

## THE ROLE OF THE CENTRAL BANK: THE ISRAELI CASE

STANLEY FISCHER\*

The theory and practice of central banking has changed markedly in the past quarter century, in parallel with advances in macroeconomics that draw on the rational expectations approach and on game theory, and in response to the inflationary experiences of the 1970s and 1980s and the accumulation of evidence on the nature of the Phillips curve.<sup>1</sup>

These changes have already had a major impact on central banking in Israel. This lecture, in memory of Don Patinkin, mentor and friend of so many of us here this evening, presents an occasion for a systematic statement of the current approach to monetary policy and the role of the central bank in Israel, and some of the academic work and evidence on which it is based.

In discussing modern central banking I shall take up: first, central bank independence; second, the inflation targeting approach to monetary policy; and third, the institutional arrangements most conducive to the success of the central bank. Of course, my discussion will relate to Israel and to changes proposed in the draft Bank of Israel law. I should note though that I will focus on monetary policy, and not on other aspects of the work of the Bank of Israel, including bank supervision and the role of the Governor as economic adviser to the government.

### 1. CENTRAL BANK INDEPENDENCE

The analytic case for central bank independence revolves around the inflationary tendencies inherent in the conflict between the short- and long-run effects of monetary expansion, and in the temptations of monetary financing of government spending.<sup>2</sup> In other words, governments with short horizons often push for more expansionary monetary policy than would a government with a longer horizon. They do this because in the short run expansionary monetary policy tends to affect output first and inflation later – and given their shorter horizon they are happy to leave the inflationary problem to be dealt with later. Similarly, a government that has difficulties financing itself is tempted to turn to the central bank for help – meaning that it chooses monetary rather than debt financing of its deficit.

\* Bank of Israel. This speech was prepared for delivery at the Jerusalem conference on November 29, 2005 in memory of Don Patinkin, ten years after his death. I am grateful to my colleagues Yaakov Danon, Gaby Fishman, Karnit Flug and Meir Sokoler for their comments and suggestions.

<sup>1</sup> For an introduction to the recent literature, see Alex Cukierman (2005); see also Bernanke and Woodford (2005), which includes contributions by Mervyn King, and by Lars Svensson and Michael Woodford.

<sup>2</sup> I draw here on Fischer (1994). Among the earliest analytic contributions are those of Barro and Gordon (1983) and Rogoff (1985).

Both these scenarios should be familiar in Israel. The second issue – monetary financing of the budget deficit – was dealt with through the "no financing" law of 1985, which marked the first step of the Bank of Israel on the road to independence. The first issue, the dynamics of inflation following an interest rate reduction, is different in Israel than in many other countries: this is because an interest rate change typically produces an immediate impact on the exchange rate, which – because housing, rental and a few other prices are specified in dollars – then has an almost immediate impact on inflation and inflationary expectations. This effect was clearly visible, for instance, following the December 2001 sharp cut in the interest rate, which had to be followed by an even larger increase in the rate. But while this mechanism has a different dynamics in Israel, it is but one example of the increasing extent of the discipline that financial markets now impose on governments that pursue short-sighted policies.

More generally, the empirical case for central bank independence is based on evidence, reviewed in Cukierman (2005), that inflation and the actual (*de facto*, as opposed to *de jure*) extent of central bank independence are negatively related. This relationship is stronger among the industrialized countries than developing countries, in part because the relationship between *de facto* and *de jure* independence is less clear among the developing countries. The evidence also supports the view that greater central bank independence is positively associated both with better and more stable growth performance, and greater stability of inflation and interest rates.

These are good and sufficient reasons to support central bank independence.

Let me make four further points about central bank independence. First, in a world with a benevolent government, full coordination of monetary and fiscal policy would be optimal. But in practice governments do not operate as optimal social planners, and it becomes necessary to seek alternative arrangements to keep economic outcomes as close as possible to optimality.

Second, independence of the central bank has to be accompanied by accountability: the central bank needs to be given a well-specified task, and should be held responsible for meeting its goals; in addition, it should be required to explain and justify its policies to the legislature, the government and the public. I will return to this point later.

