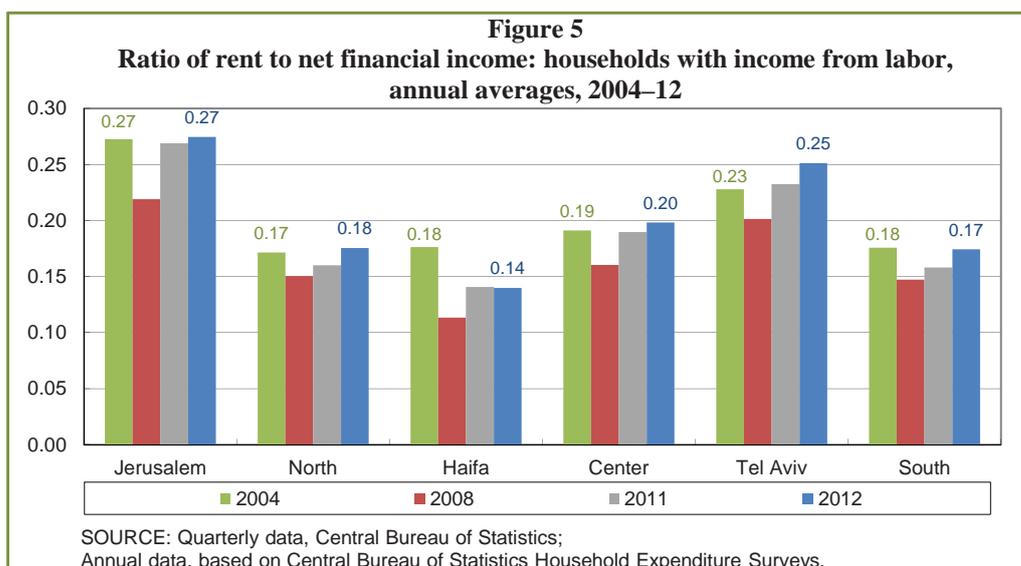


### 3.2 Rental affordability for households with income from labor

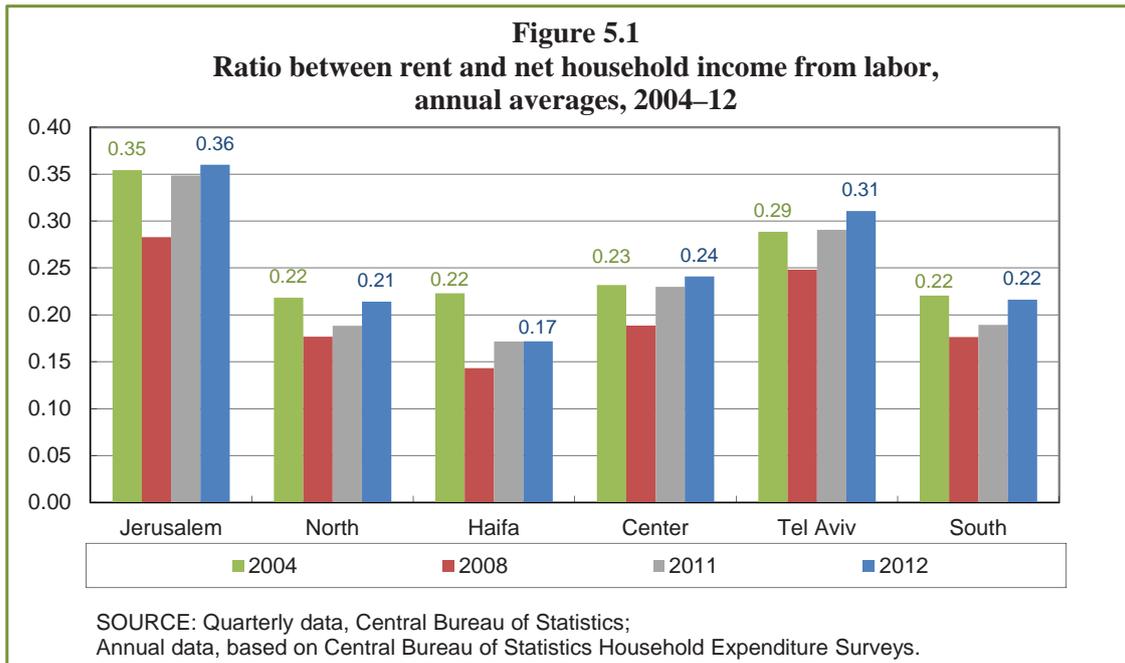
We will now assess affordability relative to net household income from labor alone, meaning relative to gross income from labor net of compulsory payments and taxes.<sup>14</sup> This segment of the population is different from the one in Figure 4. We therefore first show—in Figure 5—affordability by net monetary income of the population that has income from labor. The picture that emerges is not quite as good as the one in Figure 4: Affordability in 2012 is less than in 2004 not only in Tel Aviv, but in the North and Center districts as

well. However, from the standpoint of the trend, this figure also shows no sweeping deterioration across districts. The ratios obtained are lower than those in Figure 4.

Figure 5.1 shows affordability relative to net income from labor, for the same population as shown in Figure 5. The figure shows that in the Jerusalem, Center and Tel Aviv districts, affordability in 2012 was lower than in 2004, it was higher in the North and Haifa districts, and there was no change in the South district. In other words, here as well there is no sweeping deterioration across districts, even though the deterioration took place in the central districts.



<sup>14</sup> Household income from labor is calculated as the total labor income of individuals in the household.

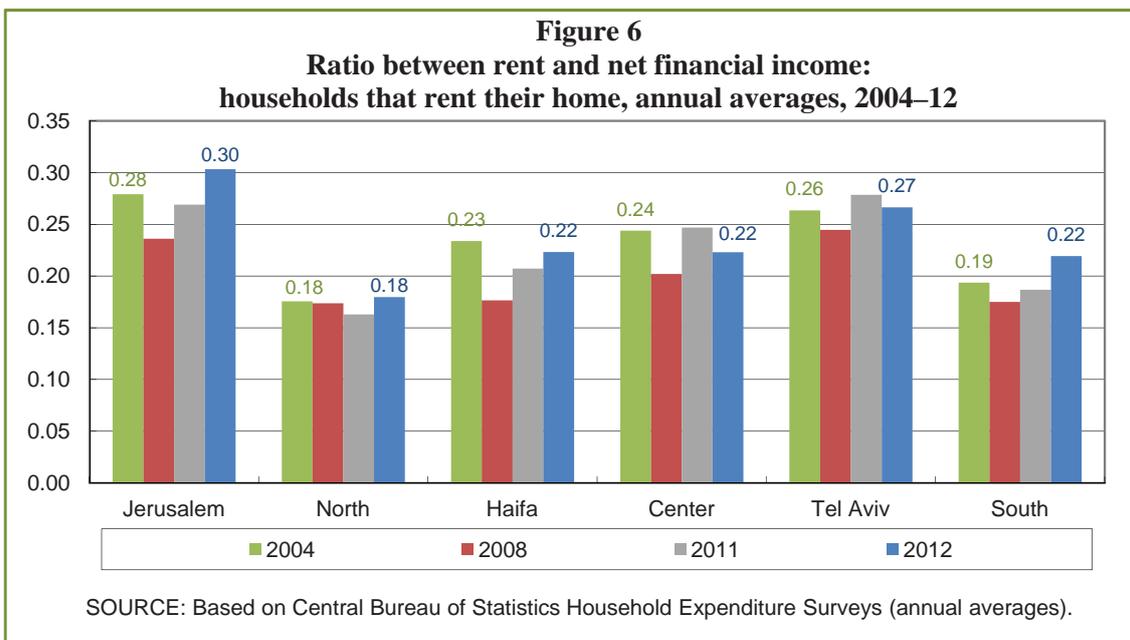


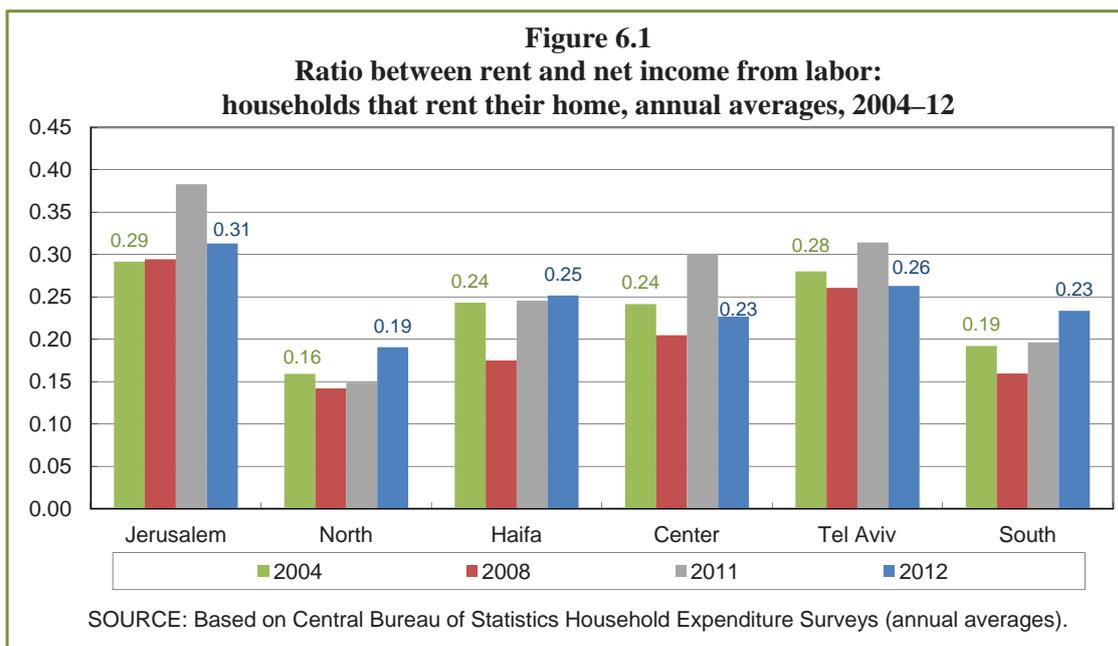
The gaps between the districts remained similar. As in the previous figures, this figure also shows that the Jerusalem district has the lowest affordability, and Haifa has the highest affordability. No sweeping deterioration across districts is found, even when assessing affordability relative to median net income from labor (not shown). It is important to note here that rents (as well as home prices) also include a basket of products that comes with the residential area (such as proximity to centers culture and leisure). It therefore seems that the relative high cost in the Jerusalem and Tel Aviv

districts indicates that these areas have greater value in the eyes of consumers.

### 3.3 Rental affordability according to Expenditure Survey data on renters only

The indices above measured rents (the numerator) by rental fees published quarterly by the Central Bureau of Statistics. We now assess rental affordability according to data that appear in the Expenditure Survey published yearly by the Central Bureau of Statistics, and we focus on households that





rent their home. In other words, we assess rental affordability by rental expenditure out of the net monetary income of the group of renters in the Survey. The results appear in Figure 6. As to the trend, affordability increased compared to 2004 in the Center and Haifa districts, was unchanged in the North, and declined in Jerusalem, Tel Aviv and the South. (The deterioration in Tel Aviv was minor, and the deterioration in the South was larger.) However, the picture of improvement or deterioration in the various districts is generally dissimilar to the picture that emerges from Figure 4. Here too, Jerusalem has the lowest affordability, but this time, it is the North district—not Haifa—that has the highest level of affordability. A similar picture emerges when assessing housing affordability for renters by income from labor alone (Figure 6.1). The figures also show that in 2012, affordability in the Center, South and Haifa districts was similar. A similar picture (not shown) is obtained when calculating according to the average ratio (as opposed to the ratio of the averages) between rent and net household monetary income in the group of renters.

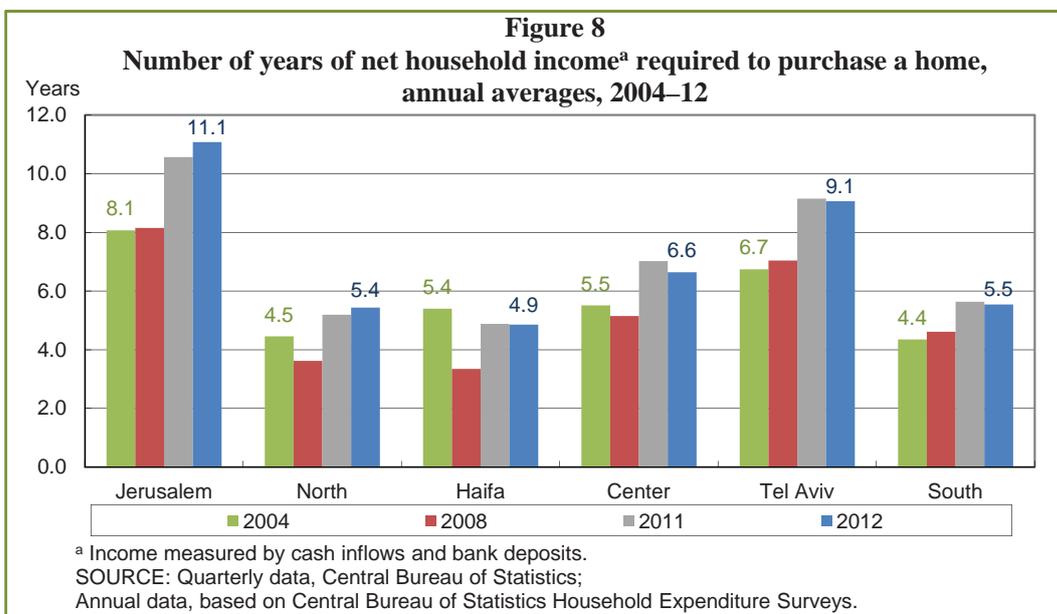
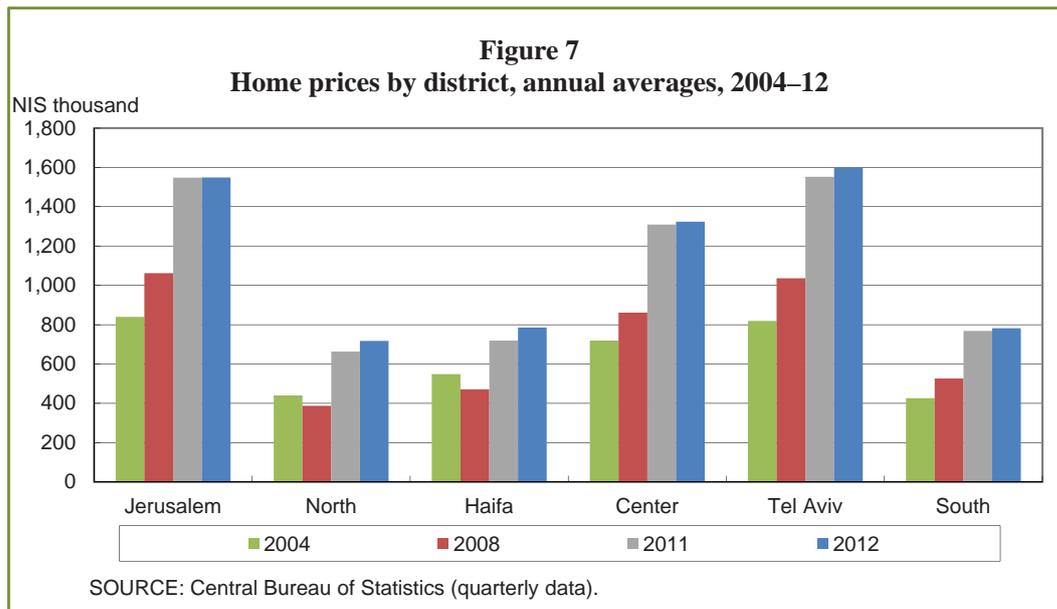
#### 4. Housing affordability by way of purchasing a home: an analysis by district

We now assess home purchase affordability by way of measuring the number of years of income required to purchase a home, and base the assessment on household income data taken from the Expenditure Survey. A higher number of years means greater difficulty in purchasing a home, and less affordability.

