9 Inflation Targeting Under a Crawling Band Exchange Rate Regime: Lessons from Israel

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Consider a small, open economy that, after a long period of chronically high inflation, substantial fiscal and current account deficits, and a marked accumulation of domestic and foreign debt, implements a comprehensive, exchange rate–based stabilization program. The program results in a sharp reduction in the rate of inflation to about 15–20 percent per year. Although this reduction in inflation is considered a major achievement, it is accompanied by a real appreciation of the currency and weakened export competitiveness two to three years after the stabilization, and this trend cannot be sustained over time. Given this situation, and given the increasing need to allow for some reaction of the nominal exchange rate to capital inflows and outflows, sooner or later policymakers in this hypothetical economy are likely to consider introducing some degree of exchange rate flexibility. The question is how to do so while avoiding the possible inflationary consequences of a nominal depreciation and creating the conditions for a further reduction in inflation toward world levels.

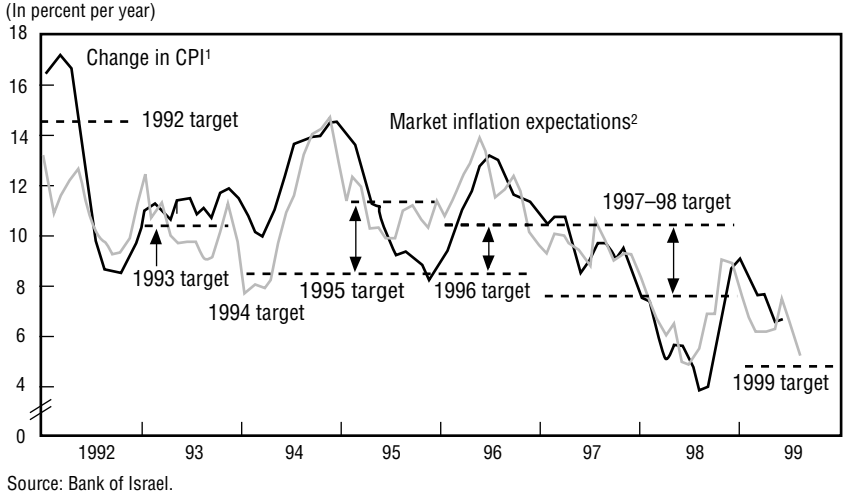
Faced with just such a policy dilemma, several countries have devised exit strategies from the regimes they adopted during the first phase of stabilization and have sought greater exchange rate flexibility in at least one of two forms: crawling exchange rate bands or explicit inflation targets. In those countries that have adopted them, crawling bands are seen as a regime that partly maintains an anchoring role for the nominal exchange rate, yet at the same time provides flexibility to deal with short-term shocks and with the marked volatility of international capital flows. Inflation targets, if credible, are seen as

[1]Parts of this chapter draw on the authors' previous joint work as cited in the references. The authors thank Rafi Lipa for research assistance. The views expressed in the paper are the sole responsibility of the authors.

a transparent mechanism through which the authorities can make commitments and discipline their monetary policy without necessarily incurring the macroeconomic costs of a currency peg. In some countries, such as Chile, Colombia, Israel, and Poland, the two anchors coexist.

The disinflation experience in recent years of various countries with the characteristics just described provides a rich and useful foundation for analysis of monetary policy strategies for disinflation. A leading example is Israel, where monetary policy has been based on both a crawling exchange rate band and inflation targets since 1992. Although the years from the 1985 stabilization program to 1991 were characterized by a rate of inflation averaging about 18 percent per year, in the next phase, from 1992 to 1996, annual inflation was reduced to about 10 percent on average (Figure 1). More recently there was a sharp reduction in the rate of inflation, to 7 percent in 1997, and year-over-year inflation to September 1998 was only 4.7 percent. This decline was interrupted temporarily by exchange rate–induced pressures due to the volatility in world financial markets during September–November 1998, which gave rise to a sharp depreciation of the shekel and a rise in measured inflation. However, because of tighter monetary policy and the impact of other factors, a marked drop in the rate of inflation followed, and in fact the price level fell during the first quarter of 1999. At the time of this writing (May 1999), most forecasts

Figure 1
Israel: Inflation Targets, Actual Inflation, and Market Expectations



Source: Bank of Israel.
[1] Year over year.
[2] Expectation of the rate of inflation 12 months ahead.

pointed to an inflation rate below the official target of 4 percent in 1999, but to a slightly higher rate in the 12 months ahead.

