



On the desirability of nominal GDP targeting



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ABSTRACT

This paper evaluates the welfare properties of nominal GDP targeting in the context of a New Keynesian model with both price and wage rigidity. In particular, we compare nominal GDP targeting to inflation and output gap targeting as well as to a conventional Taylor rule. These comparisons are made on the basis of welfare losses relative to a hypothetical equilibrium with flexible prices and wages. Output gap targeting is the most desirable of the rules under consideration, but nominal GDP targeting performs almost as well. Nominal GDP targeting is associated with smaller welfare losses than a Taylor rule and significantly outperforms inflation targeting. Relative to inflation targeting and a Taylor rule, nominal GDP targeting performs best conditional on supply shocks and when wages are sticky relative to prices. Nominal GDP targeting may outperform output gap targeting if the gap is observed with noise, and has more desirable properties related to equilibrium determinacy than does gap targeting.

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1. Introduction

What rule should a central bank follow in the formation of monetary policy? Despite extensive research about this topic, it remains an unsettled question. Although nominal output targeting has recently received attention in the popular press and within policy circles, it has not been scrutinized within the context of the quantitative frameworks commonly used by central banks. The objective of this paper is to study the desirability of nominal GDP targeting within the context of a New Keynesian model with both price and wage rigidity. In particular, we compare the welfare properties of nominal GDP targeting to two other popular targeting rules – inflation and output gap targeting – as well as to a conventional Taylor rule.

Although there is some disagreement on which type of rule central banks should follow, economists agree on several principles in the design of monetary policy. First, rules are preferred to discretion. Rules allow agents to better anchor expectations, which improves the inflation-output gap tradeoff. This is true in models of either ad hoc Phillips curves as in Barro and Gordon (1983) or in micro-founded Phillips curves as in Woodford (2003). Second, the policy objectives of central banks should be understandable to the public. As argued by Bernanke and Mishkin (1997), this requires the central bank to be more accountable. Even if monetary policy follows some strict rule, forming expectations is difficult if households do not understand it. Third, the central bank faces information constraints which should be taken into account in the formation of

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monetary policy. Responding to precisely measured variables is superior to responding to imprecisely measured variables or variables that are hypothetical constructs of a model. Finally, a desirable monetary policy rule ought to support a determinate equilibrium.

In the micro-founded welfare loss function from the simplest version of the New Keynesian model where only prices are sticky, a central bank ought to care about stabilizing both price inflation and the output gap (defined as the gap between the equilibrium level of output and the hypothetical equilibrium level of output which would obtain if prices were flexible). Inflation and output gap targeting are therefore easily motivated as potentially desirable policy rules. When nominal wages are flexible, the so-called “Divine Coincidence” (Blanchard and Gali, 2007) holds, and either targeting rule fully implements the flexible price allocation. In other words, stabilizing inflation also stabilizes the output gap and vice versa. Given that the output gap is a hypothetical model-based construct, whereas inflation is easily observed at high frequencies, inflation targeting is therefore often touted as a highly desirable and easily implemented policy rule.

Inflation targeting may be less desirable in versions of the model in which the Divine Coincidence does not hold. Erceg et al. (2000) consider a version of the model in which both prices and nominal wages are sticky, the combination of which breaks the equivalence between inflation and gap stabilization and renders it impossible for the central bank to fully implement the flexible price and wage allocation. For plausible values of the parameters governing price and wage stickiness, they find that inflation targeting tends to perform poorly from a welfare perspective. Output gap targeting, in contrast, does very well, coming close to implementing the flexible price and wage allocation.

Although nominal GDP targeting has recently gained attention as potential policy rule in the popular press and within policy circles, it has received relatively little attention within the context of the type of models in widespread use at central banks and among academics. Whereas inflation targeting focuses on nominal variables and gap targeting on real variables, nominal GDP targeting simultaneously targets both nominal and real variables. And unlike output gap targeting, it does not require the central bank to observe the hypothetical flexible price and wage level of output.

In Section 2 we study the merits of nominal GDP targeting relative to other policy rules using a standard parameterization of the sticky price and wage New Keynesian model developed by Erceg et al. (2000). We evaluate different rules on the basis of the average welfare loss relative to a hypothetical flexible price and wage allocation. Like Erceg et al. (2000), we find that output gap targeting does well, producing very small welfare losses that come close to implementing the flexible price and wage allocation. Nominal GDP targeting does almost as well as gap targeting. It is associated with smaller welfare losses than a conventionally parameterized Taylor rule and significantly outperforms inflation targeting. Nominal GDP targeting performs best in a relative sense when wages are sticky relative to prices and conditional on supply shocks. These results are consistent with the intuition laid out by Sumner (2014) in a textbook aggregate supply/aggregate demand model.

We consider a more elaborate medium scale version of the model in Sections 3 and 4. In addition to price and wage stickiness, the model features investment and capital accumulation, several sources of real inertia, and a number of different shocks. In Section 4, the parameters of the model are estimated using Bayesian methods to fit recent US data. The results of the medium scale model echo those from the small scale model. Output gap targeting produces the lowest welfare losses relative to the hypothetical flexible price and wage allocation. Nominal GDP targeting does almost as well, significantly better than both an estimated Taylor rule and inflation targeting. As in the small scale model, nominal GDP targeting performs best when wages are sticky relative to prices and conditional on supply shocks, although the relative desirability of nominal GDP targeting conditional on supply and demand shocks is not as stark as in the small scale model. In the medium scale model we also study the welfare properties of nominal GDP targeting conditional on realizations of the state, as opposed to just unconditional welfare analysis as in the small scale model. We find that nominal GDP targeting is preferred to inflation targeting or a Taylor rule in all possible realizations of the state. Furthermore, though output gap targeting is preferred on average, there are some states in which nominal GDP targeting outperforms gap targeting.

Though we find output gap targeting to be the best performing (in an average sense) of the different policy rules under consideration, there are some reasons to be weary of actually implementing gap targeting as a policy rule. These reasons relate back to some of the basic principles of desirable monetary policy which are highlighted at the beginning of the Introduction. First, as a hypothetical model construct, gap targeting may be difficult to successfully communicate to the public, even if the central bank can observe the flexible price and wage level of output with precision. Second, it may be difficult for the central bank to observe the flexible price and wage level of output, particularly in real time. This point has been made by Orphanides (2001, 2003) and Orphanides and van Norden (2002). Third, gap targeting may result in equilibrium indeterminacy. This point has been made in the context of sticky price New Keynesian models with positive trend inflation in Hornstein and Wolman (2005), Ascari and Ropele (2009), and Coibion and Gorodnichenko (2011).

We consider in Section 4 a couple of different exercises to address some of these points in the context of the estimated medium scale model. In one, we assume that the central bank observes the flexible price and wage level of output with noise, and compute the amount of noise which would equate the welfare losses associated with targeting the mis-measured gap and targeting nominal GDP. We find that if the noise in the observed flexible price and wage level of output is more than about one-third the volatility of the actual flexible price and wage level of output, then nominal GDP targeting produces a lower welfare loss than does gap targeting. In a second exercise, we suppose that the central bank adjusts its perceived flexible price and wage level of output to the actual flexible price and wage level of output slowly. If the central bank adjusts slowly enough, then gap targeting can result in significant welfare losses relative to nominal GDP targeting. Third, we investigate the determinacy properties of gap targeting when trend inflation is positive. We find that if trend inflation is

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