



DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT
ECONOMIC AND SCIENTIFIC POLICY **A**

Economic and Monetary Affairs

Employment and Social Affairs

Environment, Public Health and Food Safety

Industry, Research and Energy

Internal Market and Consumer Protection



**Is Nominal GDP Targeting a
Suitable Tool for
ECB Monetary Policy?**

**Monetary Dialogue
September 2015**

COMPILATION OF NOTES



DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Is nominal GDP targeting a suitable tool for ECB monetary policy?

Monetary Dialogue 23 September 2015

COMPI LATION OF NOTES

Abstract

In the current monetary policy framework, the ECB (as most central banks) set a target for the annual inflation rate as a nominal anchor to maintain price stability. The ECB inflation rate is defined as the year-on-year percentage change of the harmonised index of consumer prices.

Nominal GDP rather than the consumer price index is sometimes advocated as a more effective policy tool for the conduct of monetary policy as nominal GDP changes being the sum of nominal and real changes in overall economic activity allows to directly target output fluctuations. In addition, nominal GDP is a less volatile aggregate than the consumer price index and the level of nominal GDP is the relevant indicator for assessing the sustainability of debt.

The notes in this compilation discuss the relative strengths and weaknesses of inflation vis-a-vis nominal GDP targeting. The notes by key monetary experts have been requested by the Committee on Economic and Monetary Affairs (ECON) of the European Parliament as an input for the September 2015 session of the Monetary Dialogue between the Members of the ECON Committee and the President of the ECB.

This document was requested by the European Parliament's Committee on Economic and Monetary Affairs.

AUTHORS

Andrew HUGHES HALLETT (School of Economics and Finance, University of St Andrews)

Wolfgang LECHTHALER, Claire A. REICHER, Mewael F. TESFASELASSIE (Kiel Institute for the World Economy)

Christophe BLOT, Jérôme CREEL, Xavier RAGOT (OFCE, Observatoire Français des Conjonctures Économiques)

RESPONSIBLE ADMINISTRATOR

Dario PATERNOSTER

EDITORIAL ASSISTANT

Irene VERNACOTOLA

LINGUISTIC VERSIONS

Original: EN

ABOUT THE EDITOR

Policy departments provide in-house and external expertise to support EP committees and other parliamentary bodies in shaping legislation and exercising democratic scrutiny over EU internal policies.

To contact the Policy Department or to subscribe to its newsletter please write to:

Policy Department A: Economic and Scientific Policy

European Parliament

B-1047 Brussels

E-mail: poldep-economy-science@europarl.europa.eu

Manuscript completed in September 2015

© European Union, 2015

This document is available on the internet at:

<http://www.europarl.europa.eu/committees/en/econ/monetary-dialogue.html>

DISCLAIMER

The opinions expressed in this document are the sole responsibility of the authors and do not necessarily represent the official position of the European Parliament.

Reproduction and translation for non-commercial purposes are authorised, provided the source is acknowledged and the publisher is given prior notice and sent a copy.

CONTENTS

INTRODUCTION	4
1. IS NOMINAL GDP TARGETING A SUITABLE TOOL FOR ECB MONETARY POLICY?	7
by Andrew HUGHES HALLETT	
2. IS NOMINAL GDP TARGETING A SUITABLE TOOL FOR THE ECB'S MONETARY POLICY?	27
by Wolfgang LECHTHALER, Claire A. REICHER, Mewael F. TESFAELASSIE	
3. FLEXIBLE INFLATION TARGETING VS. NOMINAL GDP TARGETING IN THE EURO AREA	45
by Christophe BLOT, Jérôme CREEL, Xavier RAGOT	

INTRODUCTION

Like most central banks, the primary objective of the ECB's monetary policy is to maintain price stability, which is defined in terms of a medium-term target for inflation. Since the 1980s, inflation targeting has been widely considered as the most suitable approach to maintain price stability and create an environment conducive to economic growth. The ECB's Governing Council has announced a quantitative definition of price stability¹: "Price stability is defined as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below, but closed to, 2%."

In the aftermath of the financial crisis, an intense debate has emerged on the appropriate targets for the conduct of monetary policy and the relevance of targeting nominal GDP rather than a consumer price index² was raised. Among the various arguments put forward in favour of nominal GDP targeting, the following are worth mentioning: a) targeting nominal GDP allows to directly target output fluctuations; b) the level of nominal GDP is the relevant indicator for assessing the sustainability of debt; c) nominal GDP is a less volatile aggregate than the consumer price index (as the latter may be highly sensitive to the impact of exogenous factors, such as oil prices, completely outside the control of a central bank).

Moreover, nominal GDP targeting has been advocated by prominent monetary experts³ as an effective policy tool in lifting inflation, potentially comparable to other unconventional monetary policy measures such as quantitative easing (QE) or forward guidance on interest rates). As for QE, it can be effective only if the additional creation of monetary base is permanent, so that prices and nominal income would be expected to be permanently higher and agents would therefore increase nominal spending today. As for forward guidance, it may not be strong enough as a policy tool: when the ECB announces, for instance, that it is committed to keep policy rates low for an extended period of time, it is because the ECB is truly adding policy stimulus or because it is expecting weak(er) growth in the future? A nominal GDP target that returns nominal GDP to a pre-crisis trend path would be an alternative approach, not susceptible of the above critiques and perhaps easier to communicate to the public⁴.

Against this background, the notes in this compilation discuss the relative strengths and weaknesses of inflation targeting vis-a-vis nominal GDP targeting for the conduct of monetary policy. The main conclusions and policy recommendations are summarised below.

The notes have been requested by the Committee on Economic and Monetary Affairs (ECON) of the European Parliament as an input for the September 2015 session of the Monetary Dialogue between ECON and the ECB.

Andrew Hughes Hallett (University of St Andrews). From the ECB's point of view, nominal income targeting is a feasible regime, but probably with as many drawbacks as advantages. On the positive side: it is easily understood, it accommodates beneficial supply shocks, provides stronger responses in bad times, and is a more efficient rule when supply responses are limited or structural reform is needed. The drawbacks are: inflexibility, problematic policy responses when prices and output react at different speeds, it may overreact or destabilise, and is robust to real time measurement errors. In addition, it

¹ <https://www.ecb.europa.eu/mopo/strategy/pricestab/html/index.en.html>

² In the euro area, harmonized index of consumer prices (HICP)

³ Michael Woodford (2013). Monetary Policy targets After the Crisis:
<http://www.imf.org/external/np/seminars/eng/2013/macro2/pdf/mw2.pdf>

⁴ Add Turner (2013), Debt, Money and Mephistopheles: How do we get out of this mess?
<http://www.group30.org/images/PDF/ReportPDFs/OP%2087.pdf>

appears to be less effective than the flexible form of Taylor rule that the ECB now uses. Nominal income targeting may be feasible, but probably not desirable

Wolfgang Lechtlaer et al. (Kiel Institute for the World Economy). While it has become popular to discuss NGDP targeting as a radical departure from current policy, the authors argue that by itself, NGDP targeting would not represent a radical departure from flexible inflation targeting, if carefully done. This is because a NGDP targeting is a special case of flexible inflation (or price level) targeting, merely with a stronger weight on output. This similarity between the two sets of policies makes it possible to discuss the tradeoffs in moving from inflation targeting to a NGDP targeting. The authors identify major tradeoffs along two dimensions: the choice of a target itself (inflation/prices or NGDP), and the choice of a target in levels or in changes. Both flexible inflation targeting and NGDP targeting use monetary policy to “lean against the wind” in a prescribed, rules-based, manner. This leaning against the wind may or may not be a good thing depending on the shocks and frictions underlying business cycles. For instance, if business cycles are driven by economic distortions, and these distortions cause the economy to fluctuate by too much, then there could be some benefit from using monetary policy in this way. In addition, it is necessary to think of the tradeoffs in choosing a target based on levels or rates of change: is it more useful to let bygones be bygones, or to ensure credibility by promising to correct for past mistakes? Here, there is some theoretical evidence that the latter type of setup would provide stimulus in the current environment (at the zero lower bound), while making a return to such an environment less likely. However, the theoretical and practical debate is not yet completely settled, and further work is necessary to help settle that debate.

Another issue is the interaction between monetary policy and other types of policy (such as macro-prudential and fiscal policies, not to mention legal and political issues). These types of policy remain an issue, since the choice of a monetary policy target leaves open problems related to leverage, bubbles, incorrect expectations, and financial and fiscal sustainability. However, at the same time, monetary policy does interact with these other policies. In the event of another financial or fiscal crisis, these considerations will have to be taken into account; in practice this is likely to imply that a flexible target is more realistic than a strict target.

Christophe Blot et al. (OFCE). Inflation targeting (IT) regimes do not overlook changes in real variables. Actually, in flexible IT regimes, central banks explicitly react to changes in either the level of economic activity or the situation in the labour market. Then, flexible IT and NGDP regimes are very close. Authors’ estimates and simulations provide some illustrations on this point. Overall, the benefit of a regime-shift might be very small. Besides, communication issues may arise with the adoption of NGDP targeting as neither the nominal GDP, nor the implicit GDP deflator are variables which are scrutinized by households or firms. And as communication plays a key role for the credibility of monetary policy, the authors consider that such a regime shift would introduce unnecessary difficulties for the ECB without providing additional policy flexibility. If the aim were to bring the ECB to pay more attention to growth, it would be more productive to introduce a dual mandate (for activity and price developments) and to set an explicit target for either output growth or the unemployment rate. NGDP targeting would not help financial stability either. Actually, IT regimes have been largely criticised in this respect and the adoption of NGDP regime would not make the ECB more concerned about financial stability.

NOTES

DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Is nominal GDP targeting a suitable tool for ECB monetary policy?

Andrew HUGHES HALLETT

IN-DEPTH ANALYSIS

Abstract

The idea of targeting smooth growth for nominal income (GDP), as an alternative to the conventional Taylor or inflation targeting rules for setting monetary policy, has been in discussion for many years. But they have never been used in practice. In this paper we review the pros and cons of adopting such an approach, and find them to be rather finely balanced. To dig deeper, we consider certain particular features of nominal income targeting: the crucial role of supply side responsiveness (nominal income targeting substitutes for poor responses or a lack of market or structural reform); the need to bring market forces into play; the question of whether income targeting increases discipline; and the extra constraints imposed by having a dual mandate.

The upshot is that nominal income targeting emerges as a special case of the more flexible Taylor rule formulation, although it does generalise on pure inflation targeting. In practice the Taylor rule form may be improved by using time varying, state contingent coefficients. De facto, this is what the ECB has done in recent years. The simulation studies available suggest that the more flexible rules of this kind perform better in reducing the fluctuations of output and inflation away from target; and are, crucially, more robust to model uncertainty (important for design) and real-time data/information errors (important in implementation).

CONTENTS

EXECUTIVE SUMMARY	9
1. INTRODUCTION	10
2. SHOULD THE ECB ADOPT NOMINAL INCOME TARGETING?	11
2.1 The Case for Nominal Income Targeting at any Central Bank	11
2.2 The Case against Nominal Income Targeting	12
3. SPECIAL FEATURES NOMINAL INCOME TARGETING	14
3.1 Supply Side Responses and Stabilisation	14
3.2 Market Forces	14
3.3 Increased Discipline?	15
3.4 Dual Mandates and Secondary Objectives	16
4. COMPARISONS WITH OTHER MONETARY RULES	17
4.1 Theoretical Comparisons	17
4.2 Empirical and Simulation Evidence	17
5. POLITICAL ECONOMY: SHOULD THE ECB TARGET EUROZONE NOMINAL INCOME OR NATIONAL NOMINAL INCOMES?	19
6. CONCLUSION	20
REFERENCES	21
ANNEX A	23
Nominal income targeting as a special case of a Taylor Rule	23
ANNEX B	24
Supply side responses: when can a nominal income targeting regime be effective?	24

EXECUTIVE SUMMARY

The question reviewed in this paper is, would nominal income targeting delivered materially better outcomes than other possible rules for monetary policy, such as inflation targeting, Taylor rules, monetary targeting, optimal rules or fixed interest rate rules? Second, would nominal income targeting be a suitable policy regime for the ECB? Would the ECB even be allowed to adopt a secondary target, given its statutes and operating conventions?

Nominal income (GDP) targeting is not a new proposition. It first appeared in the writings of Meade (1978), Tobin (1980) and Bean (1983). But most of the analysis of its merits and desirability is more recent. This paper evaluates the case for adopting nominal income targets at the ECB using this literature. We conclude:

- first, the ECB is already operating with a flexible form of nominal income targets;
- second, the desirability of doing so depends crucially on the benchmark which is taken to be the point of comparison;
- third, pure inflation targeting is a special case of nominal income targeting and therefore less flexible than a nominal income targeting regime – which, in its turn, is then less flexible than a Taylor rule approach;
- fourth, nominal income targeting is found to be effective as a policy if labour supply (the supply side generally) is inelastic – with implications for the need for reform. Otherwise it is not effective.
- fifth, nominal income targeting rules become progressively less effective as incomes become more unequally distributed.
- last, the balance of the empirical or simulation studies shows that nominal income targeting rules perform less well, certainly in terms of reducing output and inflation fluctuations, than more flexible generalisations such as the Taylor rule. Significantly, they also appear to be more vulnerable to model and real time data errors.

1. INTRODUCTION

The recent financial crisis, with its deep reduction in employment and incomes, has led a number of economists and policy analysts to question the way central banks have run their monetary policies. Policies that focus on stabilising inflation at a low level, typically using strict inflation or monetary targeting rule, or a Taylor rule principally focussed on inflation control, have not been notably successful in periods of financial stress or economic depression. As a result, many economists and analysts have argued that the US Federal Reserve, and the ECB (being the most affected by the crisis and the inability to escape its consequences), would do better to adopt a strategy explicitly designed to smooth out the fluctuations in nominal output or nominal income: see Crook (2011), Romer (2011), based on earlier work by Gordon (1985), McCallum (1988, 1997), Hall and Mankiw (1994), or Feldstein and Stock (1994).

Others advocate a similar approach for more particular ends. For example Bean (2013) suggests such an approach might be more successful in dealing with fall out of a financial bust, asset bubble or extreme negative shocks such as a commodity (cost) shock, oil crisis, exchange rate shock or foreign economic collapse. Turner (2013) argues that such rules are desirable as a temporary measure for resolving severe recessions, while Summers (2014) suggests they are needed to combat secular stagnation, and Woodford (2013) proposes such rules as a more flexible form of inflation targeting. But none of these papers deal with the impaired transmission problem. In contrast, the “market monetarists” advocate nominal income targets because they do allow a greater role for market forces, especially on the supply side: Sumner (2014). Others (Koenig 2012) maintain that nominal income targets will create greater inflation discipline.

The question of course is, would nominal income targeting have delivered materially better outcomes? The proposition itself is not a new one. It can be traced back to the writings of Meade (1978), his co-workers¹, Tobin (1980) and Bean (1983). But most of the analyses of its desirability are more recent. This paper evaluates the case for adopting nominal income targets at the ECB using this literature. We conclude:

- first, the ECB is already operating with a flexible form of nominal income targets;
- second, that the desirability of doing so depends crucially on the benchmark which is taken to be the point of comparison;
- third, that pure inflation targeting is a special case of nominal income targeting and therefore less flexible than a nominal income targeting regime – which, in its turn, is less flexible than a Taylor rule approach;
- fourth, nominal income targeting is an effective policy if labour supply (and supply side generally) is inelastic – with implications for the need for reform. Otherwise it is not effective.
- fifth, nominal income targeting rules become progressively less effective as incomes become more unequally distributed.

¹ Meade, Vines and Maciejowski (1983) and Weale et al (1989).

2. SHOULD THE ECB ADOPT NOMINAL INCOME TARGETING?

2.1 The Case for Nominal Income Targeting at any Central Bank

- i) Nominal income targeting gives some weight to removing persistent deviations of national output and employment from their target path, or to smoothing out fluctuations in output and employment, compared to pure inflation targeting; and a greater weight to output or employment than would be the case in typical Taylor rule regimes. It therefore reinstates society's traditional desire to maintain high and stable growth and employment. That is, it helps offset the higher output fluctuations associated with an independent and conservative (inflation averse) central bank, also those associated with sticky wages and prices or where markets are distorted or slow to adjust.