Third, I have often been struck by the far-sightedness shown by Britain's Labor government that immediately on coming to office in 1997 gave independence to the Bank of England. Up to that point the Bank of England had not been independent and the interest rate decision was made by the Treasury. The government, particularly the Chancellor of the Exchequer, understood that economic performance would be better with an independent central bank than if the Treasury continued to make the monetary policy decisions, and probably also understood that there were political benefits to not having to take responsibility for interest rate decisions. The decision to give the Bank of England its independence has been well justified subsequently by the quality of the Bank of England's monetary policy and the performance of the U.K. economy.

Fourth, we need to draw the distinction between *goal* and *instrument* independence of the central bank. A fully independent central bank would have both goal and instrument independence, and would decide both on the goals of its policies, and on how to deploy its instruments to attain those goals. The European Central Bank is to a considerable extent in this position. Alternatively, the government could specify the goals of central bank policy, and delegate to the central bank the task of achieving those goals, using the instruments it has under its control. In this case, the central bank would have instrument independence, but not goal independence. Most independent central banks are in this position – a position

in which the government has delegated to the central bank the task of meeting the goals specified for it. In such cases the central bank's tasks can be considered to be more technical and professional, requiring less political judgment than would be necessary if the bank had both goal and instrument independence.

*De facto*, the Bank of Israel is in such a situation – having instrument but not goal independence – today, and it would be in the same situation under the proposed new Bank of Israel law.

## 2. THE GOALS OF MONETARY POLICY AND THE INFLATION TARGETING APPROACH

Since 1990 when the Reserve Bank of New Zealand adopted an inflation targeting (IT) approach to monetary policy,<sup>3</sup> major G7 central banks – including the Bank of England, the Bank of Canada, and the European Central Bank – have shifted to that approach, as have central banks in both industrialized and emerging market countries, among them Australia, Brazil, Chile, Israel, Korea, Mexico Norway, Poland, South Africa, Sweden, and several others. The Bank of Japan is expected to adopt the approach just as soon as it can shift the economy from deflation to inflation, and the new Chairman of the Federal Reserve System, Ben Bernanke, is on record as favoring IT.

The central feature of the IT approach is the establishment of an inflation target as the primary or central goal of policy for the central bank. In some cases, as for the Bank of England, the target is expressed as a single number – in the UK it is 2 percent – and in other cases it is expressed as a range, of which the Israeli 1–3 percent is representative.

Typically other goals of macroeconomic policy, including employment and growth, are also specified as policy targets for the central bank, with a proviso that these goals should be pursued to the extent that they do not conflict with longer-term price stability. The central bank's responsibility to promote and support the stability of the financial system in its role as lender of last resort is also generally mentioned.

Earlier central bank legislation generally specified a wide range of policy goals for the central bank, without prioritizing among them. Why the change in approach?

In the first instance, it is essential that the economy have a nominal anchor for prices, and the inflation target provides such an anchor. The need for a nominal anchor to tie down the price level has been well understood at least since the 1956 publication of Don Patinkin's *Money, Interest, and Prices*, and no doubt even earlier by readers of Wicksell's discussion of a pure credit economy in *Interest and Prices* (1898).

In the Bretton Woods period the United States' commitment to fix the dollar price of gold provided the nominal anchor for the global economy. After the breakdown of Bretton Woods, central banks generally moved to using the money stock as the nominal anchor. But the instability of the demand for money made that approach increasingly problematic, especially in the 1970s and 1980s. Further, in some countries, particularly those that had developed extensive indexation arrangements, the need for a nominal anchor seemed at times to have been forgotten. Israel in the first half of the 1980s was among this group of countries.

Thus the inflation target is the nominal anchor for the economy. Further, the price level or the inflation rate is a more useful nominal anchor in a monetary economy than is a

<sup>3</sup> This and other experiences, including that of Israel, are described in Bernanke *et al.* (1999).

nominal stock like the quantity of money, for what matters to economic agents is the real value of the nominal contracts into which they enter, uncertainty about which is likely to be reduced by specifying the desired path of future prices.<sup>4</sup>

It is one thing to recognize the inflation target as a nominal anchor and another to specify that the target should be set at a low inflation rate. The choice of a low inflation rate is based on an analysis of the costs and benefits of inflation: in brief, there are many costs of inflation, and few benefits.<sup>5,6</sup> In particular, the view that inflation hurts the poor appears to be true (see Easterly and Fischer (2001), and for the Israeli case, Dahan (1993)).

