7-30-2012

Bank of Israel Investment of the Foreign Exchange Reserves, 2011

Bank of Israel

Bank of Israel

Investment of the

Foreign Exchange

Reserves

Annual Report 2011

CONTENTS

TABLES

FIGURES

MAIN DEVELOPMENTS[1]

- Israel's foreign exchange reserves grew by $4 billion in 2011 to $74.9 billion, compared with an increase of about $10 billion in the previous year.[2] As was the case in the previous three years, the increase in the reserves this year was primarily the result of foreign currency purchases by the Bank of Israel.

- The global financial crisis has emphasized the importance of holding a high and adequate level of reserves.

- The rise in the level of Israel's foreign exchange reserves in 2011 increased the ratios between the reserves and various economic aggregates, which are customarily used to assess the adequacy of the level of the reserves. Increasing these ratios strengthens the economy's resilience to crises and improves Israel's international financial standing. In comparisons to other countries, Israel's reserves relative to most of these aggregates is above the median of both the developed and developing countries.

- The management of reserves this year was influenced in particular by the spread of the debt crisis in Europe and its increasing severity, which led to the lowering of credit ratings for countries and banks throughout the continent and in other countries as well. These developments have begun to undermine the foundations of the euro zone and constitute a real threat to its continued existence in its present form. They also threaten the stability of the global financial system as a whole. The deterioration in the quality of credit of government issuers and large financial institutions worldwide, which until recently were considered to have a relatively low risk of default, has narrowed the traditional investment space for reserves managers worldwide and has raised the level of risk they are exposed to. Within the framework of compliance rules, which have been tightened since the start of the crisis in 2008, the Bank of Israel continued to introduce measures this

[1] The Market Operations Department has been reporting to the public on the investment of the reserves since 2000. The reports for previous years, some of which have been published as chapters in the Bank of Israel's reports, can be found on the Bank of Israel's website http://www.bankisrael.org.il/publheb/publhslf.php?misg_id=27.

[2] The level of reserves throughout this survey does not include the IMF allocation to Israel of Special Drawing Rights (SDRs) or the balance of Israel's Reserve Tranche in the IMF. At the end of December 2011, these totaled $1.8 billion, as compared to $1.6 billion at the end of 2010. For further discussion of this issue, see the Bank of Israel Financial Statements for 2011.

year that are intended to reduce the exposure of the reserves to countries whose macroeconomic situation is deteriorating.

- The holding-period rate of return on the reserves in terms of the numeraire[3] was 1.3 percent in 2011, compared with an average of 3.3 percent during the period 2002–11. This rate of return, like those in previous years, was determined to a large extent by the low level of interest rates and yields to maturity in the financial markets and the continuation of short-duration reserve management relative to previous years. Short-duration management has been adopted due to the high risk of obtaining a negative holding-period rate of return on the reserves if yields to maturity increase from their currently low levels. A central bank's risk profile is a unique one, as it is based on the objectives of holding foreign exchange reserves. Thus it demands a very conservative investment management policy, which of course has an impact on the rates of return.

- In shekel terms, the reserves portfolio had a positive and high holding-period rate of return (7.1 percent), which was due to the weakening of the shekel against the numeraire currencies, particularly the dollar and the euro.

- With the goal of improving the return to risk ratio of the reserves portfolio, the policy of investing part of the reserves in currencies and assets of developed countries with strong economies that are not included in the numeraire continued and was even expanded.

- The active-management contribution in 2011 was 21 basis points, which was similar to its average during the last ten years. As in previous years, the main contribution of active management in 2011 was the investment of part of the reserves in the currencies and assets of countries whose currencies are not included in the numeraire and the benchmark. These investments performed better than the benchmark assets, primarily because the level of interest rates in those countries was higher than in the benchmark countries and also because they were managed with a longer duration.

- The establishment of the Monetary Committee in October 2011, in accordance with the New Bank of Israel Law, strengthened the decision making processes related to reserve management. The application of the new law removed the legal

[3] The numeraire is the neutral currency composite of the reserves. See Section A.1 in this document.

obstacles that in the past had prevented the investment of reserves in certain types of financial assets, which the Bank considered worthwhile economically, and appropriate with regard to risk management. Since the new law went into effect, the Bank has begun to further diversify the assets in which it invests and, as part of that process, two percent of the reserves were, for the first time, invested in the US stock market at the beginning of 2012. Meanwhile, the Bank is continuing to identify and evaluate channels for exploiting the additional degrees of freedom granted by the new law in the selection of assets.

A. THE FOREIGN EXCHANGE RESERVES

1. The framework for holding and managing the reserves[4]

According to the **Bank of Israel Law, 5770–2010**, one of the Bank's functions is to hold the country's foreign exchange reserves and to manage them.[5] In accordance with the new law, the Monetary Committee, headed by the Governor, began operating in October 2011. The law has granted it the authority, among others, to decide on issues related to reserve management[6] This change has strengthened the decision making process for the management of foreign exchange reserves by the Bank of Israel.

The Monetary Committee's role is to establish the guidelines for the investment of the reserves, in consultation with the Minister of Finance, and to periodically monitor their implementation. The Committee determines the allocation of responsibilities for the investment of the reserves between itself, the Foreign Currency Committee and the Market Operations Department. In addition, the Monetary Committee, with the approval of the Minister of Finance, has the power to change the principles according to which the Government decides on the desirable long-term level of foreign exchange reserves. The Foreign Currency Committee is an internal committee of the Bank, headed by the Governor, whose function is to translate the guidelines for investment of the reserves into specific instructions for their management.

Countries hold foreign exchange reserves for three main purposes:

- To provide the economy with sufficient foreign currency for an emergency situation (such as war or a major earthquake). In such instances, it may be necessary to quickly increase imports in order to deal with the emergency while exports are liable to drop significantly, thus reducing the inflow of foreign currency. In these circumstances, the government and the private sector will find it difficult to raise foreign currency abroad and the foreign

[4] According to the law, the Bank will by March 31, 2012 publish the principles according to which the optimal level of the reserves was determined and the guidelines for their investment during 2011.
[5] Until the Bank of Israel Law, 5770–2010 came into force on June 1st, the reserves were managed in accordance with the Bank of Israel Law, 5714–1954 and its legal interpretations over the years, and in accordance with the investment policy decided on by the Governor.
[6] Until the establishment of the Monetary Committee, all of the authority later granted to the Committee by the Law was in the hands of the Governor of the Bank.

exchange reserves will become the country's main source for financing in foreign currency.

- To enable the central bank to intervene in the foreign currency market in the following circumstances: (1) the foreign exchange rate has deviated from the range that is consistent with the economy's fundamental equilibrium; or (2) the foreign currency market is not functioning adequately (market failure).

- To allow the central bank to operate in the foreign currency market in order to moderate the effect of capital flows of either foreign or local residents, which are liable to undermine the stability of the financial markets and therefore harm the stability of the economy as a whole (a specific case of the previous purpose).

In order to achieve these goals, the investment of the reserves is carried out according to the following three basic principles:

- *Maintaining the reserves' purchasing power*, or in other words, the level of use they can be put to by the Bank when needed. Currently, this objective is interpreted as the preservation of the value of the reserves in terms of the neutral currency composite that the bank has chosen, i.e. the numeraire.

- *The management of the reserves at a high level of liquidity*, or in other words the investment of an appropriate proportion of the reserves in assets that can be quickly sold in large amounts, on short notice and without affecting their realization value.

- *Achieving a reasonable holding-period rate of return on the reserves portfolio*, at an acceptable level of risk, as long as the achievement of the previous objectives is not affected.

In accordance with these principles, rules for the management of the various risks to which the foreign exchange reserves are exposed have been established as part of the investment policy for the reserves. These include currency risk, price risk, credit risk and liquidity risk. In this context, a neutral currency composition, i.e. the numeraire, has been defined. The numeraire is a basket of currencies, whose composition is

determined by the principles that reflect the objectives for holding the reserves and which take into account a number of factors that are relevant to achieving those objectives. The numeraire serves as an anchor for the management of the reserves' currency risk. The reserves portfolio holding-period rate of return is measured in terms of the numeraire and reserves portfolio managers view it as the riskless currency composition. The numeraire includes three currencies according to the following proportions: the dollar 62 percent, the euro 33 percent and sterling 5 percent.

The management of most of the financial risks to which the reserves are exposed to is carried out relative to a benchmark and according to a system of compliance rules that define the degrees of freedom for deviating from the various benchmark parameters. The benchmark is a hypothetical portfolio, which is constructed according to the rules for risk management. Its currency composition is determined by that of the numeraire and its asset structure is determined according to the desired levels of price and liquidity risks in each of the numeraire currencies. The benchmark is used by the reserves portfolio manager as a "riskless portfolio" and it also serves as a standard for evaluating the quality of management and the performance of the portfolio.

