Alternatives to inflation targeting

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Since the financial crisis, there has been an intensive discussion of the inflation targeting framework for monetary policy. Critics claim that inflation targeting central banks are too focused on inflation; they give to little consideration to the real economy and to financial risks and imbalances. Moreover, critics claim that so-called level targets are superior to inflation targets, particularly now when inflation is low and policy rates are at their lower bound. In this article we take a closer look at the discussion and some of the proposed changes.

1 Introduction

In the aftermath of the financial crisis there has been an intensive discussion of the inflation targeting framework and the monetary policies pursued, both internationally and in Sweden. In brief, the critique can be summarised in three points:

   i. Inflation targeting policies do not take unemployment and production sufficiently into account, and that contributed to unnecessarily passive and restrictive monetary policy during and after the crisis.

   ii. Inflation targeting policies take to little account of finacial risks and imbalances.

   iii. Inflation targeting cannot stimulate demand sufficiently when the interest rate is close to its lower bound, something which has been a problem in recent years.

These arguments are not new. They have been around ever since inflation targets were introduced at the beginning of the 1990s. Similarly, the proposed alternatives have been debated for a long time. But recently the critical arguments and the proposed alternatives have acquired new topicality. The reason is the financial crisis and the protracted recession that followed.

So what alternatives are proposed? The Riksbank and other inflation targeting central banks already take developments in the real economy – that is, developments in output, unemployment and so on – into account in monetary policy. But to further increase their focus on the real economy, some propose to give central banks a 'dual mandate'. With a dual mandate the central bank has two explicit goals for monetary policy; to stabilize inflation *and* the real economy. Another suggestion is a target for nominal GDP growth instead of inflation. Other alternatives are supposed to induce monetary policy to prevent the buildup of imbalances and risks on the financial markets. Finally, alternatives like price level targets and targets for the nominal GDP level have been suggested as ways to make monetary policy more effective when policy rates cannot be reduced.

In this article we take a closer look both at the critique of inflation targeting and the alternatives that have been suggested. The alternatives we focus on might seem disparate, but they have common denominators. They are meant to make monetary policy put greater weight on the real economy and/or are supposed to make monetary policy more effective. By "effective" we mean that the stabilisation of inflation or the real economy or both will be better than with inflation targeting. We will also discuss alternatives that are supposed to make monetary policy take more account of financial imbalances and risks. These latter

alternatives are perhaps better described as modifications or complements rather than proper alternatives to the current inflation targeting framework.[1]

The article has six main sections. In section 2 we present and discuss the critique of the inflation-targeting policy framework. In section 3 we look at alternatives suggested in order to make monetary policy more flexible with respect to the real economy and financial stability. In section 4 we discuss alternatives that should make monetary policy more effective. In section 5 we discuss nominal GDP targeting in levels, an alternative that should both enhance the focus on the real economy and the potency of monetary policy. Finally, we summarise and draw conclusions in section 6.

2 The critique of inflation targeting

2.1 Inflation targeting can and should be flexible

The overall aim of economic policy is to enhance growth and welfare. Monetary policy is an integral part of these policies, and in the short run an expansionary monetary policy will contribute to higher growth and lower unemployment. But history has shown that in the long run a systematically expansionary monetary policy only leads to high and varying inflation, not higher growth and employment. This is the reason why many central banks' has been assigned the task of keeping inflation low and stable.

When inflation targeting was introduced in Sweden and other countries at the beginning of the 1990s, it followed a period when high and varying inflation had been a major problem. It was important to establish credibility for the new policy and quickly build confidence in the inflation target. The focus of monetary policy was therefore on inflation. But with time, as confidence in the inflation target grew, monetary policy could take more account of the real economy. *Flexible inflation targeting* was introduced as a generic term to describe a monetary policy where the central bank aims at stabilizing both inflation and the real economy. Of course, even a central bank that only aims to stabilize inflation has to take the real economy into account, since developments in the product and labour markets will affect the outlook for inflation. But with flexible inflation targeting, stabilizing the real economy is a goal of its own.[2]

In recent years, arguments have been put forward that the flexibility should be extended so that monetary policy also can be used to counteract financial imbalances and risks. Like real economic developments, these imbalances and risks should be taken into account to the extent that they influence the expected outlook for inflation and the real economy. One question is if that is actually done since forecasts typically only extend 2-3 years ahead, while the risks may materialise after a longer period. However, the main question is whether central banks should "lean against the wind", and actively counteract imbalances and risks on the financial markets – even if that runs counter to the stabilisation of inflation and the real economy.[3] This was also a topic at the start of the new millennium when there was a debate on whether monetary policy should prevent or 'prick' asset bubbles. There were arguments both for and against, but a consensus was formed that monetary policy should refrain from this. Rather than leaning against bubbles, it was better to clean up after they burst. Following the financial crisis, this earlier consensus has been put into question.

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1   Our idea has been to limit the article to alternatives to the inflation-targeting policy as it has generally been conducted. We have chosen not to discuss, for instance, the proposal that inflation targets should be raised to reduce the risk of the interest rate hitting its lower bound in economic downturns. This does not mean, of course, that this proposal and other similar ones are less relevant. A description of alternative means and so-called complementary monetary policy measures can be found, for instance, in the article "The Riksbank's complementary monetary policy measures" in Sveriges Riksbank (2015). See also Bank of Bank of Canada (2015).

2   See Svensson (1999a) and Woodford (2003) for a theoretical explanation of flexible inflation targeting.

3   See, for example, Woodford (2012a) and Smets (2013). The question here concerns imbalances and risks in the financial system. Of course, central banks always have a responsibility for the financial system as such, see Billi and Vredin (2014).

To summarise, inflation targeting in its canonical version both can and should be flexible. The policy should stabilise both inflation and the real economy, and perhaps also reduce imbalances and risks in the financial system, even if this is more controversial.

2.2 … but may in practice focus to little on stabilising the real economy

However, despite the fact that inflation targeting should be flexible, some have argued that it has not taken the real economy sufficiently into account. For example, some argue that exessive focus on stabilising inflation explains the weak economic recovery in the EU and the United Kingdom during the first years after the financial crisis.[4] Similarly, but with opposite sign, the Riksbank is criticised at present for pursuing too expansionary monetary policy in times of strong GDP growth and rising house prices and household debt.[5]

We do not intend to evaluate or take a stance on whether inflation targeting policies has taken the real economy sufficiently into account, either generally or in Sweden. Here we merely note that there is such criticism, and use this as a base for a hypothetical discussion: If it is true that inflation targeting in general does not take sufficient account of the real economy, what might the causes be?

To begin with, we should emphasise that subjective judgements will always play a large role in monetary policy. Thus, the central bank and those who criticise it can quite simply make **different judgements** regarding the appropriate trade-off between the stabilising inflation and the real economy. For instance, the central bank may be more concerned about the credibility of its inflation target than what its critics are. The central bank may then choose a policy with greater emphasis on stabilising inflation than what its critics think is correct.[6] In this case it is not the inflation targeting framework per se that is criticised, but rather the central bank's judgements.

Measurement issues can be one reason why stabilisation of the real economy receives too little weight in monetary policy decisions. Developments in the real economy are often summarised by some measure of spare capacity. But **it is not possible to directly observe the degree of spare capacity**, and there is no generally-accepted view of how to measure it. Different measures cover different things and may give a different and conflicting picture. Moreover, the measures are usually based on data which is published with time lags and often revised afterwards. With hindsight developments of the real economy might have been quite different from what the central bank believed when decisions were made.[7] Because of these measurement issues monetary policy might put too little (or too much) weight on the real economy.[8] It is also conceivable that the central bank focuses on other measures of the real economy than what the bank's critics do.

An important reason why it is hard to gauge the capacity of the economy is that it is hard to determine what is "normal" or "long run sustainable". Normal and sustainable levels of production, unemployment et cetera are determined by factors such as the productivity and labour force growth, how well the labour market is functioning, and so on. This differs from inflation, where "normal" is defined by the inflation target.

A third cause, which to some extent is related to the causes above, is that in practice there is an **asymmetry in the way the monetary policy objectives are formulated.** The price stability objective is concretized in an *inflation target*; it is a quantified target for the change in a particular price index. But the real economy stability objective is not concretized

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4   See, for example, Sumner (2011a) and Wren-Lewis (2013).

5   See, for example, Mitelman (2014) and Cervenka (2015). For responses to the criticism of the Riksbank see, for instance, Jansson (2014).

6   There are also arguments suggesting that the central bank actually should put greater emphasis on inflation than the economic agents would on average prefer, as that gives a better development in the economy generally. See Rogoff (1985).

7   See, for example, Orphanides (2003).

8   Of course, the common increase in all prices in the economy is not directly observed either.

in a corresponding *stability target*; there is no quantified target for a particular economic variable. This asymmetry might induce monetary policy to focus more on stabilising inflation where the target is concrete and explicit, and less on stabilising the real economy where the target is less so.

2.3   ... and focus too little on financial imbalances and risks

As we explained earlier, a central bank with an inflation target can use monetary policy for financial stability purposes, even if this is controversial. This means that it is not necessarily the inflation target per se that is the problem if a central bank take insufficient account of imbalances and risks in the financial system. The problem, if there is a problem, is rather that the central bank in practice does not put enough weight on financial imbalances and risks.[9]

This can, in the same way as for the real economy, reflect that the central bank and its critics make **different judgements**. For instance, it is difficult to assess the costs and benefits from using monetary policy to reduce financial imbalances and risks. A related issue is that it is **difficult to say whether or not there are financial imbalances and risks**. There is no generally-accepted view of how to understand and measure financial imbalances and risks and it is difficult to determine what levels are normal and what levels are too high. As with the real economy, an **asymmetry in the formulation of the objectives for monetary policy** may also play a role. While the inflation target is quantified and applies to a specific and observable variable, there are typically no specific, observable and quantified target for financial stability in the monetary policy mandates and strategies. A related, but practical problem is that the **risks related to these imbalances are uncertain and may materialise many years ahead**, while policies are based on forecasts that only extend 2-3 years ahead.

2.4   Can inflation targeting become *too* flexible?

Instead of criticising inflation targeting for not being flexible enough, there are those who argue that inflation targeting in practice attempts to be too flexible; too concerned with stabilising the real economy or counteracting financial imbalances and risks. A core question in this regard is how flexible monetary policy can be without endangering the nominal anchor – see the discussion in Section 2.1. One argument is that monetary policy risks becoming overloaded unless the main focus is always on stabilising inflation.[10] Another argument is that flexible inflation targeting risks leaving other and more effective economic policy measures underutilized.[11]

Some agree that monetary policy should take the real economy and maybe even financial imbalances and risks into account, but suggest that monetary policy should follow simple rules, rather than trying to pursue "optimal" policies. The argument behind this claim is that it makes monetary policy predictable and more robust, for instance, with regard to incorrect assumptions about the transmission mechanism. The criticism is not against monetary policy stabilising both inflation and the real economy, but rather against the way inflation targeting is usually formalised in terms of a loss function (see appendix) and the endeavour to attain an "optimal" policy.[12]

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9   See, for example, Disyatat (2010), Woodford (2012a), BIS (2015) Gjedrem (2016) and Schnabel (2016).
10   See, for example, Orphanides (2013), Taylor (2016) and Archer (2016).
11   Davig and Gürkaynak (2015) and Taylor (2016).
12   See, for example, Orphanides and Williams (2008), Taylor and Williams (2010) and Hansen et al. (2016).

2.5 Inflation targeting is not the most effective way to manage inflation expectations

Above we discussed the argument that inflation targeting is not sufficiently flexible. In this subsection we discuss the criticism that says that there are alternative regimes that are more effective than inflation targeting in stabilising inflation and the real economy. These alternatives could be particularly useful in situations where central banks' policy rates are at or close to their lower bound. Since several central banks are experiencing this situation today the arguments in favour of these alternative targets for monetary policy have been put forward more forcefully in recent years.

