

**SURPRISES ON ISRAEL'S ROAD TO EXCHANGE
RATE FLEXIBILITY**

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By

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1. Introduction

Israel's experience in the last 15 years features a relatively satisfactory transition from a nominal exchange rate anchor to gradually increasing flexibility together with an inflation target anchor. This road, however, has been quite bumpy and has brought some important surprises. With the benefit of hindsight, we believe that this transition illustrates the major difficulties of intermediate exchange rate regimes in which monetary policy has to meet an inflation target and at the same time there is a limited room for fluctuations in the nominal exchange rate. As a matter of fact, in spite of a clear and transparent policy of no intervention in the foreign exchange market since early 1998, Israel still maintains a crawling exchange band, where the upper (weakest) limit depreciates at a rate of 6 percent per year, the lower (stronger) limit depreciates at a rate of 2 percent per year, and the current width is about 35 percent. Our main conclusion is that given the increasing credibility of monetary policy in inflation targeting, and given the important adjustments in fiscal policy in the second half of the previous decade, there was enough room for an early exit from the crawling currency band to full exchange rate flexibility.

In this paper we focus on the main surprises along this road. That is, we stress those empirical features of this process that turned out to be at variance with most economists' expectations, at least ours. Although this paper is only about Israel, cross-country comparisons will suggest that similar surprises have been found, to some extent, in other economies and may as well apply to other economies in the years ahead, such as e.g. Turkey. Understanding these surprises can help shape expectations and policies in countries who have recently began a transition to exchange rate flexibility.

Here we concentrate on six main surprises. These are:

- The rapid fall of inflation and its very rapid convergence to western rates.
- The sharp drop in the nominal interest rate differential, that did not lead to massive capital outflows.
- The sizable costs of sustaining a dual nominal regime, with both an inflation target and foreign exchange market intervention to target the nominal exchange rate within a given band.
- The rapid adjustment of market participants to a more flexible and potentially more volatile foreign exchange market.
- The relatively small ex-post vulnerability shown by the shekel even under severe political and economic shocks.
- The marked reduction in the passthrough from exchange rates to prices.

The paper is organized as follows. After describing in the next section the evolution of the exchange rate system and of inflation targeting in the last few years, the next six sections of the paper document and discuss each one of the six surprises. The paper ends with our concluding remarks.

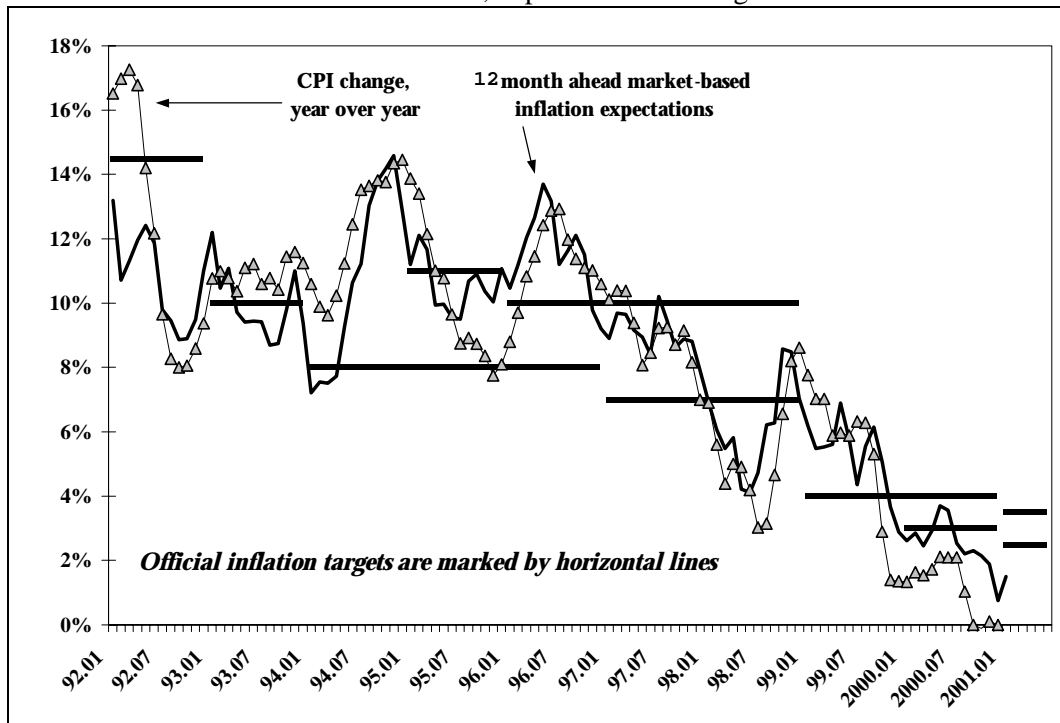
2. Israel's road to inflation targeting and exchange rate flexibility

This section presents the main features of the transition from a nominal exchange rate anchor introduced with the inflation stabilization program of mid 1985 to a regime with increasing flexibility of the nominal exchange rate and an inflation-target anchor.

Monetary policy: a growing role for inflation targeting

Monetary policy in Israel has gone through major changes in recent years. From a highly accommodative policy in the late 1970s and early 1980s, which supported the escalation of inflation to triple-digit figures, the first phase in the aftermath of the remarkable stabilization program of June 1985 featured a policy oriented toward sustaining a fixed-but-adjustable nominal exchange rate, considered as a key nominal anchor in disinflation. Throughout this first phase after the stabilization program, from 1986 to 1991, the rate of inflation stayed in the range of 16-20 percent on average per year. This was followed by a second phase, the period from 1992 to 1996, characterized by the modification of the exchange rate regime to a crawling exchange rate band and by the adoption of an explicit inflation target. In this period, the average rate of inflation was reduced to about 10 percent per year. The data clearly point to a third phase in the disinflation process, starting in 1997, featuring single-digit and declining rates of inflation towards price stability that was attained in 1999-2000. This decline of the rate of inflation throughout 1997-1999 was interrupted temporarily by the volatility in world financial markets during September-November 1998, which had an impact on Israel's exchange rate and on the rate of inflation. Nonetheless, It seems that the impact of the currency depreciation during the last third of 1998 on prices was minimized due to the existence of deflationary forces such as the drop in world commodity prices and the slowdown of domestic demand growth and restrictive monetary policy. Overall, the evolution of the nominal policy regime after 1985 shows a gradual shift toward increased flexibility of the nominal exchange rate coupled with increased emphasis on inflation targeting.

Chart 1
Gradual Disinflation: Overshooting and Undershooting the Inflation Targets
 Inflation: actual, expectations and targets



Current monetary policy in Israel is oriented toward achieving the inflation target set by government while maintaining and supporting, at the same time, the exchange rate's crawling band. The current inflation targets are 2.5-3.5 percent for 2001, 2-3 percent for 2002 and 1-3 percent from 2003 onward. The authorities consider the target from 2003 onward as a long-term price stability target.

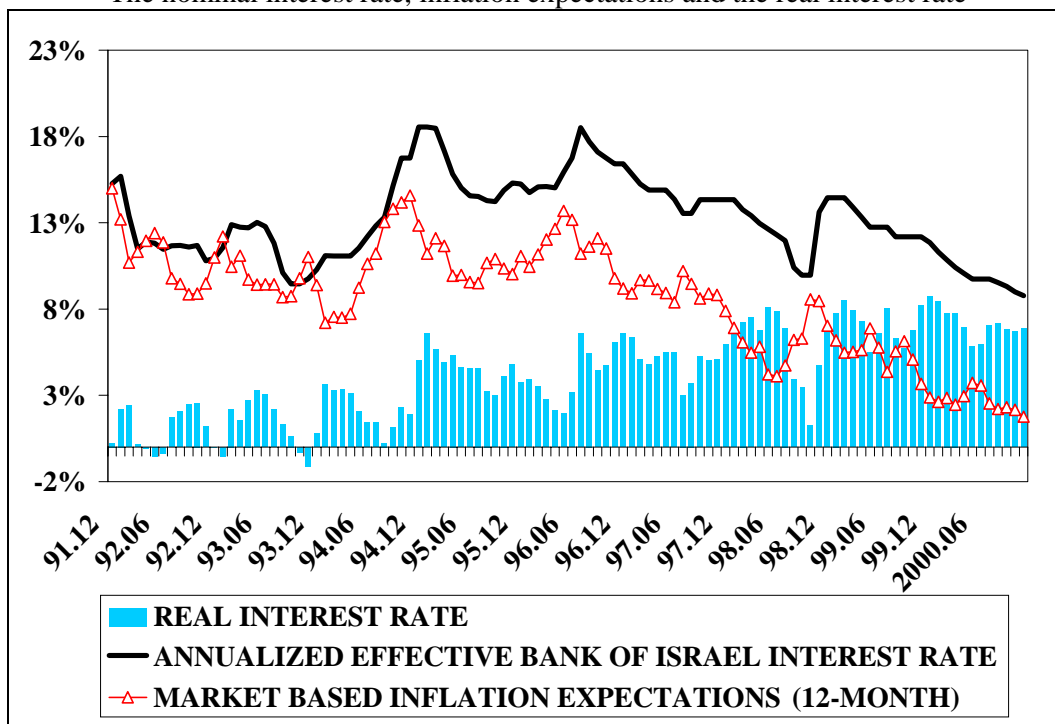
When compared to most other countries that adopted explicit inflation targets, Israel's case is unique for at least three reasons. First, it is one of the only cases in which in spite of the attempts to keep inflation relatively low, there are still some institutions and modes of operation left over from the era of triple digit inflation. Second, at variance with other cases there is a considerable degree of ambiguity about the nature and operational meaning of inflation targets as a pre-commitment device not only for monetary policy but for fiscal policy as well. In part this reflects the fact that initially inflation targets were introduced in late 1991 in the somewhat technical context of determining the slope of the crawling exchange-rate band. Only later, in the mid-1990s did inflation targets get more fundamental importance. Third, Israel is one of the very few cases where inflation targets coexist with another nominal commitment, namely the crawling exchange rate band. Accordingly, under a considerable degree of international capital mobility, concrete dilemmas about policy have emerged as a