The unique goals for which the central bank holds foreign exchange reserves dictate a conservative investment policy in practice, which is manifested in both a low level of exposure to the various types of financial risks and the need to maintain a high level of liquidity in the foreign exchange reserves. Such a risk profile differs from that generally adopted by other types of investment managers and is manifested in the cautious management of the foreign exchange reserves and in its rate of return, which is generally lower than that of other portfolios.

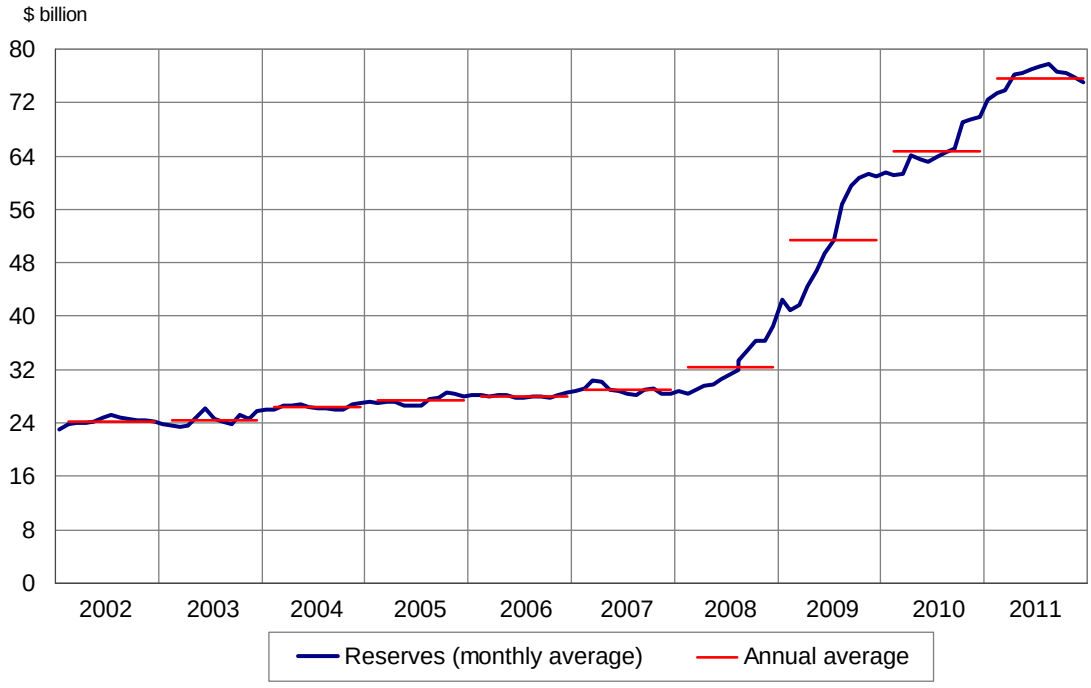
The New Bank of Israel Law, which came into effect in June 2010, removed the legal obstacles which, until then, had prevented the investment of the reserves in various types of financial assets, even though they had been evaluated in the past as worthwhile investments both from the viewpoint of liquidity and the risk-return profile. Thus, already in 2010, the Bank began, for the first time, to take advantage of the additional degrees of freedom granted by the new law and began investing part of the reserves in bonds of public sector entities in the developed countries, which had not been possible under the previous law. At the same time, the Bank of Israel

continued to consider the possibility of a more significant expansion of the variety of assets in which the reserves could be invested in coming years. The first manifestation of this change was the investment, for the first time, of 2 percent of the reserves in the US stock market at the beginning of 2012.

2. Changes in the level of the reserves in 2011

Israel's foreign exchange reserves grew by $4 billion in dollar terms in 2011, from $70.9 billion at the end of 2010 to $74.9 billion at the end of 2011 (Figure 1). In shekel terms, the level of the reserves grew by NIS 34 billion, from NIS 252 billion at the end of 2010 to NIS 287 billion at the end of 2011.

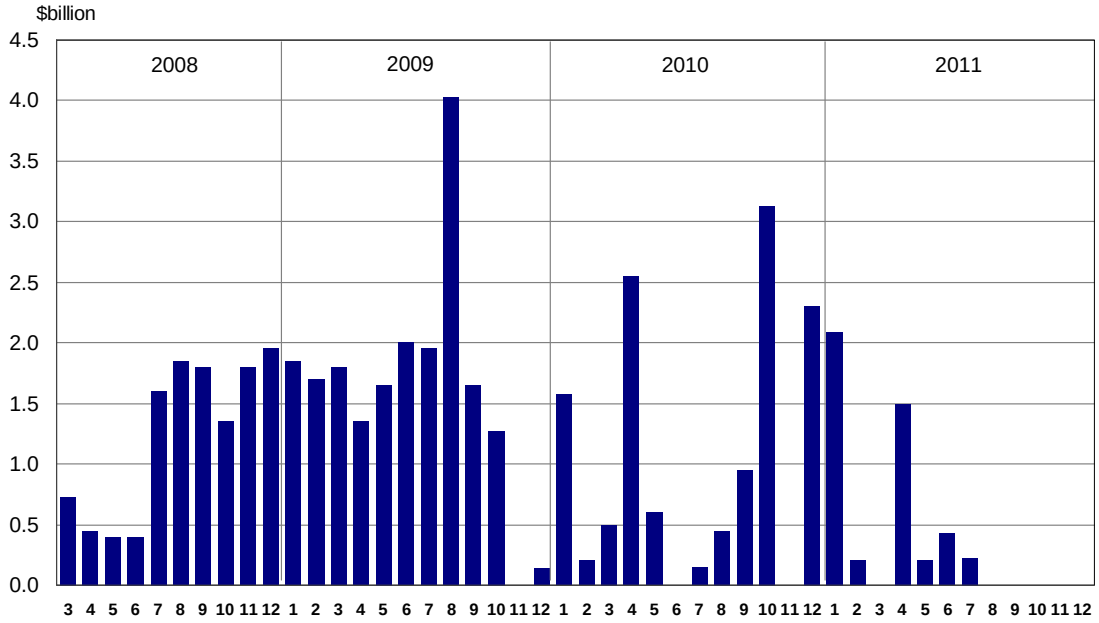
Figure 1 – Foreign Exchange Reserves, 2002–2011



The significant increase in the level of reserves during the last four years primarily reflects the purchase of dollars by the Bank of Israel, which began in March 2008. This policy was first adopted in order to increase the size of the reserves to within the desirable range (see Section 3 below) and at a later stage to protect the exchange rate in cases where the market was not functioning as it should or in cases of excessive volatility that was not consistent with the economy's fundamentals.

In 2011, the Bank continued to purchase dollars but on a much smaller scale than in previous years (Figure 2). Most of these purchases were carried out during the first half of the year and since August 2011, when the exchange rate reached a level that is consistent with the fundamentals of the economy, the Bank of Israel has not intervened in the foreign currency market. The Bank's purchases of foreign currency totaled only $4.6 billion in 2011.

Figure 2 – Bank of Israel Purchases of Foreign Currency, March 2008 – December 2011



The changes in the level of reserves in 2011 were also the result of other factors, though they had only a minor effect. The change in reserves in dollar terms that is attributed to interest income and to capital gains was almost completely offset by the weakening of most of the currencies held in the reserves portfolio relative to the dollar. The deposits of the private sector contributed a negligible amount to the reserves while the government made withdrawals that somewhat reduced the size of the reserves.

3. The principles for determining the desirable level of foreign exchange reserves

The holding of an appropriate level of foreign exchange reserves is considered to be one of the main indicators of a country's economic stability in the eyes of local and

foreign financial institutions, firms, households and rating agencies. Enlarging a country's foreign exchange reserves increases the ability of policy makers to deal with unavoidable economic, financial and political pressure. Large foreign exchange reserves also tend to lower the rates of interest that are paid both by the government and by the private sector for financing from abroad. Thus, an appropriate level of reserves is an important factor in determining the level of confidence in a country's ability to deal with economic shocks.

a. The various methods for calculating the appropriate level of reserves:

- *Relative to import months*: During most of the period following the Second World War, the appropriate level of foreign exchange reserves was measured in terms of "import months", i.e. the number of months of imports that the reserves could finance. This approach dominated as long as international capital flows were limited in scale and the main source of foreign currency shortages was the balance of payments.