To understand the potential advantage of these alternative targets, it is necessary to focus on the significance of expectations for monetary policy. Ultimately, inflation is determined by the decisions of economic agents, such as households, companies and financial market participants. These decisions are based on the current economic situation as well as expectations about the future, including expectations about future monetary policy. Thus, by influencing the expectations about future monetary policy, the central bank can influence the economic agents' decisions today and, in turn, future economic developments including inflation. A great deal of monetary policy is therefore about influencing the economic agents' expectations, and that is why it is often described as "the management of expectations".

Inflation targeting has proved effective in anchoring economic agents' inflation expectations. It creates a *nominal anchor*, whereby the economic agents expect monetary policy to bring inflation back on target if it deviates. If, for instance, inflation undershoots the target, the economic agents expect monetary policy to bring inflation back up to the target again. With such a policy "bygones are bygones"; the agents know that the central bank does not attempt to compensate periods when inflation is below target with periods with above-target-inflation. This lack of *'history-dependence'* is a drawback since it implies a less effective use of the expectations channel of monetary policy.[13]

When economic agents are forward-looking, they base their decisions on expectations of the future. If the central bank can raise inflation expectations, it will bring down real interest rates, stimulate demand, and contribute to firms increasing their prices more today. Thus, with inflation below target, it would help if central banks could use the expectations channel in this way; aim at overshooting their targets and create expectations of above target inflation in the future. Vice versa if inflation is above target.

However, the problem is that it is not credible for a central bank to do this under an inflation targeting framework, whether strict or flexible. Forward-looking economic agents realise that if future inflation starts to overshoot the target, the central bank has strong incentives in the future to deviate from the previously announced monetary policy and instead conduct a stricter policy. That would give better target fulfilment seen from that future point in time. Under inflation targeting the central bank cannot credibly commit itself to a policy which aims to overshoot the inflation target later on. It is not time consistent and therefore the policy will not have the desired effect on inflation and the real economy via the expectations channel.

This is where so called level targets come in. In sections 4 and 5 we will see that targets for the price level and the level of nominal GDP can overcome this problem and in the best case make monetary policy history-dependent and thereby more effective.[14]

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13 See, for example, Woodford (1999).
14 Targets for nominal GDP growth, as discussed in Section 3, can make monetary policy history-dependent, but not in a way that is useful when the interest rate is close to zero. The rationale behind such a target therefore appears to be that one wants to force central banks to take the real economy into account. This is discussed in greater detail in Section 3.2.

3 Proposals to make monetary policy more flexible

As we explained above, inflation targeting is criticised for not taking sufficient account of the real economy and of financial imbalances and risks. Several alternatives have therefore been proposed. We discuss some of these below.

Regarding greater weight on the stabilisation of the real economy, we look at the proposal to give central banks a so-called dual mandate, as well as the proposal to replace inflation targets with targets for nominal GDP growth. As we will see, a target for nominal GDP growth can also be considered a dual mandate. Targets for the level of nominal GDP are discussed separately in Section 5.[15] We will discuss arguments in favour and against these alternatives. We then take a closer look at the proposals for making monetary policy more flexible when it comes to counteracting financial imbalances and risks.

3.1 Dual mandate – makes little difference in practice?
What is meant by a "dual mandate"?
The term *'mandate* for monetary policy' normally means a central bank's monetary policy objectives, as specified in legislation and regulations stipulated by governments and parliaments. In Sweden for example, the Riksbank Act stipulates that the Riksbank shall maintain price stability. Furthermore, it is stipulated in the preparatory works for the Act, that the Riksbank, as an authority under the Riksdag (the Swedish parliament), shall without prejudice to the price stability target support the goals of general economic policy with a view to maintaining sustainable growth and a high rate of employment.

It is important to distinguish between the central bank's monetary policy mandate and its monetary policy strategy. The monetary policy *strategy* is usually formulated by the central bank itself, but there are also examples where it is formulated in a collaboration between the central bank and the government. The mandate comprises the base for the central bank's monetary policy strategy, while the strategy "operationalises" the mandate and governs monetary policy. The strategy makes the monetary policy objectives concrete and describes how the central bank shall work to attain the objectives.

According to a study by the Bank for International Settlements, price stability is the prime monetary policy objective in the mandates of most OECD countries. However, the mandates often also stipulate, in slightly different ways, that the central bank shall stabilise the real economy.[16] It can therefore be argued that most central banks in OECD countries actually already have a dual mandate in the sense that the mandate in some way specifies that the objective of monetary policy is both price stability and real economic stability.

However, 'dual mandate' is often used to characterise a mandate that is specifically formulated like the mandate for the Federal Reserve (Fed). The Fed's (dual) mandate states that monetary policy shall promote the goals of maximum employment and stable prices.[17]

How does this mandate differ from those of other central banks? The Fed's objective for the real economy is made concrete (employment) and partly quantified ("maximum"). The mandates for other central banks also often specify that the central bank shall work to attain a high level of employment and growth, or support the general objectives for employment, growth, unemployment and so on. But usually other central banks' mandates stipulate that the bank shall attain this objective without prejudice to the objective of price stability. In the

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15 In fact, it is not evident that a changeover from a flexible inflation targeting to nominal GDP growth targeting would lead the central bank to give greater consideration to the real economy – this depends on how much consideration it gives to the economy to start with.
16 BIS (2009).
17 The law also stipulates moderately high long-term interest rates as a goal. The wording in the Federal Reserve Act is: *"The Board of Governors of the Federal Reserve System and the Federal Open Market Committee shall maintain long run growth of the monetary and credit aggregates commensurate with the economy's long run potential to increase production, so as to promote effectively the goals of maximum employment, stable prices and moderate long-term interest rates."*

Fed's mandate there is no corresponding wording. Therefore, the objectives for employment and price stability are often considered "on an equal footing" in the Fed's mandate, unlike in the mandates of other central banks, where price stability is the principal target.

Do central banks with a dual mandate give greater consideration to the real economy?

Thus, the monetary policy mandate of the Fed appear to put greater weight on the objective to stabilise the real economy than the mandates of other central banks. This is sometimes expressed as the Fed having a "dual" mandate rather than a "hierarchical" one like other central banks. Therefore, some argue, changing mandates to be more like the Fed's would increase the real economy focus of monetary policy. However, whether a less hierarchical mandate actually matter for the monetary policy strategy is an open question. It is the monetary policy strategy that describes how the central banks put the mandate into operation, as explained above. For instance, if we compare the Federal Reserve's strategy with that of the Riksbank the differences in the descriptions of the trade-off between stabilising inflation and the real economy appear to be relatively small, see the box below.

Svensson (2004) comes to a similar conclusion regarding the significance of dual vs. hierarchical mandates. He points out that the central bank can determine long-run inflation, but not long-run growth and output. Thus, there is an asymmetry between inflation and output when it comes to their long-run levels. That can be interpreted as a hierarchical mandate. But when it comes to stabilising deviations in inflation from the target and deviations in output from the long-run level, there is no asymmetry. That can be interpreted as a dual (non-hierarchical) mandate. It is, according to Svensson (2004), not meaningful distinguishing hierarchical from dual mandates when central banks' conduct policies that can be characterised as trying to minimize an intertemporal loss function, with losses depending on both inflation deviations from target and some measure of the real economy fluctuating around its long-run level, see appendix. This characterization fits both the Fed and other inflation-targeting central banks.

Can flexibility be reinforced and made clearer in the mandate?

Thus, introducing mandates more in line with the Federal Reserve's less hierarchical one would perhaps not change much in terms of practical policies. But other changes might have a greater effect. One such change could be to make the objective to stabilise the real economy more explicit and concrete in the mandate. Alternatively, the mandate can stipulate that the central bank itself shall make the objective concrete.[18] Such a change could for instance involve specifying what variables monetary policy should focus on.[19] An even larger change would be to specify the trade-off between price stability and real economic stability in the mandate, or to state that the central bank itself has to explicitly specify the trade-off.[20]

We would like to emphasise that these proposals would entail far-reaching changes compared to existing monetary policy mandates. We can also note that with current mandates central banks could choose to specify the real economy objective and trade-off in this way in their monetary policy strategies. But few central banks have chosen to go very far in this direction.[21] There are probably several reasons for that. One could be that it would restrict the room for manoeuvre. Less room for manoeuvre would, arguably, make monetary policy less fit to adapt to changing circumstances.

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18 See, for example, Gjedrem (2016).
19 Here, too, the Federal Reserve differs somewhat from other central banks in that the mandate clearly focuses on employment.
20 See Taylor (2016) for a discussion of some such proposals.
21 The central bank that has gone the furthest in making the balance between price stability and real economic stability more concrete is Norges Bank (the Norwegian central bank). Norges Bank previously stated an explicit loss function (see appendix) which included an output gap with an explicit weight, see Norges Bank (2012). However, this output gap was not something that could be measured directly, it represented a quantified level of Norges Bank's assessment of the output gap.

It may also be the case that this way of making the real economy objective more concrete entails other problems and potential disadvantages. For example, there is no generally-accepted view of how developments in the real economy in general and spare capacity in particular should be measured (see discussion in Section 2.1). This is, for instance, an argument that the Riksbank has emphasised.[22] Different measures paint different pictures and may even suggest different policies. Moreover, since monetary policy is typically decided by a committee it may be difficult to agree on a specific measure and its "normal" level. Going one step further, and for example quantify the objective in terms of a target for employment would, according to many – including the Federal Reserve and the Riksbank –, be a mistake, as monetary policy is not able to influence employment and the real economy in a lasting way (see the box below). Finally, some would argue that objectives for the real economy can undermine confidence in an inflation target, as we saw earlier in section 2.4.

BOX – A comparison of the Federal Reserve's and the Riksbank's monetary policy strategies[23]

The committee at the Federal Reserve that makes decisions on monetary policy is called the Federal Open Market Committee (FOMC). In its strategy the FOMC observes first of all that inflation over a longer period of time is primarily determined by monetary policy and hence that FOMC can specify a longer-run goal for inflation – an inflation rate of 2 per cent being the most consistent with the mandate in the longer run. With regard to the objective of "maximum employment", the FOMC observes that what is considered maximum employment is primarily determined by non-monetary factors that affect the structure and dynamics of the labour market, that is, factors that may change over time and may not be directly measurable. It is therefore not appropriate for the FOMC to specify a fixed goal for employment. Monetary policy must instead be based on assessments of what the maximum level of employment is on different occasions, and these assessments will be based on a wide range of indicators.[24]

After specification of the objectives, the FOMC observes that "*In setting monetary policy, the Committee seeks to mitigate deviations of inflation from its longer-run goal and deviations of employment from the Committee's assessments of its maximum level.*" On the occasions when the objectives are not complementary, the FOMC states that they will follow a balanced approach in promoting them. The Committee will then take into account the magnitude of the deviations and how quickly employment and inflation are projected to return to the levels judged consistent with the mandate.

With regard to the Riksbank's mandate, the Sveriges Riksbank Act states that the objective of the Riksbank's activities shall be to maintain price stability. In addition, the government bill behind the Act states that the Riksbank shall in addition, without prejudice to the objective of price stability, support the objectives of general economic policy with a view to achieving a sustainable level of growth and high rate of employment. It was not

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22 Sveriges Riksbank (2010).
23 The Federal Reserve's strategy is described in the document "Statement on Longer-Run Goals and Monetary Policy Strategy". The Riksbank's strategy is described in detail in the document Monetary policy in Sweden and summarised in points in the box at the front of the Monetary Policy Reports.
24 Four times a year the members of the FOMC report their personal assessments of the long-run or "normal" levels for GDP growth and unemployment. In September 2016, for instance, the median assessment of normal unemployment was 4.8 per cent.

considered necessary to stipulate this in the act as it follows from the Riksbank's position as a public authority under parliament.

The Riksbank has specified the price stability objective as a target for the annual rate of change in CPI inflation of 2 per cent. With regard to the real economy, the Riksbank observes in its strategy, like the Federal Reserve, that monetary policy cannot raise growth and employment in a lasting way. These are largely determined by other factors in the long run. It is neither useful nor appropriate to set lastingly high growth or high employment as targets for monetary policy. On the other hand, monetary policy can affect the average inflation rate and in accordance with this, the overriding objective for monetary policy is to maintain price stability.

