Stability in the Balance – a Report on the Roles of Fiscal and Monetary Policy to the Expert Group on Public Economics

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Preface

A necessary requirement for macroeconomic stability is an economic policy framework designed to appropriately counteract various shocks. The conventional way to view the roles of fiscal and monetary policy is that monetary policy should be primarily responsible for business cycle stabilisation while active fiscal measures to even out the business cycle should normally be avoided. The main reason for this is that there are risks inherent in the use of active fiscal policy for stabilisation. Because deciding on expansionary measures is easier than deciding on contractive measures, active fiscal policy can lead to large build-up of debt. In addition, measures run the risk of being improperly timed due to lags in political decision making.

Events of the past years such as the global financial crisis, the COVID-19 pandemic and the war in Ukraine have caused great shocks to the economy, and thereby great challenges for economic policy. Since the financial crisis and until recently, we have had low inflation and a low interest rate environment. Under these conditions, the possibilities for stimulating the economy using monetary policy were restricted because of the limited room for further interest rate reductions. Naturally, in an environment where the possibility of counteracting negative demand shocks using monetary policy is reduced, more attention becomes focused on fiscal policy. This has put into question the established view of how the roles of monetary and fiscal policy ought to be divided and has caused a greater interest in the interaction between the two policy areas.

Monetary and fiscal policies are governed by different frameworks. In Sweden, monetary policy is conducted independently by *Sveriges Riksbank*, which has an inflation target and a responsibility for financial stability in its role of being a lender

of last resort. Fiscal policy is decided in a political process, which is governed by the fiscal policy framework. Conflicts of objectives between the frameworks can arise and there is a risk of inefficient outcomes. There are currently no guidelines for how to handle such conflicts.

In this report, Lars Calmfors, John Hassler and Anna Seim study the past interaction between fiscal and monetary policy in Sweden and analyse possible divisions of responsibilities in the future. The authors also analyse the institutional conditions for effective policy interaction and the risks involved in monetary and fiscal policy decisions being made independently of each other.

The authors point to several reasons to assign fiscal policy a greater role in stabilisation, partly through a strengthening of the automatic stabilisers and partly through allowing active fiscal policy measures to serve as a complement to monetary policy in stabilising macroeconomic developments. Fiscal policy could also provide support for monetary policy in reaching the inflation target when inflation deviates greatly from the target. The authors find that, in principle, a reassessment of the inflation target would be desirable. However, in the current situation with high inflation and a risk of rising inflation expectations, the timing for such a reassessment is not right.

I hope this report will contribute to an initiated discussion about the guidelines for a well-functioning interaction between fiscal and monetary policy going forward. This work has been followed by a highly qualified reference group consisting of people with good insight into the report's topics. The group's meetings with the authors have been chaired by me. As always with ESO reports, the authors themselves are responsible for the contents, conclusions, and recommendations.

Stockholm, January 2023

Karolina Ekholm
Chair of ESO

Contents

Boxes

Summary

Fiscal and monetary policy are both key to effective business cycle stabilisation. The experiences of the 1970s and 1980s with high inflation, low growth and recurring devaluations in Sweden led to institutional reforms with greater independence from the political system for the *Riksbank*, which is responsible for monetary policy, and the introduction of a stricter fiscal framework. The latter imposes constraints on fiscal policy, while the *Riksbank* pursues a flexible inflation target according to which stabilising economic activity is also an objective.

Since the mid-1990s, there has been a widespread consensus that, under a floating exchange rate, cyclical fluctuations should mainly be countered by monetary policy. According to this view, fiscal policy should primarily be confined to allowing the automatic stabilisers to operate, while discretionary (active) fiscal policy measures should be used sparingly.

Over the past 15 years, major macroeconomic shocks – the global financial crisis and the Great Recession of 2008–10 as well as the pandemic of 2020–21 – have demonstrated that strong fiscal policy measures are occasionally necessary. At the same time, traditional monetary policy, in the form of changes in the policy interest rate, was constrained by the *effective lower bound* on interest rates. Structural factors in the global economy have caused the neutral real interest rate, that is the real interest rate consistent with a normal level of resource utilisation and stable inflation, to trend downward for decades. Given that inflation is low and that the nominal policy rate can likely only be set marginally below zero, interest rate policy is not always able to provide sufficient stimulus in deep recessions. To reach inflation targets, central banks around the world therefore in recent years resorted to unconventional measures such as *forward guidance* on future policy and large-scale asset purchases, so-called

balance sheet operations or *quantitative easing*. Our knowledge of the effects of these measures over different horizons is limited and negative side effects are a cause for concern. All in all, this has led to the conventional wisdom on economic policy, according to which monetary policy is mainly responsible for business cycle stabilisation, being called into question.

The economy has thus undergone substantial change since the current frameworks for fiscal and monetary policy were introduced in the 1990s. This raises the question of whether they need to be adjusted – fundamentally or marginally. Since fiscal policy and monetary policy both affect aggregate demand, the interplay between them is crucial. This report analyses how the conditions for stabilisation policy have changed and whether this calls for revisions of the policy frameworks in Sweden.

The fundamentals of stabilisation policy

Business cycle downturns are usually caused by falling *demand*, failing to maintain normal levels of economic activity. In booms, demand increases cause resource overutilisation. To stabilise the economy, both fiscal and monetary policy should be *countercyclical*, that is stimulating in recessions and tightening in booms.

The economy is also exposed to supply shocks, sometimes very severe, such as during the pandemic and in connection with the Ukraine war. Such negative disturbances cannot be managed by policies stimulating demand. Demand can instead become too high so that inflation increases sharply. Which policies are appropriate after a major supply shock depends to a large extent on whether it is permanent or temporary and which industries are affected. Temporary supply shocks may have to be met by bridging policies. In the event that the supply shocks are permanent, however, such policies are harmful. This was, for example, the case during the oil crises of the 1970s.

Acyclical discretionary fiscal policy but congruent fiscal and monetary policy

We assess the stance of fiscal policy from 1996 onwards by comparing general government net lending (the difference between revenue and expenditure) with the surplus target. Measured in this way, fiscal policy as a whole, including the automatic stabilisers, has generally been countercyclical. *Discretionary* fiscal policy, on the other hand, appears on average to have been acyclical, that is, has not covaried with resource utilisation. There are also several examples of *procyclical* discretionary fiscal policy that reinforced economic imbalances at times when these were large.

We define the current monetary policy stance by comparing the real policy rate with the neutral real interest rate. Monetary policy then appears to have been *countercyclical* on average.

Fiscal and monetary policy should normally pull in the same direction, that is, be congruent. The difference between government net lending and the surplus target has co-varied positively with the difference between the real interest rate and the neutral real interest rate. There has thus typically been congruence: when fiscal policy as a whole has been expansionary (contractionary), so has monetary policy.

The neutral real interest rate is likely to remain low in the future

The neutral real interest rate is difficult to predict. However, the most common assessment is that fundamental structural factors suggest that it will remain low in the future as well, albeit probably not as low as during the last decade. Stabilisation policy should therefore be prepared to handle situations where the *effective lower bound* on interest rates binds in future recessions. Central banks could then perhaps lower policy rates further below zero than previously, but our assessment is that it may be difficult to gain legitimacy for such policies and that they are therefore unlikely.

Reasons to avoid balance sheet operations

Balance sheet operations involve the central bank buying government bonds and other long-term securities. It pays for these purchases by creating central bank money that becomes the reserves of commercial banks in the central bank. The interest on these reserves tracks the policy rate. These large-scale asset purchases seem to have lowered long-term bond yields as intended, but the effects on inflation and economic activity are difficult to estimate and thus uncertain.

Asset purchases imply that long-term borrowing by the consolidated government (including the central bank) is replaced by short-term borrowing in the form of central bank money, that is, *maturity transformation* is taking place. This entails interest rate risk. If the central bank trades in financial instruments other than government bonds, greater financial risks arise and credit as well as resource allocation in the economy is affected to a greater degree. This means that decisions normally taken within the political system are transferred to unelected officials in the central bank's executive board. Hence, there are strong arguments for trying to avoid large-scale balance sheet operations, unless, as in the spring of 2020, they are deemed necessary to maintain a well-functioning financial system.

The *Riksbank*'s bond holdings should be liquidated

The *Riksbank* should liquidate its large asset holdings. As policies that affect risk premia distort pricing signals in financial markets, it is particularly important that covered (housing) and corporate bond holdings are liquidated. The *Riksbank* has indicated that these securities will be held until maturity. We are critical of this strategy. It is unlikely that the optimal liquidation rate would coincide with how the holdings mature.

Raising the inflation target creates more scope for monetary policy but now is not the time

To avoid negative interest rates and balance sheet operations, one option is improving the scope for monetary policy by raising the *inflation target*. For a given neutral real interest rate, a higher target means a higher nominal interest rate on average. There would thus be greater scope for policy rate cuts in recessions, so that monetary policy would be better able to stimulate demand.

But it would be risky to raise the inflation target in a situation like the present (January 2023) when inflation is far above the target: it might be perceived as an adjustment to failures to keep inflation down and therefore lead to expectations of further increases that could contribute to even higher inflation. Raising the inflation target is only feasible once inflation is under control, so that the target chosen is *credible*.

Arguments for a greater role for fiscal policy

The risk that monetary policy will be constrained by the effective lower bound on interest rates in recessions strengthens the arguments that fiscal policy should play a greater role in stabilising the economy. Using fiscal policy measures in a recession has the advantage that they can help maintain low unemployment without having unintended effects on the wealth distribution and financial stability. Fiscal policy is also particularly effective at stimulating demand when the economy is close to the effective lower bound because then it does not trigger interest rate reactions. Low real interest rates also mean that the public-finance risks of higher government borrowing in economic downturns are smaller.

The automatic stabilisers should be strengthened

One way to enhance the role of fiscal policy in business cycle stabilisation is to strengthen the automatic stabilisers. Their advantage is that they trigger expansionary policies in recessions and contractionary policies in booms without requiring discretionary decisions. This reduces the risk that fiscal policy will be misused and

that a greater role for it in cyclical stabilisation will lead to excessive government borrowing.

One possibility is *automatic variations in the central government grants* to local governments. This would reduce the risk that the spending of local governments becomes procyclical due to the legal balanced-budget requirements on them that form part of the Swedish fiscal framework. The rules for these grants could be designed so that they automatically compensate for deviations in the growth of the local government sector's tax base from a moving average. *Cyclically dependent unemployment insurance*, which in recessions is made more generous in terms of higher benefit levels, longer maximum duration or greater coverage, is another option.

A disadvantage of stronger automatic stabilisers is that they can be destabilising after supply shocks. This problem must be taken into account, but our assessment is that stronger automatic stabilisers would be valuable.

Fiscal policy must not be misused

Since we find no countercyclical pattern for the discretionary fiscal policy that has been pursued in Sweden, it is not obvious that more activist fiscal policy would improve business cycle stabilisation. It is even conceivable that the practice established during the 2020–21 pandemic, with recurring new decisions on stimulus measures in supplementary budget bills, may have shifted the norms of decision-making so that politicians have become more willing to extend selective support to groups exposed to negative real income shocks. This entails risks that more of discretionary fiscal policy may in fact destabilise the economy.

A greater role for fiscal policy therefore requires a stronger fiscal framework. The *Fiscal Policy Council* could be tasked with recommending *in advance* how fiscal policy should be designed with regard to the cyclical situation. The *Riksbank* should also inform the government and parliament if monetary policy is unable to stabilise the economy and achieve the inflation target without major negative side effects, and therefore needs backing from fiscal policy.

Clearer guidelines for the balance between fiscal and monetary policy

At present, there are no clear guidelines – while such previously existed - for what role fiscal policy should play in stabilising the economy. Such guidelines ought to clarify that monetary policy and the automatic stabilisers should normally be responsible for business cycle stabilisation, but also that discretionary fiscal policy – unless fiscal sustainability considerations dictate otherwise – should support monetary policy in the event of severe demand disturbances so that it is not overloaded. The supporting role should not only apply in the event of large deviations from normal levels of economic activity, but also when inflation deviates significantly from the inflation target.

The establishment of a forum where representatives of the Riksbank and the government can meet and discuss the interaction between different policy areas, much like in the *Financial Stability Board*, should also be considered. Another possibility would be to expand the remit of the Fiscal Policy Council to also cover the interplay between fiscal and monetary policy.

Stagflation requires a holistic approach

After a long period of low inflation, prices are now (January 2023) rising sharply both in Sweden and the rest of the world. Experiences from the stagflation in the 1970s show the importance of restraining stabilisation policy so that it does not create a large positive GDP gap spurring inflation.

Since the current inflation is due to supply shocks, which have a negative impact on potential GDP, a positive GDP gap can arise despite low growth. If strong fiscal stimulus measures are implemented in such a situation, for example to compensate households for reduced purchasing power caused by higher prices and to counteract rising unemployment, the *Riksbank*'s fight against inflation becomes more difficult. A situation where fiscal and monetary policy counteract each other should be avoided. It could force a very contractionary monetary policy that causes too large

strain on highly indebted households and firms, with associated risks for financial stability.

The relationship between different changes to stabilisation policy guidelines

Changes in specific aspects of stabilisation policy have consequences for other areas. The more we are willing to accept large-scale asset purchases by the *Riksbank*, the less the need for changes.

Stronger automatic stabilisers mean less need for discretionary fiscal policy to supplement monetary policy in the event of demand disturbances, and thus less need to build in barriers against misuse of fiscal policy. At the same time, automatic stabilisers only counteract demand shocks. In the event of supply shocks that affect potential GDP more than actual, automatic stabilisers can instead exacerbate the imbalances and thereby increase the need for discretionary fiscal policy decisions.

The more one is prepared to rely on fiscal policy to stabilise the economy, the weaker are the reasons for reconsidering the inflation target. But the more sceptical one is about the possibilities of implementing carefully crafted fiscal policy measures, and the greater the confidence in the potential efficacy of interest rate policy, the stronger the reason to widen the *Riksbank*'s room for manoeuvre by raising the inflation target.

Policies in acute economic crises

This report focuses on stabilisation policy in the face of normal economic fluctuations. This does not mean that crisis policy is unimportant – quite the opposite. *Financial crises* in particular can have catastrophic economic effects and cause depressions. Effective crisis policy can prevent such developments. An example of this is the pandemic. The measures taken by the government, the *Riksbank* and other authorities with the aim of mitigating the economic consequences of the pandemic were powerful, fast and involved many new tools. The combined measures, together with similar efforts in other countries, were in all probability crucial for the

economic effects of the pandemic being considerably smaller than initially feared.

The fiscal and monetary policy frameworks currently in place did not hamper swift and powerful crisis management. On the contrary, the frameworks were crucial for sustaining confidence in Sweden's public finances and price stability throughout the crisis. Our assessment is that the coordination of the measures taken during the covid crisis was unproblematic. It is true that the *Riksbank* implemented measures that bordered on, or exceeded, the limit of what should be considered monetary policy. This includes the purchases of covered (housing) bonds and in particular the purchases of corporate bonds. The need for fast and powerful policy responses at the onset of an acute financial crisis clearly suggests that the *Riksbank* should be able to pursue such measures in the future as well. They should, however, only be resorted to in extreme situations when the stability of the financial system is at stake.

Overall conclusions

There are good reasons to avoid large-scale asset purchases on the part of the *Riksbank*, unless when on the brink of a financial crisis. Strengthening the automatic stabilisers would be worthwhile, but probably insufficient if the objective is to significantly expand the possibilities of using fiscal policy to stabilise the economy in severe recessions. In such situations, considerable discretionary fiscal stimulus may be required for effective stabilisation. But this also means greater risks of fiscal stimulus being misused and overused. These risks can be reduced, however, if the fiscal policy decisions to a greater extent than today are based on independent assessments. If this cannot be achieved, more active use of fiscal policy for stabilisation purposes can be risky.

At present, there are no clear guidelines for what role fiscal policy should play in stabilisation policy. Such guidelines are needed. They ought to clarify that monetary policy and the automatic stabilisers of fiscal policy should normally be responsible for stabilising the economy, but also that discretionary fiscal policy should support monetary policy in the event of severe demand shocks. Fiscal policy

should be of such a magnitude that large-scale asset purchases in recessions and extreme interest rate hikes in booms can be avoided.

A key tenet of effective fiscal policy is a political willingness to respect the economic policy frameworks. These frameworks enabled powerful policy responses during the covid crisis. The necessary measures in the acute stage of the crisis could be implemented without being constrained by a fear of their consequences for the long-term sustainability of public finances. In normal times, however, economic policy cannot be conducted this way. To preserve the scope for economic policy, it is crucial to return to a coherent budget process, where the overall fiscal stance and government net lending is determined explicitly instead of being the result of a series of individual and uncoordinated decisions. The political parties in the *Riksdag* must all act responsibly in this regard.

1 Introduction[1]

The interaction between fiscal and monetary policy is key to effective stabilisation policy. This is because both policies affect economic activity, and thus inflation. But they also operate through different mechanisms, and have different effects on variables that are not the direct targets of stabilisation policy. It is important to understand how monetary policy affects the conditions for fiscal policy and vice versa. The interaction between fiscal and monetary policy is important in normal times, but being able to swiftly launch effective policies becomes particularly important in economic crises.

The fiscal framework determines the conditions for fiscal policy, while the *Riksbank* (Sweden's central bank) maintains a flexible inflation target and has partial responsibility for financial stability within the framework specified by the *Sveriges Riksbank* Act. A central question is whether the design of these frameworks fosters effective interaction between fiscal and monetary policy.

Since the end of the 1990s, *conventional wisdom* has been that, under a floating exchange rate, normal cyclical fluctuations should primarily be counteracted by monetary policy. According to this view, fiscal policy should allow the automatic stabilisers in the economy to operate, while discretionary fiscal policy measures are to be used only sparingly. The rationale for this view has been a fear that fiscal activism will lead to an excessive build-up of government debt and that stabilisation measures may not be timely due to the significant time lags inherent to the decision-making process.

However, over the last 15 years, severe macroeconomic shocks – the global financial crisis of 2008–10, the subsequent great recession

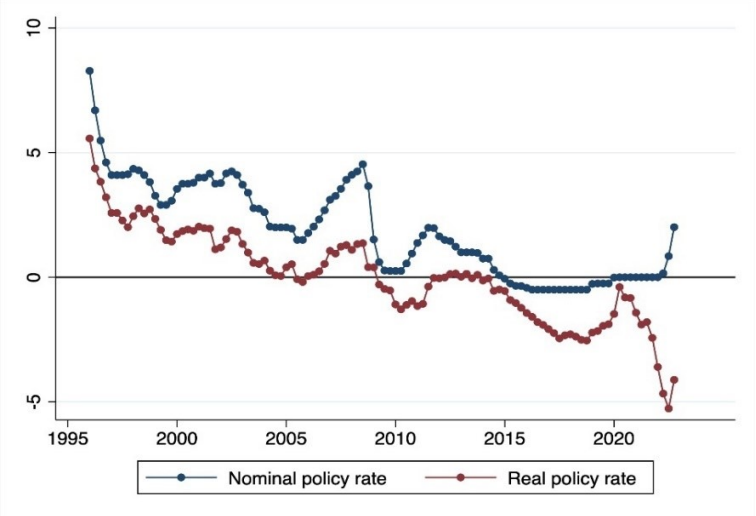
[1] We are grateful for the insightful comments and suggestions from the project reference group, which was exceptionally engaged in our work. We would also like to thank Sofia Karlsson for excellent research assistance and Axel Merkel, Anna Norén, Charlotte Nömmera, Lena Unemo and other staff at the ESO Secretariat for invaluable support. The report was translated to English by Katherine Stuart.

and the pandemic – in conjunction with low interest rates have posed major challenges to the accepted view of stabilisation policy. In Sweden, the policy rate was zero or negative from October 2014 to May 2022 (see Figure 1.1). To further stimulate the economy, the *Riksbank* then pursued unconventional monetary policy measures, mainly in the form of purchases of large volumes of government bonds with long maturities, but also through purchases of other financial instruments. These extensive asset purchases led to a sharp expansion of the *Riksbank*'s balance sheet which, in combination with the low policy rate, contributed to rising asset prices.

When the monetary policy rate hit its lower bound, pressure mounted on fiscal policy measures to sustain resource utilisation. The pandemic also implied a more important role for fiscal policy because, in a situation where incomes fell drastically, the government needed to provide insurance to both firms and households. The increase in government expenditure during the pandemic led to large budget deficits and a sharp rise in central government debt in many countries. These events have raised awareness of the importance of fiscal-monetary policy interaction. This also applies to Sweden, even though the pandemic did not lead to a permanent increase in government debt.

At the end of 2021 and in early spring of 2022, it became clear that the economic situation in Sweden and other advanced economies had changed dramatically. 2021 marked a strong recovery. But inflation also started to rise. This was largely due to supply problems of various kinds as a result of the shift in demand from services to goods during the pandemic, bottlenecks because the recovery was unexpectedly rapid, and new lockdowns in China and other Asian countries. On top of this there have been big increases in the prices of fossil fuels, various commodities and food in connection with the war in Ukraine, which started in February 2022. This entailed new challenges for stabilisation policy and in particular for the balance between monetary and fiscal policy. Central banks, including the *Riksbank*, have tightened monetary policy by raising policy rates and starting to reduce asset holdings. At the same time, fiscal policy, especially in Sweden, is partly aimed at insuring various groups against large drops in real income – as it was during the pandemic.

Figure 1.1 The *Riksbank*'s nominal and real policy rates 1996–2022, per cent



Note: The real policy rate is calculated as the nominal policy rate (previously the repo rate) minus the expected rate of inflation one year ahead, according to Prospera. Quarterly average.
Source: The *Riksbank*.

The economy has thus undergone substantial change since the fiscal and monetary policy frameworks were introduced in the 1990s. This raises the question of whether they need to be adjusted – fundamentally or marginally. It is particularly important to discuss the interaction between fiscal policy and monetary policy in various situations. In the past, there were clear guidelines for this interaction from the Swedish government, but no such guidelines exist today. This is unfortunate and risks leading to the stabilisation policy mix not being based on carefully considered principles. The current lack of clear guidelines for the balance between fiscal and monetary policy in Sweden is one important reason why we have written this report.

The report is structured as follows. Section 2 defines what is meant by fiscal and monetary policy, provides an account of the different policy instruments available, and discusses what we know about their effects. Section 3 discusses the roles played by fiscal and monetary policy: on the one hand, in principle; and on the other hand, in light of what has been *conventional wisdom* both internationally and in Sweden in recent decades. Section 4 analyses how fiscal and monetary policy in Sweden have been conducted since the

mid-1990s, focusing on how the two policies have interacted. Section 5 discusses the balance between fiscal and monetary policy that may be appropriate in the future and how this is related to the risk that, in certain situations, interest rate policy may be constrained by the effective lower bound; measures to broaden monetary policy's room for manoeuvre; the effects of monetary policy on the financial system; the prospects for conducting effective fiscal policy; and the new challenges posed by supply shocks and high inflation. Section 6 deals with institutional aspects on the interaction between fiscal and monetary policy, and summarises our conclusions.

2 How can fiscal and monetary policy stabilise the business cycle?

This section discusses what is meant by business cycle stabilisation and defines the terms fiscal policy and monetary policy. We summarise the research literature on the theoretical and empirical effects of the instruments at the disposal of the government and the central bank. The section forms the basis for the reasoning later in the report – on how stabilisation policy has actually been pursued and how we should think about it going forward.

The account focuses on analyses that are relevant for Sweden – a small, open economy with a floating exchange rate. Under perfect capital mobility, the exchange rate regime is crucial for whether monetary policy and fiscal policy, respectively, are able to stabilise the economy. Under a fixed exchange rate, monetary policy must be used to stabilise the currency. Fiscal policy then becomes the only effective stabilisation policy instrument. However, according to different variants of the Mundell-Fleming model, with a floating exchange rate, monetary policy is usually seen as the most effective tool. An interest rate cut stimulates (interest rate increase slows down) the economy by having both a direct effect on demand and an indirect effect because the currency depreciates (appreciates), which increases (decreases) net exports. On the other hand, expansionary fiscal policy may become less effective under a floating exchange rate, because the central bank could respond with an interest rate increase that will lead to an appreciation in the exchange rate.[2]

[2] However, Corsetti et al. (2012) find that, under certain conditions, expansionary fiscal policy can lead to a real depreciation. We will return to the relationship between interest rates and

Our analysis begins with a discussion of *what* should be stabilised in Section 2.1. We discuss fiscal instruments and their effects in Section 2.2. Section 2.3 focuses on monetary policy.

2.1 What should be stabilised?

In any discussion of stabilisation policy, it is necessary to define what should be stabilised. The cyclical situation is usually assessed using different measures of resource utilisation, i.e., the extent to which production capacity is being utilised. This can be gauged in surveys sent to firms asking them about their capacity utilisation or by comparing actual and potential output, i.e., output in a normal cyclical situation. Estimating potential output is complicated but essential when assessing what constitutes a well-balanced stabilisation policy. Common ways of measuring potential output are to estimate it as a stable trend or as the output that would be obtained given an estimated production function if capital and labour were to be fully utilised. The level of unemployment is also an important indicator of resource utilisation.

According to established thinking, the most important reason why resource utilisation varies is that aggregate demand is not always in balance with potential output. If the demand for goods and services is less than potential output, a recession occurs, with unemployment and other factors of production being unutilised, along with low inflation. In the opposite situation there is overheating with high inflation. Stabilisation policy can counteract such cyclical fluctuations by stimulating demand if it is too low and dampening it if it is too high.

New Keynesian theory emphasises that rigid prices and wages are the reason why fluctuations in demand cause gaps between actual and potential output. According to this model framework, the latter term is the output that would result in the absence of price rigidities. The difference between actual and potential GDP is commonly referred to as the GDP gap. If all prices could be immediately adjusted to changing demand, the gap would always be zero. Under nominal price rigidity, output gaps arise. They are sometimes

exchange rates in Section 2.5 and to the relationship between fiscal policy and the neutral real interest rate in Section 5.1.

positive and sometimes negative. A central assumption is that some, but not all, firms can change their prices and wages at a given point in time. Thus, market prices do not reflect actual production costs and the scarcity of different goods. Resources are then not allocated optimally. These resource allocation problems get worse the higher the inflation rate, since prevailing prices then more poorly reflect production costs and aggregate demand. Inflation thus creates distortions that reduce overall productivity (see also Section 5.1.3).

An important result in the New Keynesian standard model is that a well-balanced policy that reduces demand-driven cyclical fluctuations stabilises *both* inflation *and* the output gap. The reason is that, if aggregate demand deviates from potential output, the output gap and inflation are affected in the same direction. A recession with falling output leads to lower inflation. Expansionary monetary or fiscal policy can then 'kill two birds with one stone' by increasing inflation as well as output. If instead demand is too high, production capacity is overutilised, which is not desirable per se, while inflation is rising. In this case too, both problems can be solved, but this time with a tightening of monetary or fiscal policy. This result is referred to in the literature as the *divine coincidence* (Blanchard and Galí 2007).

As mentioned above, estimates of potential output are normally based on the assumption that it follows a stable trend. Deviations from the trend indicate undesirable GDP gaps driven by fluctuations in demand. Although this is viewed as the normal case, it does not always apply. Sometimes output can suddenly change for reasons unrelated to demand. Examples are disruptions in international deliveries of input goods such as semiconductors, or, as was the case during the acute phase of the pandemic, that the government decides that certain economic activity should be temporarily restricted. Another example is price increases on energy of the kind that have occurred in connection with the war in Ukraine in 2022.

Such disruptions are usually referred to as supply shocks. Unlike demand shocks, these imply that output and inflation are affected in opposite directions. A negative supply shock causes output to fall while inflation rises. Firms that do not receive enough deliveries of semiconductors, or face increased energy costs, may need to reduce their output but lack incentive to lower their prices – quite the opposite. One commonly held view is that the divine coincidence

then does not apply: expansionary policy raises output but at the same time spurs inflation, leading to a conflict of objectives in stabilisation policy. According to New Keynesian economic theory, however, this conclusion is incorrect. A negative supply shock reduces the output that would have been obtained without price rigidities – potential output falls. If demand remains unchanged or falls by less, then the output gap is *positive*, which may justify a tightening of monetary policy.