- *Relative to capital flows*: During the 1990s, a larger number of financial crises were caused by large-scale capital flows, i.e. by disruptions in the capital account, than by disruptions in the current account of the balance of payments. At the end of the 1990s, the Greesnpan-Guidotti rule came into widespread use. According to this rule, a country's foreign exchange reserves should equal at least the level of its liabilities (of both the private and public sectors) in foreign currency during the coming twelve-months period, thus allowing a country to deal with a complete cutoff from sources of foreign exchange for a period of one year. The 100 percent rule (according to which reserves should be equal to the level of foreign currency liabilities for one year) was based on an empirical study of the resilience of countries that had experienced a financial crisis during the 1990s and early 2000s. It was found that countries which had adhered to the 100 percent rule were prone to fewer foreign currency attacks and were better able to deal with them.

  During the global crisis that began in 2007, it became clear that countries which held foreign exchange reserves exceeding 100 percent were better able to handle the crisis. The main examples are Brazil, Russia and South Korea,

each of which held foreign exchange reserves that exceeded 100 percent of their foreign currency liabilities. These countries used their reserves effectively to stabilize their exchange rates and/or to maintain financial stability. Currently, it is recognized that reserves at a level of between 100 and 200 percent of the economy's liabilities in foreign currency are more effective than a level of reserves that exactly meets the Greenspan-Guidotti rule.

- *Relative to potential uses in the future (the eclectic approach)*: In calculating the appropriate level of reserves for Israel, the Bank of Israel adopted the eclectic approach, which is based on the potential uses of the reserves in a period of emergency. Clearly, in a time of national emergency, Israel will likely require reserves both for financing imports (according to the import months approach, including imports of goods and services related to the emergency situation) and also in order to deal with potential capital flows.

On the basis of the above factors taken together and according to the current conditions of the Israeli economy, the Governor has determined that the desirable level of reserves lies between $65 billion and $90 billion.

In determining the level of reserves, the cost of holding them is taken into account.[7] However, in a cost-benefit analysis it is difficult to quantitatively measure the advantages and benefits of holding foreign exchange reserves. The contribution of the reserves to the economy cannot be quantified and priced due to the fact, among others, that their contribution may be critical in emergency situations whose nature and severity are difficult to predict. Nonetheless, since the appropriate level of reserves is one of the factors that determine a country's economic stability, this is reflected in various economic and financial parameters, such as a country's credit rating and the evaluations published by rating agencies. A high level of foreign exchange reserves also lowers the costs of financing when a country issues debt abroad.

[7] The accounting cost of the activity of the Bank of Israel is recorded in the Bank's books. Nonetheless, the Bank's accounts of course do not include expected profit (from the point of view of the economy's stability) from the expected use of the reserves in various situations in the future, nor from the evaluation of the markets that large reserves contribute to the economy, as described above.

b. Israel's actual levels of foreign exchange reserves

The eclectic approach, which takes into account the need for importing goods and services and the potential capital flows in a crisis situation, was adopted in light of Israel's unique geopolitical situation, which requires a higher level of reserves relative to that dictated by the economic variables that are generally included in the calculation of the desirable level of foreign exchange reserves.

In 2011, Israel's average level of foreign exchange reserves was equal to 154 percent of the economy's short-term foreign debt and to 8.7 import months (Table 1).

Table 1 – The Level of the Reserves* Relative to Various Aggregates, 1999–2011

	Average lev of reserves ($ million)	Resrves to Capita ($)	Imports (months)	Gross external debt	Short-term external debt	Unindexed local-currency assets (M2)	Gross domestic product
				Reserves as percent of aggregate			
1999	21,687	3,493	5.4	34	78	55	20
2000	22,277	3,498	4.6	33	74	46	18
2001	23,715	3,644	5.5	35	80	43	19
2002	24,328	3,669	5.8	34	77	48	22
2003	24,447	3,623	5.6	33	81	47	21
2004	26,530	3,862	5.3	34	84	48	21
2005	27,451	3,927	5.1	35	84	47	20
2006	28,137	3,954	4.8	32	76	45	19
2007	29,179	4,028	4.1	32	73	38	17
2008	32,924	4,442	4.1	37	82	34	16
2009	51,981	6,883	8.4	56	123	50	27
2010	64,939	8,439	8.8	61	119	57	30
2011	76,052	9,735	8.8	70	139	58	32

SOURCE: Bank of Israel, The Central Bureau of Statistics, and returns from the banks.

* The reserves include SDRs and the balance of Israe's Reserve Tranche in the IMF.

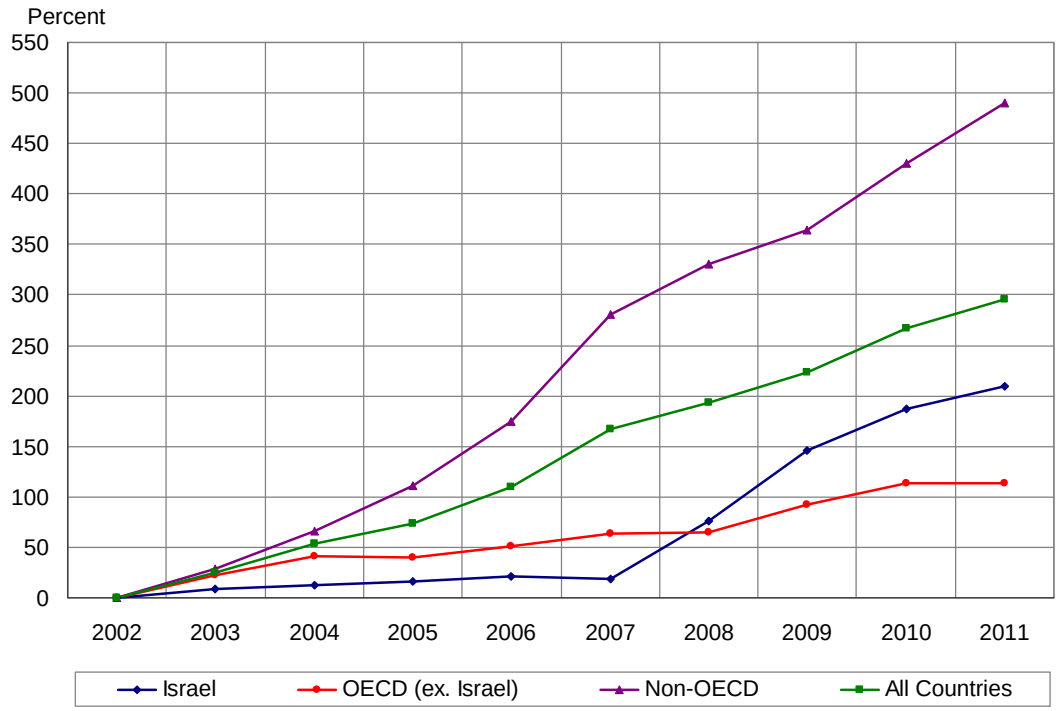
c. An international comparison of Israel's foreign exchange reserves

During the past decade, Israel's foreign exchange reserves have grown by 210 percent (Figure 3), which occurred almost entirely during the last four years. This is a much higher growth rate than in the developed countries (110 percent) but is lower than that in the developing countries (490 percent) and the rate for total global reserves (296 percent).

Israel's level of reserves relative to most of the aggregates (Figure 4) is above the median of both the developed and developing countries; however, for most of the

aggregates, Israel is not located in the upper range of the distribution. It is worth mentioning that the ratio of Israel's reserves to the economy's short-term foreign debt (i.e. 154 percent) is significantly lower than the median of the developing countries (380 percent) though it is higher than that of the developed countries (45 percent).

Figure 3 – Changes in the Foreign Exchange Reserves of Various Groups of Countries and of Israel, 2002–10[8]