However, the Riksbank states that even if monetary policy is not able to contribute to lastingly high growth and employment, it can affect growth and employment in the short term and contribute to stabilising growth and employment around their long-run, or sustainable, levels. So the fact that the Riksbank aims its monetary policy at attaining the inflation target does not prevent it from giving consideration to the real economy. The Riksbank expresses this as: "At the same time as monetary policy is aimed at attaining the inflation target, it is also to support the objectives of general economic policy for the purpose of attaining sustainable growth and a high level of employment. This is achieved through the Riksbank, in addition to stabilising inflation around the inflation target, also endeavouring to stabilise production and employment around paths that are sustainable in the long term."

3.2   Nominal growth targeting forces monetary policy to take account of the real economy

In this section we focus on targets for the growth rate of nominal national income or total production. This is usually measured by nominal GDP growth, and in the following we refer to targets for nominal GDP growth as *nominal growth targets.* We discuss the related proposal to stabilise the GDP level in Section 5.

In the 1980s and early 1990s nominal growth targets were proposed as alternatives to targets for the money supply.[25] When inflation targeting was introduced in the 1990s, the alternative to target the nominal growth rate was put aside. More recently this proposal have received renewed interest.[26] This is partly because a nominal growth target forces the central bank to take account of the real economy.

Nominal GDP differs from the measure of GDP growth that is normally discussed. Normally, GDP growth refers to **real** GDP growth which is the growth rate of production expressed in fixed prices. Thus, it is a measure of the growth rate of output volume. Nominal GDP reports the value of what is produced when expressed in current prices. It is thus a measure that reflects both price and volume. In principle, nominal GDP growth is the sum of inflation (measured as the change in the so-called GDP deflator) and growth in output volume (real GDP growth).

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25   Two early advocates were Meade (1978) and Tobin (1980). Örn (1999) note that the question goes back even further. During the interwar period Professor David Davidson at Uppsala university in Sweden proposed a norm for monetary policy that with modern terminology means that monetary policy would stabilise the nominal national income.

26   The debate is at its most intense on various economic blogs, where two of the most eager supporters are Scott Sumner (themoneyillusion.com) and Jeffrey Frankel (jeffrey-frankel.com). More cautiously positive contributions have been made by Simon Wren-Lewis (mainlymacro.blogspot.com), while Tony Yates has been openly critical (longandvariable.wordpress.com). An interesting exchange between Greg Ip and Ryan Avent on The Economist's blog "Free Exchange" on 1 November 2011 reflects many of the arguments for and against that have arisen in the debate. For a survey of research-based literature, see for instance Billi (2015) and Garín, Lester, and Sims (2016). Most of the research-based literature and general discussion concerns objectives for the level of nominal income and not the growth rate (which was the case in the earlier literature). However, there are those who specifically discuss targets for growth in nominal income. Røisland (2001) shows that nominal growth targets can be better than inflation targeting in a traditional model. Jensen (2002) and Guender (2007) shows that nominal growth targets can be better than inflation targeting in a New-Keynesian model. See also McCallum (2011).

A nominal growth target entails an implied inflation target. For instance, if the nominal growth target is 5 per cent and the long-term growth potential of GDP is 3 per cent the implicit inflation target is 2 per cent. A nominal growth target also implies that monetary policy shall put equal weight on stabilising inflation and stabilising real GDP growth, see appendix.[27] Note that the equal weight refers to what is implied by the target for nominal growth, not monetary policy in general. In principle a central bank with a nominal growth target could also stabilise a measure of the real economy like output, in the same way that a central bank with an inflation target also have the objective of stabilising the real economy.

Below, we first look at the arguments in favour and against nominal growth targeting separately. We then compare nominal growth targeting to flexible inflation targeting and look at the results of studies where the mechanisms behind several of these arguments can interact.

Arguments in favour nominal growth targeting

As explained above, nominal growth targeting implies that the central bank stabilises the total of inflation and real output growth. A possible advantage of a nominal growth target is therefore that it **forces the central bank to take account of the real economy**. A closely linked argument is that it **allows the central bank to react to supply shocks in a better way** than under inflation targeting.[28] Supply shocks refer to disruptions to the economy that makes inflation and growth "go in different directions". For instance, a higher oil price will cause inflation to increase in the short run. But at the same time it raises production costs and thereby slows down growth. For inflation targeting, this leads to a conflict between the objectives of price stability and real economic stability since bringing inflation back to target will dampen growth even further. However, with a nominal growth target such a conflict need not arise as the two effects tend to offset each other, leaving nominal growth more or less unchanged by the increase in the oil price. There might therefore be no need for monetary policy to react to this shock and developments in the real economy is "automatically" taken into account.

There are also arguments in favour of nominal growth targets that are not revolved around the stabilisation of the real economy. One is that it can **simplify the communication** of monetary policy.[29] There will be less need to distinguish between developments of prices and developments in the real economy. Furthermore, the problem of finding a measure of spare capacity, such as an output gap, might be reduced. Economic agents may also find it easier to relate to a target for nominal income growth than an inflation target, making it easier for the general public to understand monetary policy.

A third argument is that **it is easier to hold a nominal growth-targeting central bank accountable** as it is easy to evaluate nominal growth targeting policies ex post.[30] With a nominal growth target there is only one target and it is easy to determine whether it has been attained or not.

A forth argument is that **nominal growth targets can reduce risks in the financial system**. The argument is linked to the fact that it is difficult for borrowers to insure themselves against unexpected income losses in the future. A stable and predictable (national) nominal growth rate may help stabilise household income growth, making it more predictable. This can in itself improve welfare for households, but it can also reduce risks in the economy and in the financial system.[31]

Finally, **a nominal growth target may make monetary policy history-dependent**. In order for an output gap to close, real growth must differ from the potential long-run real growth. And if, for example, real growth is higher than potential this will, in isolation generate above

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27 See also Svensson (1999a).
28 See, for example, Frankel (2012), McCallum (2011) and Bhandari and Frankel (2015).
29 See, for example, McCallum (2011), Sumner (2011b) and The Economist (2015).
30 See, for example, Bean (2013).
31 Koenig (2013) and Sheedy (2014).

target nominal growth. Consequently, economic agents can expect that if the monetary policy conducted does not close an output gap today, it will not close it tomorrow either.[32]

Arguments against a nominal growth target

As we explained above, a nominal growth target can be taken to imply that monetary policy shall weigh stabilisation of inflation and GDP-growth equally. But having an **equal weight on stabilising inflation and GDP growth might not be optimal**.[33]

Another argument against a nominal growth target is that **inflation expectations may be weakly anchored**.[34] This has to do with the fact that with a nominal growth target there is only an implicit inflation target, making it harder for economic agents to form their inflation expectations. Furthermore, the implicit inflation target is defined in terms of the GDP deflator, a measure that does not specifically measure consumer price changes like the CPI. If the link between inflation measured in terms of the GDP deflator and in terms of CPI is weak, or if the general public does not understand the link, inflation expectations may be poorly anchored.

Another problem is that with a constant nominal growth target the implicit inflation target will change if the economy's long-term sustainable real growth rate changes. If sustainable growth changes often, then the implicit inflation target will change often. A further complication is that changes in the sustainable growth rate can be difficult to detect. This means that there can be temporary undetected changes to the implicit inflation target. If an implicit inflation target changes frequently, temporarily, and in a way that cannot be detected, the inflation expectations may be poorly anchored.

An often mentioned practical problem with nominal growth targeting is that data on **nominal growth is published with long time lags and revised substantially and often**.[35] It may be difficult to determine monetary policy without data on the current level of the target variable. Furthermore, substantial revisions and less reliable data could lead to incorrect assessments. It may also be difficult to evaluate monetary policy ex post if the target variable is revised substantially afterwards. GDP statistics differ in this way from inflation statistics which is published rapidly on a monthly basis and rarely revised.

Some have also objected to the argument that a nominal growth target would be easier for the central bank to communicate. They claim that, on the contrary, **it may be more difficult to communicate monetary policy with a nominal growth target**.[36] The argument is based on the notion that nominal GDP is a variable that few non-economists are familiar with, making it a hard target to relate to for most people.

Another practical problem may arise if **monetary policy impacts inflation and the real economy with different time lags**. In theoretical models nominal growth targeting might lead to increasingly volatile inflation and growth if monetary policy works with different time lags and inflation expectations are backward looking.[37] However, the problem disappears in models where monetary policy works with similar lags and inflation expectations are forward-looking.[38]

A nominal growth target works poorly when resource utilization is low and the policy rate is close to its lower bound. With a nominal growth target monetary policy should counteract a nominal growth which is higher than the nominal growth target. That may imply that monetary policy will be tightened at a time when the economy is recovering from

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32 Jensen (2002) and Guender (2007).
33 In the simple New Keynesian model optimal monetary policy coincides with a nominal growth target only in one special case where the weight of the real economy in the central bank's loss function is equal to the slope of the Phillip's curve, see for instance Jensen (2002) and Walsh (2003).
34 See, for instance, Bean (2009) and H M Treasury (2013) and the references there.
35 Bean (2013) and H M Treasury (2013).
36 See, for example, Posen (2013).
37 Ball (1999) and Svensson (1999a).
38 See, for example, Guender (2007).

a recession. Understanding this, economic agents will lower their expectations regarding future growth and that gives a negative impulse to the economy today. To counteract this effect the central bank will have to lower the policy rate even more, something which is not possible when it is already at its lower bound.

Little difference between nominal growth targeting and flexible inflation targeting in practice
It is of course true that nominal growth targeting will stabilise the real economy more than strict inflation targeting where the central bank always try to bring inflation back to the target as quickly as possible. But inflation targeting central banks are not strict but flexible inflation targeters, as described earlier. The most relevant comparison is therefore between nominal growth targeting and flexible inflation targeting, not nominal growth targeting and strict inflation targeting.

Comparing nominal growth targeting with flexible inflation targeting it is not obvious that the existence of supply shocks speaks in favour of the nominal growth target. A central bank with flexible inflation targeting can overlook supply shocks, for instance a temporary increase in the oil price, in the same manner as a central bank that targets nominal growth. The fact is that inflation targeters make such trade-offs routinely. Being aware of the temporary nature of the effects of some shocks they can choose to focus on measures for underlying inflation instead of measures of headline inflation.

For the sake of symmetry, we should also point out that a central bank with a nominal growth target could stabilise some measure of the real economy in addition to the nominal growth target, as we explained above. In that case policies will be closer to optimal policies.[39] Furthermore, the problems with a nominal growth target in situations where the interest rate is close to its lower bound is reduced if the central bank explicitly stabilise the real economy in addition to nominal growth.

As we explained above, some argue that it can be difficult to anchor inflation expectations with a nominal growth target. This problem can be reduced if the central bank is explicit about the level of the implicit inflation target, that is, the level that together with the growth potential of the economy adds up to the nominal growth target. To make it easier for economic agents, the central bank could also be more explicit about its views on the relationship between the GDP deflator and a more consumer-related index, such as the CPI. However, such communication could on the other hand also make the agents more uncertain over which measure of inflation is actually the central bank's target, which can hamper the anchoring of inflation expectations.

All these arguments for and against aside, some have pointed out that nominal growth targeting should in practice result in more or less the same monetary policy as flexible inflation targeting. In the long run policies under both regimes should stabilise nominal GDP growth. And in the shorter run a central bank that pursues flexible inflation targeting should take the real economy into account in much the same way as under nominal growth targeting.[40]

As far as we know, there is no country that has tested a nominal growth target for monetary policy. There is therefore no empirical evidence to rely on to make comparisons and assess whether monetary policy with a nominal growth target is better than flexible inflation targeting.[41]

However, there are a few studies where the two alternatives are compared in theoretical models. In these studies, some of the mechanisms and arguments that were discussed above are in play, but not all. None of the studies allow for inflation expectations to become less

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39 See, for example, Rogoff (1985), Røisland (2001) and Jensen (2002).
40 For instance, Bean (2013) shows that the Bank of England has implicitly tried to stabilise nominal GDP. See also Koenig (2012) and Blot, Creel, and Ragot (2015).
41 Örn (1999) notes that the revaluation of the Swedish krona after the Second World War was based on theoretical reasoning linked to targets for nominal income.

anchored with a nominal growth target. On the other hand, they do not include the potential gains from improved accountability and financial stability. Studies that try to capture the problem with unreliable data suggest that nominal growth targeting can stabilise inflation and the real economy better than a Taylor-rule based variety of flexible inflation targeting when there can be major errors in the estimates of the output gap.[42]

Studies that focus on the history dependency of nominal growth targeting suggest that it stabilises inflation and the real economy better than inflation targeting if (i) the relationship between inflation and unemployment is weak –that is, the so-called Phillip's curve is relatively flat– (ii) the economy is mostly exposed to supply shocks, and (iii) the central bank's loss function puts considerable more emphasis on stabilising inflation relatively to the real economy.[43] However, it is unclear how robust these results are.

