

# Inflation targets: practice ahead of theory

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Inflation targets were introduced well ahead of the development of the theory of inflation targeting. The practice was successful because it comprised a new set of procedures and institutions for setting monetary policy in a transparent and accountable fashion; the later theory was less useful because it purported to be a theory of the determination of the price level. In the countries that were early adopters of inflation targets the focus was on creating new institutions to shape the way monetary policy was set in a world of increasing financial liberalisation and an absence of exchange controls. Inflation targeting was thus from the outset not seen simply as announcing a numerical target. It was rather a transformation of the way in which decisions on monetary policy were made and explained.

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## 1 Introduction

In the early 1990s a new approach to monetary policy started to spread across the world. The essence of this new approach was the combination of a numerical target for inflation in the medium term and the flexibility to respond to shocks to the economy in the short run – and so the framework became known as flexible inflation targeting.

Inflation targets were introduced well ahead of the development of the **theory** of inflation targeting. The **practice** was successful because it comprised a new set of procedures and institutions for setting monetary policy in a transparent and accountable fashion – ‘constrained discretion’; the later theory was less useful because it purported to be a theory of the determination of the price level. A target for inflation is an objective not a determinant of inflation. The two are not the same, a lesson ignored recently by many central banks – to their cost. Merely announcing a target does not guarantee its achievement.

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An examination of the practice of inflation targets is revealing of how a target of 2% for CPI inflation emerged from the economic problems of the 1970s and 1980s. The motives behind the introduction of an explicit target for inflation can be summarised as follows:

First, following the 'Great Inflation' of the 1970s, there was a recognition that monetary policy should aim at achieving price stability in the medium term. Objectives such as raising economic growth or reducing inequality were to be left to the fiscal authorities and to governments. The clarity of that objective has been diluted in recent years with new objectives for reducing climate change, inequality and the promotion of diversity, as well as concerns about fiscal dominance during and after the pandemic.

Second, the experience of the 1980s was that intermediate targets for monetary policy were unreliable because their relationship to the final objective of inflation was unstable. They were also hard to explain to a wider public.

Third, since we cannot commit future generations – or even our own – to ensuring price stability, there was interest in how we could design an institutional framework that made it likely that money would retain its value.

In the modern era, inflation targets began in New Zealand (1990), Canada (1991), the United Kingdom (1992) and Sweden (1993). In all cases the move reflected the experience of high and volatile inflation of the 1970s following the end of the Bretton Woods system of fixed exchange rates and disillusion with the performance of intermediate targets, such as monetary aggregates, in the 1980s. In the UK and Sweden inflation targets were introduced following the collapse of a commitment to a fixed exchange rate in September and November 1992, respectively.

In all countries the focus was not on a new theory of inflation but on creating new institutions to shape the way monetary policy was set in a world of increasing financial liberalisation and an absence of exchange controls. That focus was especially clear in New Zealand where the 1988 budget contained a commitment to introduce legislation 'to make certain that no politician can interfere with the Bank's primary objective of ensuring price stability' (Reddell 1999, p. 65). Independence was enshrined in the Reserve Bank of New Zealand Act of 1989. Central to this was the relationship between government and central bank. Interestingly, the Act made no reference to an explicit inflation target but required that the Governor and the Treasurer negotiate and agree a Policy Targets Agreement (PTA). The initial PTA signed in March 1990 stated that, 'An annual inflation rate in the range of 0 to 2 percent will be taken to represent the achievement of price stability' (Reserve Bank of New Zealand 1990).

In February 1991, Canada became the second country to adopt an inflation target. At the time, CPI inflation was over 6% a year (almost double that in the US). An agreement between the Bank of Canada and the Department of Finance set out a target path for inflation to fall to 2 per cent by the end of 1995, with a 'control band' of plus or minus 1 percentage point around each of the path's steps (Carter, Mendes

and Schembri 2018). Again, the motivation was disillusion with previous reliance on intermediate targets.

In September 1992, the UK left the Exchange Rate Mechanism (ERM) after massive speculation against sterling. The level of interest rates implied by membership of the ERM was far too high for the needs of the domestic economy. Discussions between the Bank of England and the Treasury led swiftly to the announcement of an inflation target. After exit from the ERM, the case for central bank independence was openly discussed in the British press and recommended by both the Treasury Select Committee of Parliament and a number of independent experts. Chancellor Lamont wanted to go down this path, as had his predecessor Nigel Lawson. But Prime Minister Major, as had his predecessor Margaret Thatcher, refused to countenance such a move. As a substitute for independence, however, new powers were granted to the Bank along with requirements for greater accountability and transparency which became central to the UK framework. The first Bank of England *Inflation Report* was published in February 1993.<sup>8</sup>

Sweden also abandoned an exchange rate link and then adopted an inflation target in 1993. Even where inflation targets preceded formal independence of the central bank, as in the UK and Sweden, the institutional changes surrounding the introduction of inflation targets were a natural (though not inevitable) precursor to independence. It is no accident that because the Federal Reserve System was already independent, its adoption of an explicit inflation target lagged behind other central banks and it was the persistence of Ben Bernanke as Fed Chair, influenced by his presence at conferences that discussed inflation targets, that led to the adoption of 2% as the Fed's working definition of price stability in 2012. Japan followed in 2013.