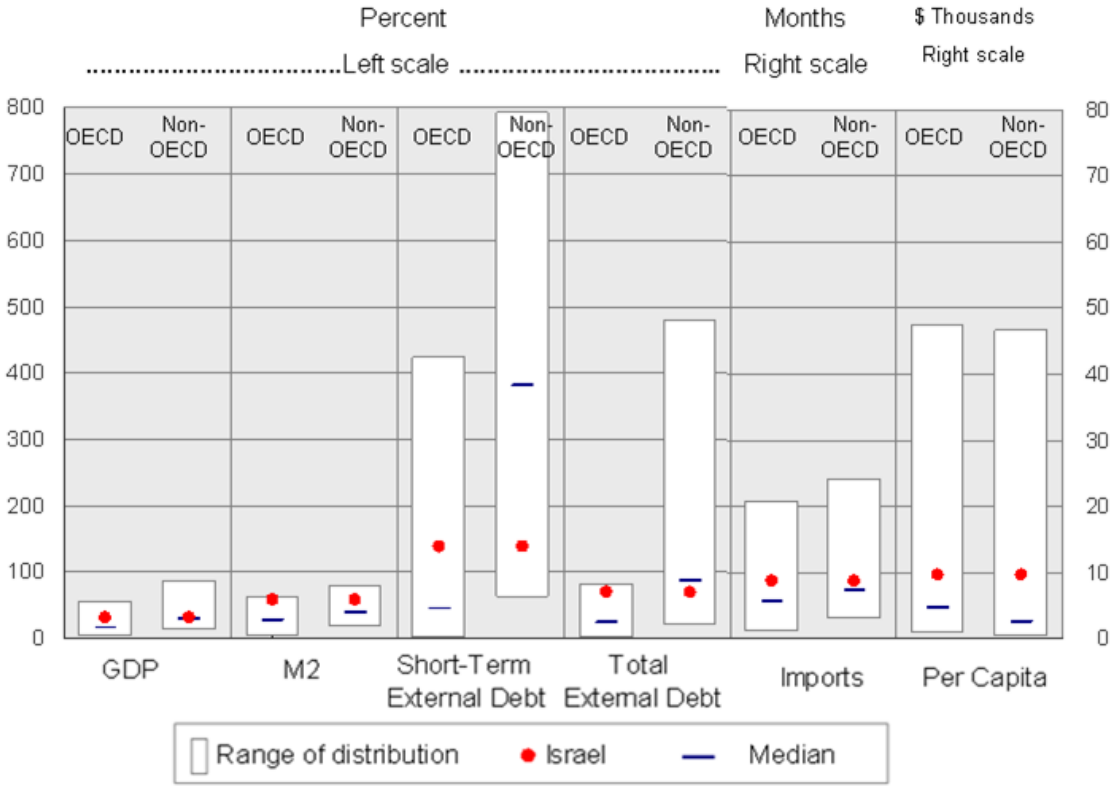
d. Intervention in the foreign currency market and the desirable level of reserves

It is important to mention that according to Paragraph 53 of the Bank of Israel Law, intervention in the foreign exchange market by the Bank of Israel in order to fulfill its function and meet its goals, may cause a deviation of the actual level of the reserves from their desirable level. The activity of the government and of the banking system can also bring about such a deviation. In general, the Bank will take action in order to change the level of reserves only when the deviation is significant and prolonged and

[8] The countries in the OECD group are: Australia, Canada, Chile, the Czech Republic, Denmark, Hungary, Iceland, Korea, Mexico, New Zealand, Norway, Poland, Sweden, Switzerland, and the United Kingdom. The countries in the non-OECD group are: Bulgaria, Brazil, China, India, Latvia, Lithuania, Malaysia, Romania, Russia, Singapore, South Africa, Taiwan, Thailand, and the United Arab Emirates.

only if these actions are consistent with the achievement of the Bank's goals as determined by the Bank of Israel Law, which include price stability, supporting the other goals of economic policy and supporting the stability of the financial system. Therefore, the foreign exchange reserves could deviate from their desirable level for a significant period of time.

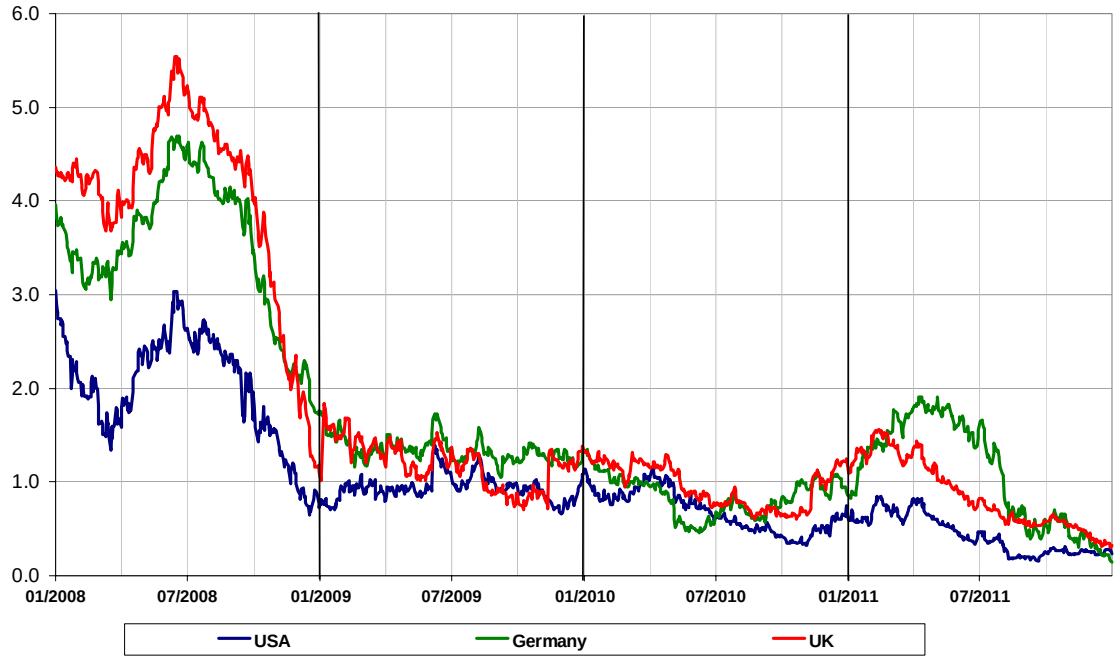
Figure 4 – The Level of Reserves at the End of 2011 Relative to Various Aggregates, Israel Compared to Other Countries



B. THE INTERNATIONAL FINANCIAL ENVIRONMENT IN 2011

In 2011, the management of foreign exchange reserves was carried out in a complex environment. At the center of events this year was the debt crisis in Europe which worsened in severity and spread to additional countries. The crisis led to the widespread lowering of credit ratings of both countries and banks and threatened the integrity of the euro zone and the stability of the global financial system. The traditional investment space for reserves managers worldwide, including the Bank of Israel, narrowed and became more complex, due to the deterioration in the quality of credit of government issuers or entities with government guaranties and of large financial institutions. This was accompanied by growing concerns related to their stability, even though they were until recently considered to have a relatively low risk of default.

Figure 5 – The Two-Year Yields to Maturity of Government Bonds of the US, Germany and UK, 2008–11



The adverse events that took place this year in the financial markets led to a sharp rise in yields to maturity among many of the developed countries which experienced financial difficulties. This rise in yields reflected a lack of confidence on the part of investors and their growing concerns over the possibility of default. In contrast, there was a further drop in yields to maturity in the US, Germany and a number of other

developed countries, which were still perceived as stable and relatively safe during this period. These yields have reached unprecedented lows (Figure 5) and most of the reserves are invested in these countries.

The US government continued to institute expansionary fiscal measures while the Fed continued with the second round of quantitative easing, which it initiated in the previous year until mid-year. Towards the end of the year the Fed instituted Operation Twist, a program of assets exchange. As part of this program, the Fed sold short-term treasuries while purchasing medium-term and long-term treasuries, in order to lower interest rates for longer terms on the yield curve. Its goal was to lower the cost of financing and thus ease credit conditions in the US economy. In addition, the Fed declared that it intends to maintain the interest rate at its current low level until the end of 2014.

These programs and their predecessors, which were a response to the downturn in the US economy since the onset of the crisis in 2008, were among the factors leading to the rise in the US deficit and level of debt to record levels in 2011. They also led to a rapid increase in the debt to GDP ratio, increasing the concern that the ceiling for US debt, which is set by the Congress, would be breached. As a result, a major political battle ensued, which was accompanied by deep disagreements between various factions in the administration. In the end, it was agreed that the ceiling would be raised again, alongside a commitment to adopt measures that will reduce the deficit and slow the growth in debt. This episode was among the factors that motivated S&P to lower the country's perfect credit rating, for the first time ever, by one level, i.e. from AAA to AA+. This event, though it caused a major stir and increased volatility in the markets, did not in the end hurt the standing of the US in the eyes of investors and it continued to serve as a "safe haven", given the adverse developments in Europe.

The worsening debt crisis in Europe and its spread to additional countries, particularly during the second half of the year, led to greater pressure in the markets and to high volatility. The fiscal situation of some European countries, including Greece, Spain, Portugal and Italy, continued to worsen and in response there were large increases in their CDS spreads and the yields on their bonds, simultaneous with the significant lowering of their ratings by international rating agencies. In reaction to the

deterioration in the situation, European leaders announced various programs during the course of the year to deal with the crisis; however, it appears that they did not manage to stop the downward spiral and the uncertainty regarding the ability of the peripheral countries in Europe to avoid default increased to even higher levels. In addition, concern increased that the crisis would spread to the core countries and the possibility of the breakup of the euro zone or the exit of some of its member countries became more real.

As the crisis in Europe worsened, the ECB, which at the beginning of the year had maintained a low level of intervention, became more active in the bond market through the purchase of bonds issued by some of the euro zone countries whose situations were deteriorating. In addition, the ECB expanded the scale of its financing and liquidity facilities available to the financial system in Europe, with the goal of reinforcing its stability. Within this framework, towards the end of the year, it introduced greater flexibility with respect to the types of collateral it was willing to accept from the banks and announced that it would provide funds to European banks on a full allotment basis in the form of loans of up to 3 years (as opposed to one year up until then), with the goal of easing the financing distress of European banks. These measures were greeted positively in the markets and contributed to somewhat narrower CDS spread among the peripheral countries and to a drop in yield spread on the bonds of those countries relative to Germany.