Figure 7 shows home prices by district. Prices in 2008 were higher than prices in 2004 in all districts other than Haifa and the North. In 2012, prices were higher than in previous years in all areas. In 2004 and 2008, prices were highest in Jerusalem, and in 2012, Tel Aviv had the highest prices. In 2004, prices were lowest in the South, with the North becoming the least expensive district in the following years.

Figure 8 shows affordability with respect to net household monetary income from all sources. Affordability improved in 2008 (compared to 2004) in the Center, Haifa and North districts, it was somewhat lower in Tel Aviv and the South district, and there was no change in Jerusalem. 2012 presents a general picture of deterioration (compared to 2004) with lower affordability in all districts other than Haifa, and particularly in Jerusalem and Tel Aviv. While an additional year of income was required to purchase a home in the South, North and Center districts, an additional 2.5–3 years were required in Jerusalem and Tel Aviv.

The figure also shows that the lowest home purchase affordability is in Jerusalem, similar to rental affordability. Affordability in the Center district is higher than in Tel Aviv or Jerusalem. The Haifa district is exceptional in that affordability there improved. Home purchase affordability in the Center district is quite similar to affordability in the periphery, separated by one year of income. An essentially similar picture emerges when assessing affordability with respect to net income from labor alone (Figure 8.1), and when assessing home prices relative to the median total monetary income and income from labor (not shown).

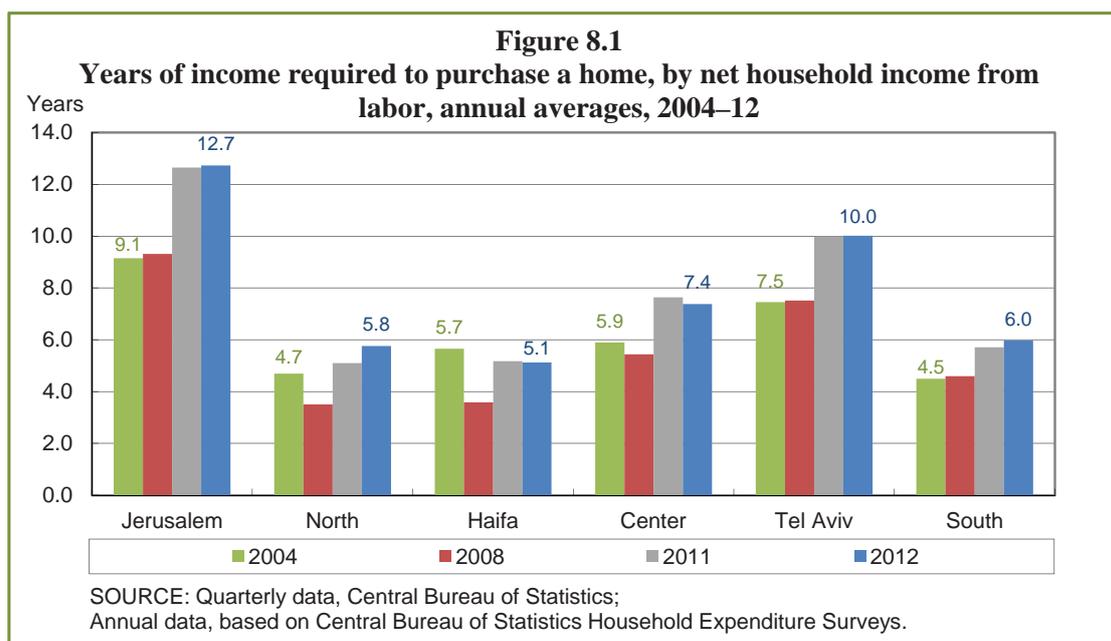


### 5. Discussion of the findings

The increase in home prices since 2008 has increased the number of years of income required to purchase a home in all districts other than Haifa: In 2012, an additional 1–3 years of income were required to purchase a home, compared to 2004. Home purchase affordability, without taking into account the decline in the cost of financing, therefore declined in general.

The picture that emerges regarding rental affordability is different: There was no sweeping deterioration (in

all districts) between 2004 and 2012, even though rents increased by about 40 percent during that period (see Table 1). However, an analysis of the two sub-periods shows that the rate of increase in income was not parallel to that of rents: Affordability improved greatly until 2008 because household incomes increased greatly while rents remained stable. Since 2008, rents increased to a great extent while incomes increased only slightly. It emerges, therefore, that the deterioration in affordability during the second period basically offset the improvement of the first period. An assessment of the possibility that affordability did not decline between 2004 and 2012 due to increasing household



density—in terms of the number of people per household—rejected this possibility since the data show that household density did not increase during this period (see row 3 in Table 2).

Table 2 presents the factors leading to the fact that household income increased by a greater extent than the increase in wage per employee post. (As stated, the comparison to 2011 is more reliable.) The increase in the number of work hours per household, which reflected growth in the number of wage earners, contributed to the increase in household income. These data are in line with the growth trends in the participation rate and with the decline in the unemployment rate. The decline in the tax rates on income from labor also contributed to a net increase in household income, particularly until 2009.

## 6. Summation

The foregoing discussion gives rise to a number of economy-wide and cross-district conclusions. In terms of the economy-wide conclusions, (a) the indices of home purchase affordability (in terms of years of income) indicate that there was a deterioration between 2004 and 2012, and that in general, an additional 1–3 years of income are required in order to purchase a home (with the exception being the Haifa district). However, the rental affordability indices present a different picture: Even though rental prices have increased in the current cycle, rental affordability in 2012 does not show a sweeping deterioration (i.e. in all districts) compared to 2004. All of the indices show that affordability increased in some districts and declined in others. (b) The stability in rental affordability means that household

income and rent increased at similar rates. Household income increased thanks to a general increase in wages in the economy, a decline in taxes on labor, and an increase in the number of work hours and in the participation rate. (c) When dividing the study period into sub-periods, we find that rental affordability improved between 2004 and 2008—because income increased while rents remained stable—but declined sharply between 2008 and 2012 because rents increased rapidly while household income grew slowly. This decline in affordability offset the earlier improvement.

In terms of the cross-district conclusions, Jerusalem has the lowest level of affordability (i.e. it is most difficult to afford a home), and Haifa has the highest level of affordability. There is a marked gap between affordability in the Center district and affordability in Tel Aviv and Jerusalem.

**Table 1:**  
Gross wage per employee post, rent and home prices  
rate of change (percent), (annual averages), 2004–12

	Change (percent)		
	2004–12	2004–08	2008–12
1. Rent and home prices <sup>a</sup>			
Rent	43.9	2.0	41.1
Home prices	66.3	12.7	47.5
2. Income <sup>b</sup>			
Gross wage per employee post	24.1	12.4	10.5
Gross financial income	41.6	21.7	16.4
Net financial income	47.5	24.3	18.7
Gross income from labor	44.9	26.8	14.2
Gross financial income in excess of gross real income per employee post	14.1	8.3	5.3

<sup>a</sup> SOURCE: Central Bureau of Statistics, quarterly data.

<sup>b</sup> SOURCE: Based on Central Bureau of Statistics Household Expenditure Survey.

**Table 2:**  
Indicators of work hours, taxes and compulsory payments, and household density

	2004	2005	2006	2007	2008	2009	2010	2011	2012
1. Weekly work hours									
Entire household	43.4	43.4	43.6	45.7	46.3	45.4	46.4	46.6	48.8
Head of household and spouse	34.9	35.1	35.0	36.2	37.0	36.3	36.5	36.8	42.0
Excluding head of household and spouse	8.5	8.3	8.6	9.4	9.4	9.1	9.9	9.8	6.7
2. Average number of wage earners per household	1.18	1.20	1.22	1.25	1.27	1.27	1.3	1.31	1.35
3. Number of individuals per household	3.33	3.33	3.32	3.30	3.32	3.34	3.33	3.34	3.29
4. Self-employed as a share of workers	8.8	9.4	10.1	9.4	9.4	9.7	10.0	10.3	10.3
5. Taxes and compulsory payments as a share of gross income from labor	26.1	24.8	23.7	24.1	23.0	21.3	21.6	21.0	21.0

SOURCE: Based on Central Bureau of Statistics Expenditure Surveys.

## The Impact of Terrorism, Israel's Image, and Economic Variables on Different Types of Incoming Tourism<sup>1</sup>

- The issue examined herein is the impact of the security situation, Israel's image, and economic variables on different types of incoming tourism.
- It was found, as expected, that the security situation has a significant impact on tourist arrivals in Israel, but to different degrees depending on the purpose of the visit: tourists coming on a pilgrimage, vacation or for touring are affected to a great extent by the level of terrorism, while those coming on business and to visit relatives are minimally affected. It was also found that within each purpose of the visit, tourists with an attachment to Israel—whether as Jews or as tourists who have visited the country previously—are less affected by the level of terrorism.
- The impact of economic variables on tourist arrivals is secondary: The economic variables, including the exchange rate, have more of an impact when the security situation is calm.

### 1. Introduction

In 2012 the tourism industry employed about 110,000 people. This is a labor-intensive industry in which a relatively large percentage of employees are drawn from the periphery, and, conspicuously, the proportion of employees with no academic degree is high. These characteristics of the composition of tourism employees indicate that the industry is more important to Israel than its relative share of GDP—by virtue of its ability to provide work for people with a low level of education, whose rate of employment in recent years has been lower than those with higher education.

The tourism industry in Israel relies mainly on overseas tourists, whose visits provide higher added value to the economy than Israeli tourists. The demand from tourists to visit Israel is largely dependent on the security situation. Tourists, however, are not a single entity, and their visits have different purposes (pilgrimage, vacation, business, etc.). Some of them are Jews and others Christians; some arrive in an organized framework, others independently; for some this is their first visit to Israel, while others have visited the country previously. The impact of the security situation on tourism demand is likewise heterogeneous. This study therefore analyzes the impact on each type of tourist separately.

<sup>1</sup> Based on "The impact of terrorism, Israel's image and economic variables on incoming visits to Israel by different types of tourists", Research Department, Bank of Israel (forthcoming).

The demand for tourism is likely to also be affected by Israel's image regarding civil issues that are of interest to tourists, such as lifestyle and doing business, which they learn about from newspaper articles published in the foreign press. Tourism demand is also likely to be affected by classic economic variables: as the literature indicates, tourism demand is affected by the real exchange rate, GDP in Israel and in the countries that supply it with tourists, and prices in other tourism destinations in the Middle East, which could provide an alternative to or complement a visit to Israel.

The empirical framework includes a panel estimate that examines the impact of the security variables, civil-image variables, and economic variables on the demand of each type of tourist. The long-term analysis was undertaken in the framework of cointegration.

The research presented here could assist the body that regulates the tourism industry, namely the government, in several respects: in the short term—in formulating marketing policy for incoming tourism. The marketing of incoming tourism is partially conducted by the government, seeing that the issue at stake here is a public good (the State of Israel). The research examines which tourist segments the government should focus on, at different levels of terrorism. In the long term, seeing that the hotel industry is one that is planned to a large extent<sup>2</sup>, the research could assist in preparing precise (as far as possible) estimates of the expected number of different types of tourist arrivals. These estimates are important for formulating incentive policy for constructing hotels.

Section 2 of the study reviews the empirical literature on the subject; Section 3 describes the empirical approach; Section 4 presents the developments that have taken place in Israel; and Section 5 defines the estimation variables, and presents the estimation methods and the empirical results.

### 2. Literature review

The present study is different from previous studies in several respects: It focuses on the significant impact of the security situation on tourist arrivals in Israel; it uses distinctive data—quantitative measures of victims of terrorism, data on the international press' level of interest in Israel regarding war and unrest, as well as regarding civil issues; and it differentiates between different segments of tourists, which makes it possible to examine the impact of the security situation, Israel's civil image and economic variables on different kinds of incoming tourism. Similar to several

<sup>2</sup> The government allocates land for tourism, authorizes the hotels' construction plans, and in most regions even provides investment grants.

newer studies, this study attempts to construct a more solid empirical base than the standard empirical approach—and to respond to criticism of the approach adopted.

Several studies have examined the negative impact of terrorism on tourism to Israel. Fleischer and Buccola (2002) were the first to introduce the *level of terrorism* variable, a variant of which we have used in this study, as a factor with a negative impact on tourists' overnight stays in Israel. Fleischer and Buccola (2002) define the level of terrorism by means of a variable that ranks the intensity of terrorism according to the number of Israeli and Palestinian fatalities. Menashe and Sharabany (2011) used this variable to examine the impact of terrorism on hotel overnights in Israel in the years 1997–2010, and found that the level of terrorism almost completely dominated tourists' demand for overnight stays.<sup>3</sup>

### **Media coverage of Israel and particularly the country's security situation**

The dominance of the security situation in determining the level of demand of tourists to Israel, as emerges from the above studies, and the understanding that a series of the number of fatalities (Israeli and Palestinian)<sup>4</sup> cannot fully reflect the security instability in Israel, led Fielding and Shortland (2009) to examine the impact of the media on tourist arrivals. They examined the impact of terrorism on incoming American tourism to Israel in the years 2001 to 2006, both directly, according to the number of victims, and indirectly, according to the level of media coverage of the terrorism events. They found that the indirect impact—according to the media reportage—was stronger in certain cases.

The international media coverage of a particular country is not restricted to security issues, but encompasses various areas, including lifestyle, business and sport. Stepchenkova and Eales (2011) found that negative publicity about Russia in the international media has a significant negative effect on tourism demand. The present analysis also examines the effect of media coverage of various civil issues on tourism demand.

<sup>3</sup> The negative impact of terrorism is not restricted only to demand from tourists. Becker and Rubinstein (2011) found that terrorism changed the patterns of consumption of transportation services and cafés, the major impact being on casual users, including tourists. Terrorism thus causes a forced change in the consumption patterns of incoming tourists.