By the time of my Mais lecture in 2005, the number of countries with inflation targets had risen to 22 (King 2005).<sup>9</sup> And some argue that the number of inflation targeting countries is now over 50. I do not in this paper assess the success or otherwise of inflation targeting. Views differ. But it is important to point out that inflation targeting was from the outset not seen simply as announcing a numerical target. It was rather a transformation of the way in which decisions on monetary policy were made and explained. Transparency and accountability were central to the project. Inflation targeting was seen as the natural way to conduct policy when there is a great deal of uncertainty about the transmission mechanism of monetary policy.<sup>10</sup>

The adoption of inflation targets followed the failure of several earlier false paths, often because apparently stable relationships turned out to be nonstationary. Narrow monetary aggregates failed because the hypothesis that the relationship between base money and the total money supply was stable was shown to be wrong by the experience of the 1980s and even more so by quantitative easing. The more stable long-run relationship between broad money and total nominal spending was disturbed by financial deregulation in the early 1980s. Exchange rate target zones

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<sup>8</sup> Independence in respect of monetary policy was eventually granted in May 1997.

<sup>9</sup> The title of the lecture was 'Monetary Policy: Practice Ahead of Theory'.

<sup>10</sup> See the analysis in King (1997).

failed because the political cost of sticking to the regime in the face of asymmetric shocks proved too great, a possibility which the theory had largely ignored. In each case a key assumption of the theoretical model broke down. Discretion became inevitable.

But the use of that discretion could be constrained by institutional arrangements to promote the accountability, and hence credibility, of policymakers. Inflation targets were a logical way to achieve that, with central bank independence a natural partner. Inflation targeting was never meant as a non-monetary theory of inflation. Rather, it is a way to take decisions in a world of radical uncertainty. A similar approach was followed by those central banks that did not adopt formal inflation targets, such as the European Central Bank. In that sense, practice was ahead of theory.

## 2 Structure of inflation targeting

Inflation targeting has evolved over time and will surely continue to do so. To understand its main characteristics, it is helpful to distinguish five questions about monetary policy:

### 2.1 What is the objective?

At the outset, the objective was the continuous achievement of price stability rather than a particular number for the rate of consumer price inflation. After a period of high and volatile inflation, it was too ambitious to aim at a single numerical target and a range for inflation was typical of inflation targets, as in Canada. In Britain the Chancellor announced on 8 October 1992: 'I propose to set ourselves the objective of keeping underlying inflation within a range of 1–4%, and I believe by the end of the Parliament we need to be in the lower part of the range' and 'I believe we need to aim at a rate of inflation in the long term of 2% or less'.<sup>11</sup> Success in bringing down inflation led to a convergence on a point target of 2%. Over time the European Central Bank (ECB) gravitated to a symmetric 2% target for CPI inflation as its measure of price stability.

A symmetric target was important to convince the public that policymakers were not 'inflation nutters' determined to get inflation down to the lowest possible level. Ranges around the central target, however, created some confusion about the aim of policy. Was 2.9% as acceptable as 2% or even 1.1%? And what was the effective difference between 2.9% and 3.1%? In the end, policymakers were instructed to aim continuously at the central target and were judged by the average inflation rate over some past period. Anticipating that method of *ex post* judgement introduced an element of price-level targeting into the regime. *Ex ante*, policymakers were supposed to target inflation some eighteen months to two years ahead to avoid undesirable volatility of output – an approach that was understood from the beginning and became known as 'flexible inflation targeting'. *Ex post*, they were judged by the average rate of inflation during their period in office.

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<sup>11</sup> Letter from the Chancellor to the Chairman of the Treasury and Civil Service Committee, 8 October 1992.

One largely unresolved issue is whether the flexibility (formally, the trade-off between the volatility of inflation and the volatility of output) should be left to the discretion of policymakers or mandated by legislatures. The horizon over which it is desirable to bring inflation back to target depends on the nature of the shocks hitting the economy. The choice of that horizon has typically been left to central banks, although that judgement has political consequences and in Britain in 2013 the new remit for the MPC, which instructed the Bank to use ‘monetary activism’ and forward guidance, created the room for the government to intervene in the choice of horizon.<sup>12</sup>

## 2.2 Who makes decisions on monetary policy and how should they be held accountable for their actions?

As already mentioned, the spread of inflation targeting was accompanied by a wave of interest in central bank independence. Both developments reflected the failure of previous attempts to achieve price stability.<sup>13</sup> But governments were slow to move to full independence in the wake of the introduction of inflation targets, and in principle central bank independence is neither necessary nor sufficient to achieve price stability. In Britain, the Chancellor retained the power not only to set the target but also to determine interest rates. But changes in the procedures followed in setting policy were clearly thought to be desirable, indeed necessary.

Mandating central banks to pursue an inflation target was the route followed in many countries. Who should set the target? In New Zealand and Canada, the target was the result of a negotiation between the government of the day and the central bank governor. In the former country, the Policy Targets Agreement was a contract to ensure good performance by the Governor. In the latter, a failure to agree the target led to the decision not to reappoint John Crow as governor in 1993. In the UK, the government sets the target which is reaffirmed at each Budget. But the ECB and the Federal Reserve define the target themselves.