But, by the same token it will reactivate the old concerns about imposing a dual mandate, or secondary objectives such as those in pillar II of the ECB's mandate, on an independent central bank. It is undeniable that nominal income targets will deliver worse inflation out-comes on average than a single (inflation) target regime or an inflation focussed Taylor rule. The question is: will that trade-off be worth it? This must depend on one's relative priorities. They will vary with the economic circumstances at the time (section 3.4). In a severe recession, when inflation is low and unlikely to take off, nominal GDP targeting will put weight on restoring real output (or output growth) to its full capacity path in a way that inflation targeting or a fixed Taylor rule would not. But in a boom, when inflation is the main problem, nominal income targeting will put significant weight on controlling inflation as well as returning excess output to its equilibrium, full capacity path – albeit slower than in conventional inflation targeting or Taylor rule regimes where the Taylor principle applies.

- ii) Hence there is automaticity and symmetry in the rule, but not flexibility. With small or benign shocks, no one is likely to be concerned. But in bad times, recession or inflation, nominal income targeting will look good compared to traditional inflation targeting or fixed Taylor rules. On the other hand, the latter are not the only alternatives to nominal income targeting: Hughes Hallett and Acocella (2015) show that any economy is stabilisable (and at an arbitrary speed) if suitably strong parameters are selected in a Taylor rule. So, to say that nominal income targeting is suitable is not to say that better rules cannot be found, especially when some flexibility is needed.
- iii) Nominal income targets automatically absorb supply shocks correctly, or at least better than traditional monetary policy rules. A positive demand shock for example will raise both incomes and prices. Higher interest rates, the response of inflation targeting, is the right response for both problems. A nominal income targeting rule will react the same way, al-though possibly more vigorously because it is acting against both excess prices and greater output. This raises the possibility of overcompensation and induced instability. By contrast, a positive supply shock lowers prices while boosting output. With nominal income targeting these two effects to some extent offset each other, calling for relatively little policy action. That preserves the two gains to the economy. Inflation targeting (and, to a lesser extent, a Taylor rule) however would have lowered interest rates, adding to the overexpansion of output and leading to rising inflation expectations. That would be counter-productive and could possibly be destabilising.²
- iv) Another advantage of nominal income targeting rules, already implicit in the comments above, is that they are simple and therefore relatively easy to explain to (and convince) the public – part of managing expectations in a helpful direction. This would be a

² The same reasoning applies in reverse for negative demand and supply shocks; these policy rules are symmetric.

particular advantage if the alternative were (or needed to be) a Taylor rule with flexible coefficients, or a conventional rule with “constrained discretion” to improve the outcomes³. Nominal income targeting removes these variations, which clearly improves accountability and our ability to influence expectations. On the other hand, it is not clear that accepting an inferior rule just because it is simple is necessarily desirable. The gains from managing expectations more efficiently can easily be offset by losses from inferior outcomes.

- v) Nominal income targeting can be expected to help limit asset price bubbles. If it is true that asset bubbles tend to form when income growth is higher than average and credit is easy, as it is for obvious reasons, targeting nominal incomes will automatically increase interest rates whenever asset bubbles are a threat – cutting the source of the funds and the availability of credit that created the bubbles. Whether it would have enough impact to deflate emerging bubbles is another question. But nominal GDP targeting would certainly help reduce the chances of a financial crisis unless the restrictions are very sharp or sudden in which case they could actually trigger the financial crisis they were designed to avoid.

In summary, nominal income targeting allows the policymaker to balance the targets of low inflation with maintaining growth at long run potential (full capacity) output. As a result policy will move to offset variations in aggregate demand while permitting the economy to benefit from the gains from supply shocks. The downside is rules of this kind lack flexibility compared to other monetary rules, not least that inflation and real output deviations from target will always, and in all circumstances, be treated as equally damaging.

2.2 The Case against Nominal Income Targeting

Nominal income targeting has several drawbacks. If we take the output target to be growth in real incomes, then:

- i) The difficulty is that inflation data appears earlier and is less subject to revision. In the UK, for example, reliable figures for inflation typically appear a year ahead of those for real output. The average revision in the latter over 1993-2009 are large, a percentage point or more, while those inflation are small. This means that a nominal income rule will initially react almost exclusively to changes of inflation from target, giving it the characteristics of an inflation targeting regime, and only later to deviations of real output. And when it does react to output, it will do so inaccurately and be for a while subject to revision. It will be hard for the public to track these changes, and to know if any changes are due to data revisions or changes in policy. This puts the policy makers’ credibility at risk.
- ii) This makes clear communication of policy intentions and the justification for any policy changes that much more difficult.
- iii) The difficulty of measuring real incomes accurately and without revisions is compounded when this information enters the decision rule in the form of an output gap (i.e. deviations from potential output as the target). Output gaps are notoriously difficult to measure with any accuracy *in real time* and can lead to significant decision errors as a result. Poor and unrevised measures of GDP apart, the difficulty of measuring potential output in real time make measures of deviations of real output from target especially

³ An example of a conventional rule with constrained discretion is an inflation targeting rule designed to reach the inflation target in the medium term, but allows short run decisions to keep nominal GDP close to a target path in the near term (Woodford 2013). Formally this means operating with time varying, state dependent preferences (Hughes Hallett 1979). Other possibilities include flexible targets, or targeting future expected inflation. These rules all allow temporary deviations from the underlying rule to improve the short term without losing control over the final target.

risky⁴. Of course nominal income rules are not the only policy rules to have this difficulty. Taylor rules also suffer this problem and many analysts have concluded this is a reason not to use such rules. Yet the output gap term typically enters the Taylor with a rather small coefficient (annex A) so that errors in measuring the output gap affect the policy decisions by only a small amount. That is not the case with nominal income targeting.

- iv) The discussion so far has assumed an output growth target. If the target is output levels then nominal income targeting will become more difficult because, in a recession, not only does growth have to be restored to target, it has to go further. It needs to exceed target for a while in order to restore GDP to its pre-recession level. After the financial crisis, this would be very expensive and it is not certain that policy could have achieved what is asked of it.
- v) Time inconsistency may become a problem here. If in recognition of the larger job now asked of them, policymakers may choose to spread their policy effort over a longer period. This involves holding policy tighter than they prefer, which imposes a larger cost in lost output and hence an incentive to change policies. After a while they may conclude they should accelerate the recovery, which upsets expectations and will involve greater stimulus than originally planned and therefore more inflation and increased inflation expectations. That will make the recovery more difficult.

In summary, it is not difficult to agree that nominal income targeting makes a great deal of sense as a policy regime. It is simple and intuitive. But the practical difficulties involved in measuring the output term in real time, defining the output target accurately, explaining the necessary revisions, make it a difficult and risky rule to maintain in practice.

⁴ Hughes Hallett et al (2012a). Errors in measuring the output gap are a particular risk in the varied economies of the Euro-zone.

3. SPECIAL FEATURES NOMINAL INCOME TARGETING

3.1 Supply Side Responses and Stabilisation

Section 2.1, item iii), made the point that nominal income targeting rules will automatically absorb supply shocks correctly, or at least better than traditional monetary policy rules.

For the proponents of nominal income targeting, this is a significant advantage – if not the most important advantage. For example, a positive demand shock will raise both incomes and prices and call for higher interest rates from any monetary policy rule. But a positive supply/productivity shock will lead to lower prices but higher output, calling for counter-productive interest rate increases from inflation targeting but no new policy changes under nominal income targeting (unless we have a positive output gap already). The story is reversed for negative demand shocks or adverse supply or cost shocks.

Nominal income targeting is often held to be superior for precisely this reason. But the reality is rather different and more nuanced when one looks at the underlying analysis in more detail. Annex B looks at the supply of productive factors, represented here by supply in the underlying labour markets and implicitly the need for structural reform. The same could be done for market structures more generally and for the financing of capital, but the analysis gets complicated. Annex B makes the necessary point.

The original comment is of course correct in principle, but two more subtle conclusions now replace it:

- i) Nominal income targeting is optimal if labour supply, and hence the supply side more generally, is totally *inelastic*; and is an effective policy rule if labour supply is very inelastic. Otherwise it is not effective as a policy rule.
- ii) Conversely, nominal income targeting becomes progressively less effective as the share of capital in national income increases and/or as the elasticity of labour supply responses diminishes. In other words, nominal income targeting rules become less effective the more unequal is the distribution of income, or the less responsive/more in need of reform is the labour market – because, in either case, any recovery from a depression, or any inflation restraint in a boom, will have less impact on employment and hence employment incomes.

3.2 Market Forces

Market monetarists argue that nominal income targeting would allow market forces a fuller play in steering an economy. This, they say, would allow governments – or the ECB in this case – to avoid many of the counterproductive consequences of the traditional monetary policy rules suffered in other parts of the economy in the past.⁵

By this they mean many things. First, central banks typically target current and past levels of inflation, rather than future expected (forecast) levels of inflation. That does not allow market determined expectations of inflation to discipline decision making as much as they perhaps should. However this is easily corrected in inflation targeting or Taylor rules. The Bank of England (to give one example) explicitly targets expected inflation two years ahead in its version of a flexible inflation targeting rule and finds that performance improves (as this comment anticipates that it should).

Second, and related to the first point, central banks often choose to target (smooth) their policy rate changes rather than target inflation and output exclusively, in effect attempting to attenuate (if not reverse) market forces in the financial markets. While this criticism may

⁵ This type of argument is widely used in the literature. Sumner (2014) has a good representative summary which I follow here.

be correct in principle, it ignores some important practical aspects of policy making. One is that central banks control only their policy rate, but what they need to influence is market rates more generally. To have that influence, they need to make announcements of future policy rates (and any other policies) through a communications process that is direct and not subject to errors, revisions or reversals that undermine credibility. In addition, they have to announce future policies (as well as how well the targets will be achieved) to bring some consistency between the market's expectations and what the policy makers are trying to achieve. This is a matter of forward guidance; the explanation for and justification of the policies, in order to reduce the level of uncertainty in the markets. This inevitably involves "forecasts" of future policy instruments, as a focal point that reinforces their targets.

Third, there is a view that policies should target levels; that is, they should return inflation and output to their previous levels after a disturbance – presumably because if the markets were in equilibrium before the disturbance, they should be encouraged/allowed to return to that equilibrium afterwards. This may not allow for the fact that the free market equilibrium has changed as a result of the disturbance (although with some additional uncertainty for the markets, it can be updated to accommodate the simulated impact of those changes). It may also be an inappropriate type of policy in the first place. Had it used in the aftermath of the 2008-2012 financial crisis, returning to pre-crisis output levels would have involved a stimulus of 15% of GDP (or more) for many of the EU economies.⁶ Interventions that large would generate large, hard to control inflationary expectations, and be unlikely to succeed.

3.3 Increased Discipline?

It is often claimed that nominal income targeting would generate more discipline than other monetary policy rules. We touched on that point in section 2.1, and it is not obviously true unless maintaining output has higher priority than inflation control – which is not the case for nominal income targets.

So where does this idea come from? Koenig (2012) gives a typical analysis of the greater discipline argument. Leaving aside the problem of errors in measuring potential output or the output gap, nominal income targeting requires the target to be announced and applied over a longer time horizon than say inflation targeting. This may be arguable; but it reflects a genuine need for wage, labour and debt contracts to be able to accommodate that target, and the fact that the real side of the economy adjust more slowly than the price or nominal side which is the focus in inflation targeting. If that is true, then the best that nominal income targeting can do is ensure that expected (nominal) GDP hits its target in T periods time which, if potential output grows as expected, means expected inflation has to be on target too, which means average inflation has to remain on the target path, *in expectation*, along the way. The extra discipline here is due to that imposed on the inflation expectations in each time period. It contrasts with inflation targeting where the only constraint/discipline is on inflation reaching its target value, in expectation, in period T . In this regime, there are no additional output targets subject to inertia or expectations dynamics so it doesn't matter what happens to inflation along the way.

Whether this the way the world really works is another matter; the assumption is that inflation is not subject to the same persistence or expectations dynamics and can always be corrected in the end-phase if there is no second target that would be lost in the process.

Put more formally, this discipline argument relies on the difference between path controllability (you have to remain on a given path in every period, in expectation) and dynamic controllability (you have to hit certain targets at some point in the future, in expectation, without concern for what may happen in earlier or later periods); *and also* on some strong assumptions about the dynamics of inflation and inflation expectations.

⁶ Bean (2013)

On the first, controllability, point: the same distinction will hold for *any* policy regime, there is nothing special about nominal income targeting in this regard. On the second: there is no support, empirical or theoretical, in the literature for these assumptions. The usual wage and price dynamics, with forward looking expectations, would rule them out. But that said, the possibility that a dual mandate, where one target with slower moving dynamics exerts a certain degree of discipline on the other, does exist.⁷

3.4 Dual Mandates and Secondary Objectives

The possibility of nominal income targeting automatically raises the issue of dual mandates or secondary objectives at the central bank since nominal income contains prices times real output (equally, income growth comprises inflation and output growth).

This is an issue not discussed much in the formal literature, but is important in institutional design. The big question is as always: what are the appropriate relative priorities between the two (or more) targets at the margin, and when are you allowed to change those priorities, or should you ever be allowed to shift relative priorities? There are those who argue that no central bank can follow two targets with one set of (monetary) policies with any success, and the attempt to do so will only compromise our ability to reach the more important target (inflation): Sumner (2014). At a simple level this is correct. Tinbergen's static controllability theorem says that to reach two targets in a given time period, even if one is secondary to the other, we would need two independent instruments. That would require monetary policy to be coordinated (jointly chosen) with another – likely to be fiscal policy – which would undermine the principle of independently chosen monetary policies. But to do the same thing in two periods presents no problem. All we need is monetary policy choices for the two periods; an interest rate for the first period, say, and an announced or expected interest rate for the second.⁸ No compromises or dependence are involved.

This explains the stress placed on forward guidance and good communications in section 3.2. But we are back with the problem of relative priorities and whether they should shift with the state of the economy (as argued by Hughes Hallett, 1979). It is interesting therefore that different central banks take different positions. The Fed has a dual mandate (low inflation, full employment growth), the Bank of England has a single target (low inflation with a defined target value and tolerance limits), and both allow coordination with fiscal policy to achieve an output growth target. The ECB occupies an intermediate position, with defined low inflation as the primary target (Pillar I) and output growth, *inter alia*, as the secondary target (Pillar II). The relative priority of Pillar II, or when it should switch in, is never revealed other than to note that the ECB's statutes require that Pillar I (low inflation) to have absolute priority until the inflation target has been met. Thereafter Pillar II may be considered. This is a system with lexographic priorities.

Since nominal income targets can always be split between inflation and output targets, it is fair to say that the ECB is already operating a form of nominal income targeting. The issue is whether dominant anti-inflation preferences, or lexographic priorities, is the best way to implement such a rule.

The alternatives would be to set the problem up with “piecewise” objectives to be switched in and out, or non-quadratic objectives, or low weights on the secondary objectives, or with intermediate targets. These options all stress that the underlying problem is really to agree a systematic way to specify time varying priorities, contingent on the state of the economy.

⁷ This is an advantage of dual mandates in general: see Libich et al (2011) with monetary policy disciplining fiscal, for example.

⁸ Using dynamic controllability; the problem of time inconsistency does not arise here, see Hughes Hallett et al (2012b).

4. COMPARISONS WITH OTHER MONETARY RULES

4.1 Theoretical Comparisons

Annex A below makes a similar point about different priorities on primary or secondary objectives, but in terms of the coefficients in the policy decision rule. We need to do this to represent the different mandates accorded to different central banks (section 3.4).

Let r denote the nominal interest rate, specifically the policy rate operated by the central bank. Then the policy rule to be used in a nominal GDP targeting regime can be written as:

$$r = \bar{r} + [\log GDP - \log GDP^*]$$

where “*” denotes a target value, and \bar{r} is the equilibrium interest rate when the economy is fully in balance. Generalising, so that the inflation term and the real income term may, if desired, have different impacts on the policy decisions, we can write this policy rule as:

$$r = \bar{r} + a[\log(P/P_{-1}) - \log(P^*/P_{-1})] + b[\log Y - \log Y^*]$$

Comparing this expression with that above shows that a nominal income targeting rule is to adjust interest rates in response to inflation deviations and the output gap with weights specialized to $a = b = 1$. In contrast, the conventional Taylor rule has $a > 1$ (the so called Taylor principle); and $b > 0$, but small.

Hence, to create nominal income targeting we need to raise b while lowering a till we reach $a = b = 1$. This yields a restricted form of the traditional Taylor rule. On the other hand, pure inflation targeting is a special case of a nominal income targeting rule with $b = 0$ (and $a = 1$) and is therefore less flexible than nominal income targeting – which, in its turn, is a special case of, and less flexible than, the Taylor rule.