<sup>4</sup> Of course, with corrections in the event of a regional flare-up, such as the Second Lebanon War of July–August 2006.

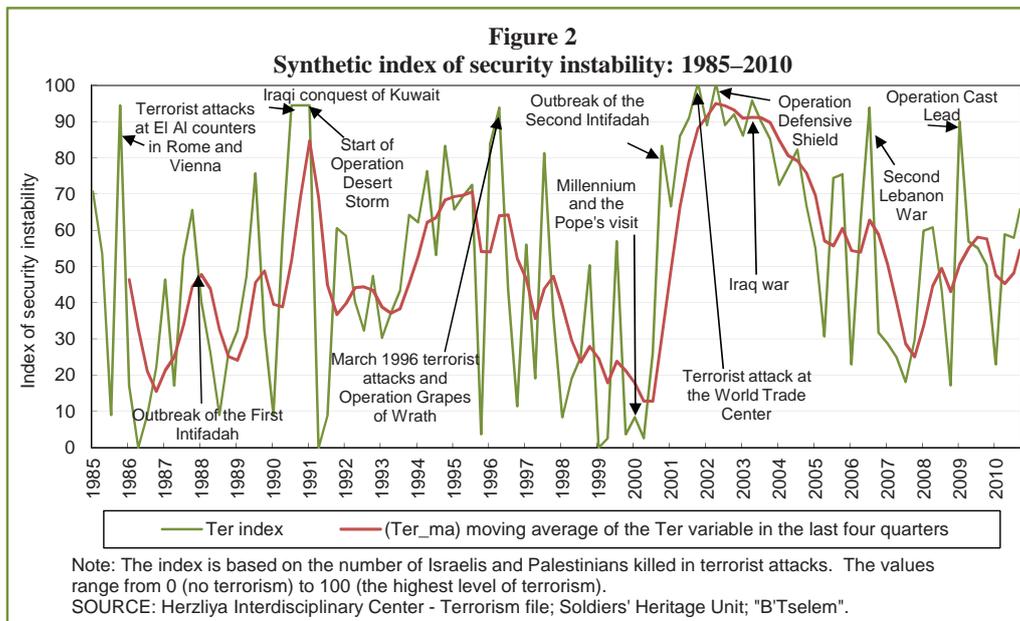
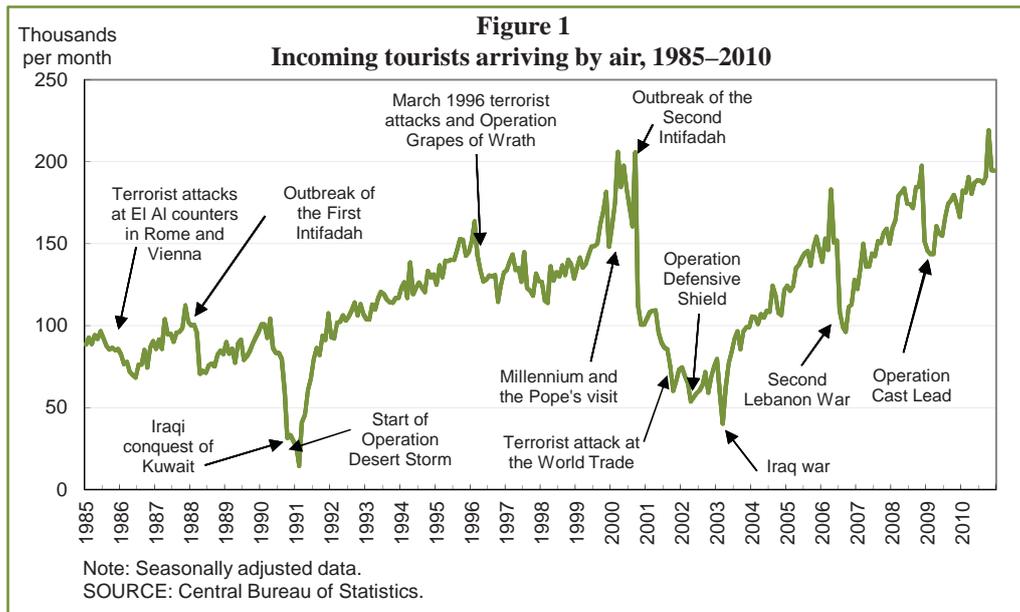
### **Distinction between different types of tourists**

Studies of tourism to Israel, similar to earlier studies worldwide on tourism demand, consider incoming tourism as a single entity, even though there are different types of tourists, for example, tourists visiting for different purposes. The major difficulty is the paucity of data, since most countries do not collect data on the types of tourists. Cortes and Blake (2010) characterized incoming tourists to the UK according to the purpose of their visits. They examined the effect of economic variables on the expenditures of tourists arriving for different purposes and from different countries, and found large variance between types of tourists regarding sensitivity to economic variables.

### **3. The empirical approach adopted in this study**

The empirical approach adopted in this study had to deal with three characteristics of the data: their non-stationary and cointegrative nature, dependence between the cross sections, and the heterogeneous nature of the impacts—especially the impact of the security situation—on the number of tourists. The major method of estimation in the study, that of Eberhardt and Teal (2010), the Augmented Mean Group (AMG), made it possible to deal with the above three characteristics of the data.

An econometric approach that dealt with the above three data characteristics in a study on tourism demand was undertaken recently by Fuleky, Zhao and Bonham (2014) on incoming tourism to Hawaii from several states in the US. They found that estimation methods that did not take the common factors into account produced biased estimates. The approach used for the present analysis, that of AMG—Eberhardt and Teal (2010), does take the common factors into account.



#### 4. Developments in Israel

The number of tourist arrivals and their composition has changed greatly over the years. When the level of terrorism was high the overall number of tourists fell, and the proportion of those visiting for business purposes, for family visits, and the proportion of Jewish tourists rose. On the other hand, when the level of terrorism was low the overall number of tourist arrivals in Israel rose, as did the proportion of those visiting for pilgrimages and vacations and touring, as well those for whom this was their first visit to Israel.

##### *a. Security instability greatly affects tourists' demand*

Figure 1 shows that incoming tourism reacts immediately and severely to a deterioration in the security situation in Israel and in the region. A salient example was the period of the second Intifadah (uprising), during which the number of incoming tourists fell dramatically.

Figure 1 also underscores the importance of defining a variable that will describe the security instability, and that will reflect the impact of this instability on tourists' demand, which is measured by their arrival in Israel.

In order to measure the impact of terrorism on the different types of incoming tourists, it is necessary to define a measure of the level of terrorism. A synthetic index of security instability was therefore defined (Figure 2), based on data of fatalities—Israeli citizens killed in terrorist attacks, soldiers in acts of hostility and wars, and Palestinians. From this data a linear index was constructed of terrorism according to the fatalities data. The index is divided into 100 grades on a scale from 0 (calm) to 100, according to the percentile of the linear index at each grade. For example, an index of 40 means that in 60 percent of the quarters, the level of terrorism was higher. This implies that the synthetic index of terrorism is not linear with respect to fatalities: a very small number of terrorism victims is sufficient to move from grade 0 to grade 1, while the transition from grade 99 to 100 reflects a very large number of victims.<sup>5</sup>

Many other events could affect the security situation as perceived by a particular tourist. In order to reflect the security situation in general, a series of the number of articles published on Israel in the foreign press dealing with wars and unrest was added.

*b. The connection between media exposure abroad about Israel and the number of incoming tourists*

**Media coverage of war and unrest connected to Israel in the foreign press** could provide potential tourists with additional information about Israel's security situation beyond the information contained in the *level of terrorism* (Ter) variable. In order to analyze the connection between media exposure and tourism, a comparison was made between the level of terrorism and the number of articles published by the AP news agency on Israel dealing with war and unrest, as an approximation of coverage by the international media.<sup>6</sup> Most of the news items about Israel on this subject are, of course, negative. Figure 3 presents the Terrorism Index and the number of articles published.

According to the Figure, the international media's interest in terrorist attacks in Israel declined in 2001, even though the number of victims of terrorism in the second Intifadah from 2001-2004 remained very high. There are grounds to assume that the potential tourist's exposure to the level of terrorism in Israel decreased, and therefore his tendency to visit Israel

<sup>5</sup> Because the security incidents have a cumulative effect on the demand for tourism services in Israel, at least in the recent past, regressions were used to examine the variable as a moving and weighted mean of several quarters.

<sup>6</sup> The analysis assumes that articles on this subject are generally negative, and that their level of negativity remains constant over time. Therefore, the *number* of articles could provide an indication of Israel's security situation.

rose. A further difference in information between the *image* variable on the subject of war and unrest, and the *level of terrorism* variable arises from the existence of events that are not fully considered by the Terrorism Index, such as regional unrest and the disengagement, despite subjective intervention in the Terrorism Index, which is limited to the largest events.

Even though the security situation, whether reflected by the number of articles or by the Terrorism Index, is an important factor affecting tourist arrivals in Israel, it can be expected that the amount of attention devoted to civil matters in Israel, as an antithesis to the level of terrorism, could provide potential tourists with additional information on what is happening in the country. This information could be obtained by the extent of media coverage of Israel dealing with civil subjects such as lifestyle and business. This media coverage is mostly positive, in that it presents Israel's civil face that is unconnected to the country's image regarding war and unrest.<sup>7</sup>

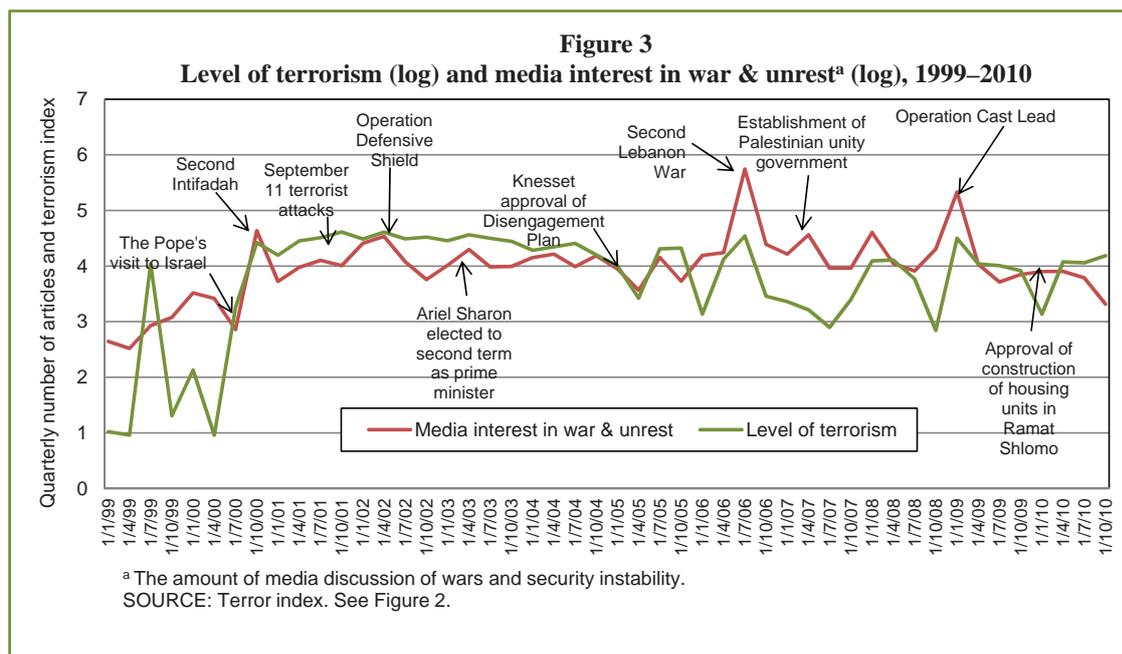
*c. Security instability affects the number of tourist arrivals in Israel differentially, depending on the purpose of the visit, the tourist's religion and how the trip was organized*

According to Table 1, the intensity of tourists' reaction to terrorism is very heterogeneous, depending on the purpose of the visit. The number of tourists visiting Israel for all purposes (segments) is obtained from tourism surveys by the Ministry of Tourism. The surveys provide data on the characteristics of the tourists visiting Israel from 2000 to 2010, such as the purpose of the visit, the tourist's religion, whether this is the first visit to Israel or a repeat visit, and how the visit was organized (organized tour, tour package, or independently organized).

The table indicates a large difference in the impact of terrorism on the number of tourist arrivals, depending on the purpose of the visit. Sensitivity to terrorism among pilgrimage tourists and to some extent also tourists who come to tour and for vacation, is high, while sensitivity to the level of terrorism among tourists whose purpose is to visit relatives or for business is lower.

Additional characteristics of the incoming tourists (first/repeat visit, the visitor's religion, organization of the trip) are likely to display different sensitivities to the level of terrorism. At times when the level of terrorism is low, the

<sup>7</sup> The tone of the articles was not analyzed, but the assumption underlying the "image lifestyle" series is that they are, on average, positive (despite some negative articles), and that the level of positivity is constant throughout the period. The number of articles, therefore, attests to positive interest worldwide in the subject of lifestyle in Israel.



proportion of non-Jewish tourists, those visiting Israel for the first time, and those arriving as part of a group or a tourist package is greater, and at times when the level of terrorism is high, the trend is reversed (Table 1).

The econometric examinations estimating the effect of the security situation on each of the tourist segments is important for regulator, because of that regulator’s ability to intervene: in the short term, during periods of high levels of terrorism, the publicity focus can be directed at target populations that are less affected by terrorism; and in the long term, the number of hotel rooms can be planned according to assessments of the expected security situation.<sup>8</sup>

**5. The model, definition of the estimation variables, the method of estimation, the statistical tests and the empirical results**

**The model and definition of the estimation variables**

The empirical analysis of the impact of the security situation on incoming tourists to Israel was undertaken by means of a panel regression during the period from 2000:Q1 to 2010:Q4. The dependent variable is the entry of various types of tourists, and includes thirty-three different segments (cross-

<sup>8</sup> In the long term, the responsible body can also plan the distribution of hotel rooms by taking into account the security situation and the level of substitutability between Israelis and tourists in different regions of the country. In situations of security unrest, regions with a high level of substitutability will experience relatively less turmoil. This study did not examine the level of substitutability in different regions of the country. See the comments in the conclusion.

sections) of tourists.<sup>9</sup> The explanatory variables are security variables, civil image variables, and economic variables.

The security explanatory variables are the level of terrorism, and the image of Israel regarding war and unrest. The civil image and economic variables are the image of Israel regarding lifestyle and its business image. The latter reflects the economic interest in Israel, which could explain tourist arrivals for business purposes.