This chapter documents and analyzes Israel's experience with monetary policy and disinflation, with particular emphasis on the coexistence of two nominal anchors—an exchange rate band and an inflation target—in circumstances where the fiscal policy stance is not compatible with the latter. Despite some difficulties, inflation targeting has played a very useful and important role in Israel's disinflation and has become the main anchor of nominal policies.

Israel's Experience with Inflation Targeting

Monetary policy in Israel has gone through major changes in recent years. It was highly accommodative in the late 1970s and early 1980s, supporting the escalation of inflation to triple digits. 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, which was considered a key nominal anchor in the disinflation effort. Throughout this first phase, from 1986 to 1991, inflation stayed in the range of 16–20 percent as a yearly average. The second phase, from 1992 to 1996, was characterized by the modification of the exchange rate regime to one based on a crawling exchange rate band and by the adoption of an explicit inflation target. The crawling band stipulates a rate of crawl of the central parity that is approximately equal to the difference between the inflation target and a forecast of world inflation. Currently the government announces the inflation target for a given year, after consultation with the central bank, in the second half of the preceding year, in the context of the next year's budget decisions. In this second phase the average rate of inflation was reduced to about 10 percent per year.[2]

Although it is still too early to reach a definitive conclusion, recent developments suggest that a third phase in the disinflation process began in 1997, characterized by single-digit and declining rates of inflation. As already noted, inflation was 7 percent in 1997 and 4.7 percent year-over-year to September 1998. Following a temporary acceleration of inflation from September to November 1998—mainly due to the impact of world financial developments on Israel's exchange rate and prices—inflation continued to fall. In fact, the consumer price index fell during the first quarter of 1999, quite a rare event in Is-

[2]For description and analysis of monetary and exchange rate policies in Israel in recent years, see Bruno (1993), Leiderman (1993), Helpman, Leiderman, and Bufman (1994), Bufman, Leiderman, and Sokoler (1995), Leiderman and Bufman (1996), and Sokoler (1997). On inflation targets, see Leiderman and Svensson (1995).

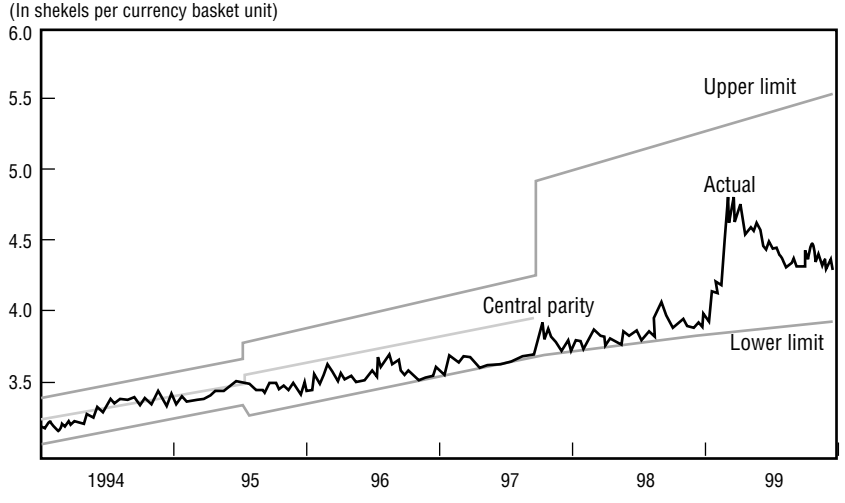
rael's inflation history, and most current forecasts point to an inflation rate for 1999 that is below the official target of 4 percent.