A fall in output caused by demand being too low can in principle be remedied by expansionary policy that neutralises the shock. A supply shock cannot be handled in the same way. Shortages of components, higher energy costs or closed restaurants are not problems that can be solved by such policies. The theoretical conclusion that negative supply shocks can justify a tightening of policy is of practical significance. Poorly chosen stabilisation policy is not only ineffective but can be harmful. Such mistakes were probably important drivers of the policy failure that led to stagflation in the 1970s (see Section 5.4).

The real world is, of course, more complicated than the New Keynesian model. In particular, in addition to nominal price rigidities, there are many reasons why a GDP gap can arise. A temporary negative supply shock in one sector, such as a disruption in the supply of input goods, leads to a reduction in output. This can lead to redundancies and raise unemployment, resulting in costs for individuals as well as costs to society as a whole. If the redundant workers lose contact with the firms in which they were employed, unemployment may remain high for a long time.[3] This can have repercussions for the rest of the economy, which can affect output in sectors unaffected by the initial supply shock. An important task for stabilisation policy is to counter such feedback mechanisms. But general demand stimulation is a blunt instrument here. Normally, this makes monetary policy less appropriate than carefully-crafted fiscal policy measures, such as temporary support for short-time work. Supply shocks often impact some parts of the economy more

[3] A further complication is that, under certain assumptions, fiscal stimulus may have a direct effect on potential output. One potential mechanism is that higher domestic demand means higher domestic output prices relative to consumer prices (which include import prices) than would otherwise be the case. Employees who wish to achieve a certain *real consumption wage* (wage relative to the consumer price level) can therefore accept a lower *real product wage* (wage relative to the producer price level). This means higher equilibrium employment and thus higher potential output (see Bean 1994 and Lindblad 2010).

than others. This may justify the government acting as an insurer for particularly severely affected households and perhaps also firms. During the COVID-19 crisis, this was done on a large scale. But such initiatives should not be seen as stimulus policy motivated by low demand. Although it may be argued that, without these measures, demand could have fallen more than potential output, it was not in fact a matter of achieving the highest possible demand stimulus per tax krona spent.

Which policy is needed after a major supply shock depends to a large extent on whether it is permanent or temporary. A supply shock that temporarily lowers production in a particular industry may need to be countered by bridging policy that allows the industry to quickly return to its previous output once the supply shock has faded away. Support for short-time work, loans on generous terms or even direct support to firms may then be appropriate. However, if the supply shock is permanent, it is desirable that the affected industry slowly shrinks and that its production factors are transferred to other parts of the economy. Bridging policy is then harmful. Policy should instead be aimed at facilitating the necessary structural change. In real time, it can be difficult to assess whether or not a shock is permanent. There is a risk that one simply hopes for the best, without sufficient grounds, and assumes the shock is temporary. Support measures can then become counter-productive. This happened in Sweden during the oil crises in the 1970s.

Thus, the first line of defence against negative supply shocks is not stimulative policy. However, supply shocks often affect demand, in part directly through reduced income but also as a result of increased uncertainty. This increases saving and reduces investment. Stabilisation policy aimed at managing demand is therefore not necessarily irrelevant following a supply shock. However, a knee-jerk reaction that says that any drop in output can and should be countered by stimulative policy is dangerous.

Potential output is usually estimated, using more or less advanced methods, as normal output. These assessments are thus likely to contribute to the misinterpretation of declines in output caused by supply shocks and are often seen as a rationale for excessively expansionary policy. During the COVID-19 crisis, both the National Institute of Economic Research and the government assessed that the GDP gap was strongly negative because output was

lower than under normal circumstances. But potential output also fell sharply. As stated above, the GDP gap is the difference between actual and potential output. If a drop in potential output is underestimated, the measured GDP gap will therefore be more negative than the actual gap. It cannot be ruled out that potential output fell as much as actual output during the COVID-19 crisis. If that were the case, the GDP gap would have remained unchanged despite the large fall in GDP.

Furthermore, it is possible that positive supply shocks – greater supply of labour and productivity increases due to offshoring and digitalisation – that increased potential GDP may have resulted in the output gap being overestimated for several years prior to the COVID-19 crisis: the difficulties in achieving the inflation target at that time may be indicative of this (see also Sections 4.2 and 4.3).[4] One should not expect the methods used to estimate potential output to completely remedy such problems. It is therefore important that, in situations with significant supply shocks, the responsible authorities emphasise the shortcomings of the methods used to estimate GDP gaps.

It is also important to distinguish between the possibilities for various measures to stabilise normal cyclical fluctuations and the demands posed in deep crises. Specifically, we distinguish between: (i) *normal times* with moderate cyclical fluctuations, when monetary policy can consist of changes in the policy rate; (ii) periods when monetary policy is limited by the *effective lower bound* on interest rates; and (iii) *crises* with major shocks posing threats to financial stability.

2.2 Fiscal policy

Fiscal policy refers to policy that changes government expenditure or revenue. In addition to stabilising the business cycle, fiscal policy also has other objectives such as to contribute to an efficient resource allocation, to reduce income inequality, and to achieve

[4] Jonsson and Theobald (2019) report model calculations which indicate that supply shocks in Sweden, in the form of weaker bargaining power for workers (which they attribute to lower levels of trade union membership and a higher proportion of fixed-term jobs), but also higher labour-market participation and lower replacement rates in unemployment insurance (after tax), may have contributed to both lower inflation and lower real wage increases.

environmental goals and climate targets. These other goals are beyond the scope of our analysis. However, as we noted above, it is not possible to completely disentangle the different aims of fiscal policy. For example, fiscal policy motivated by stabilisation policy considerations could delay necessary structural change. Similarly, fiscal policy motivated by structural factors can have stabilisation policy consequences. The fact that fiscal policy must contribute to the long-term sustainability of public finances is another important aspect.

In analyses of long-term fiscal sustainability, the starting point is the government's *dynamic budget constraint*. It describes how government expenditure can be financed by tax revenue or by borrowing (see Section 2.1).[5] The budget constraint can be expressed in terms of the change in the *debt ratio*, that is, the debt as a share of GDP. Long-term sustainable public finances presumes that the government's debt ratio does not keep increasing indefinitely. We return to this issue in Sections 3.1.1 and Box 3.2.

A distinction is usually made between two types of fiscal policy: (i) discretionary policy involving active decisions on tax rates and government expenditure; and (ii) automatic stabilisers, which affect government net lending (the difference between revenue and expenditure) over the business cycle, since tax revenue and some types of expenditure depend on the level of economic activity.

Box 2.1 The government's dynamic budget constraint

If we disregard the central bank and consider the rest of the government in isolation, its dynamic budget constraint can be written as

$$D_{t+1} - D_t + T_t = i_t^D D_t + G_t, \qquad (2.1)$$

where D is government debt, T is tax revenue, i^D the nominal interest rate on government debt, and G is government expenditure excluding interest (primary expenditure). Subindex t indicates time. The left-hand side of (2.1) displays different ways for the government to finance the expenditure on the right-hand side.

[5] We disregard the role of the central bank in this section but return to it in Section 2.3 and in Box 2.6.

The dynamic budget constraint can also be formulated in terms of primary and total net lending:

$$D_{t+1} - D_t = i_t^D D_t - (T_t - G_t) = i_t^D D_t - S_t = -F_t, \qquad (2.2)$$

where $S_t = T_t - G_t$ is government primary net lending, i.e., the difference between revenue and expenditure excluding interest payments; and $F_t = S_t - i_t^D D_t$ is government (total) net lending, i.e. the difference between all revenue and expenditure. Equation (2.2) states that net lending in period *t* is equal to the reduction in the debt between periods t and $t + 1$.

To express the variables in equation (2.2) as shares of nominal GDP, we divide by $P_t Y_t$, where P_t is the price level and Y_t is real GDP. We also take advantage of the fact that if nominal GDP grows at a rate $\rho_t \approx \pi_t + \gamma_t$, where π is the rate of inflation and γ is the rate of growth for real GDP, then $P_{t+1}Y_{t+1} = (1 + \rho_t)P_t Y_t = (1 + \pi_t)(1 + \gamma_t)P_t Y_t$ applies. This yields:

$$d_{t+1}(1 + \rho_t) - d_t = i_t^D d_t - s_t = -f_t, \qquad (2.3)$$

where lower-case letters refer to variables as shares of GDP, i.e. $d_t = D_t/P_t Y_t, d_{t+1} = D_{t+1}/P_{t+1}Y_{t+1}$ and $f_t = F_t/P_t Y_t$. The equation states that the difference between the debt ratio in period *t+1*, multiplied by 1 + the growth rate in period *t*, and the debt ratio in period *t* is equal to net borrowing as a share of GDP in period *t*. This relationship is central to the long-term development of the debt ratio and will play an important role in Section 3.1 (in particular, Box 3.2).

2.2.1 Discretionary fiscal policy

Discretionary fiscal policy measures may aim to affect demand in the economy. Under certain assumptions, however, attempts to stimulate the economy through debt-financed tax cuts will have no effect. If individuals are forward-looking and understand the government's intertemporal budget constraint, they will realise that lower taxes or larger transfers today must be financed by tax in-

creases or reductions in transfers in the future.[6] An increase in public consumption means that tax increases are to be expected in the future. Households therefore reduce their consumption. This mechanism reduces the effect of discretionary fiscal policy on aggregate demand and can even completely neutralise it. The latter case is known as *Ricardian equivalence*.

Ricardian equivalence is based on a number of stylised assumptions such as individuals having an infinite planning horizon, that they understand both their own and the government's intertemporal budget constraints, and that their ability to borrow, and thus freely choose how they want to allocate their consumption over time, is unlimited. Reality differs from this picture in many ways. Therefore, fiscal policy has a greater impact than the Ricardian assumptions would suggest. These should be seen as an analytical benchmark that can serve as a starting point for more realistic analysis of fiscal policy. Ricardian effects exist but are not equally strong everywhere in the economy. They are weaker for liquidity-constrained households and firms that live *hand-to-mouth*. Measures affecting the disposable income of such hand-to-mouth consumers can therefore be expected to have greater effects on demand than measures targeting agents with significant financial assets or strong borrowing prospects.

Effects of changes in public consumption

According to the traditional Keynesian view, higher public consumption not only has a direct effect on aggregate demand, but also a multiplier effect, because the increase in demand boosts incomes in the economy, which in turn increases consumption and thus demand even more, and so on. Higher public consumption also affects GDP in neoclassical models but for different reasons. There, a negative income effect is obtained, which increases GDP. The reason is that if, for instance, the increase in public consumption is funded by an increase in the income tax, households' disposable

[6] We obtain the government's intertemporal budget constraint by repeatedly applying the dynamic budget constraint (2.1) over an infinite time horizon. The intertemporal budget constraint contains the present discounted value of future items and captures the relationship between outstanding debt and future primary revenue and expenditure that results from the dynamic budget constraint being met in each period.

incomes will decrease and cause them to increase their supply of labour, thereby leading to higher GDP.

An extensive body of empirical research estimates *fiscal multipliers*. These are generally defined as the ratios between the change in GDP and the change in public consumption or in the tax revenue that caused the change. The literature is difficult to summarise because there are different ways of estimating multipliers and the effects of a given measure depend on a large number of country- and time-specific factors such as the exchange rate regime, the cyclical situation, and how the measure is funded. Moreover, a correlation between a fiscal measure and GDP does not necessarily reflect a causal link from fiscal policy to GDP, but may also depend on changes in GDP affecting policy. This problem can be handled more or less convincingly, which gives rise to different results in terms of the size of the fiscal multipliers (Caldara and Kamps 2017). The research also estimates multipliers over different horizons, and it is common to distinguish between *impact*, *peak* and *cumulative multipliers*.

Ramey (2019) summarises the literature and notes that cumulative fiscal multipliers for public consumption appear to lie in the range of 0.6–1 for industrialised countries. However, she notes that the results are due to country-specific factors and to the interaction with monetary policy for example. Hjelm and Stockhammar (2016) estimate structural VAR models using Swedish quarterly data for the period 1980–2015 and find (i) that higher government expenditure (or lower taxes) increase GDP in the short term, which is interpreted as evidence of Keynesian effects; (ii) no evidence of business cycle-specific effects of fiscal policy on GDP; and (iii) slightly stronger effects of fiscal policy for Sweden than in the international research literature.[7,8] Ankargren and Shahnazarian (2019) report an average multiplier for public consumption of 1.3 during the period 1997–2018.

The size of the fiscal multipliers depends on how they affect the interest rate level. Expansionary fiscal policy that increases resource utilisation normally means higher inflation and thus leads to the central bank raising interest rates. This reduces demand. Therefore,

[7] The acronym VAR stands for Vector Autoregression. VAR models assume that a number of endogenous variables affect each other in a complex way. By estimating such models, one can study the effects over time of various shocks.
[8] However, Blinder (2016) reports large multipliers for the US.

one should expect public consumption to have a larger multiplier effect when the economy is at its effective lower bound on interest rates (see Section 5.1). Erceg and Lindé (2014) estimate a New Keynesian model and find support for this. Eggertsson (2006), Werning (2011), and Corsetti and Müller (2015) find the same in numerical examples in general equilibrium models. If fiscal multipliers are sufficiently large in such situations, an increase in government expenditure may be self-funded. Ramey (2019), Almerud and Laun (2021), and the National Institute of Economic Research (2021) also note that fiscal multipliers are likely to be large when the interest rate is zero or negative.

Almerud and Laun (2021) calculate fiscal multipliers using the National Institute of Economic Research's calibrated general equilibrium model SELMA, and find that the multipliers are larger for public consumption and public investment than for taxes. According to their analysis, the former multipliers are above 1 over one-year and two-year horizons. They find, as per textbook theory, that the multipliers are larger if a fiscal change is not met by an interest rate response, for example because the rate is at its effective lower bound.

Effects of changes in taxes and transfers

Ramey (2019) notes that the size of the fiscal multipliers for taxes depends to a large extent on the approach used. Time series studies generally find large, negative multipliers for tax changes in the range of -2 to -3. These estimates are surprisingly similar across countries and also stable across different estimation methods. Based on the results in the time series literature, it thus seems likely that tax changes have a greater impact on the level of activity than changes in public consumption.[9] However, estimates in calibrated New Keynesian models find smaller multipliers for taxes than for public consumption, so the conclusions differ depending on the choice of method.

[9] Ramey (2019) also notes important differences between multipliers for public consumption and for taxes in terms of how they vary over time. The effect of a change in public consumption is relatively stable over time, so the difference between average and peak multipliers is small. For taxes, however, the multipliers tend to rise over time. It is therefore standard practice to calculate cumulative tax multipliers over the period from when the tax change occurred until the point that the effect is at its peak.

Studies of Sweden generally seem to find larger multipliers for public investment and public consumption than for taxes (Hjelm and Stockhammar 2016; Fiscal Policy Council 2018, 2020; National Institute of Economic Research 2021). This is in line with textbook Keynesian models, according to which the effects of tax cuts in the first round are diminished by a share of them being saved.

Tax cuts have the biggest effects on demand if they target households with limited access to borrowing – hand-to-mouth consumers. This group would like to consume more today if they could allocate their consumption optimally over the lifecycle by borrowing. Their current consumption is limited by their income. Therefore, households that are liquidity-constrained have a higher marginal propensity to consume than households that are not. Larger transfers to low-income groups, for example in the form of higher housing allowances or more generous student aid, is an alternative to tax cuts if the objective is to stimulate consumption in these groups. A commonly held view has been that it is primarily low-income households that are liquidity-constrained. However, recent research has shown that even wealthier households are often liquidity-constrained because a large part of their assets is tied up in real estate and therefore illiquid (Kaplan et al. 2014). These wealthy hand-to-mouth consumers are also discussed in Section 2.3.6.

More generous unemployment benefits can also be an effective way of increasing aggregate demand, as the unemployed are likely to be liquidity-constrained. Kekre (2021) investigates the significance of longer maximum benefit periods in deep recessions in a model of the US economy. With perfectly flexible prices, a longer benefit period would reduce output and employment due to the effects on job search activity and wage formation. With nominal price rigidity, the effect would be close to zero if the central bank follows a *Taylor rule* (see Box 2.3). However, in a recession, when the central bank does not change the nominal interest rate – for example because the interest rate is at the effective lower bound – the net effect on output and employment will be strongly positive. This is not only due to an increase in income for the unemployed with a high marginal propensity to consume, but also to the fact that extended benefit periods reduce the incentive for precautionary saving among the employed.

Another tax change that raises households' purchasing power is a reduction in the value-added tax (VAT). For example, lower VAT on food, which constitutes a larger share of expenditure for low-income households than for high-income ones, may be an option if one wants to focus specifically on groups with a high marginal propensity to consume. However, research shows that transfers to these groups are probably more effective (Fiscal Policy Council 2011). A *temporary* reduction in VAT gives households an incentive to reallocate their consumption over time, so that it rises during the period when VAT is reduced and decreases both before and after that period. The effects of such a measure on demand for consumer durables can be very significant.[10]

A lower payroll tax is another possible stimulus measure. It makes it cheaper for firms to employ workers. The measure stimulates both supply and demand, and should in theory increase GDP but has an ambiguous effect on the GDP gap. However, in the calibrated New Keynesian macro model reported in Almerud and Laun (2021), the effects of lower payroll taxes on GDP are negligible. Korkeamäki and Uusitalo (2009) are unable to identify any effect on employment of a temporary regional reduction in payroll taxes in Finland. One possible explanation is that many employers are reluctant to increase employment if the payroll tax reduction is only temporary. If that is the case, such reductions are less appropriate as stabilisation policy tools. Whether permanent reductions in payroll taxes are suitable for achieving structural objectives such as higher equilibrium employment and higher potential GDP is another matter.

2.2.2 Automatic stabilisers

Fiscal policy not only operates through active decisions but also through the automatic adjustments in tax revenue and certain government expenditure that occur when the level of economic activity fluctuates. These *automatic stabilisers* help to smooth the business cycle. Their size is not the result of stabilisation policy considerations, but rather indirect consequences of other trade-offs

[10] A temporary reduction in VAT gives rise to intertemporal substitution effects similar to those of an interest rate cut (Assarsson 1993). See Box 2.4 on the Euler equation.

such as between, on one hand, certain public consumption and income equalisation targets and, on the other hand, the social efficiency losses resulting from taxation.

The budget elasticity

The standard way of measuring the strength of the automatic stabilisers is through the *budget elasticity*. It specifies by how many percentage points general government net lending changes as a share of GDP when the GDP gap increases by one percentage point. If one makes the simplifying assumptions that tax revenue is proportional to GDP, but all government expenditure is independent of GDP, the budget elasticity equals government expenditure's share of GDP.[11]

In more precise calculations, one estimates how revenue from different taxes varies with the business cycle. These calculations take into account how different tax bases vary with the GDP gap, how different tax revenues vary with these tax bases, and how important different tax bases are. In addition, one usually takes into account that expenditure for unemployment benefits varies over the business cycle.[12] However, government expenditure's share of GDP has proved to be a good approximation of the budget elasticity when compared to more precise calculations for various countries (see for example Fiscal Policy Council 2011).

Flodén (2009) calculates the size of the automatic stabilisers in the period 1998–2009 for Sweden. The analysis distinguishes between personal income taxes, social security contributions, corporate taxes and indirect taxes (on consumption). According to the study, the budget elasticity fell from around 0.6 in 1998 to around 0.5 in 2009. Almenberg and Sigonius (2021) replicate Flodén's study for the period 1998–2019. In their baseline calculation, the elasticity is 0.47 in 2019 compared to 0.55 in 1998. The fall occurs mainly during the period investigated by Flodén. This is mainly explained by the fact that personal income taxes and expenditure on unemployment benefits decreased as shares of GDP.

[11] See equation (2.5) in Box 2.2.
[12] See equation (2.6) in Box 2.2.

However, the former effect has been partly counteracted by the fact that the income tax has become more progressive.[13]

Semi-automatic stabilisers are also sometimes discussed. These are budget items that can only be changed by active decisions, but that are characterised by policy makers being prepared to change them depending on the cyclical situation, and where such changes are also made regularly. The most obvious example is expenditure on active labour market programmes. These are included in alternative calculations by Flodén as well as by Almenberg and Sigonius. According to Flodén, the budget elasticity is then about 0.1 higher than in the baseline calculation. Almenberg and Sigonius, however, find that the elasticity is only marginally affected because expenditure on labour market programmes appears to have been mainly determined by factors other than the cyclical situation.

Box 2.2 The budget elasticity

General government net lending, F, as a share of GDP, Y, can be written as

$$\frac{F}{Y} = \frac{T(Y)}{Y} - \frac{G(Y)}{Y},$$

where T is tax revenue and G is general government expenditure including net interest payments.[14] Differentiating with respect to, and dividing by, Y gives the following expression for the *budget elasticity*, which measures the change in general government net lending as a percentage of GDP when GDP increases by 1 per cent:

$$\frac{d(F/Y)}{dY/Y} = T'(Y) - \frac{T(Y)}{Y} - G'(Y) + \frac{G}{Y}. \qquad (2.4)$$

If $T(Y) = tY$ and $G'(Y) = 0$, we get

[13] Equation (2.4) in Box 2.2 shows that the budget elasticity depends positively on $T'(Y) - T/Y$, i.e., on the difference between the marginal tax rate and the average tax rate. During the period studied, reductions in marginal tax rates on personal income were smaller than reductions in average tax rates, i.e., progressivity increased.

[14] In Sweden, net interest income amounts to about 1 per cent of GDP and is therefore of little importance. In Box 2.1, we distinguish between primary net lending and (total) net lending by explicitly taking into account interest payments on outstanding government debt. We do not make such a distinction here.

$$\frac{d(F/Y)}{dY/Y} = \frac{G}{Y}. \tag{2.5}$$

In this case, the budget elasticity is equal to general government expenditure's share of GDP. The relative change in GDP is approximately equal to the change in the GDP gap, since

$$d\left(\frac{Y - Y^*}{Y^*}\right) = \frac{dY}{Y^*} \approx \frac{dY}{Y},$$

if $Y \approx Y^*$, where Y^* is potential GDP. This means that the budget elasticity also gives the approximate change in net lending as a percentage of GDP when the GDP gap increases by 1 percentage point of potential GDP.

When taking into account different taxes and tax bases, the following formula is typically used:

$$\frac{d(F/Y)}{dY/Y} = \sum\nolimits_i \epsilon_i \left(\frac{T_i}{Y}\right) - \epsilon_Y^G \left(\frac{G}{Y}\right), \tag{2.6}$$

where ϵ_i is the elasticity between tax revenue from tax base i and this tax base and ϵ_Y^G the elasticity between general government expenditure and GDP. The budget elasticity is then calculated as a weighted sum of the elasticities of the tax revenues from different tax bases in relation to these tax bases, the weights being the different tax revenues' shares of GDP, minus general government expenditure's elasticity with respect to GDP, weighted by general government expenditure's share of GDP. It is straightforward to show that (2.6) is consistent with (2.5) if GDP is the only tax base, $T(Y) = tY$, $G'(Y) = 0$ and $F = 0$.

General government net lending can be decomposed into central government and local governments' net lending:

$$\frac{F}{Y} = t - \frac{G}{Y} = \left(t^K + \frac{B}{Y} - \frac{G^K}{Y}\right) + \left(t^S - \frac{B}{Y} - \frac{G^S}{Y}\right),$$

where t^K is the local government proportional tax rate, t^S is the central government proportional tax rate, B is central government

grants to local governments, G^K is local government expenditure and G^S is central government expenditure, excluding central government grants to local governments. As the balanced-budget requirement for local governments implies that $t^K + B/Y - G^K/Y = 0$, we have $F/Y = t^S - B/Y - G^S/Y$.

Differentiating with respect to, and dividing by, Y then gives

$$\frac{d(F/Y)}{dY/Y} = \frac{(B + G^S)}{Y}. \qquad (2.7)$$

In this case, the budget elasticity is thus equal to the central government expenditure's share of GDP.

The balanced-budget requirement for local governments

The calculations described are based on the assumption that local government expenditure is not affected by the business cycle. This is a questionable assumption, however, because it does not take into account the requirement for local governments to run a balanced budget. Under this requirement, municipalities and regions must budget for revenue exceeding costs. If a deficit nevertheless arises, it must be compensated for within a three-year period. This can mean that local government expenditure needs to be adjusted when tax revenue is lower in a recession. If this requirement is taken into account, the automatic stabilisers will be weaker than in the calculations above.

Assume that the balanced-budget requirement for local governments is binding and that expenditure therefore has to be adjusted when tax revenues fall in a recession. How this will change the calculation of the strength of the automatic stabilisers can be roughly estimated by assuming that all taxes are proportional to GDP and that other public sector (central government) expenditure is unaffected. The budget elasticity is then equal to the sum of central government grants to local governments and general government expenditure excluding local government expenditure, both measured as shares of GDP.[15] In 2019 (the last year before the

[15] See equation (2.7) in Box 2.2.

pandemic), total consolidated government expenditure amounted to 48.0 per cent of GDP, local government expenditure to 23.6 per cent of GDP, and central government grants to 4.1 per cent of GDP. With these assumptions, the budget elasticity will be $0.480 - 0.236 + 0.041 \approx 0.29$. This number should be compared to the elasticity of 0.48 that would apply if local government expenditure were not affected by the business cycle.

The calculation above is rough. In addition, the balanced-budget requirement applies to local governments' *net revenue* (revenue less *costs* including depreciation of investments) and not to their net lending (revenue less *expenditure*). Net revenue and net lending can develop differentially, especially over shorter periods. Moreover, due to the requirement to sustain a "sound economy", local governments are normally assumed to run a surplus (a common objective is 2 per cent of central government general grants and tax revenue,[16] which corresponds to approximately 0.5 per cent of GDP). Finally, since 2013, municipalities and regions have been able to build up local rainy-day funds (*resultatutjämningsreserver*), which can be utilised in a recession. In 2021, these amounted to around 0.7 per cent of GDP. They are unevenly distributed: the majority (3/4) are found in the municipalities and only 1/4 in the regions (Regeringen 2022). Around 30 per cent of municipalities and 45 per cent of regions have not set aside rainy-day funds and are also those with the weakest net revenue (and therefore those for which the balanced-budget requirement is likely to bind). Thus, many local governments are likely to act pro-cyclically, at least in deep recessions, unless discretionary decisions ensure that central government grants vary counter-cyclically.[17] From a stabilisation-policy perspective, this can be problematic.

A reasonable assessment is that Almenberg and Sigonius's estimate of a budget elasticity just under 0.5 is only a small over-estimation in the case of moderate recessions, but that the elasticity in the case of major negative shocks can be in the range of 0.3–0.4, and closer to the lower bound the bigger they are.

[16] Regeringen (2018).
[17] A similar assessment was made by *Utredningen om en effektiv ekonomistyrning i kommuner och regioner* (2021) (Inquiry into effective financial management in municipalities and regions).

Support for short-time work

An assessment of the automatic stabilisers should also take into account the support systems for short-term work. These aim to prevent lay-offs by allowing for working-time reductions and having the government, the employer, and the employee share the costs between them. Such a system was introduced in 2014. It can only be used in an exceptionally deep recession. This support can be characterised as a semi-automatic stabiliser, since a system is already in place, but a discretionary government decision is required to activate it. This decision can only be made after the National Institute of Economic Research has assessed that the economy is in an exceptionally deep recession.

In 2020, a system was also introduced that is to be in permanent use. Access to support under this scheme is a *right* for employers "who have been affected by temporary and severe financial difficulties caused by circumstances beyond the employer's control and which could not reasonably have been foreseen or avoided" (Regeringen 2021a). The new system therefore constitutes an automatic stabiliser. It was used during the 2020–21 pandemic (when it was also made more generous through active decisions). To the extent that support for short-time work keeps unemployment low, the importance of unemployment insurance as an automatic stabiliser decreases.

So far, no calculations have been made to gauge the impact of the support systems for short-term work on the overall budget elasticity. However, it is clear that they operate asymmetrically over the business cycle. Support under the new system goes to firms that meet the criteria even in a normal business cycle. But since these firms are relatively few, the potential for reducing the support in a boom is much smaller than the potential for increasing it in a recession.

Effects on activity

The budget elasticity is silent on to what extent the automatic stabilisers affect economic activity. Just as multiplier effects differ across various discretionary measures, the effect on resource utilisation depends on which automatic stabiliser is being

considered. Assessing these effects requires a comparison of how the economy adjusts to different disturbances in two states: with and without the stabilisers. No such analyses exist for the Swedish economy.