The economic variables are the volume of tourism, which reflects the demand for trips abroad in countries from which tourists visit Israel, according to the number of outgoing tourists from these countries and according to the types of tourists. The other economic variables in the analysis are the standard economic variables in studies of this kind—the real effective exchange rate between Israel and the countries from which the tourists originate, and the effective exchange rate between Israel and the countries that could constitute a tourism substitute/complement to Israel, such as Egypt and Jordan.<sup>10</sup>

<sup>9</sup> The 33 cross-sections are the result of 5 purposes of visit X 2 (the visitor’s religion Jewish/Christian) X 2 (first /returning visit) X 2 organization of the package (independent/organized). From the 40 cross sections, 7 were eliminated because of a paucity of observations.

<sup>10</sup> Series in which seasonal adjustments needed to be made were handled by the X12 census method; Jewish and Christian holidays and festivals were taken into account, as well as the number of working days per month. The economic data are in fixed prices. Most of the data were taken from Ministry of Tourism publications, the Central Bureau of Statistics, and the Bank of Israel’s databank.

**Table 1**  
**Characteristics of incoming tourism, 2000–10**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Purpose of the visit (%)	100	100	100	100	100	100	100	100	100	100	100
Vacation and tourism	39	33	22	24	24	25	19	26	28	31	38
Pilgrimage	30	10	7	8	10	17	22	24	35	27	30
Visit relatives	17	31	44	42	39	37	43	36	20	26	17
Business <sup>a</sup>	12	22	20	20	20	18	14	12	13	16	12
Solidarity and other	1	5	6	6	7	3	2	2	4	1	3
Religion (%)	100	100	100	100	100	100	100	100	100	100	100
Jewish	20	39	55	55	53	43	44	40	30	34	24
Non-Jewish	80	60	46	45	47	57	56	60	71	66	76
Organization of the trip (%)	100	100	100	100	100	100	100	100	100	100	100
Group	48	20	13	13	13	21	28	31	39	30	38
Non-group travel package	13	16	15	9	10	9	7	6	24	28	31
Individual	39	64	71	78	77	70	65	63	37	42	30
Frequency of visits (%)	100	100	100	100	100	100	100	100	100	100	100
First visit	59	38	24	24	27	38	38	43	52	48	58
Repeat visit	41	62	76	76	73	62	62	57	48	52	42
Number of tourists (thousand)	2,417	1,196	862	1,063	1,506	1,903	1,825	2,063	2,560	2,321	2,803

<sup>a</sup> Including conferences, studies and research, and medical treatments.

SOURCE: Ministry of Tourism surveys, 2000–10.

## Results of the estimate

The estimate is for each of the 33 cross-sections (the segments). The sign and the size of most estimates of the parameters are in the expected direction.

Table 2 presents the basic model and the model with the addition of interaction variables.

In the basic model the *image of Israel regarding war and unrest* variable complements the potential tourist's exposure to the security situation in Israel, in conjunction with the *level of terrorism* variable.

In other words: Change in the *image of Israel regarding war and unrest* + change in the *level of terrorism* = change in the security situation.

The overall impact of the security situation in the estimation is that a deterioration of one point in the security situation will lead to a decline of 2.3 percent in the number of tourists, nearly all as a result of the direct level of the victims (the *level of terrorism* variable). For example, in the center of the distribution of the quarterly number of fatalities for the

years 2000 to 2010, an increase of one Israeli fatality in the quarter is equivalent to a deterioration of about 4 points in the security situation, while in a bad security situation, in the 98<sup>th</sup> percentile of the distribution, an increase of 28 Israeli fatalities is equivalent to a deterioration of one point in the security situation. The results are compatible with those obtained by Menashe and Sharabany (2011), where it was found that an increase of one point in the severity of terrorism, according to the same index, would lead to a decline of 1.8 percent in tourist arrivals.<sup>11</sup>

The estimate of Israel's image regarding lifestyle is expected to be positive, inasmuch as "civil" news items about Israel are likely to increase its positive exposure and thus increase demand. In the basic estimation, the coefficient is in the opposite direction to what could be expected, but the civil news on Israel variable is negatively correlated to the *terrorism* variable, and the estimate, which takes into account the interaction between them, shows that when the

<sup>11</sup> Even though in this study, as opposed to that of Menashe and Sharabany (2011), a new variable was introduced in addition to Ter, the Image war & unrest log, which describes the security situation, the estimate without this variable produced similar results.

**Table 2:**  
The basic model and the model including interaction

	The model including interaction	The basic model
Level of terrorism	-2.269***	-1.659***
Israel's image on the subject of war and unrest	-0.054	0.551
Israel's image on the subject of lifestyle	-0.414***	-0.156
Business image <sup>a</sup>	0.215**	0.257***
Real exchange rate	0.531	1.001
Volume of tourism	0.480**	0.414*
Interaction between Israel's image on the subject of war and unrest and the exchange rate		-0.124
Interaction between the level of terrorism and Israel's image on the subject of lifestyle		-0.00283

a Dummy variable for the business segment multiplied by the Business image log variable.

\*\*\* Significant to a level of 1 percent, \*\* Significant to a level of 5 percent, and \* Significant to a level of 10 percent.

level of terrorism is low, the civil news items about Israel do not affect tourist arrivals, but in periods of security tension, any news item about Israel, even about lifestyle, adversely affects the number of tourist arrivals to a moderate extent. (For details, see Table 3.)

The *business image* variable, which explains tourist arrivals solely for business purposes, is positive and significant. An increase of one percent in the number of articles about Israel (not in the context of business and war and unrest) increases the number of tourists for business purposes and conferences by 0.22 to 0.26 percent.

A variable that is used in many studies worldwide as an explanatory variable of incoming tourism is the real exchange rate. The elasticity of tourist arrivals to this variable, as expected, is positive, but not significant. Elasticity is positive because appreciation of the real exchange rate implies an increase in prices in Israel for the foreign tourist. The overall impact of the exchange rate is at the lower limit of the findings of studies undertaken worldwide, the reason being that Israel is a distant and relatively expensive destination, and usually the price elasticity in distant destinations is lower than for closer destinations. (See Schiff and Becken, 2011.)<sup>12</sup>

<sup>12</sup> Visiting Israel is regarded as expensive, and is therefore suitable only for wealthier tourists whose sensitivity to economic variables is relatively low. For example, the average cost of a visit to Israel in 2011 was \$1,500 and \$142 a day, as opposed to \$940 for a visit to the UK. The UK data are based on Monthly Overseas Travel and Tourism, September 2013, retrieved on November 28, 2013. The data for Israel are taken from the Survey of Incoming Tourism, Ministry of Tourism, September 2012.

The real exchange rate correlates positively with the security situation, especially with the “newspaper items” on the security situation, in view of the fact that depreciation can also occur as a result of an unstable security situation. In the model that includes interaction between the exchange rate and the security situation, it was found that the exchange rate affects the arrival of tourists when the level of terrorism is low, albeit not significantly, and that the higher the level of terrorism, the lower the impact of the exchange rate. (For details, see Table 3).

**Table 3:**  
Estimate of additional, non-security variables

Segments	The overall effect of Israel's image on the subject of lifestyle		The overall effect of the real exchange rate	
	Low level of terrorism	High level of terrorism	Low level of terrorism	High level of terrorism
Weighted average	-0.156	-0.440	1.001	0.332

An analysis that includes the effect of the exchange rate on those coming solely for business purposes, found, similar to the finding of Cortes and Blake (2010), that the price elasticity is reversed, with a negative sign: The more the shekel strengthens (real appreciation), the more business people come to Israel. This is probably because real appreciation correlates with a strong economy, which attracts business people.

Table 4:  
The effect of the security situation on the tourism segments

	General	Jewish		Non-Jewish	
		First visit	Repeat visit	First visit	Repeat visit
Vacation and tourism	-2.402***	-2.736***	-1.059***	-3.110***	-2.049***
Pilgrimage	-3.887***	-	-2.028*	-3.435***	-1.814***
Visit relatives	-1.184***	-0.84	-0.395***	-2.035***	-1.508***
Business, conferences	-1.769***	-	-0.742***	-1.328**	-0.245
Weighted average	-2.227***				

The *tourism volume* variable was estimated with a sign in the expected direction. The significance of the coefficient is that an increase of one percent in global demand for tourism will increase the number of tourist arrivals to Israel by 0.4 to 0.5 percent.<sup>13</sup>

**Impacts of the security situation on different types of tourists:** As expected, the security situation differentially affects tourists from different segments. Table 4 presents the overall impact of the security situation according to purpose of the visit, the visitor's religion, and whether this is a first or repeat visit.

The results show a large difference in the impact of the security situation according to the purpose of the visit: tourism for visiting relatives and for business is minimally affected by the security situation (the level of terrorism and Israel's image regarding war and unrest), while tourism for vacation and touring, and pilgrimage, is affected to a large extent. This result can be explained by the findings of Bental and Regev (2010). They claim that tourists are very sensitive to terrorism because of the substitution effect—their ability to replace the destination relatively easily. Indeed, tourists visiting for vacation and touring, and to some extent for pilgrimage, can relatively easily choose alternative destinations, whereas tourists coming on business or to visit relatives are more restricted in their ability to substitute the destination.

The impact of the security situation on tourists who had visited Israel previously and on Jews was less than on tourists who had never visited before and on non-Jews. In other words: the stronger the tourist's familiarity or connection with Israel, the less he is affected by the security

situation. As a consequence, even though there is still a difference in sensitivity to the security situation between visitors for various purposes, given the same religion and same frequency of visiting the country, it appears that the differences in terms of purpose of the visit are fewer.<sup>14</sup>

In summary, the results show that the impact of the security situation has a dominant effect on the number of tourists coming to Israel. The security situation also overshadows tourists' economic considerations. There were, however, large differences in the effect of the security situation among the tourism segments. Data on the number of media articles about Israel on war and unrest did not directly provide additional information to the tourist beyond the variable of direct mention of the number of people killed in terrorist attacks. At times when few negative articles on Israel are published, the economic variables have more of an impact than at times when there are many negative articles on Israel.

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<sup>13</sup> Additional models were estimated, including estimates of income elasticity from the variable  $\log(\text{GDP World})$  and  $\text{GDP in Israel}$   $\log(\text{GDP Isr})$ . The estimates were found to be not significant.

<sup>14</sup> Jewish pilgrims need not be considered, because there are so few.

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## The Effect of High-Frequency Algorithmic Trading on Securities Trading in Israel

- With the advances in technology in recent years, new methods for trading in securities have been developed. The main innovation has been in the use of algorithms for automatic trading, without human intervention. These automatic trading systems have changed the face of securities trading and are considered to have had a major effect on its characteristics.
- Most of the research in other countries has shown that algorithmic trading improves the level of liquidity, primarily by lowering its cost which is reflected in bid-ask spreads. However, there are those who claim that the system has disadvantages which increase the probability of extreme fluctuations in the financial markets and are liable to reduce the worthwhileness of investment for traders that operate using more traditional methods.
- A survey of the capital market in Israel indicates that algorithmic traders are active on the Tel Aviv Stock Exchange on quite a large scale and that their activity is focused mainly on trading in options on the Tel Aviv 25 Index. However, algorithmic trading is also widespread in other securities, such as corporate bonds.
- The entry of algorithmic traders to corporate bond trading on the Tel Aviv Stock Exchange has led to a sharp increase in the number of quotes submitted but has not led to a simultaneous improvement in the level of liquidity. This is in contrast to the situation in other countries and raises some doubt as to the advantages of high-frequency algorithmic trading in Israel.
- Regulators in Israel should take into account the changes that have occurred in the characteristics of securities trading as a result of the entry of high-frequency traders. They should formulate trading rules that are suited to the new conditions in order to prevent potential adverse effects on trading.

### 1. Background

Algorithmic trading is electronic trading carried out through a series of predefined rules, which allows trading in the capital market without human intervention. The system makes use of the analytical capabilities of computers to carry out market analysis, trend identification, automatic decisions

to buy/sell securities and the execution of transactions in the financial markets.<sup>1</sup>

When analyzing algorithmic trading, a distinction is generally made between two main trading methods: low-frequency and high-frequency. Low-frequency trading is used primarily by institutional investors to execute orders for their clients and the average position is held for several days. The main objective of this system is to increase efficiency, reduce cost, and improve the execution of trading, since automatic algorithms reduce the need for traders. High-frequency trading is primarily used by private financial companies and its main advantage is the speed of executing trades while producing profits in a short period of time through the rapid analysis of new information received during trading.

The use of high-frequency trading in the capital markets both in Israel and abroad has grown rapidly in recent years. Currently, it accounts for more than one-half of trading volume in the US and about 40 percent in Europe.<sup>2</sup> In Israel, according to Tel Aviv Stock Exchange data, about one-third of trading volume in equities and 40 percent of the trading in bonds is carried out by high-frequency traders using trading programs that send buy/sell orders automatically.<sup>3</sup>

The high-frequency trading system is based on computer programs known as trading algorithms, whose goal is to create profits using a variety of trading strategies. The trading algorithms gather information on securities in real time and analyze it in a fraction of a second. On the basis of that analysis, automatic decisions are made and buy/sell orders are sent to the trading system of the stock market with lightening speed. The rest of the traders and the traditional trading systems are not able to operate at this speed<sup>4</sup>, and furthermore, the frequency of trading is increasing as trading technology improves.

There many strategies used in trading algorithms. Some identify regularities in the movements of share prices

<sup>1</sup> Further details can be found in Talya Tobolsky, "The High-Frequency Algorithmic Trading Method", Discussion Paper 2014.03, Feb. 2014 and also Gitit Gur-Gershoren, Idan Michaeli, Guy Sabbah and Erez Refaeli, "Algorithmic trading and high-frequency trading: a survey and initial findings from the Israeli capital market", working paper – 11/2013.

<sup>2</sup> "Understanding High Frequency Trading", World Federation of Exchanges.

<sup>3</sup> These figures are based on the definition of trading algorithms by the Tel Aviv Stock Exchange as traders that send more than 1,000 orders on average per day (in all the markets) and/or traders that send 5,000 orders per day at least once annually.

<sup>4</sup> US Commodity Futures Trading Commission & SEC (2010), "Findings Regarding the Market Events of May 6, 2010".

(technical analysis) and some try to identify outlier events in certain shares and exploit them. Other strategies exploit the advantage of speed, characterize reports on companies as “positive” or “negative” and provide high-frequency traders with a potential profit before the other investors have time to react.