C. THE HOLDING-PERIOD RATE OF RETURN ON THE RESERVES IN 2011

The holding-period rate of return on the reserves in terms of the numeraire[9] totaled 1.3 percent in 2011, which is its lowest level during the last decade and is significantly lower than the average yield during that period (3.3 percent; Table 2). The holding-period rate of return on the reserves in 2011 in shekel terms was much higher (7.8 percent), which was due to the weakening of the shekel against the currencies in which the bulk of the reserves are invested.[10]

In view of the changes that have occurred in the macroeconomic environment in recent years as a result of the financial crisis, the currencies and assets of developed countries with solid economies and a high growth potential have been added to the reserves portfolio since the beginning of 2010. These countries were hardly affected by the crisis and due to their positive economic situations were expected to benefit from the beginning of the global recovery and the strengthening in the demand for goods. The motivation of the decision to invest part of the reserves in these currencies was to improve the risk -return profile of the reserves portfolio. During the course of 2011, the level of investment in the currencies and assets of these countries was increased to some extent and they constituted a currency and asset position with an average size of about 9 percent relative to the numeraire and the benchmark.

Notwithstanding the above, the Bank of Israel's investment rules are, as mentioned, quite conservative and they limit the degree of exposure to various types of risk. In this context, the various rules of compliance, including those to prevent excess exposure to credit risk, were tightened already during the initial stages of the global financial crisis, before its focus shifted to Europe,. With the onset of the crisis in September 2008 as a result of the collapse of the Lehman Brothers investment bank and with the worsening of the situation of numerous banks worldwide, it was decided to no longer invest in bank deposits. Thus, the exposure to banks during 2011 remained close to zero, as it was during the previous two years. During the year, the reserve portfolio's levels of credit and liquidity risk rose as a result of the negative

[9] As mentioned, the numeraire is the neutral currency composite of the reserves portfolio and therefore the yields on the portfolio and on the benchmark, which are multi-currency, are measured in terms of the numeraire and not in terms of some arbitrary currency.
[10] For further details, see Bank of Israel Financial Statements for 2011.

developments in the financial markets, particularly in Europe. Therefore, the Bank of Israel took additional steps to reduce these risks, even though the rules of compliance were already conservative at that point, including the reduction and in some cases the elimination of exposure to countries whose macroeconomic situation was deteriorating and the limiting of the investment horizon for some of the assets and countries. These steps prevented large losses and overall the Bank of Israel's reserves portfolio was hardly affected by the aforementioned negative developments this year.

Table 2 - The Performance of the Actual Portfolio vis-à-vis the Benchmark, 2002-2011

(Percent, in numeraire annual terms, weekly standard deviations in annual terms in parentheses)

	Performance		**Incremental yield**		
	Actual Portfolio	**Neutral Benchmark**	**Total**	***of which:* currency management**	***of which:* asset management including duration and diversification**
2002	**5.18**	**4.98**	**0.20**	***0.03***	***0.17***
	(1.32)	(1.41)	(0.17)		
2003	**2.15**	**1.94**	**0.21**	***0.04***	***0.16***
	(0.81)	(0.79)	(0.09)		
2004	**1.70**	**1.67**	**0.03**	***0.02***	***0.01***
	(0.66)	(0.68)	(0.08)		
2005	**2.64**	**2.44**	**0.21**	***0.00***	***0.20***
	(0.60)	(0.67)	(0.12)		
2006	**3.83**	**3.70**	**0.12**	***-0.02***	***0.15***
	(0.73)	(0.79)	(0.14)		
2007	**6.91**	**6.91**	**0.00**	***0.05***	***-0.05***
	(1.37)	(1.50)	(0.25)		
2008	**5.95**	**6.14**	**-0.19**	***0.02***	***-0.22***
	(1.42)	(1.46)	(0.53)		
2009	**1.91**	**0.81**	**1.10**	***-0.02***	***1.12***
	(0.60)	(0.65)	(0.22)		
***2010**	**1.73**	**1.19**	**0.54**	***0.43***	***0.10***
	(0.57)	(0.36)	(0.53)		
2011	**1.28**	**1.07**	**0.21**	***0.04***	***0.16***
	(0.80)	(0.39)	(0.71)		
2002-2011	**3.31**	**3.06**	**0.24**	***0.06***	***0.18***

* The returnes were recalculated, see reference in the text.

It should be noted that the rates of return reported in the past for 2010 were in terms of a different numeraire than the one we used previous to 2010 and in 2011. This is because the numeraire in 2010 included additional currencies apart from the dollar, the euro and the sterling, which were excluded following a reexamination of the issue. The current calculation in Table 2 is in terms of the numeraire that is currently in use, which includes only the dollar, the euro and the sterling and which was in use to measure rates of return during all of the past decade, except, as mentioned, in 2010. According to the current calculation, the contribution of portfolio management in 2010 was higher than according to the previous calculation, primarily due to exchange rate differences.

1. **The rate of return and risk of the benchmark**

The major factor determining the holding-period rate of return on the reserves portfolio is the composition and structure of the benchmark since they dictate the main characteristics of the portfolio for the portfolio manager. The holding-period rate of return on the benchmark this year was 1.07 percent, which is similar to that for the previous year (1.19 percent) and lower than the average for the past decade (3.06 percent).

The benchmark's low rate of return during the last three years relative to most of the previous years is the result of the historically low level of interest rates and yields to maturity in the markets in which the reserves are invested, due to the global financial crisis. Contributing to the benchmark's low level of return was primarily the continued investment in assets with relatively short duration, whose sensitivity to changes in yield to maturity is low. The shortening of duration for part of the portfolio began already in 2009 in response to the sharp downward shift in yield curves, with the aim of maintaining the return to risk profile of the reserves portfolio. The objective was to reduce the possibility of capital losses that would exceed interest income in the case of a large increase in yields to maturity. This was part of the Bank's long-term policy to avoid a significant risk of loss on the reserves portfolio in terms of the numeraire. However, the shortening of duration of the portfolios reduced interest income as well as the scope of capital gains that could be achieved in the event of a drop in yields, which is in fact what happened again this year in the benchmark countries. Thus, if the duration of the portfolio had not been shortened to

such an extent out of fear of an increase in yields, the holding-period rates of return on the reserves since the beginning of the process would have been much higher.[11] However, it is important to remember that these actions were not implemented in order to take a position for the sake of profit but rather, as mentioned, to reduce the risk of a negative rate of return.

The volatility (standard deviation) of the benchmark's rate of return in 2011 totaled 0.39 percent, which is low relative to the past decade and similar to that in the previous year (Table 2). The low level of volatility in the benchmark is also a result of the record-low levels reached by yields to maturity in the bond markets of the benchmark countries, such as the US, UK and Germany. Another factor that has contributed to the low volatility is the duration of the portfolio, which again this year was low relative to its level in previous years. The benchmark's relatively low level of volatility reflects the Bank of Israel's policy of prudence in managing its foreign exchange reserves. This is manifested in the benchmark assets which mainly consist of the bonds of large developed countries with solid economies and high credit ratings, which have shown a relatively high level of resilience during the crisis.

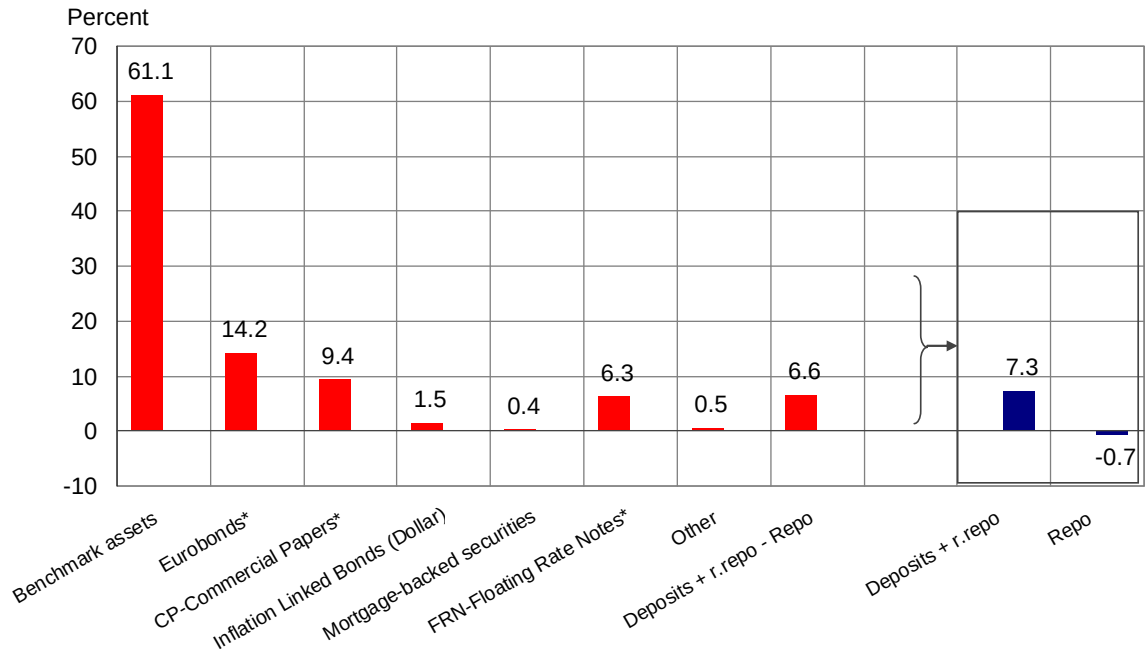
2. The contribution and risk of active management

