A new look at price level targeting

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1 Introduction

When different methods of achieving price stability were first being established inflation was relatively high and price level targeting appeared clearly inferior to direct inflation targeting. Now inflation has been low and has had a low variance it appears that price level targeting may be more attractive as price expectations will be held more firmly on a medium-term target in the event of shocks.[1]

This note re-evaluates price level targeting in the light of recent experience and concludes that the original objections are much less likely to hold. Price level targeting is unlikely to involve higher costs than inflation targeting. There is little chance that deflation will be required in response to shocks. There is little chance that policy will encounter the lower bound problem.

If indeed price level targeting can be readily understood by people and as a result expectations anchored firmly on a path for the price level over the medium to longer term, then it may well be a less costly route to price stability than inflation targeting, especially under uncertainty about how the economy works. Price expectations act as an additional stabiliser to policy actions, raising real interest rates in the face of a positive price shock and lowering them for a negative one.

However, such conclusions are partly dependent on the models used and do presuppose that in future the world will not be subject to more extreme shocks than it has over the last decade. Nevertheless, a reappraisal of the policy strategy might therefore be warranted. The Bank of Canada is embarked on just such a review and is publishing the results.

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[1] Price level targeting is actually quite an old concept. As Berg and Jonung (1998) review, Sweden was successfully targeting he price level in the 1930s.

2   Context

When the modern approach to maintaining price stability was developed in New Zealand in the second half of the 1980s the objective was conceived as being long term – protecting the value of people's savings for retirement. However, the target was expressed in terms of the rate of inflation over the year and not in terms of target path for the price level to ensure that long term stability. Inflation targeting is compatible with a stable price level over the longer term if the average inflation rate actually achieved is close to that implied for the price level path. In some inflation targeting countries, Sweden for example, this has been the case but in others, including New Zealand itself, it has not and compliance with the inflation target has resulted in a drift above the implied price level path. In part this discrepancy is a function of the specific form of the inflation target. If, as in Australia, it is to be achieved over the course of the economic cycle, there is a degree of automatic averaging built into the design. In the same way, although the Eurosystem does not describe itself as an inflation targeter, it has a target for inflation 'over the medium term'.[2] It is therefore worth asking 'why not express the target in terms of the price level?' as the two seem quite similar and price level targeting offers a firmer commitment

This renewed interest is emphasised by a programme of research that is being undertaken at the Bank of Canada (Ambler, 2007: Cateau, 2007; Coletti et al., 2008; Cote, 2007; Oleksiy et al., 2008, inter alia) investigating the merits of price level path targeting as part of a review of the most suitable basis for achieving the form of price stability that will be of the greatest benefit to the people of Canada.[3] The other main part of the programme is investigating whether inflation of less than the current 2% a year target would be more beneficial. While this is a related issue it is not pursued here. However, some of the benefits of price stability stem from making it more literally true so that inter-temporal allocation can be done with a minimum of error. The default risk premium on long-term debt is also expected to fall, with an ageing population such concerns become of more importance. Opinion is, however, divided on whether any such gains from reducing long-run inflation

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[2] The Eurosystem has not documented what its explicit objectives are in responding to actual or expected inflationary pressures but it is probable that like many inflation targeters it seeks to bring inflation to its target of below but close to 2% six to eight quarters ahead when policy has its main bite.

[3] Of these papers, Cateau (2007) not only provides a helpful survey of the literature but also sets out the Bank of Canada's research plan, listing the various projects.

below 2% are substantial. McCallum (1999) argues that they may be small while Doepke and Schneider (2006) argue they may be large. It is not possible to resolve this dispute on the basis of current knowledge.

The original arguments in favour of inflation targeting and against price level targeting were two sides of the same point. On the one side, achieving a given path for the price level might entail deflation from time to time. Where there is a risk of a debt-deflation spiral, this is undesirable in itself (King, 1994) but it may well also involve a fall in nominal wages, which is widely thought difficult to achieve (Akerlof et al., 1996). On the other, in a low inflation world, trying to get the price level to fall might encounter or risk encountering the zero bound to the nominal interest rate and hence the target might be infeasible. The consequence would then be a relatively large cost in terms of output variation for a relatively small gain in price stability. Simulations in Lebow et al (1992) and Fillion and Tetlow (1993) for example suggested that price level targeting resulted in greater variance in both inflation and output and were hence dominated by inflation targeting as a monetary policy strategy. It is also noticeable that the earlier articles tended to assume that the price level target to be achieved was zero inflation and hence the zero bound problem was more readily encountered.