All in all, our conclusion from reading the academic literature is that there is neither empirical nor theoretical support for the notion that nominal growth targeting should be better than flexible inflation targeting when it comes to stabilising the real economy. Nor does the academic literature speak strongly for one or the other alternative when it comes to the other arguments in favour of or against a nominal growth target. An exception is that there can be significant gains from history-dependence under nominal growth targeting. However, as we have also seen, the type of history dependence that arise under nominal growth targeting can be a disadvantage when the policy rate is close to its lower bound. Even though nominal growth targeting might not be a preferable regime to flexible inflation targeting, we believe that nominal GDP growth can be a relevant indicator in the monetary policy analysis of flexible inflation targeting central banks, in line with simple monetary policy rules, for instance.

3.3   Inflation targeting and risks in the financial system

In the previous sections we described proposals put forward for making inflation targeting central banks more flexible when it comes to stabilising the real economy. But as we discussed in section 2.3, the flexibility may also be about using monetary policy to safeguard financial stability. In this section we look at proposals aimed at increasing the flexibility in this respect. The few concrete proposals that have been put forward would not really involve a change in regime. The discussion has mainly concerned supplementing and improving inflation targeting policy as it is conducted today.

A ternary mandate can lead to greater consideration for financial stability

Maintaining financial stability is usually considered one of the central bank's main tasks. And indeed, the large majority of central banks have this responsibility, stated either through laws and statutes, or more self-imposed.[44]

However, traditionally central banks have chosen not to allow the connection between financial stability and price stability influence monetary policy to any great extent. Critics claim that this needs to be reconsidered. Pointing to the experiences from the financial crisis they argue that financial stability and monetary policy are more interconnected than previously assumed.[45] Furthermore, theoretical models suggest that market failures and imperfections in the credit markets may need to be counteracted, possibly by monetary

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42 Beckworth and Hendrickson (2016).
43 See Jensen (2002) and Guender (2007). See also Kim and Henderson (2005) and Walsh (2003). In Section 5 we take a closer look at studies that analyse targets for nominal income in levels.
44 BIS (2009).
45 See Billi and Vredin (2014).

policy.[46] Therefore, there may be reason to add financial stability to the dual monetary policy mandate, thus giving central banks a ternary mandate for monetary policy. There are examples of central banks whose monetary policy strategies now specify that consideration to financial stability concerns could be included in their monetary policy, for instance Norges Bank and the Bank of England.[47]

If central banks' principals want monetary policy to focus more on safeguarding financial stability they could consider amending the monetary policy mandates with a third objective, making them ternary. Going one step further, the principal could specify indicators and targets in the mandate, or state that the central bank should specify this itself. A far reaching move would be to require the central bank to specify the weight it will put on safeguarding financial stability relative to the other objectives.

But, analogously to the objective of stabilising the real economy, there might be problems and disadvantages with making the target more concrete in this way. One problem is that it is difficult to determine what is meant by financial stability. It is generally interpreted as meaning that the financial system is functioning efficiently and is resilient to shocks. But from a monetary policy perspective counteracting risks and imbalances in the financial markets may be the crucial issue, not strengthening the financial system as such. Financial shocks can have large negative consequences for the macroeconomy without necessarily threatening the functioning of the financial system. However, imbalances and risks on financial markets are not particularly concrete as a concept either, and there may be differing opinions as to how they should be understood and measured. Different measures paint different pictures and it is difficult to determine what levels are desirable.

Furthermore, it is debated if and to what extent monetary policy should actually take imbalances and risks in the financial system into account. In theoretical models it is typically better to use macroprudential policy to counteract financial imbalances.[48] A ternary mandate would also risk increasing uncertainty over the inflation target, and thereby endangering the nominal anchor. Finally, some fear that expanding the monetary policy mandate this way may weaken the support for independent central banks among politicians and the general public, as monetary policy would then have to make trade-offs that normally fall under fiscal policy.[49]

A concrete proposal: Look beyond the forecast horizon

In the section above we pointed out that as of yet there are relatively few concrete proposals on how to increase the financial stability focus of monetary policy. Some have concentrated on finding measures of financial risks to include in monetary policy deliberations.[50] Others have focused on the practical problem that monetary policy decisions are based on forecasts that only reach 2 to 3 years ahead, while financial risks may materialise after this period. In an article in the Monetary Policy Report published in July 2013 the Riksbank described a possible framework for dealing with this problem. The starting point was to assume that four years ahead, that is, beyond the forecast horizon, there was some probability that a financial risk would materialise and force the economy into a deep recession with inflation and the real economy far below target levels. The probability of this crisis was assumed to be connected to the growth of household debt, the build-up of which could be mitigated by restrictive monetary policy today. Improved target attainment for inflation and the real economy in the short run would then be weighted against the costs of increased risks for a

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46 See, for example, Woodford (2012a) who explains why this could be a desirable wording of the central banks' objectives. His argument is in brief that deficiencies in the credit markets can reduce welfare via mechanisms that are not entirely captured by the central bank's forecasts for inflation and economic activity. Note that it is not necessarily the case that monetary policy should give consideration to this if there are other available tools, such as macroprudential policy, which can be used to counteract these deficiencies.

47 See Norges Bank (2016) and H M Treasury (2016). The Riksbank mentions in its strategy that "risks linked to developments on the financial markets are taken into account in the monetary policy decisions".

48 IMF (2015) and the references there.

49 See Billi and Vredin (2014) and the references there.

50 See, for example, Stein (2014) and Borio (2004).

very bad target attainment in the longer run. The Riksbank concluded that this framework for including financial stability considerations in monetary policy would require a lot of judgements and would probably not provide simple answers.

Later studies and research confirm this conclusion. In the majority of studies the costs of using monetary policy to reduce the risk of a future crisis largely outweigh the gains.[51] An important reason is that empirically monetary policy have very little impact on the probability of a future crisis. Other studies, however, conclude that the gains from using monetary policy to lean against the risk of a future crisis outweigh the costs. In these studies monetary policy has a greater impact on the probability of a crisis and can also influence the severity of the crisis if it happens.[52]

4 Proposals for a more effective monetary policy

As we described in Section 2.4, there may be alternatives to inflation targeting that are more effective in the sense that they make better use of the expectations channel. They could therefore stabilise prices and the real economy better. In this section we take a closer look at two of these alternatives: price level targeting and average inflation targeting.

## 4.1 Price level target – gains due to strong assumptions

With a price level target the aggregate price level is supposed to develop according to a specific path, for instance a path where the CPI increases by 2 per cent annually. The objective of monetary policy is to stabilise the price level on this path. If prices deviate from the target the objective is not to bring inflation back to 2 per cent, but to bring the price level back to the level it would have had if the index had increased by 2 per cent a year. Unlike an inflation target, a price level target thus requires that historical deviations are "made up for" in later periods. If, for instance, inflation is lower than 2 per cent in one period, it must be higher than 2 per cent in later periods. Otherwise the price level would not return to its target path.

The difference between a price level target and an inflation target is illustrated in Chart 1. The left-hand panel shows the price level and the right-hand panel shows inflation. The solid red lines show inflation and the price level when prices increase in line with the target of 2 per cent annually. Let us now assume that some shock occurs that make inflation fall for 12 months, as indicated by the blue lines in the right panel. Suppose as well that monetary policy responds to this by bringing the price level or inflation back on target, depending on whether the target concerns the price level or the inflation rate. The solid blue lines in the two panels show what happens to the price level and inflation respectively with a price level target. The dotted blue lines show the development with an inflation target. With a price level target the period with inflation below 2 per cent is offset by a period with inflation above 2 per cent so that the price level will return to the target path (solid red line). With an inflation target the central bank does not compensate for below-target inflation but simply brings inflation back to 2 per cent. When inflation is back at this level, prices will again rise by 2 per cent a year, but now along a path below the original path for the price level.

51 See Bank of Canada (2016), Svensson (2016a), IMF (2015), Ajello, Lopez-Salido, and Nakata (2016) and Norges Bank (2016).

52 Adrian and Liang (2016) show that the gains exceed the costs if one makes different assumptions from Svensson (2016a) regarding, for instance, how much unemployment would increase during a crisis. However, Svensson (2016b) argue that Adrian and Liang's assumptions are hardly realistic. Gerdrup, Hansen, Krogh, and Maih (2016) find in their model that the gains of using monetary policy to try to reduce the development of imbalances and risks in the financial system outweigh the costs if the economic agents underestimate the risks and if the size of potential crises depends on indebtedness in the economy. Clouse (2013) uses a stylised theoretical model to show that monetary policy should give consideration to stability risks if monetary policy can affect these risks, but that the relationship is complicated and depends on what model one uses. See also BIS (2016) and Filardo and Rungcharoenkitkul (2016).

Figure 1. Price level and inflation with a price level target and an inflation target
Vertical axis measures index value (price level) and per cent (inflation).
Horizontal axis measures number of months.
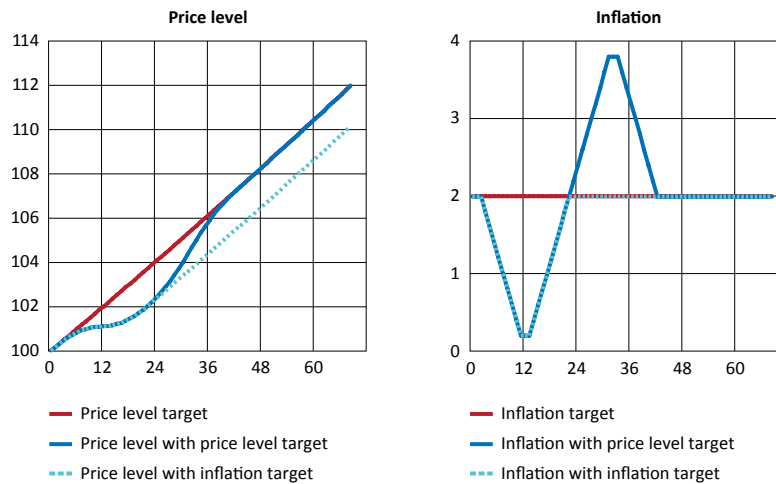
Note. Fictitious example.

Arguments in favour of a price level target

The most common argument for a price level target is that **it makes monetary policy history-dependent and thereby more effective**. In Section 2.4 we explained how monetary policy becomes more effective if it over- or undershoots the inflation target before converging back to the target. We also explained why such a policy is time-inconsistent and therefore not credible under inflation targeting. But with a price level target such a policy may become credible as deviations from the implicit inflation target must later be followed by deviations in the opposite direction, as illustrated in figure 1.[53] However, for there to be gains in effectiveness, a number of relatively strong assumptions must hold. In particular, it is important that economic agents are forward – rather than backward looking when they form their expectations. We will return to this below.