The contribution of active management reflects the sum of the contributions resulting from the decisions to invest the reserves portfolio according to a different composition than that of the benchmark, with the goal of achieving a higher yield. These differences can be, for instance, in the currency composition, the asset composition, the duration or the diversification of terms to maturity, as long as it is within the framework of the degrees of freedom granted to the portfolio manager.

Thus, for example, while the benchmark primarily consists of the government bonds of the US, UK and a small number of European countries, the reserves portfolio consists of assets of various types. Its proportion of government bonds is in the vicinity of 60 percent and they also include bonds of countries that are not included in the benchmark (Figure 6).

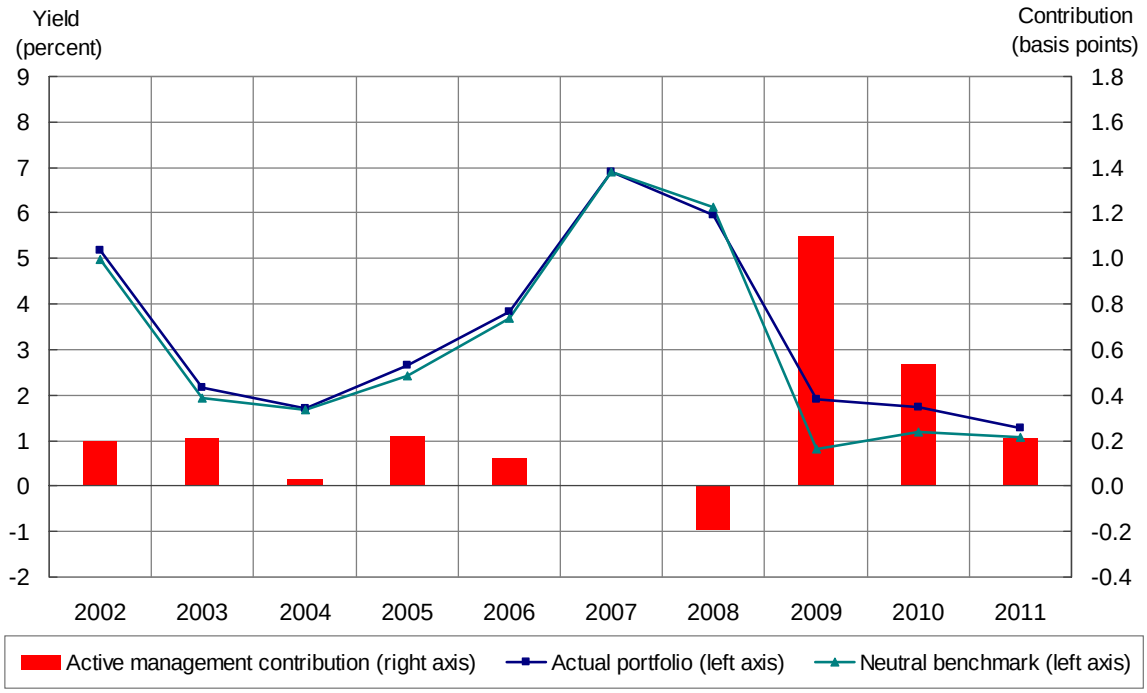
[11] This can be seen in the comparison between the performance of the dollar portfolio and that of private funds in the US bond market (see Section 3).

Figure 6 – The Asset Composition of the Reserves Portfolio, 2011



* Includes the issues of the banks with full government guarantee and of issues of PSEs (Public Sector Entities).

Figure 7 – The Rate of Return and the Contribution of Active Management, 2002-2011



During the past decade, the contribution of active management has been positive every year, except for 2008 (Figure 7). However, since the crisis in 2008 there has

been greater variation in the excess rate of return, as a result of high volatility in the prices of assets in the financial markets during that period and as a result of the decision to invest part of the reserves in new currency portfolios during the last two years.

In 2011, the contribution of active management totaled 21 basis points, which is similar to the average for the last decade (Table 2). As in the previous year, this contribution was achieved primarily as a result of the decision last year to shift part of the reserves to currencies and assets that are not included in the numeraire or the benchmark. This decision contributed about 26 basis points to the total excess rate of return over the benchmark (Table 3).

Table 3 - Active Management Contribution by components, 2010 and 2011
(basis points, in annual terms)

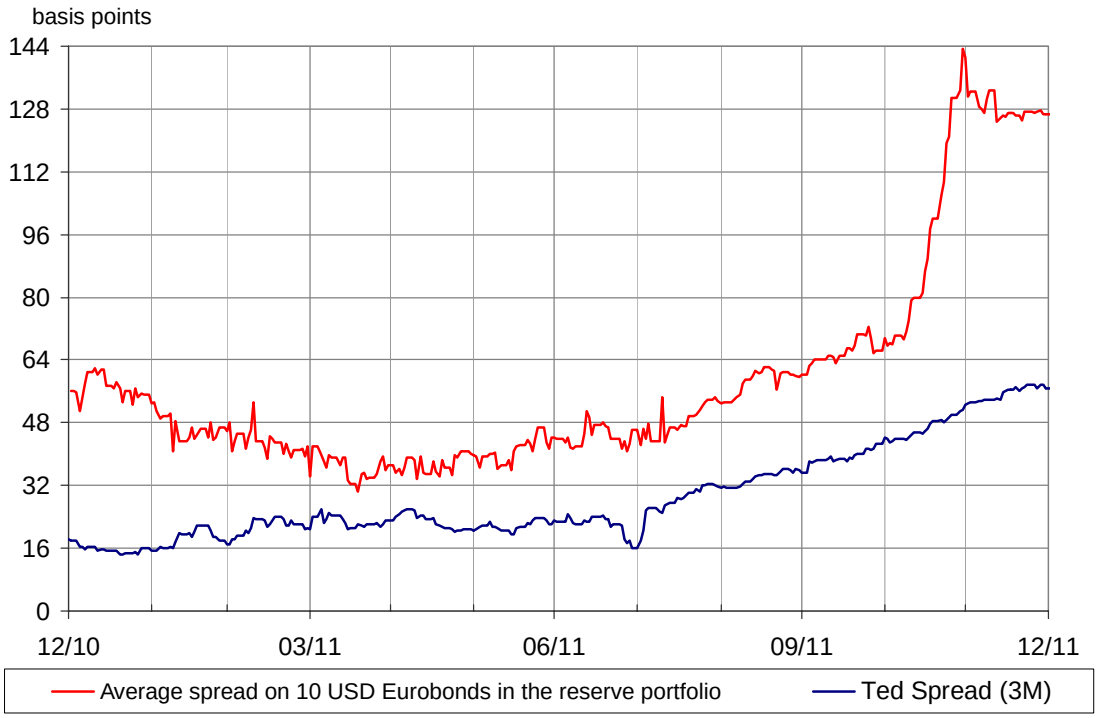
	2010	**2011**
Numeraire currencies portfolios	9.0	-5.3
of which: Asset management	*10.3*	*-2.9*
of which: Duration and diversification positions	*-1.4*	*-2.5*
New currencies portfolios	46.6	25.9
Other currencies positions	0.0	-0.5
External management assets	1.6	-0.5
Other	-3.5	1.1
Total	**53.8**	**20.7**

The contribution of shifting part of the reserves that were invested in assets denominated in the numeraire currencies to assets denominated in non-numeraire currencies embodies various management decisions, which reflects changes due to the shift between the various currencies and markets, such as differences in exchange rates, yields and yield spreads. Thus, for example, the yield curves in the bond markets of the additional countries in which reserves were invested were higher than those in the bonds markets of the US and Germany and in addition the drop in yields to maturity in the these countries were in general larger and therefore produced larger capital gains. In addition, the characteristics chosen for the management of portfolios in these currencies, such as duration, diversification and type of assets, differed from those chosen for the management of the portfolios in the benchmark currencies. Thus, for example, the portfolio of investments in these currencies was from the outset managed with a higher duration than the portfolios in dollars and in euros and

therefore the performance of the assets in the new markets was significantly better than that in the dollar and euro markets.