Since the contributions of Friedman (1968) and Phelps (1967), it has been understood that there is no long-run tradeoff between inflation and unemployment. Thus there is no permanent benefit in terms of reducing unemployment by permitting higher inflation – except at very low rates of inflation or when there is deflation.

There may nonetheless be a longer-term relationship between inflation and growth. There is no question that inflation and growth are negatively related at high rates of inflation. However the relationship is not monotonic, for deflation is generally bad for growth. Bruno and Easterly (1995) estimated the turning point to be as high as 40 percent; Sarel (1996) put it at 8 percent; and in some unpublished work, I have found the turning point to be at 5 percent inflation.<sup>7</sup> My own belief on the relationship between inflation and growth is that as the economy begins to live with lower inflation, the turning point becomes lower, but that somewhere in the low single digits there will be a turning point that is based on the impact of deflation on growth.

In all cases where inflation has been low and stable for some time, governments have established target inflation rates around the 2 percent level – in principle balancing the expected marginal costs of possible deflation with the marginal costs of the distortions from higher inflation. The Israeli target range of 1–3 percent appears to be fully in line with international experience, that is to say, in line with the conclusions that other governments have drawn from their reading of the evidence on the costs and benefits of inflation.<sup>8</sup>

It is important to note that negative inflation is costly, and accordingly that undershooting the inflation target is also costly. For that reason the Bank of Israel has emphasized that it aims to keep inflation at the center of the target range, and that it regards both overshooting and undershooting the inflation range as errors. In line with this approach, the proposed Bank of Israel law requires that in the event of deviations of inflation from the target range in either direction, the Governor has to write a letter to the government explaining the causes of the deviation, and the Bank's plans for returning the inflation rate to the target range.<sup>9</sup>

<sup>4</sup> There is a subtlety here about the distinction between inflation and price level targeting to which I will return below.

<sup>5</sup> See Fischer and Modigliani (1978), summarized in Fischer (1994). See also Feldstein (1999).

<sup>6</sup> Woodford (2003) begins his major work, *Interest and Prices*, which several reviewers have praised by comparing it with Patinkin's *Money, Interest, and Prices*, with a discussion of the importance of price stability.

<sup>7</sup> This work was based on data through the mid-1990s, and I conjecture that the estimated turning point would be lower if recent experience in East Asia – including China – and Latin America were included.

<sup>8</sup> My colleague Karnit Flug has pointed out that in principle the inflation target range should also reflect the variability of the inflation rate. For analysis of the Israeli case, see Amir and Ribon (1999).

<sup>9</sup> There are similar provisions in the law in the U.K., New Zealand, and other inflation targeting countries.

While there is no long-run tradeoff between inflation and unemployment (or growth), there *is* a short-run tradeoff: more rapid growth will generally be accompanied by a tendency to higher inflation.<sup>10</sup> That tradeoff does not complicate monetary policy greatly in the face of shifts in aggregate demand. For instance, if the inflation rate is too low because a decline in aggregate demand has caused a recession, then the monetary policy decision is simple. Both inflation and output will be too low, and both need to be increased, so the interest rate should be cut.<sup>11</sup> Similarly, if the economy is overheating, with growth exceeding that of potential output, and inflation rising, the interest rate should be raised.

That is to say that in these circumstances the hierarchy of monetary policy goals would have no impact on the central bank's choice of policy: policy that is appropriate for achieving the inflation target is also appropriate for achieving output and unemployment goals.

The monetary policy decision is, however, not so simple when the economy is hit by a supply shock that both moves inflation above its target range and reduces output. The central bank could raise interest rates sharply and crack down on aggregate demand,<sup>12</sup> in an attempt to return as rapidly as possible to the target inflation range. Alternatively, it could decide to take a very long time. Assuming that the aggregate output or unemployment cost of a very rapid return to the target range is higher than a more gradual return,<sup>13</sup> the central bank has to balance the costs of temporarily higher inflation against the costs of temporarily higher unemployment and lower growth. With output already growing too slowly, or unemployment too high, it would not be appropriate to choose a target path for inflation that attempts to return very rapidly to the inflation target range. The choice of the return path would need to be made by comparing the costs and benefits of different inflation-output paths corresponding to different interest rate paths – and this would obviously need to be done with the help of at least one econometric model. Here the credibility of the central bank matters a great deal, for the more firmly are long-term inflation expectations anchored, the less do temporary deviations matter.<sup>14</sup>