4.2 Empirical and Simulation Evidence

There are a few studies that examine how well nominal income targeting rules perform in practice, compared to the obvious alternatives: inflation targeting, Taylor rules, monetary targeting, optimal monetary rules, fixed interest rate rules. There are three points to note:

- i) Since nominal income targeting has never adopted in practice, this can only be done by simulation. There is no definitive real world experience.
- ii) Optimal policy rules will contain a term in real income/output *even if* the policymakers' preferences place zero weight on output or employment (Mishkin, 2002). This is because output above capacity puts upward pressure on prices even if current inflation is on target.
- iii) The consensus result is that nominal income targeting performs quite poorly, at least compared to certain other rules. It may lead to greater instability; it is vulnerable to model uncertainty (meaning it is hard to design a robust rule) and to real-time data uncertainty or information errors (meaning it is hard to operate reliably).

The most detailed study is by Rudebusch (2002) who focuses on the model and information uncertainty issues; and on the importance of persistence and expectations dynamics (thus implicitly on the discipline issue). Results are obtained for two nominal income rules (with and without interest rate smoothing) and the standard Taylor rule. All rules are optimised: the coefficients are chosen to minimise deviations of inflation, output and interest rates from their target values.

The Taylor rule outperforms nominal income targeting overall and in each component when inflation is unconstrained by persistence or expectations dynamics. So the strong discipline of nominal income targeting is not sustained. The same is true when mild or strong forward

looking expectations are added in, although the margin by which the Taylor rule is better is reduced the stronger is forward looking behaviour, which suggests that output and inflation transmissions of different speeds is a serious problem for rules like income targeting that treat their deviations together/jointly. These results seem robust to variations in priorities.

Model uncertainties likewise show the Taylor rule to be robust, in that it continues to outperform nominal income targeting in both targets, albeit by smaller margins as the expectations mechanism gets more powerful (anticipated in McCallum 1997). Finally, the Taylor rule with real-time information errors in the output gap measure beats both income targeting rules without any such errors on all criteria except the most extreme errors case. Hence, the case for nominal income targeting, rather than a Taylor rule, looks very weak.

Against that, a recent paper by Beckworth and Hendrickson (2015) claims the opposite. But the simulations in this study operate with ex-post data and therefore take no account of the data errors and revisions in output or the output gap. If they were included, the nominal income targeting performance would deteriorate relative to inflation targeting (unaffected) and to a conventional Taylor rule with a small coefficient on output (minimally affected) – potentially reversing the paper's conclusions. Also the policy rules are not optimised, so the Taylor rule's inferior performance may simply be because the rule was poorly chosen.

A different study by Clark (1994) examines the impact of decision lags and errors in the forecasted adjustment needed. Compared to history, and in the absence of implementation and decision lags, nominal income targeting would have lowered the output and inflation deviations from target. But add those lags back in and those deviations get larger. Thus, in the more realistic case, nominal income targeting has made things worse.

5. POLITICAL ECONOMY: SHOULD THE ECB TARGET EUROZONE NOMINAL INCOME OR NATIONAL NOMINAL INCOMES?

The Euro economy is unique in that it offers the possibility of targeting Euro-zone nominal incomes or allowing national policymakers to target their own national incomes. The same possibility arises in all federal or decentralised economies of course, albeit to a smaller extent. But what distinguishes the Euro-zone from other economies is that national income is still very much the focus of policy in member states, those states are still sovereign, and they still control nearly all the policy instruments outside monetary policy.

So while the answer must appear obvious at a formal level, the ECB cannot run separate national monetary policies, and is not allowed by statute to take a national view when setting monetary policy, it is far less obvious in a world of practical politics. First the ECB can always follow a course of monetary federalism (as often suggested). Second, it is naive to suppose that the introduction of nominal income targets would not intensify the demands that national income targets should be taken into consideration. In fact, it is unlikely that member states, under pressure from their electorates⁹, would not increase their efforts to reach their own targets for output and employment, which is to place an even greater burden on fiscal policies than we have seen in the years since the introduction of the Euro itself. Even if the fiscal compact were able to rule that out, which is far from certain, there are ways around those restrictions: easing prudential and/or financial conduct regulation, structural reform by sector, monetary federalism.

The ECB would no doubt recognise the power of these political pressures and might reasonably refuse to adopt nominal income targeting as a consequence.

⁹ See, for example, Demertzis, Hughes Hallett and Viegli (2004).

6. CONCLUSION

From the ECB's point of view, nominal income targeting is a feasible regime, but probably with as many drawbacks as advantages. On the positive side: it is easily understood, it accommodates beneficial supply shocks, provides stronger responses in bad times, and is a more efficient rule when supply responses are limited or structural reform is needed.

The drawbacks are: inflexibility, problematic policy responses when prices and output react at different speeds, it may overreact or destabilise, and is robust to real time measurement errors. In addition, it appears to be less effective than the flexible form of Taylor rule that the ECB now uses. Nominal income targeting may be feasible, but probably not desirable

REFERENCES

- Bean, Charles (1983) "Targeting Nominal Income: An Appraisal", *Economic Journal*, 93, 806-19.
- Bean, Charles (2013) "Nominal Income Targets: an Old Wine in a New Bottle", speech given at the Institute of Economic Affairs, 27 February 2013, available at www.bankofengland.co.uk/publications/speeches/2013/speech640.pdf.
- Beckworth, David and J. Hendrickson (2015) "Nominal GDP Targeting and the Taylor Rule on an Even Playing Field", mimeo, Universities of Western Kentucky and Mississippi.
- Clark, Todd E. (1994) "Nominal GDP Targeting Rules: Can they Stabilise the Economy?" *FRB Kansas City Economic Review*, Third Quarter, 11-25.
- Crook, Clive (2011) "The Fed Must Fix on a Fresh Target", *Financial Times*, August 14.
- Demertzis, M., A. Hughes Hallett and N. Viegi (2004) "An Independent Central Bank Faced by Elected Governments" *European Journal of Political Economy*, 20, 907-22.
- Feldstein, Marin and James Stock (1994) "The Use of a Monetary Aggregate to Target Nominal GDP" in G. Mankiw (ed) "Monetary Policy", Chicago University Press, Chicago.
- Gordon, Robert (1985) "The Conduct of Domestic Monetary Policy", in A. Ando et al (eds) "Monetary Policy in Our Times", MIT Press, Cambridge, MA.
- Hall, Robert and Gregory Mankiw (1994) "Nominal Income Targeting" in G. Mankiw (ed) "Monetary Policy", Chicago University Press, Chicago.
- Hughes Hallett, Andrew (1979) "Computing Revealed Preferences and Limits to the Validity of Quadratic Objective Functions for Policy Optimisation", *Economics Letters*, 1979, 2, 27.
- Hughes Hallett, A. and N. Acocella (2015) "Forward Guidance: Stabilisation and Stabilisability under Endogenous Policy Rules at the Zero Lower Bound", mimeo, Universities of St Andrews and Rome.
- Hughes Hallett, A., R. Kattai and J. Lewis (2012a) "How Reliable are Cyclically Adjusted Budget Balances in Real Time?" *Contemporary Economic Policy*, 30, 75-92.
- Hughes Hallett, A., N. Acocella and G. di Bartolomeo (2012b) "Expectations Dynamics: Policy Announcements and the Limits to Dynamic Inconsistency", *Studies in Nonlinear Dynamics and Econometrics*, 16.
- Libich, J., A. Hughes Hallett and P. Stehlik (2011) "Welfare Coordination of Fiscal and Monetary Policy", *Czech Economic Journal*, 5, 7-27.
- McCallum, Bennett (1988) "Robustness Properties of a Rule for Monetary Policy", *Carnegie-Rochester Conference Series on Public Policy*, 29, 173-204.
- McCallum, Bennett (1997) "The Alleged Instability of Nominal Income Targeting" Working Paper 6291, NBER, National Bureau for Economic Research, Cambridge, MA.
- Meade, James E. (1978) "The Meaning of Internal Balance", *Economic Journal*, 88, 423-35.
- Meade, J. E., David Vines and J. Maciejowski (1983) "Stagflation: Demand Management" Allen and Unwin, London.
- Mishkin, Frederic (2002) "The Role of Output Stabilisation in the Conduct of Monetary Policy", *International Finance*, 5, 213-27.
- Koenig, Evan F. (2012) "All in the Family: The Close Connection between Nominal GDP Targeting and the Taylor Rule", *FRB Dallas Staff Papers*, 17, 2-9.

- Romer, Christina (2011) "Dear Ben: It's time for Your Volker Moment", *New York Times*, October 29.
- Rudebusch, Glenn D. (2002) "Assessing Nominal Income Rules for Monetary Policy with Model and Data Uncertainty", *Economic Journal*, 112, 402-432.
- Summers, L. H. (2014) "US Economic Prospects: Secular Stagnation, Hysteresis and the Zero Lower Bound", *Business Economics*, 49, 65-73
- Sumner, Scott (2014) "Nominal GDP Targeting: a Simple Rule to Improve Fed Performance", *Cato Journal*, 34, 315-337
- Tobin, James (1980) "Stabilisation Policy Ten Years After", *Brookings Paper on Economic Activity*, 11, 19-90.
- Turner, Adair (2013), "Debt, Money and Mephistopheles: How do we get out of this mess?" Group of Thirty, Washington DC: www.group30.org/images/PDF/ReportPDFs/OP%2087.pdf
- Weale M., A. Blake, N. Christodoulakis, J.E. Meade and D. Vines (1989) "Macroeconomic Policy: Inflation, Wealth and the Exchange Rate", Unwin and Hyman, London.
- Woodford, Michael (2013) "Monetary Targets After the Crisis", <http://imf.org/external/np/seminars/eng/2013/macro2/pdf/mw2.pdf>

ANNEX A

Nominal income targeting as a special case of a Taylor Rule

(or inflation targeting in a Taylor Rule, but a generalisation of pure inflation targeting)

Let r denote the nominal interest rate, specifically the policy rate operated by the central bank. Then the policy rule to be used in a nominal GDP targeting regime can be written as:

$$r = \bar{r} + [\log GDP - \log GDP^*]$$

where "*" denotes a target value, \bar{r} is the equilibrium interest rate when the economy is fully in balance, and units of GDP have been chosen so that the coefficient on the $[\log GDP - \log GDP^*]$ term is unity. Using the fact that $\log GDP = \log P + \log Y$, where P is the price index and Y is real national income (output), we can write the decision rule as:

$$r = \bar{r} + [\log P + \log Y - \log P^* - \log Y^*]$$

$$\text{or } r = \bar{r} + [\log P - \log P_{-1} + \log Y - \log P^* + \log P_{-1} - \log Y^*]$$

where subscript "-1" means the previous period's value. Generalising, so that the inflation term and the real income/output term may if desired have differential impacts on the policy decision, we can rewrite this policy rule as:

$$r = \bar{r} + a[\log(P/P_{-1}) - \log(P^*/P_{-1})] + b[\log Y - \log Y^*]$$

Comparing this expression with those above shows that a nominal income targeting rule is to adjust interest rates in response to inflation deviations and output gap with weights specialized to $a = b = 1$. In contrast, the conventional Taylor rule has $a > 1$ (the so called Taylor principle) and $b > 0$ but small.

Hence, to get to nominal income targeting we need to raise b while lowering a till we reach $a = b = 1$. It is therefore a restricted form of the traditional Taylor rule. Put differently, with nominal targeting it becomes very difficult to steer where you want the policy impact to fall: on output and employment (Y) or the price level or inflation (P). On the other hand, pure inflation targeting is a special case of nominal income targeting with $b = 0$ (and probably $a = 1$) and is therefore less flexible than a nominal income targeting regime – which, in its turn, is less flexible than the Taylor rule.

ANNEX B

Supply side responses: when can a nominal income targeting regime be effective?

(adapted from Bean (1983))

We start with the labour market since the purpose of nominal income targeting is to give some priority to stabilising national income and employment around their equilibrium levels, compared to what may happen in other monetary policy rules or regimes. We can write labour demand as

$$L_t^d = \frac{1}{a} [-\log W_t + \log P_t + b + s_t],$$

where W_t denotes the current wage level, s_t = a possible productivity shock, $b = \log(1-a)$ where $(1-a)$ represents labour's share of national income (implying a is the capital share, hence $0 < a < 1$). Meanwhile labour supply will be given by

$$L_t^s = \frac{1}{d} [\log W_t - \log P_t - c]$$

where $d > 0$ and c is a constant. Equilibrium in the labour market is achieved where demand and supply are equal ($L_t^d = L_t^s$), which happens when wages adjust to balance the two:

$$\log W_t^* = \log P_t + \frac{ac + bd}{a + d} + \frac{ds_t}{a + d}.$$

Assuming labour contracts are set one period in advance on the basis of the market clearing wage to be expected at that point, actual labour demand can be obtained by substituting the expected value of W_t^* into the demand equation above:

$$\log L_t^d = \frac{1}{a} [\log P_t - E_{-1} \log P_t + s_t - \frac{d}{a + d} E_{-1} s_t + b - \frac{ac + bd}{a + d}]$$

where " E_{-1} " denotes the expectation of a variable given the information available one period earlier. But national output (income) will be defined by $\log Y_t = (1-a) \log L_t + s_t$, the economy's production function where capital input has been normalised at one and the labour input is employment demanded in period t . Hence:

$$\log Y_t = \frac{(1-a)}{a} \left[\log P_t - E_{-1} \log P_t - \frac{d}{a + d} E_{-1} s_t + b - \frac{ac + bd}{a + d} \right] + \frac{s_t}{a}.$$

Taking expectations as before, the deviation of output/national income from what would have been projected one period earlier is given by:

$$\log Y_t - E_{-1} \log Y_t = \frac{(1-a)}{a} [\log P_t - E_{-1} \log P_t] + \frac{1}{a} (s_t - E_{-1} s_t).$$

That implies the equilibrium (full information) output level will be, at equilibrium wages:

$$\log Y_t^* = \frac{(1-a)}{a} \left[b - \frac{ac + bd}{a + d} + s_t - \frac{ds_t}{a + d} \right] + s_t,$$

and hence that

$$\log Y_t - \log Y_t^* = \frac{(1-a)}{a} [\log P_t - E_{-1} \log P_t] + \frac{(1-a)d}{a(a+d)} (s_t - E_{-1} s_t).$$

If we now write nominal GDP as $X_t = Y_t P_t$, this last expression becomes

$$\log Y_t - \log Y_t^* = \frac{(1-a)d}{a+d} [\log X_t - E_{-1} \log X_t] + \frac{(1-a)}{a+d} (P_t - E_{-1} P_t).$$

Stabilisation policy will aim to minimise deviations of output from target: $\log Y_t - \log Y_t^*$. This can be done successfully by targeting nominal income, that is $\log X_t - E_{-1} \log X_t$, if $\frac{(1-a)}{a+d}$ is zero or at least very small. That will happen if $d \rightarrow \infty$ or very large; or if $a \rightarrow 1$. Under those conditions, nominal income targeting will eliminate any deviations of real output from its full information target level. Two conclusions now follow:

- i) Nominal income targeting is optimal if labour supply, and hence the supply side more generally, is totally *inelastic* and is an effective policy rule if labour supply is very inelastic.¹ Otherwise it will not be effective as a policy rule.
- ii) Conversely, nominal income targeting becomes steadily less effective as $a \rightarrow 1$ and/or d diminishes. In other words, nominal income targeting rules become less effective the more unequal is the distribution of income or the less responsive is the labour market – because the recovery would then have less impact on employment and hence employment incomes.

¹ Note that d is the *inverse* of the labour supply elasticity.

NOTES

DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Is nominal GDP targeting a suitable tool for the ECB's monetary policy?

**Wolfgang LECHTHALER, Claire A. REICHER,
Mewael F. TESFAELASSIE,**

IN-DEPTH ANALYSIS

Abstract

We seek to clarify whether or not nominal GDP targeting (NGDP) may be a suitable tool for the ECB's monetary policy. We argue that this question really consists of three distinct but related questions: (1) Is it better for the ECB to put more weight on output than it does currently, by switching to a NGDP target? (The theoretical evidence suggests, maybe, but this depends on the distortions faced by the economy.) (2) Should a NGDP (or inflation) target be formulated in rates of growth, or in levels? (The theoretical evidence suggests that a levels target may have some appealing properties, by stabilizing expectations.) (3) What technical issues remain to be addressed? (Issues include the selection of an operating instrument, difficulties in estimating trends, data revisions, and communication.) Altogether, we argue that thinking about nominal GDP targeting in this way might help to clarify what is otherwise a confusing debate.