result of shocks and developments that gave rise to conflicts between the monetary policy measures required to achieve each one of these two targets.

Chart2

The real interest rate rose as part of the disinflation strategy. The nominal rate was reduced cautiously along with the progress towards price stability.

The nominal interest rate, inflation expectations and the real interest rate



As in other countries, the explicit inflation target in Israel has become a key nominal anchor in the economy and as such it plays two main roles. First, it provides a transparent guide to monetary policy, the commitment, discipline, and accountability of which can be judged according to whether policy actions were taken to ensure that the target is achieved. Second, if credible it should serve as a coordination device in the wage- and price-setting process and in the formation of the public's inflation expectations. In an economy with a large public sector as Israel, the credibility of the inflation target can be strengthened if the specific target that was chosen serves also as a coordination device in the setting of public-sector wages, of prices of public-sector utilities, and of the price deflator used to translate real government spending into nominal government budget figures.

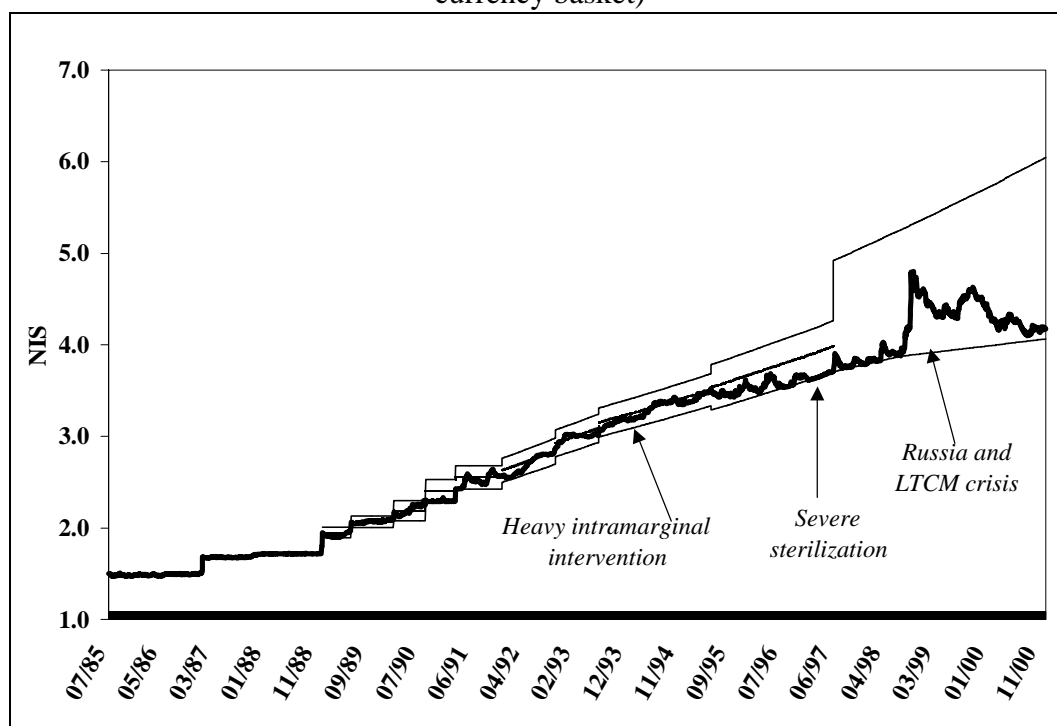
A road with clear limits: Israel's exchange rate band

Israel's crawling exchange rate band was introduced in late 1991, as a part of relaxing the fixity of the previous band system that was based on a fluctuation zone around a fixed central parity rate. The move to a more flexible system came after a series of speculative attacks on the NIS during the 1988 to 1991 period which were mainly based on the perception that a fixed exchange rate was not sustainable in view of the persistent domestic-foreign inflation differential. During this period, the interest rate was used entirely to cope with speculative attacks on Israel's foreign currency reserves and not as an instrument aimed at achieving a given inflation objective. From 1992 to mid-1998 there were no major threats to the exchange rate regime and the interest rate gradually gained a central role in the effort to meet the inflation target that was introduced, for the first time, in December 1991 as a part of the new crawling exchange rate band system.

Chart 3

Israel: From a fixed exchange rate regime, to a narrow band to a widening and crawling band

The exchange rate of the Shekel (until 7/86 vis-à-vis the US\$; from 8/86 vis-à-vis a currency basket)



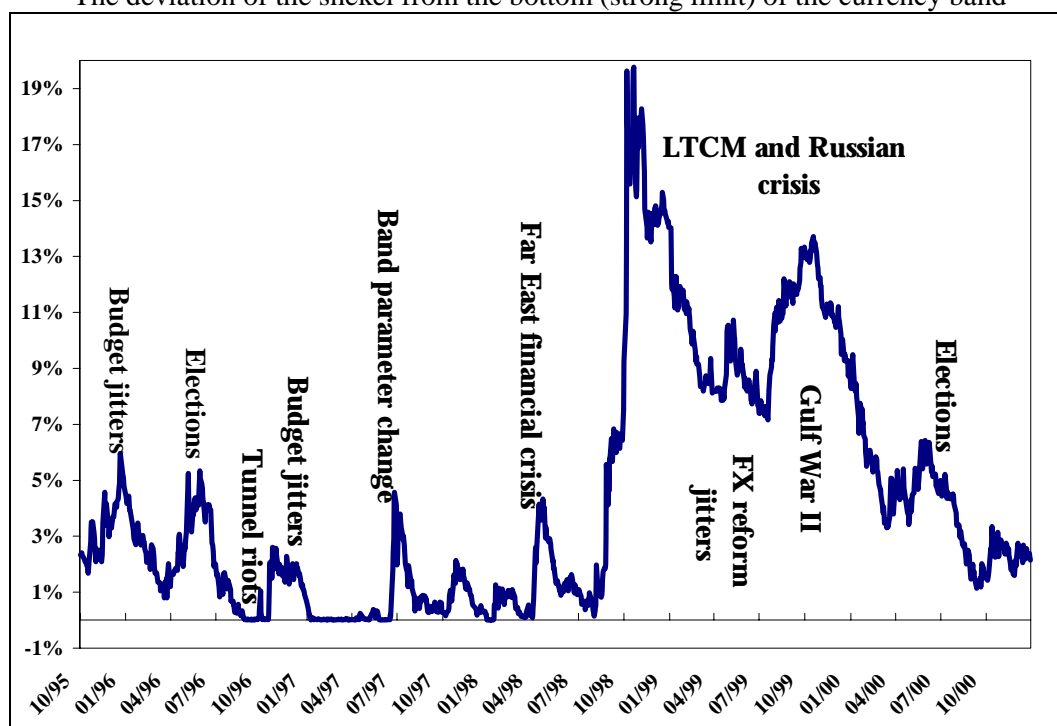
In late 1998 Israel, as most other countries, felt the impact of the Russian financial crisis and the collapse of LTCM. The shekel depreciated by about 11 percent throughout from September 1998 to November 1998. As a result, the exchange rate depreciated to the mid point of the 32 percent wide currency band. Despite much public debate, the Bank of Israel

did not intervene in the currency market's trading, which saw a substantial increase in turnover during this episode. Here the central bank's dilemma was how to act – by raising interest rates, by selling foreign exchange or perhaps by a combination of both. The central bank opted for use of the interest rate only, while at the same time allowing for market forces to determine exchange rates, with no official intervention. Ultimately, the Bank of Israel remained focused on inflation expectations and following their rise the interest rate was increased by 400 basis points in a matter of one month. It appears that this step, along with a stabilization of world financial markets, was enough to convince the markets that turmoil had ended and the shekel started to appreciate gradually.