Although a nominal exchange rate commitment such as a crawling exchange rate band can be effective in achieving disinflation, it may give rise to certain well-known difficulties. First, any such commitment is fragile and vulnerable in a world of substantial capital mobility, where cross-border capital flows can be subject to sharp reversals. Second, a preset range for the trajectory of the nominal exchange rate can slow the process of real exchange rate adjustment to real and financial shocks. Third, the existence of a relatively narrow range for exchange rate fluctuations may lead to a distortion, in that the public might come to perceive exchange rate risk as substantially less than it is in reality. This distortion may induce large capital inflows when there is a sizable gap between domestic and foreign interest rates. Developments in Mexico and several East Asian countries before their crises in the 1990s are evidence that this can happen. Last, nominal exchange rate targeting may conflict with other objectives of macroeconomic policy, including monetary policy, such as the inflation target. In particular, it may well be that the level of the interest rate required to achieve the inflation target differs sharply from the level appropriate for sustaining the currency band. In part because of these difficulties, the policy regime in Israel has gradually shifted over the years toward increased flexibility of the nominal exchange rate (as shown by the widening of the band in Figure 2), coupled with increased emphasis on inflation targeting.

Figure 1 demonstrated the severe challenges to official inflation targets throughout the 1990s.[3] Although there are no explicit multiyear inflation targets in Israel, when the annual targets were set for both 1997 and 1998 (at 7–10 percent), the government added the objective of having an inflation target for the year 2001 similar to that common in the countries of the Organisation for Economic Co-operation and Development. It also set the objective of continuing the gradual reduction in inflation, to achieve price stability like that in these industrial countries over time. A measure of market expectations of inflation is derived from the yields on inflation-indexed and nonindexed bonds traded in the local capital market. It can be seen that there have been several periods in which inflation deviated from the target. Measured in December (year-over-year), as specified by the target, the largest such deviation occurred in 1994, when annual inflation reached 14.5 percent, compared with a target of 8 percent. However, in 1995 and 1997 the targets were achieved, and any de-

[3]For more detailed discussion of these and related developments, see recent issues of the Bank of Israel's *Annual Report*.

Figure 2
Israel: Exchange Rate of the Shekel and Its Target Range



Source: Bank of Israel.

viations that occurred were quite minimal. Overall, then, from a multiyear perspective it can clearly be argued that inflation targets have been achieved on average: the average annual rate of inflation from 1992 to 1998 was 9.9 percent, which is very close to the average annual inflation target of 9.7 percent.

However, there were three major episodes of acceleration of inflation *within* years, to levels well above the target: these occurred in late 1994, in the first half of 1996, and in the last four months of 1998 (Figure 1). In all these cases, the regime was challenged and its credibility endangered, as revealed in the escalation of inflation expectations to about 15 percent per year in the first two episodes and to about 10 percent in the most recent episode. These circumstances created a situation where restrictive monetary policy was needed to counterbalance an expansionary fiscal policy and demand pressures in an overheated economy, and to reduce the implied deviation of the rate of inflation from the government's inflation target.

Figure 2 shows the evolution of Israel's nominal exchange rate against a basket of foreign currencies, and the evolution of the crawling exchange rate band. Like those of the inflation target, the parameters of the exchange rate regime are set by the government following consultation with the Bank of Israel. The crawling exchange rate band was introduced in late 1991, as a means of relaxing the fixity of the previous band system, which had been based on a fluctuation zone around a fixed central parity. The move to a more flexible sys-

tem came after a series of speculative attacks on the shekel from 1988 to 1991; these attacks were mainly based on the perception that a fixed exchange rate was not sustainable in view of the persistent differential between domestic and foreign inflation. 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 for achieving a given inflation objective. From 1992 until late 1998 there were no major threats to the exchange rate regime, and the interest rate gradually took a central role in the effort to meet the inflation target. As noted previously, the inflation target was introduced for the first time in December 1991, as part of the new crawling band system.[4]

During the greater part of the crawling band's life span until 1996, the central bank operated an inner, intramarginal intervention band, aimed at keeping the exchange rate relatively close to the central parity. For several years capital inflows grew considerably, in part because of progress in the Middle East peace process from late 1993 onward, and in part as a result of financial opening and liberalization measures taken in previous years. The Bank of Israel purchased the considerable excess supply in the foreign exchange market, so that there was 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 to allow for 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 shekel to appreciate within the band, and the central bank returned to large-scale intervention in the foreign currency market. It is evident that market participants interpreted the perceived implicit commitment of the Bank of Israel to the inner band 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 the pressure toward nominal appreciation of the currency. Overall, throughout the period between late 1994 and early 1998, the Bank of Israel purchased about $16 billion through foreign currency market intervention. The sterilization of these operations was carried out by eliminating monetary loans to the banking sector and creating deposits of the banking sector with the Bank of Israel (through a reverse repo).

