

Comments on "The Macroeconomic Effects of Inflation Targeting" by A.T. Levin, F.M. Natalucci and J.M. Piger

Comments by Harald Uhlig, November 2003

written for the "Inflation Targeting: Prospects and Problems", 28th Annual Economic Policy Conference, Federal Reserve Bank of St. Louis, October 16-17, 2003.

Prof. Harald Uhlig

Institute for Economic Policy

School of Business Administration and Economics

Humboldt University

Spandauer Str. 1

10178 Berlin

GERMANY

uhlig@wiwi.hu-berlin.de, <http://www.wiwi.hu-berlin.de/wpol>

Introduction and summary of their paper

Inflation targeting has become the new gospel for conducting monetary policy. Its merits have been stressed repeatedly by a large literature, most recently by Michael Woodford (2003). The appeal is obvious. Monetary economists have concluded that, by and large, monetary policy cannot do much more than achieve some desired level of inflation. Even to the extent that monetary policy can have an influence on real activity, this lever should be used only with great caution as it may endanger the reputation to effectively fight inflation over the longer-term horizon, if used opportunistically. The argument of Kydland and Prescott (1976), that monetary policy pursuing short-term goals in a discretionary, opportunistic manner is worse than a policy committed to and sticking to an a-priori well-chosen course of action, is fundamental and well understood. Inflation targeting is often advertised as a way for monetary policy to achieve an additional degree of this desirable commitment. Inflation targeting is furthermore sold as an effective communications policy as

it makes the public focus on inflation as the macroeconomic variable (among those the public cares about) which is most effectively influenceable by monetary policy. In sum, inflation targeting is an appealing idea on a priori theoretical grounds.

But inflation targeting has long moved beyond the realm of academic conferences and scholarly journals. It actually may have had its origins in the practical choices undertaken by some central banks, and it is now in use by a large variety of central banks across the world. Thus, the interesting question is, whether inflation targeting is also appealing due to the experiences gained in practice. This is, in essence, the question asked by A.T. Levin, F.M. Natalucci and J.M. Piger (short: LNP) in their paper. Their paper follows several other, similar papers in the recent literature, most notably Ball and Sheridan (2003). LNP investigate the experience of inflation targeters and non-targeters since 1994 in a number of OECD countries. They also evaluate the experience with inflation targeting in a number of emerging market economies.

In contrast to Ball and Sheridan as well as several other previous papers, LNP find a number of clear differences between inflation targeters and non-targeters. They investigate inflation forecasts at a number of horizons, and find that the changes in inflation forecasts is correlated with lagged averages of inflation for non-targeters but uncorrelated for inflation targeters. They find that inflation is more persistent for non-targeters. While the difference is rather small for inflation measured by the CPI, it becomes substantial, once the attention is focussed on core inflation, i.e. leaving out prices for food and energy, thus refining the results by Ball and Sheridan (2003), who focussed only on CPI inflation. LNP document that GDP growth volatility is the same for targeters and non-targeters, but inflation volatility is higher for inflation targeters, but argue that this is due to experiencing larger shocks rather than the monetary policy strategy itself. As for emerging market economies, they document that the introduction of the inflation target moves inflation expectations down gradually: the transition is a smooth one, and not characterized by a break at the introduction of IT.

This is all fascinating. It is well-crafted research, providing us with a wealth of additional insights and differences between countries that have adopted inflation targeting and that have not. The choice of empirical relations these authors look at, for example the variety of links between inflation forecasts and inflation or the persistence of core inflation, is well-chosen in that these are some of the key dimensions where one would believe a priori that

inflation targeting may make a difference. The choices are creative in that some of these dimensions have not received sufficient attention before. The documentation on the details of inflation targeting in a number of emerging market economies will be useful input into further research into these issues.

Assessment

I shall by and large not quarrel with the empirical findings. The correlations found by the authors seem to be there, and they can be read as a list of interesting differences between countries which have formally adopted inflation targeting and those that have not. There is an issue regarding the bias in their estimate of the regression coefficient of inflation forecasts on current inflation: however, this issue is not the key concern I have about this paper, and I shall discuss it last.

Rather, I shall quarrel with the interpretation of these findings. The title of the paper already suggests that the authors are not merely interested in uncovering correlations, but in documenting causation, interpreting these numbers as macroeconomic effects of inflation targeting. In short, they wish to have a reader read these findings as an answer to the policy question of interest: does inflation targeting matter? And even if the authors abstained from any interpretation in that direction, this would be the question foremost on the mind of any reader of their paper.