Should the power to set policy rest with the Governor or be vested in a wider group in the form of a monetary policy committee? When the Bank of England was made independent in 1997, decisions on monetary policy were delegated with immediate effect to a committee of nine people deciding by majority vote – the Monetary Policy Committee (MPC). Individual votes were published and each member of the MPC was personally accountable to Parliament through regular appearances before the Treasury Committee. The aim was to avoid power being concentrated in the person of the Governor. By and large, this arrangement has proved to be a success – with different arguments set out in the minutes of MPC meetings, and in speeches of its members and at regular hearings in front of the Treasury Committee by all MPC members. From its creation in 1999, the ECB adopted a committee structure, although with less transparency about the views of individual members. And the

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<sup>12</sup> See the letter to the governor with the new remit, [chx letter to boe monetary policy framework 200313.pdf](#).

<sup>13</sup> Although the executive branch of government may misuse its power to raise taxes through inflation making the separation of monetary and fiscal instruments desirable (Tucker 2019).

Federal Reserve is very much led by its Chair, supported by the staff in Washington DC, with the regional presidents acting as a constraint.

Communication of the uncertainties of the effects of monetary policy is important to establish the credibility of the policy process. Changes in the process of making and communicating monetary policy were part and parcel of the move to inflation targeting, and measures to increase central bank independence were a natural partner to that move. Accountability is about how the ‘constrained discretion’ of decision-makers is exercised. As described in the New Zealand framework, ‘the Governor would be assessed primarily on the judgements the Bank exercised in pursuit of the outcome, and the way it responded to new developments’. Credibility was to be achieved in part through a track record of keeping inflation close to the target, but also on the quality of the narrative about the state of the economy presented by policymakers. Unanticipated ‘shocks’ meant that inflation might deviate from target even if earlier decisions on interest rates were appropriate. This of course was an argument that major central banks used to explain the high inflation during 2020–23. It works only if the narrative is believed to be sensible and compelling, an issue to which I return below. Credibility of the explanations for actions – the narrative as described in speeches and inflation reports – is crucial in building and maintaining the reputation of policymakers and the belief among the wider population that inflation, even if on occasions it deviates from target, will come back to target.

### **2.3 What are the instruments to be used to achieve the objective?**

The official short-term interest rate was the instrument to be used to control inflation, although fiscal policy had to be consistent with price stability. The fiscal theory of the price level had little influence on the decisions of policymakers with a clear mandate from parliaments to pursue price stability. Only in the immediate aftermath of the financial crisis did direct money creation through quantitative easing (QE) enter the armoury of central banks on a substantial scale. The description of QE as unconventional monetary policy is unfortunate. Open market operations to buy or sell government securities has always been seen as part of monetary policy, and in Britain in the 1980s there was regular discussion about the desirability of ‘underfunding’ and ‘overfunding’, QE and QT respectively. The move to inflation targeting did not alter the instruments available to achieve the target.

### **2.4 What is the theory relating changes in the instruments to changes in the objective?**

Inflation targeting is a framework for making and communicating decisions. In its early years there was no suggestion that it provided a new theory of the transmission mechanism of monetary policy. What it did do was re-establish the view that inflation was a nominal phenomenon and was determined by nominal variables. That is now taken for granted, but much effort was devoted to the imposition of detailed direct wage and price controls in the 1960s and 1970s. Nicholas Kaldor, economic adviser to Labour governments in the 1960s, wrote in 1971 that ‘It is also far more generally acknowledged – even by Conservative Prime Ministers – that the process of inflation

is 'cost-induced' and not demand-induced', with the evident implication that it can be tackled only by an incomes policy' (Kaldor 1971). Not many economists would give that answer today. It is striking that in the early period of inflation targeting policymakers believed that the announcement of a target did not in itself change the transmission mechanism of monetary policy. The same variables were used to form a view and construct a narrative about the likely path of inflation, and the risks around it, as had been central to policy before.

Over time, however, expectations came to the fore in the analysis of inflation. If inflation expectations could be anchored on the target, then inflationary shocks would become less persistent, thus altering the transmission mechanism. How were inflation expectations to be anchored on the target? In two ways. First, a successful track record in keeping inflation close to target. Second, using an empirical and theoretical framework that included all the variables materially relevant to the determination of inflation. Central banks were successful in achieving the first for almost thirty years until the recent inflation, an event that I discuss further in section 4. They were much less successful in the second. Small tractable theoretical models could not cope with the complexity of the growing financial system, and such models simply ignored money, banks and finance altogether. The relationship between money and credit and inflation appeared to be nonstationary. The fact that a relationship changes over time does not of course imply a lack of causation. The upshot was that standard models ignored money and other nominal variables. The richness of the monetary analysis of earlier thinkers, such as Keynes, Patinkin, Tobin, Friedman, Brunner and Meltzer, was lost. Instead, the models incorporated the assumption that central banks could be relied upon to 'do whatever it takes' to bring inflation back to target after any shock. Central banks were assumed to have perfect credibility irrespective of the actions they took. Or, equivalently, inflation expectations are determined by the inflation target.<sup>14</sup>

Building a sense of trust and credibility in the central bank leads to confidence that inflation will remain close to target. As Huw Pill, Chief Economist at the Bank of England, said in a recent speech, 'setting prices in line with the MPC's 2% inflation target becomes a self-reinforcing process at the aggregate level' (Pill 2024). There is much truth in the importance of this self-reinforcing process. But it cannot be independent of the setting of monetary policy instruments. Rational expectations are more accurately described as model-consistent expectations. And if the model omits variables that can affect inflation, and policy is driven by the model, then there will be times when not only inflation but also expectations of inflation drift away from the target. We need models in which the credibility of a central bank is endogenous to its actions. The assumption that expectations are determined by the target is misleading at best and dangerous at worst.