CONTENTS

EXECUTIVE SUMMARY	29
1. INTRODUCTION	30
2. BACKGROUND: THE HISTORICAL AND CURRENT DEBATE	32
3. THEORETICAL CONSIDERATIONS	33
3.1. Background: the New Keynesian model	33
3.2. Strict inflation targeting: the divine coincidence	34
3.3. But the devil is in the details: flexible inflation targeting	34
3.4. Through which instruments should a target be achieved?	35
3.5. Changes or levels?: Forward guidance and level targeting	36
4. IMPLEMENTATION	39
4.1. Main issues related to implementation	39
4.2. Practical challenges specific to inflation targeting	40
4.3. Practical challenges specific to nominal GDP targeting	40
5. CONCLUSION	42
REFERENCES	43

EXECUTIVE SUMMARY

- The slow recovery from the Great Recession across the developed world has led to a debate about whether nominal GDP targeting could provide a useful alternative to inflation targeting.
- A nominal GDP target and an inflation target are conceptually similar, except for the fact that a nominal GDP target puts equal weights on (domestic producer price) inflation and real output in the medium run, while a strict inflation target puts more weight on some measure of inflation in the medium run. However, both targets, if implemented properly, should be expected to stabilize inflation in the long run.
- Based on this setup, we argue that the debate about a nominal GDP target actually involves three questions.
- The first question is, how much should central banks take real GDP into account when working to stabilize inflation? Here, the policy evaluation literature provides some support for taking real GDP into account, although this question is far from settled.
- The second question is, should a price level target or a NGDP target be in levels, or in rates of change? Here, the policy evaluation literature tends to support the idea that a target should be in levels, since this may help to stabilize expectations and to provide stimulus at the zero lower bound.
- The third question is, what factors should be taken into account when implementing a target? Here, as important factors, we point to difficulties in estimating trend growth (which in the case of NGDP targeting can cause the central bank over the medium run to set a NGDP target path that is at odds with a stable inflation rate), data revisions (which may favor strict inflation targeting), and communication (which can go either way). We also discuss unresolved issues related to the selection of an operating instrument (e.g. an interest rate rule, or futures markets in prices or NGDP).
- All in all, we believe that a NGDP target might provide a workable alternative to stricter forms of inflation targeting, although there remain unanswered theoretical and practical questions.

1. INTRODUCTION

The slow recovery from the Great Recession across the developed world has led some commentators to propose nominal GDP (NGDP) targeting as an alternative to strict inflation targeting. The idea behind NGDP targeting is twofold: to provide a flexible alternative to strict inflation targeting by taking movements in real GDP into account, and to provide forward guidance (and stabilize expectations) by specifying a path for future NGDP. Here, we discuss some of the theoretical and practical issues related to the choice of a target, and we also discuss whether that target should be in rates of change, or in levels. Then we go on to discuss some practical issues related to implementation. While we do not take a firm position on whether a NGDP target or an inflation target is inherently desirable, we outline some of the tradeoffs that policymakers face in their choice of a target. We do this by noting that a NGDP target is not radically different from a flexible inflation target, when the latter puts equal weights on prices and real output. Because of this similarity, we argue that the debate about NGDP targeting actually revolves around three related questions: (1) How much should the central bank take output into consideration when targeting a nominal quantity in the medium run?; (2) If the central bank were to target a nominal quantity, should it target rates of change or levels?; and (3) What issues are there related to the implementation of such a target? We argue, based on a review of the literature, that the desirability of NGDP targeting depends on the types of distortionary shocks and frictions faced by the economy. However, the choice of a growth rate target or level target is independent from this consideration, motivated instead by the possible desire to provide more “forward guidance” on the future path of inflation. This type of forward guidance is expected to have effects on current outcomes through a combination of higher inflation and lower real interest rates. We also point out some technical issues that are likely to affect the implementation of a NGDP target, the main ones having to do with the estimation of trend growth, data revisions, and communication. In this context, we hope to clarify the main tradeoffs faced by policymakers.

First, we must define what we mean when we talk about an inflation target or a NGDP target. An *inflation target* (or a *NGDP target*) is a rule for setting a policy instrument, either explicitly (e.g. an interest rate rule, following Taylor (1993)) or implicitly (e.g. by directly targeting a given aggregate and then finding which paths for a given instrument support that target, following Svensson (2003)). Under strict inflation targeting, the instrument primarily seeks to achieve a particular path for a measure of inflation. Under NGDP targeting, the instrument seeks to achieve a particular joint path for prices and real GDP, which together form NGDP. The current debate is mainly about targeting a specific level of NGDP, but the rule could also be formulated in terms of growth rates.

The choice of a target has been a major theme in the policy evaluation literature, some of which is based on small analytical constructs of the economy, and some of which is based on statistical simulations of the economy. This literature provides partial (but not complete) support for targeting output along with inflation (flexible inflation targeting). The theoretical outcomes of these exercises depend on which types of shocks and frictions feed through into business cycles. When the only distortions faced by the economy are caused by sluggish price-setting, then strict inflation targeting is sufficient to achieve an optimal outcome. However, this is not a realistic assumption. More realistic distortions include distortions such as real demand shocks, sluggish wage-setting, and labor market frictions; these distortions tend to imply that an inflation target should exhibit more flexibility, by putting at least some weight on GDP. This provides some support for the idea of a NGDP target, although we consider this far from a settled question. As to the other question of targeting levels versus rates of growth, the literature has tended to find that a level target might provide additional stimulus at or near the zero lower bound of nominal interest rates,

and such a target might reduce the frequency of severe recessions in which the zero lower bound is actually hit, because expectations are more stable. This issue also motivates the debate about quantitative easing, which is explained by Gern et al. (2015).

As far as issues related to implementation are concerned, a strict inflation target can be simpler in certain ways to implement than either a flexible inflation target or a NGDP target, because revisions to the data on inflation are small, while revisions to the data on NGDP or real GDP are larger. Moreover there is considerable uncertainty about potential output growth. These are problems discussed in great detail by Orphanides and Williams (2002), Rudebusch (2002), and Goodhart et al. (2013). However, a counter-argument suggests that a NGDP target, even if in levels, would make it easier to avoid issues related to the measurement of the output gap. Additional arguments in favor of NGDP targeting involve the idea that it is easier to sell more stable nominal incomes to the public during bad times, and that a NGDP level target per se would increase the degree to which monetary policymakers are held accountable, by providing a measurable outcome.

To summarize, the theoretical evidence suggests that an explicit NGDP target, especially in levels, could possibly help the central bank to promote long-run price stability while allowing for a short-run response to output. However, this evidence is still relatively uncertain, and in the meantime, we find it useful to clarify the debate about what should and should not be expected to be achieved with a NGDP target.

2. BACKGROUND: THE HISTORICAL AND CURRENT DEBATE

In fact, the debate on NGDP targeting can be seen as an outgrowth of an older debate on inflation targeting or on other forms of targeting (e.g. money-supply targeting). That debate stemmed from the high and variable inflation of the 1970s, followed by the disinflation of the 1980s. The pressing problem at that time was to re-anchor inflation expectations and to ensure credibility, while still retaining the flexibility to respond to economic disturbances. In fact, nominal GDP targeting was already part of this debate by the late 1970s, thus predating inflation targeting, but theoretical and practical considerations led central banks (e.g. the Reserve Bank of New Zealand, the Bank of England, and the Chilean and Czech central banks) to adopt inflation targeting instead. Some of these considerations include the fact that central bankers at that time faced a large problem with inflation stabilization, that an inflation target is simple, the issues related to data revisions, and transparency. Furthermore, these considerations also led to the ECB's primary mandate of "price stability", moderated by a two-pillar approach, in which the two pillars represent the real and monetary sides of the economy. However, the experience of central banks with a broader mandate (such as the Fed, post-Humphrey-Hawkins) has shown that it is possible to explicitly put a larger weight on output while still targeting a low and stable medium-run inflation rate (as in the rule of Taylor (1993)); such a setup would represent a flexible inflation target. Within this context, Hall and Mankiw (1994) showed that a nominal GDP target can perform well in comparison with other possible targets for monetary policy.

In the current post-crisis context, proponents of NGDP targeting argue that the strategy would have put monetary policy on a more accommodative stance than that implied by an inflation targeting framework, and that such a policy stance would have mitigated the severity of the Great Recession. This is a different argument from that presented in the 1970s through the 1990s. A leading proponent of this view is Scott Sumner (2011). In this view, the fact that inflation was remarkably stable during the Great Recession, while output was not, implies that inflation targeting as currently practiced places too much weight on inflation stabilization and too little weight on output stabilization (in levels). A related debate related to "forward guidance" has explored whether or not an explicit target path for prices or NGDP in levels could help to push expectations in a more expansionary direction, which would help to provide stimulus to a depressed economy. Advocates of NGDP level targeting point toward both arguments as reasons why such a framework should replace inflation targeting. However, the exact effects of NGDP targeting remain open, and the theoretical policy evaluation literature has come to conflicting conclusions.

3. THEORETICAL CONSIDERATIONS

Analyzing the theoretical properties of a NGDP targeting regime boils down to answering two questions: a) whether the monetary authority should target just some measure of prices or also some measure of real activity in the medium run, while maintaining long-run price stability; and b) whether the monetary authority should target the level of prices (and potentially output) or the rates of change of these variables (inflation and output growth). Table 1 illustrates this distinction, by presenting a menu of different targeting regimes.

Table 1: A menu of targeting regimes

	Rate of change	Level
Prices only	Strict inflation targeting	(Strict) Price level targeting
Prices and GDP	Flexible inflation targeting (e.g. Taylor rule, NGDP growth targeting)	NGDP level targeting

We note that the different targeting regimes in this table may look at different measures of prices or output—for instance, central banks tend to stabilize some index of consumer prices, while the price level embodied in NGDP (the GDP deflator) is more related to producer prices (the GDP deflator). While Aoki (2001) finds that this distinction matters in theory, in what follows, we abstract from this distinction. Instead, we discuss the likely broad effects of each of these different targeting regimes in terms of macroeconomic stabilization and welfare. However, first, we discuss the theoretical channels through which some of these effects are likely to flow. These theoretical channels then influence whether or not it is appropriate to engage in a strict or flexible targeting regime, and whether it is appropriate to target rates of change or levels.

3.1. Background: the New Keynesian model

Most recent academic research on monetary policy has been conducted using the so-called New Keynesian model.¹ The New Keynesian model represents the “New Neoclassical Synthesis”, in the words of Goodfriend and King (1997). This model assumes some sort of nominal rigidity; for instance, either prices or wages might only adjust sluggishly. This sluggish adjustment not only implies that monetary policy can have real effects in the short run (but not the long run), but also implies that the response of the economy to shocks can be inefficient. This is important, because an inefficient response of the economy to shocks might justify a limited response of monetary policy to output. In this framework, an expansionary monetary policy stimulates aggregate demand by lowering the nominal interest rate. This puts upward pressure on nominal income, which in the long run is reflected purely through an increase in prices. However, in the short run, prices change sluggishly, and as a result, firms partially accommodate the rise in demand through a temporary rise in output.

However, this effect does not necessarily imply that monetary policy should always be used to stimulate real output. This is for two main reasons. First of all, inflation is costly, because inflation causes price signals to become distorted. This is because some prices adjust more quickly than others, which in turn causes consumers to consume an inefficient bundle of goods. Secondly, an optimal level of GDP would balance the marginal cost of producing more output (e.g. by making people work more and work harder) with the

¹ While we believe that this model provides a useful starting point to discuss the likely economic consequences of NGDP targeting, this model does not directly address institutional, political, or legal questions.

benefit of consuming more output. If GDP were already at its optimal level before the monetary policy intervention, then an expansion in GDP would actually make people worse off. As a result, it is necessary to think about what an optimal level of output would look like, before engaging in a monetary intervention. If the gap between output and its optimal level is large in either direction, then this would motivate using monetary policy to partly work against this output gap.

3.2. Strict inflation targeting: the divine coincidence

Since the most basic version of the New Keynesian model abstracts from real imperfections, that model implies that a strict inflation target also implies a zero output gap, at all times. This property of that model is known as the “divine coincidence”. To understand this property, we consider the effects of an aggregate labor productivity shock, which is an example of a supply shock. Examples of positive labor productivity shocks include good weather, a higher domestic supply of energy, or an improvement to technology. These types of shock work by lowering the effective cost of producing a given amount of output, which puts downward pressure on prices. However, because prices only adjust sluggishly, firms respond to high labor productivity partly by lowering prices, and by raising output by less than they otherwise would have. The result is a rate of inflation and a level of output that are both too low, relative to their optimal levels, or those that would have occurred if prices were flexible.

In this case, since an expansionary monetary policy raises both inflation and GDP, such a policy can push the economy towards the desired outcome. In fact, by using monetary policy to keep the price level fully stable, monetary policymakers can close the output gap (the deviation of output from its optimal level). This property of the basic New Keynesian model is known, in the words of Blanchard and Galí (2007), as the “divine coincidence”. This coincidence can justify strict inflation targeting. It is important to keep in mind that this coincidence can occur not because stable inflation is the only relevant goal for the monetary authority, but because stable inflation automatically implies no output gap, when fluctuations in output are driven by productivity shocks.

3.3. But the devil is in the details: flexible inflation targeting

The divine coincidence provides an important benchmark, but it hinges on a number of strong assumptions that are likely to be violated in practice. Furthermore, it is at odds with the thinking of central bankers, who perceive a tradeoff between inflation stabilization and output stabilization (again see Blanchard and Galí (2007)). In what follows, we highlight three types of market imperfections under which the divine coincidence might not hold: i) shocks that cause the economy to become more distorted, such as a shock that results in an inefficient tradeoff between work and consumption, or a shock to the market power of firms. These shocks tend to push inflation and output in opposite directions; ii) a situation in which both prices and wages adjust sluggishly; in this case price stability is not sufficient to close the output gap; and iii) frictions in markets, for instance, search frictions in labor markets. In all these circumstances the level of output under price stability may differ from the efficient level of output, which implies a non-zero output gap. This in turn implies a tradeoff between stabilizing inflation and stabilizing the output gap.

The first situation represents any shock which increases the amount of distortions faced by the economy; these distortions push output away from its efficient level, thus creating an output gap. Such shocks operate by making it less profitable to produce output, which causes firms to employ fewer workers. Furthermore, these shocks also put upward pressure on the overall price level. The classic examples of such shocks are a change to the tradeoff between work and consumption (“labor wedges” in the literature), an increase in labor taxes, or an increase in the monopoly power of firms (“markup shocks” in the literature).

This type of shock increases the cost of production, which can put upward pressure on the price level even when the output gap does not change (or, equivalently, put downward pressure on the output gap even when the price level does not change). As a result, in such a situation, the monetary authority cannot keep inflation stable while also keeping the output gap closed. Instead, the optimal thing for the monetary authority to do is to recognize the tradeoff between strictly stabilizing inflation and stabilizing the output gap, and to allow for a somewhat higher inflation rate when the output gap is negative. The purpose of such a policy (flexible inflation targeting) is to put some weight on output stabilization, while still recognizing that the main responsibility of the central bank is to stabilize inflation. In this context, a NGDP target could perform well, relative to an inflation target that did not take GDP into account.

The second situation is one in which both prices and wages adjust sluggishly. This is especially an issue in response to productivity shocks, because it is optimal for real wages to move in line with (marginal) productivity. However, under strict inflation targeting, the price level would not be allowed to adjust, leaving nominal wages to adjust. However, if nominal wages were also to adjust sluggishly, then real wages would also adjust sluggishly. This is not optimal, since this causes firms to hire and fire people needlessly. In this case, after a positive productivity shock, allowing the price level to decrease can help real wages to adjust more quickly, which should also help to stabilize labor markets. In this case, strict inflation targeting would not be optimal, and there would also be benefits to moving toward some form of flexible inflation targeting. In fact, Garín, Lester, and Sims (2015) show that a NGDP target can perform relatively well in such a situation.