The subsequent literature (particularly Svensson, 1999, and Batini and Yates, 2000) has pointed out that this conclusion may not be correct because it is dependent on three things: a sufficiently adverse distribution of shocks to which monetary policy has to adjust; a sufficiently aggressive response to shocks; and a particular view *of* price expectations that does not allow them to be focused on the price level target.[4] In any case, it is debatable whether all falls in the price level are disadvantageous – they could result from a favourable shock that raises the exchange rate, for example. Bordo and Redish (2003), Bordo et al (2004) and Bordo and Filardo (2004) argue that most deflations in the last two centuries were benign, particularly in the gold standard era, as they reflected supply-side productivity gains. Nor is it clear that small falls in nominal wages are costly to achieve, where this can occur through a drop in overtime hours and new hires being at lower rates than retirements. Gottshalk (2005), for example, shows that much of the supposed need for nominal wage reduction is simply the result of poor measurement and that in practice nominal wages (in the

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[4] As is common in such models, Svensson's objective function involves minimizing the weighted sum of squared inflation deviations from the target and output fluctuations round a sustainable trend. If the weight placed on output fluctuations were low then the chances of price level targeting being preferred over inflation targeting are increased.

US) are much more flexible downwards (for small shocks) than previously thought. The method is applicable to other countries.[5]

The whole issue has been opened up again in an empirical context by Gaspar et al. (2007) who argue that the range of experience in the euro area since its inception is such that the first two constraints (sufficiently adverse shocks or harsh policy response requirements) have not bitten and are not normally likely to do so in the future. Hence if expectations are focused on the price level and not inflation the output costs of maintaining price stability will actually be lower under a price level target than under an inflation target. Mishkin (2006, 211) argues for example that 'a price-level target, which encourages an expansionary monetary policy, is … more sensibly viewed as a complement to restructuring rather than an impediment'. If expectations are successfully anchored in this way then the variance of policy interest rates will fall making it less likely that the zero bound will be encountered (Cover and Pecorino, 2005). All such conclusions are of course also dependent on the model used but other modellers have come to similar conclusions (Williams, 1999; Woodford, 1999).[6] Nevertheless, it is worth revisiting the debate now that there has been a substantial period of price stability in many countries, as the original debate was somewhat hypothetical in character.

This note therefore explores a little further the nature of the debate and the empirical experience.

3   Price-level and inflation targets

An equivalent target for the price level to an inflation target of x per cent a year would be that the price level is to rise by x percent a year over the medium term. The key difference between the two is that inflation targeting is path dependent. If inflation is $x+e$ percent in the first year, the target for the ensuing year is x percent of a price level that is e percent higher than in the targeted path for the price level. Thus, as is shown in Chart 1, even if the central bank is always successful in keeping inflation within an acceptable range, the outcome can deviate exponentially from the price level target. In Chart 1 the dark line shows how a price

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[5] Other arguments have been advanced in favour of price level targeting. Carlstrom and Fuerst (2002) for example suggest that it is preferable to inflation targeting because it places a higher weight on past inflation and hence reduces the chance that policy will get heavily drawn in to any process of self-fulfilling expectations after a shock that might otherwise destabilise monetary policy.

[6] Ambler (2007) explores the key properties of the Svensson (1999) model required for his results to hold.

level target of 2% a year would unfold. The dashed lines either side of it delimit a 2% corridor of what might be considered price stability, 1% either side of it. A simple price level target would be to keep prices within this corridor all the time and to return prices to this corridor after any shocks.