High-frequency traders can be credited with having made a major contribution to increasing liquidity in the capital markets.<sup>5</sup> This is due to their active involvement in trading, and in particular to the large number of orders that they submit to the stock exchanges.<sup>6</sup> In addition, it is claimed that algo trading contributes to the efficiency of markets since its exploitation of market distortions immediately following their appearance helps to halt their development. Furthermore, when new information arrives in the market it is reflected in prices more rapidly as a result of trading algorithms. An additional advantage of trading algorithms is their contribution to reducing transaction costs,<sup>7</sup> which is due to the saving in manpower and the increased competition between trading algorithms to produce the best price quote, which also contributes to the markets’ liquidity.<sup>8</sup>

The high-frequency trading system also has disadvantages. The access to technology gives them a kind of “exclusivity” for a short period of time over new information reaching the market and gives them a significant advantage over the other traders in the market. The increased activity of high-frequency traders in the financial markets and their technological advantage are liable to lead to traditional investors abandoning trading.<sup>9</sup> This is due to the feeling of uncertainty and lack of confidence in the stock market,

which is the result of the ability of high-frequency traders to influence the direction of the market.<sup>10</sup>

Another major disadvantage of algorithmic trading is the volatility and disruptions that high-frequency traders may create when a major negative event is announced or under certain conditions when the level of uncertainty in the markets rises significantly. During these occurrences, automatic sell orders may be submitted which reinforce the trend and thus cause sharper fluctuations in the financial markets, increased losses for traditional investors, and even negatively affect the quality and reliability of trading. This situation is liable to increase liquidity risk, i.e., the probability of extreme changes in the capital market.

A number of events that have occurred in the capital market brought the issue of algorithmic trading to the attention of the public. The main example is the “Flash Crash” that occurred on May 6th, 2010 which caused the Dow Jones Average to plummet about 1,000 points and to lose about 9 percent of its value over a 20-minute period. According to an investigation by the SEC, the sharp drop in the Dow Jones was a result of a single sell order for futures contracts on the E-mini S&P 500,<sup>11</sup> which was produced by a trading algorithm.<sup>12</sup> This algorithm, which belonged to a large mutual fund in the US,<sup>13</sup> was programmed as a function of trading volume only, without taking into account the price or the period of time in which the order will be executed. On that day, there was increased uncertainty due to the situation of Greece’s economy. As a result, traders began to sell and buy numerous securities at an accelerated rate, thus increasing the volume of trading. The increased trading volume caused the algorithm to sell the E-mini Index, which increased the supply and led to a drop in the Index. Other algorithms reacted and started to buy the Index at the lower price and to trade in it, which led to an additional increase in trading volume. In reaction, the algorithm of the mutual fund further increased its selling of the Index, until finally trading was halted. As a result, the mutual fund’s customers lost about \$150 million within 10 minutes.<sup>14</sup> The selling

<sup>5</sup> Hasbrouk, J. & G. Saar (2012). “Low Latency Trading”, *Johnson School Research Paper Series No. 35-2010, AFA Chicago Meetings Paper*.

<sup>6</sup> Hendershott, T., C. Jones & A. Menkveld, (2011). “Does Algorithmic Trading Improve Liquidity”, *The Journal of Finance, Vol. LXVI, No.1*.

<sup>7</sup> The term “transaction costs” is defined as the costs borne by the sides in an economic transaction in order to execute the transaction, as well as the costs resulting from changing levels of liquidity, which are directly and negatively related to the level of liquidity.

<sup>8</sup> Larry Harris, “What to do about High-Frequency Trading”, *Financial Analysts Journal (2013) 69.2, 6–9, ProQuest.Web. 11 June 2013*.

<sup>9</sup> Furthermore, it is important to remember that most of the stock exchanges in the US are for-profit entities (unlike the Tel Aviv Stock Exchange) and some of their profits derive from the selling of information contained in the order book to high-frequency traders. High-frequency traders purchase the right to view the order book before other traders. Therefore, they are also able to react faster to changes in the markets, a situation that reduces the competitive strength of the investing public in the US.

<sup>10</sup> Andrei A. Kirilenko and Andrew W. Lo, “Moore’s Law versus Murphy’s Law: Algorithmic Trading and Its Discontents”, *The Journal of Economic Perspectives (2013) 27.2, 51–72*.

<sup>11</sup> The E-mini S&P 500 index is an index of futures contracts on the S&P 500 Index.

<sup>12</sup> However, there was no broad consensus regarding the conclusions of the SEC inquiry, particularly with regard to the responsibility of algorithmic trading for the level of volatility.

<sup>13</sup> Waddel & Reed Financial.

<sup>14</sup> Larry Harris, “What to do about High-Frequency Trading”, *Financial Analysts Journal (2013) 69.2, 6–9, ProQuest.Web. 11 June 2013*.

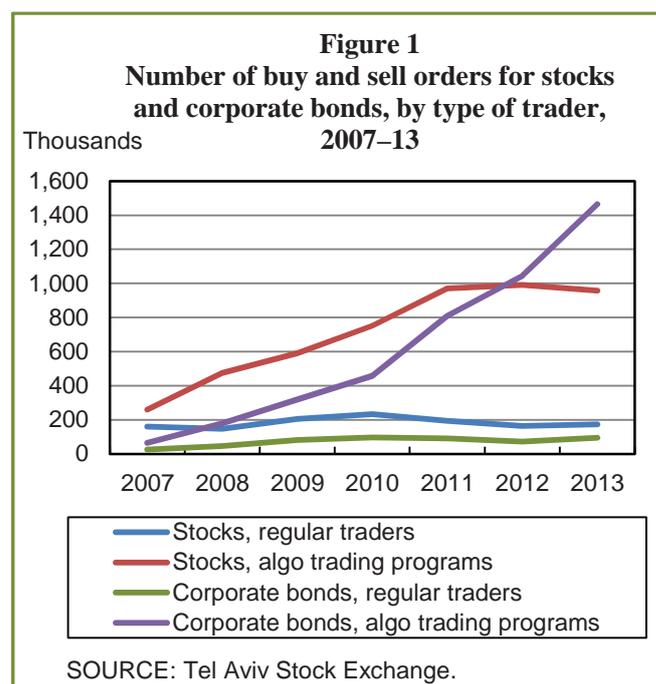
pressure spread from the futures contracts market to the stock market and caused large price declines in many shares, which in the end led to the collapse of the Dow Jones Index for about 10 minutes.<sup>15</sup> This event created panic and chaos and led to a feeling of uncertainty among the investing public. Another example of extreme volatility in share prices occurred on August 1st, 2012, as a result of a technical glitch in the trading algorithm of the Knight Capital Group, a large market maker. It lost \$440 million at a rate of \$10 million per minute.

The most prominent characteristic of most algorithms used by high-frequency traders is their speed, which allows them to use low-latency strategies. Low latency provides high-frequency traders with their competitive advantage. The strategies adopted by high-frequency traders can be divided into two main groups: The first includes strategies generally characterized as contributing to the efficiency of the markets by raising the level of liquidity and restraining the development of distortions in the market. This group of strategies includes, among others, market making and statistical arbitrage.<sup>16</sup> The second group of strategies is based on market manipulation through the exploitation of the speed advantage, which tends to disrupt the normal functioning and fairness of the capital market.<sup>17</sup> Apart from the clear problematic nature of this type of strategy, it has the disadvantage that for traders who do not use a high-frequency system it is less worthwhile to place limit orders on shares in which high-frequency traders are active. This is because a situation may likely arise in which the order will be executed when the market is going in the opposite direction. In other words, if the price of a security increases and a regular trader places a buy order, it is likely that his order will not be carried out since the high-frequency traders will be the first in line and will execute the trade before him at the desired price. Thus, this raises the concern that the order of the regular trader will be executed only if and when the market changes direction.

## 2. The development of algorithmic trading in Israel

Between 2007 and 2013, there was a sharp increase in the number of buy and sell orders sent to the Tel Aviv Stock

Exchange.<sup>18</sup> About 90 percent of the orders in 2013 originated from algorithmic trading (Figure 1), although only an average of about 3 percent of them were executed, in contrast to 30 percent of those sent in by traders using the traditional method. In the corporate bond market, this ratio was only 1 percent for algorithmic trading in contrast to 22 percent for other investors, and in the government bond market it was 3 percent for algo traders versus 53 percent for traditional investors. During the last three years, there has been a noticeable downward trend in the proportion of orders executed within total orders from algorithmic traders (Figure 2) and this is occurring while the total number of orders is growing.



### 2.1 The effect of algorithmic trading on the liquidity of corporate bonds

In 2007, high-frequency traders were responsible for about 8 percent of the trading volume in corporate bonds, and by 2011 this proportion had reached 25 percent. Subsequently, there was a gradual decline, and in October 2013 their share of trading volume was about 19 percent (Figure 3).

An analysis of the data for corporate bonds included in the Tel Bond 20 Index indicates that from 2010 until the third quarter of 2011 the number of orders increased by 400

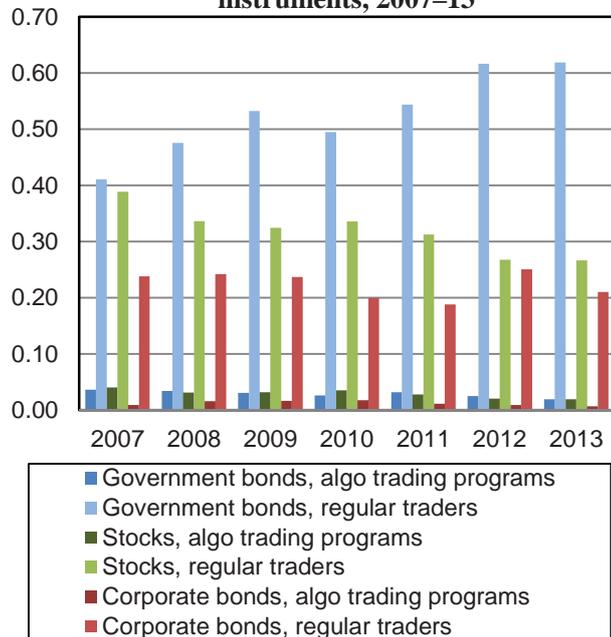
<sup>15</sup> U.S. Commodity Futures Trading Commission & SEC (2010), "Findings Regarding the Market Events of May 6, 2010".

<sup>16</sup> Statistical arbitrage is an opportunity for risk-free profit as the result of distortions in the price of a financial asset but on the assumption that the distortion created is not normal and will be closed quickly.

<sup>17</sup> The main strategies of this type are quote stuffing, front running and quote matching.

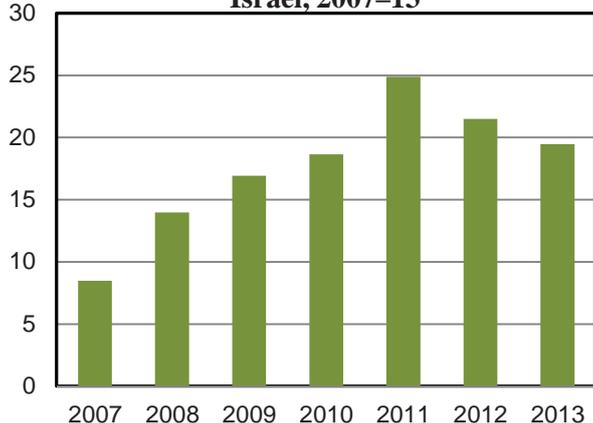
<sup>18</sup> The share of high-frequency traders in trading in the US began to rise already in 2005 and reached a peak of 61 percent of trading volume in 2009.

**Figure 2**  
Share of orders executed out of total orders placed by algorithmic and regular traders, for various investment instruments, 2007–13



SOURCE: Tel Aviv Stock Exchange.

**Figure 3**  
Share of algorithmic trading in total trading volume of corporate bonds in Israel, 2007–13

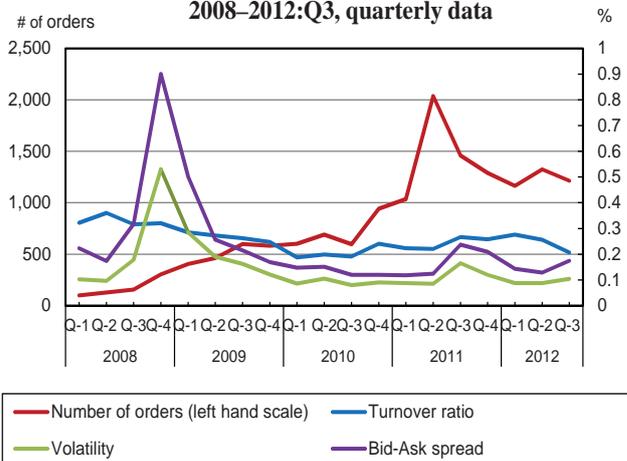


SOURCE: Tel Aviv Stock Exchange.

percent, which is a much higher rate of growth than for other types of securities. Two developments are worthy of notice: The first is the jump of about 140 percent during the second half of 2010 and the second is the jump of about 150 percent between April and June of 2011. Following that, the number of orders declined almost to levels that prevailed at the beginning of 2011 (Table 1). The aforementioned jump in the number of orders for the Tel Bond Index reflected sharp increases in each of the bond series that constitute it.

The correlation between number of orders and bid-ask spreads, which serves as a measure of the cost of liquidity, was negative during the period when algorithmic traders were not active in the market—as the number of orders increased, the spreads narrowed. However, during the period when algorithmic trading was in use the correlation became essentially zero. Thus, the introduction of algorithmic trading did not contribute to lowering the cost of trading. In theory, we would have expected that the participation of high-frequency traders would lead to an improvement in measures of liquidity and in particular in the cost of liquidity. However, the empirical results do not indicate any significant improvement. Similarly, we would have expected that the increase in the number of orders would lead to a similar increase in the turnover ratio; however, it only increased somewhat (Figure 4 and Table 1).

**Figure 4**  
Number of orders and measures of liquidity, 2008–2012:Q3, quarterly data



\* The number of orders submitted to the exchange's trading book.  
 \* Turnover ratio is defined as trading volume relative to market capitalization.  
 \* Volatility is measured by the standard deviation of the rate of change in intraday bond prices.  
 \* The bid-ask spread is defined as the spread between the best prices of supply and demand in the exchange's trading book, and measures the cost of liquidity.

**Table 1**  
**Number of orders and various measures of liquidity, bonds included in the Tel Bond 20 Index, January 2008 to September 2012**

Bid-Ask spread	Turnover ratio**	Size of trade (nominal value)	Volatility*	Average number of trades per hour of trading	Number of orders	Quarter
2008:Q1	99	7	0.10	98,032	0.32	0.22
2008:Q2	128	12	0.10	81,123	0.36	0.17
2008:Q3	155	15	0.18	64,445	0.32	0.32
2008:Q4	304	16	0.53	58,665	0.32	0.90
2009:Q1	405	17	0.28	41,289	0.28	0.50
2009:Q2	463	25	0.19	32,141	0.27	0.26
2009:Q3	598	25	0.16	29,740	0.26	0.21
2009:Q4	581	26	0.12	29,653	0.25	0.17
2010:Q1	602	18	0.09	29,943	0.19	0.15
2010:Q2	689	20	0.10	29,384	0.20	0.15
2010:Q3	598	17	0.08	29,895	0.19	0.12
2010:Q4	943	21	0.09	31,693	0.24	0.12
2011:Q1	1,035	19	0.09	33,563	0.22	0.12
2011:Q2	2,036	18	0.09	34,978	0.22	0.12
2011:Q3	1,459	23	0.16	35,559	0.27	0.24
2011:Q4	1,290	22	0.12	40,310	0.26	0.21
2012:Q1	1,163	24	0.09	38,370	0.28	0.14
2012:Q2	1,323	25	0.09	35,324	0.26	0.13
2012:Q3	1,213	20	0.10	33,862	0.21	0.17

\* Volatility is calculated as the standard deviation of the rate of change in the intraday price of bonds.