Chart 4

Deviations from the band's strong limit were driven by specific geopolitical and economic developments. Overall, the exchange rate has tended to remain close to the strong bound of the band.

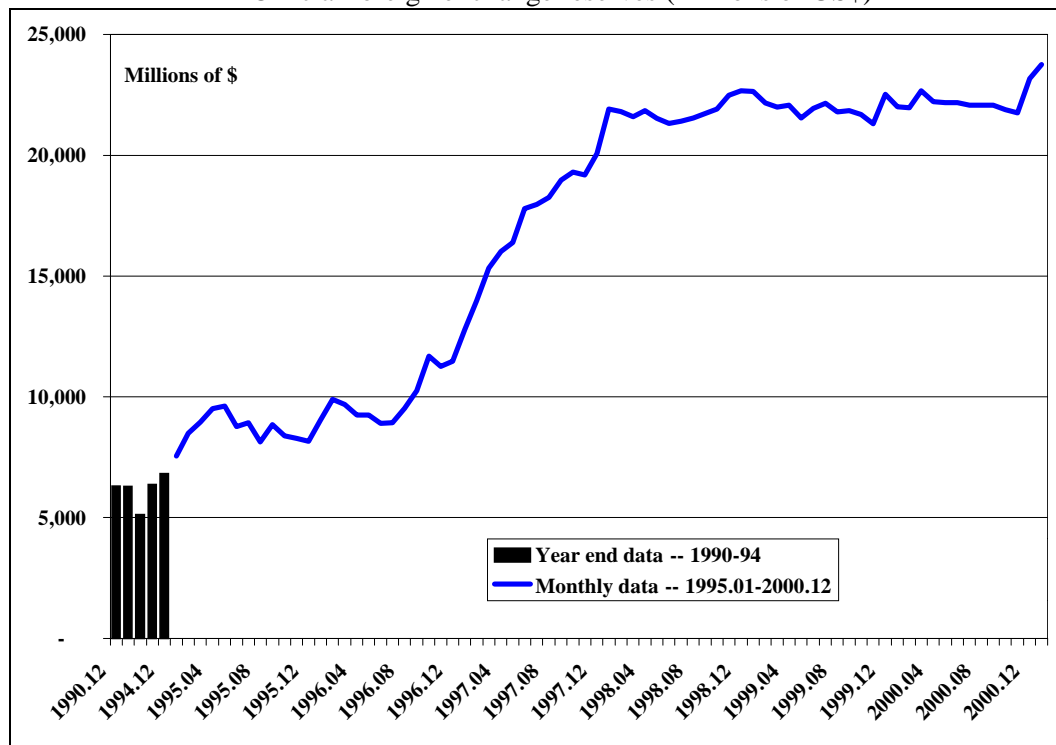
The deviation of the shekel from the bottom (strong limit) of the currency band



From the launch of the crawling band in late 1991 until 1996, the central bank operated an inner, intramarginal, intervention band, aimed at keeping the exchange rate relatively close to the central parity rate. During the period when capital inflows grew considerably--in part due to the progress in the Middle East peace process from late 1993 onwards and in part as a result of financial opening and liberalization measures taken in previous years--this intervention resulted in the Bank of Israel purchasing the considerable excess supply in the foreign exchange market, with little change in the nominal exchange rate.

In late May 1995, the Bank of Israel and the Ministry of Finance announced the widening of the exchange rate band from 5 percent to 7 percent around the central parity rate. The initial purpose of this step was to adjust the exchange rate regime so as to potentially allow greater exchange rate flexibility. In spite of the potential increase in exchange rate risk, after a few weeks there was a strong tendency for the exchange rate to appreciate within the band, and the central bank returned to large-scale intervention in the foreign currency market. It is evident that the perceived implicit commitment of the Bank of Israel to the inner band was interpreted by market participants as a signal that there was little risk associated with exchange rate fluctuations. The combination of this perception and a sizable domestic-foreign interest rate differential provided an additional incentive for domestic agents to shift from domestic-currency denominated credit into borrowing abroad, thus strengthening short-term capital inflows and their pressure toward nominal exchange rate appreciation.

Chart 4
FX reserve accumulation surged in the mid-90's due to borrowing from foreign sources.
Later on the high level was maintained by foreign investment.
 Official foreign exchange reserves (millions of US\$)



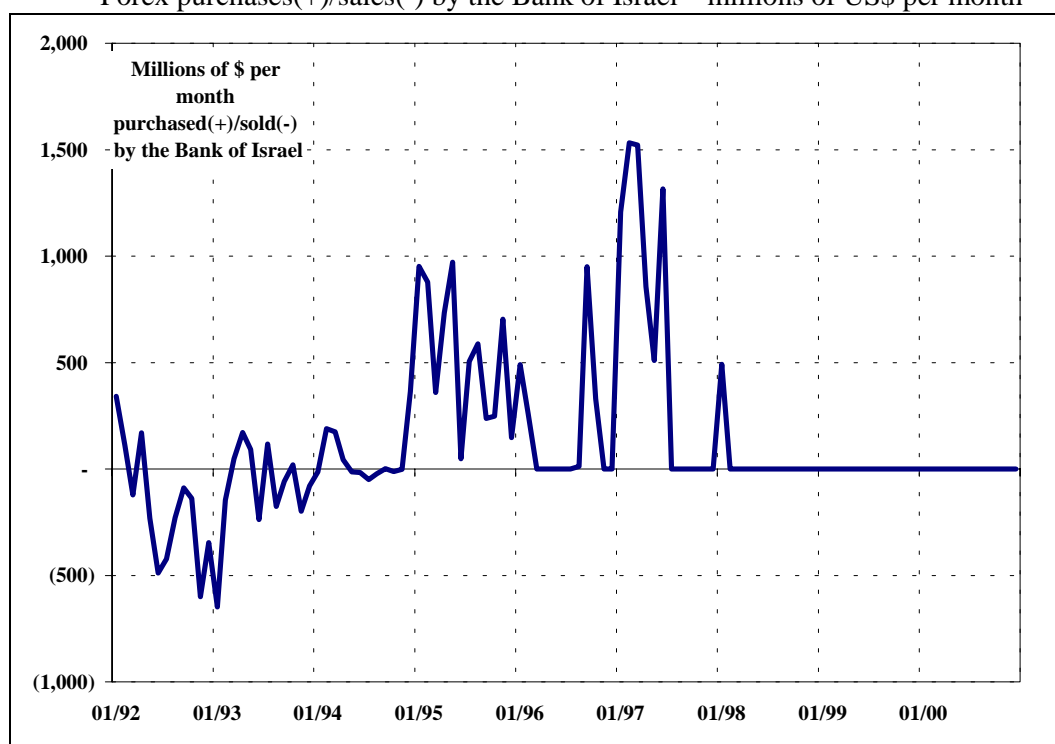
The foregoing developments, and the objective to make further progress at capital account liberalization and deepening of the foreign exchange market, prompted policy decisions that enabled increased exchange rate flexibility. Specifically, the inner band was abandoned in February 1996 and as a result there was a larger room for movements of the exchange rate within the band. By the summer of 1996 the exchange rate appreciated to the band's lower

(i.e., strongest) limit. Since the exchange rate band limits became a binding constraint a large degree of sterilized intervention of capital inflows was required—sterilization that carried with it a sizable quasi-fiscal cost—and monetary policy could not fully affect inflation developments through the very important exchange-rate channel of the transmission mechanism.

Chart 5

The central bank was forced to purchase billions of dollars in the market in order to defend the strong limit of the band. The sterilization costs were high.