Chart 1. Price level path targets and inflation targets contrasted
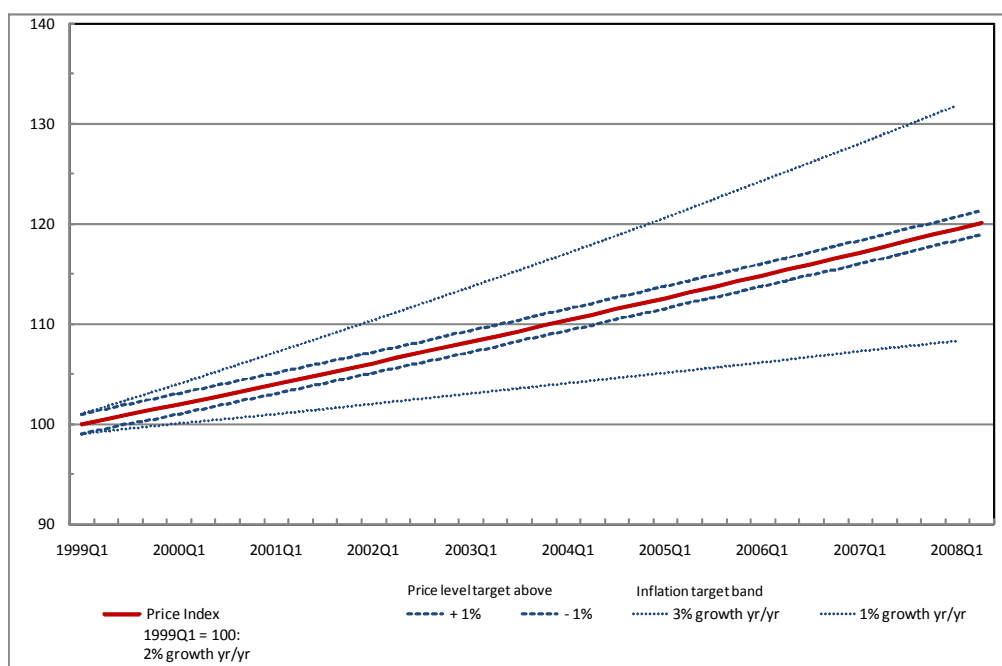
It is not immediately clear how extensive the problem of deviation of inflation targeting from the price level path is. Gaspar et al (2007, Fig.1) show that since the beginning of 1999 euro area inflation has remained within 2% of a price level path target, although recent higher inflation may well break that. This may well be a function of the Eurosystem's medium term target. By averaging inflation over a number of years the difference between a price level target and an inflation target is likely to be small. There is also no guarantee that inflation targeting countries will suffer from upward creep away from the price level path. In the same Chart 1, Gaspar et al. show that while the Canadian price index was slightly more than 2% above the price level path by the end of 2006, Sweden was 3% below it. Since this represents an eight year period it presumably gives a reasonable idea of how inflation might behave of the medium term in these different regimes

If inflation targeting is firmly on the mid-point of the target range – which is particularly likely to be true in regimes that, like the UK, specify a point target with a band of tolerance round it – and both shocks and policy seem to have little bias, then inflation targeting and

price level path targeting will tend to deliver very similar outcomes over the longer term. However deviations can build up quite rapidly. Chart 2 considers the case of inflation in New Zealand since the current target of inflation between 1 and 3 per cent was introduced in September 2002. Like the Eurosystem, the target in New Zealand is now a medium term one. Actual inflation over the period between September 2002 and March 2008 has averaged 2.6%. So, compared with a price level path target of 2% a year since September 2002, this represents a deviation of about four percentage points by the end of the period. Correcting this without some substantial negative shocks from outside the economy seems an unlikely prospect inside a decade and even then this would require a performance as 'good' as that in 1997-2000, when New Zealand was struck by the spill over from the Asian crises and policy was slow to adjust.