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<sup>14</sup>I have described this concept elsewhere as the "King Canute" theory of inflation (King 2021).

## 2.5 What is the reaction function describing how changes in the economy map into changes in the instruments?

The emergence of inflation targeting coincided with the development of the New Keynesian consensus on macroeconomic theory. This framework offered a theoretical foundation for flexible inflation targeting. Central to the New Keynesian view is the assumption that some prices (including for labour) are 'sticky' and adjust slowly in response to shocks. There are shocks to supply as well as demand. External cost shocks sometimes drive inflation away from the target, as we saw recently with rises in world energy and food prices. Because other prices are 'sticky', attempts to keep inflation at target all the time would result in inefficient fluctuations in output. In the presence of supply shocks, there is, therefore, a trade-off between stabilising inflation and stabilising output. Any monetary policy can be described as a choice of (i) an *ex ante* inflation target and (ii) an optimal response to observable shocks. Following a cost shock, it is sensible to bring inflation back to target gradually.<sup>15</sup>

In this, by now conventional, framework, the objective of monetary policy is to minimise the variability of inflation around the target rate and the variability of output (or employment) around a sustainable path consistent with stable inflation.<sup>16</sup> Such an objective means that the central bank is effectively choosing a trade-off between the volatility of inflation and the volatility of output. That choice leads to a policy reaction function describing how the central bank responds to shocks hitting the economy.<sup>17</sup> Such a reaction function is a state-contingent monetary policy rule, the most famous being the Taylor Rule which implies that interest rates should rise if inflation is above its target and output is above its trend level and fall when the converse is true. The path along which inflation should return to its desirable long-run level will therefore vary according to the state of the economy.

In practice, radical uncertainty means that our understanding of the economy is incomplete and constantly evolving. Any monetary policy rule that is judged to be optimal today is likely to be superseded by a new and improved version tomorrow. In other words, there is no time-invariant policy reaction function which could describe the policy intentions of a central bank. Rather, monetary policy in practice is characterised by a continuous process of learning. In order to form expectations, the private sector needs to understand the central bank reaction function. That function is continually being updated, and so communication in the form of a narrative explaining how the central bank's understanding of how the economy works plays a crucial role in the formation of expectations. It also points to the problem of 'forward guidance' as a tool of monetary policy. Private sector expectations of future policy rates derive from the combination of a forecast of the economy and the central bank reaction function. There is no reason to assume that the private sector has the same

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<sup>15</sup> See the formal analysis in King (1997).

<sup>16</sup> This specification of the objective function can be derived as an approximation to the maximisation of the welfare, defined over consumption and leisure, of a representative consumer with an infinite horizon (see Rotemberg and Woodford 1997).

<sup>17</sup> To implement such a policy reaction function requires an empirical judgement about the factors that drive the volatility of both inflation and output. In principle, these should include the banking and financial system, and movements in asset prices, that generate fluctuations in demand and output. In practice, however, rather little attention was paid to the role of the banking system.



view of the future path of the economy as the central bank. All the private sector needs to know is the policy reaction function. Forward guidance conflates the two. The attempt to forecast where its own policy rate will go when there is genuine uncertainty about the outlook damages the credibility of a central bank.

### 3 Dealing with overshoots and undershoots

The perpetual challenge for central banks is how to deal with overshoots and undershoots of the target. I examine the recent overshoot in section 4. Here I describe briefly an episode of an overshoot that was justified by concerns about output and employment and yet was consistent with maintaining credibility in the target. During the global financial crisis, the UK had to absorb the largest depreciation of sterling since the Second World War, as well as very large rises in oil and commodity prices. From the onset of the crisis in the third quarter of 2007 until the failure of Lehman Brothers in September 2008 the effective sterling exchange rate index fell by 9%. Between then and the introduction of QE with Bank Rate close to zero, the index fell by a further 19%. Those ‘shocks’ had an even larger first-round effect on consumer prices than the later impact from the Russian invasion of Ukraine. The Bank of England decided to accommodate the rise in the domestic price level resulting from the fall in the exchange rate to prevent further rises in unemployment. The magnitude of the rise in the price level implied by the policy of accommodation was estimated to be around 12 percentage points.<sup>18</sup> But domestically generated inflation (largely wage costs) remained low during the ‘Great Recession’ from mid-2008 to mid-2009 when GDP fell by just over 6%. As the economy recovered from mid-2009 until the end of 2012, consumer prices rose by 12.6%, a cumulative excess over the 2% target of around 5 ½ percentage points. The Bank of England’s explanation was that this was a deliberate overshoot to minimise the damage from the recession and that domestically generated inflation was running below the target.

As the financial crisis started in 2007, CPI inflation was 2.1%. By the end of 2013 it was 2.0%. Accommodation of the large sterling depreciation was achieved without loss of credibility in the target.<sup>19</sup>

Undershoots have been less dramatic. In the 2010s, some central banks became worried that inflation was undershooting the target. In response the Fed launched the average inflation targeting framework in August 2020, an explicitly asymmetric approach to deviations from target. Core inflation had averaged around half a percentage point below the target for five years. From the perspective of the pioneers of inflation targets this would have been seen less as a failure and more as nirvana. But the focus on theoretical models had encouraged a belief that inflation could be controlled rather precisely. So the question became: how can we raise inflation up to the target from a little below? As the December 2021 National Bureau of Economic

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<sup>18</sup> The assumption was that the depreciation of sterling would lead to a rise in the price of all tradable goods and services under the law of one price.