Estimates of the budget elasticity as a measure of the strength of the automatic stabilisers are most in line with traditional Keynesian mechanisms for how households' consumption is determined by their real disposable incomes. But the term 'automatic stabilisers' should really be given a broader definition that encompasses all mechanisms emanating from the systems for taxation and government expenditure that counteract economically inefficient fluctuations in economic activity. These may include systems that reallocate labour supply from one time period to another (such intertemporal substitution occurs if a progressive income tax means a lower marginal tax in recessions than in booms). Other mechanisms include unemployment insurance redistributing income from households with a low to a high marginal propensity to consume, and reducing precautionary saving in recessions (Auerbach 2019).

Using a dynamic stochastic general equilibrium model (a DSGE model) with heterogeneous forward-looking agents and nominal price rigidities, McKay and Reis (2016) analyse the extent to which the automatic stabilisers in the US economy reduce fluctuations in output and employment.[18] According to their model, changes in the tax ratio and in tax progressivity would have little effect on cyclical fluctuations, while the effects of changes in unemployment benefits and other social benefits would be greater. The most important mechanisms of unemployment insurance stem from the redistribution of income between rich and poor households, and precautionary saving. The analysis leads to the surprising conclusion that the effects on aggregate real disposable incomes are of little importance, and that whether or not net lending varies over the business cycle plays no great role in stabilising activity.

In a similar model to the above, McKay and Reis (2021) study the optimal strength of the automatic stabilisers. For example, the

[18] DSGE models are modern general equilibrium models with microeconomic foundations. The models are based on households maximising utility and firms maximising profit. They are dynamic in that they describe how the economy develops over time. Furthermore, they are based on assumptions that certain variables behave stochastically, so that the models can shed light on how the economy is affected by various disturbances in general equilibrium.

optimum level of unemployment benefits is analysed. According to Baily (1978) and Chetty (2006), the benefit level should be chosen so that a further increase exactly balances the net gain in higher consumption for the unemployed against the net loss from lower consumption for the employed as a result of the higher tax they have to pay, because unemployment increases when the unemployed have less incentive to get a job. McKay and Reis conclude that in a model with nominal price rigidities, one should also take into account how unemployment benefits are affecting the level of activity. The benefit rate should be set higher than according to the Baily-Chetty formula if a given benefit rate stimulates activity through aggregate demand more in a recession (when the level of activity is inefficiently low) than in a boom (when the level of activity is too high). There are reasons to believe that this is the case. One reason is that more people are unemployed in a recession, which means more redistribution to this group. Another reason is that higher unemployment benefits mean greater insurance coverage in the event of unemployment, which makes the employed less prone to precautionary saving in a recession. According to McKay and Reis, the macroeconomic stimulus effect plays a major role for the optimal benefit rate: for the US economy, it rises from 36 to 49 per cent.

Support for short-time work can have large effects on employment. According to the National Institute of Economic Research (2020), unemployment in Sweden in the spring of 2020, when the economy was heavily impacted by the pandemic, was 9 per cent, while the share of short-time workers (workers who had taken a cut in hours) constituted about 3.5 per cent of the labour force. It is difficult to know how many of these workers would otherwise have been unemployed. On the one hand, firms would probably not have laid off all short-time workers in the absence of support for them. On the other hand, aggregate demand would have fallen more without the support (firm profits as well as households' disposable incomes would have decreased more, and precautionary saving would have been greater). However, the large volume of short-time work indicates that it was of great importance.

2.2.3 Distributional effects of fiscal policy

Fiscal policy can have both intragenerational and intergenerational distributional effects. The intragenerational effects depend on the instruments used and how they target different groups. These effects of stabilisation policy measures can be assumed to be small if instruments are used symmetrically over the business cycle, but this is probably not the case. Fiscal expansions often seem to be given a different redistributive policy profile compared with fiscal tightenings, with a stronger focus on low-income groups, and therefore can be assumed to have an income-equalising effect.

Fiscal stabilisation-policy measures that mean budget deficits and higher government debt have intergenerational distributional effects to the extent that future generations must pay for the debt accumulated today.[19] Thus, there can be an intergenerational equity aspect to debt-financed fiscal policy, where a difficult question is how to weigh the welfare of today's generation relative to that of future generations. The intergenerational conflict of interest that arises depends on the relationship between the interest on government debt and output growth. This is discussed in Section 3.1.1.

In addition to the intergenerational distributional aspects of government indebtedness discussed above, there are a number of problems related to the risk that the government might default on its payments and the financial instability that would ensue. We will return to this in Section 3.2.3.

2.3 Monetary policy

Defining monetary policy is less straightforward than defining fiscal policy. The *Riksbank* notes that "The aim of monetary policy is to ensure that money retains its value over time, something central banks normally try to achieve by influencing the cost and availability of money in the economy".[20] According to this view, all measures affecting the value of money are thus monetary policy. A more

[19] To amortise or pay interest on existing debt, taxes may need to be raised in the future, resulting in social efficiency losses. According to Barro (1974), income taxes should be kept as constant as possible in order to minimise the distortions that they cause. This is called *tax smoothing*. In addition, deficits can crowd out public investment that could benefit future generations.

[20] https://www.riksbank.se/sv/penningpolitik/vad-ar-penningpolitik/.

practical definition is that monetary policy consists of all measures that are within the mandate of central banks. Since it is what central banks can actually do that is relevant to our discussion, we choose this broader definition.

In principle, central banks in all advanced economies are tasked with maintaining price stability and a well-functioning payment system. The central bank may also have more or less explicit objectives related to financial stability and business cycle stabilisation. In recent decades, there has been a global trend towards more transparent monetary policy frameworks that are thought to be conducive to targets being met.

In standard theoretical models, monetary policy is assumed to have only short-run effects on the real economy. In the long run, only the price level is affected. This means that *neutrality of money* prevails. Exactly what is meant here by 'long run' cannot be stated with any precision. According to the empirical models used by central banks around the world, monetary policy has real effects that last for many years. But it is not possible to rule out even longer-lasting effects. These can arise, for example, when there are strong persistence effects on employment. It is conceivable that periods of high unemployment due to low aggregate demand could increase equilibrium unemployment through various mechanisms: exclusion of unemployed from the labour market, losses of human capital from unemployment, discouraged-worker effects on the job-search activity of the unemployed, and a reduction in the number of insiders, whose employment trade unions are concerned with in wage formation. To the extent that monetary policy counteracts such effects, it can have long-term effects on employment and output. Similarly, monetary policy that keeps demand and employment high over a longer period may possibly increase equilibrium employment.[21]

The effects of monetary policy on aggregate demand are less direct than those of fiscal policy as they work via financial markets (Bartsch et al. 2020). These effects have been amplified over time as financial development has increased (Boivin et al. 2011). This has made expectations of how monetary policy will be conducted in the future more important. Influencing expectations has therefore become an increasingly important tool for central banks. For a long

[21] See for example Svensson (2014a), Holden (2017), Galí (2020a) and Calmfors (2020a).

time, their main instrument was the policy interest rate, but in recent years they have resorted to what is commonly referred to as unconventional monetary policy: *negative interest rate policy*, *forward guidance* and *quantitative easing*.

2.3.1 The policy rate

Under a floating exchange rate and in normal times, the policy rate (previously known as the repo rate in Sweden) is the central bank's most important instrument. This interest rate determines the interest rates on loans between the commercial banks and the central bank (see also Box 2.6) and the overnight interest rate, which is the one paid by banks when they borrow money from one another from one day to the next (in the interbank market). The overnight interest rate in turn affects the commercial banks' interest rates in relation to their customer households and firms, and thereby the level of activity through different channels, to which we will return below. According to these channels, a sufficiently high interest rate will tighten the economy while a sufficiently low interest rate will stimulate it. This suggests that there must be an interest rate level that neither stimulates nor tightens the economy. This is known as the *neutral interest rate* or *natural rate of interest*, and can be defined both in real and nominal terms. An important and relatively well-founded assumption is that the neutral real interest rate is determined by factors that are beyond the control of central banks (see Sections 3.1.4 and 5.1).

A simple way of modelling how central banks set interest rates is through the *Taylor rule*. It is a *reaction function* that describes how the central bank reacts to the state of the economy (see Box 2.3). Equation (2.8) in Box 2.3 shows how the central bank sets the policy rate as a response to inflation's deviation from a target level, and to the GDP gap. If the GDP gap is zero and the inflation target is met, the central bank sets the policy rate equal to the neutral interest rate.

This section discusses the effects of changes in the policy rate on economic activity and inflation via various transmission

mechanisms: (i) *the interest rate channel*; (ii) *the cash flow channel*; (iii) *the present value channel* and (iv) *the exchange rate channel*.[22, 23]

Box 2.3 The Taylor rule

According to the Taylor rule, the central bank sets the policy rate based on inflation's deviation from an inflation target, and on the GDP gap (see for example Taylor 1993, Svensson 2003, and Flodén et al. 2012). The rule is often written as:

$$i_t = r_t^* + \pi_t + \lambda_\pi(\pi_t - \pi^*) + \lambda_y(y_t - y_t^*), \quad (2.8)$$

where i is the central bank's (nominal) policy rate, r^* is the neutral real interest rate, π is inflation, π^* is the inflation target, y is the natural logarithm of GDP and y^* is the natural logarithm of potential GDP. The parameters λ_π and λ_y capture the importance that the central bank attaches to price stability and to a stable level of activity, respectively. The Taylor rule says that if inflation is at its target level and the GDP gap is zero, the nominal policy rate should be equal to the neutral real rate plus the inflation target.

Taylor (1993) originally assumed that $\lambda_\pi = 0.5$ and $\lambda_y = 0.5$. The first assumption implies that, if inflation rises, the central bank will increase the policy rate even more than the rise in inflation. The real rate will increase, which reduces the GDP gap and thus inflation. This is called the *Taylor principle*. Differentiating the policy rate according to the Taylor rule (2.8) with respect to inflation gives:

$$\frac{\partial i_t}{\partial \pi_t} = 1 + \lambda_\pi > 1.$$

Because $r_t = i_t - \pi_t$ we obtain:

[22] There are several ways of classifying transmission mechanisms. Boivin et al. (2011) distinguish between neoclassical mechanisms, which are based on an assumption of perfect financial markets, and non-neoclassical mechanisms, which arise when there are imperfections in these markets. In the research on heterogeneous agents, a distinction is made between direct and indirect effects of monetary policy depending on whether they affect households' disposable incomes (see Section 2.3.6).

[23] In addition to these channels, which all operate via demand, there is also a cost channel. It captures that a change in interest rates affects the costs of firms. Since it is likely that the deflationary effects on demand of an interest rate hike will dominate this cost effect (Hopkins et al. 2009), we focus on the former.

$$\frac{\partial r_t}{\partial \pi_t} = \frac{\partial i_t}{\partial \pi_t} - 1 = 1 + \lambda_\pi - 1 = \lambda_\pi > 0.$$

The Taylor rule is often used to describe how the central bank sets the policy rate in theoretical analyses. Many different specifications have been proposed. In some models, the policy rate in the current period also depends on the policy rate in the previous period to achieve *interest rate smoothing*.[24] In New Keynesian models, the Taylor rule is often forward-looking, that is, the policy rate is assumed to react to expected future deviations from the inflation target and the expected future GDP gap. This is also a realistic description of how most central banks respond, as they are aware that interest rate changes affect resource utilisation and inflation with a time lag of 1–2 years.

The interest rate channel

The policy rate has an effect on other nominal interest rates in the economy, since it determines commercial banks' interest income from depositing funds in the central bank and the costs of borrowing from there. It is the real interest rate, i.e., the nominal interest rate minus (expected) inflation, that governs decisions by households and firms on how to allocate their expenditure over time if there are no liquidity constraints (see the discussion of the cash flow channel below). Because nominal wages and prices are sticky, in the short run inflation is not affected by changes in the nominal interest rate. Therefore, such changes affect the real interest rate, which is assumed to affect households' consumption paths over time (see Box 2.4). If the interest rate rises, it will be more advantageous for households to save and less advantageous to borrow, which reduces private consumption and aggregate demand. As private consumption is the largest component of GDP, this transmission mechanism, at least in theory, is potentially very important.

The interest rate channel thus operates through *intertemporal substitution*: households are given an incentive to reallocate their consumption over time. Attanasio and Weber (2010) discuss empirical support for this under various assumptions about, for

[24] See, for instance, Söderström et al. (2005).

example, utility functions and market conditions. However, Boivin et al. (2011) and Kaplan et al. (2018) note that the empirical support for substantial intertemporal substitution is weak.

When the real interest rate changes, *investments* are also affected. According to textbook models, investment demand depends on the real interest rate or, more specifically, the deviation of the real interest rate from the equilibrium real interest rate. The latter is given by the marginal product of capital. This follows from the condition for firms' profit maximisation under perfect competition. In such a setting, firms maximise their profits when they employ precisely the amount of capital in production that implies that its marginal product – the increase in output from increasing the capital stock by one unit – equals the cost of this unit, that is, the real interest rate. When the latter is higher than the equilibrium real interest rate, firms have an incentive to invest in financial assets rather than in real capital. If the real interest rate is lower than the equilibrium real interest rate, firms can borrow cheaply and have incentives to invest in real capital.

Box 2.4 The Euler equation

An important component in modern macro models where households choose consumption and saving is the Euler equation. It can be written as

$$u'(c_t) = \beta(1 + r_{t+1})u'(c_{t+1}), \tag{2.9}$$

where c is the household's consumption, β is the discount factor and r is the real interest rate. $u(c_t)$ indicates the household's utility in period t and $u'(c_t)$ the marginal utility in the same period, that is, the benefit of one more unit of consumption. $u'(c_{t+1})$ denotes the marginal utility of consumption in period $t + 1$. The discount factor measures how the household values future consumption relative to consumption today and is generally assumed to be less than 1. According to the Euler equation, the household chooses to allocate its consumption over time so that the marginal utility of consumption in period t is equal to the marginal utility in period $t + 1$ when the discount factor and the interest rate are taken into account. The discount factor plays a role because it reflects how the

household values consumption in different periods. The interest rate is important since it reflects the opportunity cost: instead of consuming today, the household can save the corresponding resources, earn a return on them in financial markets and then consume that return in the next period.

The cash flow channel

A transmission mechanism that has received attention in recent years is the cash flow channel, which is sometimes also known as the income channel (see Flodén et al. 2021). According to this mechanism, an interest rate rise leads to an increase in households' interest expenditure for loans, in particular mortgages. If households lack a buffer or have limited borrowing opportunities, their consumption will decrease. The cash flow channel stems from a lack of liquidity, which means that it not only affects low-income earners but, as was pointed out above, also wealthier households with their assets tied up in housing that is fully collateralised for loans (Kaplan et al. 2014; see also Gulbrandsen and Natvik 2020). It is the nominal interest rate, not the real interest rate, that is important for the cash flow channel. An increase in the nominal interest rate has a direct negative effect on households' disposable income for consumption after interest payments, regardless of what happens to the real interest rate. Almgren et al. (2021) show that the ECB's interest rate changes have had a stronger effect on GDP in euro area countries with a large share of liquidity-constrained households than in euro area countries with a low share of such households. There is reason to believe that the cash flow channel is of considerably greater importance for households' consumption than the interest rate channel.

The cash flow channel also affects liquidity-constrained firms. Higher nominal interest rates reduce their cash flow and scope for investment, again regardless of what happens to the real interest rate.

The present value channel

Changes in interest rates affect asset prices, such as the prices of stocks and housing. Such changes affect households' consumption

through what can be labelled the present value channel. An interest rate cut means that the present discounted value of given future income streams increases. (For stocks, these income streams consist of dividends; for owned dwellings of rent payments saved by the household not renting a dwelling.) This raises the value of the assets that give these income streams. The resulting increase in wealth means that the owners have become richer and thus can afford to increase their consumption. The marginal propensity to consume out of wealth measures how much consumption rises if wealth increases by one unit. Estimates of this marginal propensity to consume differ across studies, and depend on the horizon and type of wealth that is considered. Caceres (2019) find a marginal propensity to consume out of housing wealth of 0.04 in the US. However, the effects are small or insignificant for other assets, such as stocks. Mian et al. (2013) estimate the marginal propensity to consume out of housing wealth at 0.05–0.07 in the US, but note that the effects differ across geographical areas.

Another effect of higher asset prices is that the value of the collateral that households can offer lenders rises. This enables households to increase their indebtedness: fewer are liquidity-constrained and can therefore raise their consumption. These effects are termed the *housing-collateral consumption-demand channel* and *housing-equity withdrawal* (see, for example, Muellbauer 2012, and Berger et al. 2018). This particular mechanism, which arises because a cut in interest rates spurs lending, is a common cause of the concern that low interest rates will increase the risk of macroeconomic instability due to excessive household borrowing. Several studies have shown how, before the global financial crisis in 2008–10, by increasing the value of dwellings as collateral, rising house prices enabled households in many countries to fund over-consumption in relation to their disposable income through mortgages. This contributed to overheated economies in, for instance, Australia, Denmark, the UK and the US (Mian et al. 2017, Mian and Sufi 2018, Guren et al. 2019). This exacerbated the downturn when falling house prices triggered sharp drops in consumption (Andersen et al. 2016, Broadbent 2019, and Svensson 2019).

The exchange rate channel

In an open economy such as Sweden, with perfect capital mobility, changes in interest rates affect the nominal exchange rate. The relationship between domestic interest rates, foreign interest rates and exchange rates is captured by the *interest rate parity condition*, which is described in more detail in Box 2.5.

The interest rate parity condition explains the transmission mechanism commonly referred to as the exchange rate channel. If the *Riksbank* raises the policy rate, it becomes more attractive to invest in krona assets and the krona will therefore appreciate. This makes Swedish goods more expensive, while it becomes cheaper to import from abroad. The demand for Swedish goods then falls, which helps to lower inflation. In addition, the appreciation of the krona has a mechanical direct effect on inflation as a result of lower prices on imports.

The interest rate parity condition illustrates our dependence on the rest of the world and raises the question of how much our monetary policy can deviate from that of other countries. If the European Central Bank (ECB) or the Federal Reserve increase their interest rates, the Swedish krona will depreciate because investors then acquire assets in the euro area and the US. This depreciation causes higher inflation in Sweden, which may mean that the *Riksbank* has to follow the other central banks in raising the policy rate.

Box 2.5 Interest rate parity

If we consider financial investments in two countries that are seen as equivalent in terms of liquidity and risk, an investor who chooses between investing in Sweden and a country in the euro area takes into account the nominal return in the two countries and the expected change in the exchange rate between the Swedish krona and the euro. In equilibrium, investments in the two countries must yield the same expected nominal return:

$$i_t = i_t^f + \frac{E_{t+1}^e - E_t}{E_t}, \qquad (2.10)$$

where i_t is the Swedish nominal interest rate in period t, i_t^f is the nominal interest rate in the euro country in period t, E_t is the nominal exchange rate in Swedish kronor per euro in period t (so that an increase implies a nominal depreciation of the krona), and E_{t+1}^e is the expected exchange rate in period $t+1$. Equation (2.10) is the condition for (uncovered) *interest rate parity*. It says that the return on investment in Sweden must equal the return on investment in the euro area plus the expected depreciation of the krona. If the investor expects the krona to depreciate, the Swedish interest rate must exceed the foreign interest rate to the same extent in order for the two alternatives to be equivalent.

Solving for the exchange rate in (2.10), we obtain:

$$E_t = \frac{E_{t+1}^e}{i_t - i_t^{\mathrm{f}} + 1}. \tag{2.11}$$

The equation shows that the nominal exchange rate depends negatively on the interest rate spread. If the Swedish interest rate rises in relation to the interest rate in the euro area, so that $i_t - i_t^f$ increases, the Swedish krona will appreciate relative to the euro, in other words E_t will decrease.

The interest rate parity condition above is formulated in nominal terms. But it can also be written in real terms. This is called *real interest rate parity*. To derive this condition, we first define *the real exchange rate* in period t, Q_t, as:

$$Q_t = \frac{E_t P_t^f}{P_t}, \tag{2.12}$$

where P_t^f and P_t denote the foreign and the domestic price level, respectively. The real exchange rate is thus the relative price between foreign and domestic products. An increase in the real exchange rate means a real depreciation, that is, foreign products become more expensive relative to domestic products. The expected real exchange rate in the next period, Q_{t+1}^e, is defined in a similar way as in (2.12) but in terms of expectations.

We let π_t^e denote expected domestic inflation and π_t^{ef} expected foreign inflation. Assuming that inflation both at home and abroad

is low and that the expected exchange rate change is small, the expected change in the real exchange rate can be written:

$$\frac{Q_{t+1}^e - Q_t}{Q_t} \approx \frac{E_{t+1}^e - E_t}{E_t} + \pi_t^{ef} - \pi_t^e. \tag{2.13}$$

Solving for $(E_{t+1}^e - E_t)/E_t$ from (2.13) and using this expression in (2.10), we obtain

$$i_t = i_t^f + \frac{Q_{t+1}^e - Q_t}{Q_t} - \pi_t^{ef} + \pi_t^e,$$

which can be written as

$$r_t = r_t^f + \frac{Q_{t+1}^e - Q_t}{Q_t}, \tag{2.14}$$

where $r_t = i_t - \pi_t^e$ is the domestic real interest rate and $r_t^f = i_t^f - \pi_t^{ef}$ is the foreign real interest rate. Equation (2.14) is the condition for real interest rate parity. The expression states that the domestic real interest rate is equal to the sum of the foreign real interest rate and the expected real depreciation. If the domestic real interest rate is higher than the foreign rate, it must correspond to an expected real depreciation of the domestic basket of goods, that is, an expectation that the price of domestic goods will fall relative to that of foreign goods.

If one adds to the arbitrage condition (2.11) the assumption that an unexpected temporary interest rate increase does not affect the future expected exchange rate, it follows that an interest rate increase must lead to an immediate (and unexpected) appreciation. This is also confirmed by empirical studies (see, for example, Andersen et al. 2003). However, if the arbitrage condition is to be fulfilled, the exchange rate must subsequently depreciate continuously, as long as the domestic interest rate is higher than the foreign rate. But the empirical support for this is weak. A higher domestic interest rate than in the rest of the world appears instead to be consistent with an appreciating exchange rate. This *uncovered interest parity puzzle* has been discussed by among others Backus et al. (2013) and Engel (2014). However, the support for interest rate

parity is stronger for assets with longer maturities (Alexius and Sellin 2012).

Despite the mixed empirical support for interest rate parity, the relationship is a key component of macro models of open economies.

Effects of changes in the policy rate

A key challenge when estimating the effects of changes in the policy rate is that these are usually caused by some kind of shock, which makes it difficult to separate the effects of the change in the interest rate from the effects of what triggered it. Various empirical strategies have been used to deal with this problem. Coibion (2012) summarises the literature. A common approach is to estimate VAR models, under the assumption that a change in the policy rate will affect output, employment and prices with a lag. The results in Christiano et al. (1999) indicate that an increase in the Fed's policy rate by 1 percentage point reduces GDP by around 0.7 per cent. Output starts to decline after two quarters and then continues to decrease for a further few quarters. The policy rate increase also affects the price level, which starts to fall after approximately 18 months. Other VAR studies find effects of a similar magnitude.

Another approach is to create measures of monetary policy surprises based on the central bank's communication. With this approach, the effects of a policy rate change are found to be much larger. For example, Romer and Romer (2004) find that a policy rate increase of 1 percentage point leads to a maximum reduction in GDP of 4.3 per cent. Coibion (2012) concludes that the effects of a policy rate change probably lie between the small estimates in the VAR literature and the bigger effects in Romer and Romer (2004) and related studies.

Some studies combine theory and empirical evidence by estimating DSGE models and studying the effect of monetary policy shocks. Corbo and Strid (2020) estimate such a model adapted to Swedish conditions. There, a 1 percentage point increase in the policy rate gives rise to a maximum decline in GDP of just over 0.6 per cent after 5–6 quarters. Annual inflation falls by at most 0.15–0.20 percentage points (after one year). A change in the policy

rate has a relatively rapid effect on inflation in this and other DSGE models because firms are assumed to be forward-looking.

2.3.2 Forward guidance

Many of the monetary policy transmission mechanisms are driven by expectations. As mentioned above, communication about the future policy rate, what is known as *forward guidance*, has become one of the most important tools in the arsenal of modern central banks. By signalling in publications, speeches and forecasts, the central bank can influence expectations in the economy (see, for example, Bernanke 2017, 2020, and Jansson 2018).

A distinction is often made between two types of signalling: *Delphic* forward guidance, meaning that the central bank publishes forecasts of how monetary policy is likely to be conducted over different time horizons; and *Odyssean* forward guidance, according to which the central bank commits to a certain policy.[25] Odyssean guidance can be *time-contingent* or *state-contingent*. Time-contingent Odyssean guidance specifies an interest rate path that will be followed over time. State-contingent Odyssean guidance instead allows the interest rate path to be adjusted depending on how the economy evolves; for example, it can entail an increase in the policy rate only when inflation has stayed above a specified level for a certain period of time, or when unemployment has fallen below a predetermined level. Delphic guidance is obviously more vague and less binding than Odyssean guidance. With the latter, when unexpected events make the central bank's plan less appropriate, the bank risks either a loss of credibility if it deviates from its plan, or if its plan is followed, the objectives of monetary policy not being achieved.

Bernanke (2017) notes that Delphic guidance entails the central bank communicating how it views developments in the economy, how it intends to respond, and what plans it has for the policy rate. This strategy is also used during normal times and is part of the trend towards increasingly transparent monetary policy. Odyssean

[25] This terminology was launched in Campbell et al. (2012) and stems from Greek mythology. Odysseus tied himself to the mast of his boat to avoid the temptations of the sirens, while the Oracle of Delphi made (vague) predictions about the future based on the information available at the time.

guidance is particularly useful when the interest rate is at the effective lower bound, so that further interest rate reductions are impossible. The central bank can then assure markets that the interest rate will be kept low over a longer period – longer than the bank's monetary policy reaction function would typically imply (Bernanke 2017).

The distinction between Delphic and Odyssean guidance is not always crystal clear. Flug and Honohan (2022), for instance, discuss a number of cases where the *Riksbank* seems to have felt obliged to implement measures that were signalled – but not promised – despite the fact that it was doubtful whether they were actually justified at the time they were implemented.[26] Walentin (2022) expresses similar criticism.

2.3.3 Quantitative easing

From the financial crisis of 2008–10 until late 2021, short-term interest rates close to the effective lower bound made central banks around the world carry out various balance sheet operations – what is known as *quantitative easing* (QE).[27] The most common form of QE has been central bank purchases of long-term government bonds in the secondary market. QE has also come to include more risky assets. In Sweden, such purchases have mainly entailed covered bonds issued by banks to finance household mortgages, but also bonds issued by firms.

Bond purchases expand the central bank's balance sheet. The asset side grows with the value of the bonds purchased. At the same time, the bank's current liabilities, that is, central bank money,

[26] One example is the increase of the negative policy rate to zero in January 2020, although it was not clear at the time whether inflation had met the 2 per cent target and was stable at this level. Flug and Honohan argue that the forward guidance from the previous year had created market expectations that the *Riksbank* did not want to disappoint. Another example is the *Riksbank*'s purchase of corporate bonds during the pandemic year 2020. The purchases were announced in the spring but required a few months' preparation. The purchases were subsequently made in the autumn, despite the fact that by that time the interest rate spreads had declined again. Flug and Honohan's assessment is that, to maintain its credibility, the *Riksbank* felt obliged to go through with the purchases, even though they were no longer needed.

[27] During the financial crisis in 2008, for example, the US Federal Reserve initially purchased *mortgage-backed securities* (MBS), but later switched to purchases of government bonds with longer maturities (Kuttner 2018). The *Bank of Japan* used QE as early as 2001–06 (Woodford 2012) and in recent years has been using *yield curve control* in attempts to keep long-term interest rates at target levels (Buiter 2021).

increases because the (electronic) money that constitutes payment for the bonds adds to the commercial banks' accounts in the central bank: their reserves (Riksbank 2020). Box 2.6 explains the central bank's balance sheet in more detail.

Box 2.6 The central bank's balance sheet

The assets and liabilities of the central bank are recorded in the central bank's balance sheet. These balance sheets differ across countries (Flodén 2018) and have changed significantly over time, but Table 2.1 gives a rough picture.