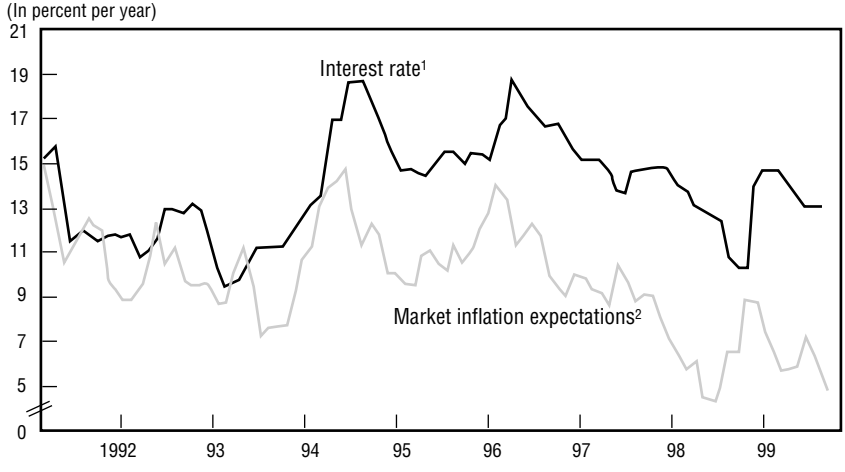
[4]Specifically, the slope of the crawl (in annual terms) was set equal to the difference between the inflation target and a forecast of foreign inflation.

These developments, together with the objective to make further progress toward capital account liberalization and deepening of the foreign exchange market, prompted policy decisions that allowed for increased exchange rate flexibility. The inner band was abandoned in February 1996, providing more room for movements of the exchange rate within the band. By the summer of 1996 the shekel had appreciated to the band's lower limit. With capital inflows continuing to exert pressure for nominal appreciation, and given the desire to deepen the foreign exchange market and to make progress toward capital account convertibility, the next (and to date latest) change in the band's parameters occurred in June 1997. At that time additional room for exchange rate flexibility was introduced by enlarging the band width from 14 percent to 28 percent, to be gradually increased, from then until mid-1998, to 30 percent. The one-time increase in the band's width was implemented entirely by raising the upper (weaker) limit of the band. At the same time, the rate of crawl of the band's lower limit was reduced to 4 percent a year, but that of the upper limit was kept at 6 percent a year. The fact that the stock of foreign currency–denominated credit did not expand further in the second half of 1997 probably indicates a perception of greater exchange rate risk on the part of the private sector. This can be explained by the widening of the exchange rate band and by developments in foreign exchange markets in Asia. To a large extent, the reduction in foreign capital inflows was offset by a rise in foreign investment and by an improvement in the current account, resulting in the actual exchange rate remaining close to the lower limit of the band.

In sum, it seems that the very slow and gradual move toward increased flexibility of the nominal exchange rate, under conditions of considerable capital mobility and strong inflationary pressures, contributed to the conflict that monetary policy in Israel has faced over the last two to three years. That conflict has arisen from the need to support two nominal goals (the inflation target and the exchange rate band) with one instrument (the interest rate). The level of the interest rate required to meet the inflation target has been higher than that which would have resulted in no pressure on the exchange rate band limits. When those limits became a binding constraint, extensive sterilization of capital inflows was required—at a sizable quasi-fiscal cost—and monetary policy could not fully address inflation developments through the very important exchange rate channel of the monetary transmission mechanism.

