

# IS IT TIME FOR PRICE-LEVEL TARGETING?

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*This paper summarises arguments for and against a shift by central banks from inflation targeting to price-level targeting. It concludes that the weight of the evidence favours a shift. One of the advantages of price-level targeting is its superior macroeconomic performance when short-term nominal interest rates are close to zero. Since this is the current situation facing many central banks, it may also be politically opportune to consider such a switch.*

**Keywords:** Price-level targeting, inflation targeting, monetary policy.

## Introduction

There are currently 26 countries that have formally adopted inflation targeting (IT) (Lim, 2008). No IT country has abandoned it as a monetary policy framework, except for Finland and Spain upon joining the eurozone in 1999. Since its inception in the 1990s, IT has coincided with less volatile inflation and real output in the countries that have adopted it, at least until the onset of the recent global financial crisis. How much of this improved macroeconomic performance can be attributed to IT itself is controversial (Dotsey, 2006, reviews the evidence). It is clear, though, that IT was often adopted more by historical accident than because of a consensus that it was an optimal monetary policy framework. For example, in Canada's case the 'implementation of an inflation reduction programme was as much prompted by the short-run problem of how to forestall a wage-price spiral threatened by the impending introduction of the GST [Goods and Services Tax] as by any longer term considerations' (Laidler, 2007, p. 3). Precisely for this reason, it is hard to imagine that further improvements in central banks' monetary policy frameworks are not possible.

One possible alternative to inflation targeting is price-level targeting (PT), or more broadly price-level path targeting (the latter allows for a gradual increase – or decrease – in prices over time along a preset path, as opposed to absolute long-run price-level stability). The main difference between the two policy frameworks is how the central bank reacts to unexpected changes in inflation. Under IT, the central bank

undertakes to return inflation to its target rate. It treats the effect of the inflation shock on the level of prices as a bygone. This means that a temporary inflation shock will have a permanent effect on the time path of the price level. Under PT, the central bank would undertake to undo the inflation shock and to return the price level to its original targeted growth path. The impact of an inflation shock on the time path of the price level is completely offset.

There is a substantial body of recent research on PT. This paper summarises the main arguments for PT from this research.<sup>1</sup> Firstly, it reviews the traditional arguments for and against PT. It then discusses the benefits to stabilisation policy from PT highlighted in more recent analyses. After reviewing some counter-arguments against PT, it concludes by suggesting that the weight of the evidence is on balance favourable and that serious consideration should be given by governments and central banks to PT, especially since it may prove of use in helping economies emerge from the current worldwide recession.

## Traditional arguments

Under IT, because inflation shocks are not offset, the price level becomes increasingly hard to predict as the forecast horizon increases. Under PT, prices can diverge only temporarily from their target path. The price level is not perfectly predictable, but its forecast error variance does not increase without limit as the forecast horizon lengthens. The long-run predictability of the price level under PT is the main traditional

argument in its favour. Under PT, current prices convey intertemporal information since the relative price of future goods in terms of today's goods is predictable, as argued by Coulombe (1997, 1998). The real value of contracts that specify future payments in nominal terms is less uncertain. Such contracts are quite common.<sup>2</sup>

The existence of long-term nominal contracts also has implications for the effects of price-level shocks on the distribution of wealth under PT and IT. This is an active area of current research, for example Doepke and Schneider (2006) and Meh *et al.* (2008). The latter paper found that price-level shocks have deleterious effects on economic welfare because of their redistributive impact. This impact is reduced under PT.

Reduced price-level uncertainty is the main argument that is traditionally invoked in favour of PT. The traditional argument against PT is that it must raise the short-run variability of both inflation and output. In response to a temporary, unexpected increase (decrease) in inflation under PT, inflation would have to be reduced below (above) its long-run target rate in the short run in order to move the price level back to its target growth path. This increases the variability of inflation, taking the initially lower (higher) price level as a starting point. Since monetary policy operates by changing interest rates in order to affect aggregate demand, output variability would be higher under PT as well.<sup>3</sup>

## Recent results on the benefits of price-level targeting

### *Improved trade-offs between inflation and output fluctuations*

More recent theoretical analyses overturned the traditional argument concerning the effects of PT on the variability of inflation and output. These analyses are based on models in which individual firms set prices for several periods. Profit maximisation leads them to set their prices as a function of their marginal costs of production and of expected inflation over the period when their prices will remain unchanged. Firms' average marginal costs of production are in turn related to the output gap (the difference between aggregate output and the level of output that would prevail if firms adjusted their prices continuously). This leads to the New Keynesian Phillips curve, a cornerstone of the models that are now used by central banks for forecasting and monetary policy analysis.<sup>4</sup> The New Keynesian Phillips curve states that current inflation is directly related to the output gap and to expectations of future inflation. It is these forward-looking inflation expectations that are responsible for an improved trade-off between output and inflation variability under PT.