Table 2.1 Rough picture of the central bank's balance sheet

Assets	Liabilities
Central government bonds	Bank reserves
Other securities	Banknotes and coins
Gold	Equity capital
Foreign exchange reserve	Miscellaneous
Miscellaneous	

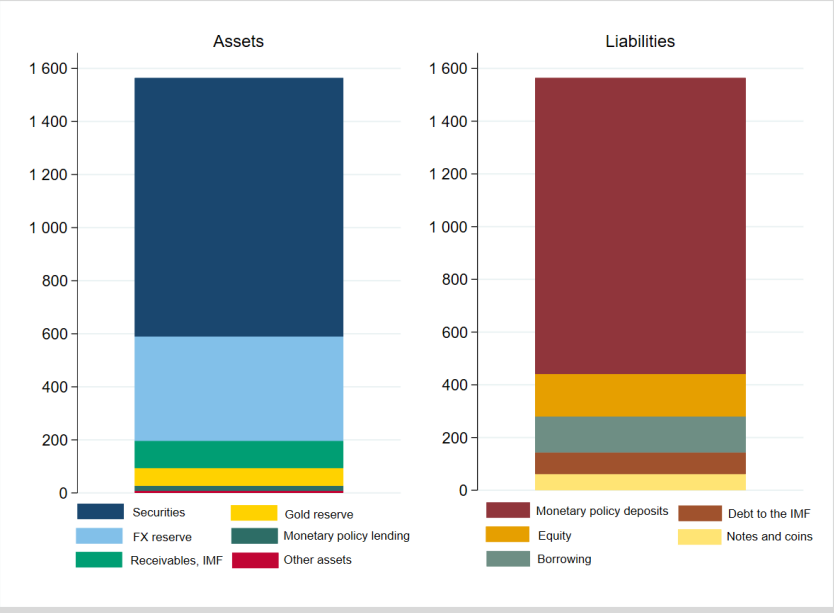
The asset side consists of the central bank's holdings of central government bonds, gold and foreign currencies. In recent years, however, central banks have purchased not only central government bonds but also other securities. During the pandemic, for example, the *Riksbank* purchased covered bonds issued by banks and used to fund lending in the form of mortgages secured in real estate. In addition, the *Riksbank* purchased local government bonds and corporate bonds, which are also recorded on the asset side. The liability side mainly consists of the banking system's reserves, banknotes and coins, and the *Riksbank*'s equity capital.

Following the financial crisis in 2008–10, as central banks pursued quantitative easing, their balance sheets expanded substantially. QE affects both sides of the central bank's balance sheet. When the central bank buys securities in the secondary market, these are added to the asset side. The funds used to pay for them add to banks' reserves on the liability side. The central bank normally pays interest on these reserves.

Figure 2.1. shows the *Riksbank*'s balance sheet at the end of 2021. The biggest item on the asset side is the *Riksbank*'s holdings of

various securities, the majority of which are central government bonds. On the liability side, the biggest item is monetary policy deposits, that is, the banks' reserves in the *Riksbank*. Half of these are *Riksbank* certificates with one week's maturity and the other half overnight deposits. The interest rate is set to the policy rate on the former deposits and to 0.10 percentage points below that rate on the latter. The average interest rate on the banks' reserves in the *Riksbank* is thus 0.05 percentage points lower than the policy rate. The interest rate on monetary policy lending is 0.10 percentage points higher than the policy rate.

Figure 2.1 The *Riksbank*'s balance sheet at the end of 2021



Note: Assets and liabilities are shown in SEK billion.
Source: Riksbank (2021a).

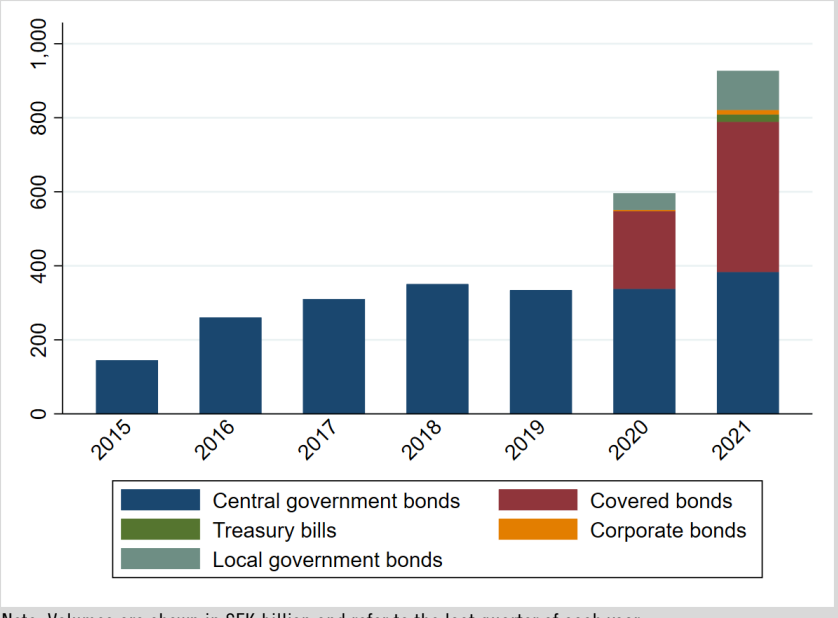
Figure 2.2 shows the evolution of the *Riksbank*'s securities holdings over time. As we concluded above, up until the pandemic, these purchases were exclusively of central government bonds. However, in 2019–20 other securities were also purchased.

Figure 2.3 shows how the banks' reserves in the *Riksbank* have grown as a consequence of quantitative easing. Since the *Riksbank* normally pays interest on these reserves, monetary policy in recent years has entailed an interest rate risk: an increase in the policy rate

gives the bank higher interest rate expenditure. On the asset side, the return on its holdings of long-term securities is unchanged if these are retained until maturity (see also Box 2.7). Alternatively, the *Riksbank* makes capital losses on long-term securities if they are sold before they mature (because their prices fall when the interest rate increases).

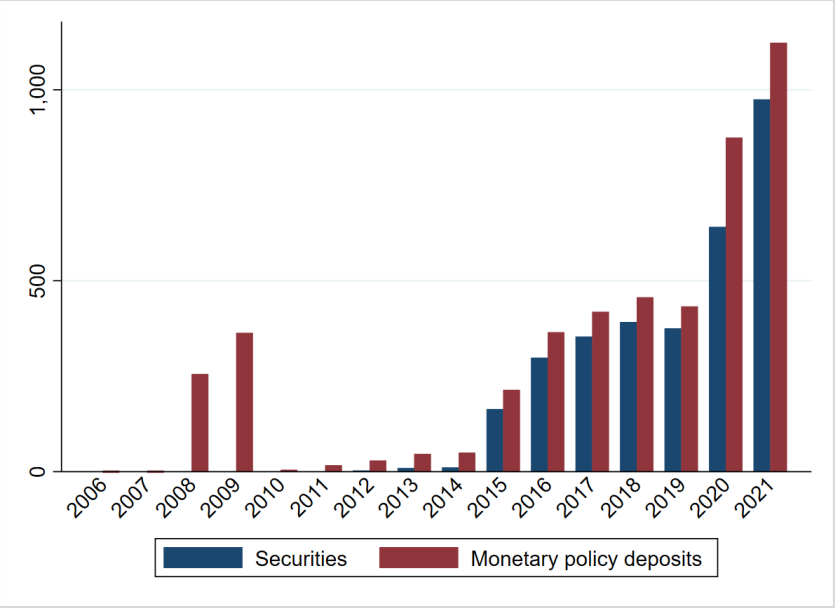
Kjellberg and Åhl (2022) estimated that the interest rate hikes in 2022 coulds lead to the *Riksbank* suffering a loss of around SEK 65 billion during the year, which would virtually erase its equity capital.

Figure 2.2 The *Riksbank*'s securities holdings by different categories at the end of the year 2015–21



Note: Volumes are shown in SEK billion and refer to the last quarter of each year.
Source: Riksbank (2022).

Figure 2.3 The *Riksbank*'s total securities holdings and monetary policy deposits in SEK billion, 2006–21



Note: Securities holdings and monetary policy deposits are shown in SEK billion. The data refer to the last quarter of each year.
Source: Riksbank (2022).

The loss is a consequence of the accounting principle applied, which is that unrealised capital losses are debited up-front. The *Riksbank* plans to hold the purchased securities until maturity, so the loss reported in 2022 is the equivalent of a negative cash flow as a result of lower interest income than interest expenditure in the coming years. The resulting loss does not necessarily mean that the purchases of these securities have resulted in a net loss for the consolidated central government (including the *Riksbank*). Kjellberg and Åhl report a calculation according to which – because the purchases have earlier kept the central government's interest expenses for new borrowing down and because they have sustained economic activity and thereby tax revenues – they can be expected to yield a small net budgetary gain.

When the central bank purchases bonds, the resulting higher demand for them leads to their prices increasing. Since the payments

on a bond are given (nominal yields and repayment), a higher price means that the bond yield decreases.[28]

In addition to the effects on long-term interest rates, QE can have a signalling effect. Woodford (2012) notes that the central bank can generate credibility for its policy rate forecasts by using balance sheet operations. This is because larger bond holdings can give the central bank an incentive to keep interest rates low for a long time. As pointed out in Box 2.6, an increase in the policy rate means losses for a central bank that has pursued QE: either capital losses if the bonds are sold before maturity; or interest losses because the income from interest on the bonds is less than the interest paid by the central bank on the banks' reserves. However, since central banks have goals other than to maximise earnings, it is unclear what importance should be attached to these signalling effects of QE.

One criticism put forward by Flug and Honohan (2022) is that the *Riksbank* did not clearly communicate in advance the intended timing of policies with regard to policy rate increases and tapering/quantitative tightening, when monetary policy after the pandemic was to be normalised again. However, since the need for changes in policy rates and in balance sheet operations depend on the state of the economy, there may be reason for a central bank to retain some flexibility regarding when QE should be phased out.

QE means that the central bank purchases large quantities of long-term financial instruments and pays by increasing the assets of the counterparties (commercial banks that deal directly with the central bank) in their accounts in the central bank, that is, their reserves there. Since both the *Riksbank* and other central banks in advanced economies pay interest on these deposits, they are thus engaging in maturity transformation by purchasing long-term assets and paying with short-term assets. Box 2.7 analyses the consequences of this for the consolidated central government's (both including and excluding the central bank) dynamic budget constraint.

[28] Assume, for example, that a bond matures in one year and that the government must then pay SEK 10 000 to the holder of the bond. If the price of the bond today is SEK 9 500, the nominal yield on the bond will be (10 000 - 9 500)/9 500 ≈5.26 per cent. If the central bank's bond purchases result in the price increasing to SEK 9 600 today, the interest rate will instead be (10 000 - 9 600)/9 600 ≈ 4.2 per cent.

Box 2.7 The dynamic budget constraint of the consolidated government

To analyse the influence of the central bank on the dynamic budget constraint of the *consolidated* government, that is, the budget equation applicable to the government, including the central bank, we now distinguish between total outstanding government debt, D^T, and the government debt that the central bank holds in the form of government bonds, D^{CB}.[29]

The dynamic budget constraint for the central government, excluding the central bank, that is the "Treasury", can be written as:

$$G_t + i_t^D D_t^T = T_t + D_{t+1}^T - D_t^T + X_t^{CB}, \qquad (2.15)$$

where i^D is the government debt interest rate, X^{CB} is transfers from the central bank to the Treasury, and other variables are defined as in Box 2.1. The left-hand side of the equation shows the total expenditure financed by the revenue and borrowing on the right-hand side.

If, for simplicity, we ignore foreign exchange reserves, the central bank's budget identity will be:

$$D_{t+1}^{CB} - D_t^{CB} + i_t^H H_t + X_t^{CB} = i_t^D D_t^{CB} + H_{t+1} - H_t + M_{t+1} - M_t, \quad (2.16)$$

where H is the banks' reserves (deposits) in the central bank, i^H is the interest rate that the central bank pays on these reserves, and M is outstanding banknotes and coins. Together with banknotes and coins, the reserves constitute what is known as *central bank money* or *high-powered money*. The left-hand side of equation (2.16) is the central bank's new purchases of government bonds, interest payments on deposits from the banks, and transfers to the Treasury, which together constitute the central bank's expenditure. These are financed by interest income from existing holdings of government bonds and increases in the amount of high-powered money.

By letting $D_t = D_t^T - D_t^{CB}$ be the government bonds held by others than the central bank and substituting X_t^{CB} from equation

[29] To simplify the exposition in the box, we do not distinguish between general government and central government, i.e., we ignore the existence of local governments.

(2.16) into equation (2.15), we get the dynamic budget constraint of the consolidated government:

$$G_t + i_t^D D_t + i_t^H H_t = T_t + D_{t+1} - D_t + H_{t+1} - H_t + M_{t+1} - M_t. \quad (2.17)$$

From the perspective of the consolidated government, the outstanding debt consists of only debt to parties other than the central bank. Under the consolidated dynamic budget constraint (2.17), primary government expenditure and interest payments on outstanding debt to the private sector must be financed through tax revenue, new borrowing, or an increase in the amount of central bank money.

The effect of balance sheet operations on the dynamic budget constraints

Balance sheet operations by the central bank affect the dynamic budget constraint of both the consolidated government (including the central bank) and the government (excluding the central bank). As discussed in Section 2.3.3 and in Box 2.7, quantitative easing means mainly that the central bank buys government bonds on the secondary market. Each government bond purchased by the central bank reduces the government's debt to parties other than the central bank and raises the banks' reserves by the corresponding amount, so that $\Delta D_t^{CB} = -\Delta D_t = \Delta H_t$.

In the dynamic budget constraint for the consolidated central government (2.17), expenditure on the left-hand side changes with $(i_t^H - i_t^D)\Delta D_t^{CB}$, that is, it increases (decreases) if the interest rate on reserves, i_t^H, is higher (lower) than the interest rate on government bonds, i_t^D. This requires a corresponding change in primary expenditure, taxes, or new borrowing, or an increase in the amount of central bank money. If the central bank's earnings affect transfer payments to the Treasury, this will also have an effect on the dynamic budget constraint (2.15) for the latter. If, for the sake of simplicity, we disregard changes in the amount of high-powered money and assume that the central bank's transfer payments to the Treasury, X_t^{CB}, are equal to its earnings, we obtain $X_t^{CB} = (i_t^D - i_t^H)D_t^{CB}$. In that case, central bank purchases of government

bonds imply a change in the resources of the Treasury, which must be counteracted by corresponding changes in taxes, primary expenditure, or borrowing.

In Sweden, the interest rate on central bank reserves has exceeded the rate on government bonds since the *Riksbank* began pursuing QE (see Flodén 2016, Figure 3), which means that the balance sheet operations have had an adverse effect on government finances. However, the analysis does not take into account the general equilibrium effects of QE on the government budget. If balance sheet operations contribute to maintaining a high level of economic activity, government tax revenue, for example, is also sustained. As we discuss in Box 2.6, Kjellberg and Åhl (2022) report estimates that indicate a small net gain in government finances from the *Riksbank*'s quantitative easing so far.

QE should thus be seen as maturity transformation. Government bonds, deposits in the central bank and even banknotes and coins are various forms of government debt. If these financial assets were perfect substitutes for each other, central bank purchases of government bonds ought not to affect the economy.[30] However, as noted in Section 5.1.2, a rapidly growing empirical literature shows that evidently, they do. Different financial instruments serve different purposes, and their yields depend on, among other things, their supply.

Liquid assets function as means of payment, for households and firms as well as between banks. Creating such means of payment from more illiquid assets such as mortgages is one of the main tasks of the banking system. Empirical evidence suggests that QE and maturity transformation of government debt as well as conventional monetary policy affect economic activity (see Sections 2.3.1 and 5.1.2). How important each of these different mechanisms is for such policy to work is an active area of research. Experience from the global financial crisis in 2008–10, when the private sector's capacity to generate liquidity collapsed; and from the COVID-19

[30] If the central bank's buying and selling of securities with different maturities have no effect on the economy, it is usually said that *Wallace neutrality* prevails (Wallace 1981). With perfect markets and perfectly rational households with infinite horizons, maturities are irrelevant and maturity transformation is therefore without effect. There is no need for money or banks either in that case. This means that a model with such characteristics is only useful for specifying the conditions required in theory for both QE and monetary policy in general to have any effects.

crisis in 2020–21, when demand for liquid assets increased sharply; shows that quantitative easing can have substantial effects, at least in such situations. In these times of crisis, central banks, including the *Riksbank*, assumed some of the tasks that normally fall on the banking system. Perhaps even more important was that central banks signalled that they were prepared to do what was necessary for financial markets to continue to function. Experiences from the Great Depression of the 1930s show how serious the consequences can be if the banking system fails (Bernanke 1983).

As mentioned, QE has also involved assets other than government debt instruments. In Sweden, mortgages are not primarily financed by deposits but by banks issuing covered bonds (also known as mortgage bonds; see Box 2.6) purchased by pension funds and other institutions that channel savings to investment. At the beginning of the COVID-19 crisis in March 2020, financial markets became more turbulent. When the *Riksbank* purchased mortgage bonds, the perceived risk of owning them fell. This meant that the banks' ability to finance their lending in the form of mortgages could be maintained. Without this policy, a development similar to a classic 'run on the banks' could have ensued (see Dybvig and Diamond 1983 for a theoretical analysis of such a situation).

To the extent that the *Riksbank*'s purchases prevented an otherwise self-fulfilling run on the banks, these purchases need not have entailed any cost to the government. It is comparable to a deposit guarantee, which is intended to prevent a disequilibrium (run on the banks) in a situation with multiple equilibria. The deposit guarantee works, at least in theory, without having to be used. However, some of the 'normal' risk in mortgage bonds during the COVID-19 crisis was probably also shifted from private investors to taxpayers. To the extent that this occurred, it should be seen as a subsidy distributed between borrowers (home-owners) and lenders (e.g., pension funds). The fact that the risk premium on mortgage bonds fell to a much lower level than before the crisis once the *Riksbank* began its purchases corroborates this view.

The ECB's purchases of bonds issued by governments with high indebtedness during both the euro crisis and the COVID-19 crisis worked in a similar way. It became possible for them to continue to roll over their debts. An expectation that this would not happen could have become self-fulfilling. However, the ECB's purchases

have probably also entailed a subsidy in the sense that these governments have been able to borrow at lower interest rates than would otherwise have been possible, even in the absence of multiple equilibria.

The substantial expansion of the central banks' balance sheets, which began with the global financial crisis in 2008–10, stopped in spring 2022. Central banks such as the Federal Reserve, Bank of England and the *Riksbank* announced cutbacks in their securities holdings as a complement to policy rate rises in order to counteract the increases in inflation above the prevailing inflation targets that have occurred. A quantitative tightening (QT) process has begun. An important question is how QT should be coordinated with the policy rate increases, that is, the rate at which the central banks' securities holdings are reduced. Should this be done at the rate by which bonds held happen to mature – as indicated by the *Riksbank*, for example – or should it be done at a faster pace through sales, such as the Bank of England started to do in 2022? This is discussed in Section 5.1.2.

2.3.4 Other monetary policy tools

In addition to the policy rate, forward guidance and quantitative easing, a central bank can also use other tools to influence demand and inflation, although these are seldom resorted to.

The central bank can intervene in the foreign exchange market by buying and selling currency. If the domestic currency has weakened, the central bank can intervene by purchasing it so that the exchange rate appreciates. Interventions in the foreign exchange market are unusual in economies with a floating exchange rate. Before the pandemic, however, this option was discussed as a possible stimulus measure, since the development of the exchange rate is an important determinant of inflation. The purpose of exchange rate interventions is then not to influence the exchange rate per se but to stabilise inflation and resource utilisation (Riksbank 2017).

The central bank can also provide loans to banks so that they increase their lending to firms. This was done in Sweden during the global financial crisis in 2008–10, but also during the period March 2020–September 2021, when the *Riksbank* offered loans to the banks

in order to prevent bankruptcies in viable businesses due to liquidity shortages. The latter programme meant that the banks could borrow at the policy rate provided that the money was lent to non-financial firms. Since the policy rate during this period was zero, this meant in practice that the banks were granted interest-free loans. It was then up to the banks which firms to lend to, but the banks had to pay a higher interest rate on funds not lent. Such a measure obviously lies in the borderland between fiscal and monetary policy.

2.3.5 The central bank as lender of last resort

Since the central bank can always print money, it is *lender of last resort*. Historically, this has meant that the central bank can print money as needed, but is now about being able to create money digitally.

The central bank supplies banks with means of payment by lending money against collateral. Banks that suffer from liquidity problems but lack such collateral, or are unable to borrow from other financial institutions in the interbank market, can turn to the central bank. The central bank can then grant emergency liquidity assistance against collateral that would not normally be accepted (Riksbank 2003). Such assistance must only be granted to solvent institutions. Acting as a lender of last resort is not part of the normal stabilisation policy tool kit but may be crucial in financial crises.

2.3.6 Distributional effects of monetary policy

Monetary policy has distributional effects. On the one hand, stabilisation policy that affects employment contributes to a more even distribution of income over the business cycle (Ekholm 2020). But the most obvious reason is that changes in interest rates affect the value of assets whose returns are not directly affected by these rates. When the interest rate falls, the value of such assets rises. This applies, for example, to housing, stocks and bonds with longer maturities. A reduction in interest rates thus leads to capital gains for those who own such assets. The more property that is mortgaged, the greater will be the effect on the owner's wealth – the leverage will be greater. An interest rate cut therefore mainly

benefits those who have taken out large loans to finance holdings of stock or real property (see the discussion on the present value channel in Section 2.3.1). Since monetary policy is sometimes contractionary and sometimes expansionary, some of these distributional effects are smoothed out over time. However, it is not likely that, on average, monetary policy is distributionally neutral. For example, larger interest payments have greater negative consequences for liquidity-constrained households than for others.

In recent years, interest in the distributional effects of monetary policy has increased. In the academic literature, New Keynesian models with heterogeneous agents, so-called HANK models (*Heterogeneous Agent New Keynesian models*) have contributed new knowledge about the transmission from a change in policy rates to aggregate outcomes and the distribution of wealth and income.

Kaplan et al. (2018) focus on the transmission mechanism from an interest rate change to private consumption in such a HANK model. In their setting, households can save in two assets: a low-return liquid asset and a high-return illiquid asset. In the model, there are two types of hand-to-mouth consumers: low-income households and high-income households with assets tied down in illiquid form. In addition, there are households that are not liquidity-constrained.

It is important to distinguish between the direct effects of monetary policy that arise without disposable income changing and the indirect effects that operate via changes in income. The authors begin by studying the transmission mechanism in a model of homogeneous representative agents (a RANK model for *Representative Agent New Keynesian model*). In that setting, monetary policy primarily has direct effects on consumption via intertemporal substitution according to the Euler equation (see Box 2.4). Indirect effects are negligible in RANK models. The reason is that the representative household's consumption is based on its permanent income and therefore does not react to the temporary changes in disposable income resulting from a change in interest rates.

In HANK models, an interest rate change also has indirect effects. These concern both aggregate demand and the distribution of income. A lower interest rate reduces the return on liquid assets. Therefore, those who are not liquidity-constrained consume more

(intertemporal substitution). Following this increase in demand, firms increase their demand for labour, which spurs wage increases. As labour income rises, households consume even more. In addition, the change in interest rates affects consumption through the government's dynamic budget constraint. Interest expenditure for government debt falls and higher labour income generates more tax revenue. Both of these effects contribute to the government being able to lower taxes. This further increases households' disposable incomes and thus consumption.

Kaplan et al. (2018) argue that there is reason to question the direct effects that drive monetary policy transmission in RANK models. Empirical studies show that consumption is relatively insensitive to changes in interest rates when controlling for income (Campbell and Mankiw 1989, Canzoneri et al. 2007, Kaplan et al. 2018). Kaplan et al. show that the indirect effects of an interest rate change, however, are significant. One conclusion is that monetary policy should affect households' disposable income if it is to have more significant effects. The predictions in the HANK model are supported in studies based on microdata. Holm et al. (2021) study how the transmission from interest rate changes to consumption depends on households' access to liquidity and find evidence of significant indirect effects accumulating over time. As previously mentioned, Almgren et al. (2021) show that the ECB's interest rate changes have had a stronger effect on GDP in euro area countries with a high share of liquidity-constrained households than in euro area countries with a low share of such households.

The empirical literature on the distributional effects of monetary policy is limited but has grown in recent years (Borio and Zabai 2016). Amberg et al. (2021) emphasise the importance of studying the whole distribution of income, rather than aggregate measures such as the Gini coefficient, to understand distributional effects. In a study of Sweden, they find that a more expansionary monetary policy increases incomes across the whole distribution but that the effects are greatest at both tails. For low-income earners, an interest rate cut generates higher labour income, probably by increasing employment, while the effect at the top of the income distribution is driven by increased capital incomes (see also Coibion et al. 2017). Amberg et al. (2021) find that unforeseen policy rate cuts of 25 basis points cause an increase in income for middle-income earners of

0.6 per cent, but that the increase is 4–5 times larger for both low- and high-income earners.[31] The effects on labour incomes are considerable in the two lowest income deciles but insignificant in the rest of the distribution. There, capital income is affected instead. Simulations show that aggregate measures of income equality, such as the Gini coefficient, are affected very little by an interest rate change since the large effects at the top and bottom tend to cancel out. In a study based on Danish data, Andersen et al. (2021) find that a more expansionary monetary policy leads to greater income inequality by increasing income at the top of the distribution and reducing it at the bottom.

In light of the rising asset prices that took place up to early 2022, it is not surprising that the effects of monetary policy on the distribution of income and wealth have stirred great interest. Expansionary monetary policy is likely to favour households with large real asset holdings in the form of stocks and real estate, but who also are more indebted than other households. At the same time, it is mainly low-income earners who benefit from monetary policy measures that keep unemployment down.

A prerequisite for monetary policy to have substantial effects on economic inequality is that policy changes are not symmetrical over the business cycle, since groups who benefit in recessions would then be disadvantaged in booms. Over the past fifteen years, monetary policy has mostly been expansionary (see Section 4.3), which means that primarily households with assets have benefited. However, it is also for these households that falling asset prices as a result of the interest rate hikes that took place in 2022 are the most painful. Our assessment is that it is more likely that, in the long term, the distribution of income and wealth will be affected more by overall trends such as globalisation (or deglobalisation), the impact of technological progress, and the evolution of the neutral real interest rate, than by monetary policy measures aimed at stabilising the business cycle and inflation.

[31] However, it is not entirely clear how to interpret these results. A significant proportion of high-income earners in a given year are households that have received a large capital gain due to selling a dwelling that year. Most of these households are likely to be middle-income earners, with large mortgages.

3 The balance between fiscal and monetary policy

Since the beginning of the 1990s, responsibility for stabilising the economy has been divided between the government and an independent central bank in Sweden and many other countries. The reason for the delegation of monetary policy has its origins in dissatisfaction with economic outcomes during the 1970s and 1980s. In Sweden, inflation and high wage increases combined with a fixed exchange rate repeatedly led to export industries and other activities exposed to foreign competition ending up with too high costs for them to be competitive. Falling profitability led to layoffs and unemployment. Ultimately, the situation became so acute that competitiveness had to be restored through a devaluation. However, this was only a temporary solution, and the pattern was repeated in cycles of devaluations (see Calmfors 2021).

In the 1990s, the Swedish monetary and fiscal policy regimes were changed radically. The fixed exchange rate was abandoned in favour of a floating exchange rate, an inflation target of 2 per cent was introduced, a fiscal policy framework was established, and the *Riksbank* was made more independent of the political system.[32] A key motive for these changes was to counteract policy *myopia*. The aim was (i) to reduce the temptation to stimulate the economy too strongly with monetary or fiscal policy; (ii) to prevent the build-up of excessive government debt that during the 1990s crisis substantially curtailed the possibility of using fiscal policy to manage the economic crisis; and (iii) to anchor inflation expectations at a stable level in order to provide greater scope for monetary policy in

[32] See for example *Finans- och penningpolitiskt bokslut för 1990-talet* (Taking stock of fiscal and monetary policy in the 1990s) (2001), Heikensten and Vredin (2002), and Calmfors (2021).

recessions and reduce the risks of expectation-driven inflation spirals in booms.

The global financial crisis in 2008–10 laid bare the macroeconomic risks associated with financial instability. During and after the crisis therefore, a major reform initiative was launched internationally to prevent financial crises, and to design instruments to deal with them should they still occur. In Sweden, as in other countries, new financial stability frameworks have been established.