In contrast, active management of the portfolios in the numeraire currencies, i.e. the dollar, the euro and sterling, made a negative contribution of about 5 basis points, which was the result of losses from asset management as well as diversification and duration positions that were opened during the year. As part of asset management, the spread assets in the portfolio, both short- and long-term, had a lower rate of return relative to the benchmark assets. This was due to the capital losses that resulted from the widening of spreads during the second half of the year, following the negative events in Europe (Figure 8).

Figure 8 – Eurobonds Spreads in the Reserves Portfolio and TED Spreads, 2011



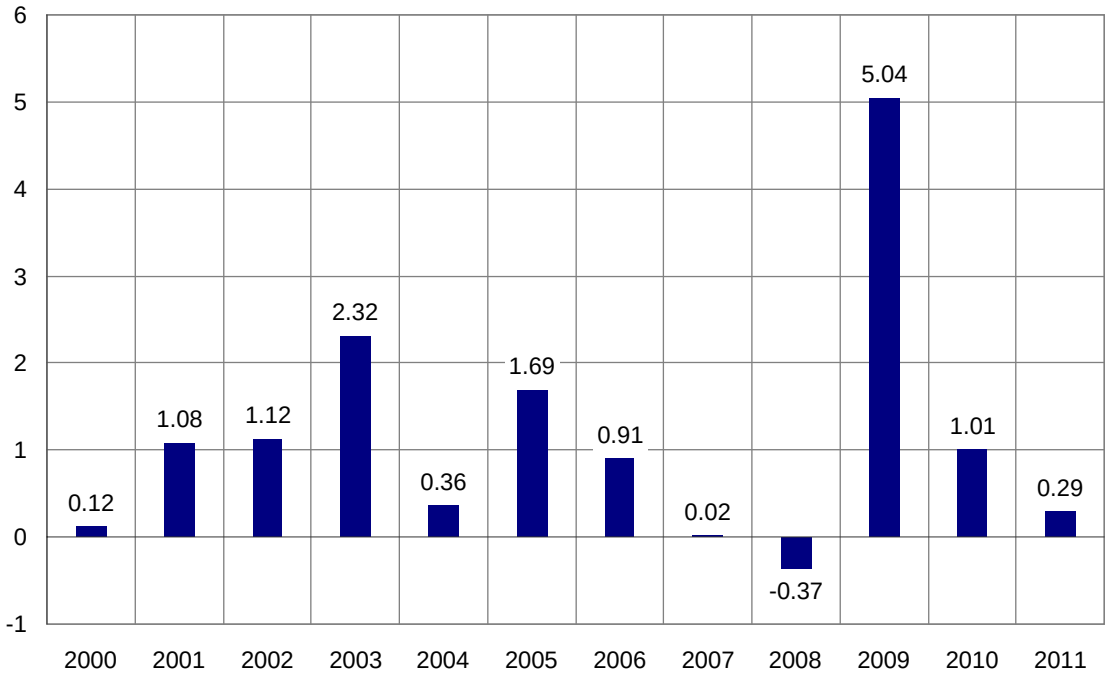
The volatility of the portfolio increased sharply this year (0.8 percent) and was double that of the benchmark (Table 2). Furthermore, the ratio of the contribution of active management to its volatility, which is known as the Information Ratio, was lower this year than the average[12] since 2000 (0.29 as compared to 0.78). This ratio is a widely used risk measure for evaluating the addition to the rate of return relative to the benchmark with respect to the risk that was taken for that purpose (Figure 9).

[12] This average does not include 2009, which was a clear outlier.

The increased volatility of the portfolio this year and the relatively low level of the Information Ratio can also be attributed to the large fluctuations in yield spreads this year, although it was primarily due to the position created in the portfolio as a result of the investment of part of the reserves in non-numeraire currencies. This position was affected to a large extent by the high level of volatility which characterized the exchange rates of these currencies this year.

Notwithstanding the above, the decision to invest in these currencies was perceived by the Bank to be correct since it reflects a long-term view and expresses confidence in the strong fundamentals of these economies. In this context, we would note that the investment of a small proportion of the reserves in equities, which began at the beginning of 2012, can contribute to reducing the volatility in long-term rates of return, due to the negative correlation that usually exists between equities and bond markets during non-crisis periods.

Figure 9 – The Ratio of the Active-Management Contribution to its Standard Deviation (the Information Ratio), 2010-2011



3. **The yield on the dollar portfolio relative to other managed portfolios**

The Market Operations Department carries out a comparison each year of the performance of the reserves dollar portfolio to a number of mutual funds that have operated in the US market during the past decade. This year, the group included 11 mutual funds that primarily invested in US government bonds during the period 2001–2011. Some of the funds are classified as "investors in short-term government bonds" while the rest are "general investors in government bonds," which, in practice, means they invest in the medium term. The funds invested no more than a small proportion of their portfolios in indexed US government bonds (TIPS) and low-rated assets (less than AA).[13] This permits a rough comparison to the performance of the Bank of Israel's US dollar portfolio despite the differences between them, including their benchmarks and the compliance rules that apply to them.[14] It should be emphasized that these differences are the result of the divergence in investment goals and risk-return profiles between a central bank that manages reserves and the managers of private mutual funds. This of course results in differences in investment policies, which have become larger in recent years as a result of the continuing financial crisis. Thus, for example, the duration of the Bank of Israel's dollar portfolio was shorter than those of the "short-term" funds and certainly than those of the "medium-term" funds, due to the prudence exercised by the Bank in order to avoid a possible capital loss on its portfolio.

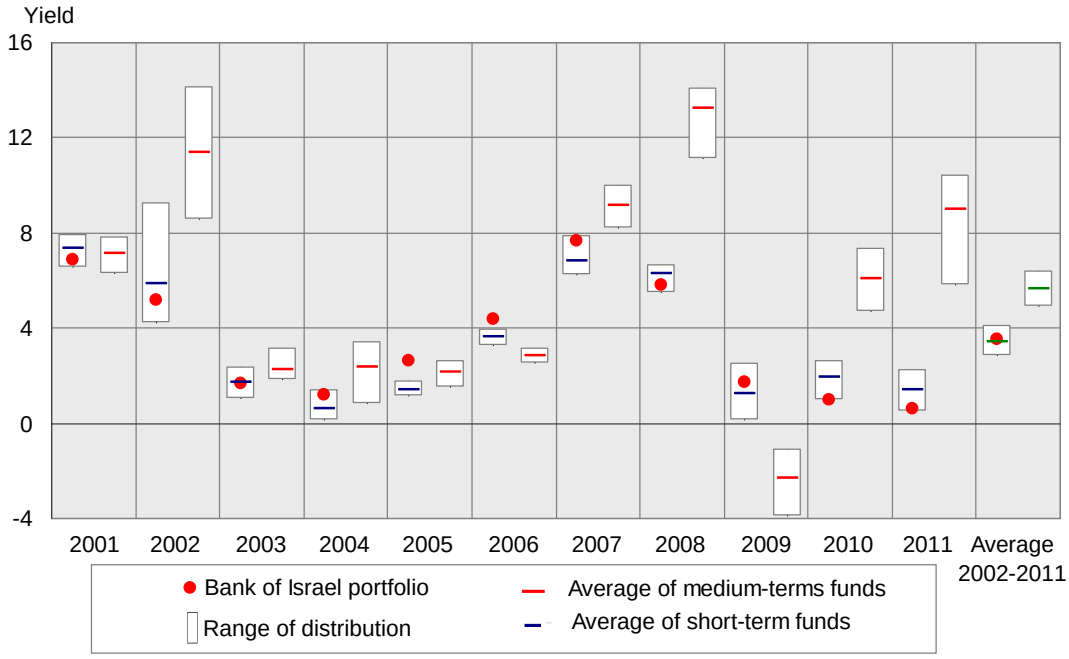
Over the years, the performance of the dollar portfolio has been within the distribution of the rates of return of the "short-term" mutual funds and in certain cases above it (Figure 11). However, in 2011, as in the previous year, the rate of return on the Bank of Israel's dollar portfolio was at the lower edge of the distribution of the mutual funds' rates of return and lower than their average rate of return by about 1 percent. This is explained, as mentioned, by the duration of the benchmark for the dollar portfolio, which continued to be set at a relatively low level, and the continued flattening of the yield curve for US government bonds during the year. Since 2011 was characterized by a fall in yields to maturity, which was more pronounced in the

[13] It may be that some corporate bonds are also included within this component, an asset class which the Bank of Israel has never invested in.