Chart 2. Inflation Experience Compared to a Price Level Target
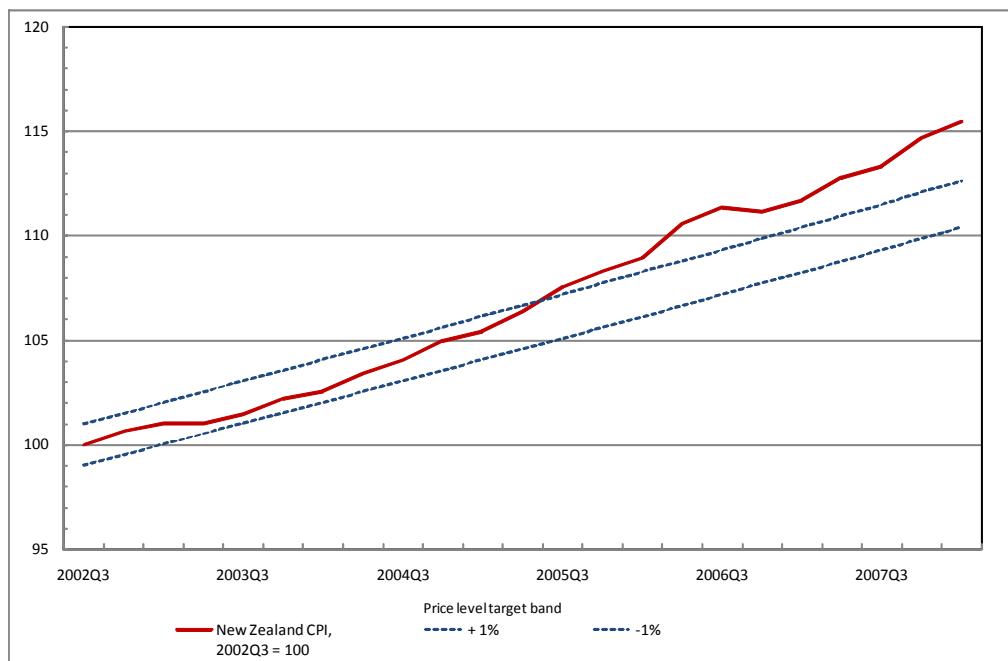
The concern, therefore, is over the rate at which any deviations would be corrected. Even in most inflation targeting regimes the nature of the requirement to return to the target is relatively soft. The New Zealand regime simply states that the Reserve 'Bank shall explain in Policy Statements made under section 15 of the [Reserve Bank] Act why such outcomes have occurred, or are projected to occur, and what measures it has taken, or proposes to take, to ensure that inflation outcomes remain consistent with the medium-term target. In pursuing its price stability objective, the Bank shall implement monetary policy in a

sustainable, consistent and transparent manner and shall seek to avoid unnecessary instability in output, interest rates and the exchange rate.' Nevertheless the normal expectation is that the return will be quite rapid, and within the normal time lag that it takes policy to have its main effect on inflation – often thought to be around 6 to 8 quarters ahead. The return to a price level path would entail a greater adjustment as not only must the excess inflation end but the excess that has occurred in the past must be offset.

This can be shown with a simple example. Let us assume that policy is on track but there is a shock taking inflation to 4%, i.e. 1% above the upper limit of the permitted band. Under inflation targeting the 1% excess inflation might be eliminated after 1 year and inflation return to the middle of the target range, 2%, after 2 years. While a linear reduction in inflation is not very plausible in real life it makes the arithmetic easier, so inflation thus falls by 0.25% each quarter and the shock is eliminated after 8 quarters. However to return to the price level path takes twice as long, with permitted inflation falling to its lowest limit of 1% a year. (In *practice* the central bank would smooth the convergence rather longer as otherwise there would have to be sudden switch from 1% inflation to 2% inflation once the price level path had been reached, see Chart 3. However, it is not worth pursuing the exact detail of an optimal path, as in practice there would be several more shocks as time passes and no single shock would ever be smoothed to elimination on its own.)

Chart 3. Reacting to Shocks under Inflation and Price level Targets
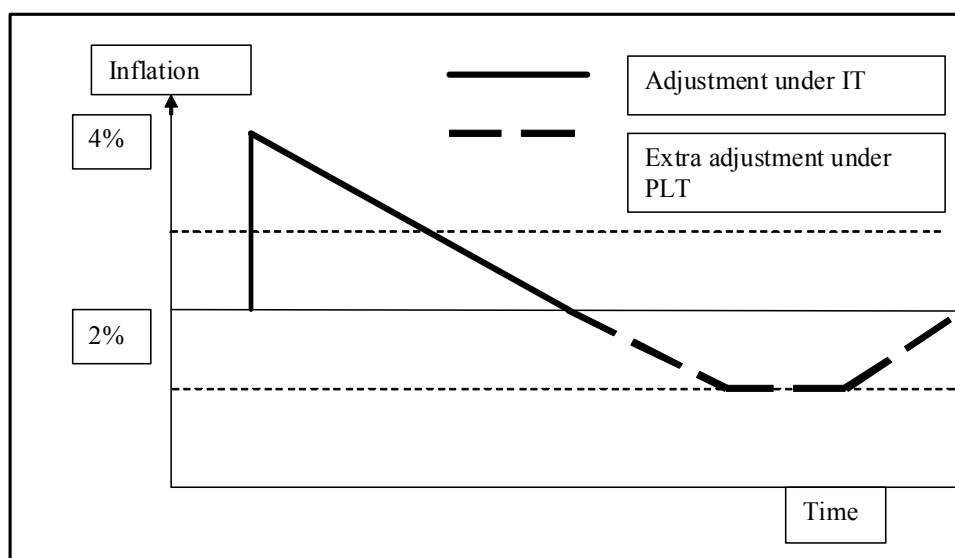
Getting inflation down quite rapidly can entail periods where the price level does not change much over a few quarters even though inflation rates over four quarters earlier are clearly positive. Returning to the price level path, even over several years, can imply a relatively sluggish price level for a year or two. This emphasises the points made earlier, that price level targeting is a more plausible choice when price shocks are normally quite small, expectations are very firmly anchored on the target and errors are corrected over a medium term horizon. Slow learning about the regime and a backward looking approach to expectations *formation* limit the attractiveness of price level targeting and make the period of error correction long (Nessen and Westin, 2005).