Box 3.1 The economic policy frameworks in Sweden

Monetary policy

According to the previous *Sveriges Riksbank* Act, the objective of monetary policy was to maintain price stability. The *Riksbank* has defined this as a 2 per cent annual increase in the consumer price index with a fixed interest rate (the CPIF). In addition, according to its monetary policy strategy, the *Riksbank* endeavours "to stabilise production and employment around paths that are sustainable in the long term" (see for example Riksbank 2022, page 3). This *flexible inflation target* is explicitly written into the new *Sveriges Riksbank* Act (Chapter 2, Article 1) that came into force January 1, 2023. According to the new act the *Riksbank* "provided it does not override the price stability objective" shall "contribute to a balanced development in output and employment (considerations of the real economy)".

The *Riksbank* is to act independently. This effectively means a dual ban on giving the *Riksbank* instructions. Earlier, the constitution stated that "no government agency may determine how the *Riksbank* shall decide in matters of monetary policy". This rule applied also to the government and its ministers. In addition, the *Sveriges Riksbank* Act prescribed that members of the executive board "may neither seek nor take instructions when fulfilling their monetary policy duties"). These provisions on the independence of the *Riksbank* have now been combined into one provision in the constitution, which clarifies that the dual instruction ban applies to

all duties for which the *Riksbank* is responsible (Chapter 9, Article 13).[33]

As before, according to the new *Sveriges Riksbank* Act, the *Riksbank* must apply the currency system adopted by the government. A difference from the previous act is that if the government adopts a currency system with a fixed exchange rate, it is the government – not the *Riksbank* – that determines the central rate and the exchange rate band. As in the previous act, the *Riksbank* may not grant loans directly to the government or other parts of the public sector. But it may acquire such debt securities on the secondary market. A new feature in the *Sveriges Riksbank* Act is the introduction of a *proportionality principle*: the intended outcome of the *Riksbank*'s measures must stand "in reasonable proportion to the costs and risks that the measure entails for the *Riksbank* and central government finances" (Chapter 1, Article 8). A specific important limitation is that financial instruments other than government securities may be bought and sold only "in exceptional circumstances" (Chapter 2, Article 5).

Fiscal policy

According to the Budget Act, there must be a *surplus target* for general government net lending, i.e., the difference between revenue and expenditure for the consolidated public sector (excluding the *Riksbank*). Having previously been 1 per cent of GDP, the target was reduced to 1/3 per cent of GDP in 2019. The level refers to the average over a business cycle. It is to be applied by estimating a fiscal space for discretionary decisions to increase expenditure or cut taxes prior to each fiscal year on the premise that *structural* net lending, i.e., net lending adjusted for cyclical fluctuations and one-off effects, should be 1/3 per cent of GDP in a normal cyclical situation. The fiscal space arises because tax revenues normally increase automatically as GDP increases, while most government expenditure does not because it is fixed in nominal terms or indexed in such a way that it rises more slowly than GDP (see, for example, Fiscal Policy Council 2011).

[33] Besides monetary policy, these duties include "carrying out currency interventions, holding and managing the foreign exchange reserve, promoting a well-functioning payment system and carrying out other basic duties arising from separate legislation (Chapter 9, Art. 13).

The surplus target is since 2019 complemented by a *debt anchor* of 35 per cent of GDP. This refers to the gross debt of the consolidated general government, i.e., the combined debt for the public sector (excluding the *Riksbank*) after internal claims and liabilities have been netted out. The debt anchor is not used to steer fiscal policy from year to year, but is instead a benchmark for reviews of the surplus target, which must be carried out every eight years. However, if deviations greater than +/- 5 per cent of GDP arise, the government is obliged to explain to the *Riksdag* why they have occurred and how they will be handled.

Another complement to the surplus target is the provision in the Budget Act which prescribes that *central government expenditure ceilings* must be set for the coming three fiscal years. Common practice is to allow a budget margin of a certain size below the expenditure ceiling. The margin is to serve as a buffer for unexpected increases in expenditure.

Under the Local Government Act, municipalities and regions must normally plan for net revenues at least in *balance*.[34] In addition, under the act, municipalities and regions must also practice sound financial management. This is usually interpreted as net revenues corresponding to at least 2 per cent of revenues from taxes and general government grants (see also Section 2.2.2).

Several government agencies are responsible for continuously monitoring fiscal policy. The government's Fiscal Policy Framework Communication specifically highlights the Fiscal Policy Council's responsibility for assessing whether the government is complying with the provisions of the fiscal framework and whether fiscal policy is sustainable in the long term (Regeringen 2018).

Finally, Sweden is subject to *EU fiscal rules*. These include maximum net borrowing of 3 per cent of GDP, a ceiling for consolidated gross debt of 60 per cent of GDP, and a medium-term target for net lending (a structural net lending target), which for Sweden is set to -1 per cent of GDP.

[34] The most important difference between net revenue and net lending is that depreciation is included as a negative item in the former and investment expenditure in the latter.

Financial stability policy

The responsibility for financial stability is shared among different government agencies. The central task of the Swedish Financial Supervisory Authority (*Finansinspektionen*) is to prevent financial crises.[35] It decides on licenses for firms to operate financial activities and the rules they must abide by. It verifies that financial institutions are complying with the rules through supervision. The activities of the authority have both a micro and a macro dimension. The micro dimension focuses on individual actors, and the macro dimension on vulnerabilities that can arise in the financial system as a whole. The Financial Supervisory Authority's tools can target both financial institutions and borrowers. Capital and liquidity requirements are examples of the former, while rules on loan-to-value ratios and amortisation requirements are examples of the latter.

According to the new *Sveriges Riksbank* Act, the *Riksbank*'s duties include "without overriding the price stability objective, contributing to the stability and efficiency of the financial system, including ensuring that the public is able to make payments" (Chapter 3, Article 1). Previously, the *Riksbank* had formulated this duty in terms of financial risks being taken into account in monetary policy decisions, while stressing that this was merely a complement to well-functioning regulations and effective supervision (see for example Monetary Policy Report 2022 on the Monetary Policy Strategy). However, according to the new *Sveriges Riksbank* Act, counteracting financial imbalances should not be seen as "a stand-alone, subordinate objective within the monetary policy framework, but should contribute to achieving the objectives for price stability and consideration for the real economy" (Regeringen 2021b).

The new *Sveriges Riksbank* Act formally instructs the *Riksbank* to assess and report on the stability of the financial system and the risks for financial disturbances. However, in its capacity as the only government agency responsible for the financial infrastructure, the *Riksbank* has the role of ensuring that the payment system functions also in acute financial crises. A key obligation in such a situation is to provide, if necessary, general liquidity support to financial institutions, or selectively to financial firms experiencing particular problems (see Section 2.3.5).

[35] See, for example, Swedish Financial Supervisory Authority (2019).

The National Debt Office (*Riksgälden*) has the main responsibility for banks in crisis. It can place such a bank in *resolution*. Then, shareholders and bond holders are supposed to bear the primary responsibility for arising losses. Under extraordinary circumstances, however, funds may also be mobilised from the *Resolution Reserve* created by compulsory contributions from banks and other financial institutions. Funds from the deposit insurance fund, similarly financed, can also be used to protect depositors in the banks. In addition, under certain circumstances, the National Debt Office can provide preventive support to fundamentally viable banks and financial institutions in crisis by utilising a previously built-up stability fund.

Representatives of the Ministry of Finance, the Swedish Financial Supervisory Authority, the *Riksbank* and the Swedish National Debt Office meet regularly in the Financial Stability Council to discuss financial risks and share information. However, the council does not make decisions; it is merely a discussion forum.

Both the global financial crisis 2008–10 and the COVID-19 crisis in 2020–21 showed the importance of strong confidence in public finances, price stability, and the stability of the financial system. During both these crises, fiscal and monetary policy in Sweden could be conducted without any confidence problems despite massive crisis measures. The very extensive loan-financed fiscal policy support programmes during the pandemic could not have been implemented, or at least not worked as well as they did, without strong confidence in public finances. Similarly, confidence in the value of money was a prerequisite for the *Riksbank*'s purchases of large quantities of mortgage bonds being effective in preventing risk premia from increasing.[36]

The experiences from the global financial crisis and the COVID-19 crisis are clear indications that the fiscal and monetary frameworks have been effective. At the same time, important premises for

[36] In a crisis, demand for safe assets increases. Historically, this has often resulted in the price of gold rising and the value of financial assets falling. If confidence in the value of money remains strong, demand for liquidity will also increase. By purchasing financial assets and thereby generating liquidity during the pandemic, the *Riksbank* could prevent the price of financial assets from falling as well as avoid a situation where the price of money rose – in other words, deflation. Without confidence in the value of money, falling asset prices and uncertainty could have led to concerns that the financial system would fail, capital flight and, ultimately, a financial crisis (see also Section 3.2.3).

economic policy have changed compared to the time when these frameworks were introduced. Major macroeconomic shocks of a different nature to those in the past have occurred and required measures from both monetary and fiscal policy. The neutral real interest rate has fallen substantially. For a number of years, central banks found it difficult to reach the inflation target. As discussed in Sections 2.3.3 and 5.1.2, in a situation with nominal interest rates around zero, like other central banks, the *Riksbank* supplemented its normal interest rate policy with other monetary policy instruments, primarily large purchases of bonds. In 2022, high inflation once again became a problem to which monetary and fiscal policy had to respond (see Section 5.4).

As pointed out in the introduction to this report, there is thus reason to consider whether the policy frameworks introduced in the 1990s need to be amended. It is particularly important to discuss the interaction between fiscal policy and monetary policy in different situations. Section 3.1 analyses this interaction in the long term, and Section 3.2 in the short term.

3.1 The interaction between fiscal and monetary policy in the long term

Monetary and fiscal policy are obviously interdependent in the short term, since both contribute to stabilisation policy and are partly interchangeable. There is mutual interdependence between them in the long term as well. The most important reason for this is that government finances must be sustainable in the long run, and that both fiscal and monetary policy affect the government's dynamic budget constraints (see Box 2.7). This section highlights various aspects of this relationship. Section 3.1.1 discusses how net lending affects debt dynamics under different assumptions about interest rates and growth. Section 3.1.2 then studies how inflation affects debt dynamics. Section 3.1.3 describes the *fiscal theory of the price level*. Section 3.1.4 analyses whether fiscal policy can change the conditions for monetary policy by influencing the neutral interest rate.

3.1.1 Fiscal policy and debt dynamics

As discussed in Section 2.2, stabilisation policy using fiscal policy requires that government net lending varies countercyclically. If the government pursues contractionary policy in a boom, net lending will be more positive (less negative). It will be less positive (more negative) if the government pursues expansionary policy in a recession. The question then arises: around what value should net lending vary? Intuition might lead one to answer that this value needs to be zero so that on average the budget is balanced over the business cycle. An average deficit would lead to an unsustainable development of government debt, while a surplus would make the government infinitely rich at the expense of the private sector. However, this intuitive answer turns out to be incorrect.

Both permanent (average) deficits and surpluses are consistent with sustainable public finances. The reason why intuition is misleading in this case is that there is no end date when the central government ceases to exist and by which its debts must be paid. Furthermore, the size of government debt should be related to the size of the economy, that is, nominal GDP. The reason is that the government's capacity to pay its debts, as well as the temptation to avoid them, depends on the debt in relation to government revenue. The key measure of government debt is therefore the *debt ratio*, that is, debt as a share of GDP. Box 3.2 shows mathematically how the development of the debt ratio over time depends on net lending, GDP growth, and the interest rate on government debt. Here, we provide a verbal discussion.

The debt ratio falls if the debt is being paid off, i.e., if net lending is positive. However, the debt ratio also falls when the denominator, GDP, grows. Nominal growth therefore decreases the debt ratio because a given nominal debt is 'diluted' by a larger GDP. Growth in GDP thus creates scope for net borrowing without the debt ratio necessarily increasing. The size of this dilution effect depends on the growth rate and the level of debt. Without debt, no scope for dilution is created, and the larger the debt, the bigger is the dilution effect. If the debt ratio is negative, i.e., if the government has positive net financial wealth, the dilution effect will also be negative. To maintain a constant net financial wealth ratio as GDP grows, the

government must then increase its financial assets, i.e., produce positive net lending.

It can be shown that any constant level of net lending, positive or negative, expressed as a share of GDP leads to the government debt ratio ultimately converging to a stable level (see equation 3.2 in Box 3.2). The long-term debt ratio is given by the net borrowing as a share of GDP divided by the long-term growth rate of nominal GDP. Conversely, if the government runs a surplus, net assets as a share of GDP converge to government lending as a share of GDP divided by the nominal growth rate of GDP.

Box 3.2 Debt dynamics

To analyse debt dynamics and fiscal sustainability, we use the dynamic budget constraint for the government excluding the central bank in Box 2.1 and the equivalent expression for the central bank in Box 2.7.

Debt dynamics without the central bank

We first ignore the role of the central bank. Our starting point is equation (2.3) in Box (2.1), repeated here for convenience:

$$d_{t+1}(1+\rho_t) - d_t = i_t^D d_t - s_t = -f_t. \qquad (3.1)$$

The debt ratio converges towards a stationary value if net lending, *f*, is constant as a share of GDP and the nominal growth rate, ρ, is constant and greater than zero. This value is obtained by setting $d_{t+1} = d_t \equiv d$ and will be:

$$d = -\frac{f}{\rho}. \qquad (3.2)$$

The government debt ratio will thus be lower if net borrowing as a share of GDP, *-f*, decreases or if nominal GDP grows faster. In the case of net lending, the stable debt ratio will be negative, which means positive government financial wealth.

It is illuminating to think about the equation for debt dynamics in terms of the relationship between the nominal interest on government debt and the nominal GDP growth rate. By subtracting $\rho_t d_t$ from both sides of equation (3.1), assuming that the growth rate, ρ, and the interest on government debt, i^D, are constant and again setting $d_{t+1} = d_t \equiv d$, we get a stationary equilibrium in which the following applies:

$$0 = (i^D - \rho)d - s = -\frac{(i^D - \rho)f}{\rho} - s \tag{3.3}$$

and consequently that

$$s = -\frac{(i^D - \rho)f}{\rho}. \tag{3.4}$$

The effect of a change in net lending, *f*, on primary net lending, *s*, is given by

$$\frac{ds}{df} = -\frac{i^D - \rho}{\rho}. \tag{3.5}$$

Equation (3.5) shows that if the nominal interest is higher than the nominal growth rate, i.e., $i^D > \rho$, higher (lower) net lending means that primary net lending will be lower (higher) in the long term. If, instead, the nominal interest rate is lower than the nominal growth rate, which has been the case for a long time, i.e., $i^D < \rho$, higher (lower) net lending instead means that primary net lending will be higher (lower) in the long term.

Extension with exogenous financial assets

The above discussion does not take into account the fact that the government has both financial assets and financial liabilities that are exogenous with respect to the government surplus or deficit. These assets consist of both interest-bearing assets like student loan claims and non-interest-bearing assets (stocks) directly held by the government and in the public pension system. To make the analysis tractable, we assume the following:

1. The government does not buy or sell any stocks. The increase in the value of stocks is equal to the nominal growth rate of GDP.

The government's stockholding therefore constitutes a constant share of GDP, a.

2. The government's interest-bearing assets are also constant as a share of GDP.

With these assumptions, the debt variable d in equation (3.1) can be reinterpreted to refer to the government's *interest-bearing net debt*. This is then what converges to $-f/\rho$. With a surplus target of 1/3 per cent of GDP and a nominal growth rate of 4 per cent, interest-bearing net debt converges to -1/12≈−8.3 per cent of GDP. This means that interest-bearing net assets converge to 8.3 per cent of GDP. The *financial net debt* in this situation is the interest-bearing net debt less the stockholdings, $-f/\rho - a$. In other words, net financial wealth converges towards $f/\rho + a$. To the extent that the government's financial assets partly are financed through borrowing, they must be added to the interest-bearing net debt to obtain the *gross consolidated government debt*.

The relationship between net lending and primary net lending will now be:

$$i^D d_t - n_t a_t - s_t = -f_t,$$

where d_t stands for the interest-bearing net debt and n_t for dividend income as a percentage of the stockholdings. In a stationary equilibrium, for primary net lending, s, the following applies:

$$s = -\frac{(i^D - \rho)f}{\rho} - na.$$

Consequently, as above, then $ds/df = -(i^D - \rho)/\rho$.

At the end of 2021, according to the financial accounts, the interest-bearing net debt of the general government was 34.9 per cent of GDP, its (consolidated) gross debt was 36.7 per cent of GDP, its non-interest-bearing assets (stocks) 65.7 per cent of GDP and its financial net wealth 30.7 per cent of GDP. It should be noted that the (consolidated) gross debt is measured at its nominal value, while the other measures reflect the prevailing market valuation. In

the equations above, we have used nominal values throughout for government debt and assumed (as already noted) that the market value of stocks follows GDP. The latter may be a reasonable approximation in the long run.

Debt dynamics including the central bank

To analyse the impact of the central bank on the (unconsolidated) government finances, we express the dynamic budget constraint for the government, excluding the central bank, as shares of GDP. Equation (2.15) in Box 2.7 gives

$$g_t + i_t^D d_t^T = t_t + (1 + \rho_t) d_{t+1}^T - d_t^T + x_t^{CB}, \qquad (3.6)$$

where lower-case variables as before denote shares of nominal GDP, which is assumed to grow at the rate ρ_t.

Similarly, we can express the variables in the central bank's budget equation (2.16) as shares of GDP. We obtain:

$$\begin{aligned}(1 + \rho_t) d_{t+1}^{CB} - d_t^{CB} + i_t^H h_t + x_t^{CB} \\ = i_t^D d_t^{CB} + (1 + \rho_t) h_{t+1} - h_t + z_{t+1},\end{aligned} \qquad (3.7)$$

where the last term is seignorage, z_{t+1}, as a share of nominal GDP:

$$z_{t+1} \equiv \frac{M_{t+1} - M_t}{P_t Y_t} = (1 + \rho_t) m_{t+1} - m_t. \qquad (3.8)$$

As above, we define government primary net lending as the difference between tax revenue and primary expenditure. When expressed as shares of GDP, we get:

$$s_t = t_t - g_t. \qquad (3.9)$$

We now add the central bank's transfers to the Treasury to the government's total net lending in Box 2.1. The expression then becomes:

$$f_t = s_t - i_t^D d_t^T + x_t^{CB}. \qquad (3.10)$$

In a stationary equilibrium, where the debt ratio, net lending and growth rate are constant, as in the analysis above without the central bank (equation 3.2), (3.6) means that

$$f = -\rho d^T \tag{3.11}$$

and that the debt ratio converges towards

$$d^T = -\frac{f}{\rho}. \tag{3.12}$$

The only difference from equation 3.2 is that the definition of government net lending has been changed so that it now also includes the central bank's transfers to the Treasury, which means that it is affected by the central bank's balance sheet operations.

From (3.7), we can solve for the central bank's transfers to the Treasury in a stationary equilibrium (where we now additionally assume that the central bank's holdings of government bonds, d^{CB}, reserves, h, interest on the reserves, i^h, and seignorage, z, are constant):

$$x^{CB} = (i^D - \rho)d^{CB} - \left(i^h - \rho\right)h + z. \tag{3.13}$$

From (3.6) and (3.9), we obtain government primary net lending in a stationary equilibrium as:

$$s = (i^D - \rho)d^T - x^{CB}. \tag{3.14}$$

If we substitute in the expression for x^{CB} from (3.13) in (3.14) and additionally utilise the expression for d^T in (3.12), we get:

$$s = -\frac{(i^D - \rho)f}{\rho} - (i^D - \rho)d^{CB} + \left(i^h - \rho\right)h - z. \tag{3.15}$$

The relationship between government primary net lending and its net lending is the same as in the analysis above without the central bank. However, equation (3.15) now also allows us to analyse how the central bank's balance sheet operations affect government primary net lending in a stationary equilibrium. When the central

bank buys government bonds, the banks' reserves increase equivalently, that is $\mathrm{d}d^{\mathrm{CB}} = \mathrm{d}h$. Consequently, we have:

$$\frac{\mathrm{d}s}{\mathrm{d}d^{CB}} = i^h - i^D. \qquad (3.16)$$

With given central government net lending (and given seignorage), central bank purchases of government bonds mean that primary net lending in stationary equilibrium will increase if the interest, i^h, on bank reserves (with which the central bank pays) exceeds the interest on the purchased bonds, i^D. The logic is elementary. Central bank returns decrease and thus also transfers to the Treasury. This must then be offset by higher primary net lending, that is, by an increase in tax revenue relative to primary expenditure. Otherwise, net lending cannot be kept constant. If instead $i^H < i^D$, securities purchases mean lower primary net lending for the government.

Table 3.1 displays the values towards which the debt ratio converges over time for different levels of net lending under different assumptions about the interest rate, given that the growth rate of nominal GDP is 4 per cent per year. Permanent net lending of 1 per cent of GDP means that the debt ratio, *d*, tends towards a stationary value of -1/4, or -25 per cent. This means a net financial wealth of 25 per cent of GDP. Similarly, net borrowing of 1 per cent would lead to a debt ratio of 25 per cent of GDP. The meaning of government debt here is, in fact, the *net debt* of the *general government*, that is of the whole public sector. Sweden's fiscal framework sets a target for net lending in the public sector as a whole (excluding the *Riksbank*). (Consolidated) gross debt can deviate from net debt and does so in the case of Sweden. Financial assets that yield a return in the form of capital gains, such as stocks, must also be treated separately, since this return is not counted in net lending. We will return to this below (see also Box 3.2).

Table 3.1 Long-term net debt and primary net lending (per cent of GDP) at 4 per cent nominal growth rate

	Nominal interest rate		
Net lending	**6 per cent**	**4 per cent**	**2 per cent**
1 per cent of GDP			
Long-term net debt	-25	-25	-25
Long-term primary net lending	-0.5	0	0.5
0 per cent of GDP			
Long-term net debt	0	0	0
Long-term primary net lending	0	0	0
-1 per cent of GDP			
Long-term net debt	25	25	25
Long-term primary net lending	0.5	0	-0.5

Given (average) net lending, the general government net debt therefore automatically tends to a stationary level. How quickly this level is reached is determined by the nominal GDP growth rate. A share of the difference between the actual debt ratio and its long-term level disappears every year. With a nominal GDP growth rate of 4 per cent per year, 4 per cent of the difference disappears annually. The half-life of the deviation is (approximately) $70/\rho$, where ρ is the nominal growth rate measured in per cent per year. Thus, with an annual growth rate of nominal GDP of 4 per cent, half of the difference between the actual debt ratio and its stationary long-term level disappears in about 17 years. With a growth rate of 2 per cent, the half-life will be about 35 years.

Everything else equal, the more negative government net lending, the higher government net debt. Given that the interest rate is positive, the interest payments for the debt will then also be larger. Since net lending includes (nominal) interest payments, larger such payments at given net lending require higher taxes or lower other (primary) government expenditure, i.e., higher primary net lending. As discussed earlier, the difference between government revenue and expenditure excluding interest payments constitutes primary net lending (see Box 2.1).

Lower net lending for a *given* government debt creates room for lower taxes and/or higher primary government expenditure. On the

other hand, lower net lending leads to an increase in government debt, which increases interest payments. This requires higher taxes and/or lower primary government expenditure. Which of these mechanisms pulling in opposite directions is the strongest? In other words, must a reduction in net lending today lead to higher taxes or lower primary expenditure in the future? The answer depends on the difference between the interest rate on the government debt and the GDP growth rate.

Greater net borrowing increases the debt ratio once it has reached its stationary level. This raises interest payments if the interest rate is positive. For example, with a debt ratio of 25 per cent and a nominal interest rate of 2 per cent, interest payments are the product of these figures, that is, 0.5 per cent of GDP. With double the debt ratio or double the interest rate, interest payments are twice as high, i.e., 1 per cent of GDP.

A higher debt ratio also means that the size of the dilution effect described above will be greater. With a debt ratio of 25 per cent, for example, and a nominal growth rate of 4 per cent, the dilution effect will be the product of these figures, that is, 1 per cent of GDP. The dilution effect thus creates scope for net borrowing of 1 per cent of GDP. With double the debt ratio, this scope is twice as large.

From these simple calculations, we see that a higher debt ratio has two opposing effects on the net lending required for the debt ratio to remain constant: the interest rate effect and the dilution effect. The interest rate effect is stronger if the interest rate is higher than the growth rate of GDP; otherwise the dilution effect is stronger. If net lending is permanently reduced, the long-term debt ratio is higher. In the first case, when the interest rate is higher than the growth rate, the higher debt ratio inevitably requires an increase in primary net lending. This means that in the short term, taxes can be cut (or primary expenditure increased) if the surplus target is lowered, but that taxes must be increased (or primary expenditure lowered) in the long term. Hence, there is an intertemporal conflict between objectives.

However, there is no such conflict in the case where the interest rate is lower than the GDP growth rate. Then, lower net lending creates scope for lower taxes or higher primary expenditure in both the short and long term. A reduction in net lending means in effect a financial 'free lunch' for the government.

Let us again consider an example where nominal growth is 4 per cent as in Table 3.1. If the interest rate is 6 per cent, each percentage of GDP by which net lending is reduced requires long-term strengthening of primary net lending by 0.5 per cent of GDP. If the interest rate is instead 4 per cent, i.e., equal to the growth rate, the two effects cancel out. Although a reduction in net lending leads to higher debt and thus higher interest payments, once the debt has reached its stationary level, it is possible to borrow to make these payments so that primary net lending is not affected. If, instead, the interest rate is 2 per cent while the growth rate is 4 per cent, in the long term primary net lending can be weakened by 0.5 per cent of GDP – taxes can be cut or primary expenditure increased by this amount.

3.1.2 Monetary policy and debt dynamics

Let us now analyse how monetary policy can affect the above reasoning. We start from the premise that monetary policy has a long-term effect on inflation but not on real interest rates and real GDP growth rates. Then monetary policy can affect only *nominal* interest and growth rates by changing the inflation target. The reason is that the nominal interest rate is given by the real interest rate plus inflation and the nominal growth rate by the real growth rate plus inflation.

We can now analyse the effect of changes in the inflation target. A long-term increase (decrease) in inflation will move the long-term net debt ratio closer to (further from) zero for given net lending. This is due to higher (lower) inflation increasing (decreasing) the nominal GDP growth rate. In Box 3.2, higher inflation means an increase in the parameter ρ. Assume that net lending is -1 per cent of GDP, that the real growth rate is 2 per cent per year and inflation is 2 per cent per year so that the nominal growth rate is 4 per cent. The long-term debt ratio will then be 25 per cent. If inflation increases to 4 per cent, nominal growth will be 6 per cent. The debt ratio will then be converging to 1/6 instead, that is, about 17 per cent. With net lending of 1 per cent of GDP, in the long term, we instead get government net financial wealth of 25 per cent of GDP at 2 per cent inflation, and 17 per cent at 4 per cent inflation.

Given our assumptions, a permanent change in the inflation rate will change the nominal interest rate one-to-one so that the real interest rate is not affected. If, for example, inflation increases by 2 percentage points, the nominal interest rate rises equivalently. Initially, nominal interest payments will then increase. But the higher growth rate also means that a given debt is diluted each year by higher nominal GDP. Given net lending relative to GDP, the debt (or wealth, if positive) over time decreases as a share of GDP. Higher inflation, and thus higher nominal growth, creates scope for net lending/borrowing further from zero without the debt ratio (or wealth ratio) rising in the long term.

Consider again the example of net lending of -1 per cent, a real growth rate of 2 per cent and an inflation rate of 2 per cent. The debt ratio will then be 25 per cent in the long run. If inflation and the nominal interest rate increase by 2 percentage points permanently, interest payments will increase by 0.5 per cent of GDP when the debt ratio is 25 per cent. If net lending then decreases correspondingly, i.e., to -1.5 per cent, primary net lending will remain unchanged. With nominal growth, which is now 6 per cent, the debt ratio will be 1.5/6 = 1/4, i.e., it remains unchanged at 25 per cent.