With a price level target, monetary policy becomes more effective in general (as long as the underlying assumptions hold true). But an argument often put forward in favour of price level targeting is that it can be **particularly useful in situations where the interest rate is at or close to its lower bound** when it might be harder to stimulate demand using traditional monetary policy.[54]

Other arguments in favour of a price level target are based on the fact that **a price level target reduces the uncertainty surrounding the future price level**. With a price level target, economic agents can be more certain about the price level in the future since, if the central bank lives up to its commitments, the price level will only deviate from the set path temporarily, and over time prices will return to the target. This differs from an inflation target where previous deviations are not made up for. The future price level is therefore very uncertain. If, for instance, the central bank misses the inflation target on the downside more than the upside, the price will in the longer run be much lower than if inflation rises in accordance with the inflation target. With more certainty around the future price level, the risks are smaller for those who save and invest and wealth transfers between borrowers and savers will not be as arbitrary.[55]

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53 The insight that there are such short-term stabilisation gains with a price level target is relatively new. Svensson (1999b), using a more traditional model, showed that a price level target can help to make monetary policy time consistent. Vestin (2006) showed how a price level target can implement optimal (time consistent) monetary policy in a modern New-Keynesian model.
54 See, for example the discussion in Côté (2007). Svensson (2003) and Evans (2012) argues that one can introduce a temporary price level target if the interest rate has reached its lower bound and there is at the same time considerable spare capacity in the economy.
55 See, for example, Côté (2007).

Arguments against a price level target

For a price level target to be more effective than an inflation target, **several assumptions must hold**. A key assumption is that economic agents are forward-looking when they form expectations. Furthermore, they must understand how monetary policy works under a price level target and adapt their expectations accordingly. Put simply, for a price level target to make monetary policy more effective, the expectations must change in the "right" direction when a shock occurs. The economic agents must understand and base their decisions on the notion that low inflation today implies high inflation tomorrow, and vice versa.

If expectations only change slightly in the right direction, the stabilisation gains with a price level target is reduced. If the expectations do not change at all, a price level target may even be less effective than an inflation target.[56] The reason is relatively straightforward. Assume that inflation is currently higher than 2 per cent, and that there are expectations that it will remain high rather than decline in the coming period. It will then take a more substantial monetary policy tightening to bring inflation down to 1 per cent (which would be needed with a price level target) than to 2 per cent (which would be needed with an inflation target). Thus, if inflation expectations are adaptive, a price level target implies greater fluctuations in the real economy than an inflation target.

How realistic is the assumption that the expectations of households and companies change in the "right" direction? Ultimately, this is a question of how the economic agents form their expectations, an issue which is heavily debated. The gains in effectiveness from a price level target arises in theoretical models where agents have full information on how the economy works. Their expectations are assumed to be rational in the sense that they are based on this information. If the central bank starts to target the price level, agents will immediately base their expectations on this new target. If prices fall below the level target, the agents would expect inflation to overshoot the implicit inflation target during a later period, and adjust their decisions today to those expectations.[57] In reality, even though economic agents probably are somewhat forward-looking, empirically they seem to be less forward looking than what theory assumes. Consequently, it is not evident that expectations would change in the "right" direction if a price level target is introduced.[58]

One reason why economic agents may not necessarily change their expectations in such a way is that they may not perceive the price level target as credible. They may, for example, doubt that the central bank is willing to create an economic downturn to counteract a large one-off increase in, say, the oil price (see below). In that case, expectations will not change as required for a price level target to be more effective than an inflation target.[59]

Another potential challenge, which is related to the point above, is that under price level targeting **the central bank cannot disregard shocks with only temporary effects on inflation**. Let us assume that the oil price suddenly soars. The direct effect is that prices of petrol, fuel etc. rise, pushing up CPI inflation temporarily. Under flexible inflation targeting the central bank can disregard this initial effect on inflation and concentrate on mitigating any second round effects. If there is scope, monetary policy could even become more expansionary to counter the negative effects from rising production costs on the real economy.

But with a price level target the central bank cannot disregard this initial increase in inflation, as low inflation today must be offset by high inflation tomorrow. The central bank either has to tighten monetary policy to counteract the direct effect on CPI inflation or not react and instead allow negative indirect effects to affect the economy thereby lowering future inflation that way.[60] Of course, this argument assumes that the price level target is

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56 See, for example, Gaspar, Smets, and Vestin (2007).
57 One implication of this is that the size of the efficiency gains provided by a price level target will be model-dependent, that is, they will vary depending on which model one assumes for the economy.
58 See Amano, Engle-Warnick, and Shukayev (2011) and Kryvtsov, Shukayev, and Ueberfeldt (2008a).
59 See, for example, Masson and Shukayev (2011).
60 There are also those who argue that an inflation target and a price level target become equally good/bad if one takes into account in the analysis that the economy consists of several different sectors, see for instance Ortega and Rebei (2006).

defined in terms of headline CPI inflation and not in terms of an underlying measure that is adjusted for energy prices.

Gains with a price level target in theory, but uncertain gains in practice
As far as we know, there is only one example of a central bank with a price level target, namely the Riksbank during the period 1931-1937. As a crisis measure the Riksbank was then given the task of maintaining a constant purchasing power for the krona, that is, it was to maintain a constant price level.[61] During this period the Swedish economy performed relatively well. But it is difficult to draw any general conclusion from this example. Firstly, this was a brief and very unusual period in the Swedish economy and the world economy. Secondly, there was no country with an inflation target during that period to compare with.[62]

In the academic literature there are studies that compare price level targeting with inflation targeting in quantified macroeconomic models. Some of these find that there are benefits of a having a more predictable price level in the long run.[63] Other studies focus on the short term stabilisation gains and find that the gains from having a more effective monetary policy are significant, especially if there is a lower bound for the policy rate.[64] But it turns out that these gains disappear fairly quickly when several sectors are allowed in the model, if the economic agents are backward-looking rather than forward-looking, or if they do not adjust their expectations as assumed in the theory.[65]

To summarise, our conclusion is that it is still unclear whether price level targeting would be better than flexible inflation targeting in practice. Price level targeting has hardly been tried and the theoretical gains do not clearly exceed the costs. Furthermore, the assumptions required for price level targeting to be beneficial might not hold in practice. This was also the conclusion reached by the Bank of Canada when its monetary policy was reviewed in 2011, and by H M Treasury in the United Kingdom in 2013.[66]

4.2   A target for average inflation – a mid-way solution
An alternative to the inflation target, which may give similar gains as a price level target, is a target for average inflation. With this type of target the central bank shall stabilise average inflation over a fixed number of years at a certain level. For example, if the average is taken over 2 years, then a yearly inflation rate 1 percentage point below the target one year, must followed by an inflation 1 percentage point above the target the following year. This means that monetary policy becomes history-dependent, as with a price level target, but not to the same extent. With a price level target all historical deviations from the target path for the price level must be recovered. So if the path for the price level implies that prices should increase by 2 per cent a year, all deviations from 2 per cent inflation must be compensated for, otherwise the price level will not return to the target path. With an average target the central bank does not need to compensate for all of the historical deviations, only the most recent.
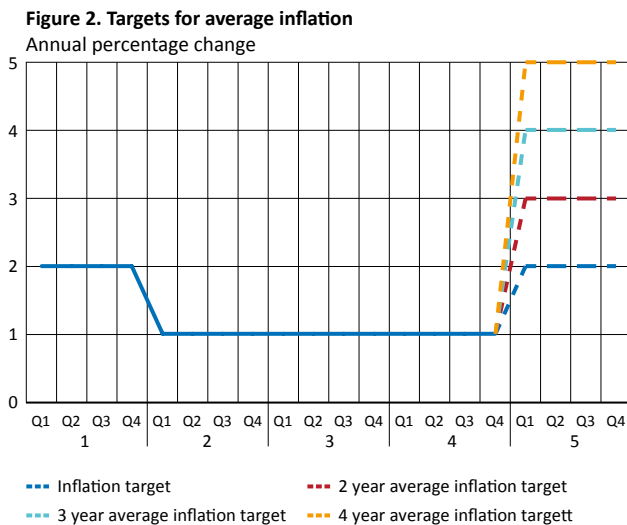
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61 See Berg and Jonung (1999).
62 Straumann and Woitek (2009) refer to various historical sources and empirical data and argue that the Riksbank's monetary policy during this period was actually governed by a wish to maintain a stable weak exchange rate – not an "innovate monetary policy/price level target".
63 See, for example, Dib, Mendicino, and Zhang (2008) and Meh, Ríos-Rull, and Terajima (2010).
64 See, for example, Resende, Dib, and Kichian (2010) and Coibion, Gorodnichenko, and Wieland (2010).
65 See, for example, Cateau, Kryvtsov, Shukayev, and Ueberfeldt (2009), Masson and Shukayev (2011) and Kryvtsov, Shukayev, and Ueberfeldt (2008b).
66 Bank of Canada (2011) and H M Treasury (2013)

Figure 2. Targets for average inflation
Annual percentage change

- - - Inflation target
- - - 2 year average inflation target
- - - 3 year average inflation target
- - - 4 year average inflation targett

Note. Constructed example of the difference between a target for inflation and a target for average inflation.

This is illustrated in figure 2. The broken lines show what inflation has to be in year 5 if inflation has been 1 percentage point below a target of 2 per cent during the three previous years. As we can see, it depends on whether the target is defined as an average over 1 year (as current inflation targets), 2 years, 3 years or 4 years. If the average is defined over 4 years, all deviations from the earlier years must be recovered, in the same way as with a price level target. Thus, if the target is explicitly defined in terms of average inflation over, for instance, 3 years, it is a mid-way solution between an inflation target and a price level target.

We should emphasise that in figure 2 we have disregarded what happens after year 5. Looking beyond year 5 reveals a potential disadvantage of average inflation targeting, namely that it can cause oscillating inflation. Let us assume, for instance, that the target is defined as an average inflation of 2 per cent over a period of 3 years. Given the numbers in figure 2, inflation would then need to be 1 per cent in years 6 and 7 respectively. In year 8 we would once again need an inflation of 4 per cent, and so on. However, if the central bank also tries to stabilise the real economy, the fluctuations would gradually disappear over time.[67]

We would also like to point out that the inflation targets of most central banks, including the Riksbank's target, are not a targets for average inflation. The dotted blue line in figure 1 in section 4.1 illustrates how inflation would evolve with an inflation target. When inflation undershoots the target the central bank will aim to bring *inflation* back on target. It does not have to recover previous deviations from it. Thus, there is nothing in the current monetary policy strategies that says that average inflation will be on the inflation target. However, if economic shocks are symmetrical over time, and monetary policy reacts in a symmetric way, we can expect long term average inflation to coincide with the inflation target.

Arguments for and against a target for average inflation
The theoretical arguments in favour of average inflation targets are the same as the arguments in favour of price level targets. Compared with an inflation target, the uncertainty regarding the future price level is reduced, monetary policy becomes history-dependent and it may be easier to escape a situation where the interest rate is at or near its lower bound. However, as we explained earlier, under average inflation targeting it is only the most recent deviations from the inflation target that will be recovered. These arguments in favour of a target for average inflation are the same as for a price level target, but they are somewhat weaker.

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67 Nessen (2002).

Similarly, the arguments against a target for average inflation are more or less the same as the arguments against a price level target. First, some benefits only accrue under assumptions that may not hold in practice. Second, with a target for average inflation the central bank cannot disregard shocks that affect inflation temporarily. These arguments against average inflation targeting become weaker the shorter is the period for the average, in the same way as the arguments in favour becomes weaker when the period for the average is shortened.

However, an argument that particularly speaks in favour of a target for average inflation is that it may actually function better than both a price level target and an inflation target if some of the economic agents have backward-looking expectations. This can be explained as follows. We described earlier how a price level target can give a more stable development of the real economy and inflation than an inflation target if the economic agents have forward-looking expectations. But with a price level target there will be larger variation in these variables if the economic agents have backward-looking expectations. If there are both forward-looking and backward-looking expectations of inflation among economic agents, a trade-off arises. A well-adapted target for average inflation can then stabilise both inflation and the real economy better than an inflation target.[68] In general, the average should be defined over a short period if the agents are mainly backward-looking and over a longer period if they are mainly forward-looking.

Few studies comparing average target with inflation target

As far as we know, there is no examples of central banks with a target for average inflation.[69] The mandate for the central banks in Australia and New Zealand could be interpreted as targets applying to average inflation, but other information indicates that they also have "normal" inflation targets and conduct flexible inflation targeting. The Reserve Bank of Australia is explicit about this.[70] The Reserve Bank of New Zealand is less explicit – as far as we know –, but from the bank's communication we interpret its target as a traditional inflation target.[71]

There are a few studies that compare targets for average inflation with inflation targets in quantified models.[72] The studies find that there are net benefits from stabilising average inflation compared to stabilising inflation if the period for the average is well adapted to how forward-looking the economic agents are when forming inflation expectations (see the section on arguments in favour of a target for average inflation above). However, it is difficult to say anything about the gains of a target for average inflation more generally and in practice on the basis of these few studies.