I am skeptical that such a causal interpretation is legitimate. In particular, I am wondering about four issues. First, which central bank should be classified as inflation targeting? I.e.: is this classification useful? Second, has inflation targeting been beneficial for the variables of ultimate interest, i.e. for reducing the level and volatility of inflation, for reducing the volatility of output growth and perhaps increasing the level of economic activity? Third, the adoption of inflation targeting seems to me to be largely a choice endogenously explained by some of the variables under investigation: this is true in the OECD sample but it is particularly true for the emerging market economies. For example, fiscal restraint there probably matters far more than the adoption of a formal inflation target. Finally, given all the supposed benefits of inflation targeting, one has to wonder what central banks did before

inflation targeting, and whether inflation targeting will help prevent bad monetary policy in the future.

Which central bank pursues inflation targeting?

In his comments on the Ball-Sheridan paper, Mark Gertler (2003) pointed out that classifying countries in the run-up to European monetary union as non-inflation targeters seems a bit arbitrary in light of the fact that there were some rather explicit preconditions in terms of achieved inflation rates for entering monetary union. This applies to this paper as well. More generally, where is the big difference between a central bank which pursues the goal of price stability as a prerequisite to monetary union and a central bank which issues official statements about its price stability goals? Do we really think that printing fan charts of inflation in monthly reports can make a substantial difference in monetary policy?

Take the case of the Bundesbank, a non-inflation targeter according to the classification in LNP. Indeed, officially, the Bundesbank has pursued money growth rate targeting for many years. But, as has been noted by a number of authors, the Bundesbank has always chosen to ignore violations of the announced money growth rate target, if it helped in pursuing some other, more important goal, most notably price stability. Secondly, the money growth rate target has been derived from some underlying goal regarding the desired inflation rate, even if that may not have been stated as explicitly as, say, by the Bank of England. Finally, public debates about monetary policy choices by the Bundesbank rarely evolved around keeping or violating money growth rate targets: rather, the debates were practically always in terms of inflation.

The literature has drawn a distinction between central banks that attach a high weight to inflation versus central banks that pursue inflation targeting (which is also consistent with a low weight on inflation in the objective function of the central bank), and has emphasized that the distinction between targeters and non-targeters is a distinction regarding their communication strategies. But if the communication, however done, ends up to lead to the public discussing and evaluating monetary policy choices regarding achieved levels of

inflation and implications for inflation rates in the future, as was undoubtedly the case for the Bundesbank, and if by contrast public debates focus on exchange rate movements and the general state of the economy rather than on keeping or violating some inflation target, even if the appropriate fan charts are printed in some monthly bulletin, isn't it a bit artificial to call an example of the latter an inflation targeter and the Bundesbank a non-targeter? One could argue that successful inflation targeting should precisely lead to an end of a discussion about likely inflation rates in the future, and that the debate should therefore shift to other issues, but this misses the point. Inflation targeting presumably only works, if the central bank is somehow held accountable for violating its inflation goals: if a reaction by the public debate is unlikely even when violations occur, and if the central bank officially targeting inflation does not care either, then inflation targeting takes place on paper only. Indeed, this is precisely the argument that has been made regarding money growth rate targeting for the Bundesbank: it applies with similar force to inflation targeting.

Moreover, proponents of inflation targeting typically argue for "flexible inflation targeting", which seems to mean that central banks also weigh in other objectives other than pursuing their inflation target, when making their policy choices. For example, a central bank targeting a particular rate of inflation may decide to pursue a looser monetary policy in a recession and a tighter monetary policy in a boom, even if this leads to medium-term violations of their inflation target, as long as this is all explained well to the public. Interestingly, money growth rate targeting can be viewed as accomplishing precisely this. If a central bank pursues a particular rate of money growth, calculated as the sum of desired inflation and average economic growth and subtracting average changes in the velocity of money, then money growth will be high and thus monetary policy loose precisely when economic growth falls short of the average and the other way around. Money growth rate targeting has gone out of fashion, but it almost certainly is a better way to implement "flexible inflation targeting" than a policy which rigidly enforces a particular inflation rate period-by-period! So, perhaps, the Bundesbank should be classified as a flexible inflation targeter, while other central banks, which rigidly focus on inflation in their reports should be excluded from this category. Since the issue at stake is whether flexible inflation targeting should be used or not, the categorization by LNP (using categorizations used by a number of previous authors, obviously, so they are not to blame) could be exactly misleading.