If inflation increases and this leads to a corresponding increase in nominal growth and interest rates, the debt ratio will remain unchanged in the long term if net lending has changed so that primary net lending is constant.[37] It is tempting to conclude from this that one could set a target for *primary* net lending rather than net lending. However, this only works if the interest rate is lower than the GDP growth rate. Otherwise, a target for primary net lending leads to unstable debt dynamics (see Box 3.2). In that case, any divergence of the debt ratio from its stationary level gets larger and larger. The reason for the difference in stability is that, with a net lending target, primary net lending/borrowing is lower (higher) if the debt is higher (lower) than at the stationary level. This creates a stabilising force since primary net lending increases when the debt is higher than at the stationary level and vice versa. This means that the debt always moves towards a value determined by the ratio

[37] The stable debt ratio is $d = -f/\rho$. Consequently, $f = -\rho d$ and if we take differentials $\mathrm{d}f = -\mathrm{d}\rho d = \mathrm{d}i d$. Furthermore, from the definitions of net lending and primary net lending, we know that $f = s - id$ and consequently that $\mathrm{d}f = -\mathrm{d}i d$ if primary net lending is kept constant.

between net lending/borrowing and the nominal growth rate. However, if the inflation target is changed, the target for net lending/borrowing can easily be adjusted so that primary net lending remains unchanged in the long term.

As demonstrated, a surplus target means that general government net wealth will be positive in the long term. However, this does not mean that government debt must disappear. First, the central government has financial assets and, if these exceed its net wealth, debt is required to finance them. Even Norway, where central government net wealth is very large, exceeding GDP several times over, has significant government debt in the form of government bonds. It is therefore quite possible to accumulate central government net wealth via a surplus target without this necessarily meaning that government debt disappears.

Second, the surplus target relates to net lending in all of the public sector, including the pension system. Although the pension system's finances are isolated from those of the rest of the central government, surpluses in the pension system create scope for lower net lending in other parts of the public sector. According to a forecast by the National Institute of Economic Research (2022), net lending in the pension system will increase to 0.9 per cent of GDP in 2030. Unless the surplus in the pension system starts being distributed (what is termed an *accelerator*), net lending there will continue to grow.[38] A surplus in the pension system's net lending and a deficit in central government net lending creates financial assets in the pension system but liabilities for the central government. Assets in the form of domestic government bonds owned by central government agencies, the pension system and local governments are deducted from the outstanding government debt when consolidated general government gross debt (Maastricht debt) is calculated.[39] However, most of the pension system's financial assets are in asset classes other than Swedish government bonds. Debts raised by local governments are included in the Maastricht

[38] Net lending in the local government sector is estimated at -0.3 per cent of GDP in the National Institute of Economic Research's baseline scenario (National Institute of Economic Research 2022).

[39] However, the *Riksbank* is not included in the consolidated general government. The National Debt Office's previous borrowing to finance part of the *Riksbank*'s foreign exchange reserve therefore raised the consolidated general government debt. This borrowing has now ceased and the *Riksbank* is paying back the loans from the National Debt Office on an ongoing basis (Riksbank 2021b).

debt, which is therefore greater than the central government debt. At the end of 2021, they amounted to 37 percent and 23 percent of GDP, respectively.

The surpluses in the pension system have created, and continue to create, financial assets there. They currently constitute just over 30 percent of GDP and are expected to remain at approximately this level until 2050 according to the National Institute of Economic Research (2022). These assets are larger than the net assets that will be generated by the net lending of 1/3 percent of GDP.[40] As noted, the surplus target is formulated for the consolidated general government, that is, for the sum of central government, the pension system and local governments. If the pension system generates a sufficiently large surplus and the local government sector is in balance, the central government can run a deficit at the same time as the surplus target is met. This deficit means a need for borrowing by issuing government bonds. To the extent that the pension system does not purchase these, the consolidated general government accumulates gross debt. Therefore, even if the surplus target is reached, the Maastricht debt does not disappear. The National Institute of Economic Research (2022) forecasts that the total financial net wealth of the general government will increase slightly from 26 per cent of GDP in 2022 to 29 per cent in 2050 if the current surplus target is sustained and met. Maastricht debt is forecast to fall, albeit slowly, from 32 per cent of GDP in 2022 to 28 per cent in 2050. With a balance target instead, net financial wealth would amount to 24 per cent and the Maastricht debt 34 per cent over this horizon.

Due to demographic factors, net lending in the pension system may vary. If the buffer funds in the pension system need to be used to bridge a temporary gap between the system's income and expenditure, it enters as a negative item in government net lending. To achieve a given surplus target, net lending in the remainder of the public sector must then increase – through higher taxes or lower primary expenditure. This should be avoided, however, since a temporary use of the buffer funds does not signal any need for budgetary strengthening but is a consequence of natural demo-

[40] As shown above, a surplus target of 1/3 per cent together with a nominal growth rate of 4 per cent will lead to a long-term net financial debt ratio of (-1/3)/4 = -1/12, i.e., a net financial wealth of 8 per cent of GDP.

graphic variations that the pension system is designed to cope with. This justifies adjusting the surplus target when there are major changes in the pension system's net lending.

3.1.3 *The fiscal theory of the price level*

According to textbooks, the government is bound by its *intertemporal budget constraint*. This condition is based on the government's dynamic budget constraint, but takes into account that it must apply for all future periods without the debt ratio exploding (see also Section 2.2 and Box 2.1). The intertemporal budget constraint states that the outstanding debt must be equal to the present discounted value of future amortisation payments. The latter are comprised of future primary surpluses, i.e., the differences between revenue and expenditure, excluding interest payments. If the government has an outstanding debt, it cannot then be rolled over indefinitely by taking up new loans to pay amortisations and interest payments. According to this view, there are no free financial lunches: the government has to pay back what it owes. But, as we have seen in Section 3.1.1, this need not necessarily be the case. If the economy's growth rate is permanently higher than the interest rate, there *are* free financial lunches to be had. It is then possible to roll over the amounts needed to pay interest and amortisation on new loans forever without ever paying back the outstanding debt. Those who have lent money to the government will get it back when the bonds issued by the government mature. Bond interest and amortisation payments are financed by issuing new bonds. If the interest rate is permanently lower than the growth rate, this strategy is compatible with a stable debt ratio. However, if the interest rate is higher than the economy's growth rate, such a strategy will lead to an ever-growing debt-to-GDP ratio, which is not compatible with sustainable public finances.

The interest rate on safe government bonds has been significantly lower than the economy's growth rate for a long time. Interest rates have now risen, but there are many indications that they will also in the future continue to be lower than the economy's growth rate, provided that borrowing is perceived as relatively risk-free. Of course, it is not possible to make reliable long-term forecasts for

neither the interest rate nor the GDP growth rate. If over a long, but still finite, horizon, the interest rate is lower than the growth rate, it is not possible to roll over interest payments and amortisation indefinitely. However, a debt that is rolled over will shrink as a share of GDP until the date the interest rate exceeds the growth rate. This will produce a financially cheap lunch, albeit not completely free.

We have used the term 'free financial lunch' above. But there may also be free *real lunches*. These can arise if the return on real investments, such as machinery and infrastructure, is lower than the economy's growth rate. If such a situation is permanent, the economy is *dynamically inefficient*.[41] The economy then accumulates too much capital. If the share of GDP invested is reduced and consumption is increased instead, all generations – both present and future – will be better off. Under these assumptions, free real lunches arise. However, we are arguably not in a situation of over-investment.[42] On the contrary, most evidence suggests that the transition to climate neutrality in Sweden, as well as elsewhere in the world, will require an increased investment ratio. Although this can be financed at least in part by increased borrowing, the real resources that are utilised must come from output – they are not free.

If the intertemporal budget constraint nevertheless must be adhered to, the traditional view is that it must occur by the government adjusting taxes or expenditures. However, defaulting on payments is also a way of adhering to the constraint. In theory, the losses incurred by those who have lent money are then regarded as a form of revenue for the government.

In contrast, according to the *fiscal theory of the price level*, the government intertemporal budget constraint is an equilibrium condition that determines the price level. The starting point for the reasoning is that government debt is (primarily) nominal, i.e., a promise to pay a number of national currency units in the future. Unexpected changes in future price levels will then change the real value of the outstanding debt, or in other words, the amount of goods and services it represents. The next step in this theory is to assume that inflation will ensure that the intertemporal budget condition is met. If the central government stubbornly, suddenly

[41] See Diamond (1965) for an early account of this.
[42] Here we refer to the level of aggregate investment. Another aspect concerns the choice of investments. Public funds are sometimes invested in projects with low economic returns (see, for example, Börjesson and Eliasson 2015).

and unexpectedly decides to reduce future amortisations, the real value of the debt must fall. According to the *fiscal theory of the price level*, this is achieved by inflation rising. If this approach is taken to its extreme, such changes in the government's amortisation of its debt are the only way to bring about unexpected changes in inflation. Monetary policy can steer expected inflation, but divergences from inflation are determined by unexpected changes in fiscal policy (Cochrane 2021). It is therefore unexpected changes in the price level that change the real value of outstanding nominal government debt.[43] In other words, under certain conditions part of government debt is inflated away. Conversely, unexpectedly low inflation increases the real value of outstanding government debt.

In our view, this theory has little to say about the relationship between Sweden's fiscal and monetary policy. There are a number of reasons for this. First, it is unclear whether the intertemporal budget constraint really does place restrictions on policy. There are many indications that, at least for the foreseeable future, it will be possible to roll over government debt without paying it back because the nominal growth rate exceeds the nominal interest rate on the debt as discussed above. The significant fall in the government debt ratio since the 1990s crisis has largely occurred without amortisation. Instead, it is nominal growth that has caused the debt to fall in relation to GDP through the dilution mechanism discussed above.

Second, it is unclear why it is the price level that determines the real value of the government debt. If the owners of the government debt suddenly expect smaller amortisations in the future, the price of the bonds can fall without the general price level necessarily changing. This has happened many times before throughout history, in our vicinity most recently in the euro countries during the euro crisis.

At the end of 2021, Sweden's central government debt was about 23 per cent of GDP, of which about one fifth was real bonds whose real value cannot be reduced by inflation. With the local government sector also included, the consolidated general government debt was 37 per cent of GDP. The possibility of inflating away debt depends on the term to maturity of the debt. On average it is 5 years, which

[43] If expected increases in inflation reduce the real value of outstanding government debt, rational lenders would not lend to the government. Why would anyone do that if it can be expected that the debt will be inflated away?

is low from an international point of view. This means that around one-fifth of government debt is renewed every year. An unexpected increase in inflation leads to the value of nominal debts falling. Suppose, for example, that the price level suddenly rises by 5 per cent. The real value of the outstanding nominal government debt will then decrease by 5 per cent, i.e., by approximately 1 per cent of GDP. A sudden and permanent increase in inflation has greater effects, but due to the short term to maturity of government debt, the effect of a permanent increase in inflation is not particularly great either. A sudden and permanent increase in inflation of 2 percentage points would reduce the value of a nominal five-year bond by barely 10 per cent, while a 30-year bond would lose about 45 per cent of its value.[44]

Finally, the general government interest-bearing net debt is considerably less than the central government debt. The general government has significant interest-bearing assets, amounting in 2021 to SEK 679 billion.[45] Although these are mainly held by the public pension funds, a policy that deliberately inflates away part of the value of these funds could well lead to compensation claims from current and future pensioners.

The conclusion is therefore that a policy that deliberately creates unexpected changes in inflation in Sweden would have relatively small effects on general government debt and on the government's intertemporal budget constraint. According to the *fiscal theory of the price level*, this would mean that small changes in expected future primary surpluses would have very large effects on the price level. This seems unreasonable.

3.1.4 Fiscal policy and the conditions for monetary policy

As established in Section 2.3, the primary instrument of monetary policy is the policy rate. According to the Taylor rule, which was discussed in Box 2.3, the central bank sets the policy rate in response

[44] We are assuming for simplicity a bond without coupons, i.e., without any payments before maturity. If such a bond falls due for payment in 5 years and inflation increases by 2 percentage points, the real value of this payment decreases by $(1-(1+0.02)^{-5}) = 9.4$ per cent. If the payment falls due in 30 years, the drop in value will be $(1-(1 + 0.02)^{-30}) = 44.8$ per cent. For a coupon bond, the drop in value will be smaller.

[45] Financial Accounts, Statistics Sweden. Non-interest-bearing assets (stocks) are not relevant in this context, since their value, everything else equal, can be assumed to be largely independent of inflation.

to inflation's deviation from the target level and to the GDP gap. If the GDP gap and the inflation deviation are zero, the real policy rate follows the neutral real interest rate, which is determined by factors beyond the control of the central bank (see Section 5.1).

However, the neutral real policy rate is not constant over time. Although the rate cannot be directly observed, there is strong evidence to suggest that it followed a declining trend over the last three decades. According to Armelius et al. (2018), in Sweden it has fallen by around 5 percentage points since the mid-1990s (see Figure 4.5 in Section 4.1). Since the neutral nominal interest rate is equal to the neutral real interest rate plus expected inflation, a constant (and credible) inflation target means that the neutral nominal interest rate falls in parallel with the real rate. Since there is a limit on how low the nominal interest rate can be set, the scope for expansionary monetary policy shrinks.

The causes of the falling neutral real interest rate is an active area of research. We discuss this in Section 5.1.1. The focus here is on whether fiscal policy can affect the neutral real interest rate in the long term and if so, whether this is desirable.

As we discuss in Section 3.2, fiscal policy and monetary policy are (imperfect) substitutes in stabilisation policy. If fiscal policy is more expansionary, the need for expansionary monetary policy decreases. However, the effect on economic activity of expansionary fiscal policy – and of expansionary monetary policy – is temporary. At each point in time, there is a level of output that is consistent with normal use of production resources. Temporarily, actual use may be higher or lower, for example through overtime work or through high unemployment and many individuals in short-time work. The economy generally tends to return to normal resource utilisation, i.e., to potential output, via several mechanisms. A permanent weakening of net lending (a reduction in the surplus target) has an expansionary effect on output which thus will dissipate in a few years' time.[46] This does not, however, preclude a lower level of general government net lending having long-term effects on the neutral real interest rate.

[46] Specifically, we are referring to the effect of increased demand resulting from reduced net lending. Depending on how this occurs, of course, effects on potential output may arise. An obvious example is a tax cut on labour income, which can be assumed to increase equilibrium employment.

According to traditional macroeconomic theory, a permanent weakening of fiscal policy has effects on interest rates in a closed economy. This is referred to as *crowding out*. The effect of an expansionary fiscal policy is counteracted in the longer term by the interest rate increasing, which reduces demand for investment.

Basic macroeconomic theory also describes that this crowding-out effect does not occur in small open economies. But this will not be due to higher real interest rates and lower investment, but because net exports fall. In a small open economy, in the long term the real interest rate is determined in the rest of the world. A reduction in Sweden's surplus target would then have no effect on the neutral real interest rate (see also Box 5.1). Since the decline in the neutral real interest rate is a global phenomenon that has occurred irrespective of differences in fiscal policy between countries, this reasoning seems to be empirically relevant. However, it is likely that larger general government net borrowing in many countries simultaneously would increase the neutral real interest rate in the world economy. This would reduce private investment, but this would only be economically desirable if investments were too high. Lower net lending in Sweden alone, on the other hand, would have no substantive effect on the long-term neutral real interest rate. To create more scope for monetary policy and raise the average nominal interest rate, an increase in the inflation target would be more effective (see Section 5.1.3).

3.2 Interaction in the short term: the stabilisation policy mix

Fiscal and monetary policy both affect economic activity – and thus also inflation. In this respect, the two policies are substitutes. But they are not perfect substitutes – their effects on the economy are not identical. They affect demand through different mechanisms and have different side effects.[47] The political conditions for decision-making are also radically different for these two policies, since fiscal policy is decided within the political system and monetary policy is decided by an independent central bank. This raises the question of

[47] By side effects of fiscal and monetary policy, we mean their impact on variables that are not the actual targets of a given measure.

what the best way is to try to achieve a certain level of activity. It can be done by fiscal and monetary policy affecting demand in the same direction (a *congruent* policy mix) or by counteracting each other (a *divergent* policy mix). A certain level of activity can be achieved through many different combinations of fiscal and monetary policy. This part of the report deals with various aspects of this policy mix. Section 3.2.1 discusses the points of departure for the analysis. Section 3.2.2 describes how views on stabilisation policy have changed in recent decades. Section 3.2.3 shifts the focus to economic crises. Section 3.2.4 discusses the guidelines that exist for what roles fiscal and monetary policy play in Sweden.

3.2.1 Points of departure

Mundell (1962) provides a classic analysis of how fiscal and monetary policy are best combined (an analysis of what he calls *the assignment problem*). His conclusion was that a policy instrument should be assigned the objective that it is, relatively speaking, most effective in achieving: the principle of *effective market classification*. Mundell analysed how monetary and fiscal policy should be used to simultaneously achieve internal balance (full employment) and external balance (unchanged foreign currency reserves) under a fixed exchange rate. His conclusion was that the appropriate assignment is to use monetary policy to achieve external balance, and fiscal policy to achieve internal balance. His rationale for this was that, relatively speaking, monetary policy is more effective at influencing the external balance than fiscal policy.[48] This assignment of objectives would guarantee convergence towards a stable equilibrium if the two instruments were adjusted only gradually to deviations from their respective objectives.[49]

Tobin (1987) is another early analysis of the policy mix problem. He criticised the Reagan years' combination of contractionary monetary policy and expansionary fiscal policy in the US because it led to high real interest rates and a real appreciation, which reduced

[48] Specifically, he argued that the effect of monetary policy on the external balance in relation to its effect on the internal balance is greater than the effect of fiscal policy on the external balance in relation to its effect on the internal balance. This is true because movements of capital are very sensitive to interest rate differences between countries.
[49] In graphical analysis, this means that the reaction functions (which indicate how one instrument reacts to changes in the other) should have the 'right' relative slopes.

investment and current account surpluses, and caused high government indebtedness. Tobin advocated instead a policy that would achieve the same level of economic activity but where monetary policy should be expansionary and fiscal policy contractionary. According to his reasoning, this would mean higher income growth (through more investment and greater accumulation of foreign assets) and less government indebtedness.[50] Currently (January 2023) there is concern that a similar situation to the one Tobin criticised could arise in many countries, including the US and Sweden: contractionary monetary policy aimed at combating inflation in the presence of fiscal policy that is expansionary (see Section 5.4).

One way of looking at the policy mix emphasised by Bartsch et al. (2020) – referring to the reasoning of Arthur Okun, as recounted by Tobin (1987) – is that it should not *overburden* neither monetary nor fiscal policy, but that both should be kept *middle-of-the-road*. Such an approach can be justified by greater uncertainty about the aggregate demand effects when policy becomes extreme. This may include large budget deficits and sharply growing government indebtedness in fiscal policy or zero/negative interest rates and large balance sheet operations in monetary policy during recessions. In booms, one probably wants to avoid extremely high interest rates – which can hit heavily indebted households and firms hard, and have very negative effects on investment demand. Extreme policies can trigger crises: high interest rates on government debt and a government debt crisis in the case of fiscal policy, and financial imbalances and a financial crisis in the case of monetary policy. These considerations lead to the conclusion that in the event of major demand disturbances, fiscal and monetary policy should be used congruently so that neither policy needs to become extreme.

In a report to the Swedish Fiscal Policy Council that attracted a great deal of attention, Leeper (2018) advanced a different argument for why fiscal and monetary policy should pull in the same direction. According to his reasoning, in order to be effective, an expansionary monetary policy – aimed at increasing the level of economic activity and thus inflation – must be supported by an expansionary fiscal policy. A reduction in interest rates means lower interest income for

[50] The fact that such a policy mix could lead to excessive *private* indebtedness and asset price bubbles was – naturally enough at the time – not a risk that Tobin conceived of.

lenders to the government. For them to maintain their demand for goods and services, fiscal policy must therefore ensure that the sector's primary net lending is weakened – today or in the future – so that the lenders' (lifetime) income is maintained. The argument is not convincing. The mechanism highlighted by Leeper cannot be important for aggregate demand in Sweden because government interest-bearing net debt is small (and some government securities are held by foreign investors).[51]

However, it is easy to find examples of situations where a divergent policy mix is justified. One obvious example is where government indebtedness has become so large that fiscal policy should prioritise reducing it, even in a recession. An expansionary monetary policy may then be appropriate to compensate for fiscal policy's contractionary effects on demand.[52] One can also conceive of the reverse where a government wants to reduce a strong government net financial position and a large budget surplus even in a boom. In that case, expansionary fiscal policy should be counteracted by a more contractionary monetary policy than the cyclical situation would otherwise call for.

Another situation where divergent fiscal and monetary policies may be justified is when a central bank has used forward guidance and, during a recession, 'promised' to keep the interest rate low for some time to come, thereby influencing interest rate and inflation expectations and also by this route stimulating economic activity. For reasons of credibility, the central bank may then want to stick to the promised low interest rate even in the event of a strong economic upswing.[53] In that case, combining expansionary monetary policy with contractionary fiscal policy may be justified.

[51] In its annual report, the Fiscal Policy Council distanced itself from the conclusions of the commissioned background report (Fiscal Policy Council 2018).
[52] This line of reasoning assumes that, in such a situation, fiscal tightening does not have expansionary effects on demand because the risk of an acute government debt crisis or more 'chaotic' consolidation measures in the near future decreases and households and firms consequently view the future more optimistically, and lenders require lower risk premia. There is a body of research on such 'expansionary contractions' (see, for example, Giavazzi and Pagano 1990 and Alesina et al. 2019). But the conclusions have also been questioned. For example, Bergman (2010) finds no evidence for Sweden's budget consolidation in 1994–97 having had any reverse effects on demand.
[53] See also Sections 2.3.2 and 5.1.3.

3.2.2 Conventional wisdom on the policy mix in macroeconomic thinking

In recent decades, the *conventional wisdom* in both macroeconomic theory and practice has been that monetary policy delegated to an independent central bank should primarily be responsible for stabilising economic activity and inflation (see for example Snowdon and Vane 1999, Taylor 2000 and Romer 2012).[54] This stabilisation policy role for monetary policy is reflected not least in different versions of the Taylor rule discussed in Box 2.3 having generally been regarded as a benchmark for how a central bank should act. According to this view, fiscal policy, which is determined within the political system, should normally only stabilise the business cycle through its automatic stabilisers. Discretionary fiscal measures aimed at stabilising the business cycle should, as a rule, be avoided.[55] In the economic policy debate in Sweden, this view on the interaction between monetary and fiscal policy has been expressed for example in STEMU (2002), Regeringen (2011) and the *Riksbank* committee (2019).

According to this conventional wisdom, there should be a clearly formulated inflation target for monetary policy. The better inflation expectations are anchored to this target, the greater the possibility for the central bank to stabilise the level of activity in the event of conflicts arising between price stability and employment objectives. Fiscal policy should be guided by clear rules on the fiscal balance and/or government debt dynamics over the business cycle to safeguard the long-term sustainability of public finances. The better the compliance with budget rules, the greater the positive stabilisation effect of automatic stabilisers and fiscal policy in general.

A number of reasons have been put forward for the described view on the policy mix:

- Monetary policy is more *effective* than fiscal policy when it comes to influencing the level of activity under a floating exchange rate in various variants of the Mundell-Fleming model. This is based

[54] Romer and Romer (1994) is also an influential contribution. They analyse stabilisation policy in the US during the post-war period and conclude that "monetary policy alone is a sufficiently powerful and flexible tool to end recessions" while "discretionary fiscal policy, in contrast, does not appear to have had an important role in generating recoveries" (page 55).
[55] See, for example, Eichenbaum (1997), Feldstein (2002), Fatás and Mihov (2003) and Fiscal Policy Council (2021).

on the conclusion that changes in fiscal policy are counteracted by changes in the exchange rate, so that an expansionary (contractionary) fiscal policy causess an appreciation (depreciation) of the currency, which implies that net exports decrease (increase).[56]

- Decisions on stabilisation policy are often driven by political *myopia*. Governments tend to conduct expansionary fiscal policy in recessions that is not offset by tightening in booms. There may be several reasons for this. Generous fiscal policy may increase the likelihood of a government being re-elected. Handing over large debts to new governments formed by competing parties reduces their scope to benefit those who voted for them. Common-pool problems mean that different interest groups are always pressuring governments to benefit them, regardless of the costs to the society as a whole. Myopia in fiscal policy leads to a weakening of public finances in the long term. This is referred to as *deficit bias*.
- Discretionary decision-making can give rise to *time-inconsistency problems*. Politicians who want to achieve ambitious employment targets have incentives to promise a low-inflation policy first and then, once expectations have been formed, to try to achieve higher employment through a more expansionary policy than announced. The likely result is an *inflation bias* without any gains in terms of employment.
- An *independent central bank* is less inclined towards political myopia, and less susceptible to time-inconsistency problems. Moreover, a central bank can quickly implement policy changes, while fiscal policy is determined in a slow decision-making process. Fiscal measures therefore risk being ill-timed.
- Monetary policy is *technically complex* and requires specialist knowledge about financial markets. At the same time, the distributional consequences are normally smaller than for fiscal policy, and therefore political value judgements are less important in the choice of policy. This can justify delegation to non-political experts.

[56] However, Corsetti et al. (2012) show that, under certain conditions, expansionary fiscal policy can lead to real depreciations. See also Section 2.

In an ideal world without imperfections – such as politics taking short-term factors too much into account, difficulties in making binding commitments, decision-making delays for fiscal policy and asymmetries in knowledge between politicians and experts – full coordination of fiscal and monetary policy would always be desirable. In models, such positive coordination gains can be exploited by a benevolent *social planner* deciding on both fiscal and monetary policy with the aim of maximising a social welfare function. These gains are lost when fiscal policy is managed by the government and monetary policy by an independent central bank. However, this cost is generally seen as being outweighed by better handling of the real-world imperfections described above.

Box 3.3 Time-inconsistency and coordination problems

The delegation of monetary policy to independent central banks is supported by research on time-inconsistency problems (Kydland and Prescott 1977; Barro and Gordon 1983a, 1983b, and Rogoff 1985 are the original contributions). According to these models, discretionary decision-making on monetary policy implies an *inflation bias*.

The analysis of monetary policy's time-inconsistency problems is usually based on the assumption that for politicians (and the society), the smaller the deviations in inflation and the level of activity from their desired levels, the better. For the sake of simplicity, the desired level of inflation is usually set to zero. The desired output level is assumed to be higher than potential output. Inflation is determined by an expectations-augmented Phillips curve. This means that inflation exceeds (falls below) expected inflation if output is greater (less) than potential output. According to the analysis, policymakers acting in accordance with citizens' preferences, i.e., maximising society's welfare function, have an incentive to pursue policies that cause inflation. In the standard models in the field (such as Barro and Gordon 1983a, 1983b, and Rogoff 1985), inflation (in reality its deviation from the desired level) is proportional to the difference between the desired output and potential output.

Incentives for an inflationary monetary policy arise because policy makers can act *after* inflation expectations are formed. These

can thus be taken as given when policy is determined. With low inflation expectations, output can therefore be increased if monetary policy allows inflation to become higher than expected. In equilibrium, however, rational private actors will understand the incentives of policy makers and therefore adjust their expectations to the inflation that will result. For this reason, inflation will in equilibrium be higher without any effect on the output level. In the model described, inflation problems can be reduced if monetary policy is delegated to an independent 'conservative' central bank that values low inflation relative to a high level of activity more than do citizens and the government. The inflation bias can be completely eliminated if the central bank has a preference function where the output goal equals potential output.

Most models of monetary policy's time-inconsistency problems do not analyse fiscal policy. However, as shown in Appendix A.2, it is straightforward to include it too in a stylised model. This can be done by assuming that output exceeds the potential level if fiscal policy is expansionary (= budget deficit) or the real interest rate (the monetary policy variable) is lower than an equilibrium interest rate and vice versa with a budget surplus or higher real interest rate than the equilibrium interest rate. According to the social welfare function, citizens are assumed to want inflation to deviate as little as possible from the desired level (set to zero), output to deviate as little as possible from an output goal (higher than potential output), the budget balance to deviate as little as possible from an objective for it (set to zero), and the real interest rate to deviate as little as possible from its equilibrium level.

If the government determines both fiscal and monetary policy by maximising society's welfare function (or – which is in principle the same thing – the government and central bank both maximise society's welfare function), then the same inflation bias arises as in the model described above with politically determined monetary policy as the only policy instrument. The real interest rate will be equal to the equilibrium interest rate and the budget deficit will be zero. Inflation is explained by rational private actors adjusting their inflation expectations to a level where, according to the social welfare function, policy makers have no incentive to deviate from either the equilibrium interest rate or a balanced budget.

