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# Review of the literature on the comparison of price level targeting and inflation targeting

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## Introduction

This paper assesses some of the literature that compares price level targeting and inflation targeting. The literature on price level targeting is relatively recent and generally theoretical in nature. The lack of empirical analysis is mainly due to the fact that, with the exception of a brief period in the 1930s, when the Swedish central bank adopted price level targeting, no central bank has operated price level targeting as a monetary policy regime. Therefore, empirical results can only be obtained using simulated data.

## What is the difference between price level targeting and inflation targeting?

Many central banks have adopted price stability, either explicitly or implicitly, as a primary goal for monetary policy. There is no precise definition of price stability. Taken literally, price stability could be interpreted to mean a constant level of prices through time, as measured by a general price index, such as a Consumers Price Index (CPI). In practice, however, price stability has often been interpreted as low and stable *inflation*<sup>1</sup>, and this is the interpretation that has been made in New Zealand since the adoption of inflation targeting.

There are many different monetary policy frameworks for achieving price stability, but they generally fall into two categories: direct (where the monetary policy regime directly aims to achieve and maintain price stability by targeting either the level of prices or the rate of increase in prices); and indirect (where price stability is achieved by targeting an intermediate variable, such as monetary and credit aggregates or the exchange rate).

In recent years, several countries have adopted explicit inflation targeting as their monetary policy. Operationally, this generally means that they have an objective to keep inflation within some pre-specified band<sup>2</sup> over a specified period.

Inflation targeting is forward-looking, with monetary policy being aimed at keeping future inflation within the defined target zone. Under inflation targeting, a central bank does not seek to compensate for past breaches of the inflation target. For example, if inflation over-shoots the inflation target in one period, the central bank does not seek to compensate for that by reducing inflation below the target; it merely seeks to bring inflation back to the target. Therefore, under an inflation targeting regime “bygones are bygones” and the central bank worries only about the *future* path of inflation.

The alternative direct method of seeking to achieve price stability is to target the general level of prices, rather than targeting an inflation rate. Price level targeting generally involves targeting a price index, such as the CPI, either so as to maintain the index at a constant level or at a level that increases at a specified rate every year. (An increasing price level target makes allowance for a low rate of inflation, to recognise that price indices do not fully adjust for quality improvements in goods and services, and in recognition that, in some economies at least, a very low rate of inflation is better for the economy than absolute price stability.)

Unlike in the case of inflation targeting, which is forward-looking in nature, price level targeting does not allow “bygones to be bygones”. In price level targeting, if the price level increases at a rate that is above the targeted price level, the central bank is required to tighten monetary policy so as to restore the price level back to the target level. In some situations, this could require a period of deflation or close to zero inflation, depending on the nature of the price

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<sup>1</sup> Alan Greenspan: “Price stability is the state where people no longer take changes in the general level of prices into account when undertaking their normal transactions”.

<sup>2</sup> Some central banks use a point target with a band for a “margin for error” around it.

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level target. However, as with inflation targeting, there is scope within a price level targeting regime for the central bank to ignore transient price shocks and for the central bank to bring the price level back to its target over a period of time, rather than risk doing this too quickly.

There are several monetary policy regimes around the world that explicitly target inflation, but there are no regimes with an explicit or implicit price level target. In earlier periods, the gold standard may be viewed as an implicit price level targeting regime, but only Sweden between 1931-37 had a regime with explicit price level targeting.

Even though there are no current examples of regimes that target the level of prices, price level targeting has received increasing interest in the monetary policy literature, and several recent papers compare inflation targeting and price level targeting.<sup>3</sup>

As with any choice between alternative policy options, price level targeting has a number of different costs and benefits compared with inflation targeting. For example, price level targeting offers the potential benefit of delivering greater certainty of the level of prices through time and may provide greater prospects for maintaining price stability in the longer term than under an inflation targeting regime. It may therefore be more effective in reducing the longer term costs of low inflation, and in anchoring a low level of longer term inflation expectations, than in the case of inflation targeting. However, price level targeting can also impose potential costs, including possibly a greater variability in inflation and the possibility of greater volatility in output, particularly if the targeting arrangements do not make sufficient allowance for transient price shocks or allow the central bank some flexibility in the period allowed for bringing the price level back to target.

Below, we summarise some of the main conclusions to emerge from the literature on price level targeting.