PT implies a commitment by the central bank to offsetting unexpected changes in the price level. This commitment conveys an improved trade-off between the current output gap and current inflation. The logic behind this is simple. Consider the central bank's response to a positive shock to inflation coming from an increase in marginal production costs (a 'cost-push' shock). By committing to reducing future inflation even after the shock has dissipated (in order to return the price level to its target path), current expectations of future inflation are reduced. According to the New Keynesian Phillips

curve, this reduces current inflation for a given level of the output gap, reducing the output loss associated with fighting inflation in the face of the positive shock.<sup>5</sup> In turn, this reduces inflation persistence and inflation variability.<sup>6</sup>

The central bank's ability to commit to its promise to fight future inflation is crucial. Without it, there is a time-inconsistency problem.<sup>7</sup> Once the central bank reaps the benefit of its announced future policy on current inflation, it is in its interest (and the interest of society as a whole) to renege on its announced policy, because inflation can only be fought by reducing output and employment. In turn, when individuals recognise the central bank's incentive to renege, its policy will not be believed. An inability to commit to its announced policies reduces the attainable level of economic welfare. It is no longer optimal to offset inflation shocks, and optimal monetary policy more closely resembles IT than PT. When the central bank cannot itself commit to a policy of price-level stability, economic welfare can improve if it is directed to maximise an objective function defined in terms of the price level rather than inflation.<sup>8</sup> Svensson (1999) first showed this result. Vestin (2006) showed that in the standard New Keynesian model, assigning such an objective to the central bank is a perfect substitute for commitment.

### *Endogenous changes in wage indexation*

Most of the literature comparing PT and IT takes as given the type and degree of nominal rigidity across the two types of monetary policy regimes. The details of how prices are set in the theoretical models are usually imposed by assumption. As pointed out by Barnett and Engineer (2000, p. 132), it is likely that price setting as well as wage and financial contracts would have different forms under different policy regimes.

This point was developed in a series of papers by Patrick Minford with various co-authors (Minford, 2004; Minford and Peel, 2003; Minford, *et al.*, 2003). They considered households that cannot insure against fluctuations in their real wage and that have a strong interest in smoothing fluctuations in their real wage. They found that the optimal degree of wage indexation is lower under a PT regime, and that this can lead to substantial welfare benefits. The superiority of PT results from reducing fluctuations in the real wage in response to monetary shocks. Amano *et al.*, (2007) develop a model with nominal wage rigidities and an endogenous degree of indexation to unexpected changes in the price level. They show, as in Minford's work with his co-authors, that the optimal degree of wage indexation is lower under a PT regime. Improved welfare under PT in their model comes from a different mechanism: it helps the economy respond better to real shocks, moving the labour market closer to Walrasian equilibrium.

### *The zero bound on nominal interest rates*

Inflation targets have generally been positive and in a range of 1.5% to 3% in economies with central banks that follow IT, which means that measured inflation is positive on average. A commonly-stated objection to lower inflation targets is that it raises the possibility that nominal short-term interest rates will hit the so-called zero bound: the central bank cannot lower its

target interest rate below zero given the availability of an alternative asset, namely cash, that always pays a zero nominal rate of interest. In response to large negative inflation shocks that call for expansionary monetary policy, the zero lower bound may become a binding constraint on monetary policy.

Some recent work has shown that, for a given target inflation rate, a PT regime (with the same average rate of inflation) can help to avoid hitting the zero lower bound.<sup>9</sup> The argument for why this would be the case is straightforward. A negative inflation shock under PT is, if the regime is credible, expected to be followed by inflation that is higher than average in order to bring the price level back to its predetermined path. This means that the bank's target interest rate has to be reduced by less to achieve a given reduction in the real interest rate than under IT. For this reason, monetary policy has more leverage to stimulate aggregate demand under PT.