The equilibrium described can be compared to an equilibrium where monetary policy is delegated to an independent central bank, while the government determines fiscal policy. For example, we can assume that the central bank acts according to a preference function using the same weights as in society's welfare function, but where only inflation, the deviation of output from a target for it, and the deviation of the real interest rate from the equilibrium interest rate are included, while the output target coincides with potential output. The government can be assumed to act on the basis of a welfare function with the same desired output and weights as in the social welfare function, but where only inflation, the deviation of output from the output goal, and the budget balance are included. In addition, we can assume that the central bank and the government act simultaneously but independently of each other, i.e., that the interest rate is taken as given when the budget balance is determined and vice versa (a Nash equilibrium).

Under the assumptions made, there is still an inflation bias but it is smaller than when the government controls both fiscal and monetary policy. At the same time, the two policies will counteract each other: fiscal policy is expansionary with budget deficits, while monetary policy is contractionary with a real interest rate above the equilibrium rate.

It is not possible to say in general whether the equilibrium with delegation of monetary policy provides higher or lower social welfare than the equilibrium where the two policies are determined jointly (politically). In both cases, output is equal to the potential output. The delegation equilibrium has the advantage that inflation is lower. But at the same time, fiscal and monetary policy are not coordinated effectively, leading to a combination of budget deficits and too high real interest rates. Which equilibrium is preferable will depend in a complex way on different parameter values.

The model analysis described is a specific illustration of the fundamental trade-off between the advantage of being able to handle various imperfections better by delegating monetary policy to an independent central bank, and the disadvantage of fiscal and monetary policy then being less well-coordinated than with joint (political) decision-making on both policies. The analysis does not explain the macroeconomic development in the decade or so between the global financial crisis in 2008–10 and the pandemic

crisis. In most advanced economies, this period was marked by inflation below both the central bank's inflation target and the private sector's expectations (probably due to positive supply shocks), expansionary monetary policy and budget consolidations. However, the model may describe a conceivable future equilibrium: with inflation that remains above the inflation target and is driven by budget deficits, while the central bank tries to counteract it through contractionary monetary policy with a high real interest rate. It is possible that the inflation processes that took hold in 2022 in many countries may lead to a sustained such situation (see also Section 5.4).

3.2.3 Fiscal and monetary policy in crises[57]

From dearly bought experience, we have learned that economic crises can be greatly amplified via financial markets. The effect of an initial adverse shock – for example, a decline in export demand, greater pessimism around future prospects, a pandemic or a geopolitical conflict – can be exacerbated by reactions in financial markets, so that the economic consequences end up being very great and long-lasting. This section briefly describes a taxonomy that divides financial amplification mechanisms into four levels. The first level is the least serious and most manageable, while the opposite is true of the fourth. This taxonomy is useful in understanding both the anatomy of financial crises and what fiscal and monetary policy measures may be appropriate at each stage.

Level 1 amplification – borrowers' balance sheets

We start by assuming that an adverse shock of some kind causes a fall in asset prices, e.g., house prices. Such a fall weakens the balance sheets of borrowers. This leads to reduced consumption and investment. One reason is that borrowers' wealth decreases, but a potentially more important one is that their borrowing possibilities in real time and in the future are curtailed. Households and other

[57] This section is inspired by a presentation given by Olivier Blanchard at the Nobel Symposium Money and Banking in May 2018. See https://www.hhs.se/en/houseoffinance/outreach/conferences/container/nobel-symposium-on-money-and-banking/.

borrowers will then want, or be forced, to try to restore their balance sheets by saving, thus reducing their expenditures. The effect is then first that demand for goods and services falls, which reduces GDP and increases unemployment. Second, demand for real assets decreases, which amplifies the fall in asset prices and thus creates a feedback mechanism.

This amplification mechanism has received long-standing attention in the literature (see Bernanke and Gertler 1989, and Kiyotaki and Moore 1997 for early analyses). It is linear in the sense that its strength is roughly proportional to the initial adverse shock. The mechanism can therefore be described using standard models and thus forecast. It is comparatively weak, but its strength increases in the initial level of aggregate household debt and the interest rate. Level 1 amplification is part of the normal business cycle, and traditional fiscal and monetary policy are effective means of mitigating its effects. Also, measures directly targeting the feedback mechanism itself, such as counter-cyclical amortisation requirements (more amortisation in good times than in bad), can be effective countermeasures.

Level 2 amplification – lenders and financial intermediaries' balance sheets

This amplification mechanism is activated when the balance sheets of lenders (banks and other financial intermediaries) are affected through credit losses and through asset values falling. Lenders will then want, or have, to reduce their lending. This applies in particular to less secure investments, which means that risk premia rise. For some borrowers, it becomes impossible to borrow. A *credit crunch* occurs. As with the first amplification mechanism, the effect is that consumption, investment and asset prices fall.

The Level 2 amplification mechanism is often stronger than the first, especially if lenders have little equity in relation to their lending. For loans originating from solid lenders such as pension funds, the effect is weaker or absent. The mechanism can be modelled and it too is relatively linear.

Traditional monetary policy is effective in counteracting the Level 2 amplification mechanism. Regulations ensuring that the balance sheets of banks and other creditors do not become too weak

are one way of reducing in advance the risk that this amplification mechanism becomes strong. In an emergency situation, however, such regulation needs to be relaxed. Otherwise, it runs the risk of being counter-productive by forcing creditors to reduce lending at a time when this is undesirable.

Level 3 amplification – run on the banks and other financial institutions

Level 3 amplification is based on uncertainty suddenly increasing about the solvency and viability of important financial intermediaries. These intermediaries may then run into severe liquidity problems. This can lead to *bank runs*, i.e., situations where all depositors want to withdraw their funds immediately. This course of events can cause self-fulfilling expectations of bankruptcies. Deposit guarantees have been in place for a long time to eliminate the risk of these mechanisms when it comes to households' bank deposits, but runs on banks or other financial institutions can still occur when firms and whole-sale investors want to withdraw their funds. To avoid this, financial intermediaries may need to quickly sell many of their assets. If a sufficiently large share of intermediaries does this at the same time, asset prices drop sharply in *fire sales*, amplifying the process.

Falling asset prices can also mean that financial assets with fixed returns, regarded as safe investments before the crisis, suddenly become risky. This occurs ifs the securities backing these assets were high-value in relation to the pre-crisis debt, but where the declining values of these securities suddenly mean that this is no longer true. When this happens, the market can freeze completely. This happened in some countries during the global financial crisis in 2008–10. An example is the market for short-term loans between banks. These are normally considered risk-free. Lending banks do not then have to consider credit risks or perform credit assessments of the borrowing banks.

The course of events generated by Level 3 amplification is commonly considered a *financial crisis*. It differs from the lower-level amplifications: quantitatively in the sense that the amplification is stronger and events happen faster; qualitatively in the sense that the processes are not linear and can give rise to multiple equilibria.

A financial crisis can arise suddenly and spread rapidly across the globe. Warning signs may exist, but in practice it is impossible to predict exactly if and when processes leading to a financial crisis will start.

In an emergency situation, the government and the central bank can play a decisive role in stopping Level 3 amplification mechanisms. Important tools include the issuing of guarantees, offering loans (against less secure collateral than under normal circumstances) and taking over risky assets. Provided that there is sufficient confidence in the government and the central bank, these measures can shut down the amplification mechanisms that threaten to create a financial crisis.

Level 4 amplification – lost confidence in the government

The government can normally act as a stabilising force in a financial crisis. But in the worst-case scenario, the government may also be drawn into it and contribute to deepening the crisis. The triggering factor is when the lenders to the government start to view the commitments it has made to reduce the effects of the lower-level amplification mechanisms as overpowering and not credible. Confidence in government finances and/or in price stability will then disappear.

Here too, the feedback mechanism is potentially so strong that multiple equilibria can arise. If the government is expected to be able to honour its interest payments, it is possible to issue government bonds with interest rates that are not excessive. But if expectations arise that the central government will not be able to cope, interest rates may surge making it impossible to borrow at manageable rates. This may apply in particular to loans with long maturities. A steeper yield curve leads to shorter maturities being selected, which in turn increases the quantity of bonds maturing at each point in time.

Bad equilibria involving a government fiscal crisis can thus be triggered by self-fulfilling expectations. The risk of this depends on the extent of the government's financial commitments and initial debt situation (see Reinhart and Rogoff 2009). The extent to which the fiscal framework and the political system in general create confidence in the willingness and capacity of the government to

service its commitments is also central. So although it is possible to understand which mechanisms are material in a crisis, it is difficult to calculate the probability of such a course of events and impossible in practice to define exactly the conditions under which government debt crises arise. A general safe limit for, for example, the size of government debt can therefore not be determined. It depends on the situation and a large number of institutional factors that vary over time and between countries (see for example Calmfors 2020b).

A country that finds itself in a situation where Level 4 amplification mechanisms set in loses its ability to influence developments in the short term through economic policy measures. Bartsch et al. (2020) discuss how fiscal and monetary policy can serve as a *backstop* for each other in order to avoid such a situation arising. As a last resort, the central bank can finance budget deficits by 'printing money' (in practice, through extensive purchases of government bonds in the secondary market). This reduces the risk of government default and holds down real interest rates on government debt. At the same time, a central bank that has made large purchases of securities risks major losses if interest rates rise. An – implicit or explicit – guarantee that the government will then inject capital may therefore be necessary for a central bank to risk a policy of this kind. Although nothing prevents central banks from having negative equity, in practice they scarcely want to end up in such a situation. A well-functioning interaction between fiscal and monetary policy can be crucial in preventing Level 4 amplification mechanisms in a crisis.

Conclusions for stabilisation policy

From the taxonomy described, it can be concluded that the most important task of stabilisation policy is to prevent the triggering of Level 3 and Level 4 amplification mechanisms. This becomes an issue of having capital requirements for banks and measures to ensure that credit risks are absorbed by financial institutions that have sufficient capacity to bear them. If large losses arise in pension funds that have not guaranteed their members any return, this will not have at all the same effect on the economy as if they arise in banks or other financial intermediaries with low capital adequacy.

That the stabilisation policy framework creates conditions for the government being able to act in a crisis and prevent Level 3 amplification mechanisms without amplification mechanisms of Level 4 occurring is at least as important. Experiences from the pandemic demonstrate the importance of confidence in the government's capacity to launch powerful policies in a crisis. It underlines the importance of clarity and credibility for both the fiscal and monetary policy frameworks. We do not see here any conflict between the objectives of fiscal policy and monetary policy, nor do we identify any important coordination problems.

A task for stabilisation policy is to counteract Level 1 and 2 amplification mechanisms in the event of economic shocks, as they lead to unnecessarily large cyclical fluctuations. A stronger motive for counteracting these mechanisms is to prevent them from triggering the higher levels of amplification that can cause a financial crisis or a government fiscal crisis. This is particularly important if the bulwark safeguarding the economy from the higher levels of amplification mechanisms is weak. If the opposite is true, the need for forceful stabilisation policy in normal times is more limited. The same applies to the relationship between Level 1 and 2 amplification mechanisms. If the institutional setting is such that a drop in house prices leads to a deterioration in the balance sheets of households, but not those of banks, it is less important to counteract Level 1 amplification mechanisms.

Additional measures aimed at counteracting Level 1 amplification mechanisms in advance can entail significant costs for affected households. For example, amortisation requirements and rules limiting the size of mortgages in relation to the value of the dwelling or the borrower's income are costly for those affected. Also monetary policy that is *leaning against the wind* – meaning that it is tighter than is justified on the grounds of stabilising inflation and resource utilisation but aims to reduce the build-up of debt in the private sector – should be included in this costly category. It is important to try to quantify both the advantages and disadvantages of such measures. The advantages in terms of a lower risk of financial crisis are smaller if losses in the household sector do not spill over into the banking sector. The probability of such spillovers is arguably small in Sweden, at least in comparison to the risk in the US. In many US states, the option exists to hand the keys of the

house over to the bank, i.e., to transfer ownership of the dwelling, and thereby be quit the mortgage. This can be an attractive option if house prices have fallen so much that the value of the dwelling owned by the household is below the value of its debt. Such rules force banks to bear a significant share of the losses in the event of a fall in real estate prices. But this is not the case in Sweden. However, when it comes to commercial real estate, there are significant risks for the banking sector in Sweden as well. This is because a commercial real estate company can go bankrupt and thus force the lenders (the banks) to bear part of the loss.

Measures of the kind discussed in the previous section have been implemented in Sweden without adequate analysis of their respective advantages and disadvantages. The latter can be significant when individuals' opportunities to finance the purchase of a dwelling are reduced or when monetary policy becomes tighter than is justified for the purposes of stabilisation policy, with higher unemployment as a result. These measures should therefore only be taken if they are likely to be sufficiently effective in reducing the risks of a financial crisis. It is fully possible to perform such analyses; see for example Svensson (2017).

3.2.4 Guidelines for the interaction between fiscal and monetary policy

The conventional wisdom on stabilisation policy described in Section 3.2.2 has largely guided the thinking behind fiscal and monetary policy in Sweden. The clearest expression of this can be found in the government's Fiscal Framework Communication to the parliament in 2011 (Regeringen 2011). One section discusses the respective roles of the *Riksbank* and the government and when and how fiscal policy is to be used. The attitude towards active fiscal policy as part of stabilisation policy is consistently sceptical.

The communication notes that "in the normal case, monetary policy will stimulate the economy in downturns and restrain it in upswings" because when demand is affected by a shock, there is normally no conflict between stabilising employment and stabilising inflation. It is further stated that "in such situations fiscal policy shall not make it more difficult for the *Riksbank* to keep inflation low and stable" by being procyclical. However, according to the

communication, in the case of normal demand shocks, "monetary policy will influence demand and inflation in the same direction, so as a rule there is no reason to try to affect demand with active (discretionary) fiscal measures in such situations". The communication emphasises the risks of fiscal policy being ill-timed due to decision-making lags, or of measures intended to be temporary becoming permanent because they are politically difficult to reverse. Instead, the communication stresses that fiscal policy's contribution to stabilisation should be mainly through the automatic and semi-automatic stabilisers (pages 32–33).

According to the communication however, "situations do exist when fiscal policy may need to *supplement* (our emphasis) monetary policy more actively". This is true in the case of major supply shocks and "when a demand shock is so great that, by itself, monetary policy cannot sufficiently counteract the fall in demand". The latter circumstances are clarified as situations "when the policy rate is approaching zero per cent" (page 34).

The communication also argues that the stabilisation policy mix should be influenced by the causes of the disturbances. Monetary policy is highlighted as effective in countering demand shocks to the export sector by affecting the exchange rate. Fiscal policy should then only be used to counteract contagion effects in other parts of the economy. It is also noted that when "instead the primary shock hits domestic demand, fiscal measures are better suited to counteract a loss of demand" (page 34).

Other arguments stress that the fiscal multipliers are small and that fiscal policy therefore can never fully return unemployment to normal levels in the event of major cyclical disturbances, since the effects on public finances would then be excessive. Fiscal measures should be either temporary (while stressing that they may be difficult to reverse) or if permanent, "they should consist of measures that are structurally appropriate and help to avoid bottlenecks when the economy recovers again and that contribute to permanently higher employment and GDP" (pages 35–36).

In the current Fiscal Framework Communication from 2018, stabilisation policy is scarcely mentioned (Regeringen 2018). The only stabilisation policy guidelines concern how deviations from the surplus target should be handled (page 15). It is then important to take account of the business cycle: "To minimise the risk of fiscal

policy being procyclical, government net lending that is deemed permanently above (below) the surplus target should not be dealt with until the next economic downturn (economic upturn)". The communication also states: "If, for example, government net lending is judged to be permanently above the surplus target and an economic downturn is not expected in the near future, it is possible to gradually reduce net lending. It must then be ensured that the effects on demand are not greater than can be dealt with by monetary policy".

Regarding monetary policy, the new *Sveriges Riksbank* Act codifies the current flexible inflation target policy by clearly formulating the objective of monetary policy as maintaining not only low inflation but also to stabilise output and employment (see Box 3.1). Despite this, the parliament bill on the new act (Regeringen 2021b) did not include any discussion of the appropriate balance between fiscal and monetary policy measures for stabilisation purposes.[58]

To sum up, there are no clear guidelines today in Sweden for the respective roles of fiscal and monetary policy in stabilisation policy. The lack of such guidelines in the government's 2018 Fiscal Framework Communication was criticised by the Fiscal Policy Council (2018). The deletion of the stabilisation policy section in the communication could be interpreted as the government and the *Riksdag* no longer supporting the guidelines contained in the 2011 communication. However, the prevailing lack of clarity is unfortunate. It risks leading to both fiscal and monetary policy decisions becoming too ad hoc, and the stabilisation policy mix not being based on well-considered principles.

[58] However, the *Riksbank* Committee (2019), assigned to propose changes to the *Sveriges Riksbank* Act, clearly states that "monetary policy is *mainly responsible* (our emphasis) for stabilisation policy under a floating exchange rate regime", but also states that "this does not *preclude* (our emphasis) fiscal policy from *assisting* (our emphasis) to stabilise the economy in the event of major cyclical fluctuations, especially in deep recessions, where the central bank is limited in what it can do and cannot cut its policy rates more" (page 685).

4 How has Sweden's fiscal and monetary policy been conducted?

This section analyses empirically how stabilisation policy has been conducted in Sweden. We explore to what extent fiscal policy has been countercyclical. This means higher net lending in a boom and lower net lending in a recession. *Procyclical* policy amplifies cyclical fluctuations by being contractionary when resource utilisation is low and expansionary when it is high. If there is no correlation between net lending and resource utilisation, fiscal policy is said to be *acyclical*. Similarly, we can characterise monetary policy based on the level of the real interest rate. We also study the relationship between, on the one hand, fiscal and monetary policy and, on the other hand inflation. Part of the analysis is aimed at determining whether fiscal and monetary policy have been *congruent*, i.e., have affected demand in the same direction; or *divergent*, i.e., have affected demand in different directions (see also Section 3.2.1).[59]

In addition to graphical analysis, we estimate regressions capturing how real interest rates, net lending and structural net lending have co-varied with the GDP gap and inflation's deviation from the inflation target. Structural net lending measures net lending corrected for effects of the business cycle, i.e., for the automatic stabilisers (see Section 2.2.2). The aim is to compute the level of net lending under the fiscal policy pursued if the GDP gap had been zero. Structural net lending can be seen as a measure of discretionary (active) policy. We present both *ex-post* and *ex-ante* estimates. The

[59] Our analysis is inspired by Bartsch et al. (2020). However, they study *changes* in fiscal and monetary policy variables, while we focus on *levels*, which are more relevant if the objective is to discuss how policy contributes to business cycle stabilisation.

former use realised values, while the latter use the forecasts that were available when the policy was designed.

One obvious problem when interpreting the correlations that we observe is that causality can go in both directions. We are interested in what policy is conducted in different cyclical situations. At the same time, the policy pursued affects macroeconomic outcomes. Expansionary fiscal or monetary policy contributes to higher resource utilisation and inflation. The correlations that we observe are a combination of the effects of the business cycle on policy and of policy on the business cycle. However, we interpret the observed co-variation as largely reflecting how policy has responded to resource utilisation and inflation. Our implicit identifying assumption is that exogenous shocks that have affected the business cycle – the 1990s crisis, the IT crash after the turn of the millennium, the global financial crisis, the recovery thereafter, and the COVID-19 crisis – have been far more important than any exogenous policy shocks. But since we make no econometric attempts to deal with these causality problems, the results should be seen as preliminary.

Another problem is that the effects of monetary and fiscal policy on GDP and inflation do not arise immediately but with lags. Econometric estimates indicate that the effect on GDP initially grows and reaches its maximum after one or more years. Hence, even if economic policy measures are perfectly correlated with the business cycle, their effects are not. In addition, there are also normally decision lags for fiscal policy. However, the consensus view in the research literature is that well-balanced countercyclical monetary policy contributes to stabilising the business cycle despite the time lag. For fiscal policy, research is somewhat more disparate, but as discussed in Section 2.2 there is ample reason to believe that countercyclical fiscal policy is able to stabilise the business cycle.

Section 4.1 explains the data and variables used. Section 4.2 studies how fiscal policy has co-varied with resource utilisation and deviations from the inflation target. Section 4.3 documents the correlation of monetary policy with the same outcome variables. Section 4.4 analyses the interaction between fiscal and monetary policy and sheds light on whether policies have been congruent or divergent. Section 4.5 gives a brief overview of economic policy during the pandemic.

Sensitivity analysis, based on alternative measures of the real interest rate and resource utilisation, is presented in Appendix A.3. Appendix A.4 reports the estimation results.

4.1 Data

Our study covers various measures of fiscal and monetary policy and is based on annual observations from the period 1996–2021. Below, we present the variables that form the basis of the analysis and study how they have evolved over time.

Variable definitions

As a measure of the fiscal policy stance, we use the deviations of both net lending and structural net lending from the surplus target. Since the target applies over a business cycle, it is reasonable to define expansionary fiscal policy as net lending below the target level, and contractionary fiscal policy as net lending above it. Net lending comprises both active measures and automatic stabilisers. The data for both net lending and structural net lending are obtained from the National Institute of Economic Research.

To measure the stance of monetary policy, we use estimates of both the neutral real interest rate, i.e., the interest rate that would be required to close the GDP gap at a given point in time, and the actual real interest rate from Armelius et al. (2018). Expansionary monetary policy is defined as the real interest rate being lower than the neutral real interest rate, and contractionary policy as the real interest rate being higher than this rate. In most of the analysis, we use Armelius et al.'s measure of resource utilisation.

Since the *Riksbank*'s inflation target has been formulated in terms of the consumer price index with a fixed interest rate (the CPIF) since 2019, we use this measure of inflation throughout. This ensures that mechanical effects of interest rate changes do not affect the inflation outcome.

In our ex-ante regressions, we use the forecasts for GDP gaps and inflation that were presented in the budget bill for each year. Since forecasts for the CPIF are not available for the entire sample period,

in these ex-ante estimations we use CPI forecasts when CPIF forecasts do not exist.

We limit ourselves to the period 1996–2021, since before this period there is no clearly defined surplus target to relate fiscal policy to (see also Box 3.1). When we use the estimates in Armelius et al. (2018), the sample period is 1996–2018. When we rely on forecasts for the GDP gap and inflation from the budget bills, data are only available for the period 2002–21.

As a complement to the estimates of the GDP gap and real interest rate presented in Armelius et al. (2018), we also use the National Institute of Economic Research's data on resource utilisation and develop our own measure of the real interest rate based on the policy rate minus expected inflation four quarters ahead according to the surveys by Prospera. The results from this analysis are reported in Appendix A.3.

The evolution of the variables over time

Figure 4.1 displays the GDP gap ex ante and ex post. The forecast GDP gap fluctuates more than the actual gap. The deviations are particularly large after the global financial crisis 2008–10. From 2010 and a few years onward, in connection with the budget bill the government estimated that the GDP gap would be significantly more negative than it actually turned out to be.

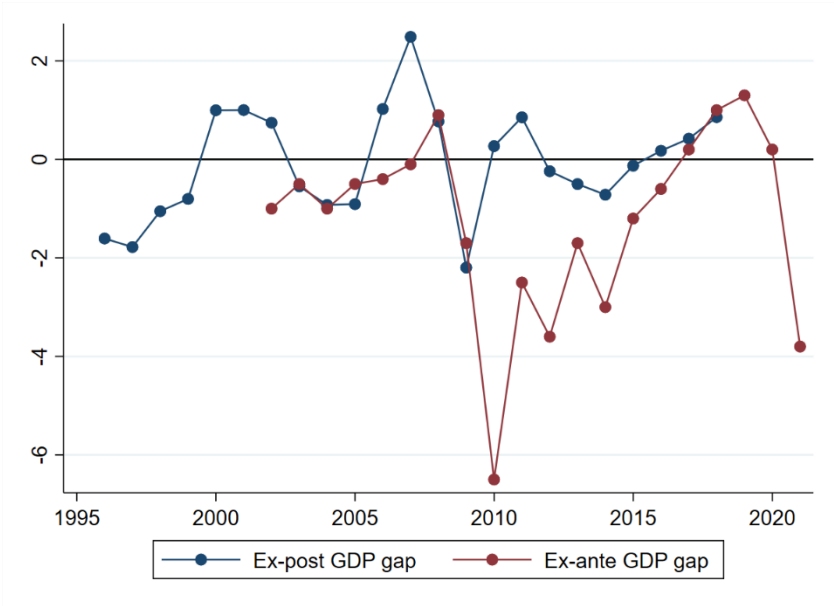
Net lending and structural net lending are illustrated in Figure 4.2. As expected, net lending is mostly below structural net lending when the GDP gap is negative. However, there are exceptions that may reflect the difficulties involved in measuring structural net lending. Figure 4.3 shows the deviation of net lending and structural net lending from the surplus target.

The evolution of the real interest rate according to the estimates in Armelius et al. (2018), and according to our own calculations, are shown in Figure 4.4. The two variables co-vary and follow a negative trend. Both measures of the real interest rate are negative after the global financial crisis 2008–10. The rise in the real interest rate that can be observed in our own calculations for the period 2011–12 reflects a higher policy rate, but also a fall in inflation expectations

during this period. The real interest rate fell further when the policy rate became negative in 2015.

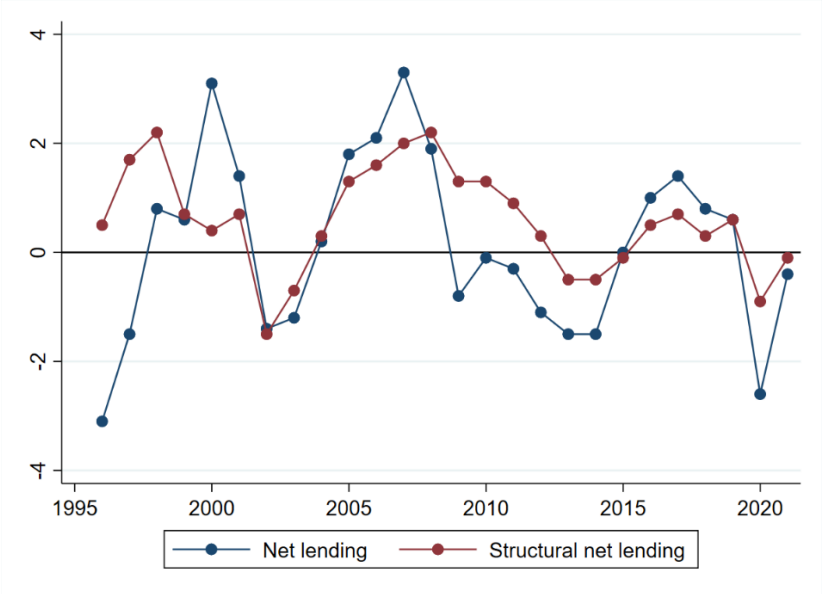
Figure 4.5 shows the neutral real interest rate in Armelius et al. (2018) and the deviation of the real interest rate from it. Since the deviation is defined as the neutral interest rate minus the actual real interest rate, a positive value for this variable means that monetary policy is expansionary, and a negative value means that it is contractionary. The graph indicates that monetary policy was expansionary after the global financial crisis and remained so from 2014 until 2021, except for in 2018. The negative deviation during that year, despite the fact that the policy rate was negative at the time, is due to the neutral real interest rate being so low that, according to our definition, monetary policy cannot be deemed expansionary.

Figure 4.1 GDP gap ex ante and ex post 1996–2021



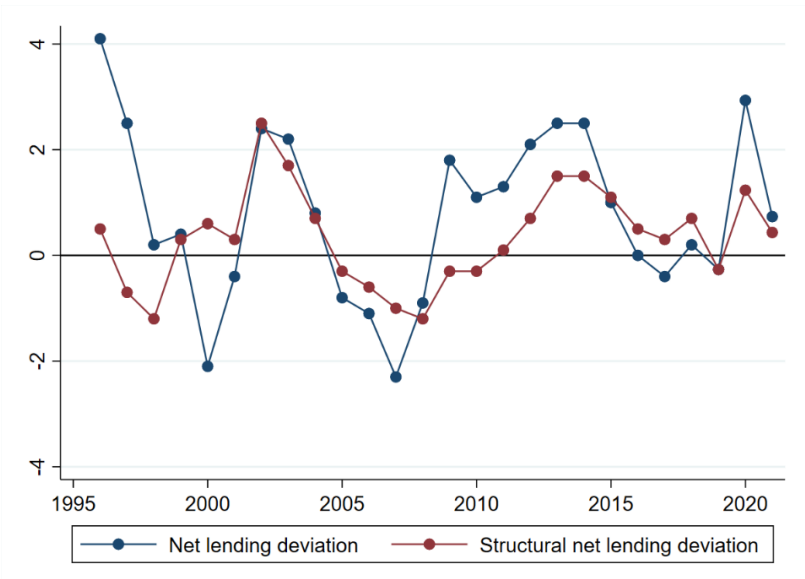
Sources: Ex-post GDP gap according to Armelius et al. (2018). Ex-ante GDP gap according to the budget bills for the respective years.