## Some conclusions from the literature

### How much do past target misses matter?

Price level targeting is seen as a way to eliminate base drift in the price level that results from the “let bygones be bygones” approach of inflation targeting. Gavin and Stockman (1988) show that the base drift problem leads to a higher level of uncertainty about what price levels will be in the future. The central bank may miss its inflation target by a very small percentage in some years, but if these misses are not offset, they will accumulate and may become quite large over a long time horizon. A monetary policy regime that offsets these deviations from a price level target could potentially reduce the uncertainty and costs associated with the effect of inflation on the real return on long-term investment or saving.

### The Swedish experience with price level targeting

The only country that has adopted formalised price level targeting is Sweden, between 1931 and 1937. In 1931, Sweden left the gold standard and adopted a monetary policy framework aimed at targeting the CPI. The CPI was normalised to 100 in September 1931 and remained near 100<sup>4</sup> until the first months of 1937, when it rose above 102. The Swedish central bank abandoned price level targeting in April 1937. Over the period of price level targeting, Sweden recorded 32 months of inflation, 21 months of deflation and 14 months when the CPI was unchanged. Berg and Jonung (1998) suggest that price level targeting allowed Sweden to have less deflation, and one of the least severe depressions, in that period. The authors suggest that price level targeting can be used to raise inflation expectations in the face of deflation. This is one of the reasons why price level targeting is suggested in Svensson (2001) as a solution for the deflation problem in Japan.

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<sup>3</sup> Svensson (1996,2001), Dittmar, Gavin and Kydland (1999), Vestin (2000), Carlstrom and Fuerst (2002).

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<sup>4</sup> During that period the CPI reached a peak of 101.5 in July 1932 before falling to a trough of 98.4 in October 1933. Then it started to increase gradually and reached a new peak of 101.6 in December 1936.

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## Price level targeting may deliver lower inflation variability in certain models with output persistence

In one of the first papers that compares inflation targeting with price level targeting, Svensson (1996) uses a standard framework with a short-run Philips curve and with inflation entering the central bank's loss function<sup>5</sup>. This paper assesses price level targeting and inflation targeting by endogenously deriving the price level and inflation rules. The central bank acts under discretion and faces persistent output— ie: the present level of output is explained in part by last period's level of output. Under inflation targeting, the future price level is a "random walk" with drift and thus with an ever-increasing variability. In other words, the price level cannot be forecast and the best prediction would be its present value plus a constant.

Within this framework Svensson finds, as expected, that price level targeting results in lower variability in the price level than in the case of inflation targeting. A more counter-intuitive result of this research is that price level targeting delivers lower inflation variability in the presence of output persistence. These results arise from the fact that, in the model used by Svensson, inflation in an inflation-targeting regime depends on the future path of output, whereas under price level targeting inflation depends on the change in output.<sup>6</sup> However, these results are highly sensitive to the output persistence assumption and the endogenous derivation of the price level and inflation rules and need to be interpreted with considerable caution.

In a similar paper, Dittmar and Gavin (2000) examine the inflation-output variability trade-offs implied by optimal inflation and price level rules. The Dittmar and Gavin result reinforces the conclusions of Svensson (1996), by showing

that when a New-Keynesian Phillips curve is employed, the amount of persistence in output affects the inflation-output variability trade-off. In contrast with a New-Classical case, this paper finds that even when the current level of output does not depend on last period's output, a price level targeting regime delivers a more favourable trade-off between inflation and output variability than does inflation targeting. More clearly, when we assume a New Keynesian Phillips curve (where expectations are strictly forward-looking, i.e. future inflation affects the current trade-off between inflation and output), price level targeting delivers lower output and inflation variability, regardless of the degree of importance of past levels of output for current output.

## Price level targeting with forward-looking price setting behaviour

Most of the research on price level targeting versus inflation targeting derives its results from models with a backward-looking Philips curve. In a recent paper, Vestin (2000) compares the two regimes in the same model as Svensson (1996), but with a forward-looking Philips curve, as derived by Calvo (1983). Clarida, Gali and Gertler (1999) have shown that gains from 'commitment'—under commitment the central banks follows a rule when deciding on monetary policy—are possible when the central bank aims at the natural rate of unemployment.

Vestin assesses if such gains can be obtained when commitment devices are removed— ie: in a situation of discretionary monetary policy. The main result of the paper is that when price setting occurs on a forward-looking basis, and the central bank has considerable discretion as to its monetary policy actions, a price level target may deliver lower inflation and output variability than an inflation target. Also, the paper looks at different scenarios by allowing the degree of employment persistence to vary.