<sup>19</sup> Just before we both left office as central bank governors, Stan Fischer remarked to me at one of the BIS bimonthly meetings that the UK experience during this period had been a test of the inflation targeting framework: ‘it has been tested and has proved its worth’.

Research Reporter explained, ‘a major focus of research and practice was how to further stimulate these economies through unconventional monetary policy and raise their rates of inflation toward target levels’. By that time, inflation was already well above target and the approach of average inflation targeting has seemingly quietly disappeared.

## 4 The 2020–23 inflation

From the early 1990s until 2020, inflation in the major western economies averaged close to 2%. But after thirty years of low and stable inflation, central banks lost control of inflation during the pandemic. CPI inflation in the euro area peaked at 10.6% in October 2022, in the US at 9.1% in June 2022, and in Britain at 11.1% in October 2022. And although inflation fell quite sharply across the G7 economies during 2023, inflation had risen to its highest level for several decades. What went so badly wrong?

Part of the answer is the sharp rise in food and energy prices following the Russian invasion of Ukraine. But that is not the whole story. Excluding food and energy prices, in the first quarter of 2024 core CPI inflation remained well above target at around or over 4% in the US and UK and over 3% in the euro area. And that is despite a rise in official interest rates of around 5 percentage points. Central banks were slow to realise that the rise in inflation was more than a ‘transitory’ deviation from target.

We are all familiar with Milton Friedman’s dictum that inflation is always and everywhere a monetary phenomenon. Yet money has disappeared from central bank analysis of inflation. Monetarism became discredited for three main reasons. First, the relationship between monetary aggregates and nominal incomes proved nonstationary. This told us less about the role of money and more about structural shifts in banking and the financial system. Second, Friedman and other American monetarists focused on the monetary base rather than broader monetary aggregates which could not be controlled directly by the central bank. But as the experience of QE has shown, base money is relevant to the determination of aggregate nominal demand only insofar as it affects broader measures of money.<sup>20</sup> Third, and somewhat bizarrely for a discipline that purports to be a science, as universities moved to the progressive left, so ideas associated with the Chicago boys of Milton Friedman appeared increasingly distasteful. For these three reasons, academic research turned its back on decades of monetary theory and decided to develop a theory of inflation without any reference to money at all. But inflation is a nominal variable. Any coherent theory of inflation must be related to nominal variables. The new models contained no theory of the nominal side of the economy – no banks, no money, no financial sector. The challenge of how to close the model and determine the price level in the medium term was solved by the assumption that inflation was determined by expectations and that expectations were determined by the official inflation target. In other words, the model assumed that inflation in the medium term would always return to the official inflation target of 2%. Milton Friedman’s dictum had been

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<sup>20</sup> The ‘money multiplier’ is much more unstable than the velocity of broad money.

replaced by the new dictum that inflation was always and everywhere a transitory phenomenon.

But a satisfactory theory of inflation cannot take the form ‘inflation will remain low because we say it will’; it must explain how changes in policy – whether via QE or changes in interest rates – affect the economy. For a long while, central banks were successful in keeping inflation close to the target and so nothing disabused them of the strong assumption they were making – until the pandemic came along. Following a sharp reduction in potential supply – the consequence of the measures taken to prevent the spread of Covid – central banks decided to expand demand by a substantial programme of money printing through quantitative easing. Although most central banks are reluctant to describe it as such, QE is an expansion of the broad money supply because central banks buy bonds from investors who place the sale proceeds in their bank accounts adding to total deposits. Unlike its use after the banking crisis a decade or so ago, aimed at preventing a fall in broad money resulting from a contraction of commercial bank balance sheets, this time QE created a substantial monetary overhang. Growth rates of broad money accelerated rapidly, in the case of the United States to the highest levels since the end of the Second World War, at an annual rate of over 26% in the first half of 2021. In the UK broad money growth peaked at over 15% and in the euro area at almost 13%. Aggregate money demand exceeded aggregate supply valued at the current price level.

The case for substantial monetary expansion in March 2020 was framed as a response to ‘dysfunctional markets’. But the monetary injection – as a market-maker of last resort – was not withdrawn once financial markets were operating normally. Substantial fiscal stimulus was being provided by governments. Further stimulus in the form of QE in 2020 and 2021 was unnecessary. The actions taken to deal with the pandemic reduced the supply of goods and services while giving fiscal support to households and businesses. Central banks increased the supply of money. This produced the time-honoured recipe for inflation – too much money chasing too few goods.<sup>21</sup> The possibility that aggregate nominal demand was excessive was ignored. A similar conclusion was reached by Eggertsson and Kohn (2023) who focus on tightness in the labour market. They show that the ratio of vacancies to unemployment in the US was, by late 2021, at its highest level since WWII, a record parallel to that of the broad money aggregates.<sup>22</sup>

I am not suggesting that policymakers respond in an automatic fashion to changes in the growth rates of monetary aggregates. But I do think it would have been sensible to ask in 2020 and 2021: if broad money is growing at 15%, and especially 25%, a year, what is going on here? In the past decade, central banks have unfortunately abandoned reporting on and monitoring the broad monetary aggregates.

In the models that now dominate central bank thinking, inflation is pinned down by a central bank reaction function which guarantees that interest rates, or QE, will be set so as to ensure that inflation returns to target. But in a world of radical uncertainty,

<sup>21</sup> Borio et al. (2024) document the statistically significant relationship between broad money growth and inflation in the recent inflationary episode.