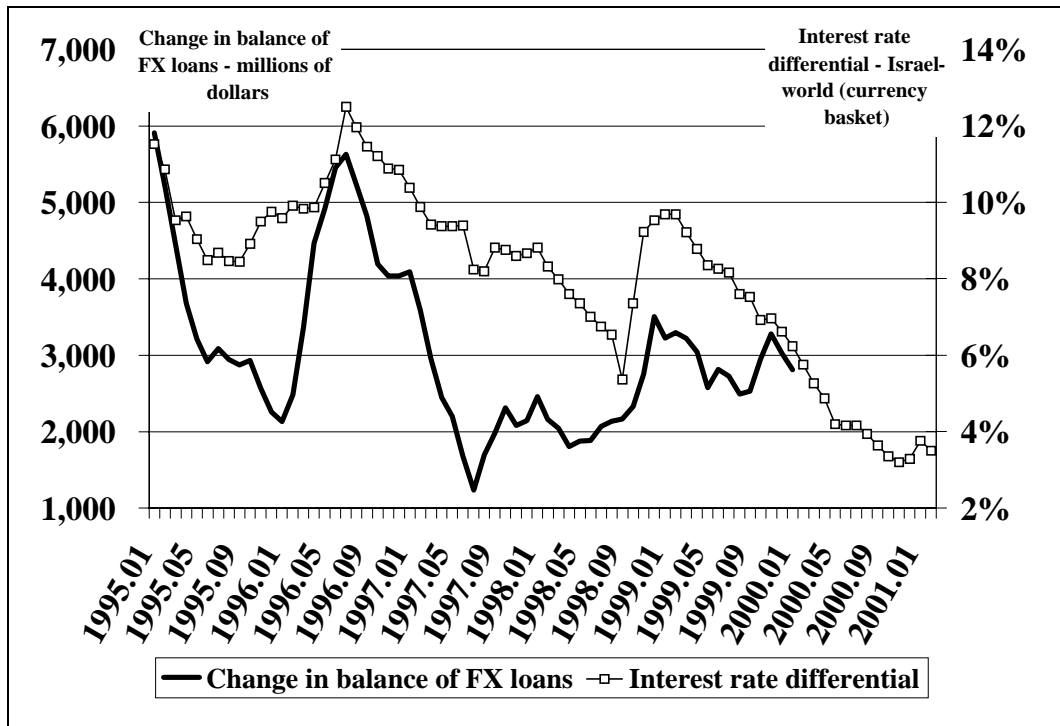
Forex purchases(+)/sales(-) by the Bank of Israel – millions of US\$ per month



With the background of a continuation of capital inflows and pressure for nominal exchange rate appreciation, and given the desire to deepen the foreign exchange market and to make forward progress in liberalization toward capital account convertibility, the next and latest change in the band's parameters occurred in June 1997 when additional room for exchange rate flexibility was introduced in the form of enlarging the band's width from 14 percent to 28 percent, to be gradually increased later on. The increase of the band's width was implemented entirely through the raising of the upper (i.e. weakest) limit of the band. Parallel to the upward widening of the band, the rate of crawl of the band's lower limit was reduced to 4 percent per year and leaving the slope of the upper limit at 6 percent per year. In mid-1998, the slope of the lower limit of the band was reduced even further to 2 percent while the upper limit remained at 6 percent. This has created a situation where the band's rate of widening

has been stepped up since mid-1998 from 2 to 4 percent a year. As of late 2000 the band's width had exceeded 35 percent.

Chart 6
A high foreign-domestic interest rate differential and perceived low exchange rate risks drove FX borrowing.
 The interest rate differential and the change in the net stock of loans from foreign sources 12 months ahead



The fact that following these changes the expansion of the stock of foreign-currency denominated credit slowed down considerably from the second half of 1997 and throughout 1999 and 2000 probably indicates a stronger perception of foreign-exchange risk by the private sector, both in view of the wider exchange rate band and of the developments in global financial markets. This perception of risk grew considerably during the period of rapid depreciation of the shekel in late 1998. Perhaps the unwillingness of the central bank to intervene in the foreign exchange market during this episode also contributed to the public's heightened perception of exchange rate risk.

Table 1
Credit inflows were high in the mid-90's and later on foreign investments surged.
 Net capital flows of the non-financial private sector –
 US\$ millions - inflows(+)/outflows(-)

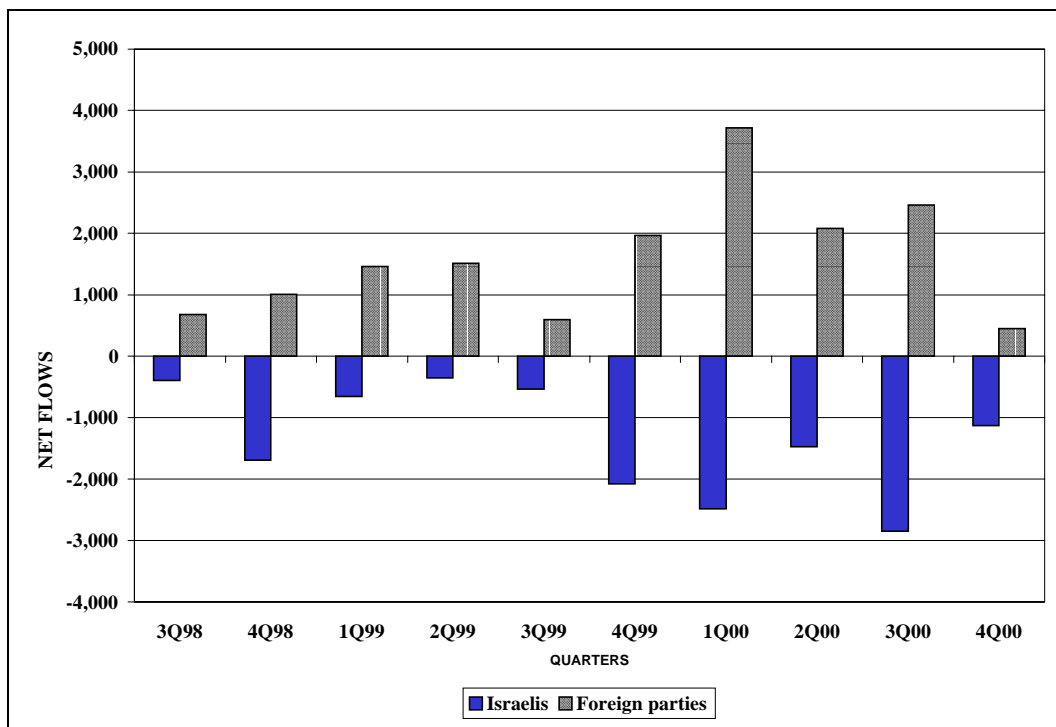
	1995	1996	1997	1998	1999	2000
Total Capital flows to Israel	9,217	5,674	7,806	1,037	1,535	763
Capital flows by Israelis	6,115	489	2,018	-3,248	-4,119	-7,940
Financial investments abroad(-)	-9	231	-44	299	-285	-998
Direct investments abroad(-)	-563	-602	-626	-1,081	-875	-2,424
FX credit from Israeli banking system	5,828	2,245	4,494	2,542	3,323	2,163
Direct credit from foreign sources	343	728	815	-9	-47	-29
Increase of foreign currency deposits in Israel (-)	105	-1,225	-1,102	-2,555	-3,101	-3,652
Increase of foreign currency deposits abroad (-)	22	-119	-247	-279	-1,902	-2,433
Other flows	389	-769	-1,272	-2,165	-1,232	-567
Capital flows by foreign residents	3,102	5,185	5,788	4,285	5,654	8,703
Total financial investment	1,601	3,743	3,882	2,472	2,708	4,017
<i>of which: Israeli securities abroad - primary mkt.</i>	326	1354	1741	876	3,214	4,183
<i>Israeli securities abroad - secondary mkt.</i>	279	342	245	-64	-497	170
<i>Financial investment - TASE</i>	386	335	455	203	-52	-521
<i>Government bonds sold abroad</i>	610	1712	1441	1457	46	185
Direct investments	1397	1538	1831	1772	2,856	4,642
Shekel credit received (-) net of increase in shekel deposits	104	-96	75	41	90	44

As far as pressure on the exchange rate is concerned, while net capital inflows kept the exchange rate relatively close to the bottom of the band throughout mid-1998, a moderate reversal of the flows in late 1998 was enough to cause a substantial depreciation of the shekel. In the first half of 1999, as the uncertainty in the financial markets subsided and with the aid of tighter monetary policy, the exchange rate started to appreciate once again, though this appreciation was limited and came to a halt in the second half of the year. Overall, there was a net capital outflow from Israel of about \$700m in the last quarter of 1998 compared to net capital inflows during previous quarters. Interestingly, the net outflow of funds in the last quarter of 1998 was led by Israelis exporting capital from Israel and not by foreign investors pulling investments from Israel. In fact, during the last quarter of 1998 there was a net inflow of foreign investments to Israel.