The possible advantages of PT close to the zero bound are of more than merely theoretical interest. Currently (May 2009), several major central banks have moved their policy rates close to zero and are actively seeking ways to make their monetary policies even more expansionary. One possibility that has received some attention is PT.<sup>10</sup> Under IT, if inflation is expected to remain at or close to zero for an extended period of time, followed by a return to a low targeted inflation rate, the average expected inflation rate over this period would be close to zero. Under a credible commitment to a price-level path, average expected inflation would be equal to the slope of the price-level path (the long-run inflation rate). For the same time path of short-term nominal interest rates, the long-term real interest rate would be lower by the difference in average expected inflation, resulting in stronger aggregate demand.

## Counter-arguments

### *Expectations*

Forward-looking expectations are the key to the superiority of PT. If price setters base their choices on past inflation rather than expected future inflation, it is no longer optimal for the central bank completely to offset the effects of inflation shocks on the price level.<sup>11</sup> Why should this be the case? A change in the price level in New Keynesian models arises because those firms that are able to modify their output price choose to do so. This creates a distortion in relative prices that reduces the efficiency of production (Ambler, 2007). If the central bank tries to bring the price level back to its initial level or path, firms whose relative prices are out of equilibrium may not be able to change their prices, and firms whose prices are on the equilibrium path may be pushed out of equilibrium. Minford (2004) puts it this way:

'The best thing to do strictly depends on the chances of being allowed to change your price. If it is low (the usual assumption), then it is best to keep the new price level as there is a low chance of those who already changed their price being allowed to change it back. If it is high (over 50%), then reversal could be worthwhile as there is a good chance that those who already changed could change back. The break-even chance is 50%; below this it is optimal to keep the new price level'.

### *Prolonged movements in relative prices*

Most of the models used to study the costs and benefits of PT have contained a single goods sector. They feature relative price changes across differentiated goods within a particular sector, which are always inefficient. Prolonged relative price swings across broad classes of goods such as commodities and manufactured goods are absent from these models. If prices such as commodity prices are volatile and persistent, targeting a path for the overall consumer price index could force the central bank to engineer painful adjustments in more sticky prices, such as in the price of manufactured goods. In this context, Aoki (2001) showed that in an economy with one sector in which prices are sticky and a second in which they are flexible, monetary policy should optimally stabilise fluctuations in the sticky price. Not targeting the flexible-price sector facilitates optimal adjustments in relative prices.<sup>12</sup> Volatile swings in subcomponents of consumer price indices have led some central banks to construct measures of 'core' inflation that leave out these components, even if these core inflation rates are not explicitly targeted.

### *Communication and the transition from IT to PT regimes*

Central banks, especially central banks that explicitly target inflation, typically communicate their economic analysis to the public in terms of inflation rates. To a large extent, the reputations that central banks have acquired for transparency under IT have been built on anchoring expectations around a constant inflation target. PT would imply varying the targeted rate of inflation in the short run. The inflation target would have to be lower than its long-run average if the price level was higher than the targeted growth path, and higher than average if it was lower than its growth path.

Most formal comparisons of the welfare properties of the IT and PT regimes are built on the premise that individuals understand perfectly the workings of both regimes so that their expectations are completely rational at all times. These comparisons ignore the costs associated with a transition from an IT regime to a PT regime, which would involve the private sector learning about the workings of the regime. The learning process itself could mean expectations that are more dispersed across individuals in the short run.<sup>13</sup> The adjustment in expectations would present communication challenges to the central bank that is effecting the regime change. If monetary policy announcements continued to be explained in terms of inflation, this would entail frequent revisions of targeted inflation rates in response to shocks that provoked deviations of the price level from its targeted path. This could lead to inflation expectations being less firmly anchored than under current IT regimes, even in the long run. For example, consensus forecasts of inflation over short and medium horizons in Canada seem to have coalesced around the Bank of Canada's targeted rate of inflation, which has been constant for over ten years. It would be possible to base communication concerning monetary policy on the price level itself, rather than on the inflation rate. It is possible to imagine a situation in which an interest rate increase could be justified on the basis of the percentage deviation of the targeted price index

from its targeted price path. It is not known what the effects of this would be on the expectations of a public that has been conditioned for a long time to think in terms of inflation rather than the level of prices. The communication issue is less easily subject to formal modelling, but will have to be addressed by any central bank contemplating a move to PT.