Has inflation targeting been beneficial?

Despite the arguments given above, I shall proceed with the categorization and the results in LNP as the working hypothesis as to the differences between inflation targeters and non-targeters. The key policy question in light of this experience is: has inflation targeting been beneficial? More precisely, has inflation targeting been beneficial for the variables of ultimate interest, i.e. for reducing the level and volatility of inflation, for reducing the volatility of output growth and perhaps increasing the level of economic activity? It may be nice (if true) that long-run inflation expectations are anchored more firmly for inflation-targeting countries, but how helpful has that been for the variables we ultimately care about?

Here, the inflation targeters do not seem to fare well. Table 4 in LNP reveals, that the standard deviation of inflation for inflation targeters has been 1.54, but only 0.81 for non-targeters, while output growth volatility has been essentially the same (2.63 versus 2.48). Based on these numbers alone, one certainly would not want to make the case that adapting inflation targeting is a good idea.

The authors stress, that this unconditional perspective is misleading because inflation-targeting countries may have been hit by larger shocks or have started from economic conditions which were worse. Indeed, this argument is at the heart of the Ball-Sheridan (2003) paper: once one conditions on initial conditions, most of the differences between inflation targeters and non-targeters are explained by "regression to the mean".

Would the authors here reach the same conclusion? That would then only say, that there really is no substantive difference in economic activity due to the introduction of inflation targeting, and this again does not provide an argument in favor of introducing IT (nor, obviously, an argument against it). It seems to me that much more work than in this paper is required in order to conclude that inflation targeters have been more successful in containing shocks hitting the economy than non-targeters. One could do this, it seems to me, by more finely identifying the shocks hitting these economies with, say, a multivariate VAR, and to then assess their impact on monetary policy choices as well as inflation expectations.

Examining figure 1 in the LNP paper reveals that inflation expectations gradually kept declining for the non-targeters, but not so for the inflation targeting countries. While one

could debate whether inflation expectations have declined too much in Japan, overall this figure does indicate to me that the non-targeters have been more successful in bringing inflation down to the (currently) most desired level somewhere between 1% and 3%. Inflation targeting does not strike me as virtuous monetary policy, if the target is too high! The analysis also reveals that the inflation forecasts had similar volatility across both groups of countries: while there may have been more external shocks in the targeting countries, I am nonetheless surprised that the targeters apparently were not able to offset these shocks sufficiently in order to anchor long-term expectations more firmly.

Finally, the authors document, that inflation volatility has been more high-frequency for targeters than for non-targeters. In particular, the response of core CPI is more transitory in targeting countries. So, perhaps one could make the case that inflation targeting leads to a shift of inflation volatility from the low-frequency spectrum to higher frequencies. But would that be desirable? Probably not. Recent models of the New Keynesian variety allow for some indexation of otherwise sticky prices to past or to expected inflation: in these models, ongoing inflation or predictable inflation (or deflation, for that matter!) is not particularly harmful. Instead, the economic distortions mainly come from distorting relative prices between firms that can adjust their prices in response to current shocks and firms that cannot. In short, in these models, low-frequency volatility of inflation is ok, but high-frequency volatility is bad for the economy and leads to an overall lower level of economic activity. If this is what would happen with inflation targeting, which seems to be what the empirical results suggest, then this would be an argument against inflation targeting, not in its favor.

Endogeneity.

An overarching problem in moving from interpreting the correlations as indicating causation is the endogeneity of the introduction of inflation targeting. While this could help the case in favor of inflation targeting (for example, if countries with highly volatile inflation adopt inflation targeting, one cannot blame that high volatility on inflation targeting), one should not move to a causal interpretation, given the evidence currently presented. Put differently, inflation targeting is probably often introduced in the aftermath of some mild or strong crisis or some general overhaul of institutional structures.

The endogeneity issue is already important for the OECD countries under consideration. For example, inflation targeting was introduced in the United Kingdom alongside with a whole set of institutional changes, most notably a greater degree of independence for the Bank of England. Indeed, one can read the Ball-Sheridan (2003) paper as arguing that inflation targeting was typically introduced, when the economic situation was sufficiently bad. By contrast, things "look ok" in the United States and the European Monetary Union. The need to introduce inflation targeting there simply has not been as pressing, so it has not been done.