However, a second issue arises. It is common practice under inflation targeting to treat 'supply shocks' as being something outside the central bank's control and hence to accept their initial impact but concentrate on avoiding 'second round' effects that would allow the shock to become embedded in expectations. If such supply shocks are symmetrically distributed then they will cancel each other out over the medium term. In transition economies with substantial administered prices that are being phased out this is unlikely. In the past, shocks to commodity and agricultural prices, although they may last substantial periods of time if supply is difficult to adjust, have tended to be offset eventually. If, however, the limits to resources become more immediate such shocks may have a clear upward trend. In this case the requirements of targeting a path for the price level over the medium term and inflation targeting will clearly diverge, although inflation targeting itself will start having problems in anchoring inflation if there is a sequence of shocks of the same sign.

However, not all aspects of the current low inflation regime are beneficial to price level targeting as opposed to inflation targeting. One characteristic of the current regime appears to be that the Phillips curve is getting flatter. If this is the case then the ability to affect inflation through any given change in economic activity falls (Iakova, 2007). This implies that the adjustment period to return prices to the target path will have to be longer. Unless that is that expectations play an enhanced role. Indeed one of the main reasons advanced for the flattening of the Phillips curve is the increased credibility of monetary policy.

4   Communicating the Price Level Target

People have become used to thinking in terms of inflation but few think in terms of price levels. Explaining the policy to financial markets would not be difficult but it would be harder to explain the detail to the general public unless it can be converted into terms they can relate to proximate actions. The concept of the target is not the problem. It is just as easy to explain that inflation will not be allowed to drift away from 2% (or 'below but close to 2%) over the long term as it is over the medium term but it is more difficult to translate this into shorter term requirements. Thus, for example, wage bargainers can take into account inflation forecasts for the next two or three years but it would take quite a considerable change in reference to translate this into values of the price index. Such changes are not impossible. Items that are already indexed linked, such as rents in some countries, are already expressed in index numbers.

The most likely approach therefore would be to show progress of the price level relative to its target graphically and to supplement this with an explanation of how it is expected to return to its path over the coming few years. This could readily take the form of fan charts in the same way as these are used for inflation at present. However, it seems likely that one would want to talk in terms of the changes required and hence some of the discussion would remain in terms of inflation as this is such a widely used concept.

Clearly, starting with the conceptual target itself is not the problem. This is likely to be 'popular'. The original target in New Zealand was set out in terms of protecting the value of people's savings for retirement. Gaspar et al. (2007, p.10) quote President Roosevelt as saying in 1931 'The United States seeks the kind of dollar which a generation hence will have the same purchasing power and debt paying power as the dollar we hope to attain in the near future.' This makes sense in terms of the original New Zealand target of inflation centred on 1% a year, as this 1% was believed to be the extent of bias in the calculation in the price index to the nearest round number (Rae et al., 1992). Hence, bias adjusted, the target was a constant price level in terms of purchasing power. These days, however, no one is targeting inflation so low and all regimes have some element of erosion in purchasing power built in. This is much more difficult to explain in a long term framework. It is not intuitively obvious why one should erode purchasing power at any specific rate. The

justifications for positive but low rates of inflation in the long term are based on assertions about adjustment costs for which there is little evidence in practice. With real growth rates of 2% to 3% a year, inflation rates in the range 0 to 2% are unlikely to be associated with much need to reduce nominal wage rates for any individual in the same job, nor threaten to bring interests rates close to the zero bound. Recent studies suggest that both nominal and real wage stickiness are readily mismeasured and have traditionally been over-estimated (*Economic Journal*, February, 2008).