<sup>22</sup> Bernanke and Blanchard (2023) espouse a contrary view.

where none of us know the true dynamics of the economy, we cannot be confident that central banks will in fact behave in a way consistent with hitting the inflation target. In such a world, expectations are too fragile to guarantee total central bank credibility.

Simple analytical models are immensely valuable as a way of generating insights which can be carried across to the policy process. But by design they do not include all relevant information and are not good ways of making a forecast. Policy must be set in the world, not in a model. There is an interesting parallel between the failure of models that assume inflation must converge on the official target and models of exchange rate target zones. In the latter, the original models implied that when the exchange rate was at the lower bound of the target zone then monetary tightening would lead to a rise in the exchange rate within the band (Krugman 1991). The target zone was inherently stabilising because of expectations of future policy changes.<sup>23</sup> A key assumption of the model is that the target zone is completely credible (Svensson 1992). The model ignores the possibility that the regime might change. Yet in 1992 that is exactly what happened in the European Exchange Rate Mechanism. A rise in interest rates led not to a rise in the exchange rate but to a loss of credibility in the continued existence of the regime. Equally, models of inflation that assume that inflation will always return to its target assume perfect central bank credibility. A lesson from the empirical failure of both sets of models to forecast what happened is that credibility needs to be modelled as endogenous to economic variables. That should be an important area for future research.

## 5 Proposals for the future

There are two major challenges facing monetary policy in the future. First, will central banks maintain their commitment to keeping inflation close to their target? Second, will central banks avoid the misjudgements of the recent past?

On the first, the relatively benign environment of the 1990s and early 2000s has given way to a much more difficult backdrop of high and rising sovereign debt levels and budget deficits (pushing up the equilibrium real rate of interest), and a shift away from trade liberalisation towards investment in domestic capacity to boost resilience. Both of these are likely to put some upward pressure on inflation and require higher interest rates to keep inflation close to target. In particular, the sharp rise in budget deficits in advanced economies during and following the pandemic has led to concerns that fiscal dominance is leading central banks to accommodate the consequences of high debt levels. Sovereign debt levels of 100% or more of annual GDP are increasingly common. The scale of QE during the pandemic was akin to monetisation of the increase in national debt. Prospects for putting fiscal policy on a sustainable path seem remote on both sides of the Atlantic. There will be greater interest in the monetary-fiscal policy mix. Life will not be easy for central banks seeking to reduce the size of their balance sheets and avoid monetisation of high levels of national debt. Goodhart and Pradhan (2020) and Afrouzi et.al. (2024) have

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<sup>23</sup> This is a similar property to the Maradona theory of interest rates (King 2005).

argued that demographic and political economy factors mean that central banks will come under pressure to pursue more accommodative monetary policies. Although it seems unlikely that governments would rescind formal, or *de jure*, central bank independence, *de facto* independence could, and arguably has, come under question through the appointments of senior central bank personnel regarded as sympathetic to government.

On the second, it is instructive that most of the large past mistakes in judging the future path of the economy, and hence of inflation, reflected not a lack of sophisticated models but basic misjudgements – a failure to comprehend the fragility of the western banking system prior to the financial crisis and a misunderstanding of the balance between demand and supply as the pandemic evolved. In both cases insufficient attention was paid to monetary variables. In a world of radical uncertainty, in which the structure of underlying relationships is changing, decisions need to be taken before there is time to develop and estimate new models. The value of models is to gain insights that can be taken to the world, but they are not a description of the world. Small models are helpful in generating insights; large models can never capture the full complexity of the world and so are rarely helpful in forecasting at times when change means that a forecast would be useful. A key task for central banks is to ask and, if possible, answer the question ‘what is going on here?’

For that to be feasible, discussion and debate inside the central bank are crucial. Most central banks are well equipped to do this. But a potential impediment is ‘groupthink’.<sup>24</sup> It is striking that in 2020 and 2021, when outside commentators were divided between ‘team transitory’ and those increasingly concerned about inflation, there was unanimity within central bank policy committees (Eggertsson and Kohn 2023, and House of Lords 2023). Only later were interest rates raised. One way of reducing the risk of ‘groupthink’ would be consciously to introduce more intellectual diversity into central banks, both staff and policy-making committees.

The experience of inflation targets in practice suggests that the **commitment** to keeping inflation close to the target can be undermined by giving too many responsibilities to a central bank that inevitably reduce the time and focus of senior personnel on the main responsibility of achieving price stability (House of Lords 2023). To avoid some of the past mistakes, it is crucial not to rely on model forecasts but to analyse what is going on in the economy today. Models can help but they are no substitute for thinking through the likely consequences of developments for which there is no precedent.

Perhaps the most fundamental critique of inflation targeting is that the financial crisis demonstrated that price stability is not sufficient for economic stability more generally. Low and stable inflation did not prevent a banking crisis. Did the single-minded pursuit of consumer price stability allow a disaster to unfold? Would it have been better to accept sustained periods of below or above target inflation in order to prevent the build-up of imbalances in the financial system and the economy more

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<sup>24</sup> The use of forward guidance makes groupthink more likely and suppresses differences of view on policy-making committees.

widely? Is there, in other words, sometimes a trade-off between price stability and financial stability?<sup>25</sup> The basic New Keynesian model omits a number of key factors and it lacks an account of financial intermediation, so money, credit and banking play no meaningful role. Those omissions obviously limit the ability of the model to help us understand the trade-offs between monetary policy and financial stability.