## Conclusions

It is the opinion of the author that the evidence is, on balance, favourable to PT. The choice of the appropriate price level to avoid exacerbating fluctuations in the stickier components of the consumer price index resulting from volatility in commodity prices needs serious study, but is not insurmountable. The appropriate way for central banks to communicate their strategy to the public also needs to be addressed.<sup>14</sup> The most convincing argument in favour of PT given current economic conditions is probably its superior performance compared to IT in facilitating expansionary monetary policy when short-term interest rates are at or near zero.

As stated in the introduction, the formal adoption of IT has been associated with increased price level and output stability. The onset of the current financial crisis has changed this perception. It is unlikely that a shift to a different monetary policy paradigm would garner much political support in a context where the current paradigm seems to be working smoothly. Central banks have been actively looking for ways to augment their impact on real interest rates that are not feasible under the current IT regime. The time may indeed be ripe at least to give serious consideration to the potential benefits of price-level targeting.

1. Because PT has never actually been implemented, except for a short period in Sweden in the 1930s, this research is on the results of simulating model economies.
2. There is no consensus on why these contracts are so prevalent. Fischer (1994) argued that the benefits of reduced uncertainty could not be very high, since individuals can easily use indexed contracts. In contrast, Howitt (2000) judged on the basis of the same evidence that 'long-term price-level uncertainty is one of the most serious consequences of inflation, because of its ruinous effects on long-term contracting'.
3. Formal models from the first half of the 1990s largely confirmed this intuition. See, for example, Lebow, *et al.* (1992) and Haldane and Salmon (1995). These models abstract from forward-looking expectations, which are crucial for reaping the benefits from PT, as argued in the next section.
4. See Clarida *et al.* (1999) for a detailed exposition of the standard New Keynesian money with an application to optimal monetary policy.
5. The argument in response to a negative shock is symmetrical.
6. Clarida *et al.* (1999) and Woodford (1999) showed that price-level stability is the optimal monetary policy under commitment in standard New Keynesian models.
7. The classic reference on time inconsistency is Kydland and Prescott (1979).
8. This objective could be made explicit as part of an explicit agreement between the central bank and the government of the day.
9. See Eggertsson and Woodford (2003) and Wolman (2005).
10. For example, Mankiw (2008) writes, 'Suppose the Fed cuts the federal funds rate once again to, say, 25 basis points. More important, at the same time, the Fed announces a target path for the price level as measured by the core CPI. The price path might be, say, an increase of 2 or 3 per cent per year. The Fed promises not to raise the fed funds rate over the next 12 months and, after that, will keep the funds rate at that low level as long as the price level is significantly below its target path. The credibility of the promise is paramount. To get long-term real interest rates down, the Fed needs to convince markets that it will vigorously combat deflation, and that if deflation happens in the short run, the Fed will reverse it by subsequently producing extra inflation . . . Monetary economists will recognize that this policy is price-level targeting rather than inflation targeting.'
11. Price setting of this type is in line with the theoretical models of the early 1990s discussed above. It is often introduced to enable New Keynesian models to explain the persistent fluctuations in inflation rates observed in the data and that the basic model cannot explain.
12. The gold standard is sometimes cited as an example of a PT regime that failed. Under the gold standard, the price of one commodity (gold) was targeted, and all other relative prices in the economy had to adjust to it. Aoki's analysis suggests that this type of regime would be highly suboptimal.
13. Gaspar *et al.* (2007) model this learning process in a New Keynesian model. They conclude that PT is superior to IT unless learning is implausibly slow.
14. One possible strategy would be to target a long moving average of past inflation rates. It can be shown that the longer the moving average, the more price level surprises are automatically offset. Currently, many central banks that use IT measure inflation at a monthly frequency but use the year-on-year change in the price level as their targeted inflation rate. This in fact amounts to a 12-month moving average of monthly rates. Changing the definition of the targeted inflation rate to a longer moving average would reduce the amount of price-level drift, would involve minimal operational changes and would entail almost no change in the way central banks communicate their strategies.

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