5 Proposal for both more flexible and more effective monetary policy – target for the level of nominal GDP.

A proposal that in theory may imply that monetary policy takes the real economy into account to a larger extent, and at the same time in a more effective way, is the proposal that monetary policy should stabilise the level of nominal GDP around a targeted path.

A target for the level of nominal GDP concretise the monetary policy target in the same way as a nominal growth target (see Section 3.2). The central bank shall target a concrete

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68 Nessen (2002) and Nessen and Vestin (2005).
69 Strictly speaking, all central banks where the inflation target is expressed as the annual rate of inflation have an average target for inflation where the average is taken over 1 year.
70 Debelle (2009).
71 See Bollard (2002) and Lewis and McDermott (2016).
72 Nessen and Vestin (2005) and Lewis and McDermott (2016).

and explicit variable around a quantified target path. For instance, the target can be to stabilise nominal GDP along a path where it grows by 5 per cent a year. As the target is a level target policy becomes history-dependent in a similar manner as with a price level target.

We saw earlier that a nominal growth target – a target for nominal GDP growth – can be regarded as an inflation target and a target for real GDP growth. Similarly, a target for the level of nominal GDP can be regarded as a price level target and a target for the level of real GDP. The central bank shall also give the same weight to the two targets (see appendix).[73]

Arguments for and against a target for the level of nominal GDP

A target for the level of nominal GDP has the same presumed advantages as a nominal growth target (see Section 3.2): Monetary policy automatically takes the real economy into account and does not need to react to temporary supply shocks, it is simple to communicate and easy to evaluate ex post. Furthermore, financial risks may be reduced as the target could reduce uncertainty about the future income of households and companies.

Also, with a target for the level of nominal GDP, it will be the price level and not just inflation that is targeted (see Section 4.1). Thus, it would reduce the uncertainty about the future price level in a similar way to a straightforward price level target. Moreover, monetary policy can be more effective with a target for the level of nominal GDP compared to a target for the growth rate. That is particularly useful if the policy rate is at or close to its lower bound, as is the situation now. Economists who have called for more monetary policy stimulus during the recession in recent years have mainly highlighted this argument, together with the increased consideration to the real economy, as a reason why the current inflation target should be replaced – permanently or maybe temporarily – with a target for nominal GDP.[74]

In the same way as a target for the level of nominal GDP shares potential advantages with a nominal growth target, it also shares conceivable problems and challenges. For instance, it may be too restrictive to weight stabilisation of inflation and the real economy equally in every situation. Furthermore, the price-level part of the target is only implicitly defined and refers to the GDP deflator, which is not a measure that specifically covers the prices of consumers' purchases. This can lead to inflation expectations becoming poorly anchored, in the same way as for a nominal growth target. It may also be difficult to communicate monetary policy as the less well-known nominal GDP measure might be hard for economic agents to relate to. A practical problem may be that data on nominal GDP is published with long lags and revised substantially and often. An increase in economic volatility may arise if monetary policy affects inflation and the real economy with different time lags.

When we discussed the price level target we noted that with such a target it may be difficult to disregard shocks that affect inflation temporarily. This also applies to a target for the level of nominal GDP, as the central bank must then compensate for deviations of nominal GDP below the target arising from temporary changes in inflation. But with a level target for nominal GDP this effect is counteracted since shocks affecting inflation also impact the real economy. If inflation increases as a result of a temporary supply shock, that may at the same time reduce GDP growth, and vice versa. This means that it may require less monetary policy response from the central bank with a target for the level of nominal GDP than with a straightforward price level target.

As with the price level target, the gains in effectiveness of monetary policy only prevail under fairly restrictive assumptions with regard to the formation of households' and companies' expectations.

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73 See also Svensson (1999a).
74 See, for example, Hatzius and Stehn (2011) , Romer (2011), Woodford (2012b) and The Economist (2013, 2016).

No clear indications that a target for the level of nominal GDP is preferable to flexible inflation targeting

As we noted earlier, there are potential advantages, but also potential problems and challenges with a target for the level of nominal GDP. This means that a comparison with well-functioning flexible inflation targeting may very well come out in favour of flexible inflation targeting. But it is difficult to draw any clear conclusion since it will depend on a number of factors, which may differ from country to country and from period to period.

No central bank has had a target for the level of nominal GDP, as far as we know. Thus, there is no empirical or comparative study to draw conclusions from. Several studies have been conducted using quantified macroeconomic models, but the results from these give no clear indications as to which alternative is preferable.[75]

A study that has received considerable attention recently does find that there are advantages with a target for the level of nominal GDP.[76] However, this analysis is based on a specific model, and the comparison is made with a strict inflation targeting policy instead of a flexible policy, making it difficult to draw any general conclusions from the study.

6 Conclusion

Since the financial crisis, there has been intensive international discussion of inflation targeting. It has been proposed that inflation targets should be replaced with different targets, for instance a price level target or a target for nominal GDP. The proposals stem from the notion that current inflation targeting focuses too much on stabilising inflation and that monetary policy is less effective than it could be, especially now that the interest rate is at its lower bound. In this article we have taken a closer look at the debate and some of the alternatives proposed.

When we discuss alternatives to inflation targeting, it is important to remember that monetary policy with an inflation target both can and should be flexible. It shall stabilise both inflation and the real economy. It could also take imbalances and risks in the financial markets into account, although this is more controversial. Several of the proposals now being discussed are aimed at making central banks to take greater account of the real economy or financial stability in their monetary policy deliberations.

One proposal is to give the central banks a so-called dual mandate, where the objectives for price stability and real economic stability are formulated more equally than in current hierarchical mandates. However, the question is whether this would make much difference in practice. Even with a less hierarchical wording of the mandate an inflation targeting central bank must safeguard confidence in the inflation target. The problem, if it actually is a problem, is rather that there is an asymmetry in how concrete the targets are. The price stability objective is very explicitly formulated, while the objective for stabilising the real economy is normally formulated more vaguely. This may lead inflation targeting central banks to perhaps put too much weight on stabilising inflation relative to stabilising the real economy. A solution might be to stipulate in the mandate that the central bank shall define concrete target variables and levels for both inflation and the real economy. However, there are potential problems with this, for example, there is no generally-accepted view of what the appropriate measure of developments in the real economy should be.

Another proposed alternative that, at least in theory, could make the central bank stabilise the real economy to a greater extent is a target for the growth rate of nominal GDP. A nominal growth target implies that the central bank puts stabilisation of inflation and real growth on an equal footing. An argument against this alternative is that inflation

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75 Honkapohja and Mitra (2014) and Billi (2015) find that in many situations it may be better to conduct inflation targeting. This also applies if there is a lower bound for the interest rate, which in isolation favour a level target. Benchimol and Fourçans (2016) find larger net gains from a nominal GDP-growth target.

76 Garín, Lester, and Sims (2016).

expectations may become poorly anchored as the inflation target will be implicitly defined and difficult to communicate. There are no real-world examples and the theoretical research gives no clear-cut answers as to what is preferable when it comes to choosing between flexible inflation targeting and nominal GDP growth targeting.

When it comes to imbalances and risks in the financial system, the proposals first and foremost concern supplementing the current inflation targeting policy, for example introducing a ternary monetary policy mandate whereby the central bank shall stabilise inflation, the real economy and also counteract financial imbalances and risks. Another proposal is that inflation targeters should look beyond the normal forecast horizon when making monetary policy decisions. However, recent research indicates that it might be better to allow macroprudential policies to take care of financial imbalances and risks in the financial system. A much-debated question is whether it is possible to recoup any net gain from trying to counteract financial imbalances and risks with monetary policy. Would costs in the form of weaker economic performance in the short run outweigh uncertain gains in the longer run? The relatively limited research on this question indicates that the costs weigh heavier. But the answer is not clear-cut and there are definitely reasons for central banks to regularly analyse financial stability risks and assess expected gains and losses of monetary policy measures.

In theory, a target for the price level or for the level of nominal GDP can make monetary policy more effective than current inflation targeting. However, the gains require that economic agents fully understand how level targets work and what they mean for monetary policy. Moreover, they require economic agents to be forward-looking. If they are backward-looking and largely believe, for instance, that inflation tomorrow will be the same as yesterday, level targets may be a disadvantage and increase fluctuations in both inflation and the real economy. There is not much empirical work to base a choice between inflation targeting and level targeting on and theoretical work does not provide clear-cut answers as to which alternative is preferable.

References

Adrian, Tobias and Nellie Liang (2016), "Monetary Policy, Financial Conditions, and Financial Stability", Staff Report No. 690, Federal Reserve Bank of New York.

Ajello, Andrea, David Lopez-Salido, and Taisuke Nakata (2016), "Financial Stability and Optimal Interest-Rate Policy", Finance and Economics Discussion Series No. 067, Federal Reserve Board.

Amano, Robert, Jim Engle-Warnick, and Malik Shukayev (2011), "Price-Level Targeting and Inflation Expectations: Experimental Evidence", Working Paper No. 18, Bank of Canada.

Archer, David J. (2016), "A Coming Crisis of Legitimacy?", *Sveriges Riksbank Economic Review*, No. 3, pp. 86-95.

Ball, Laurence (1999), "Efficient Rules for Monetary Policy", *International Finance*, Vol. 2, No. 1, pp. 63-83.

Bank of Canada (2011), "Renewal of the Inflation-Control Target: Background Information – November 2011", Bank of Canada.

Bank of Canada (2015), "Framework for Conducting Monetary Policy at Low Interest Rates", Bank of Canada.

Bank of Canada (2016), "Renewal of the Inflation Target: Background Information – October 2016", Bank of Canada.

Bean, Charles (2009), "'The Meaning of Internal Balance' Thirty Years On", *The Economic Journal*, Vol. 119, No. 541, pp. 442-460.

Bean, Charlie (2013), "Nominal Income Targets: an Old Wine in a New Bottle", speech at Conference on the State of the Economy, February 27th, Institute for Economic Affairs: London.

Beckworth, David and Joshua R. Hendrickson (2016), "Nominal GDP Targeting and the Taylor Rule on an Even Playing Field", mimeo.

Benchimol, Jonathan och André Fourçans (2016), "Nominal Income versus Taylor-Type Rules in Practice", Working Paper No. 1610, ESSEC.

Berg, Claes and Lars Jonung (1999), "Pioneering Price Level Targeting: The Swedish Experience 1931-1937", *Journal of Monetary Economics*, Vol. 43, No. 3, pp. 525-551.

Bhandari, Pranjul and Jeffrey A. Frankel (2015), "Nominal GDP Targeting for Developing Countries", *Working Paper No. 20898,* National Bureau of Economic Research.

Billi, Roberto M. (2011), "Output Gaps and Monetary Policy at Low Interest Rates", *Economic Review*, No. 1, Federal Reserve Bank of Kansas City.

Billi, Roberto M. (2015), "A Note on GDP Targeting and the Zero Lower Bound", *Working Paper No. 270,* Sveriges Riksbank.

Billi, Roberto M. and Anders Vredin (2014), "Monetary Policy and Financial Stability – a Simple Story", *Sveriges Riksbank Economic Review*, No. 2, pp. 7-22.

BIS (2009), "Issues in the Governance of Central Banks", Central Bank Governance Group, Bank for International Settlements: Basel.

BIS (2015), "85th Annual Report", Bank for International Settlements: Basel.

BIS (2016), "86th Annual Report", Bank for International Settlements: Basel.

Blot, Christophe, Jérôme Creel, and Xavier Ragot (2015), "Flexible Inflation Targeting vs. Nominal GDP Targeting in the Euro Area", in *Is Nominal GDP Targeting a Suitable Tool for ECB Monetary Policy?*, European Parliament: Brussels.

Bollard, Alan (2002), "The Evolution of Monetary Policy in New Zealand", speech at Rotary Club of Wellington, November 25th: Wellington.