This approach, in which the central bank at times will not be aiming to return immediately to the target inflation range, is known as *flexible inflation targeting*. This approach is discussed extensively in Bernanke *et al.* (1999), who conclude (p. 84) about flexible inflation targeting that "a targeting regime can restrain inflation in the longer run, even when the regime permits target misses in response to short-run considerations." In the proposed Bank of Israel law, the need for flexibility is recognized by defining the central goal of monetary policy as being "to maintain price stability *over the course of time*".<sup>15</sup>

Accordingly, as is often emphasized, the inflation-targeting approach to monetary policy is a form of *constrained discretion*.<sup>16</sup> The constraint is that the central bank has to aim to return the inflation rate to within its target range; the discretion takes two forms: that

<sup>10</sup> Sussman and Lavi (1999) show this to be the case in Israel too.

<sup>11</sup> There are of course difficult issues about how far and how fast to adjust interest rates, but we do not go into them further here.

<sup>12</sup> In an open economy part of the impact of the higher interest rate would be through the effect of an appreciated exchange rate on net exports.

<sup>13</sup> This would not necessarily be the case in a model that was linear in all respects, but it would be the case if, for example, the costs of diverging from the target unemployment rate were quadratic.

<sup>14</sup> I am grateful to Meir Sokoler for this point.

<sup>15</sup> The original is in Hebrew, and the translation may not be exact.

<sup>16</sup> See Bernanke *et al.* (1999), pp 293–94.

of deciding how rapidly – by what path – it is best to return inflation to target: and that of deciding how best to use the interest rate and its other policy tools to achieve that path.

The inflation-targeting approach to monetary policy has worked well, and no country that has adopted it has wanted to reverse the decision. But as with everything in the policy sphere, it is not the last word, and there remain open questions.

First, the central bank sometimes faces pressures to try to affect the real exchange rate, particularly when the exchange rate has recently appreciated. At least temporarily, the central bank could produce a real depreciation by cutting the interest rate, but this would tend to increase inflation. In the event that the inflation rate was below the target range, the inflation targeting approach would move the real exchange rate temporarily in the desired direction. But in a small open economy the best way to produce a longer-term effect on the real exchange rate would be through the use of fiscal policy, with a fiscal contraction tending to produce a depreciation.

The central bank might also be urged to intervene directly in the foreign exchange market. In the Israeli case this would completely change the current rules of the game, in which market forces determine the exchange rate and the central bank has not intervened in the market since 1997. The present non-intervention system works well, and although no central bank should completely rule out the possibility of foreign exchange intervention in the event of extreme disturbances, the Bank of Israel sees no good reason to engage in exchange market intervention except under rare circumstances.

Second is the no less difficult question of what to do in the event asset prices demonstrate irrational exuberance. A more or less standard answer is to do nothing in response to asset prices unless their behavior affects or is likely to affect inflation. In the late 1990s, the Fed adopted the approach of not raising interest rates to deal with a suspected asset price bubble, in part because they found it difficult to define the appropriate level of asset prices, in part because inflation was not a problem, and in part because they believed that the interest rate increase needed to prick the bubble was so large as to be very likely to induce a recession. Instead the Fed opted for the strategy of waiting for the bubble to burst, and then cut interest rates sharply to limit the resultant damage to output. This strategy was broadly successful. Nonetheless, while it is clear that monetary policy should respond to asset prices if their behavior threatens the achievement of the inflation goal, there is not yet agreement on how monetary policy should respond to errant asset price behavior in other circumstances.

Third is the question of what inflation rate to target – whether headline inflation, the actual inflation rate such as the CPI that is reported to the public, or some measure of core inflation, which excludes the prices of goods such as energy and food that fluctuate a great deal, and whose fluctuations may be assumed to be trendless. In a country with extensive indexation to the CPI, it is advisable to target actual inflation; further, when it is no longer clear that the price of energy is trendless, it is not advisable to exclude energy price inflation from the inflation target index. Rather, the central bank should take account of movements in prices that it regards as temporary in formulating its monetary policy decision.