\*\* Defined as trading volume divided by total issued capital.

These results contradict most of the findings in the literature, according to which the participation of algorithmic traders narrows bid-ask spreads and improves liquidity.<sup>19</sup> Furthermore, according to the literature, the significant increase in the number of orders should have been accompanied by a similar increase in the turnover ratio; however, it increased only moderately. It can therefore be concluded that as a result of the activity of algorithmic traders the link between orders and executed trades weakened. It is important to note that these results relate only to corporate

bonds and cannot be used to arrive at conclusions regarding other types of assets traded on the Stock Exchange.

A possible explanation of the findings for Israel is related to the characteristics of the Israeli capital market, which consists of a single trading venue for securities and a relatively low level of liquidity relative to other countries. Thus, the ability to exploit arbitrage opportunities between different venues that exists in other countries does not exist in Israel. This explanation is consistent with the conclusions drawn from the empirical results of Boehmer, Fong and Wu (2012)<sup>20</sup> who emphasize that the increase in algorithmic trading volume in shares of small companies is liable to reduce their liquidity, primarily due an increase in volatility

<sup>19</sup> See, for example, Gitit Gur-Gershgoren, Idan Michaeli, Guy Sabbah and Erez Refaeli, "Algorithmic trading and high-frequency trading; a survey and initial findings from the Israeli capital market", working paper – 11/2013.

<sup>20</sup> E. Boehmer, K. Fong and J. Wu (2012), "International Evidence on Algorithmic Trading", available at SSRN 2022034.

that is not characterized as “positive” and which is a result of faster price discovery.

It is important to emphasize that when examining the measures of liquidity that are used to analyze the effect of algorithmic trading on the efficiency of trading, whether in Israel or abroad, the results are highly influenced by the global financial crisis and therefore it is very difficult to use this sample period to reach unambiguous conclusions regarding the effect of algorithmic trading.

### 3. Regulation in other countries

The “Flash Crash” incident provided regulatory agencies around the world with an incentive to examine ways of supervising algorithmic trading in order to avoid its adverse effects on trading and to prevent similar incidents in the future.

Regulatory measures taken in other countries can be categorized into two types: the first involves various mechanisms for identifying the activity of algorithmic traders and preventing ex ante harm that it might cause, while the second involves mechanisms that will be put into play in the market ex post, in the case of an incident and in order to limit the incident’s effect.

In 2012, the SEC began the process of building a huge database called MIDAS,<sup>21</sup> which will include all the buy and sell orders placed in the US capital market. This database will include all the orders made on all the national exchanges, including orders that were cancelled or changed and all trades made on the exchanges or outside of them. Such a unique database will make a major contribution, first and foremost, to understanding the processes and changes taking place in the structure of financial markets and at a later stage will reinforce the ability of the SEC to supervise and monitor traders, particularly high-frequency traders. In addition, it is the intention of the SEC to construct risk indices that will make it possible to identify at an early stage algorithms that are liable to increase volatility and risk in the markets.<sup>22</sup>

As in the US, a significant proportion of trading in Europe is carried out by alternative electronic trading systems. The main legislation for the supervision of algorithmic trading in Europe is the new version of the MifID (MifID II) regulations, formulated by the European Commission, expected to go into effect in 2015. The regulations introduce

a number of restrictions that will apply to high-frequency traders and to the stock exchanges and trading venues in which they operate. Companies that use algorithms in this way will be required to report on the trading strategies they adopt. In addition, supervision will be increased over trading venues that allow the activity of algorithmic traders. Thus, the various exchanges will be required to themselves monitor and minimize extreme price movements and to handle the loads on their servers. In parallel to this legislation, various countries in Europe, including Italy and France, have started to impose taxes on high levels of trading and to require high-frequency traders to regularly report changes in their trading strategies.

Another entity that is dealing with the issue is IOSCO<sup>23</sup> which works to achieve uniform international policies and tools that will be adopted by its members and determines the agenda of regulators in the financial world. IOSCO has 203 members in more than 100 countries, which consist mainly of financial regulatory authorities and stock exchanges. In 2011, it published a report<sup>24</sup> recommending regulatory measures to improve the efficiency of markets and to minimize the negative effects of high-frequency trading. These recommendations are intended to assist member regulators in identifying the effects of technological advances, to reduce risk, and to promote a uniform approach to these developments.

It appears that regulatory entities worldwide are working to prevent “technical” malfunctions in trading activity in order to minimize the probability of another incident like the Flash Crash. However, there remains an information problem in the capital market that is created with the entry of algo traders, which is liable to result from trading manipulation and other failures. Apart from this, there is doubt regarding the ability of regulators to fully understand the strategies of algorithmic traders and their effect on the future of trading. This is becoming especially relevant as algorithmic trading becomes more and more complex, in part due to technological advances. Therefore, it is becoming increasingly important to efficiently supervise trading activity and ensure its stability and to protect traditional investors.

### 4. Regulation in Israel

An analysis of the regulation of high-frequency trading in Israel requires the distinguishing between the characteristics of trading systems in the US and European markets on the one hand and those in the Israeli market on the other. It is

<sup>21</sup> Market Information Data Analytics System.

<sup>22</sup> E. Walter (2013, February), “Harnessing Tomorrow’s Technology for Today’s Investors and Markets”, *speech presented at The American University School of Law, Washington, D.C.*

<sup>23</sup> International Organization of Securities Commissions.

<sup>24</sup> “Regulatory Issues Raised by the Impact of Technological Change on Market Integrity and Efficiency”.

possible that the activity of high-frequency traders in a large market with high liquidity and many players and trading venues, such as the US, will have a different effect than in a small market such as Israel, in which there is only one trading venue.

It is important to note that in contrast to trading in the US capital market, in which high-frequency traders operate at speeds of a few thousandths of a second and take advantage of colocation<sup>25</sup>, algorithmic traders in Israel are not in actuality high-frequency traders. Although algorithmic traders in Israel operate at faster speeds than other traders in the market, they do not come close to the speeds of high-frequency traders in other countries. It is possible that the reasons for this are related to the lack of sophistication of the Israeli capital market, as reflected in low liquidity and in the technology of the trading systems, which are apparently less advanced than those in other countries. Furthermore, unlike trading in the US and Europe, in Israel there is only one stock exchange, in which all securities trading takes place, and it is the central clearing house. In addition, there are no alternative trading systems in Israel as there are in the US and Europe (apart from the trading in government bonds in the MTS system, which is accessible only to the primary market makers). The empirical findings in Israel indicate that the improvement in the liquidity of trading in corporate bonds as a result of the activity of high-frequency traders is not significant, despite the large number of automatic orders generated by them. Therefore, there is concern that the advantages gained from the participation of high-frequency traders are not very large on the level of the economy as a whole but that the activity nonetheless involves not-insignificant risks, such as the displacement of traditional investors and more severe volatility in trading.

In recent years, the Tel Aviv Stock Exchange has supervised algorithmic trading only in the derivatives market, in which the quantity of orders submitted by algorithmic traders is particularly high. The restriction placed on algorithmic trading in derivatives is an “orders-to-trade ratio” of 11/1, which means that for every 11 orders submitted to the Stock Exchange’s order book, at least one option must be traded.<sup>26</sup> The goal of this restriction is to reduce the load created by

algorithmic traders on the Stock Exchange’s servers and is not intended to limit potential damage.

In September 2013, new regulations went into effect regarding trading in the stock market. They are basically identical to those introduced in the US and include the following measures:

- The Stock Exchange will require every investor who trades using algorithms to identify himself by a serial number, which will be used each time he submits orders. Furthermore, Stock Exchange members through which orders are submitted by algorithmic trading programs must receive approval from the Stock Exchange, and will be required to report on orders placed through him by algorithmic trading programs.
- A member of the Stock Exchange through which these trades are made will have the power to block algorithmic traders from trading, or to cancel orders not yet executed, if it is revealed that the algorithmic trader is disrupting the efficient and fair execution of trading.
- The Stock Exchange can prohibit trading by algorithmic traders if it feels that their trading activity is out of the ordinary and may interfere with the normal functioning of trading.

These are very general regulations and constitute the first step taken by the Stock Exchange towards restricting the trading of algorithmic traders. Nonetheless, in order to fully supervise algorithmic traders and to the extent that there is interest in placing limitations on them, regulations that are more specific and more drastic will be needed. For example, this could include requiring algorithmic traders to meet the requirements that apply to official market makers. Since stock exchanges in other countries are motivated by profit, which is produced from the commissions on each trade, they permit entities that are not registered as market makers to behave as if they are, but do not demand that they meet all the obligations of market makers. If high-frequency traders were required to fulfill the same obligations as official market makers, this would reduce the probability of extreme volatility. Another possible effective restriction is related to the types of commissions that the Tel Aviv Stock Exchange collects from traders. At the moment, a commission is only collected when a trade is executed but not for submitting an order. In order to reduce the volume of orders from algorithmic traders, it is possible to charge a special commission when the number of orders exceeds some limit during a specified time period. This would reduce, for algorithmic traders, the worthwhileness of flooding the order book without any intention of executing trades. It is important to remember that each of the aforementioned measures has advantages and disadvantages, and their effect

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<sup>25</sup> Colocation refers to locating a trading computer in physical proximity to the trading center in order to shorten communication time. This shortens the time for both receiving data from the trading center as well as for submitting orders to it.

<sup>26</sup> The Tel Aviv Stock Exchange has changed this ratio several times according to the scope of activity of algorithmic traders and the capability of the communication system between the trading systems and the traders. The most recent change, in March 2014, raised the ratio from 1/7 to 1/11.

on the participation of algorithmic traders in trading should be carefully considered.<sup>27</sup>

It is recommended that regulators in Israel continue to monitor the implications of this activity on trading in Israel and to understand the various strategies used in algorithmic trading, in order to evaluate their potential effect on trading. It would be worthwhile taking into account not only the expected effect of the participation of high-frequency traders in the short run but also the long-term effects, such as the displacement of traditional traders.

In conclusion, it is important to note that since Israel has only one trading venue (unlike the US) and high-frequency traders are not using strategies to close price gaps between different trading venues (market inefficiencies), it can be assumed that the strategies adopted in Israel, which submit a large number of orders most of which are not executed, are primarily based on exploiting the advantage of speed. Even if trading volume increases to some extent as a result of the activity of high-frequency traders, it is difficult to conclude from the empirical findings on corporate bond trading data in Israel that this increase improves the market's efficiency.

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<sup>27</sup> These restrictions on algo traders were proposed by regulators worldwide; they have not yet been adopted as required regulations. See “Regulatory Issues Raised by the Impact of Technological Changed on Market Integrity and Efficiency”. International Organization of Securities Commission, 2011.

## Trade links between Israel and the Palestinian Authority<sup>1</sup>

- Israeli–Palestinian trade is significant for the Palestinian economy. Palestinian purchases from Israel account for about two-thirds of total Palestinian imports and Palestinian sales to Israel account for about 81 percent of total Palestinian exports. In contrast, trade with the Palestinian Authority is equivalent to only a small percentage of Israeli foreign trade.
- The difference between Israeli sales to the Palestinian Authority (about NIS 16.4 billion in 2012) and Israeli purchases from the Palestinian Authority (about NIS 3 billion) was partially offset by the payment to Palestinian employees in Israel (about NIS 4.3 billion).
- Israeli sales to the Palestinian Authority are mainly low technology and medium-low technology manufacturing and energy products (electricity, fuels and food products). The value added share of sales to the Palestinian Authority (about 54 percent) is therefore lower than that of Israeli exports to the rest of the world (about 68 percent), the major part of which is high technology and medium-high technology manufacturing products.
- The reported sales of goods and services from Israel to the Palestinian Authority generated total value added of about NIS 6–9 billion for the Israeli economy in 2012 (0.8–1.2 percent of business sector product).

**Trade and employment ties between Israel and the Palestinian Authority are influenced by their geographic proximity and unified customs envelope, which contribute to the expansion of those ties, as well as by changes in the diplomatic-security situation.** The uniform customs envelope and currency area save costs such as customs payments, export procedures, and exchange rate hedging, and enable trade that is similar in its procedures to trade within the Israeli economy. Nevertheless, due to security limitations, the transfer of goods between Israel and the Palestinian Authority requires inspections that delay trade and make it more expensive. The lack of an automated connection between the Palestinian banks and the Israeli clearing houses also hampers trade and its monitoring.

Israeli sales to the Palestinian Authority that were reported to the Israel Tax Authority or the Ministry of Agriculture in 2012 (the latest year for which complete data are available)

<sup>1</sup> The writers wish to thank the Israel Tax Authority and the Central Bureau of Statistics for providing access to detailed data regarding Israeli-Palestinian trade and input-output tables, and particularly to Rachel Daniel and Haydee Faur for their assistance in understanding and completing the data.

totaled about NIS 16.4 billion, while total reported Israeli purchases from the PA during this period are estimated at about NIS 3.0 billion. The Israeli surplus was partially offset by the payment for labor of Palestinian workers in Israel (about NIS 4.3 billion), such that the total Israeli surplus from reported trade and employment links with the Palestinian Authority was about NIS 9.1 billion. The Israeli surplus in trade and employment ties with the Palestinian economy increased between 2009 and 2012 as a result of growth in Israeli sales to the Palestinian Authority beyond the marked growth in payment for labor with the expansion of Palestinian employment in Israel.<sup>2</sup>

The expansion of Palestinian employment in Israel strengthens the specialization of the Palestinian economy in the export of labor rather than the export of goods and services. This specialization may negatively impact the competitiveness of manufacturing in the Palestinian economy, thereby reducing Palestinian export potential to Israel and the rest of the world. In the long term, this specialization may negatively impact the growth of the Palestinian economy.<sup>3</sup>

Data on trade between Israel and the PA are mainly based on special VAT invoices<sup>4</sup> from the Israel Tax Authority, which are classified by the industry of the selling company.<sup>5</sup> The trade data also include agricultural products that are not reported to VAT but are supervised by the Ministry of Agriculture.<sup>6</sup> Trade data do not include wholesale trade that is not reported to the Tax Authority, or retail trade, which is exempt from reporting in VAT invoices designated to Israeli-

<sup>2</sup> According to data from the Palestinian Central Bureau of Statistics, Palestinian employment in Israel increased during these years to an average of about 83,000 Palestinian workers in 2011–12 (an average growth of about 10 percent compared to 2009–10). These estimates do not include residents of eastern Jerusalem who are included in Palestinian statistics.