[14] Among other things, note that the performance of the mutual funds is measured after deducting management fees, which reflect the cost of operating expenses, while the performance of the Bank of Israel's dollar portfolio is reported without deducting expenses of this kind.

long and medium terms than in the short term, it would be expected that the medium-term funds would have higher rates of return than the short-term funds, as indeed was the case.

Figure 10 – The Distribution of Annual Rates of Return for Fund Managers in the US Market, 2001-2011

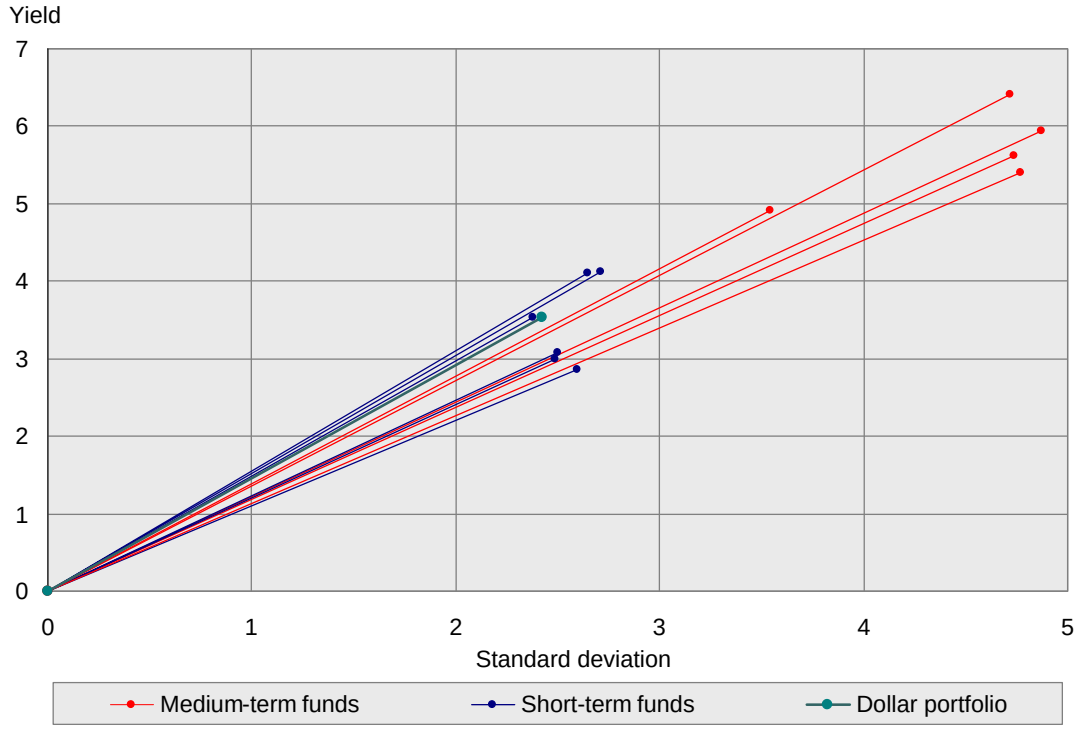


The average performance of the Bank of Israel's dollar portfolio over the years is equal to that of the short-term mutual funds. This is apparently due to the similarity in average duration between them. The medium-term mutual funds had a higher rate of return on average over the past ten years than the short-term mutual funds but their annual rates of return were more volatile and in some years, such as 2009, were even negative. This highlights the choice made by the Bank of Israel to invest reserves in a conservative and safe manner, even at the expense of obtaining a lower rate of return, since it is committed to maintaining their value.

The evaluation of the average rate of return on each mutual fund relative to its volatility since 2001 (Figure 11) reveals that the return to risk ratio of the dollar portfolio, which is represented by the slopes of the lines from the origin, is among the highest ratios of the various mutual funds. In comparison to the medium-term mutual funds, the return to risk ratio of the Bank of Israel's dollar portfolio is higher, which

means that the additional return achieved by these funds was accompanied by a higher level of risk.

Figure 11 – The Dollar Portfolio Relative to Funds in the US Market—Yield and Risk, 2001–11



Appendix 1: Glossary

Basis points	0.01 percent; one ten-thousandth.
Benchmark portfolio	A hypothetical portfolio constructed according to agreed-upon rules, which is used as a standard for evaluating the performance of an investment portfolio manager and as an anchor for the management of portfolio risk.
Certificate of deposit (CD)	A bank deposit whose ownership can be transferred and therefore it is traded in the money market.
Commercial paper (CP)	Zero-coupon bonds that are sold at a discount, with an original term to maturity of less than 270 days (about nine months).
Credit risk	The exposure to the possibility of loss due to default on debt, whether of an issuer, a financial institution or a country, or as a result of changes in the market's evaluation of the probability of such an event.
Currency risk	The exposure to the possibility of a loss as a result of a change in exchange rates.
Currency terms (e.g. US dollar terms)	The rate of return obtained from multiplying the values of all the assets by the corresponding rates of exchange of the currency or basket of currencies.
Eurobonds	Bonds sold in financial markets outside the country of the currency in which they are denominated.
Foreign exchange reserves	Financial assets that are issued by foreign entities and which are denominated in a foreign currency (including gold). They are owned exclusively and managed by a central bank and are not encumbered in any way.
Forward	An agreement to buy or sell a particular type of asset, such as foreign currency, at a predetermined price and on a predetermined future date.
GNMA	Bonds backed up by mortgages that are issued by the Government National Mortgage Association, which are fully guaranteed by the US government.
Holding-period rate of return	Rate of change in the value of an asset or portfolio over a defined period.
Interest rate risk	The exposure to the possibility of a loss as a result of changes in rates of interest or in yield to maturity.
Legal risk	The exposure to the possibility of a loss as a result of a mistake in

	the wording of a contract, to the benefit of the investor.
Liquidity	The ability to realize assets immediately without a loss in value.
Modified duration	The ratio between a small change in the value of a debt instrument, expressed as a percentage of its original value, and the change in the yield to maturity (with the opposite sign) of the instrument. Measured in units of time.
Neutral	The value of a certain characteristic of a portfolio when it is in a riskless state.
Numeraire	A currency composite that is determined to be the benchmark for the reserves portfolio. See Section A1 above.
Operational risk	The exposure to the possibility of a loss due to a systemic failure, human error and the like.
Portfolio duration	The average duration of a portfolio of debt instruments (where the duration of each asset is weighted according to its proportion of the portfolio); a widely accepted index used to measure the portfolio's interest rate risk. However, according to its definition, duration measures the sensitivity of small and parallel shifts in the yield curve. In practice, shifts in the curve are often accompanied by changes in its slope.
Repo, reverse repo	Repurchase agreement; the purchase of a security simultaneously with a commitment to sell it back at a future date and at a fixed price. From an economic viewpoint, this type of transaction is identical to a loan/deposit backed up by a guarantee (the security). When the Bank of Israel sells a security for future repurchase, this is a repo; the opposite transaction is called a reverse repo.
Risk-free portfolio	A portfolio in which the investor is not subject to gains or losses.
Spread asset	An asset whose yield to maturity is composed of the yield of a different asset (such as a government bond) and a yield spread, which changes (usually continuously and moderately) according to the supply and demand for the assets of this type.
Standard deviation	A statistical index for measuring the spread of a distribution around its expectation. Often used as a measure of total exposure to uncertainty. See also volatility.
Swap spread	The difference between the yield to maturity of a government bond and the fixed interest rate that is paid from one party to the other in an interest rate swap for a similar period.
TED spread	Treasury-Eurodeposit Spread. The difference between the yield to maturity of government bonds that mature within a short time and

	the interest rate on a deposit that is redeemed on a similar date.
TIPS	Treasury Inflation-Protected Security; a bond issued by the US government that is indexed to the CPI.
Trade	An agreement to transfer or encumber the ownership of financial assets, such as foreign currency or securities.
Treasury bill, note or bond	Bonds issued by the US government.
Volatility	The standard deviation (see definition in this glossary) of the distribution holding-period rates of return for a financial asset, such as a security or portfolio, over a defined time period (a day, a week, etc.). It is in general calculated as the logarithmic holding-period rate of return (log(1+y) where y is the simple holding-period rate of return).
Yield curve	A curve representing the yields to maturity of bonds with similar characteristics (such as the bonds of a particular country in the local currency) and different maturities
Yield spread	The difference between yields to maturity of two debt instruments.
Yield to maturity	The holding-period rate of return, in annual terms that would be obtained from holding a debt instrument until its redemption, under the assumption that all of its cash flow would be invested at the same rate of return until that date. Synonymous term: internal rate of return.