The third situation is one in which markets are subject to important real frictions, like financial frictions (collateral constraints, incomplete markets, or imperfect information) or labor market frictions (hiring and firing costs, unemployment, or other restrictions). While these frictions are extremely important in the real world, the standard New Keynesian model abstracts from these frictions. The academic literature on these frictions has shown that these frictions can (but need not) imply a tradeoff between stabilizing inflation and the output gap. For instance, labor market frictions might make it costly and time-consuming for firms to hire workers and for workers to find jobs. These frictions produce unemployment, a certain share of which represents an efficient way to move workers from old jobs to new jobs. However, when the bargaining environment is not efficient, these frictions can also cause employment and output to adjust inefficiently in response to shocks. In this situation, Faia (2009) and others show that it would not necessarily be optimal to strictly focus on inflation, but instead to undo some of these inefficient responses. (A similar set of arguments could be made about the optimal response to an economy beset by financial frictions or even financial crises.) As a result, it could be reasonable for policymakers to adopt a more flexible inflation target, although Ravenna and Walsh (2012) and Bullard (2013) argue that this type of target, in practice, can look much like a strict inflation target, because the optimal response to the output gap is rather small.

3.4. Through which instruments should a target be achieved?

So far our discussion has been focused on the choice of a target. An open question is how these targets should be put into practice. Motivated by this question, much of the policy literature has focused on a situation in which the central bank uses an interest rate as its instrument. Such a rule of thumb can be motivated by the idea that it is unrealistic to expect the central bank to be able to engineer an optimal outcome at all times, given that central banks are uncertain about the exact shocks and frictions faced by the economy. Instead, the idea is that the central bank can achieve a reasonable outcome by implementing a flexible inflation target by responding to inflation and output (and, in principle, other things) in a prescribed way. For instance, Taylor (1993) analyzes the

conduct of monetary policy in the US during the 1980s and 1990s. He finds that movements in the Fed Funds rate can be very well described by a simple rule that relates the nominal interest rate (here, the Fed Funds rate) to the natural interest rate (the interest rate that is consistent with stable inflation), the inflation rate, and the output gap. This rule takes the form:

$$Int_t^{actual} - Int_t^{natural} = \alpha(Infl_t^{actual} - Infl_t^{desired}) + \beta(Gap_t),$$

where the gap between the actual and natural interest rates (Int_t^{actual} and $Int_t^{natural}$) is a function of the gap between the actual and desired inflation rates ($Infl_t^{actual}$ and $Infl_t^{desired}$), and the output gap is given by (Gap_t). In this equation, Taylor recommends a response to inflation α of 1.5 and a response β to the output gap of 0.5. These responses are meant to capture the intended behavior of the central bank in response to its perceived tradeoff between inflation stabilization and output stabilization.

The key point is that this so-called Taylor rule can also be interpreted as a form of flexible inflation targeting, since this rule gives weight to both inflation and the output gap. The weight of both coefficients is subject to an ongoing debate; however, Janet Yellen (2012), the chair of the board of the Federal Reserve System, has recently argued for a stronger weight β on the output gap. This discussion about the relative weight of inflation and output gap is closely related to the discussion about NGDP targeting, because nominal GDP is the product of inflation and real GDP, and thus a nominal GDP target would automatically give equal weight to both variables.

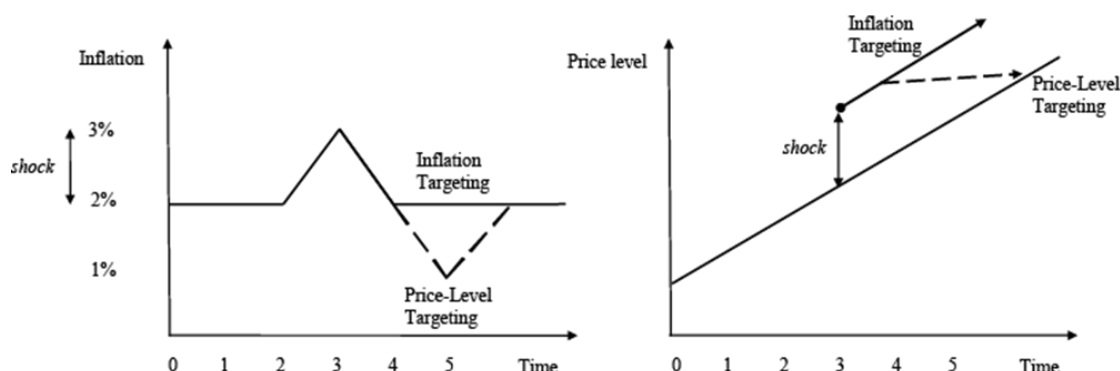
3.5. Changes or levels?: Forward guidance and level targeting

While the US, Europe, and elsewhere experienced relatively stable inflation and GDP from about the mid-1980s through the mid-2000s, this has been less true since the crisis. Instead, the crisis has presented several challenges. For instance, in response to the crisis, it became more difficult to engage in expansionary monetary policy once short-term nominal interest rates effectively reached their zero lower bound (ZLB). As a result, policymakers have resorted to unconventional measures such as quantitative easing and forward guidance. Forward guidance in particular is where price-level or NGDP-level targeting may come in useful, since a level target could provide forward guidance about future policy actions, and this guidance could be used to influence expectations. This setup is different from the forward guidance that central banks such as the Fed and the Bank of England had actually followed during the crisis. For instance, in 2011, the Fed adopted time-based forward guidance, with the intention to keep the policy rate unchanged for, "an extended period." This time-based guidance was replaced in 2012 by threshold-based guidance, with the Fed promising to keep rates low "at least as long as the unemployment rate remains above 6-1/2 percent, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee's 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored." See Floro and Tesfaselassie (2013) for a detailed discussion of this point.

The concept of forward guidance is based on the idea that today's outcomes are affected by expectations about future outcomes, and most importantly, expectations about future GDP and future inflation. For instance, expectations about higher inflation in the future will induce some firms to change their prices by more today. As a result, an expectation of higher future inflation could feed through into higher inflation today. At the same time, these expectations of higher inflation could also stimulate the economy through lower real

interest rates. Thus, while the zero lower bound prevents the monetary authority from lowering the nominal interest rate, the monetary authority can try to indirectly push down the real interest rate by creating expectations of higher future inflation, which feed into higher inflation and output today.

Figure 2: Implications of price level vs. rate of change (inflation) targeting



This figure shows the paths of inflation and the price level after a shock, under inflation (rate-of-change, solid line) and price-level targeting (dashed line). A similar comparison would hold for NGDP growth and level targeting, replacing “inflation” with “NGDP growth” and replacing “price level” with “NGDP level.” Source: Hatcher and Minford (2014).

This is not a completely new idea—Eggertsson and Woodford (2003) proposed a similar type of price level target to address Japan’s extended stay at the zero lower bound. The idea of using such a level target to provide forward guidance is to promise to allow inflation and GDP to remain above target for some time in the future, in order to move toward some pre-set path for prices or NGDP. The implications of this can be seen in Figure 2, for the example of an inflation (i.e. rate-of-change) target versus a price-level target. With a level target, monetary authorities target a predetermined path for the target variables. In the case of an upward target miss (shown in period three), a level target forces an adjustment in policy in order to move back toward the target path. This would entail, for a while, lower inflation. By contrast, a rate of change target like an inflation target would “let bygones be bygones” and act as if the target miss had not occurred. In the current context, an adoption of an NGDP level target or a price-level target based on a pre-crisis trend would cause the ECB to engage in a massive monetary expansion. The idea of such an expansion would be to undo the effects of the recession on nominal GDP, and to push expectations of inflation and growth upward. However, when the catch-up ‘history’ begins is unclear, partly due to uncertainty about post-crisis potential output. The way in which this issue is resolved will likely have consequences for anchoring of long-term inflation expectations going forward. For these and other reasons, some commentators such as Goodhart (2013) have argued against switching to NGDP level targeting.

The key argument in favor of implementing a target path for NGDP rather than engaging in other forms of forward guidance is that other forms of forward guidance could imply that the monetary authority promises to breach its own (inflation targeting) rules in the future. This is because, in order to stimulate the economy today, the monetary authority would promise not to follow its own inflation targeting rule for some time in the future, by accepting inflation above that target. However, once the recession has been overcome, the monetary authority would have an incentive to breach its previous promise and to resume follow its old inflation targeting rule, since once the ZLB no longer binds and the economy has recovered, that rule is optimal. Economists call this problem the “time inconsistency problem,” and this might cause the monetary authority’s credibility to suffer. The key point is that a binding target path of either prices or of NGDP would be meant to help provide some credibility to policymakers, and this credibility would in turn make it easier to provide

forward guidance. (However, Posen (2013) argues that NGDP level targeting would still face this problem.) In providing this guidance, the choice of a price-level or NGDP target should be made based on the same theoretical considerations discussed above.

The theoretical case for NGDP level targeting as a forward guidance tool has been made, among others, by Woodford (2012). Similarly, in a recently published study, Coibion et al. (2012) have found strong theoretical support for price level targeting. Importantly, they take the zero lower bound into account, and they find that under inflation targeting, recessions that are deep enough so that the ZLB becomes binding are rare but costly. They go on to show that price level targeting would result in less-deep recessions and stronger recoveries than would inflation targeting. Furthermore, price level targeting would imply that the ZLB would become binding less often. Therefore, switching from inflation targeting to price level targeting can lead to a substantial improvement in overall welfare, even if there is no foolproof way for such a target to always avoid hitting the zero lower bound. However, we are not yet aware of a study which compares price level targeting with NGDP level targeting, in light of the other theoretical considerations that we consider to be important. Therefore, we still consider the choice of a level target, were one to be adopted, to be an open question.

4. IMPLEMENTATION

4.1. Main issues related to implementation

If the ECB were to decide to target nominal GDP instead of targeting inflation or prices, then it would have to decide how to implement this new target. Some of the issues related to implementation mirror those related to the implementation of an inflation target, while other issues seem to be more specific to the choice of a NGDP target. The first main issue is the choice of a numerical target, based on all of the considerations outlined in Section 3, and on the ECB's own definition of "price stability." The questions that must be answered when setting this target are, given the ECB's definition of "price stability" and estimates of trend GDP growth, what should be the growth rate in NGDP? How does one set a target NGDP path (if in levels), and relative to which periods? And, how does one communicate these targets to the broader public?

The next main issue is the choice of an operating instrument, in order to implement the chosen target. While theoretical studies (for instance, Svensson (2003)) often assume that a central bank like the ECB can accurately hit its target, this assumption is not likely to be met in the real world. For instance, the ECB does not directly control the European price level or GDP—to do so would require an Orwellian level of control—but the ECB does have more control over short-term interest rates and monetary aggregates. In fact, the ECB adjusts these instruments in order to meet its current medium-run target of price stability. Even so, the ECB does not meet these targets with perfect accuracy; instead, it has to adjust its policy in response to past errors, using some implicit or explicit rule.

In fact, this inability to use monetary policy to fine-tune prices or GDP motivates the debate about Taylor rules. Under a Taylor rule, the ECB would increase interest rates whenever inflation or output is above target. It turns out that something like a Taylor rule could also be used to implement NGDP targeting, at least when the zero lower bound does not bind. As Andolfatto (2013) shows, this would entail adding an additional term to represent the past deviation of the *price level* from its long-run path. While the specific implementation of this idea would require more thought, this idea would require relatively few changes from current operating procedures, to the extent that current policy resembles a Taylor rule but with equal weight on inflation and on output.

A more ambitious idea would be to set up a futures market in a price index or NGDP, and then for the central bank to either buy and sell these futures, or otherwise adjust monetary policy, in order to use these futures prices (rather than interest rates) as an operating instrument. To the extent that these futures prices represent accurate forecasts, then this approach should minimize fluctuations in the underlying target. Furthermore, this idea would encourage central banks to act proactively to avoid future target misses, rather than act reactively to past target misses. This idea is known as "market monetarism", in the words of Christensen (2011) and Sumner (2011). While this approach is innovative, the likely consequences of this policy approach are not yet completely clear, and this approach would require the euro area to set up a new array of futures markets. In fact, for these futures markets to make it possible to target NGDP, financial markets would have to be efficient, in the sense of providing accurate forecasts. To the extent that financial markets are not efficient (because of bubbles, market frictions, or policy itself), then targeting futures prices would not completely solve the problems inherent in implementing a NGDP target. Nonetheless, if futures markets were to be set up, they would likely provide some information about the beliefs of market participants, and this information would be useful in implementing the target.

The next issue is, in the case of a level target, how should the ECB go about correcting for policy misses, and how quickly? A quick glance at Figure 2 shows how a fast response to

policy misses could result in stop-and-go policy. However, too slow of a response would result in policy that looks much more like a growth-rate target rather than a level target. This is one tradeoff that the ECB would have to address if it were to set up any kind of level target.

Another issue is related to central bank communication. For instance, Sumner (2011) posits the following scenario. During a period of low inflation, an inflation target calls for higher inflation. However, higher inflation might be difficult to communicate to the public, because the public thinks of higher inflation something bad (i.e. a higher cost of living). In contrast, a NGDP target would call for increase in nominal income, and that might sound more acceptable to the broader public. This is because the public thinks of higher income as something good. The opposite would be true when inflation is high. During a period of high inflation an inflation target calls for lower inflation (which sounds good to the public). In contrast, a NGDP target would call for lower nominal income (which sounds bad to the public). In any case, policymakers who wish to implement an inflation target or a NGDP target would have to think about how they communicate these targets to the public.

4.2. Practical challenges specific to inflation targeting

Although inflation is revised less often than NGDP or real GDP, the measurement of inflation and implementation of a flexible inflation target are also subject to debate. For instance, since the 1996 Boskin commission, many have argued that the CPI exaggerates inflation, because changes to the consumption basket as well as the benefits of new products and quality improvements are not considered sufficiently. There is also the issue of which inflation rate to target—for instance, Aoki (2001) argues that central bankers should target the stickiest prices of the economy, rather than overall prices. In practice, this would mean putting more weight on the stickiest producer prices (which are included in NGDP) than on consumer prices (which include fast-moving food and energy prices, as well as import prices). Additionally, Sumner (2011) argues that the CPI underestimated inflation during the Great Recession because the cost of housing was not measured appropriately. These problems accompany problems with estimating the level of the output gap, which as Orphanides and Williams (2002) show, is an issue with flexible inflation targeting.

4.3. Practical challenges specific to nominal GDP targeting

There are also some challenges that are more specific to a NGDP targeting. These challenges would need to be considered, but they need not rule out NGDP targeting. The first challenge is the prevalence and magnitude of data revisions. While statistics on consumer prices and producer prices are in general not extensively revised, this is not the case for nominal GDP. Nominal GDP is subject to frequent statistical and conceptual revisions, such as the change in national accounting standards from the ESA95 to the ESA10; these revisions make nominal GDP a moving target. In fact, these revisions are so extensive that the New Zealand Herald (2011) reports that the Reserve Bank of New Zealand considers NGDP targeting to be a “complex, technical approach to monetary policy.” This does not rule against a NGDP target, though if such a target were to be adopted, central bankers would have to find a way around this issue.

Other challenges include the slower, less frequent reporting and benchmarking of GDP (quarterly or annual) as opposed to prices (monthly), the use of seasonally adjusted vs. unadjusted data, difficulties in estimating trend growth (so that targeted NGDP can be allowed to grow in such a way to ensure medium-run and long-run price stability), the discrepancies among different measures of nominal GDP (based on an income, expenditure, or production approach), and in the case of “market monetarism”, the setting up and regulation of a new set of futures markets. In particular, problems with estimating trend growth imply that a medium-run NGDP level target may deviate from potential for

considerable periods of time, which in turn may cause some unintended, persistent deviations from price stability. These deviations may come about because after (for instance) a fall in trend real GDP growth, the central bank may take some time to come to this realization. In the meanwhile, the central bank would set an overoptimistic NGDP target path, which given a lower trend rate of real GDP growth, would result in a higher inflation rate than intended. Altogether, these challenges need to be considered if one were to set up a NGDP target, although they do not preclude such a target.

5. CONCLUSION

While it has become popular to discuss NGDP targeting as a radical departure from current policy, we argue that by itself, NGDP targeting would not represent a radical departure from flexible inflation targeting, if carefully done. This is because a NGDP targeting is a special case of flexible inflation (or price level) targeting, merely with a stronger weight on output. This similarity between the two sets of policies makes it possible to discuss the tradeoffs in moving from inflation targeting to a NGDP targeting. We identify major tradeoffs along two dimensions: the choice of a target itself (inflation/prices or NGDP), and the choice of a target in levels or in changes. Both flexible inflation targeting and NGDP targeting use monetary policy to “lean against the wind” in a prescribed, rules-based, manner. This leaning against the wind may or may not be a good thing depending on the shocks and frictions underlying business cycles. For instance, if business cycles are driven by economic distortions, and these distortions cause the economy to fluctuate by too much, then there could be some benefit from using monetary policy in this way. In addition, it is necessary to think of the tradeoffs in choosing a target based on levels or rates of change: is it more useful to let bygones be bygones, or to ensure credibility by promising to correct for past mistakes? Here, there is some theoretical evidence that the latter type of setup would provide stimulus in the current environment (at the zero lower bound), while making a return to such an environment less likely. However, the theoretical and practical debate is not yet completely settled, and further work is necessary to help settle that debate.