## Credibility matters for the choice of the monetary policy regime

Maclean and Pioro (2000) attempt one of the few investigations that use simulation results generated from random impulses to the economic model used in the research underlying this paper. The authors add price level targeting

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<sup>5</sup> A loss function represents a mathematical expression that quantifies the central bank's preferences. The loss function includes variables that represent objectives of the central bank. In practice central banks try to control their losses by minimising deviations of inflation and other variables included in the loss function from their target.

<sup>6</sup> Under inflation targeting, Svensson derives a decision rule as a linear feedback rule for inflation on output. Therefore, the variance of inflation is proportional to the employment variance. Under price level targeting, Svensson assumes that the decision rule is a linear feedback rule of price level on output. Thus, inflation is a linear function of the first difference in output.

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to a policy rule, with backward-looking expectations, and with credibility effects tied more specifically to inflation and price level targets. The main objective of the research is to see if the results obtained from small models can also be achieved in a larger model with more complex dynamics - in this case, the Bank of Canada's Quarterly Projection Model.

One of the findings is that the assumptions made about expectations are crucial in determining the results from adding price level targeting into a reaction function that follows a Taylor rule. Under price level targeting, the authors find that there is a trade-off between slightly decreased inflation variability and significantly increased output and interest rate variability. On the other hand, if expectations are highly model consistent<sup>7</sup>, the introduction of a price level target reduces inflation *and* output variability without changing the variability of nominal interest rates. This result is dependent on the degree of central bank credibility assumed in the model, as this affects the degree to which inflation expectations are anchored to the inflation target.

### *Theoretical comparison of inflation targeting to price level targeting*

Mishkin (2000) finds that inflation targeting should generally be preferred over price level targeting as a framework for achieving price stability. He cites two advantages of price level targeting over inflation targeting. First, a price level target can reduce uncertainty about where the price level will be over long time horizons<sup>8</sup>. Second, in some models<sup>9</sup>, a price level targeting regime can induce less output variability. The results that favour price level targeting depend on key assumptions about the price setting process, including whether inflation expectations and price setting behaviour are forward or backward-looking.

By contrast, in models that use forward-looking behaviour, price level targeting produces more output variability because unanticipated shocks to the price level are not treated as bygones and must be offset.<sup>10</sup> Mishkin also suggests that periods of deflation resulting from price level targeting will induce lower interest rates on average, increasing the risk of interest rates of zero. Some economists argue that monetary policy is ineffective in such an environment (ie a liquidity trap)<sup>11</sup>, as can arguably be seen in the case of Japan at present.

## Conclusion

The literature that explores the relative costs and benefits of price level targeting versus inflation targeting is relatively new and theoretical. Most of the papers we have reviewed suggest that, on balance, inflation targeting is more likely to deliver satisfactory price stability outcomes at lower costs in terms of output and inflation variability than in the case of price level targeting. Some of the literature makes a case for price level targeting, particularly in terms of its potential to deliver greater certainty in the price level in the longer term, and some papers suggest that price level targeting offers the potential to achieve a lower level of inflation variability than in the case of inflation targeting. However, the consensus, and our own intuition, is that the variability of output, inflation and interest rates is likely to be greater with price level targeting than with inflation targeting, and that, on balance, inflation targeting is a more satisfactory policy framework for striking the right balance between price stability and stability in the real economy.

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<sup>7</sup> They assume that agents have full understanding of the shocks hitting the economy, a full understanding of the model of the economy, and they know the rule being followed by the monetary authority. This assumption is used in work by Svensson (1996), Vestin (2000) and Dittmar, Gavin, and Kydland (1999).

<sup>8</sup> Inflation target misses are not reversed by the central bank resulting in inflation following a stationary stochastic process, I(0), and price level will be non-stationary, I(1). As a result uncertainty of where the price level will be in the future grows with forecast horizon.

<sup>9</sup> Svensson 1999, Dittmar, Gavin and Kydland 1999, Dittmar and Gavin 2000, Vestin 2000.

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<sup>10</sup> According to Mishkin this view, which was proposed by Fischer (1994), is supported by simulations of econometric macro models with backward looking expectations (see Haldane and Salmon 1995)

<sup>11</sup> Fischer (1994) and Checchetti (1998)

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