However, the net outflow of funds from Israel and the depreciation of the shekel were short lived and throughout 1999 net capital inflow regained momentum. In contrast to previous years, the main source of net capital inflows shifted in 1999-2000 from borrowing from

foreign sources to large scale investments by foreign investors. Accordingly, net capital inflows by foreign investors rose from \$4bn in 1998 to \$6bn in 1999 and \$9bn in 2000. The rapid increase of foreign investments in 2000 was split equally between financial (portfolio) investments and FDI, which reached about 4-5 percent of GDP each. A substantial portion of foreign capital inflows was balanced out by a sharp rise in capital outflows by Israeli's in 2000. These outflows rose from \$3bn in 1998 to \$4bn in 1999 and \$8bn in 2000. The increase has come following an almost full liberalization of Israel's foreign currency controls in 1998. Israelis have learned to take advantage of the relaxed regulation and as part of a process of diversification of the portfolio, there has been an increase in outflows. Overall, despite the increase of outflows by Israel's, in net terms Israel saw net capital inflows in 2000 and the shekel appreciated, although it did not reach the band's limits and central bank intervention was not required.

Chart 7
Israelis have increased their net capital outflows in 2000 in search of diversification, while foreign investments grew stronger – in total there was a net inflow in 2000.
 Capital inflows – Israelis and foreign parties – millions of US\$ per quarter



3. Inflation shows a rapid decline and convergence to western rates

Here we discuss the first surprise of the last few years: the rapid fall of the rate of inflation, and its undershooting the inflation target. The decline of the rate of inflation in the 1990's went through several discrete step down phases with the first being in 1991-92 in which inflation went from about 18-20 percent per year to about 10 percent per year. It is hard to find a single economic factor that explains the major reduction in the rate of inflation in 1991-92, and this reduction cannot be attributed to a single specific decision by the authorities to that matter. Instead, foreign price deflation, tight fiscal and monetary policies, and a rise in unemployment together with a more flexible labor market and the lack of autonomous wage pressures combined to result in a decline in the rate of inflation, which was then further supported and transformed into a persistent change by the behavior of fundamentals (and in particular, of monetary policy) in the period that followed.

The second marked reduction in the rate of inflation was from about 10 percent per year in 1996 to 7 percent per year in 1997 and lower than that during most of 1998. The decline of inflation in this episode was rapid and took form in a series of very low CPI figures and even several months of CPI decline in late 1997 and early 1998. In fact, the year-over-year rate of inflation in August 1998 was only 3 percent.

As in the 1991-92 episode, the 1997-8 phase of disinflation occurred with the support of several economic variables. It is possible to group the factors into three main categories. Consider first external price impulses in the form of Israel's 'imported' inflation. As in the 1991-92 episode, the decline in Israel's rate of inflation was supported by a substantial drop in foreign price pressures. A second set of disinflationary factors was related to the state of the economy, that moved away from full employment, with GDP growth falling from 4.5 percent in 1996 to only 2 percent in 1997-98 while unemployment rose from 6.7 percent in 1996 to 8.7 percent in 1998. Third, there was an important shift in monetary policy from mid-1996 onward. Specifically, there was a marked increase in the real, ex-ante, interest rate on central bank funds, from about 2 percent in the first half of 1996 to about 5 to 6 percent and even higher from mid-1996 onwards. Unlike the 1991-92 episode, the 1997-98 episode did not include a decline of real wages, a factor that seems to have been offset by a higher degree and duration of monetary tightening in the 1997-98 episode than in the 1991-92 episode.

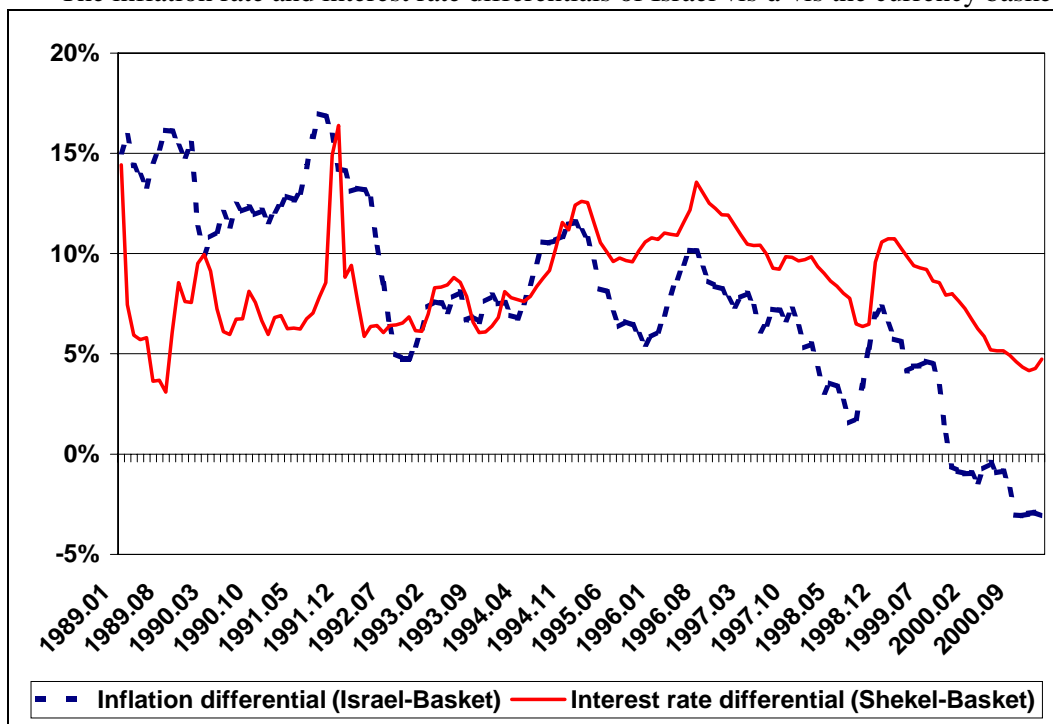
The decline of the rate of inflation in 1998 was interrupted temporarily by the depreciation of the shekel in late 1998. However, following a 4 percent interest rate increase and the return to a more tranquil state of affairs in world financial markets, the shekel quickly went from depreciation to appreciation. This change, combined with weak growth of domestic demand

enabled the rate of inflation to return to its trend of decline and the first half of 1999 there was a decline of the price level and this marked the third phase of the inflation rate step down. In this phase the rate of inflation declined to only 1.3 percent in 1999 and zero percent in 2000, thus undershooting the inflation targets of 4 percent for 1999 and 3-4 percent for 2000.

Chart 8

Monetary policy has tightened over time and the interest rate differential has gradually risen above the inflation differential

The inflation rate and interest rate differentials of Israel vis-à-vis the currency basket

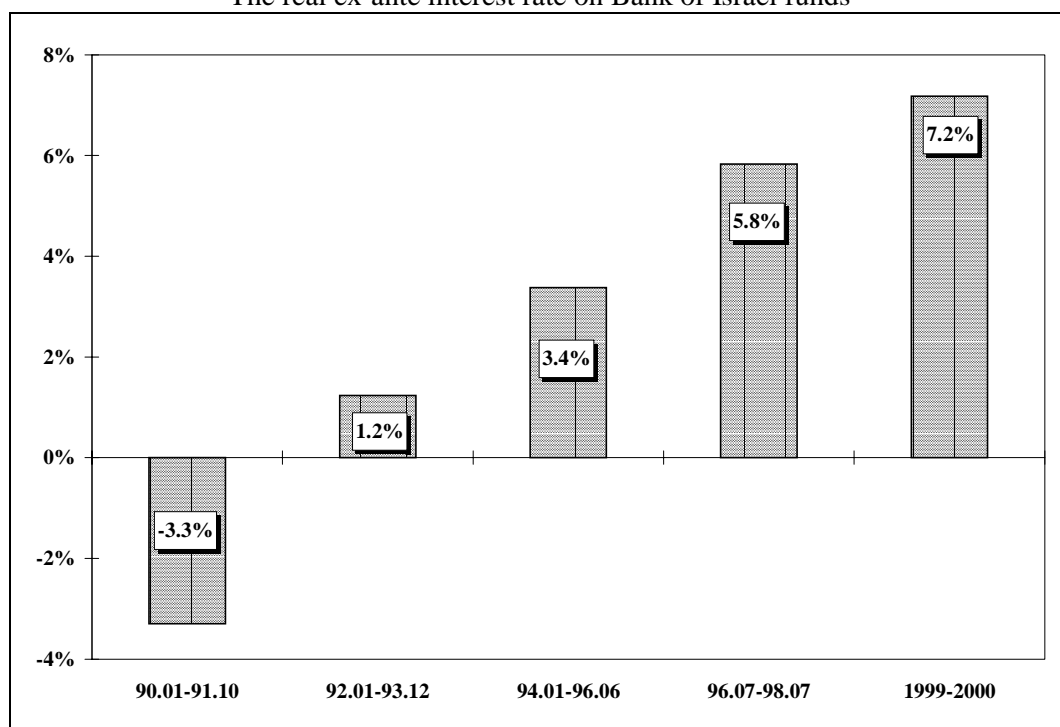


The decline of the rate of inflation in 1999-2000 was quite surprising for both the market participants and the authorities. As a result inflation expectations and forecasts were characterized by a long series of errors. Similarly, the phenomenon of inflation falling more rapidly than expected has been seen in the past in the US where basically most econometric models have predicted higher inflation in recent years in a relatively overheated economy, yet inflation remained stubbornly low.