Fourth is the question of whether to target the inflation rate or a path for the price level. In the event the target is specified in terms of the inflation rate going forward, past mistakes in attaining the target are treated as bygones, and the path of the *price level* suffers from base drift – in other words, uncertainty about future price levels increases the further in the future they are. If the target were the price level, then past mistakes would have to be corrected, with the goal of returning to the target path for the price level. Uncertainty about

future price levels would be reduced under this approach. It is unlikely that the Bank of Israel would recommend price level, as opposed to inflation, targeting in the near future.<sup>17</sup>

Fifth is the issue of the role of measures of expected inflation in the inflation targeting approach. In recent years the Bank of Israel has placed a great deal of weight in making its interest rate decisions on movements in expected inflation, as derived from the financial markets and from forecasters. The IMF has criticized the Bank for taking this approach rather than basing its decisions primarily on its own models, pointing out the dangerous circularity of the Bank's approach.<sup>18</sup>

Interestingly, though, the Bank's approach has seemed to work. Why? Note that it is possible to deduce market expectations of future interest rates from the term structure of interest, and thus to deduce what monetary policy path the markets regard as consistent with the expected path of inflation. In my so far limited experience at the Bank of Israel, the policy actions assumed by the markets have been close to those the Bank has implemented. Presumably the views expressed in the markets reflect calculations by market participants, based on explicit or implicit models of the monetary mechanism. Accordingly one can view a monetary policy that responds to market expectations as drawing on the markets' models, which are not necessarily any worse than those of the central bank.

Nonetheless, it is essential that the central bank should have and use its own models, to enable it to consider the choices of different policy actions, as well as to ensure that it understands the basis for the market's views. The Bank of Israel is now engaged in developing and improving the econometric models it uses in formulating its policy decisions.

### 3. INSTITUTIONAL ARRANGEMENTS

The institutional arrangements under which independent central banks operate vary.<sup>19</sup> In some countries, including New Zealand and Canada, monetary policy decisions are in principle made by the Governor alone – this is the so-called single-decision maker model, which currently applies also in Israel.

However in most central banks, including the Fed, the Bank of England, the ECB, and the Bank of Japan, the monetary policy decision is made by a committee, chaired by the Governor. There is reason – including empirical evidence – to think that committee decision making is generally preferable to individual decision making.

I thus believe that, as recommended by the Levin Committee in 1997, it would be better if the monetary policy decisions of the Bank of Israel were made by a committee, along the lines of the Bank of England's Monetary Policy Committee (MPC). The UK's MPC

<sup>17</sup> Svensson (1999) has shown that under certain circumstances, price level targeting produces better macroeconomic outcomes than does inflation targeting. More recently, Warburton and Lees (2005) have shown in a new-Keynesian model of the New Zealand economy that the optimal outcome is produced by specifying that the central bank should attain its target inflation rate over the medium term, defined as 2–3 years. Within this horizon, following a period of above-average inflation, the central bank would attempt to offset the deviation by targeting a below-average rate.

<sup>18</sup> This point is discussed in Svensson and Woodford (2005). They show that determinacy in such circumstances can be ensured by basing policy decisions in part on the behavior of lagged endogenous variables.

<sup>19</sup> See the material in Tuladhar (2005).

includes a minority of outside members who are not on the staff of the Bank of England, and I believe such an approach would also be useful in the Israeli case, as it would allow outside experts, who would not be beholden to the Bank and the Governor, to take part in and vote on the interest rate decision.<sup>20</sup>

But it would be essential that the outside members be expert professionals, rather than political appointees chosen to represent a political movement or party. Accordingly the draft Bank of Israel law states clearly that the outside members of the Monetary Committee should be experts in relevant fields (for instance, macroeconomics, monetary economics, finance); the draft law also specifies that the potential candidates for the Monetary Committee be chosen by a non-political committee, headed by a retired judge, and that government has to vote yes or no on the list rather than on individual members.

For the Monetary Committee to operate successfully, it is also essential that its tasks be seen as technical or professional. That is why it is important that the goals of monetary policy be specified as clearly as possible. Here I would like to quote extensively from Mervyn King, Governor of the Bank of England (King, 2005, pp 13–14). "[M]y belief is that in a committee without a clear objective there would be scope for people to set their own agenda. Members might try to argue that their view of the objective is the right one and other people's the wrong one. .... What is true about our Monetary Policy Committee ... is that the entire discussion is focused on a technical economic judgment about what it is necessary to do to hit the inflation target. ... Individual accountability, allied to the fact that the target is given to us from outside means that the nature of our discussions is absolutely, solidly focused on the state of the economy and what we need to do to interest rates to keep inflation on track to hit the target".