The example of Japan is misleading. In many respects the reason that it got stuck in modest deflation was that it had no longer term price level target (Svensson, 2001). With a believable commitment of such a form it would have been more readily possible to get consumers to spend in the short term, whilst purchasing power was greater. However, many of the problems with Japan in that period had more to do with an unwillingness to assign losses in the banking sector and the uncertainty this caused. Monetary policy is only effective in dealing with monetary problems and other causes of inflationary and deflationary pressures need to be addressed directly if the solution is to be efficient.

The key issue is the effectiveness of the expectations channel. If this works well then interest rates per se have a rather smaller task to play in maintaining price stability. Thus the more forward looking are expectations the more likely it is that a price level path target will dominate an inflation target in terms of both price and output stability. If the price level target is credible then people will expect future inflation if current deflation threatens. In any case price falls per se are not the problem. If prices fall because of favourable external price shocks, such as a substantial fall in world commodity and food prices, this has no downward implications for the rest of the economy, rather the opposite. (It will of course have an adverse effect in the commodity and food exporting countries.) A commitment to future inflation following an unexpected fall in prices is much more credible than a commitment to sustained below target inflation in the event of an upward shock. The issue of credibility seems unlikely to be symmetric. Large upward shocks are therefore likely to question the policy makers' commitment to the price level path.

Gaspar et al. (2007) point out that if the future policy regime is credible, the expectations mechanism is itself a stabilising force. If there is positive shock and prices rise, it is expected that future inflation will be lower, thereby raising real interest rates. In this way nominal interest rates do not have fluctuate as much to maintain price stability as they would if expectations were not so firmly anchored on the target. Turning this argument round – if price expectations can successfully be anchored on the price level path rather than on

inflation then monetary policy itself does not need to be so active and consequently the chance of meeting the zero bound is reduced.

5   Intermediate regimes

There is some discussion in the literature of 'hybrid' regimes (McCallum, 1994; Batini and Yates, 2001) which are a cross between inflation targeting and price level targeting. These can be of two sorts. In one, the amount of price level drift can be restricted, whereas in the other, used in Batini and Yates (2001) the issue is how long a temporary drift in the price level away from its path should be tolerated. Indeed it is this more flexible approach to price level targeting that Gaspar et al. (2007) espouse. In the same way that no one in practice advocated the extreme form of inflation targeting of correcting shocks in the next period (Mayes and Riches, 1996) so is no one advocating a strict form of price level path targeting. The question is simply the speed at which the economy should return to the price level track. Dittmar et al. (1999) formulate inflation targeting as having two components, one of which aims to correct the drift in the target. In practice therefore slow adjustment price level targeting and slow drift correction inflation targeting models will be the same for any given correction rate. The greater the nominal rigidity in the economy the slower adjustment will need to be if the coat of correction is not to mount. In the Batini and Yates calibration there are almost no losses compared with inflation targeting if policy makers put a weight of a half on drift correction. Ambler (2007) shows that the more persistent inflation is the stronger the weight that should be placed on the inflation target rather than the price level target. At the same time the argument in favour of low inflation rather than absolute stability is likely to become more attractive.

One concern is to establish whether an explicit commitment to return to a quantified path *works* better in fixing expectations than a vaguer commitment to achieve an average inflation rate over an undefined medium term.

6   Uncertainty and Robust Policy

Prima facie one might expect that price level targeting would increase the costs of the policy mistakes that are inevitably made when there is uncertainty both in the central bank and in the private sector about how the economy responds. However, Aoki a*n*d Nikolov (2005) and

Orphanides and Williams (2007) show that this does not appear to be the case. A price level target appears preferable because it requires the policy maker to correct past mistakes. It is thus a fairly robust rule. Like first difference rules, which are well regarded at present (Kilponen and Leitemo, 2005), it will tend to point policy in the right direction. This robustness is particularly important as all simulations assessing the relative merits of inflation targeting and price level targeting are inevitably model dependent.

7 Changing the Regime

It is one thing to be able to show that a credible price level targeting regime would be an improvement over a credible inflation targeting regime but quite another to move *from* the second to the first successfully. A central bank would only contemplate the move if there had been noticeable price level drift, i.e. if inflation had been consistently more one side of the target than the other. A second possibility is that it has been outside the target range altogether on a number of occasions, in which case there may already be some dent to credibility. Oleksiy et al. (2008) suggest that to shift expectations the central bank will need to be clearly zealous in returning to the price level path, where this involves a clear difference from what would be required under the previous inflation target. Thus the initial steps will be more difficult both for the central bank and for society at large. Simply following the path of smooth adjustment as one would when credible is likely to be more difficult. Expectations will not adjust and hence interest rates will have to be shifted by rather more to achieve the target. It is difficult to be certain of whether the harsh initial step is necessary but if the smoother path proves unable to shift expectations readily the next step will have to be even harsher.