The decline of Israeli inflation to a level lower than those of industrialized countries has come as a result of both domestic and external factors. On the policy side, both monetary policy and fiscal policy had played an important role – monetary policy maintained a high level of short term interest rate of about 6% in 1996-98 and 7% in 1999-2000 while fiscal policy was able to post a lower than targeted budget deficit in 1999-2000. Moreover, in 2000 there was a surge of government tax revenues, which enabled a reduction of indirect taxation on many

consumer goods and deducted about 1 percent from the consumer price index in that year. On the external side, Israel's import prices declined from 1995 through 1998 and the increase of these prices in 1999 and 2000 was relatively low. Moreover, the decline of the degree of passthrough of imported inflation (i.e. foreign prices and the depreciation of the exchange rate) and the appreciation of the shekel in 1999-2000 were a major element behind this phase of price convergence. Other fundamental factors include the slack in economy from 1996 until mid-1999 that enabled and increase in demand from mid-1999 to mid-2000 to be addressed by an increase in domestic production and imports and not by an increase of prices.

Chart 9
Tight monetary policy has helped disinflation
 The real ex-ante interest rate on Bank of Israel funds



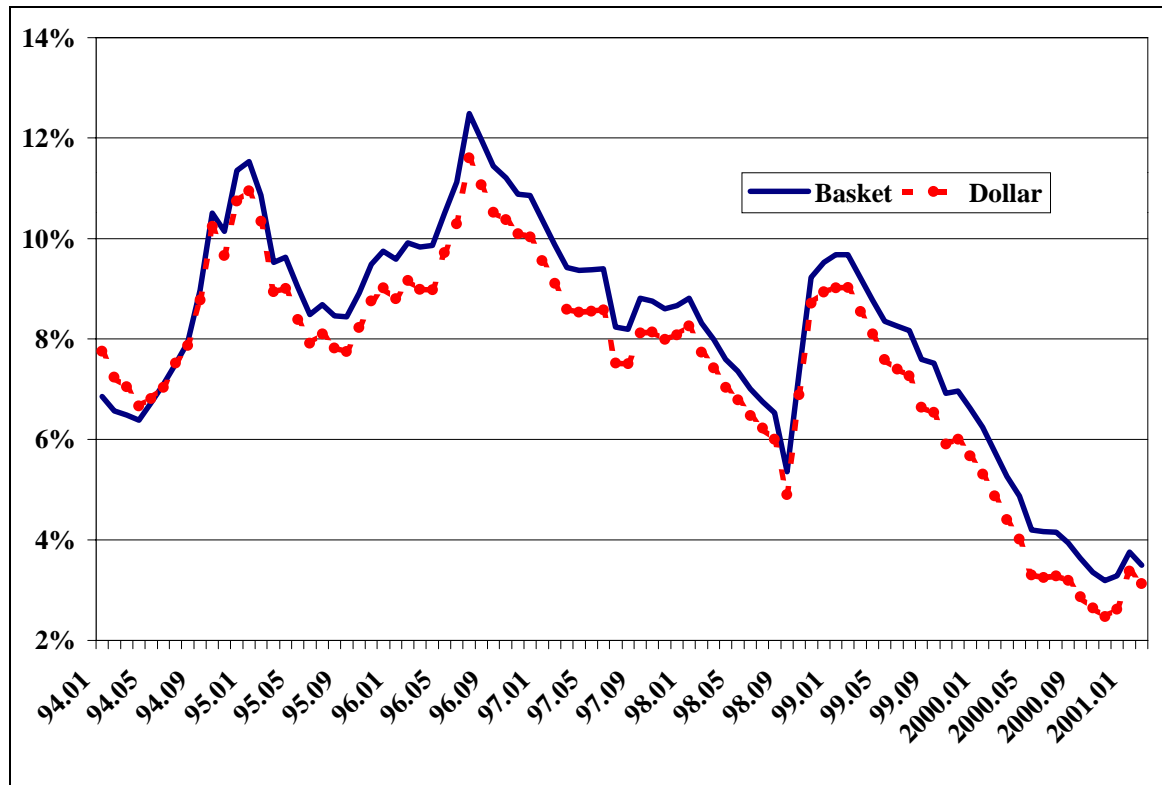
4. A record-low nominal interest rate differential did not lead to major capital outflows

One of the most interesting developments in Israel's financial markets over the past few years is the appreciation of the shekel despite the substantial reduction of the interest differential between Israel and the large developed countries. The reduction of the interest rate differential followed the success of reducing the rate of inflation in Israel to a price stability level. During this process the Bank of Israel constantly reduced the interest rate, albeit at a moderate pace. As a result the interest rate differential declined to record low levels and in spite of existing fears that such a level will prompt major capital outflows, this was not observed, and the shekel remained relatively strong along the process. It seems safe to say that this illustrates that when there is a strong fundamental such as a marked drop in the

inflation rate differential under strong monetary policy credibility, sharply lower nominal interest rate differentials need not bring about capital outflows and domestic currency depreciation.

Chart 10
The interest rate differential has narrowed since 1999, but the exchange rate has remained calm.

The differential between Israeli and foreign interest rates against the 5-currency basket and the dollar



Israel's strong economic fundamentals have also shown up in a great deal of foreign interest in Israel companies which have led to a surge of foreign investments over the past few years and have contributed to the strength of the shekel. Israel has one of the most liberal approaches towards foreign investment in the world. This reflects a strong commitment to promoting foreign investment, a favorable attitude towards investment protection, including a negligible risk of expropriation, and a culture that is extremely open to foreign influence. The Government of Israel, through the Investment Promotion Center of the Ministry of Industry and Trade, provides various incentives for investment in Israel, which include grants and tax exemptions. Unlike many other countries that have enjoyed a surge of FDI, labor costs in Israel are relatively high, Israel's economy is not heavily based on exports of commodities and the overall magnitude of privatization has been relatively small compared to other emerging markets and transition economies. FDI to Israel seems to have been drawn in both

by the country's extensive knowledge base, with a large R&D intensive high-tech sector, and by quality firms in other branches of the economy, such as financial services and food manufacturing. The ongoing improvement of Israel's macroeconomic fundamentals has also played a role in the increase of foreign investment and these have been subject to increasing coverage by the large international credit rating agencies and foreign banks and investment companies. The geopolitical situation is also of importance and the progress of the peace process in previous years has played an important role in the increase of investment.

Israel's total stock of FDI stood at some \$18.9bn at the end of 1999. The stock of FDI has grown at a relatively rapid pace of 35% per year on average from 1995 to 1999 and was especially high in 1999 with a 74% increase as a result of a sharp appreciation of the value of these investments. FDI inflows have risen over the past two years and have reached \$5bn in 2000 (equivalent to about 5% of GDP), compared to \$2.9bn in 1999 and an annual average of about \$1.4bn in 1995-1998. The recent increase in FDI inflows is a result of several large acquisitions of Israeli firms, mainly in the high-tech sector, by foreign companies. Some of the larger FDI inflows in previous years were a result of privatization in Israel, mainly of the telecom and banking sectors. Israel has also enjoyed strong financial investment inflows as well, mainly through public offerings of Israeli company shares on the US NASDAQ. Outflows of FDI by foreign investors are almost non-existent. However, direct investment outflows by Israeli's have been growing and in 2000 have reached \$2.4bn compared to \$0.9bn in 1999.