Such models do not provide a convincing account of the gradual build-up of debt, leverage and fragility that characterises the run-up to financial crises.<sup>26</sup> There is no mechanism for ensuring that misperceptions about the sustainable level of spending are corrected quickly. It may take many years before those beliefs are invalidated by experience. An equilibrium pattern of spending and saving can emerge that is stable temporarily but not sustainable indefinitely. If policymakers can, first, identify misperceptions, and second, correct them by changes in monetary policy – both highly uncertain empirically – then there is indeed a trade-off between hitting the inflation target and reducing the chance of a financial crisis down the road. This reinforces the case for thinking deeply, and from differing perspectives, about what is happening in the economy.

There may be circumstances in which it is justified to aim off the inflation target for a while in order to moderate the risk of financial crises. I do not see this as inconsistent with inflation targeting because it is the stability of inflation over long periods, not year to year changes, which is crucial to economic success. But it emphasises the importance of a credible narrative to explain and justify monetary policy.

I conclude with six suggestions for how to implement inflation targets and monetary policy in future:

1. When making model-based forecasts of inflation, and other variables, explore different assumptions about the credibility of policy. At present, many forecasts are made using models which assume that inflation will always come back to 2% because that is the target. It would be sensible to produce additional forecasts based on the assumption that inflation expectations follow a path that returns to the target over a much longer horizon. That would at least reveal how sensitive are the short-run dynamics of inflation to the assumption about the longer-term anchor of inflation. Simulations of this kind should be a regular feature of staff analysis presented to policy committees. Ideally, credibility would become an endogenous rather than an exogenous variable.
2. When presenting forecasts, far less attention should be directed to the central projection and much more on the risks around it. That was one of the recommendations of the Bernanke review of the Bank of England's forecasting processes: 'communicating to the public about the MPC's perceptions of the level of uncertainty and the balance of risks remains essential' (Bernanke 2024). It had also been the purpose behind the fan

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<sup>25</sup> See the analysis of such a trade-off in terms of a Minsky-Taylor frontier in King (2012).

<sup>26</sup> Focussing on small deviations around the linearization of the steady-state of a dynamic stochastic general equilibrium model helped to divert attention away from the gradual build-up of big risks.

charts used by the Bank for many years and why they contained no line for a central projection but instead were designed to emphasise whether the balance of risks was judged to be on the upside or downside based on forward-looking judgements, not a mechanical projection of past outturns.<sup>27</sup> But after 2013, the Bank started to emphasise the central projection and play down the presentation of risks.<sup>28</sup> As Bernanke points out, ‘For public communication, the importance the MPC attaches to the central forecast is illustrated by its prominence in all of the Bank’s post-decision public releases’. This is contrary to the approach of the MPC during its first decade and a half which was to downplay the central projection and play up an assessment of the risks around the target.

3. When presenting risks there are many ways to skin a cat. In his review of the Bank, Bernanke proposes that the MPC focus on explaining the qualitative assessment of the degree of uncertainty. He recommends dropping all reference to and numbers for mean forecasts. To communicate the risks Bernanke recommends dispensing with fan charts and moving to a discussion of different scenarios. Bernanke argues that the construction of the fan charts is ‘uncomfortably ad hoc’. But as Goodhart has commented, ‘the number of potential scenarios is huge, and the choice of which scenario to adopt is, surely, even more ad hoc than the fan chart’ (Goodhart 2024). Bernanke states in a footnote that ‘the width and skew of fan charts are primarily determined by MPC members’ judgement, informed by discussion of potential risks’. That is exactly what he argues elsewhere should determine the Committee’s judgement about risks. The choice between fan charts and verbal discussion of scenarios is a matter of taste not economics, and the two are complements not substitutes. Both the Fed and the Bank of England underestimated the need to tighten monetary policy in 2020 and 2021 – one published and presented its views using the so-called ‘dot plots’ and the other fan charts. It made no difference. The real problem was the misjudgement.
  
4. Abandon forward guidance. The use of forward guidance as a tool of monetary policy is a dangerous game. It ran into trouble early on when guidance was linked to just one real variable, the path for unemployment. And markets have been only too happy to blame central banks when they feel they have been led up the garden path. The Federal Reserve does not know the short-term policy rate it will want to set six months from now, let alone what it will be in 2025 or 2026. For example, the markets’ interpretation of guidance about the number of rate cuts during 2024 (a matter of months away) has varied during this year from zero to six. It would be better to be honest about the uncertainty. Associated with the use of

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<sup>27</sup> Fan charts were first published by the Bank of England in the February 1996 *Inflation Report*, not in 1992 as reported by Bernanke (2024).

<sup>28</sup> Goodhart (2024) points out that ‘the Bank at times itself downgraded their use [of fan charts]. For example, during Governor Carney’s regime, the fan chart for inflation two years hence was kept at a constant width and zero asymmetry, that is, no skew.

forward guidance is the publication of a future path of policy rates – in the case of the Federal Reserve this takes the form of the well-known ‘dot plots’. In March 2022, the range of projected Federal funds rates in 2023 for all FOMC members was 2.4 to 3.1%. The outturn was over 5%. Central banks do not know the future path of policy rates because the path of the economy is uncertain. It does know its own reaction function. Markets compute their estimate of the future path of interest rates by feeding their own view of the evolution of the economy into the central bank reaction function. Their view of where the economy is headed may well be different from that of the central bank. Forward guidance conflates the reaction function with the forecast of the central bank. There is nothing to be gained by doing this and much credibility to be lost. A central bank should focus on the setting of the policy instrument – interest rates and QE – today, not in three years’ time. In a report on the monetary policy of the Swedish Riksbank, the late Marvin Goodfriend and I showed how damaging it was for their policy committee to be distracted from the immediate policy decision by an internal debate about where rates should be in three years’ time (Goodfriend and King 2015). A more important task is to develop a narrative about the state of the economy that changes over time meeting by meeting, report by report.