The implications of the interaction between current and expected future developments on current monetary policy adjustments can be discussed in terms of developments in Israel (Figures 1 and 3). Figure 3 shows clearly that there have been three recent episodes of marked interest rate hikes by the central bank: in late 1994 and early 1995, in the second half of 1996, and in late

Figure 3
Israel: Inflation Expectations and Interest Rate on Bank of Israel Funds



Source: Bank of Israel.
[1] Annualized effective rate on monetary loans by the Bank of Israel.
[2] Expectation of the rate of inflation 12 months ahead.

1998. Although there is no official or commonly used inflation forecast formulated by the Bank of Israel, market-based inflation expectations are widely used. In many cases these expectations, also plotted in Figure 3, have played a key role in Israel's inflation forecast targeting. The first two interest rate rises in Figure 3 were triggered by a combination of a rise in expected inflation, a rise in the government budget deficit, and a reduction in the rate of unemployment. The third was triggered by the turbulence in world financial markets in late 1998 and its implications for depreciation of the domestic currency. Along similar lines, when underlying factors signaled an easing of inflationary pressures, the central bank adjusted interest rates downward.

Policy Lessons

Israel's experience shares much in common with the experiences of other countries—in Asia, Eastern Europe, and Latin America—with similar or different nominal anchors. These commonalities allow some broad lessons and conclusions to be drawn.

First, although nominal exchange rate targeting has been extremely useful in the initial phase of a disinflation, as time has passed an increasing number of countries have found difficulties with this regime, especially under conditions of considerable capital mobility. The result has been a gradual move to-

ward increased flexibility of nominal exchange rates. At the same time, official inflation targets have been taking more and more of the spotlight in monetary policymaking. Shifts in this direction have occurred, for example, in Sweden and in the United Kingdom in the early 1990s, and in Mexico and the Czech Republic more recently.

Second, the coexistence of multiple anchors—whether a crawling currency band together with an inflation target, or an inflation target together with a target for monetary aggregates—sooner or later becomes a source of policy conflict, which may damage policy credibility. For example, the use of high domestic real interest rates to combat inflation may be accompanied by substantial capital inflows, creating strong pressures for a nominal appreciation beyond the limit of the exchange rate band. This gives rise to the need for sterilized foreign exchange market intervention, which typically imposes a nonnegligible quasi-fiscal cost. In many other cases, high domestic real interest rates, required to defend the currency band in the face of demand for foreign exchange, could not be supported because they were higher than required for the planned disinflation.

Some of these difficulties can be reduced by setting a clear hierarchy of priorities between the two targets. Moreover, for those countries maintaining an exchange rate band, it is extremely important that the parameters of the two anchors be synchronized. For example, the slope of a crawling band needs to be synchronized with the inflation target.

Third, the extent to which the exchange rate is allowed to fluctuate, either within a band or in general through foreign exchange market intervention, has important side effects on the public's perception of exchange rate risk. This may give rise to a distortion, in the form of a perceived risk of exchange rate fluctuations that is much lower than is warranted in reality. This, in turn, may result in larger capital inflows and increased vulnerability. The main lesson here is that, if bands are used, they need to be broad enough not to create this distortion. True, this can result in greater exchange rate volatility, which can be damaging to some sectors, but this volatility can be attenuated by developing appropriate derivatives and other financial instruments.

Fourth, when inflation targets are used, it is extremely important to determine very clearly the principles of operation, mechanisms for ensuring accountability, the role of the central bank, and other functional and institutional details. To gain credibility, the inflation targeting regime has to be as unambiguous as possible. In addition, credibility is strengthened if there are supporting policies relating to the government budget, wages, and so forth, to avoid any overburdening of monetary policy. Synchronization of fiscal, monetary, and

wage policies is extremely important for generating substantial reductions in inflation, as shown by the Israeli experience in 1991–92 and 1997–98.

The discretionary nature of inflation targets may lead to problems of credibility at the beginning of the regime. It is extremely important then how policy reacts. A strong and aggressive response, when needed, can generate credibility. In Israel, each of three major deviations of inflation from target was met by a strong policy reaction. Israel's experience shows that such a prompt reaction is key for gaining credibility.

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