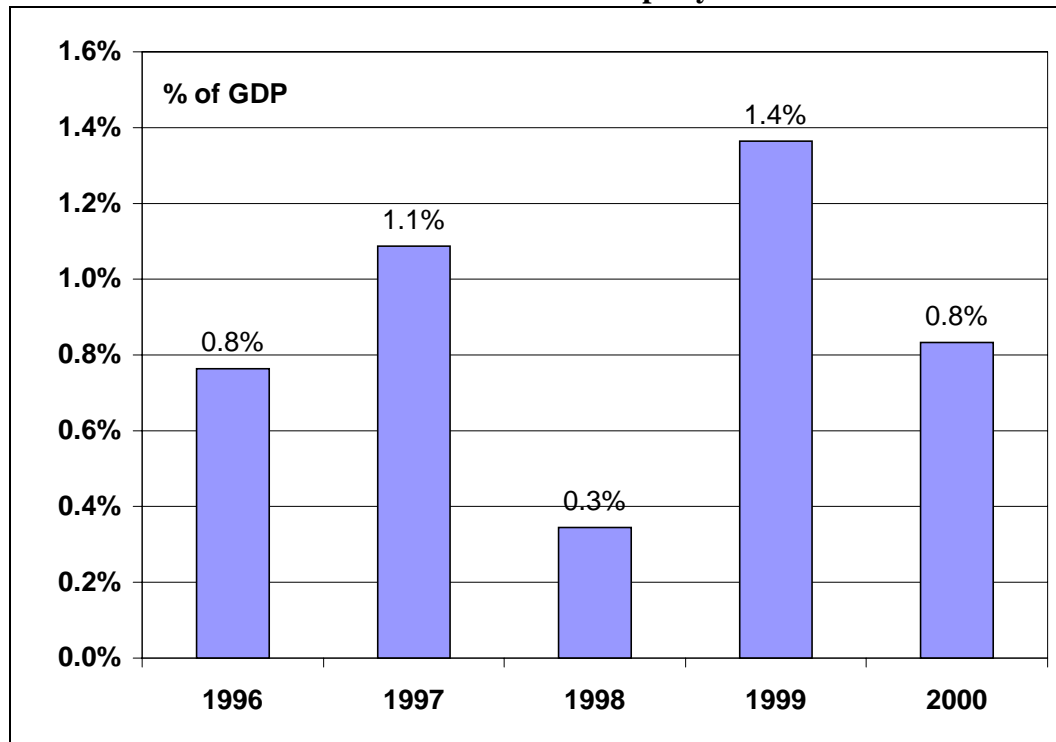
5. The perils of sterilization

One of the side effects of the coexistence of an inflation target and the exchange rate band was a substantial net inflow of capital to Israel in 1995-1997. The Bank of Israel found itself in a rather constrained position with only one policy instrument, the short term central bank rate, but faced with the need to achieve several targets simultaneously, such as an inflation target and a nominal exchange rate target. In order to prevent the shekel from appreciating beyond the exchange rate band's limits the Bank of Israel was forced to intervene in the foreign currency market and to buy excess supply in order to maintain the band.

This policy is typically associated with heavy monetary sterilization of the intervention in the foreign exchange market. Two main side effects are: the sizable quasi-fiscal costs of sterilization, arising from the fact that the interest rate paid on the domestic assets used for sterilization is higher than the marginal returns earned on the increased central bank international reserves. And, second, the emergence of a 'distortion': the private sector's perceives a lower degree of exchange rate risk than the true degree. Clearly, a more flexible

policy allowing for appreciation of the shekel according to market forces would have contributed to a sharp reduction in the need to intervene in the market, there would be much less distortion of the risks and the fiscal cost of monetary policy would have been lower.

Chart 11
The quasi-fiscal cost foreign exchange purchases by the central bank has been close to 1% of GDP per year



The Bank of Israel has limited abilities to conduct open market operations in the shekel market and the implementation of its policies has been conducted through a system of monetary loans and deposits. Following the extensive monetary sterilization needs, within a period of several years, the Bank of Israel went from monetary lending to the commercial banks to a system of substantially large deposits of the banks in the central bank (i.e. borrowing from commercial banks) through which the Bank of Israel absorbed excess liquidity in the market. This has also shown up in an excess of expenses over income in the Bank of Israel's financial report and a deficit in its capital.

The quasi-fiscal cost of this policy is estimated an average of about 0.9% of GDP per year during 1996-2000. Nonetheless, there have been some fluctuations in this level and in this respect 1998 is noteworthy as it saw a substantial decrease of the quasi-fiscal cost following a depreciation of the shekel and an increase of the shekel term return on Israel's official foreign exchange reserves.

The cost was calculated as the differential between the interest rate paid by the Bank of Israel on the shekel deposits that it had received from the commercial banks and the interest rate earned on its foreign exchange reserves. From this differential the rate of depreciation of the shekel was deducted, thus accounting for an additional item of return on the foreign exchange reserves aside from the interest earned. This interest rate differential, adjusted for the depreciation of the shekel, was multiplied by the stock of foreign exchange reserves accumulated since January 1995, which marks the period when the inflows started. For each year the result in shekel terms was divided by nominal GDP.

6. The foreign exchange market: market participants adjust quickly to more flexibility

The widening of the currency band was accompanied by considerable concerns about the possibility that more flexibility, and the 'loss' of the exchange rate anchor would create considerable uncertainty in the private sector, which could damage international trade (exports in particular) as well as real and financial investments. These reservations took form in heated debate between the Bank of Israel which was in favor of added flexibility while the Ministry of finance was in favor of a much more gradual approach.

It appears that the added measure of exchange rate flexibility that started in mid-1997 with a substantial widening of the exchange rate band received a boost by the late-1998 events of Russia and LTCM, which restored Israeli awareness of the foreign exchange risk factor. Following this development there is evidence of a relatively quick adjustment of Israeli exposure to these risks, which has taken form in an increase of Israeli capital outflows and a slowdown of financing in foreign currency. Therefore, it appears that the ability of exchange rate to react strongly when needed, without being constrained by band limits but within the framework of an orderly market, has played an important role in ultimately achieving a balanced approach of Israeli's towards foreign currency along with a generally stable exchange rate.

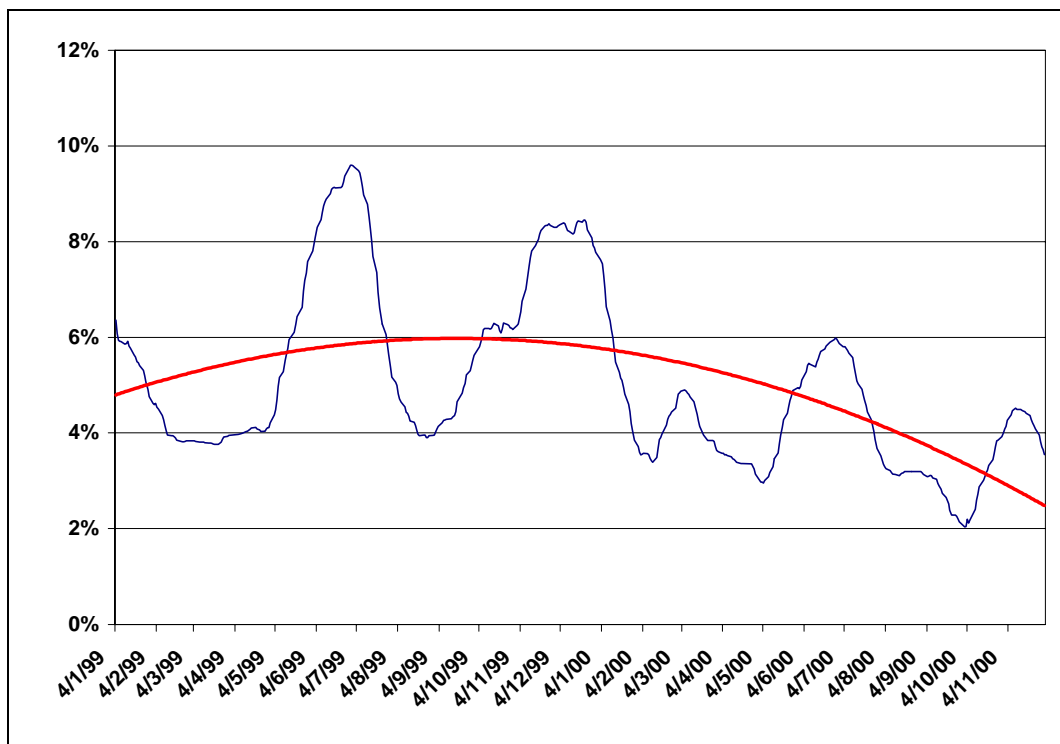
7. A strong currency and little volatility in spite of sharp political and economic shocks

The shekel has remained strong in spite of the various shocks such as the flare-up of violence in late 2000, early election being called recently and the decline of the NASDAQ, in which Israel has the largest number of non-American companies registered. The stability of the shekel has been maintained with no intervention in the forex market since early 1998. This has been the case even with the substantial impact of Russian and LTCM shocks in 1998. Similarly, the shekel responded only marginally to the financial turmoil that took place in Turkey in February 2000. In several respects, the situation in Turkey is similar to that of Israel

in the 1980s: high inflation, a fixed exchange rate, loss of credibility of the authorities. Moreover, over time, the degree of volatility of the shekel's exchange rate has declined consistently as can be seen in the following chart.