Thus introducing the price level targeting regime needs to be done at a time when the central bank has strong political capital in order to make the change acceptable. Shifting inflation expectations downwards will entail higher interest rates than expected, which always causes some popular opposition.[7] This implies that there has to be a fairly general discontent with the performance of the bank in achieving price stability and a wish for change. Building a constituency for this might prove difficult if there is no such widespread discontent. The Bank of Canada and the Canadian government have chosen such an opportunity by commissioning a widespread study of what would be better for Canadian society. As the

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[7] As the Japanese have discovered there can be problems in raising expectations as well, if deflation is encountered.

result of such a comprehensive and objective study it would be reasonably easy to introduce what will effectively be quite a small change at the time it is introduced. Clearly other countries could undertake similar reviews, especially if it were part of a regular process of reviewing the success of monetary policy and scope for improvements, such as the Eurosystem considered after the first five years.

The alternative is simply to operate the existing inflation targeting regime in such a way that the price level target is achieved and to explain price level targeting as a form of evolution and an improved commitment to the original target. This would be relatively easy in the case of the Eurosystem as the target is one related to average inflation over a number of years. What would be more difficult is to correct previous errors rather than start anew. In other words if the Eurosystem were to decide to reverse the degree to which the price level has drifted since the beginning of 1999, this would involve a number of years of adjustment. In part this might be achieved opportunistically if inflation turns out to be rather lower than intended. Maintaining that lower rate for a while may be politically easier than engineering it deliberately in the first place. Similarly, if expectations are somewhat myopic they may already be consistent with the shift in regime. The problem with such an opportunistic approach is that it is not easy to have it as an explicit strategy. It is more likely to be an ex post description and hence does not meet the highest standards of transparency.

In their model Oleksiy et al (2008) consider a variety of paths by which credibility is eventually achieved. Since their general finding, given the model they use, is that the welfare gain from price level targeting is small, it is not surprising to find that the losses from continuing with inflation targeting may be smaller than those from imperfectly credible price level targeting and that it would take several periods of successful operation of the price level target to offset this loss. This finding of the smallness of the gain in shifting to price level targeting is also obtained by Coletti et al. (2008) in their simulations of a joint model of Canada and the US. Thus while the existence of the gains may be robust to quite a wide range of shocks and model parameters it may be more difficult to decide whether the change is worthwhile given the risk that the new regime may not be fully credible. The more important is the maintenance of price stability in the objective function and the lower is output stabilization then the more likely the switch to price level targeting will be worthwhile (as is also shown by Cateau (2008) in simulations with the Bank of Canada's ToTEM model).

The greater the credibility, the more the expectations channel operates and the less any change in the price level needs to be achieved through output changes. There is no reason to expect that the normal mechanisms for enhancing credibility do not apply in this case. First

of all, clear communication of what is intended will facilitate change. Second, effective transparency so that people can observe that the strategy is being applied will speed the adjustment. Both success and effort need to be readily observable.

8   Concluding remark

Taken together, the new evidence provides a good case for moving to price level (path) targeting. Not only are the downsides of deflation, nominal wage rigidity and the zero bound unlikely to bite if policy does not seek too rapid a return to the path but the costs of achieving price stability are likely to be lower because of the impact on expectations. Such gains are even likely for regimes that already target a rate of inflation over the medium term. Knowing that even extended divergences in the price level will eventually be offset, despite a string of unfavourable shocks, will help keep expectations on the target and hence obviate the need for harsh policy to bring them down again. However, if the central bank is credible and successful the gains will probably be small.

Since shifting expectations itself may entail a clear cost, such a shift in policy would most easily be achieved when expectations are already on target. Regime change is however more commonly a reaction to problems with the existing regime. Probably the best way to achieve such a change would be to undertake a public review of what constitutes price stability and the optimal benefits to society, as is currently being undertaken by the Bank of Canada. Price level path targeting is one part of that review but the other is what the path itself should be. While there is no obligation for others to undertake both parts, it is arguable that more literal stable price regimes are superior to low inflation regimes that still erode the value of money.

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