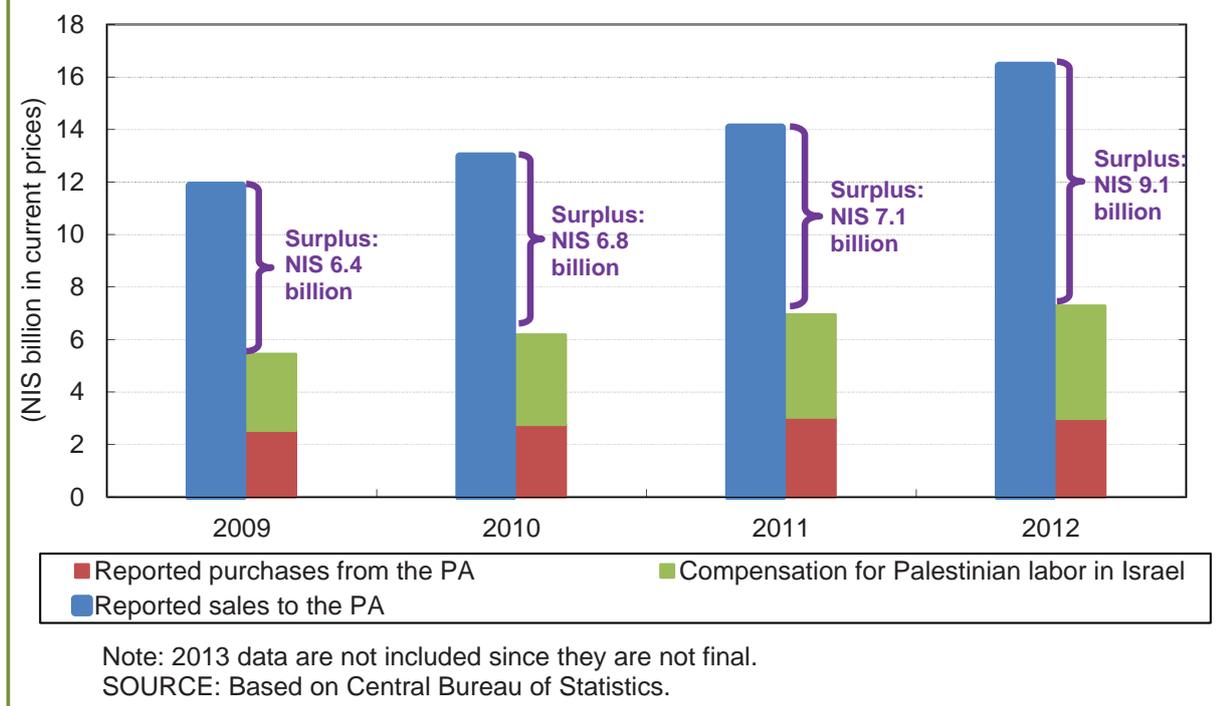
<sup>3</sup> The impact of employment in Israel on Palestinian exports and growth is discussed in: Maurice Schiff, (2004). “Trade Policy and Labor Services: Final Status Options for the West Bank and Gaza”, World Bank, IZA Discussion paper No. 1029, and World Bank Policy Research Working Paper No. 2824; Claus Astrup and Sebastien Dessus (2005), “Exporting Goods or Exporting Labor?: Long-term Implications for the Palestinian Economy,” Review of Middle East Economics and Finance, 3, No. 1, 39-61.

<sup>4</sup> Israeli-Palestinian trade is reported to the Tax Authority by way of special VAT invoices (P or I invoices) as per the arrangement set out in the Paris Protocol.

<sup>5</sup> This is different than Israeli trade data with foreign countries, which are based on Customs reports and classified by the industry of the sold goods.

<sup>6</sup> The official transfer of agricultural produce that is not liable to VAT is documented by the Central Investigation and Enforcement Unit (formerly the Flora and Fauna Supervision Unit) of the Ministry of Agriculture.

**Figure 1**  
**Balance of trade and labor between Israel and the Palestinian Authority, 2009–12**



Palestinian trade. Retail trade includes purchases by Israeli households in the Palestinian economy and by Palestinian households in the Israeli economy.<sup>7</sup>

### 1. Israeli sales to the Palestinian Authority

In 2012<sup>8</sup>, reported Israeli sales to the Palestinian Authority totaled about NIS 16.4 billion, the equivalent of about 5 percent of total Israeli exports (excluding diamonds) to the world, and about 1.7 percent of GDP in that year. Sales of goods to the Palestinian economy, which constituted about 90 percent of total sales to that economy, were about NIS 14.8 billion, the equivalent of

about 8 percent of total goods exports (excluding diamonds) to the world. The volume of goods sales to the Palestinian economy exceeds goods exports (excluding diamonds) from Israel to every other trading destination except the US (about NIS 41 billion).<sup>9</sup> At first glance, this figure may indicate the importance of the Palestinian economy as a trading destination for the Israeli economy, and all the more so considering that Palestinian GDP is only about 4 percent of Israeli GDP.<sup>10</sup> However, the uncertainty regarding the origin of some of the goods sold to the Palestinian economy, their industry distribution, and the value added derived from them indicate that their importance to the Israeli economy is limited.

**About 27 percent of Israeli sales to the PA are from companies in the Trade industry (excluding trade in fuels). However, it is not possible to determine whether the goods sold by this industry were produced in Israel or imported, since VAT documents do not indicate the**

<sup>7</sup> Purchases by Israeli Arabs in the West Bank in 2011 were estimated at about NIS 1.2 billion in a study commissioned by the Palestinian Monetary Authority. Purchases within the Palestinian Authority by residents of eastern Jerusalem and by Israelis who are not Arab can be added to this amount. In contrast, purchases by Palestinian households from Israeli companies, including those in Judea and Samaria, can be added to the reported Israeli sales to the Palestinian economy. According to reports in the Palestinian media, such purchases are widespread, but there is no credible estimate of them, not even an estimate of the order of size. We cannot estimate the net impact of trade that is not reported in the Israeli-Palestinian balance of trade.

<sup>8</sup> The latest year for which there are full data.

<sup>9</sup> A comparison between sales to the Palestinian Authority, which are documented in VAT invoices, and exports to the rest of the world, which are documented in Customs documents, is structurally difficult.

<sup>10</sup> As of 2012.

Table 1

Israeli sales to the PA by industry and their share of total industry revenue in 2012

	Sales classified by selling industry <sup>a</sup>			Sales classified by production industry <sup>a</sup>		
	Sales (NIS million)	Share of total sales to the PA (percent)	Share of industry revenue <sup>b</sup> (percent)	Sales (NIS million)	Share of total sales to the PA (percent)	Share of industry revenue <sup>b</sup> (percent)
Total	16,467	100.0	1.0	16,467	100.0	1.0
Agriculture, forestry and fishing	885	5.4	2.3	1,638	9.9	4.3
Manufacturing, mining and quarrying	3,363	20.4	0.8	9,648	58.6	2.4
<i>of which:</i> Manufacture of food products	1,189	7.2	2.0	2,052	12.5	3.4
Manufacture of beverages and tobacco products	288	1.7	3.7	529	3.2	6.7
Manufacture of wood products	117	0.7	5.8	385	2.3	19.0
Manufacture of paper and paper products	266	1.6	3.5	309	1.9	4.1
Manufacture of petroleum products, chemicals and chemical products	675	4.1	0.8	3,651	22.2	4.1
Electricity, water and sewerage services supply	3,181	19.3	7.2	3,254	19.8	7.3
<i>of which:</i> Electricity supply	3,046	18.5		3,119	18.9	
Water and sewerage services supply	135	0.8		135	0.8	
Construction	142	0.9	0.1	253	1.5	0.2
Wholesale and retail trade and repair of motor vehicles <sup>c</sup>	7,272	44.2	1.5	8	0.0	0.0
<i>of which:</i> Wholesale and retail trade of motor vehicles and their repair	172	1.0	0.3	7	0.0	0.0
Wholesale and retail trade excluding motor vehicles	7,100	43.1	1.6	1	0.0	0.0
<i>of which:</i> Wholesale and retail trade of fuels	2,759	16.8				
Transportation and storage, postal and courier activities	520	3.2	0.7	520	3.2	0.7
Financial and insurance activities	752	4.6	3.1	752	4.6	3.1
Other	352	2.1	0.1	352	2.1	0.1

<sup>a</sup> Sales classified by selling industry are sales classified by the industry to which the selling company belongs, and constitute the lower bound of sales estimates of Israeli goods and services to the Palestinian Authority by these industries (excluding the Trade industry). Sales classified by production industry incorporate both sales by companies in the production industry and the corresponding Trade industry sales of that industry's products (for example, Food Manufacturing industry sales plus Trade industry sales of food products), and constitute the upper bound of sales estimates of Israeli goods and services to the Palestinian Authority from, these industries (excluding the Trade industry).

<sup>b</sup> Central Bureau of Statistics data on industry revenue are based on VAT.

<sup>c</sup> Trade industry sales classified by production industry exclude general trade items, which are not identified.

\* "0.0" denotes a figure smaller than 0.05.

SOURCE: Based on Israel Tax Authority and Central Bureau of Statistics.

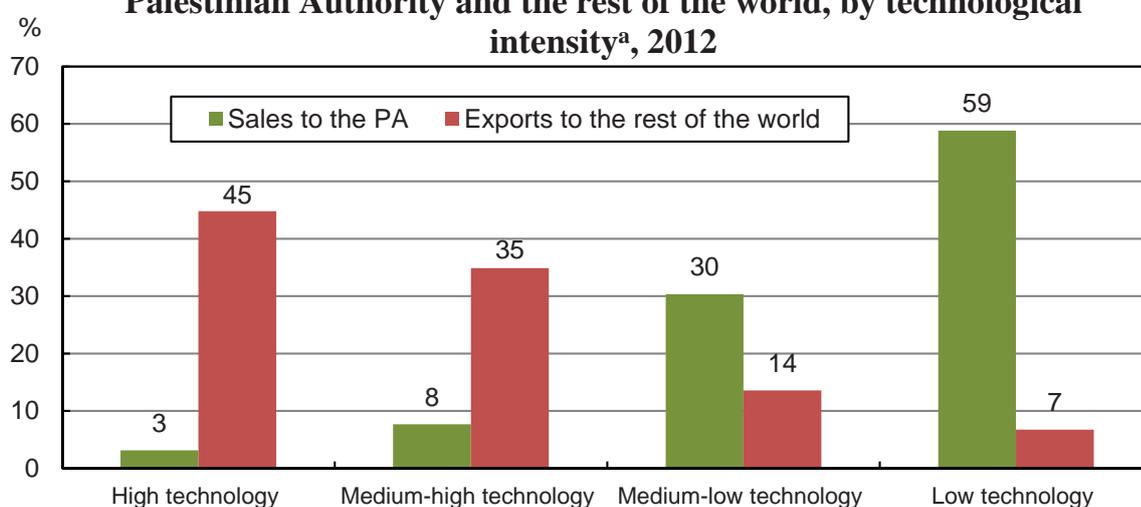
country of production.<sup>11</sup> Therefore, this analysis relies on two classifications of Israeli sales to Palestinian businesses: “sales classified by selling industry”, which are classified by the industry to which the selling company belongs, and “sales classified by production industry”, which essentially reclassifies sales recorded by the Trade industry among the production industries. Thus, it takes the sales of each production industry and adds the corresponding Trade industry sales of that industry’s products (on the assumption that all goods sold by the Trade industry are manufactured in Israel). For example, the Food Manufacturing industry’s “sales classified by production industry” include both the Food Manufacturing industry’s sales classified by selling industry, and Trade industry sales of food products. “Sales classified by selling industry”—excluding the Trade industry—are therefore the lower bound of the sales estimate of Israeli products to the Palestinian Authority, and “sales classified by production industry” (based on the assumption that all Trade industry sales are Israeli-produced goods) are the upper bound of our estimate.

The Manufacturing industry’s “sales classified by selling industry” totaled about NIS 3.3 billion in 2012 (36 percent of total “sales classified by selling industry” [excluding sales

by the Trade industry] to the PA), while the Manufacturing industry’s “sales classified by production industry”—including sales by commercial companies specializing in manufactured products—totaled about NIS 9.6 billion (58 percent of total sales to the PA). Most of the sales are from the Petroleum Products and Chemicals Manufacturing, Food Manufacturing, and Paper Manufacturing industries. But even to these industries, the importance of the Palestinian economy is limited: Only about 1–4 percent of their revenue comes from sales to the Palestinian economy. The importance of the Palestinian economy to the Wood Manufacturing industry is larger: About 6 percent of its total revenue comes from “sales classified by selling industry” to this economy.<sup>12</sup>

**The goods sold to the Palestinian Authority are typically low technology and medium-low technology, in contrast to Israeli goods exports to the rest of the world, which mainly come from the high technology and medium-high technology industries.** Sales of Israeli low technology manufacturing to the Palestinian Authority are the equivalent of about 17 percent of total Israeli low technology manufacturing exports to the world. More than half of the goods sold to the PA by the manufacturing industry in 2012 originated from low technology industries, about one-third

**Figure 2**  
**Distribution of manufacturing exports (excluding diamonds) to the Palestinian Authority and the rest of the world, by technological intensity<sup>a</sup>, 2012**



<sup>a</sup> Classified by selling industry.

SOURCE: Based on Israel Tax Authority and Central Bureau of Statistics.

<sup>12</sup> It is likely that the share of sales of Israeli produced wood products to the Palestinian economy out of the industry’s sales is lower than 19 percent (the share according to sales by production classification), since a marked share of Trade industry sales of wood products is transit trade of wood imported from abroad.

<sup>11</sup> As opposed to import and export documents.

from medium-low technology industries, and the remainder came from high technology and medium-high technology industries. In contrast, the high technology and medium-high technology industries manufacture about 80 percent of Israeli exports to the rest of the world, while the share of these industries in manufacturing sales to the Palestinian market is only about 11 percent.

There are a number of factors explaining the concentration of manufacturing sales to the PA in low technology industries: Imports to the Palestinian economy in general are mainly low technology and medium-low technology manufacturing products; the geographic proximity between Israel and the PA, in contrast to the large distance between Israel and its main export destinations, lowers the shipping costs for products from low technology industries; and the uniform Customs envelope and standards that ease the transfer of goods between Israel and the Palestinian Authority and hampers the import of low technology products from neighboring economies. The importance of the joint customs envelope is reflected in the development of the Gaza Strip's trade which, since 2007, has purchased a wide variety of products from Egypt, imported from Sinai through the tunnels.

**Sales by the Electricity and Water industry to the Palestinian Authority totaled about NIS 3.2 billion in 2012—about 7.2 percent of the industry's revenue** (Table 1). Most of the sales by this industry are of electricity—about 18 percent of total sales to the Palestinian Authority. Inflated Palestinian debts to the Israel Electric Corporation, and the prohibition imposed on the Israel Electric Corporation against halting the supply of electricity to the Palestinian economy hint that electricity sales to the Palestinian Authority are somewhat of a burden on the Israel Electric Company, rather than a source of profit.