The endogeneity issue is of even stronger force for the emerging market economies investigated by LNP. A number of recent papers in the literature have documented that fiscal consolidation and reform has been of greatest importance in allowing monetary policy to pursue the goal of price stability. As an example, the currency board in Argentina did not break down because the central bank lacked commitment, but rather because the fiscal situation deteriorated. Likewise, the dramatically high inflation rates in Russia at the beginning of the 90s were not a choice by central bankers uninterested in the pursuit of price stability, but rather because the only way to finance government expenditures (aside from borrowing) in the absence of a functioning tax system was seignorage.

These fiscal considerations are key in evaluating the success or failure of monetary policy reforms in emerging market economies. They are largely absent in the paper at hand, and should be investigated seriously in future research following up on LNP.

The interesting question remains whether inflation targeting has contributed above and beyond fiscal consolidation or general institutional reforms. To answer this question, one would need to find a clever instrument for the introduction of inflation targeting, which is uncorrelated with these other forces. Finding a convincing instrumental variable seems to be a thorny problem here, but one worthy of attention. E.g., one might try the fraction of academics on the boards of central banks (who may presumably be more inclined to move towards the academically appealing idea of inflation targeting), but even this might just be a consequence of general reforms. An alternative is to control more carefully for variables indicating reforms, e.g. the ratio of fiscal deficits to GDP and the like.

The authors are careful in not overstating their results, and that is good. For example, they say that "it is not completely obvious, the extent to which [the reduction in inflation] can be credited ... to IT". They observe that the reduction in inflation expectations is gradual, and that no sharp break can be observed at the time of its introduction. This all seems to me to be in line with the few that the introduction of inflation targeting at some point is simply a step that typically happens in countries undergoing reform.

What did central banks do before there was inflation targeting?

The paper investigates the episode since 1994 to evaluate the macroeconomic effects of inflation targeting. That may be a rather short period to evaluate the success or failure of certain monetary policy principles. Inflation targeting did not exist before that time (to my knowledge), though. So, what did e.g. the Fed (a non-targeter, but perhaps recently influenced by the targeting debates) do, before inflation targeting was a policy option? Was monetary policy necessarily much worse?

Annual US Inflation Rates

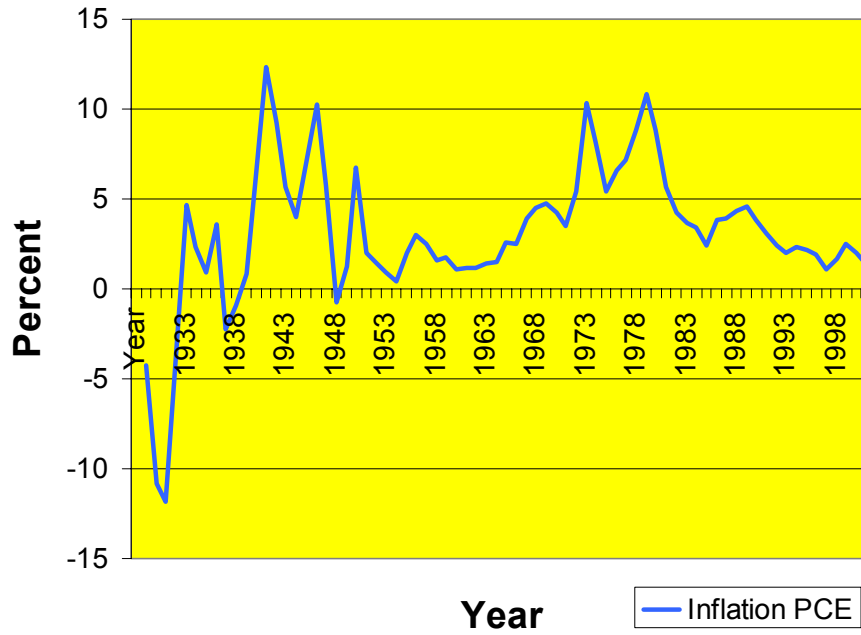


Figure 1

Inflation 10yr Standard Deviation (US)