Another issue is the interaction between monetary policy and other types of policy (such as macroprudential and fiscal policies, not to mention legal and political issues). These types of policy remain an issue, since the choice of a monetary policy target leaves open problems related to leverage, bubbles, incorrect expectations, and financial and fiscal sustainability. However, at the same time, monetary policy does interact with these other policies. In the event of another financial or fiscal crisis, these considerations will have to be taken into account; in practice this is likely to imply that a flexible target is more realistic than a strict target.

REFERENCES

- Andolfatto, David, 2013. "NGDP targeting and the Taylor Rule." *MacroMania* blog.
- Aoki, Kosuke, 2001. "Optimal Monetary Policy Responses to Relative Price Changes." *Journal of Monetary Economics* 48(1), pages 55-80.
- Blanchard, Olivier and Gali, Jordi, 2007. Real Wage Rigidities and the New Keynesian Model, *Journal of Money, Credit and Banking* 39(1), pages 35-65.
- Bullard, James, 2013. "Some Unpleasant Implications for Unemployment Targeters." speech held at the 22nd Annual Hyman P. Minsky Conference.
- Christensen, Lars, 2011. "Market Monetarism: The Second Monetarist Counter-revolution." Mimeo, Danske Bank.
- Coibion Olivier, Gorodnichenko Yuriy and Wieland Johannes, 2012. "The Optimal Inflation Rate in New Keynesian Models: Should Central Banks Raise Their Inflation Targets in Light of the Zero Lower Bound?" *Review of Economic Studies* 79, pages 1371–1406.
- Eggertsson, Gauti, and Michael Woodford, 2003. "The Zero Bound on Interest Rates and Optimal Monetary Policy." *Brookings Papers on Economic Activity* 1:2003, pages 139-233.
- Faia, Ester, 2009. "Ramsey Monetary Policy with Labor Market Frictions." *Journal of Monetary Economics* 56, pages 570–81.
- Floro, Danvee & Tesfaselassie, Mewael F., 2013. "Can forward guidance be ambiguous yet effective?" *Kiel Policy Brief* 65, Kiel Institute for the World Economy.
- Garín, Julio, Robert Lester, Eric Sims, 2015. "On the Desirability of Nominal GDP Targeting." NBER Working Paper 21420.
- Gern, Klaus-Jürgen, Nils Jannsen, Stefan Kooths, and Maik Wolters, 2015. "Quantitative Easing: What are the key policy messages relevant for the euro area?" *European Monetary Dialogue*, 23 March 2015.
- Goodfriend, Marvin, and Robert G. King, 1997. "The New Neoclassical Synthesis and the Role of Monetary Policy." *NBER Macroeconomics Annual* 1997(12), pages 231-296.
- Goodhart, Charles, Melanie Baker, and Jonathan Ashworth, 2013. "Monetary targetry: Might Carney make a difference?" In: Reichlin, Lucrezia, and Richard Baldwin, eds. *Is Inflation Targeting Dead? Central Bankin After the Crisis*. VoxEU E-book.
- Hall, Robert E., and N. Gregory Mankiw, 1994. "Nominal income targeting." In: *Monetary Policy*, N. Gregory Mankiw, Ed., NBER.
- Hatcher, Michael and Minford, Patrick, 2014. "Inflation targeting vs price-level targeting: A new survey of theory and empirics." VoxEU.
- New Zealand National Herald, 2011. "RBNZ defends monetary policy target." April 16, 2011.
- Orphanides, Athanasios and Williams, John C., 2002. Robust Monetary Policy Rules with Unknown Natural Rates, *Brookings Papers on Economic Activity*, No. 2, pp. 63-118.
- Posen, Adam, 2013. "Cheap talk is no alternative to inflation targeting." In: Reichlin, Lucrezia, and Richard Baldwin, eds. *Is Inflation Targeting Dead? Central Bankin After the Crisis*. VoxEU E-book.

- Ravenna, Federico and Walsh, Carl, 2012. "Monetary policy and labor market frictions: A tax interpretation." *Journal of Monetary Economics*, 59(2), pages 180-195.
- Rudebusch, Glenn D., 2002. Assessing nominal income rules for monetary policy with model and data uncertainty, *Economic Journal* 112, pages 402-432.
- Sumner, Scott, 2011. "Market Monetarism?" *The Money Illusion* blog.
- Svensson, Lars, 2003. What is Wrong with Taylor Rules? Using Judgment in Monetary Policy through Targeting Rules? *Journal of Economic Literature* 41(2), pages 426-477.
- Taylor, John B., 1993. "Discretion versus policy rules in practice." *Carnegie-Rochester Conference Series on Public Policy* 39, pages 195-214.
- Woodford, Michael, 2012. *Methods of Policy Accommodation at the Interest-Rate Lower Bound*. Federal Reserve Bank of Kansas City.
- Yellen, Janet, 2012. Speech held at the Money Marketers of New York University, New York.

DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Flexible inflation targeting vs. nominal GDP targeting in the euro area

Christophe BLOT, Jérôme CREEL, Xavier RAGOT

IN-DEPTH ANALYSIS

Abstract

We assess the pros and cons of nominal GDP targeting vis-à-vis flexible inflation targeting regime. We show that the benefit of a regime shift towards nominal GDP targeting in the euro area might be small. Moreover, nominal GDP targeting is not concerned with financial stability. Finally, targeting nominal GDP would make ECB communication very difficult. If the aim of a regime shift were to bring the ECB to pay more attention to growth, it would be more straightforward to fix a dual mandate and to set an explicit target for real output growth or the unemployment rate.

CONTENT

EXECUTIVE SUMMARY	47
1. INTRODUCTION	48
2. INFLATION TARGETING AND NOMINAL GDP TARGETING: A REVIEW OF THE LITERATURE	49
2.1 Inflation targeting: definition and performance	49
2.2 Nominal GDP targeting	51
3. ECB MONETARY POLICY	53
3.1 Policy rules	53
3.2 Results	54
4. CONCLUSION	58
REFERENCES	59

EXECUTIVE SUMMARY

Nominal GDP (NGDP) targeting has resurfaced in the recent debate on the monetary policy regime. Some economists have argued that it would help central banks to better achieve their mandate. In the US, it would help the Federal Reserve to meet its dual mandate. In the euro area, others claim that it would make economic growth enter the realm of central bankers. The NGDP targeting regime would provide better macroeconomic stabilization properties than its direct competitor, the inflation targeting regime, which has been largely adopted by central banks since the 1990s. In this paper, we aim at assessing the pros and cons of NGDP targeting compared to inflation targeting.

First, it should be reminded that inflation targeting (IT) regimes do not overlook activity. Actually, in flexible IT regimes, the central banks also react to economic activity. Then, flexible IT and NGDP regimes are very close. Our estimates and simulations provide some illustrations on this point. Therefore, the benefit of a change in regime might be very small.

Second, communication issues may arise with the adoption of NGDP as neither the nominal GDP, nor the implicit GDP deflator are variables which are scrutinized by households or firms. As communication plays an important role for the credibility of monetary policy, we consider that such a regime shift would introduce unnecessary difficulties for the ECB without providing much more flexibility.

Third, if the aim is to bring the ECB to pay stronger attention to growth, it would be more straightforward to fix a dual mandate and to set an explicit target for real output growth or the unemployment rate.

Finally, it is not clear whether NGDP targeting would promote financial stability or not. IT regimes have been widely criticised in this respect and the adoption of NGDP targeting would not make central banks be more concerned by financial stability. In our view, promoting financial stability is the main challenge for central banking, an issue on which NGDP targeting does not provide satisfactory answers.

1. INTRODUCTION

The debate on the opportunity of adopting a nominal GDP (NGDP) targeting regime raises the issue of whether the change in central banks' practices would improve the current economic environment. Therefore, this debate raises the issue of the (in)effectiveness of current monetary policymaking. For two to three decades, most central banks have adopted regimes which are considered close to an inflation targeting (IT) regime. There may be some differences though. The Bank of England is, for example, a "pure" inflation targeter, whereas ECB has not adopted this regime, although with its price stability objective, it is close to. The question arises of whether changing the policy regime towards NGDP targeting would improve macroeconomic and financial stability in the euro area in comparison with the IT regime.

In the first part of this paper, we discuss the very nature and objectives of inflation targeting, before surveying empirical research about the economic performance of IT countries and central banks.

In the second part, we test different monetary rules in the euro area and wonder whether IT and NGDP targeting regime are close one to another. If they are, a formal regime shift would not generate many advantages. We also investigate the rooms for manoeuvre that the adoption of NGDP targeting might have brought to the euro area.

Finally, we conclude on the requirement to enhance central bank communication and to improve financial stability. The NGDP targeting regime does not seem well-suited to both objectives.

2. INFLATION TARGETING AND NOMINAL GDP TARGETING: A REVIEW OF THE LITERATURE

2.1 Inflation targeting: definition and performance

A great deal of attention has been paid to IT in the literature devoted to monetary policy during the “Great Moderation”. As such, this strand has advocated a general framing of monetary policymaking, encompassing clear targets, accountable policymakers and a flexible strategy. In the words of its promoters, e.g. Bernanke et al. (1999), inflation targeting should be viewed as a “framework” rather than as a prescription of adopting mechanical rules like the Taylor rule. The essence of IT lies somewhere between rules and discretion, and has been labelled: “constrained discretion”. The IT framework can be related to discipline in that it anchors expectations thanks to the publicly announced inflation target range. But it permits some flexibility: deviations from the target do not incur a loss of credibility and reputation provided the reasons for the deviations are explained to the public. This flexibility gives some leeway to monetary policy and gives IT framework a specific feature that a mechanical use of a Taylor rule cannot retain. Flexibility is also needed to account for the transmission delays of monetary policy. As it takes time for interest rate changes to alter the path of activity and inflation, the central bank cannot tame contemporaneous shocks and then cannot perfectly control current inflation. Consequently, inflation expectations play an essential role in the implementation of IT.

This may explain why most of empirical papers dedicated to inflation targeting do not only focus on inflation performance but also deal with the anchoring of private expectations. Evidence points to lower and better anchored inflation expectations with IT adoption (Johnson, 2002, Levin et al., 2004, Fregert and Jonung, 2008, and Gürkaynak et al., 2010), while there is no significant effect on inflation performance (Cecchetti et al., 2002, Ball and Sheridan, 2003, Angeriz and Arestis, 2007, Lin and Ye, 2007, Genc, 2009, and Cecchetti and Hakkio, 2009). These papers are all confronted with the control group problem enlightened by Gertler (2003) and magnified by the exceptional stability of inflation during the last decade. Insofar as all countries in the world have seen inflation rates decrease, it is difficult in a comparative setting to evidence a change either in inflation expectations or in inflation performance that could be solely attributed to a change in institutions. Besides, some central banks are not considered as inflation targeters as they have not adopted such a regime *de jure* whereas inflation is central in the implementation of monetary policy (it is notably the case of the ECB). The control group may not perform differently from the inflation targeters’ group.

Compared to the literature on the impact of IT on inflation performance or private expectations, a few studies investigate whether the institutional adoption of IT has modified the conduct of monetary policy. A frequent criticism against IT (see the CEPR volume edited by Lucrezia Reichlin and Richard Baldwin, 2013) has been to state that IT central bankers have an exclusive target, inflation, and do not pay sufficient attention to other targets, like output gaps, nominal growth and financial stability. Empirical research on the monetary reaction of IT central banks helps investigate this statement. Seyfried and Bremmer (2003) find a break in the monetary policy reaction functions of six IT countries, and they conclude that IT central banks pay more attention to inflation pressures (proxied by the output gap) than to current inflation (whose coefficient is never significant). In opposition and for the UK specifically, Trecroci and Vassalli (2010) find, using time-varying parameters, higher response to inflation across time (but with a significantly negative interest rate smoothing parameter) and Assenmacher-Wesche (2006), using Markov-Switching VAR, low and non-significant response to inflation before

IT and a higher response afterwards. Davradakis and Taylor (2006) find significant response to UK inflation only since IT adoption but provided the latter is above target. Baxa et al. (2014) find that the response to inflation has become less strong after IT adoption in five IT countries with a TVP model. Creel and Hubert (2015)'s main result is that the adoption of inflation targeting has not led to a stronger response to inflation in Canada, Sweden and the UK. This result is consistent across three econometric models and across alternative specifications regarding the source or the nature of the potential break or the targeted real variable (the output gap or the unemployment rate). Moreover, there is no evidence of a higher response to output which may suggest increased concern about inflation if output is considered as a leading indicator of inflation.

From the most recent literature, two intertwined interpretations may be put forward, based on two supposed benefits of inflation targeting. First, IT - through central bank commitment to a target - is meant to anchor private inflation expectations, which will enable a central bank to control inflation without pursuing aggressive action towards inflation variations. Second, the central bank's decision to lower inflation may have actually led to low and stable inflation, and hence to a lower response to inflation. The credibility of the monetary policy framework change may have thus led to changes in inflation expectations and in the inflation process. Osborn and Sensier (2009) and Faroque and Minor (2009) provide strong evidence of changes in the level and persistence of inflation respectively in the UK around 1992 and in Canada around 1991 when inflation targeting was introduced. Their results are consistent with Benati (2008) for a wider range of countries. Fregert and Jonung (2008) provide evidence of a decrease of inflation expectations through wage agreements in Sweden when IT was implemented. Since long term expectations appear to be better anchored with IT (Gürkaynak et al., 2010), central banks have no reason to increase their response to inflation.

Last, the outcome of Creel and Hubert (2015) suggests that inflation targeting countries which have adopted the IT *framework* have not over-emphasize inflation deviations from target like "inflation nutters" to take the words of King (1997), while the IT *paradigm* common to IT and non-IT central banks in the last decade has made emerge a consensus around the inflation target at a 2% level. The debate on IT adoption might therefore be centered on the level of the inflation target rather than on the supposed over-emphasis of monetary policymakers on inflation at the expense of other policy targets.

The advent of the global financial crisis has certainly revived criticism against IT. Contrary to what had been long taken for granted (see Blot et al., 2015), the objective of price stability has not showed a unique relationship with financial stability. Stated differently, price stability has not produced financial stability. Frappa and Mésonnier (2010) have notably suggested that house prices increases have been higher for countries adopting IT regimes than for non-IT countries. Does this mean that IT has been responsible for the crisis? The empirical literature discussed above shows that the performance of IT countries has not been worse than non-IT countries. In this respect, IT would not be a specific "perpetrator" of the crisis (see the introduction of Reichlin and Baldwin, 2013). Moreover, the anchoring of expectations that IT or IT-like monetary policies (e.g. ECB policies) have performed has been unanimously praised (Gillitzer and Simon, 2015). Finally, Fazio et al. (2015) suggest that banks in countries which have adopted IT regime are more stable and seem to be less vulnerable to global liquidity shocks.

In practice, it has then been shown that countries which have adopted IT regimes have generally not overlooked output performance (and notably the output gap) either because such a variable can be seen as a leading indicator of future inflation or because

central bankers also care about growth and employment performance and consider that monetary policy may help to stabilize the output, at least in the short term. From here, it comes that adopting formally a NGDP targeting would not boil down to adding an indicator of activity in the central banks' objectives or in their reaction function.

2.2 Nominal GDP targeting

The long lasting real crisis stemming from the global financial turmoil of 2007-2008 has revived a debate about a change in monetary policy strategy. The former "Jackson Hole" consensus, according to which central banks should target inflation, has been challenged. Financial stability has now become a major concern and may then become an objective for central banks. Besides, deflation fears have resurfaced with the persistent slack of economic activity notably in the euro area. Under a growing risk of deflation, and considering it finally occurred, a few economists proposed to apply a nominal GDP targeting which would partly disconnect monetary policy from an exclusive inflation target. Nominal GDP targeting consists in adopting a simple feedback rule in which the central bank moves the policy rate in response to deviations of the nominal GDP to a target (defined in level or in growth rate). The target would be defined as the sum of an inflation target and the growth rate of potential output.