Borio, Claudio (2004), "Securing Sustainable Price Stability: Should Credit Come Back from the Wilderness?", Working Paper No. 157, Bank for International Settlements.

Cateau, Gino, Oleksiy Kryvtsov, Malik Shukayev, and Alexander Ueberfeldt (2009), "Adopting Price-Level Targeting under Imperfect Credibility in ToTEM", Working Paper No. 17, Bank of Canada.

Cervenka, Andreas (2015), "Stefan Ingves gör självmål", *Svenska Dagbladet*, September 3rd.

Clouse, James A. (2013), "Monetary Policy and Financial Stability Risks: An Example", *Finance and Economic Discussion Series No. 41,* Federal Reserve Board.

Coibion, Olivier, Yuriy Gorodnichenko, and Johannes F. Wieland (2010), "The Optimal Inflation Rate in New Keynesian Models", Working Paper No. 16093, National Bureau of Economic Research.

Côté, Agathe (2007), "Price-Level Targeting", *Discussion Papers No. 8,* Bank of Canada.

Davig, Troy and Refet PP. Gürkaynak (2015), "Is Optimal Monetary Policy Always Optimal?", *International Journal of Central Banking*, Vol. 11, No. 4, pp. 353-382.

Debelle, Guy (2009), "The Australian Experience with Inflation Targeting", speech at XI Annual Seminar on Inflation Targeting, 15 May, Banco Central do Brasil: Rio de Janeiro.

Dib, Ali, Caterina Mendicino, and Yahong Zhang (2008), "Price Level Targeting in a Small Open Economy with Financial Frictions: Welfare Analysis", Working Paper No. 40, Bank of Canada.

Disyatat, Piti (2010), "Inflation Targeting, Asset Prices, and Financial Imbalances: Contextualizing the Debate", *Journal of Financial Stability*, Vol. 6, No. 3, pp. 145-155.

Evans, Charles L. (2012), "Monetary Policy in a Low Inflation Environment: Developing a State Contingent Price Level Target", *Journal of Money, Credit and Banking*, Vol. 44, No. 2, pp. 147-155.

Filardo, Andrew and Phurichai Rungcharoenkitkul (2016), "A Quantitative Case for Learning Against the Wind", Working Paper No. 594, BIS.

Frankel, Jeffrey (2012), "Time for Nominal Growth Targets," Project Syndicate, January 12th, 2016 at www.project-syndicate.org.

Garín, Julio, Robert Lester, and Eric Sims (2016), "On the Desirability of Nominal GDP Targeting", *Journal of Economics and Control*, Vol. 69 pp. 21-44.

Gaspar, Vítor, Frank Smets, and David Vestin (2007), "Is Time Ripe for Price Level Path Stability?", Working Paper No. 0818, European Central Bank.

Gerdrup, Karsten R., Frank Hansen, Tord Krogh, and Junior Maih (2016), "Leaning Against the Wind when Credit Bites Back", Working Paper No. 9, Norges Bank.

Gjedrem, Svein (2016), "Central banks' role, Objectives and Accountability", *Sveriges Riksbank Economic Review*, No. 3, pp. 104-108.

Guender, Alfred V. (2007), "A Comparative Analysis of the Stabilizing Properties of Nominal Income Growth Targeting", *Economics Letters*, Vol. 95, No. 2, pp. 217-222.

H M Treasury (2013), "Review of the Monetary Policy Framework: Report Presented to Parliament", Chancellor of the Exchequer by Command of Her Majesty: London.

H M Treasury (2016), "Remit for the Monetary Policy Committee", H M Treasury: London.

Hansen, Lars Peter, et al., (2016), "Statement on Policy Rules Legislation," viewed October 25th, 2016, Available at http://www.johnbtaylor.com/.

Hatzius, Jan and Jari Stehn (2011), "The Case for a Nominal GDP Level Target", US Economics Analyst No. 41, Goldman Sachs.

Honkapohja, Seppo and Kaushik Mitra (2014), "Targeting Nominal GDP or Prices: Guidance and Expectation Dynamics", Discussion Paper No. 9857, Centre for Economic Policy Research.

IMF (2015), "Monetary Policy and Financial Stability", Staff Report, International Monetary Fund: Washington, D.C.

Jansson, Per (2014), "Swedish Monetary Policy after the Financial Crisis – Myths and Facts", speech at Bank Summit 2014, 12 December, Svenska Dagbladet: Stockholm.

Jensen, Henrik (2002), "Targeting Nominal Income Growth or Inflation?", *The American Economic Review*, Vol. 92, No. 4, pp. 928-956.

Kim, Jinill and Dale W. Henderson (2005), "Inflation Targeting and Nominal-income-growth Targeting: When and Why are they Suboptimal?", *Journal of Monetary Economics*, Vol. 52 pp. 1463-1495.

Koenig, Evan F. (2012), "All in the Family: the Close Connection between Nominal-GDP Targeting and the Taylor Rule", *Staff Paper No. 17,* Federal Reserve Bank of Dallas.

Koenig, Evan F. (2013), "Like a Good Neighbor: Monetary Policy, Financial Stability, and the Distribution of Risk", *International Journal of Central Banking* , Vol. 9, No. 2, pp. 57-82.

Kryvtsov, Oleksiy, Malik Shukayev, and Alexander Ueberfeldt (2008a), "Adopting Price-Level Targeting under Imperfect Credibility", Working Paper No. 3, Bank of Canada.

Kryvtsov, Oleksiy, Malik Shukayev, and Alexander Ueberfeldt (2008b), "Adopting Price-Level Targeting under Imperfect Credibility: An Update", Working Paper No. 37, Bank of Canada.

Lewis, Michelle and Dr J. McDermott (2016), "New Zealand's Experience with Changing its Inflation Target and the Impact on Inflation Expectations", Discussion Paper No. 7, Reserve Bank of New Zealand.

Masson, Paul R. and Malik D. Shukayev (2011), "Are Bygones not Bygones? Modeling Price-level Targeting with an Escape Clause and Lessons from the Gold Standard", *Journal of Macroeconomics*, Vol. 33, No. 2, pp. 162-175.

McCallum, Bennett, (2011), "Nominal GDP Targeting," Shadow Open Market Committee, viewed October 1st, 2016, Available at http://shadowfed.org/.

Meade, James (1978), "The Meaning of "Internal Balance"", *The Economic Journal*, Vol. 88, No. 351, pp. 423-435.

Meh, Césaire A., José-Víctor Ríos-Rull, and Yaz Terajima (2010), "Aggregate and Welfare Effects of Redistribution of Wealth under Inflation and Price-level Targeting", *Journal of Monetary Economics*, Vol. 57, No. 6, pp. 637-652.

Mitelman, Henrik (2014), "Nu blir Ingves börsens bästis", *Dagens Industri*, October 29th.

Nessen, Marianne (2002), "Targeting Inflation over the Short, Medium and Long Term", *Journal of Macroeconomics*, Vol. 24, No. 3, pp. 313-329.

Nessen, Marianne and David Vestin (2005), "Average Inflation Targeting", *Journal of Money, Credit and Banking*, Vol. 37, No. 5, pp. 837-63.

Norges Bank (2012), "Monetary Policy Report 2/12", Norges Bank: Oslo.

Norges Bank (2016), "Monetary Policy Report With Financial Stability Assesment 3/16", Norges Bank: Oslo.

Orphanides, Athanasios (2003), "The Quest for Prosperity Without Inflation", *Journal of Monetary Economics*, Vol. 50, No. 3, pp. 633-663.

Orphanides, Athanasios (2013), "Is Monetary Policy Overburdened?", *Working Paper No. 435,* Bank for International Settlement.

Orphanides, Athanasios and John C. Williams (2008), "Imperfect Knowledge and the Pitfalls of Optimal Control Monetary Policy", in *Monetary Policy under Uncertainty and Learning*, Vol. 13, Klaus Schmidt-Hebbel, Carl E. Walsh, Norman Loayza, and Klaus Schmidt-Hebbel, red., Central Bank of Chile: Santiago.

Ortega, Eva and Nooman Rebei (2006), "The Welfare Implications of Inflation versus Price-Level Targeting in a Two-Sector, Small Open Economy", *Working Paper No. 12,* Bank of Canada.

Posen, Adam (2013), "Cheap Talk is No Alternative to Inflation Targeting", in *Is Inflation Targeting Dead? Central Banking After the Crisis*, Lucrezia Reichlin and Richard Baldwin, red., Centre for Economic Policy Research: London.

Resende, Carlos d., Ali Dib, and Maral Kichian (2010), "Alternative Optimized Monetary Policy Rules in Multi-Sector Small Open Economies: The Role of Real Rigidities", Working Paper No. 9, Bank of Canada.

Rogoff, Kenneth (1985), "The Optimal Degree of Commitment to an Intermediate Monetary Target", *The Quarterly Journal of Economics*, Vol. 100, No. 4, pp. 1169-1189.

Romer, Christina (2011), "Dear Ben: It's Time for Your Volker Moment", *New York Times*, October 29th.

Røisland, Øistein (2001), "Institutional Arrangements for Monetary Policy When Output Is Persistent", *Journal of Money, Credit and Banking*, Vol. 33, No. 4, pp. 994-1014.

Schnabel, Isabel (2016), "What role for Central Banks in Safeguarding", *Sveriges Riksbank Economic Review*, No. 3, pp. 49-54.

Sheedy, Kevin D. (2014), "Debt and Incomplete Financial Markets: A Case for Nominal GDP Targeting", *Brookings Papers on Economic Activity*, Vol. 48, No. 1, pp. 301-373.

Smets, Frank (2013), "Financial Stability and Monetary Policy: How Closely Interlinked?", *Sveriges Riksbank Economic Review*, No. 3, pp. 121-160.

Stein, Jeremy C. (2014), "Incorporating Financial Stability Considerations into a Monetary Policy Framework", speech at International Research Forum on Monetary Policy, 21 March: Washington, D.C.

Straumann, Tobias and Ulrich Woitek (2009), "A Pioneer of a New Monetary Policy? Sweden's Price-level Targeting of the 1930s Revisited", *European Review of Economic History*, Vol. 13, No. 2, pp. 251-282.

Sumner, Scott (2011a), "Re-Targeting the Fed", *National affairs*, Vol. 9, No. Fall, pp. 79-96.

Sumner, Scott (2011b), "The Case for NGDP Targeting: Lessons from the Great Recession", Adam Smith Institute: London.

Svensson, Lars E. O. (1999a), "Inflation Targeting: Some Extensions", *Scandinavian Journal of Economics*, Vol. 101, No. 3, pp. 337-61.

Svensson, Lars E. O. (1999b), "Price-Level Targeting versus Inflation Targeting: A Free Lunch?", *Journal of Money, Credit and Banking*, Vol. 31, No. 3, pp. 277-95.

Svensson, Lars E. O. (2003), "Escaping from a Liquidity Trap and Deflation: The Foolproof Way and Others", *Journal of Economic Perspectives*, Vol. 17, No. 4, pp. 145-166.

Svensson, Lars E.O. (2004), "Commentary", *Federal Reserve Bank of St. Louis Review*, Vol. 86, No. 4, pp. 161-164.

Svensson, Lars E. O. (2012), "Comment on Michael Woodford 'Inflation Targeting and Financial Stability'", *Sveriges Riksbank Economic Review*, No. 1, pp. 33-39.

Svensson, Lars E. O. (2016a), "Cost-Benefit Analysis of Leaning Against the Wind: Are Costs Larger Also with Less Effective Macroprudential Policy?", *Working Paper No. 21902,* National Bureau of Economic Research.

Lars E.O. Svensson (2016b), "How Robust Is the Result That the Cost of "Leaning Against the Wind" Exceeds the Benefit? Response to Adrian and Liang", mimeo.

Sveriges Riksbank (2010), "Monetary Policy in Sweden", Sveriges Riksbank: Stockholm.

Sveriges Riksbank (2015), "Monetary Policy Report: February 2015", Sveriges Riksbank: Stockholm.

Taylor, John B. (2016), "Independence and the Scope of the Central Bank's Mandate", *Sveriges Riksbank Economic Review*, No. 3, pp. 96-105.