Let me discuss, next, transparency and accountability, starting with transparency. Given the importance of expectations and the credibility of central bank policy, it is important that the central bank explain as clearly as possible the basis for its decisions, including the economic forecasts on which it was based. It is also important that it provide its views on likely economic developments, particularly in inflation, on a regular basis, as is done through the inflation reports that many central banks, including the Bank of Israel, produce. Transparency is desirable in any case, whatever policy approach the central bank follows, but it is especially important for an independent, inflation-targeting central bank.

All central banks provide a summary of the discussion during the meeting of the policy committee that decides on the interest rate, typically including the votes of the individual members. These reports are produced reasonably soon after the meeting, in general before the next policy meeting. The new Bank of Israel law would require publication of the summary of the discussion and the individual votes, well before the next meeting of the Committee.

In the U.K., the summary of the discussion includes information about the stands taken by individual members. This is probably not desirable, since it can lead to individuals speaking for the record rather than in an attempt to find the optimal decision, including by learning from the discussion and from the views of their colleagues.

<sup>20</sup> The accountability of the governor becomes more complicated when the interest rate decision is made by a committee, since there may then be occasions when the Governor does not agree with the monetary policy decisions the central bank is implementing. Although the governor could from time to time be in a minority, his position would become untenable if he were permanently in the minority. The Governor of the Bank of England has recently been in the minority on one decision, but such a situation is likely to be very rare.



As to accountability, the central bank, particularly the Governor, should be held responsible for meeting its goals. This accountability in part takes the form of requiring the Bank to explain and justify its actions, typically in reports that are presented to the legislature and to the government, as well as to the public. It also takes the form of requiring the Governor to send an explanation to the government of the reasons for the Bank's failure to meet its goals, and of its plans to return to within the target range. The legislature typically can also request that the Bank, either the Governor or members of the Monetary Committee, appear before a relevant committee, as now happens in many countries. The law has provision to dismiss the Governor and members of the Monetary Committee in cases of extreme dereliction of duty, but this should be very difficult for the government to do. One could also imagine devising enforcement mechanisms – rewards and punishments for members of the Monetary Committee – to reinforce accountability, but the best enforcement mechanism is almost certainly the reputational effect of success or failure.

In some central banks, both management and policy decisions are made by the same board. In others, there is a separate management board, whose role is analogous to that of the board of directors of a corporation. Given that the expertise needed for managing an institution like the typical central bank, and that needed for making monetary policy decisions, are different, there is a strong case for setting up a management board, or Board of Directors, that would have the responsibility for certifying the budget, the work program, and other management decisions made by the management of the Bank. In this regard, the Governor acts as the CEO of the Bank, with the same relationship to the chairman of the Board of Directors as obtains in a public company. The draft Bank of Israel law proposes such a Board, with a majority of outside members, one of whom would be chairman. Thus, appropriately, the Governor would not be chairman of the Board of Directors, though he and the deputy governor would be members of the Board.

To maintain the independence of the Bank, it would be important that the members of the Board, most of whom should have business or management experience, be chosen for their professional abilities, rather than on a political basis. The draft law recommends a similar approach for the choice of the Board members as was suggested above for the choice of members of the Monetary Committee.

#### 4. CONCLUDING COMMENTS

The draft law of the Bank of Israel would modernize the legal basis on which the Bank operates, defining its independence and its accompanying accountability. The new law would align its internal structure and decision-making processes with best international practice.

The Bank of Israel already enjoys a substantial measure of *de facto* independence,<sup>21</sup> and the question thus arises of whether the law needs to be changed.

The answer is yes. Any significant difference between the *de facto* and *de jure* situations is very likely to lead to tensions in one direction or the other – in this case, to intermittent assaults on the independence of the Bank. And beyond defining the Bank's independence and accountability, the new law will also lead to major improvements in the Bank's monetary policy decision making, its management, and its transparency. This is a prize well worth having.

<sup>21</sup> See Cukierman (2006).