In the current deflation context, one important line of reasoning is that a shift from IT to NGDP targeting would permit an immediate monetary stimulus. With inflation below the 2% target and output below its potential, central banks would easily legitimate new decisions to foster unconventional measures. Moreover, if the regime shift were credible, central banks would achieve a better anchoring of expectations: expected growth and inflation would increase and the economic situation would improve. In the US, advocates of a NGDP regime consider that it would help the Federal Reserve to better fulfil its dual mandate. Frankel (2013) argues that: "a 4-5% target for nominal-GDP growth in the coming year would have an effect equivalent to that of a 4% inflation target". Considering the aversion of most central bankers to a sudden rise in their inflation target, Frankel argues for a two-step shift in the monetary targets: first, a shift to two targets, one for inflation and one for nominal GDP, in order to keep inflation expectations anchored; then a shift to a single NGDP target once real growth has come back to its potential.

Another argument for NGDP targeting relates to the nature of shocks. Whereas demand shocks can be optimally dampened by an inflation-targeting strategy, supply shocks cannot (Sumner, 2012). In the latter case, central banks face a trade-off between a decreasing inflation and an increasing output. Under a NGDP targeting, it is argued that a productivity shock would be better managed than under an IT regime. The central bank would tighten (loosen) monetary policy if the real consequences of the shock were more important than the inflation effects.

A third argument in the literature relates to public debt: the sustainability of public finances, which is of high importance in the Euro area, draws heavily on the evolution of debt to nominal GDP. Targeting the latter would help anticipate the future debt to GDP ratio and the fiscal policy required to achieve its stabilization, hence achieving better coordination of monetary and fiscal policies (Turner, 2013). The stabilization property of NGDP targeting on the household debt-to-GDP ratio is also advocated by Koenig (2013) and Sheedy (2014). When households' debt is contracted with fixed nominal interest rates, NGDP targeting would contribute to reducing the volatility of the value of the unit of account at long horizon. It would thus contribute to stabilizing the economy by reducing the unintended redistributive effect of fluctuations in the value of the unit of account. Empirical works conclude that these redistributive effects can indeed be substantial (Doepke and Schneider 2006).

Targeting a nominal variable is quite reminiscent of monetary targeting in the monetarist vein of Milton Friedman. The revival of NGDP targeting therefore raises the issue of its feasibility. Belongia and Ireland (2015) argue that the velocity of monetary aggregates is stable enough to make monetary targeting feasible.

Five counter-arguments to a formal adoption of NGDP targeting can be put forward:

1. The first is recurrent in the literature: NGDP targeting is close to flexible inflation targeting where the interest rate moves with inflation deviations and the output gap along a Taylor-type monetary policy rule (see e.g. Koenig, 2012; Frankel, 2013; Woodford, 2013). Garin et al. (2015) argue that IT, output gap targeting and NGDP targeting are only special cases of a Taylor rule encompassing inflation, output gap and NGDP variables. In this respect, it may well be that NGDP targeting has de facto been implemented and an institutional shift to NGDP targeting is not necessary.
2. The second counter-argument relates to the nature of NGDP targeting: in level or in growth-rate. There have been a few papers discussing the comparison between both (McCallum, 2015), the adoption of the former (Woodford, 2013), or a comparison with price level targeting (Billi, 2015)¹. Adopting a NGDP target in level would work as an “error-correction” mechanism as Woodford names it: overshooting the target would have to be followed by a period of undershooting. Variability in prices and GDP would not change provided private agents were perfectly able to expect the error-correction. However, if rational expectations are not shared by the central bank and the public, NGDP targeting in level will generate an increase in the variability of NGDP, hence a cost to the economy.
3. The third counter-argument relates to the transparency and ability to communicate on nominal GDP. The reason is: nominal GDP is an index which has no tangible content for the public, whereas a consumer price index draws on prices which are meaningful to the public (Posen, 2013). Moreover, NGDP is regularly revised and is final only a few years after the first data issue. Practicing NGDP targeting in growth-rate or in level will eventually mean a lot more policy errors than under an IT regime. It must also be added that with NGDP, the target might be revised more frequently with the change of potential output. Whereas there is a broad consensus on the inflation target, there is much more debates on the growth rate of potential output, which may change with labor force participation and trend productivity. Central banks would then have to change the target from time to time, making communication tricky with the risk of undermining central bank’s credibility. Finally, NGDP is based upon the price of GDP, not the price of consumer goods, and the price of GDP is certainly more out of reach of the public understanding and concern than the price of goods and services.
4. In the NGDP regime, the composition of nominal growth (inflation versus real growth) would not matter. Yet, social preferences may give different weight to these two variables, justifying some asymmetry in the reaction function.
5. The fifth counter-argument relates to financial stability. With its focus on nominal GDP only, the NGDP targeting literature misses the objective of ensuring or favoring financial stability. In this respect, Whelan (2013) and Blot et al. (2014) have argued for a broader mandate for central banks: the price stability objective should be augmented with an objective of financial stability and an objective of economic performance, without a hierarchy attached to these objectives. Rather than a dual mandate, as in Fed’s statutes, they advocate a triple mandate.

¹ Billi (2015) argues that NGDP targeting is less effective than price level targeting to dampen a technology shock under a zero-lower bound.

3. ECB MONETARY POLICY

We assess whether introducing NGDP targeting would have changed the stance of monetary policy in the euro area during the crisis. Would it provide the ECB with more flexibility and more leeway to deal with low inflation and low growth environment? To this end, we estimated the reaction of short term interest rates in the euro area to different macro indicators: inflation, real output growth, nominal output growth and financial stability index since 1999. Drawing on the pre-crisis period, we perform a counterfactual experiment and compare the outcomes with actual short term rates and with shadow rates (which is an implicit measure of monetary policy including unconventional measures).

3.1 Policy rules

We distinguish three different types of rules: a flexible IT, a NGDP targeting and a “triple mandate” rule (see equations below). All three rules include a constant and a first lag for the instrument, EONIA rate². The source of the quarterly data is the ECB Statistical Data Warehouse.

Flexible IT

$$i(t) = \rho i(t-1) + (1-\rho) * (\bar{i} + \theta_{\pi} * (\pi - \bar{\pi}) + \theta_y * (y_r - \bar{y}_r))$$

where $i(t)$ is the interest rate fixed by the central bank, π the inflation rate and y_r an indicator of real activity. $\bar{\pi}$ and \bar{y}_r are the targets for inflation rate and real activity. \bar{i} stands for the neutral nominal interest rate.

NGDP targeting

$$i(t) = \rho i(t-1) + (1-\rho) * (\bar{i} + \theta_{yn} * (y_n - \bar{y}_n))$$

where y_n stands for the nominal GDP and \bar{y}_n the target for nominal GDP.

Rules with financial stability

$$i(t) = \rho i(t-1) + (1-\rho) * (\bar{i} + \theta_{\pi} * (\pi - \bar{\pi}) + \theta_y * (y_r - \bar{y}_r) + \theta_z * z)$$

where z is a financial indicator.

The flexible IT rule includes the inflation rate and the real GDP growth rate. The latter substitutes for the output gap whose measure is very sensitive to methods and data. The NGDP targeting rule simply includes the nominal GDP growth. Both rules differ mainly to the extent that the coefficient of inflation statistically differs from the coefficient of real GDP growth in the former rule. Besides, in the IT rule, the focus is on consumer price index (CPI) whereas in the NGDP rule, the price target is the GDP deflator. The “triple mandate” rule adds a financial stability index to the flexible IT rule. We use the CISS (composite index of systemic stress) computed by the ECB as the financial stability index. All equations are estimated by OLS. Inflation target, output target and neutral interest rate are captured by the constant term.

It is worth acknowledging that the ECB is not officially pursuing any of these rules and it is not an IT area *per se* despite its targeting price stability. Our estimations only try to capture potential regularities in the reactions of the EONIA rate (which we take as a proxy of the ECB policy rate) to different macro variables. It permits to gauge the

² EONIA (Euro OverNight Index Average) is the effective overnight reference rate for the euro. It is computed as a weighted average of all overnight unsecured lending transactions in the interbank market.

sensitiveness of the EONIA rate to GDP, whether real or nominal, and to explore the extent to which the ECB might be an “inflation nutter” or not.

3.2 Results

Results of the estimation of a flexible IT rule on the pre-crisis sample (1999Q1-2007Q4) are given in Table 1. The aim here is to mimic the behaviour of the ECB in the pre-crisis period under the assumption that it followed a flexible IT rule, a NGDP rule or a “triple mandate” rule.

Table 1. Flexible IT, NGDP targeting and “triple mandate” estimation results

<i>Dependent variable</i>	<i>Flex IT rule</i>	<i>NGDP rule</i>	<i>“Triple mandate”</i>
<i>Constant term</i>	<i>-0.59***</i>	<i>-0.698***</i>	<i>-0.116</i>
<i>(t-stat)</i>	<i>(-3.39)</i>	<i>(-4.177)</i>	<i>(-0.52)</i>
<i>EONIA (t-1)</i>	<i>0.898***</i>	<i>0.867***</i>	<i>0.91***</i>
<i>(t-stat)</i>	<i>(28.11)</i>	<i>(22.32)</i>	<i>(29.14)</i>
<i>Inflation</i>	<i>0.1829**</i>		<i>-0.03</i>
<i>(t-stat)</i>	<i>(2.48)</i>		<i>(-0.32)</i>
<i>Real GDP growth</i>	<i>0.2342***</i>		<i>0.216***</i>
<i>(t-stat)</i>	<i>(9.66)</i>		<i>(7.99)</i>
<i>Nominal GDP growth</i>		<i>0.256***</i>	
<i>(t-stat)</i>		<i>(7.20)</i>	
<i>CISS</i>			<i>0.05</i>
<i>(t-stat)</i>			<i>(0.09)</i>
<i>Adjusted-R2</i>	<i>0.97</i>	<i>0.955</i>	<i>0.98</i>
<i>Sum of squared residuals</i>	<i>0.787</i>	<i>1.205</i>	<i>0.509</i>
<i>Normality test (Jarque-Bera)</i>	<i>0.12</i>	<i>1.38</i>	<i>3.94</i>
<i>(p-value)</i>	<i>(0.94)</i>	<i>(0.50)</i>	<i>(0.14)</i>

Source: Authors’ estimates

As expected, EONIA has been very inertial and its reaction to (consumer) inflation is positive and close to 1.8 in the long run. Moreover, the EONIA rate does also react to real GDP growth, with a coefficient of 2.3 in the long run, which is close to the reaction to inflation. It must yet be stressed that the difference between the two parameters of the flexible IT reaction function is statistically significant at the 10% level.

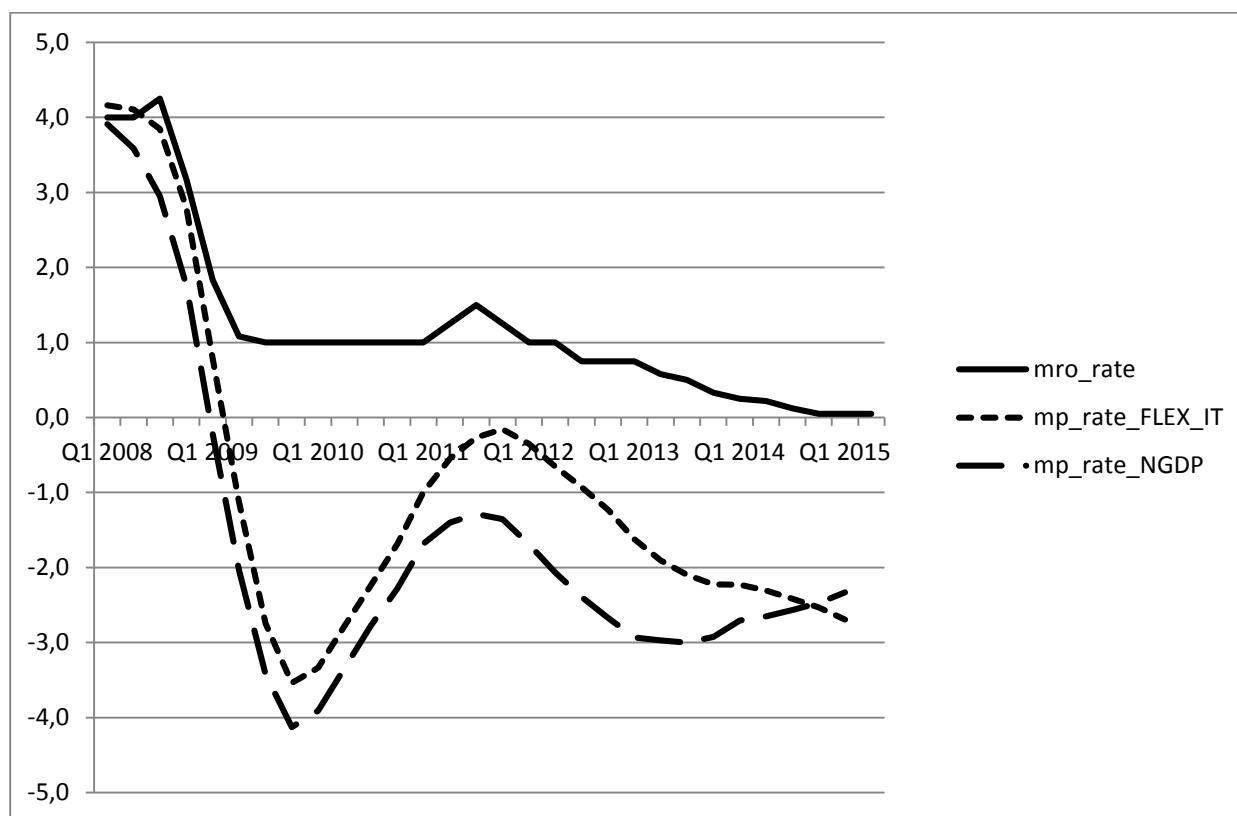
The ECB does not appear as an “inflation nutter”. The estimation of a NGDP targeting rule shows that the reaction of EONIA to NGDP is 1.9 (hence including reaction towards GDP inflation). Differences between both estimations are small and confirm counter-argument 1 (in section 2.2) that flexible IT and NGDP targeting can be very close. However, flexible IT better fits the data and therefore better characterizes the behaviour of the ECB before the crisis than NGDP targeting: the standard error is diminished by

18% and the sum of squared residuals by 35%³. Finally, the estimation of a “triple-mandate” rule shows that neither inflation nor the financial stability index is statistically significant in the pre-crisis period.