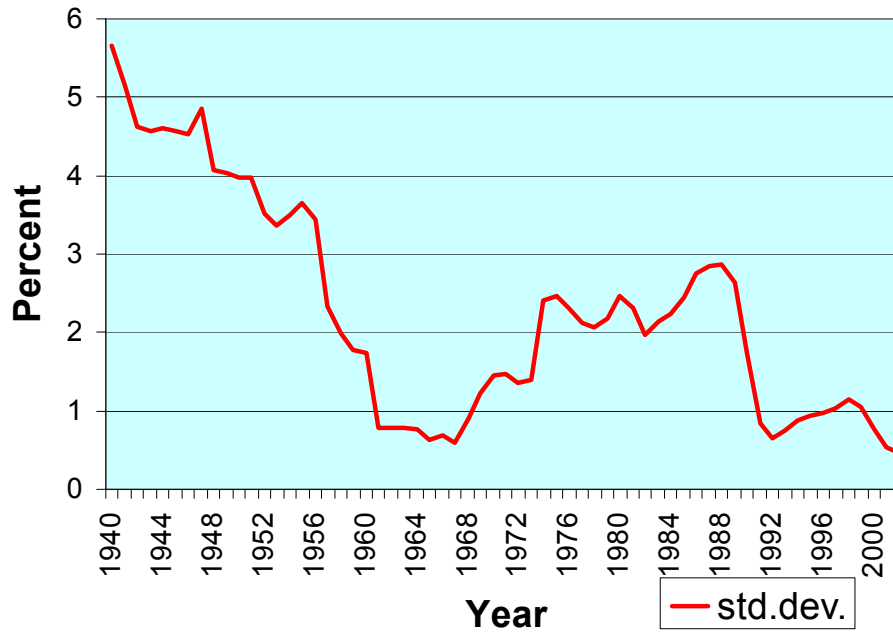


Figure 2

Figure 1 shows inflation in the US, using annual data on the PCE, taken from the NIPA tables, published by the BEA. There were several episodes of low inflation, like the thirties, the fifties and sixties and the episode since the early eighties. But not all low-inflation episodes are equal. Figure 2 shows the evolution of the volatility of inflation, calculated as the standard deviation of annual inflation over the preceding 10 years. One can now see more clearly than in figure 1, that there have been two episodes in which US monetary policy has been successful in stabilizing inflation. These standard deviations are low in the sixties as well as in the nineties. Both episodes look remarkably similar in that regard. Obviously, one needs to keep in mind that these standard deviations are "backward looking", i.e. a low standard deviation plotted for a particular year really means that inflation has been stable in the preceding 10 years up to and including the year in question.

Comparing 10yr Std.Devs.(US)