The volume of agricultural sales to the Palestinian Authority is not inconsiderable, totaling about NIS 885 million to NIS 1,640 million—about 2.3 to 4.3 percent of the industry's revenue (derived from sales classified by selling industry and sales classified by production industry, accordingly).<sup>13</sup>

<sup>13</sup> According to data from the Ministry of Agriculture, Israeli sales to the Palestinian Authority totaled about 540 million tons, about half of which were inputs for raising livestock (feed and field crops). Fruit, vegetables, dairy products and meat for human consumption were a small portion of agricultural sales (in terms of weight). This breakdown illustrates the importance of Israeli agricultural sales to the activity of the Palestinian agriculture industry, particularly to the raising of livestock (Raef Falach, Financial Accounting of Israeli Agriculture and Farming, 2012, Ministry of Agriculture and Rural Development, Research, Economy and Strategy Division, November 2013 – in Hebrew).

Sales to the Palestinian economy by the Transport and Storage industry (about NIS 520 million) and by the Financial Services industry (about NIS 750 million) are derived, among other things, from the Palestinian use of Israeli transportation infrastructure and currency. The dependency of these industries on the Palestinian market (0.7 percent to 3.1 percent of their revenue) is low, and Palestinian demand for these services has a limited impact on the Israeli economy. The importance of the Palestinian market to the other industries is very low.

**In contrast to the low share of trade with the Palestinians in the Israeli economy, Israeli sales to the Palestinian Authority constitute about two-thirds of total Palestinian imports** from the world (about 27 percent of total Palestinian GDP)<sup>14</sup> and represent the basket of Palestinian imports to a great extent. Nevertheless, a significant part of the goods imported by the PA from other countries are industrial goods with a technological intensity that is higher than that of Israeli sales to the PA, such as vehicles, mechanical instruments, electrical equipment, plastics and pharmaceutical products.<sup>15</sup> We can therefore characterize Palestinian imports from other countries to a great extent as complementary to the industrial goods imported from Israel, since it is comprised of goods that are not within Israel's manufacturing expertise and/or that are not reflected in Israel's comparative advantage as a source of imports to the PA.

A simple gravitation model<sup>16</sup> can be used to estimate Israel's expected share of Palestinian imports. The expected share of Palestinian imports from Israel according to the model—about one third of total PA imports—is significantly lower than the actual share, which is about two-thirds. It is likely that factors that were not included in this model—including the uniform customs envelope and currency area and the fact that the transfer of goods from abroad to the PA is mainly via Israel's sea and air ports—may explain the difference between the results of the model and the actual figure, and this assessment is supported by the research literature.<sup>17</sup> In

<sup>14</sup> The Palestinian Central Bureau of Statistics.

<sup>15</sup> According to Palestinian Central Bureau of Statistics trade data as reported to the United Nations (Comtrade) regarding 2012.

<sup>16</sup> Israel's exports as a share of the imports of country *j* is explained by the distance between Israel and that country, the distance squared, and the per capita GDP of the country compared to global per capita GDP. The sample includes 91 economies, and the data are for 2012.

<sup>17</sup> It was found that variables such as joint currency zones have a statistically significant positive effect on the flow of trade between countries (Elhanan Helpman, Marc Melitz and Yona Rubinstein (2008), "Estimating Trade Flows: Trading Partners and Trading Volumes", The Quarterly Journal of Economics 123 (2): 441-487; Jeffrey Frankel and Andrew Rose (2002), "An Estimate of the Effect of Common Currencies on Trade and Income", The Quarterly Journal of Economics 117 (2): 437-466.

addition, a sample examination shows that small economies tend to trade extensively with their neighboring large economies<sup>18</sup>, a finding that is in line with the large volume of Palestinian Authority imports from Israel.

## 2. The value added derived from Israeli sales to the Palestinian Authority

**The Palestinian market's limited importance to the Israeli market is illustrated by the total value added<sup>19</sup> (company profits, wages, and taxes) to the economy**

**derived from sales to the Palestinian Authority, which in 2012 totaled about NIS 6.1 billion to NIS 8.9 billion or about 0.8 percent to 1.2 percent of business sector product** (derived from sales classified by selling industry and sales classified by production industry).<sup>20</sup> Total value added (as derived from sales classified by production industry) as a share of Israeli sales to the PA is estimated at about 54 percent. By way of comparison, the value added derived from total Israeli exports to the rest of the world in 2012 (excluding diamonds) was estimated at about NIS

Table 2

The value added derived from sales to the Palestinian Authority, 2012

(NIS million, and percent of industry output<sup>a</sup>)

	Sales classified by selling industry (lower bound) <sup>b</sup>		Sales classified by production industry (upper bound) <sup>c</sup>	
	Total value added <sup>d</sup>	<i>Of which:</i> Direct value added	Total value added <sup>d</sup>	<i>Of which:</i> Direct value added
Total	6,084 (0.8%)	3,960 (0.5%)	8,888 (1.2%)	5,569 (0.8%)
<i>of which:</i> Agriculture, forestry and fishing	716	423 (3.4%)	1,345	831 (6.7%)
Manufacturing, mining and quarrying	2,026	1,038 (0.8%)	4,038	2,138 (1.6%)
Electricity, water and sewerage services supply	1,883	1,448 (13.1%)	1,925	1,481 (13.4%)
Transportation and storage, postal and courier activities	414	280 (0.7%)	414	280 (0.7%)
Information and communications	137	87 (0.1%)	163	102 (0.1%)
Financial and insurance activities, real estate, management and support. and scientific and technological services	747	593 (0.3%)	747	593 (0.3%)

<sup>a</sup> The percentages in brackets relate to the direct value added out of the industry product. (Regarding the total, the figures denote the percentage of business sector product.) The information at hand does not enable a calculation of the total value added at the industry level.

<sup>b</sup> Excluding Trade industry sales, under the assumption that the goods sold by commercial companies are not manufactured in Israel.

<sup>c</sup> Including Trade industry sales, under the assumption that the goods sold by commercial companies are manufactured in Israel.

<sup>d</sup> The total value added to the economy includes both the direct value added generated by the companies selling to the Palestinian Authority and the value added of the Israeli companies that provided the selling companies with inputs from domestic manufacturing.

SOURCE: Based on Israel Tax Authority and Central Bureau of Statistics.

<sup>18</sup> For instance, in 2012, Germany and Belgium accounted for about one-half of Luxembourg's imports, and similarly, about one-half of Andorra's imports were from Spain. In Canada as well, despite it being a large economy, about half of imports in 2012 were from the US (Comtrade).

<sup>19</sup> The calculation of the value added (direct and total) is based on input-output tables from the Central Bureau of Statistics for 2006.

<sup>20</sup> The total value added to the economy includes both the direct value added generated by companies selling to the Palestinian Authority and the value added of Israeli companies providing inputs to the selling companies from domestic production.

223 billion (about 30 percent of business product), and the estimate of value added as a share of exports during that year was about 68 percent.<sup>21</sup> Nevertheless, excluding the sale of fuels, total value added as a share of Israeli sales to the PA was estimated at about 69 percent, similar to that of Israeli exports to the rest of the world. The reason for this is the low share of total value added in fuel refining (about 11 percent). Therefore, the value added that Israel generates from the sale of fuels to the PA is very low (NIS 350 million), given the large volume of sales (about NIS 3.3 billion).

The direct value added of selling companies derived from sales to the Palestinian economy in 2012 was about NIS 4.0 billion to NIS 5.6 billion (about 0.5 percent to 0.8 percent of business product). The difference between the total value added and the direct value added, about NIS 2.1 billion to NIS 3.3 billion, reflects the value added of suppliers of production inputs to the companies selling to the Palestinian market. These effects of the industries selling to the Palestinian Authority on other industries are prominent in manufacturing, where the direct value added is about half of the total value added. In contrast, electricity industry sales to the Palestinian Authority generate almost no added value for other industries in the Israeli economy, but do generate about 13 percent of the output of the electricity and water industry.

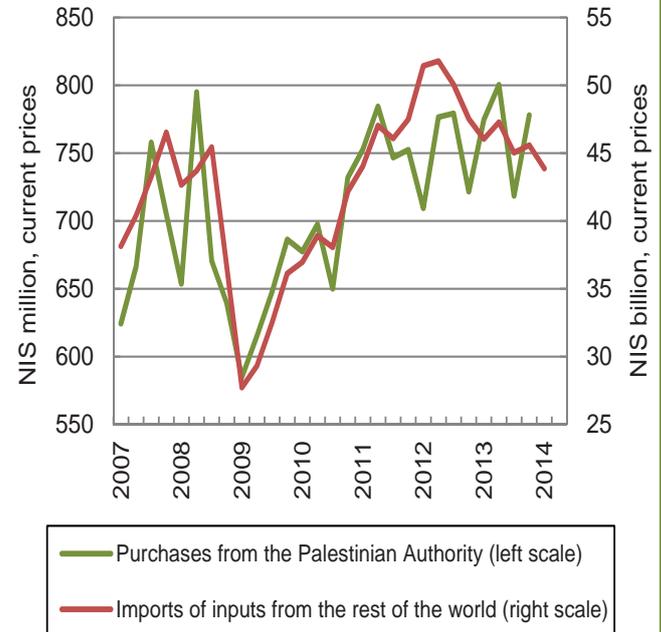
### 3. Israeli purchases from the Palestinian Authority

Israeli purchases from the Palestinian Authority (including the export of Palestinian products to the rest of the world via Israeli exporters) totaled about NIS 3.0 billion in 2013 (according to the Israeli Central Bureau of Statistics). According to estimates by the Palestinian Central Bureau of Statistics, the sales of goods (excluding services) to Israel and via Israel totaled about NIS 2.5 billion in 2012<sup>22</sup>—about 81 percent of total reported Palestinian goods exports and about 6 percent of Palestinian GDP. Israel's share of total Palestinian exports (reported and unreported) is apparently even higher due to purchases by Israeli citizens in the West Bank. The dominance of exports to Israel and via Israel to the world in total Palestinian exports—similar to Israel's share of total Palestinian imports—can be explained by the geographic proximity of the economies, the uniform Customs envelope and currency area that ease trade, and the availability of Israeli export infrastructure, which makes it easier to export via Israeli companies.

<sup>21</sup> The value added of Israeli exports to the rest of the world is calculated according to OECD data on value added as a share of Israeli exports in 2009.

<sup>22</sup> The Palestinian estimate of sales to Israel is lower, apparently because it does not include services or agricultural trade.

**Figure 3**  
**Purchases from the PA and imports of production inputs from the rest of the world**  
(Quarterly data, 2007–14)



SOURCE: Based on Central Bureau of Statistics.

The main fluctuations in Israeli purchases from the Palestinian Authority in recent years have derived from changes in the state of the Israeli economy, which are reflected in the import of inputs from abroad (excluding the Palestinian Authority): Purchases from the Palestinian Authority and imports of inputs increased rapidly in 2007 and 2008, declined sharply with the outbreak of the global crisis at the end of 2008 and the beginning of 2009, and recovered in parallel with the recovery of the Israeli economy between mid-2009 and mid-2011 (Figure 3). A major part of Israeli purchases from the PA are low technology manufacturing goods. Israel's main import goods from the PA are stone, concrete and similar products; plastic products; wood products; and metals.<sup>23</sup>

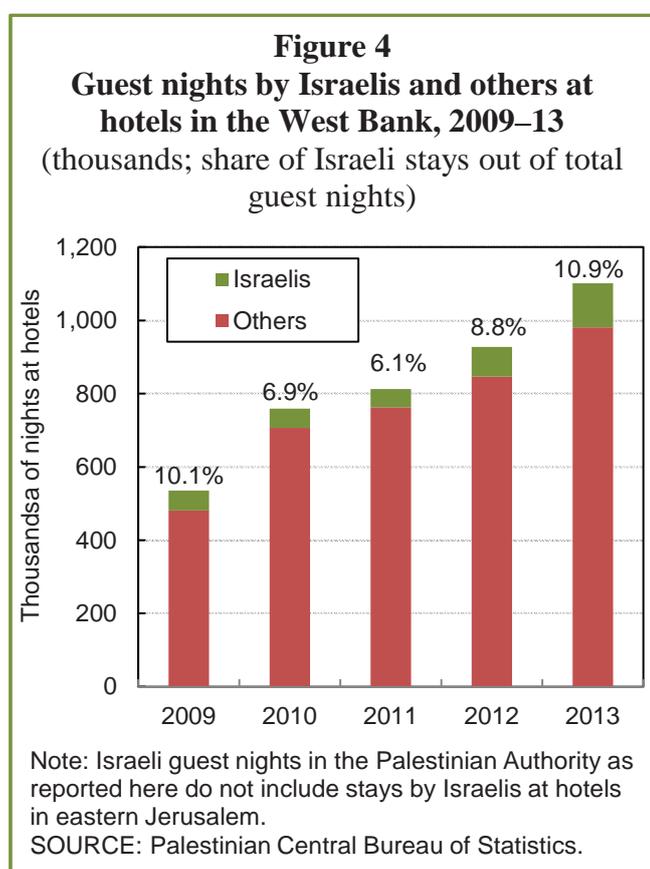
Israeli purchases from the Palestinian Authority are currently only from the West Bank, while purchases from the Gaza Strip have been prohibited since Hamas took power in June 2007. The cessation of purchases from the Gaza Strip in mid-2007 did not lead to a significant decline in the volume

<sup>23</sup> According to Palestinian Central Bureau of Statistics trade data as reported to the United Nations (Comtrade) in 2012.

of purchases from the Palestinian Authority, due to the small volume of purchases from Gaza even before the cessation of purchases (less than NIS 150 million, which was less than 10 percent of total Palestinian sales to Israel in 2006, excluding agricultural produce<sup>24</sup>), and due to a presumed diversion of the source of purchases from the Gaza Strip to the West Bank.

It should be noted that the State of Israel does not generate separate data on the value of trade with the West Bank and with the Gaza Strip, even though the goods sold to Gaza are registered and inspected by Israel, and even though trade policy toward the Gaza Strip is entirely different than policy regarding the West Bank. The generation of separate data would make it possible to assess the economic implications of Israeli policy and to adjust trade policy to the findings.

the number of guest nights by Israelis in the Palestinian Authority increased from about 50,000 in 2011 to about 120,000 in 2013. It is likely that the decisive majority of Israelis guest nights at hotels in the Palestinian Authority are Israeli Arabs. The number of Israeli guest nights increased at a more rapid rate than the rate of increase in guest nights by other tourists in the West Bank, and Israelis' share of total guest nights increased from 6 percent in 2011 to 11 percent in 2013.



In addition to the growth of Israeli purchases reported to VAT, Israeli tourism to the West Bank also increased. According to data from the Palestinian Central Bureau of Statistics,

<sup>24</sup> According to Palestinian Central Bureau of Statistics data, Palestinian exports from Gaza totaled about \$34 million (about NIS 150 million) in 2006.