Taylor, John B. and John C. Williams (2010), "Simple and Robust Rules for Monetary Policy", in *Handbook of Monetary Economics*, Vol. 3, Benjamin M. Friedman and Michael Woodford, red., Elsevier.

The Economist (2013), "Shake 'em up Mr. Carney", *The Economist*, February 2nd.

The Economist (2015), "After the Hold, be Bold: It Will Take More than Patience to free Rich Economies from the Zero-interest-rate World", *The Economist*, September 26th.

The Economist (2016), "When 2% is not Enough", August 27th.

Tobin, James (1980), "Stabilization Policy Ten Years After", *Brookings Papers on Economic Activity*, Vol. 11, No. 1, pp. 19-90.

Vestin, David (2006), "Price-Level versus Inflation Targeting", *Journal of Monetary Economics*, Vol. 53, No. 7, pp. 1361-1376.

Walsh, Carl E. (2003), "Speed Limit Policies: The Output Gap and Optimal Monetary Policy", *The American Economic Review*, Vol. 93, No. 1, pp. 265-278.

Woodford, Michael (1999), "Commentary: How Should Monetary Policy be Conducted in an Era of Price Stability?", in *Proceedings from Economic Policy Symposium at Jackson Hole*, Federal Reserve Bank of Kansas City.

Woodford, Michael (2003), *Interest and Prices: Foundations of a Theory of Monetary Policy*, Princeton University Press.

Woodford, Michael (2012a), "Inflation Targeting and Financial Stability", *Sveriges Riksbank Economic Review*, No. 1, pp. 7-32.

Woodford, Michael (2012b), "Methods of Policy Accomodation at the Interest-Rate Lower Bound", in *The Changing Policy Landscape, Economic Policy Symposium Proceedings*, Federal Reserve Bank of Kansas City.

Wren-Lewis, Simon, (2013), "Carney and the Treasury Select Committee: Episode One Preview," Mainly macro, vieved January 12th, 2016, Available at www.mainlymacro.blogspot.se.

Örn, Gunnar (1999), "Vad är det för fel på Davidsons norm? [What's Wrong with Davidson's Norm?]", *Ekonomisk Debatt*, Vol. 27, No. 6, pp. 113-323.

Appendix

Flexible inflation targeting

In this subsection we describe flexible inflation targeting more formally. This description is then used to compare flexible inflation targeting with other targeting regimes below.

Let P_t represent the price level in the period t, and p_t be the logarithm of the price level in period t. We can then write inflation in period t as $\pi_t = p_t - p_{t-1}$.

With an inflation target for monetary policy, the central bank attempts to stabilise inflation at a given level π^* (the inflation target). A common way of describing this formally is that the central bank tries to minimise the total of the squared deviations from the inflation target from period t and onwards, that is, the central bank minimises

(1) $\sum_t^\infty \beta^t (\pi_t - \pi^*)^2,$

where β^t is a discount factor. By using the squared deviations as a base, positive and negative deviations from the inflation target will be treated symmetrically, and the cost of a deviation is increasing in the deviation. In other words, it is better to have several small deviations than one large one. The sum in (1) is not the only way of measuring the costs of deviating from the inflation target, but it is the most common in the academic literature.

With a flexible inflation targeting framework the central bank also strives to stabilise the real economy. The most common way of formally describing this is that the central bank in addition to stabilising inflation also stabilises the output gap, which is a measure of the degree of capacity utilisation in the economy. Let Y_t be the level of real GDP in the period t, and y_t the logarithm of Y_t. Let Y_t^* be the normal level, or equilibrium level of GDP in period t (see the discussion in Section 2.2) and y_t^* be the logarithm of Y_t^*. In the same way as for inflation, the loss in the event of deviations from the normal level is written as

(2) $\sum_t^\infty \beta^t (y_t - y_t^*)^2.$

The central bank normally uses only one tool, the policy rate, to attain both targets: stabilising inflation around the inflation target and stabilising production around a long-term sustainable level. If there is a conflict between these two targets, the central bank has to trade them off against one another. This is often formulated as the central bank choosing a level for the policy rate that gives as little combined loss as possible, that is, the central bank minimises a loss function according to

(3) $L = \sum_t^\infty \beta^t [(\pi_t - \pi^*)^2 + \lambda(y_t - y_t^*)^2],$

where λ represents the weight the central bank gives to stabilising the real economy in relation to inflation. Thus, λ measures the degree of flexibility in monetary policy. Of course, there is not always a conflict between stabilising inflation and the output gap. In some cases, inflation and output will move in different directions in relation to their "targets" and sometimes they will move in the same direction. This depends on what shocks hit the economy. But even when they are moving in the same direction, there may be justification for the central bank to give explicit consideration to developments in the real economy.

Dual mandate

Above we explained how flexible inflation targeting theoretically can be modelled as minimisation of a loss function like equation (3). Further, we pointed out that the weight λ in the theoretical description determines which policy alternative should be chosen on each decision-making occasion.

If the authorities wish to give a central bank a very concrete dual mandate, they could consider specifying in the mandate that the central bank shall minimise the loss function (3) which also specifies the value of λ. Alternatively, they can state the arguments in the loss function and leave the weighting of the two targets to the central bank to determine.

Target for nominal GDP growth

Let N be the level of nominal GDP, i.e. $N = PY$. If we take the logarithm of this expression and look at the change over two periods, we see that growth in N is equal to the sum of inflation (the change in prices), π, and real economic growth, g,

$$nt = \pi + g$$

where nt is growth in N.

To define a nominal growth target, the central bank begins by defining the level of sustainable or long-term growth in the economy, g^*. This level is unobservable, and judgment is needed to arrive at a number. It depends on assessments of the long-term growth in productivity and labour, structural conditions with regard to the functioning of the labour market, and so on. It is important to note that if monetary policy is neutral in the long run, that is, it cannot raise output in a sustainable manner, the growth potential g^* will not be affected by monetary policy.

The central bank also needs to define an inflation target π^*. The target for nominal growth (nt^*) will now become the sum of these two, that is

$$nt^* = g^* + \pi^*.$$

The target for monetary policy is to hold nominal growth (nt) at or near nt^*.

To tie in with the formal monetary policy theory above, we can assume that the central bank tries to minimise the sum of the squared deviations from the target $(nt_t - nt_t^*)^2$. This can in turn be written as the central bank trying to stabilise the loss function.

$$L = \sum_t^\infty \beta^t \left\{ \underbrace{(p_t - p_t^*)^2 + (y_t - y_t^*)^2}_{a} + \underbrace{2(p_t - p_t^*)(y_t - y_t^*)}_{b} \right\}.$$

The first part of the expression, marked a, is similar to (3), but with $\lambda = 1$ and y is replaced with g. The second part, the covariance term marked b, is an effect of the target applying to the variance of the sum of the two. Thus, we see that a nominal growth target in practice means that the central bank shall stabilise inflation around an inflation target and the real economy around a sustainable level (the real economy's growth potential) with the same weight given to both of these targets.

To show that monetary policy can become history-dependent with a nominal growth target, we first observe that target attainment in period t means that $nt_t - nt^* = 0$. This in turn can be written as

$$(\pi_t - \pi^*) + (y_t - y_t^*) - (y_{t-1} - y_{t-1}^*) = 0,$$

where y_t is the output level, $(y_t - y_t^*)$ is the output gap and where we have used $g_t = (y_t - y_{t-1})$. We thus see that history is important to target fulfilment. If there was a positive output gap in period t-1, a positive output gap and/or inflation gap is needed in period t. This will not be the case with a flexible inflation target.

Ternary mandate

While the targets for monetary policy are normally described by means of the loss function (3), a ternary mandate would mean that we add a further element that represents financial stability risks. The loss function could then take the form

(4) $L = \sum_t^\infty \beta^t [(\pi_t - \pi^*)^2 + \lambda(y_t - y_t^*)^2 + \delta\Omega_t^2]$,

where is Ω_t a measure of financial risks, see Woodford (2012). Disyatat (2010) suggests that a weighted sum of asset prices and household debt in relation to an equilibrium level could work as a proxy for the risks in the financial system.

Looking beyond the forecast horizon

The proposal to look beyond the forecast horizon can be formally described as follows. The central bank minimise the loss function

(5) $L = \sum_t^k \beta^t [(\pi_t - \pi^*)^2 + \lambda(y_t - y_t^*)^2] + pL(crisis)$,

where p is the probability of a crisis after the forecast horizon k and $L(crisis)$ is the expected loss if there is a crisis. Monetary policy can influence p and $L(crisis)$, in addition to inflation and output for $t<k$.

Price level target

A price level target can be described as follows. The central bank sets a path for the aggregate price level measured by for instance CPI. The path may be consistent with a target for inflation, π^*, and can then be written as

$$p^*_t = p_0 + t\pi^*, \qquad t = 0,1,\ldots,\infty$$

where p^*_t is the logarithm of the price level that shall be attained in period t, p_0 is the logarithm of the price level in the period when the price level target was introduced and π^* is the yearly increase in the price level. The target for monetary policy is to stabilise the price level on this path.

More formally, the central bank tries to minimise the total of the squared deviations from the inflation target from period t, that is, the central bank minimises

(6) $\sum_t^\infty \beta^t (p_t - p_t^*)^2$.

If the central bank conducts a flexible policy, it will also take developments in the real economy into account. Formally, the central bank can then be seen as minimising the loss function

(7) $L = \sum_t^\infty \beta^t [(p_t - p_t^*)^2 + \lambda(y_t - y_t^*)^2]$,

Where $(y_t - y_t^*)$ is the output gap as described above, and λ represents the weight the central bank attaches to stabilising the real economy relative to the price level.

Target for average inflation

Average inflation over a period of length j is given by

$$\bar{\pi}_{j,t} = \tfrac{1}{j}\sum_{s}^{j-1}\pi_{t-s} = \tfrac{1}{j}(p_t - p_{t-j})$$

where p_t and p_{t-j} are the logarithm for the price level in period t and period t-j respectively.

The target for monetary policy will be to stabilise average inflation at the target level π^*. As for the inflation target, we can see this as the central bank minimising the squared sum of deviations from the inflation target

$$\sum_{t}^{\infty}\beta^t(\bar{\pi}_{j,t}-\pi^*)^2.$$

If $j = 1$ then the target is $\bar{\pi}_{1,t} = (p_t - p_{t-1})$, which is the same as a normal inflation target. If $j = \infty$ the target corresponds to a price level target as described above.

Here, too, we can imagine that the central bank takes the real economy into account and minimises

(8) $L = \sum_{t}^{\infty}\beta^t[(\bar{\pi}_{j,t} - \pi^*)^2 + \lambda(y_t - y_t^*)^2].$

Target for the level of nominal income

In brief, a target for the level of nominal income works as follows. As for a nominal growth target, the central bank first defines the long-term growth potential in the economy, g^*, and the implicit inflation target π^*. The target for the level of the nominal income in logarithms, ni^*, is then

(9) $ni_t^* = ni_0 + t(g^* + \pi^*)$

where ni_0 is the logarithm of the nominal GDP level in the period when the target was introduced. The objective of monetary policy is to stabilise ni_t at ni_t^*. Unlike a nominal growth target of 5 per cent, a nominal income level target thus requires that deviations from 5 per cent in one period must "be compensated" in later periods when growth in nominal income must be higher than 5 per cent.

If we assume that the central bank tries to minimise the sum of the quadratic deviations from target $(ni_t - ni_t^*)^2$ this can be written as

$$L = \sum_{t}^{\infty}\beta^t\left\{\underbrace{(p_t - p_t^*)^2 + (y_t - y_t^*)^2}_{a} + \underbrace{2(p_t - p_t^*)(y_t - y_t^*)}_{b}\right\}.$$

The first part of this expression, a, is similar to (3) but now is $\lambda=1$ and π is replaced by p. The second part, b, represents the fact that the aim is to minimise the variability of the sum of output and prices. Thus, we see that a target for the nominal GDP level in practice implies that the central bank shall stabilise prices around a target path and GDP along a target path and that both these goals shall be given equal weight. The target thereby entails a strict concretisation of the targets for monetary policy.