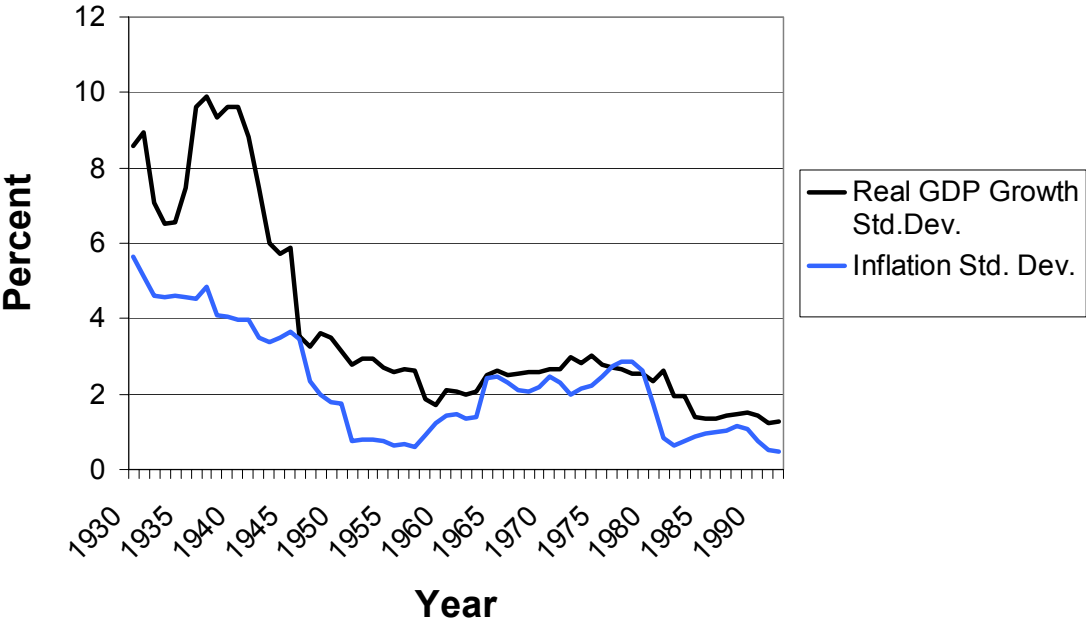


Figure 3

Scatter Plot of 10yr std. devs: inflation versus real GDP growth, US, 1940-2002

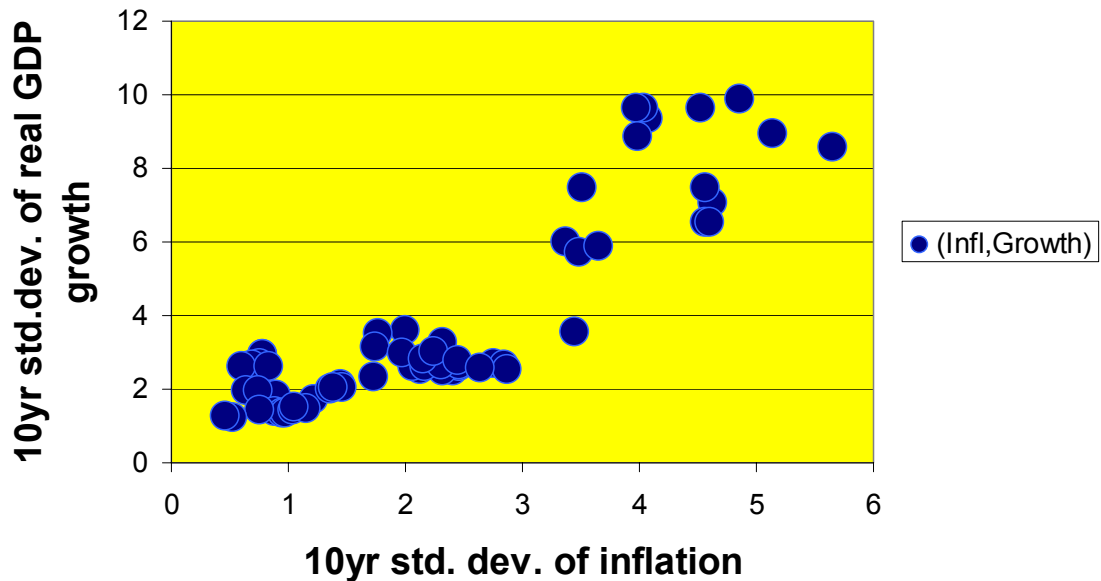


Figure 4

It is interesting to compare the inflation volatility to the corresponding volatility in real output growth, see figures 3 and 4. While the literature occasionally emphasizes a tradeoff between these volatilities, see e.g. Uhlig (..) these figures show substantial comovement between both volatilities for the US. These figures are very suggestive for supporting the claim that an environment of low and stable inflation helps to reduce output volatility and support economic activity.

From that perspective, both the fifties and sixties as well as the eighties and nineties have been particularly successful episodes of US monetary policy (or may have been episodes in which monetary policy was "lucky" due to the absence of major disruptions such as oil price shocks). These successful episodes were achieved without an explicit inflation targeting regime. I doubt that introducing an explicit inflation targeting regime could have produced better monetary policy during these episodes. The post-94 comparison by LNP focusses on an episode in US monetary policy, which already was very successful: it is therefore not surprising, that one has a hard time interpreting the evidence presented by LNP as making a case for the introduction of inflation targeting in the US.

What is much more crucial, though, is the question of how one can avoid an episode like the 70s (or, even more dramatically, an episode like the one before 1950), in which inflation volatility and output volatility were both high. Can we really be confident that political forces will continue to appoint central bankers to the FOMC, who understand the benefits of low and stable inflation, and who understand the importance of rules over discretion, and who continue to put these principles into practice? As an "insurance", wouldn't it be wonderful to somehow enshrine some of these principles underlying the currently successful US monetary policy for the future? Here is where the real issue lies. And here is where inflation targeting can help. Once an explicit inflation target has been announced and once the Fed explains its policy choices in terms of this target, a repeat of the 70s or a repeat of the episode prior to the fifties still cannot be ruled out. But it will be more difficult, since it would require a more clearly visible deviation from principles established before. These are sunshine days for US monetary policy, and there is wide agreement among monetary policy makers as well as academics as to the key goals of monetary policies and the principles underlying good conduct. Enshrining them now supports a longer life for this type of monetary policy.