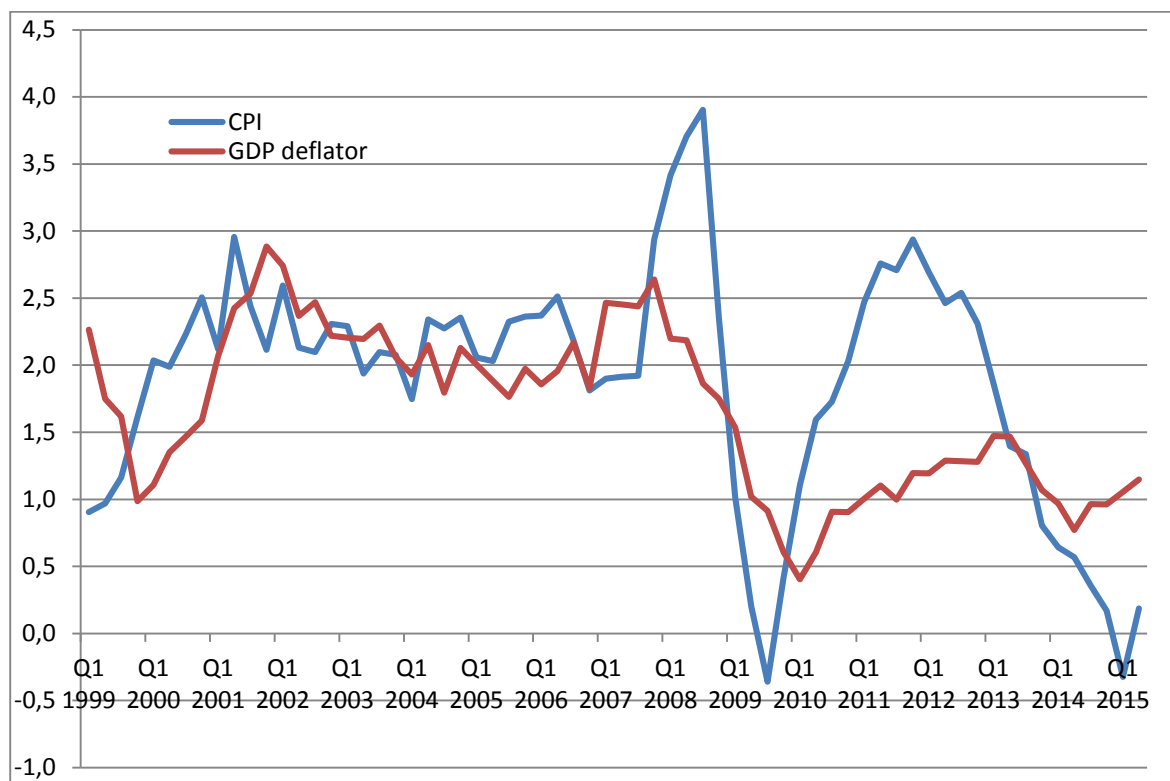
Based on these estimations, we run a counterfactual exercise on the crisis years, since 2008Q1. We simulated the path of EONIA had it reacted according to the pre-crisis estimation of a flexible IT rule or a NGDP targeting rule (see figure 1)⁴. According to both simulated paths, the nominal interest rate should have been negative had the ECB followed one or the other rule. Until 2009Q1, the actual rate and the simulated rates show very similar trends, but after that, discrepancy emerges. The beginning of 2009 seems to testify for a change in the conduct of monetary policy and a large discrepancy *vis-à-vis* modified Taylor rules. Under these rules, the expansionary stance of ECB monetary policy would have been substantially larger and nominal rates would have been set below zero. The path difference between flexible IT and NGDP targeting would have been very limited until 2010Q4; then monetary policy under a NGDP targeting rule would have given a monetary average impetus of 1% compared to the flexible IT rule. However, it must be stressed that at the end of the sample, we observe an increase in the interest rate stemming from the NGDP rule (from -3% to -2.3%) whereas a flexible IT rule leads to a further decline in the interest rate. The NGDP rule would have delivered a less expansionary monetary policy stance than the flexible IT rule. This difference relates to the gap between price measures in the two rules. The CPI inflation rate is still declining whereas GDP deflator – the measure of prices used in the NGDP rule – is positive and has increased since 2014Q2 (figure 2). Meanwhile, y-o-y real GDP growth has also been rising since the end of 2013. Then under the NGDP rule, the two variables targeted by the central bank are increasing, which would thus lead the central bank to reduce the monetary stimulus. Under the flexible IT rule, the two targeted variables provide contrasting signals; according to the rule, the ECB would have to implement further expansionary measures to tackle the rapid and sharp decline in the inflation rate.

³ The fits are not shown here but are available upon request.

⁴ Due to poor in-sample performances, simulations based on the “triple mandate” have not been performed.

Figure 1. Counterfactuals since the crisis

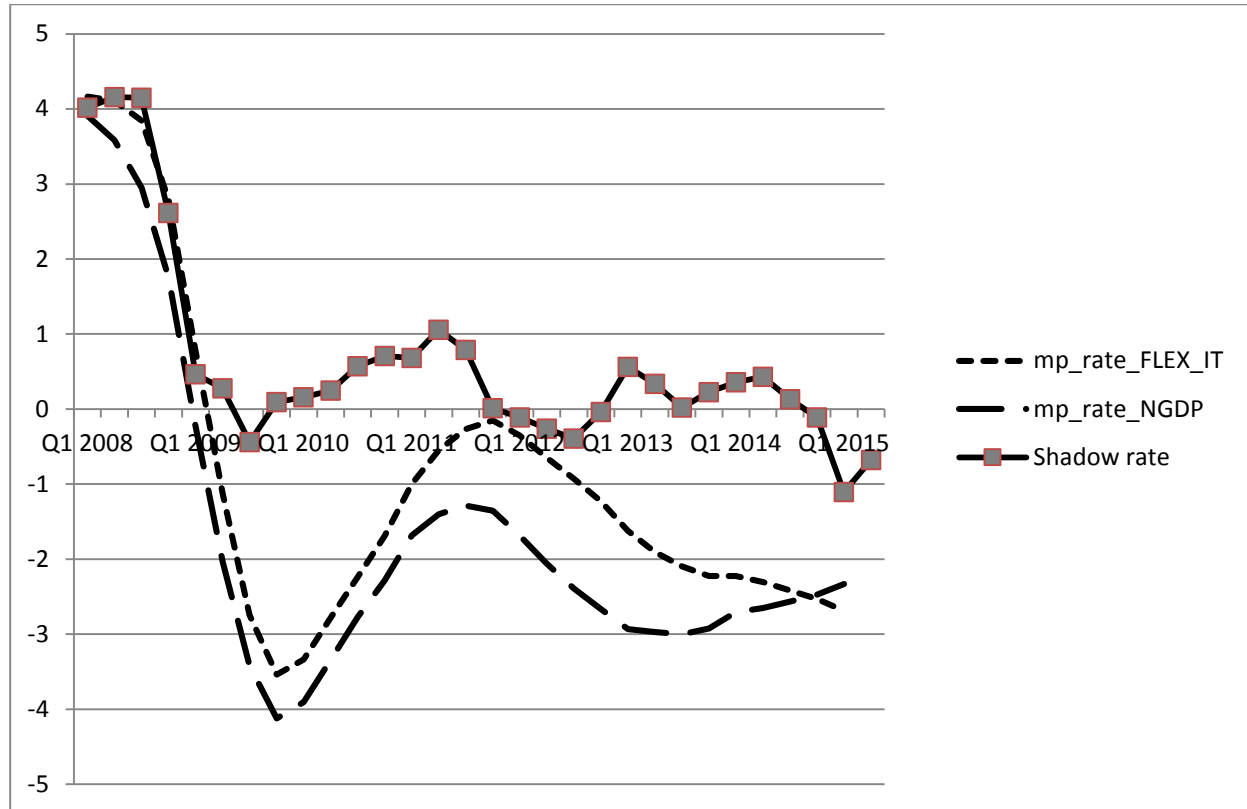
Source: ECB Statistical Data Warehouse and authors' estimates.

Figure 2. Measuring prices

Source: Eurostat.

Bearing in mind that nominal interest rates are not usually negative in practice, it may be more relevant to compare the simulated paths with the shadow rate, which incorporates unconventional monetary policy measures and more comprehensively characterizes the actual monetary policy stance in times of crisis. In figure 3, we compare the same two simulated paths as in figure 1 with the Wu-Xia shadow rate of the ECB. The main conclusion to draw here is that the monetary stimulus would have been amplified had the ECB followed a flexible IT or a NGDP rule.

Figure 3. Counterfactuals and the Shadow rate



Sources: ECB Statistical Data Warehouse, Wu & Xia and authors' estimates.

4. CONCLUSION

Nominal GDP targeting has resurfaced in the recent debate on the monetary policy regime. Some economists have argued that it would help central banks to better achieve their mandate. In the US, it would help the Federal Reserve to meet its dual mandate. In the euro area, others claim that it would make economic growth enter the realm of central bankers. The NGDP targeting regime would then provide better macroeconomic stabilization than its direct competitor, the inflation targeting regime, which has been largely adopted by central banks since the 1990s. Even if the ECB may not be classified as *de jure* inflation targeter, it remains that priority is given to price stability and that the ECB has quantified its objective in terms of inflation only. A NGDP targeting would lead the ECB to define a target for nominal GDP and to define the stance of monetary policy in reaction to the deviations of nominal GDP to the target. In this paper, we aimed at analysing the advantage of NGDP targeting, comparing this regime to inflation targeting.

First, it should be reminded that IT regimes do not overlook activity. Actually, in flexible IT regimes, the central banks also react to economic activity. Then, flexible IT and NGDP regimes are very close. Our estimates and simulations provide some illustrations on this point. The benefit of a change in regime might be very small.

Besides, communication issues may arise with the adoption of NGDP targeting as neither the nominal GDP, nor the implicit GDP deflator are variables which are scrutinized by households or firms. As communication play an important role for the credibility of monetary policy, we consider that such a regime shift would introduce unnecessary difficulties for the ECB without providing much more flexibility.

If the aim were to bring the ECB to pay more attention to growth, it would be more direct to fix a dual mandate and to set an explicit target for output growth or the unemployment rate.

Besides, it is not clear whether NGDP targeting would promote financial stability or not. IT regimes have been largely criticised in this respect and the adoption of NGDP regime would not bring the ECB to be concerned by financial stability. In our view, promoting financial stability is the main challenge for central banking, an issue on which NGDP targeting does not provide satisfactory answers.

REFERENCES

- Albanesi, S. (2006), Inflation and inequality. *Journal of Monetary Economics*, 54(4), 1088-1114.
- Assenmacher-Wesche, K. (2006), Estimating central banks' preferences from a time-varying empirical reaction function. *European Economic Review* 50, 1951-1974.
- Angeriz A. and P. Arestis (2007), Monetary policy in the UK. *Cambridge Journal of Economics*, 31(6), 863-884.
- Ball L. and N. Sheridan (2003), Does inflation targeting matter?, in B. Bernanke and M. Woodford (eds.). *The Inflation Targeting Debate*, NBER.
- Baxa, J., R. Horvath and B. Vasicek (2014), How Does Monetary Policy Change? Evidence on Inflation Targeting Countries. *Macroeconomic Dynamics*, 18(3), 593-630.
- Belongia M.T. and P.N. Ireland (2015), A "working" solution to the question of nominal GDP targeting. *Macroeconomic Dynamics*, 19, 508-534.
- Benati, L. (2008), Investigating Inflation Persistence across Monetary Regimes. *Quarterly Journal of Economics*, 123, 1005-1060.
- Bernanke, B., T. Laubach, F.S. Mishkin and A.S. Posen (1999), *Inflation targeting, lessons from the international experience*. Princeton University Press.
- Billi R. (2015), A note on nominal GDP targeting and the zero lower bound. *Sveriges Riksbank Working Paper Series n°270*, May.
- Blot C., J. Creel, P. Hubert, and F. Labondance (2014), Dealing with the ECB's triple mandate. *Revue de l'OFCE*, n°134, 163-173.
- Blot C., J. Creel, P. Hubert, F. Labondance and F. Saraceno (2015), Assessing the link between price and financial stability. *Journal of Financial Stability*, 16, February, 71-88.
- Cecchetti, S.G. M.M. McConnel and G. Perez-Quiros (2002), Policymakers' revealed preferences and the output-inflation variability trade-off: implications for the ESCB. *Manchester School*, 70(4), Special issue, 596-618.
- Cecchetti, S.G. and C. Hakkio (2009), Inflation targeting and private sector forecasts. *NBER Working Paper*, No 15424.
- Creel J. and P. Hubert (2015), Has Inflation Targeting Changed the Conduct of Monetary Policy? *Macroeconomic Dynamics*, 19, January, 1-21.
- Davradakis, E., and M.P. Taylor (2006), Interest Rate Setting and Inflation Targeting: Evidence of a Nonlinear Taylor Rule for the United Kingdom. *Studies in Nonlinear Dynamics & Econometrics*, 10(4).
- Doepke, M and Schneider (2006), Inflation and the Redistribution of Nominal Wealth, with Martin Schneider. *Journal of Political Economy*, December 2006.
- Faroque, A. and R. Minor (2009), Inflation regimes and the stability of the pass-through of wages to consumer prices in Canada. *Applied Economics*, 41, 1003-1017.
- Fazio, D., B. Tabak and D. Cajueiro (2015), Inflation targeting: is IT to blame for banking system instability? *Journal of Banking and Finance*, 59, 76-97.
- Frankel J. (2013), Nominal-GDP targets, without losing the inflation anchor. In Reichlin and Baldwin (2013).

- Frappa, S. and J-S. Mésonnier (2010), The housing price boom of the late 1990s: did inflation targeting matter? *Journal of Financial Stability*, 6, 243-254.
- Fregert K. and L. Jonung (2008), Inflation targeting is a success, so far: 100 years of evidence from Swedish wage contracts. *Economics, The Open-Access, Open-Assessment E-Journal* 2(31), 1-25.
- Garin J., R. Lester and E. Sims (2015), On the desirability of nominal GDP targeting. NBER Working Paper 21420, July.
- Genc I.H. (2009), A nonlinear time series analysis of inflation targeting in selected countries. *International Research Journal of Finance and Economics*, 24, 237-241.
- Gertler M. (2003), "Comment", in B. Bernanke and M. Woodford (eds.). *The Inflation Targeting Debate*, NBER.
- Gillitzer C. and J. Simon (2015), Inflation targeting: a victim of its own success. *International Journal of Central Banking*, September, 259-287.
- Gürkaynak, R., A. Levin and E. Swanson (2010), Does Inflation Targeting Anchor Long Run Inflation Expectations? Evidence from Long-Term Bond Yields in the U.S., U.K. and Sweden. *Journal of the European Economic Association*, 8(6), 1208-1242.
- Johnson D. (2002), The effect of inflation targeting on the behaviour of expected inflation: evidence from an 11 country panel. *Journal of Monetary Economics*, 49, 1521-1538.
- King M. (1997), Changes in UK monetary policy: rules and discretion in practice. *Journal of Monetary Economics*, 39, 81-97.
- Koenig E.F. (2012), All in the family: the close connection between nominal-GDP targeting and the Taylor rule. *Staff Papers*, FRB of Dallas, n°17, March, 1-9.
- Koenig E.F. (2013), Like a Good Neighbor: Monetary Policy, Financial Stability, and the Distribution of Risk. *International Journal of Central Banking*, June, 57-82.
- Levin A.T., F.M. Natalucci and J.M. Piger (2004), The macroeconomic effects of inflation targeting. *FRB of Saint Louis Review*, 86(4), 51-80.
- Lin S. and H. Ye (2007), Does inflation targeting really make a difference? Evaluating the treatment effect of inflation targeting in seven industrial countries. *Journal of Monetary Economics*, 54(8), 2521-2533.
- McCallum B. (2015), Nominal GDP targeting: policy rule or discretionary splurge? *Journal of Financial Stability*, 17, 76-80.
- Osborn, D.R. and M. Sensier (2009), UK Inflation: Persistence, Seasonality and Monetary Policy. *Scottish Journal of Political Economy*, 56(1), 24-44.
- Posen A. (2013), Cheap talk is no alternative to inflation targeting. In Reichlin and Baldwin (2013).
- Reichlin L. and R. Baldwin (eds) (2013), *Is inflation targeting dead? Central banking after the crisis*. CEPR eBook.
- Seyfried W. and D. Bremmer (2003), Inflation targeting as a framework for monetary policy: a cross-country analysis. *Australian Economic Review*, 36(3), 291-299.
- Sheedy K.D. (2014), *Debt and incomplete financial markets: a case for nominal GDP targeting*. *Brookings Papers on Economic Activity*, Spring, 301-372.

- Sumner S. (2012), The case for nominal GDP targeting. Mercatus Research, Mercatus Center, George Mason University.
- Taylor, J.B. (1993), Discretion versus policy rules in practice. Carnegie-Rochester Conference Series on Public Policy, 39, 195-214.
- Trecroci C. and M. Vassalli (2010), Monetary policy regime shifts: new evidence from time-varying interest-rate rules. Economic Inquiry, 48(4), 933-950.
- Turner A. (2013), Debt, Money, and Mephistopheles: How Do We Get Outof This Mess? Occasional Paper 87, Group of Thirty, Washington DC.
- Whelan K. (2013), A broader mandate: why inflation targeting is inadequate. In Reichlin and Baldwin (2013).
- Woodford M. (2013), Inflation targeting: fixit, don't scrap it. In Reichlin and Baldwin (2013).

DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT ECONOMIC AND SCIENTIFIC POLICY **A**

Role

Policy departments are research units that provide specialised advice to committees, inter-parliamentary delegations and other parliamentary bodies.

Policy Areas

- Economic and Monetary Affairs
- Employment and Social Affairs
- Environment, Public Health and Food Safety
- Industry, Research and Energy
- Internal Market and Consumer Protection

Documents

Visit the European Parliament website:
<http://www.europarl.europa.eu/supporting-analyses>

PHOTO CREDIT:
iStockphoto.com; Shutterstock/beboy



ISBN 978-92-823-9526-4 (paper)
ISBN 978-92-823-9525-7- (pdf)

doi: 10.2861/439498 (paper)
doi: 10.2861/007796 (pdf)