5. Publish and report regularly on the evolution of monetary variables, especially the growth of broad money. Inflation is a nominal variable. Broad money is a useful check on the plausibility of the narrative that underpins policy decisions. This resembles the ‘two pillar’ approach to monetary policy developed by Otmar Issing at the start of the European Central Bank. As he later wrote: ‘rejecting monetary targeting as a strategy for the ECB did of course not imply neglecting the overwhelming evidence for the long-run relation between money and prices and the undeniable fact that monetary policy has somewhat to do with money ... any deviation of M3 growth would not trigger a mechanistic monetary policy reaction but would prompt further analysis to identify the reasons behind such developments’ (Issing 2006).
6. Stop publishing transcripts of monetary policy meetings, as currently practised by both the Federal Reserve and Bank of England. There must be room for private conversations. Publishing transcripts does not enhance transparency. It merely distorts the policy process by moving the real conversation to a different, and usually earlier, meeting and means that at the final meeting for which transcripts are collected the contributions are repetitive statements by the participants prepared for subsequent publication. The spontaneity of a genuine conversation is lost.

Interestingly, many of the problems experienced by central banks during the recent episode of inflation were foreshadowed by the Swedish Riksbank in the wake of the financial crisis. In our review of the Riksbank’s monetary policy, Marvin Goodfriend and I described the problems of over-reliance on a narrow set of models, the fallacy of using models that assume total credibility of the central bank and the dangers of focussing on forward guidance for the future path of the policy rate:



‘By far the most serious problem was the growing discrepancy between the future path for the repo rate forecast by the Riksbank itself and the future path implied by prices in financial markets. ... There is something surreal about the precision of the guidance provided by individual board members as to the future path of the repo rate when contrasted with the sheer uncertainty about the future and the fact that markets took rather little notice of the published path in determining their own expectations. It became too easy to paper over major differences of view on the current stance of policy by expressing them in terms of differences of view about the likely future path of the policy rate’ (Goodfriend and King 2006, pp. 6–7). Moreover, the absence of clear authority for any other body to deal with growing imbalances and a rise in credit raised the question of whether there was a good case for a tighter monetary policy stance than was justified by looking solely at the inflation forecast eighteen months to two years ahead. During the short period 2012–2015, the Riksbank faced almost all of the challenges that emerged in other countries more recently. The fact that the Riksbank came through this episode is encouraging for the advocates of inflation targeting, albeit with the modifications advocated above.

## 6 Conclusions

The announcement of an inflation target was never seen as a substitute for a careful and deep analysis of what was going on in the economy, and in particular of developments in the nominal side of the economy. Inflation targets in practice were a way of setting monetary policy under a regime of constrained discretion, not a theory of inflation. A model based on optimising behaviour by rational agents may generate some useful insights into how to think about the economy (for example, the importance of expectations) but it is not a description of the economy and cannot make predictions. We should not throw out the baby with the bathwater (expectations matter) but policy has to contend with serious nonstationarities which make econometric estimation of past relationships a poor guide to the future. As Amar Bhidé has written, ‘evidence collaborates with and does not replace imagination’ (Bhidé 2024). A successful decision-making process must allow for a narrative to evolve after a debate and discussion.

The theory of inflation targets gradually evolved in a different direction. It shed any focus on developments in the nominal side of the economy and explained inflation in terms solely of real variables with the sole nominal variable being the inflation target. The growth of nominal demand was sidelined. In other words, it assumed that policymakers would always do the right thing. But if policymakers pursued a policy that was likely to lead to inflation moving above target – as I would argue occurred in their response to the pandemic when a reduction in aggregate supply was accompanied by a policy to boost aggregate demand way beyond anything that would maintain a balance between the two – the credibility of the inflation target would be challenged.

The weakness in the theory was similar to earlier failures of models, such as exchange rate target zones – policymakers deviated from the core assumption of the model. That possibility means that such models cannot be a reliable basis for forecasting

inflation. Models can provide extremely useful insights, but they are not a substitute for policymakers asking ‘what is going on here?’ The problem was not so much in the models as in the misuse of models.

Inflation targets have proved their worth in practice because they were implemented with a clear focus on institutional changes to impose effective constraints on the discretion desirable to respond to changes in a nonstationary economy. By airbrushing monetary and financial variables out of the picture, the theory of inflation targets has oversimplified the process by which inflation expectations are formed. Rational expectations are defined over a process determining the underlying variables, not by an objective of policy. Announcing an inflation target is no guarantee of achieving it. Setting policy in an uncertain nonstationary environment is difficult. Transparency and accountability are crucial to retaining credibility in the good faith and competence, though not infallibility, of central banks. That is the real achievement of inflation targets in practice.

Now is the time for central banks to take a gentle step back from being in thrall to the latest theoretical advance and avoid becoming the slaves of living economists.

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