We believe that the strong credibility of central bank inflation targeting and its commitment to achieving these targets have played a major role in the stability of the shekel and its resilience to internal and external shocks. This commitment has taken form in a system of monetary policy planning in which the Bank of Israel, the central bank, sets the nominal key interest rate. The decision regarding the interest rate is made at the Bank with the object of attaining the inflation targets determined by the government. Thus, the interest rate, which is the Bank of Israel's policy instrument, is set on the basis of an assessment as to the amount of monetary restraint required, given an outlook of the inflation environment in relation to the target that has been determined, and the characteristics of the monetary policy transmission mechanism via its various channels. Every month, as part of the process of making a decision regarding the desired interest rate, the Bank of Israel analyzes a range of data serving as indicators of inflation and constituting elements of the policy transmission mechanism, which also changes in accordance with the economic environment.

Chart 12
Exchange rate volatility has declined --
60 day moving standard deviation of the shekel exchange rate against the currency basket



The transparency of monetary policy vis-à-vis the public in general, and the main agents operating in the financial markets in particular, is important both to the Bank of Israel, in its desire to make its policy more efficient, and to economic decision-makers, consumers, and investors, who wish to act in accordance with expected policy. Policy becomes more transparent when the data the Bank examines are more open, their relative weight is clear, and the way they are analyzed is understood. The private sector has internalised the central bank's reaction function that would feature those interest rate adjustments needed to maintain the inflation target. It appears that this system had been successfully put to the test in late 1998 and this has convinced the markets that the Bank of Israel's intentions regarding nominal stability are to be taken seriously. Overall it appears that the mere recognition of a credible reaction function with these characteristics had an important stabilizing role for the nominal exchange rate.

8. The exchange rate passthrough becomes surprisingly smaller

The empirical evidence for Israel supports the notion that along with an increase in the degree of exchange rate flexibility there has been a decline in the response of domestic prices to changes in the exchange rate of the Israeli shekel. The following chart shows the response of the quarterly rate of inflation to a 10% impulse to the exchange rate during the 1988-94 period and during the 1995-200 period. These two periods differ in the degree of exchange rate flexibility and also in the degree of nominal instability. The impulse responses are based on bivariate VARs of quarterly inflation and the quarterly rate of change of the exchange rate.

As can be seen in the following chart, during the earlier of the two periods, a 10% shock to the rate of change of the exchange rate would have been expected to result in a cumulative increase of prices by about 4% over the first 10 quarters after the shock. In contrast, during the later period, the same size shock would be expected to result in only a 1% increase in prices during the first 10 quarters from the impulse.

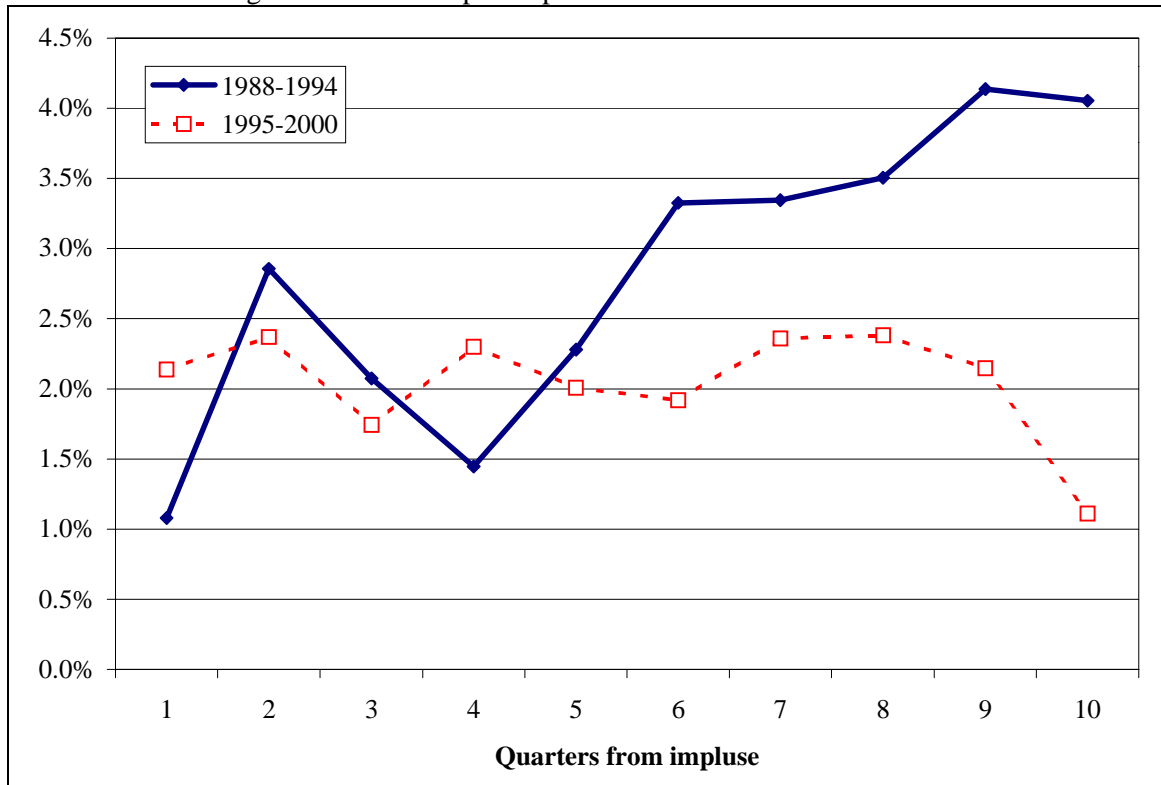
It appears the decline of the rate of inflation to 1.3% in 1999 and 0% in 2000 was in part a result of a decline in the short-term passthrough coefficient. As noted earlier, the stability of prices in 1999-2000 have undoubtedly benefited from the appreciation of the shekel in these years by about 1%.

Chart 13

Over time, with the slow convergence to price stability, the rate of inflation has become less sensitive to changes in the exchange rate.

The cumulative response of prices to a 10% depreciation of the shekel.

Impulse responses based on bivariate VARs of inflation and the rate of change of the exchange rates for two separate periods: 1988-1994 and 1995-2000



9. Concluding remarks

Since the six surprises on Israel's road to exchange rate flexibility have been summarized in the Introduction, we conclude with some additional thoughts on the choice of the exchange rate regime. What were some 'surprises' in Israel may well become 'stylized facts' in other countries following similar disinflation processes.

In our view the intermediate regime consisting of the coexistence of inflation targeting with an exchange rate band, and foreign-exchange market intervention, has prevailed for too long a time in Israel and has had a number of negative side effects. First, it created ambiguity regarding the status of the inflation target vs. that of the nominal exchange rate target. This damaged the credibility of each one of these targets. Second, it created a 'distortion:' market participants' perception of foreign exchange risk was lower than the social, true, risk. Third, this regime had substantial quasi-fiscal costs. Fourth, the regime limited the efficacy of monetary policy in achieving the inflation target.

All of these negative effects could have been avoided by an early exit to a float. Why was such a shift to a float not implemented up until now? In our view, the answer belongs to the world of beliefs of some economists who had a strong influence on the policies advocated by the Treasury, who have opposed to central bank proposals to move to a float based on their ideas that such a shift would leave the system with no anchor, it would lead to disorderly foreign exchange market conditions, and it would result in a stronger appreciation of the shekel than otherwise. The same group of economists was claiming a few years ago that it would be impossible to reduce inflation in Israel to single digit numbers without bringing about a major rise in unemployment. Our reading of recent history is that there has been no support whatsoever for these views. Yet the fact that this is, unfortunately, controversial is clear from the fact that up until now, in spite of all the international evidence pointing in the other direction, Israel still maintains an exchange rate band along with inflation targeting.

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