## REFERENCES

- Amir, Rami and Sigal Ribon (1999). "The choice and analysis of the inflation target in Israel – points for consideration", in Leo Leiderman (ed), *Inflation and Disinflation in Israel*, Bank of Israel Research Department, pp 291–312. In Hebrew.
- Barro, Robert and David Gordon (1983). "A positive theory of monetary policy in a natural rate model", *Journal of Political Economy*, 91, 4 (Aug), 589–610
- Bernanke, Ben, Thomas Laubach, Frederic Mishkin and Adam Posen (1999), *Inflation Targeting*. Princeton University Press.
- Bernanke, Ben and Michael Woodford (eds) (2005). *The Inflation-Targeting Debate*. NBER, University of Chicago Press.
- Bruno, Michael and William Easterly (1995). "Inflation crises and long-run growth", National Bureau of Economic Research working paper 5209, Cambridge, MA.
- Cukierman, Alex (2005). "Central Bank Independence and Monetary Policymaking Institutions – Past, Present and Future." Distinguished lecture delivered at the Annual Meeting of the Chilean Economic Society, September. Tel Aviv University.
- \_\_\_\_ (2006). "Legal, actual and desirable independence: a case study of the Bank of Israel", forthcoming in Liviatan and Barkai (eds), *The Bank of Israel: Fifty Years of Struggle for Monetary Control*. Forthcoming, Oxford University Press.
- Dahan, Momi (1993). "Is there a tradeoff between income inequality and economic growth?", Bank of Israel Research Department Working Paper 93.05 (July). In Hebrew.
- Easterly, William and Stanley Fischer (2001). "Inflation and the poor", *Journal of Money, Credit, and Banking*, 33, 2 (part 1), 160–78, reprinted in S. Fischer, *IMF Essays from a Time of Crisis*, MIT Press (2004).
- Feldstein, Martin (ed) (1999). *The Costs and Benefits of Price Stability*. NBER, University of Chicago Press.
- Fischer, Stanley (1994). "Modern Central Banking", Chapter 2 in Forrest Capie *et al*, *The Future of Central Banking*. Cambridge University Press.
- \_\_\_\_ and Franco Modigliani (1978). "Towards an understanding of the real effects and costs of inflation", *Weltwirtschaftliches Archiv*, 114, 810–32.
- Friedman, Milton (1968). "The role of monetary policy", *American Economic Review*, 58, 1 (March), 1–17.
- King, Mervyn (2005). "What has inflation targeting achieved?" Chapter 1 in Bernanke and Woodford (2005), *op cit*.
- Patinkin, Don (1956). *Money, Interest, and Prices*. Evanston, Illinois: Row, Peterson.
- Phelps, Edmund S. (1967). "Phillips' Curves, expectations of inflation, and optimal unemployment over time", *Economica*, 34, 3 (August), 254–81.
- Rogoff, Kenneth (1985). "The optimal degree of commitment to an intermediate monetary target", *Quarterly Journal of Economics*, 100, 4 (Nov), 1169–90.
- Sarel, Michael (1996). "Nonlinear effects of inflation on economic growth", *IMF Staff Papers*, 43, 199–215.
- Sussman, Nathan, and Yaakov Lavi. "The Phillips Curve and its changes, 1965 to 1996", in Leo Leiderman (ed), *Inflation and Disinflation in Israel*, Bank of Israel Research Department, pp 315–46. In Hebrew.

- Svensson, Lars (1999). "Price level targeting vs inflation targeting: A free lunch?" *Journal of Money, Credit and Banking*, 31 (3), 277–95.
- \_\_\_\_\_ and Michael Woodford (2005). "Implementing optimal policy through inflation-forecast targeting", Chapter 2 in Bernanke and Woodford, *op cit*.
- Tuladhar, Anita (2005). "Governance structures and decision-making roles in inflation targeting central banks", IMF Working Paper WP/05/183 (September).
- Warburton, Sam and Kirdan Lees (2005). "A happy 'halfway-house'? Medium term inflation targeting in New Zealand". Reserve Bank of New Zealand Discussion Paper, DP2005/03, October.
- Wicksell, Knut (1965). *Interest and Prices*. New York: Augustus M. Kelley, in Reprints of Economic Classics series. (Original edition published in German in 1898).
- Woodford, Michael (2003). *Interest and Prices*. Princeton University Press.