An estimation bias.

A key claim in the LNP paper is that inflation forecasts are more highly correlated with past inflation in non-targeting countries than with inflation targeting. The authors have also documented, however, that inflation is more volatile, in particular, at high frequencies, in inflation targeting countries. This leads to a bias in their coefficient estimate.

Consider their regression equation (1),

$$\Delta \widehat{\pi}_t^{(q)} = \lambda + \beta \Delta \pi_t + \varepsilon_t$$

where π_t is the inflation rate, $\widehat{\pi}_t^{(q)}$ is the q-period ahead forecast of inflation and Δ denotes the change in the variable in question. Suppose that inflation is the sum of some persistent process ζ_t - a random walk, say - plus iid noise u_t ,

$$\pi_t = \zeta_t + v_t$$

Thus, $\Delta\pi_t$ is a noisy signal about the change $\Delta\zeta_t$ of the inflation trend. Given some other source of signal about the trend change as well as some prior view, the best forecast will be some weighted average of the recent change in inflation as well as the other source of information and the prior, with the weights proportional to the precision of the signal. Put differently, the larger the variance of the noise v_t , the lower the weight of $\Delta\pi_t$ in the inflation forecast and thus, the lower the coefficient β . Econometrically, the regressor $\Delta\pi_t$ is a noisy version of the "true" regressor $\Delta\zeta_t$, leading to a downward bias in β , which is the larger the larger is the variance in v_t , i.e. the larger is the high-frequency volatility in inflation. Since the authors find higher high-frequency volatility in inflation for inflation targeters, it is therefore not surprising that the correlation of inflation forecasts with current inflation is lower than for non-targeting central banks.

Obviously, the other explanation for the lower correlation is that the variance of the trend changes $\Delta\zeta_t$ is lower or even zero for inflation targeters, as they are fixing the desired level of inflation, whereas it may be trending for non-targeters. This could and should all be sorted out in a fully specified model, including a signal-extraction-type equation for generating the forecast. The figures given in the paper are suggestive that indeed desired inflation is subject to larger changes in the non-targeting countries, as the authors suggest. As argued above, this does not imply that inflation targeters have been more successful with respect to the variables we care about, namely low and stable inflation. This economic issue is thus probably of greater relevance than the econometric issue of the estimation bias. Still, the bias deserves more attention, and estimation of a more appropriate model.

Conclusions.

This paper is interesting, creative and informative. It deepens our knowledge about the differences between countries which have adapted inflation targeting and those that did not. I do not believe that the paper can empirically support the conclusion that adopting an inflation target leads to more successful monetary policy nor does it allow the opposite

conclusion. More research is needed to get at the issue of causation: this research seems feasible to do and should be done.

What, then, is one to conclude? Should central banks, should the Federal Reserve or the ECB, adopt some version of inflation targeting? It seems to me that the case really rests in the power of the logic of the argument, not in the empirics presented by LNP. Both the Federal Reserve and the ECB keep on emphasizing that keeping inflation low and stable is the best contribution they can make in order to promote economic activity. Furthermore, both central banks try to minimize the distortions on financial markets caused by monetary policy: they do so by communicating changes in monetary policy stances in advance and by avoiding to "turn the wheels" too fast. Keeping long-run inflation expectations stable and reasonably low (but perhaps not too low) is of great importance to both these central banks. Thus, setting a clear goal for medium- and long-term inflation and discussing the policy choices also, although presumably not exclusively, in terms of how quickly and in which way they will achieve these goals can only help the Fed and the ECB to pursue their desired policies yet more effectively. Inflation targeting for these central banks will not change their policies as they are currently pursued, but rather modifies their existing communications. Inflation targeting will neither lead to dramatic changes nor will it end the search for better monetary policy. Inflation targeting will not preclude the discussion of other policy objectives for monetary policy: instead, it allows for a compartmentalization and structuring of the arguments. Furthermore, it may help to enshrine the current wisdom that low and stable inflation is a key goal for monetary policy, thus helping to avoid another return to inflationary episodes like the 70s and the corresponding distortions to economic activity. In sum, inflation targeting is an addition to current communications and discussions about monetary policy and offers a gradual improvement by helping to further organize the internal as well as public debate on monetary policy choices and by helping to commit both the public and the central banks to keeping inflation low and stable. Viewed this way, inflation targeting is a good idea and should be adapted both by the Fed and the ECB.

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