Figure 4.2 Net lending and structural net lending 1996–2021



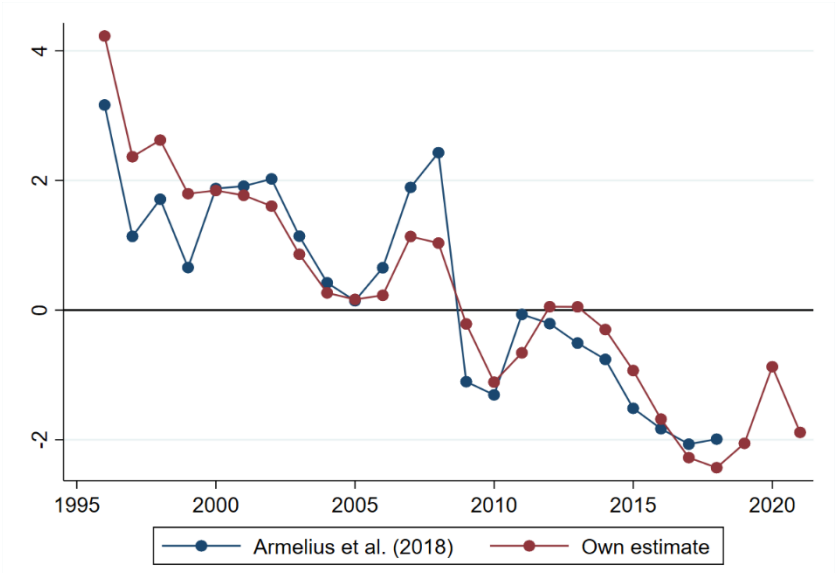
Source: National Institute of Economic Research.

Figure 4.3 Net lending and structural net lending deviations from the surplus target 1996–2021



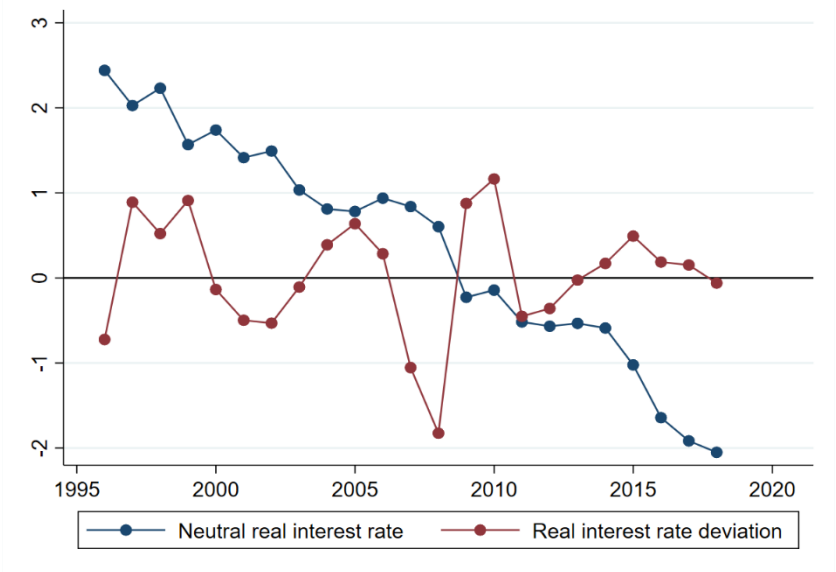
Note: The deviations measure the surplus target minus net lending and structural net lending, respectively.
Source: National Institute of Economic Research.

Figure 4.4 Real interest rate 1996–2021



Note: Real interest rates according to Armelius et al. (2018) and according to our own estimate (the policy rate minus expected inflation four quarters ahead according to Prospera).

Figure 4.5 The neutral real interest rate and real interest rate deviation from the neutral real interest rate 1996–2018



Note: All variables obtained from Armelius et al. (2018). The deviation measures the neutral real interest rate minus the real interest rate.

4.2 Fiscal policy

Figure 4.6 shows the difference between the surplus target and net lending on the vertical axis and the GDP gap according to Armelius et al. (2018) on the horizontal axis. A positive value on the vertical axis means that net lending is *less* than the surplus target which, as stated above, we interpret as expansionary fiscal policy. Conversely, a negative value on this axis means that net lending exceeds the surplus target, i.e., contractionary fiscal policy.

The graph reveals a clear negative correlation. In periods with a positive GDP gap, net lending has in general exceeded the surplus target, which indicates contractionary fiscal policy. On the other hand, in periods with negative GDP gaps, fiscal policy has been expansionary on average, i.e., net lending has been lower than the surplus target. Fiscal policy thus appears to be countercyclical when both automatic stabilisers and active measures are taken into account. The results of the graphical analysis are supported by the regressions in Table A.1 of Appendix A.4. There we find a significant negative correlation between the difference between the surplus target and net lending on the one hand, and the GDP gap on the other.

A few years stand out on closer examination. One of these is 2002, an election year, when resource utilisation was high but fiscal policy still highly expansionary. In 2005, resource utilisation was low, but fiscal policy was contractionary. In these and some other years fiscal policy – in terms of total net lending – has thus been procyclical.

Figure 4.7 shows the relationship between the difference between the surplus target and structural net lending on the one hand, and the GDP gap on the other. The correlation is close to zero. The estimates in Tables A.3 and A.4 in Appendix A.4 also show no co-variation between structural net lending and resource utilisation. Therefore, discretionary fiscal policy has been acyclical on average. Active fiscal policy decisions thus do not appear to have systematically contributed to stabilising the business cycle. Here, too, some years stand out as examples of procyclical fiscal policy. This is the case for 2002. Another example is 2009 during the global financial crisis, when discretionary fiscal policy was contractionary despite very low resource utilisation (the lowest in the entire sample

period). The observation that discretionary fiscal policy was contractionary despite a negative GDP gap in both 1997 and 1998 most likely reflects the fiscal consolidation that took place after the 1990s crisis. The years 2016–18 are characterised by expansionary discretionary fiscal policy despite high resource utilisation.

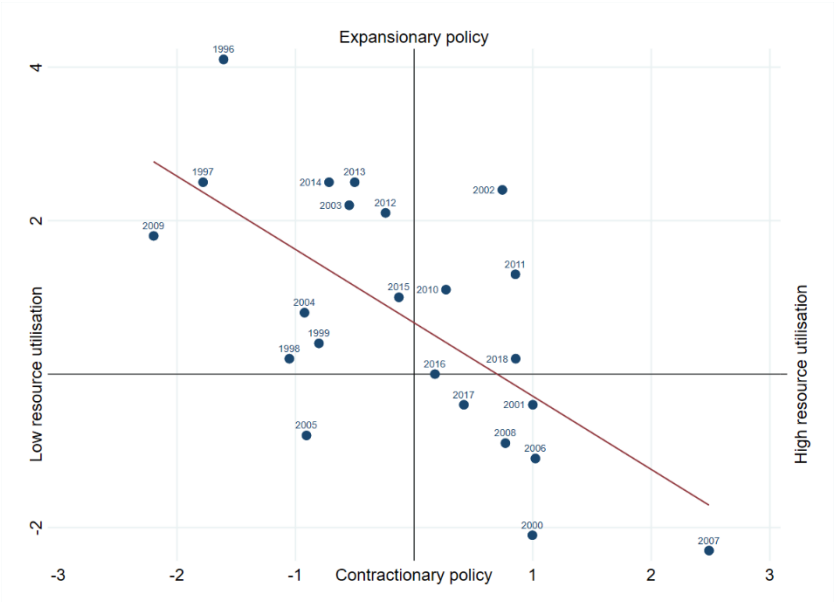
One might expect particularly expansionary fiscal policy through active measures during election years. However, the figure does not show any such systematic pattern. Structural net lending indicates expansionary discretionary fiscal policy in the election years 2002, 2014 and 2018. But discretionary fiscal policy was contractionary in the election years 1998, 2006 and 2010.

We also study the relationship between fiscal policy and deviations from the inflation target. Figure 4.8 shows the difference between the surplus target and net lending on the vertical axis, and the difference between the inflation target and inflation on the horizontal axis. There is a weak negative correlation between these two variables. In the years when inflation is below the target level, on average fiscal policy is expansionary, and when inflation is above the target, fiscal policy is mostly contractionary. This is unlikely to reflect fiscal policy reacting to inflation deviating from the target, but is probably due to inflation having co-varied with the GDP gap, which in turn has affected net lending via the automatic stabilisers.

Figure 4.9 shows the deviation of structural net lending from the surplus target on the vertical axis and the deviation of inflation from the inflation target on the horizontal axis. Here, the co-variation is even weaker than in Figure 4.8. This is not surprising since the cyclical effects have been removed in the structural measure.

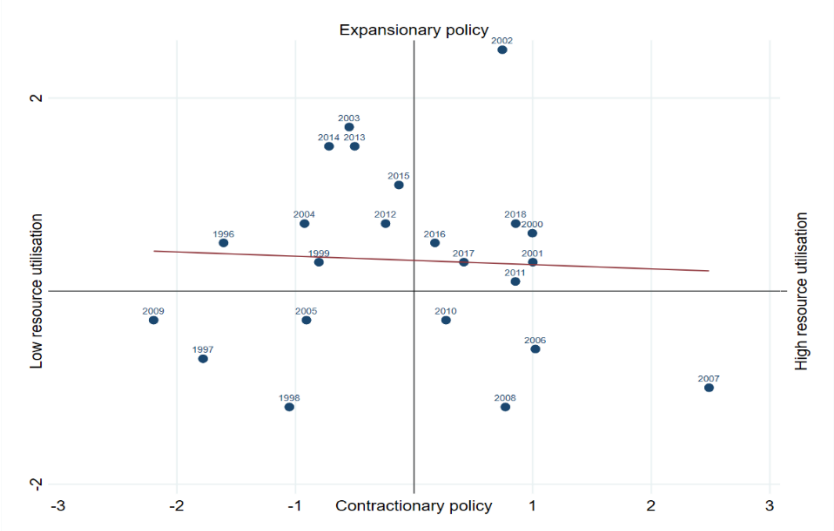
In conclusion, we note that, on average, fiscal policy appears to have been countercyclical when the automatic stabilisers are included. On the other hand, active fiscal policy appears to be *acyclical* on average. During years with small GDP gaps, this can be seen as in line with conventional wisdom that active stabilising fiscal policy should normally be avoided. However, it is more startling that there are such clear examples of procyclical discretionary fiscal policy in some years with large imbalances in resource utilisation. This is an important observation in anticipation of our discussion of the future balance between fiscal and monetary policy in Sections 5.3 and 6.

Figure 4.6 Net lending and resource utilisation 1996–2018



Note: The horizontal axis shows the GDP gap according to Armelius et al. (2018). The vertical axis shows the difference between the surplus target and net lending. The line shows the estimated linear relationship.

Figure 4.7 Structural net lending and resource utilisation 1996–2018

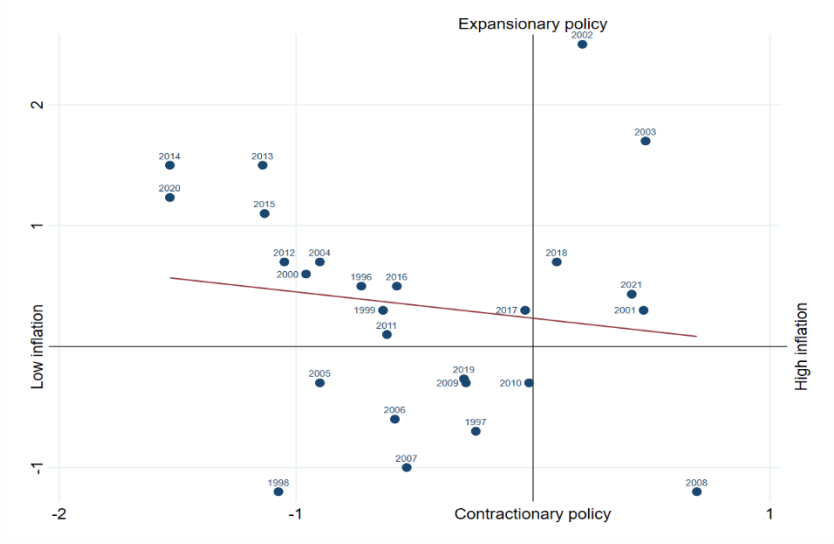


Note: The horizontal axis shows the GDP gap according to Armelius et al. (2018). The vertical axis shows the difference between the surplus target and structural net lending. The line shows the estimated linear relationship.

Figure 4.8 Net lending and deviations from the inflation target 1996–2021

Note: The horizontal axis shows the difference between the inflation target and inflation. The vertical axis shows the difference between the surplus target and net lending. The line shows the estimated linear relationship.

Figure 4.9 Structural net lending and deviations from the inflation target 1996–2021



Note: The horizontal axis shows the difference between the inflation target and inflation. The vertical axis shows the difference between the surplus target and structural net lending. The line shows the estimated linear relationship.

4.3 Monetary policy

Figure 4.10 shows the difference between the neutral real interest rate and the actual real interest rate on the vertical axis, and inflation's deviation from the inflation target on the horizontal axis when the estimates in Armelius et al. (2018) are used for the real interest rate. A positive value on the vertical axis means that the real interest rate is lower than the neutral interest rate, that is, expansionary monetary policy. The figure reveals a slightly negative correlation, i.e., on average monetary policy has been expansionary when inflation has been below the target, and contractionary when it has been above it.

Here, too, there are a few years that stand out. Monetary policy in 2007 appears to be contractionary in light of the low inflation rate. However, both 2007 and 2011 are characterised by high resource utilisation. In 2011 the *Riksbank* also communicated strong concerns about rising prices in the housing market.

Figure 4.11 shows the deviation of the real interest rate from the neutral real interest rate and the GDP gap. The graph is consistent with weakly countercyclical policy.

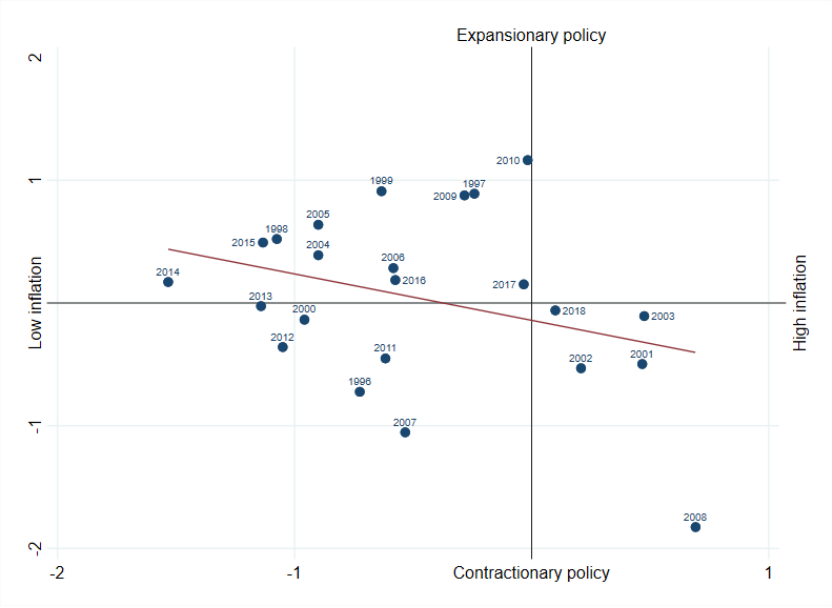
Our estimates of Taylor rules confirm the results from the graphical analysis. The ex-post estimates in Table A.5 suggest a negative co-variation between, on the one hand, the difference between the neutral real interest rate and the real interest rate and, on the other hand, the GDP gap.[60] A smaller GDP gap is thus correlated with a lower real interest rate. More specifically, an increase in the GDP gap by 1 percentage point means that the real interest rate increases by 0.3 percentage points in relation to the neutral real interest rate. A surprising result in Table A.4 is that the deviation of the real interest rate from the neutral real interest rate is not significantly correlated with the deviation of inflation from the target level. However, this result is sensitive to whether we use actual inflation outcomes or forecasts. The ex-ante estimates in Table A.5 show that a forecast positive deviation from the inflation target co-varies with contractionary (less expansionary) monetary policy. This is consistent with our priors and probably reflects the

[60] Note that the dependent variable in the estimates is formulated as in the figures, so that an increase in the dependent variable means expansionary policy, not an interest rate increase as in standard formulations of the Taylor rule.

Riksbank setting the policy rate based on its forecasts for future inflation.

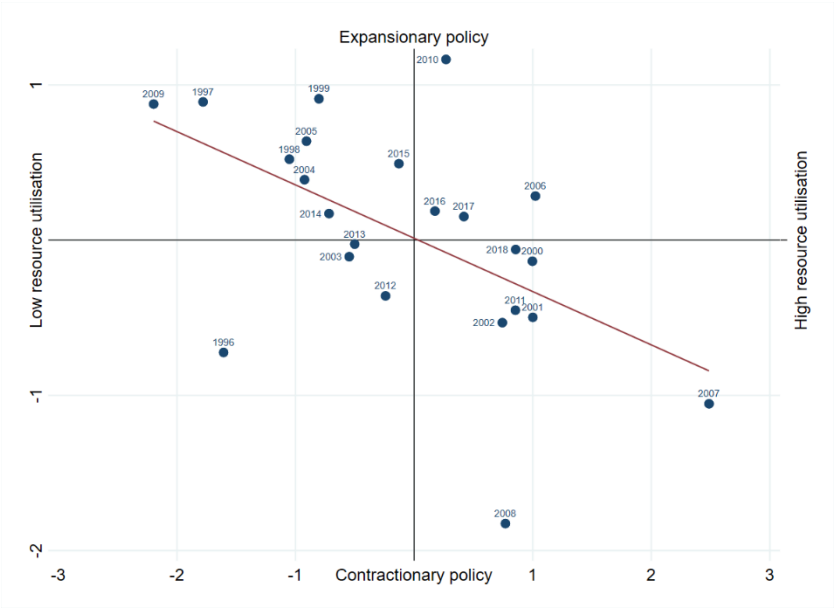
In conclusion, on average monetary policy, as we measure it, co-varies only weakly with actual deviations from the inflation target. In this ex-post analysis, monetary policy appears to be more countercyclical in relation to resource utilisation than in relation to inflation. This may seem surprising. Although the *Riksbank* has a flexible inflation target and therefore takes into account the evolution of the real economy, the inflation target is paramount (see Box 3.1). However, in the ex-ante Taylor-rule estimates, expected deviations from the inflation target have an impact on policy. It is therefore likely that the pattern reflects the time lags inherent to monetary policy: the accepted view is that it takes 1–2 years for interest rate changes to reach full effect on inflation, while GDP is affected more rapidly (see for example Christiano et al. 1999 and the discussion in Section 2.3.1).

Figure 4.10 Real policy rate and deviations from the inflation target 1996–2018



Note: The horizontal axis shows the difference between the inflation target and inflation. The vertical axis shows the difference between the neutral real interest rate and the real interest rate when these are based on Armelius et al. (2018). The line shows the estimated linear relationship.

Figure 4.11 Real policy rate and resource utilisation 1996–2018



Note: The horizontal axis shows the GDP gap according to Armelius et al. (2018). The vertical axis shows the difference between the neutral real interest rate and the real interest rate when the latter are based on the same source. The line shows the estimated linear relationship.

4.4 The interaction between fiscal and monetary policy

Figure 4.12 shows the difference between the surplus target and net lending on the vertical axis, and the difference between the neutral real interest rate and the real interest rate according to Armelius et al. (2018) on the horizonal axis. The co-variation is positive. When fiscal policy (including the automatic stabilisers) has been expansionary, so has monetary policy. On average, policy has thus been congruent when we measure fiscal policy in this way. Here too, it is interesting to identify years that deviate from the general pattern. In 1996, fiscal policy was highly expansionary while monetary policy was contractionary. Policy divergence was also a feature of 2011. However, the analysis is sensitive to the measure of monetary policy used: with our alternative real interest rate measure, the co-variation between fiscal and monetary policy is instead

negative (see Figure A.7 in Appendix A.4), that is, the policies appear to be divergent.

In Figure 4.13, net lending on the vertical axis has been replaced by structural net lending. There is then no co-variation between fiscal and monetary policy. Thus, the correlation in Figure 4.12 is due to the automatic stabilisers. On the other hand, active fiscal policy has not co-varied with monetary policy. If we use our own real interest rate measure instead, we find a negative co-variation between monetary policy and active fiscal policy (see Figure A.8 in Appendix A.3).

In our analysis, we have used the deviation of the real interest rate from the neutral real interest rate as an indicator of the monetary policy stance. However, the *Riksbank* has pursued expansionary monetary policy using instruments other than the interest rate as well in recent years (see Sections 2.3, 4.5 and 5.1). In Figure 4.12, for example, we see that monetary policy was only slightly expansionary in 2016 and 2017.[61] At the same time, however, the *Riksbank* purchased large volumes of central government bonds in attempts to raise inflation.

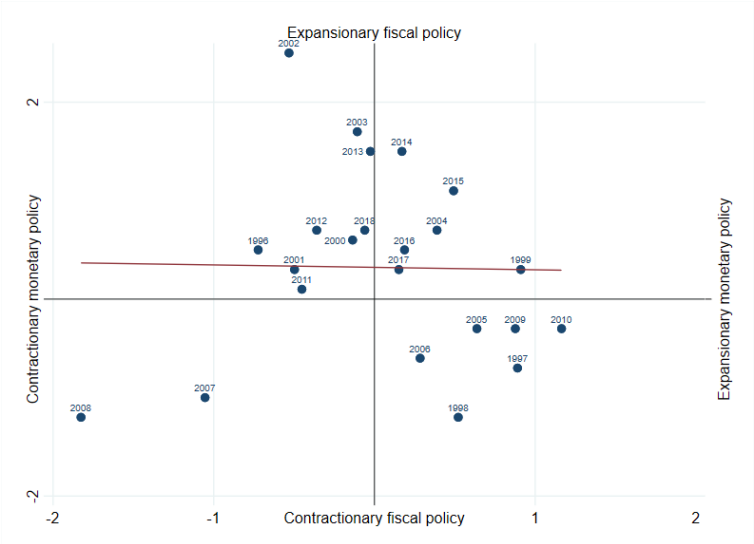
A relevant question is whether fiscal policy should have been more expansionary in the years when the *Riksbank* found it difficult to achieve the inflation target and the policy rate was negative. Then the *Riksbank* would not have had to resort to quantitative easing to the same extent. However, Figures 4.6 and 4.7 show that net lending in 2016–2018 was close to the surplus target, while structural net lending was slightly below it, which we interpret as weakly expansionary discretionary fiscal policy. We will return to the question of the relationship between fiscal and monetary policy during these years in Section 6.2.

[61] Estimates of the neutral real interest rate in Armelius et al. (2018) are only available until 2018.

Figure 4.12 Net lending and deviations from the neutral interest rate 1996–2018

Note: The horizontal axis shows the difference between the neutral real interest rate and the real interest rate when these are based on Armelius et al. (2018). The vertical axis shows the difference between the surplus target and net lending. The line shows the estimated linear relationship.

Figure 4.13 Structural net lending and deviations from the neutral interest rate 1996–2018



Note: The horizontal axis shows the difference between the neutral real interest rate and the real interest rate when these are based on Armelius et al. (2018). The vertical axis shows the difference between the surplus target and structural net lending. The line shows the estimated linear relationship.

4.5 Fiscal and monetary policy during the pandemic

On March 11 2020, the Public Health Agency of Sweden upgraded the risk of community transmission of the coronavirus that causes COVID-19 to very high. On the same day, the government presented an amending budget to compensate municipalities and regions for their additional costs in connection with the pandemic. The following day, the *Riksbank* announced that it was prepared to lend up to SEK 500 billion to the banks at the policy rate for further lending to non-financial firms. The aim was to ensure sufficient supply of credit to the business sector. Experience from previous crises, most recently the global financial crisis of 2008–10, suggests that if the supply of credit is hampered or even comes to a halt, an economic shock can be greatly amplified and the effects can be sustained for a long time.[62]

These initial interventions were followed by a large number of other fiscal and monetary policy measures. Fiscal policy targeted both firms and households. Support for short-time work, reduced expenses for sick pay, deferred tax payments, lower payroll taxes, rent relief and compensation for reduced turnover aimed to reduce the risk of redundancies and bankruptcies. More generous unemployment and sickness insurance and the easing of amortisation requirements for mortgages sought to reduce income losses for affected households. The Corona Commission (2022) estimates that almost half of the income compensation paid to households came from special pandemic measures and the rest from existing social insurance. Most of the support to the business sector consisted of special pandemic measures since the government does not normally compensate firms for business-related income losses.

The fiscal measures implemented in 2020 were very extensive and in terms of their scope designed for an economic crisis that could have been much deeper than it turned out to be. The appropriations for pandemic-related interventions in 2020 amounted to as much as SEK 304 billion, corresponding to approximately 6 per cent of GDP. About half of this amount was utilised – SEK 153 billion (Corona Commission 2022).

[62] See also Bernanke (1983), who argues that this mechanism is key to understanding why the Great Depression in the 1930s ended up being as deep and in particular as long as it was. See also Section 3.2.3.

The fiscal support measures during the pandemic faced an important trade-off between preventing unnecessary bankruptcies and the destruction of existing organisational capital and functioning employer-employee matches on the one hand, and not slowing down desirable structural change on the other (see for example Finansdepartementets ekspertgruppe 2020 and Calmfors 2020c). It is difficult without further research to have a well-founded view on whether or not policies struck the right balance. The fact that bankruptcies fell during the pandemic might suggest that the support was unnecessarily generous. But in an uncertain situation it was probably justified to do too much rather than too little to prevent a dangerous downward spiral. Similar conclusions were drawn by the Corona Commission (2022) and in a background report to it (Ekholm et al. 2022).

On the other hand, it was probably unfortunate that the support for short-time work targeted individuals with permanent employment contracts – the labour market's *insiders*. Receiving the support was conditional on the firms first trying to reduce their labour costs in other ways. For example, fixed-term employees who were not key to the business had to be laid off. This made the support less effective in protecting jobs for young people, the low-skilled and the foreign-born, who have fixed-term jobs to a greater extent than other groups.

During the pandemic, the *Riksbank* implemented a number of unprecedented measures (see also Box 2.6). In terms of volume, the biggest measure was the large purchases of covered bonds (mortgage bonds). From the end of February to the end of November 2020, the *Riksbank*'s holdings of covered bonds increased from 0 to SEK 195 billion. Purchases of these bonds continued in 2021 and the holdings peaked at SEK 419 billion at the end of November 2021. One year later it was SEK 386 billion.[63]

As Box 2.7 reports, the *Riksbank* also increased its holdings of Swedish central government bonds. These purchases started back in 2015 with the aim of lowering long-term interest rates and thus continuing to make monetary policy more expansionary at a time when the policy rate was close to its effective lower bound (see also

[63] The details on the *Riksbank*'s bond purchases were obtained from the *Riksbank*'s website on December 21 2022: https://www.riksbank.se/sv/penningpolitik/penningpolitiska-instrument/riksbankens-utokade-kop-av-vardepapper/.

Section 5.1.2). On the last day of February 2020, the holdings were SEK 338 billion. This increased to SEK 402 billion at the end of November the same year and peaked at the end of May 2022, when it amounted to SEK 404 billion. The crisis measures thus led to the *Riksbank*'s holdings of central government and covered bonds being roughly the same. Since the total quantity of outstanding covered bonds is much greater than the quantity of outstanding central government bonds, the share of the stock owned by the *Riksbank* was considerably smaller for the former than for the latter (20 per cent and 45 per cent, respectively). At the end of November 2022, the *Riksbank*'s holdings of central government bonds had fallen to SEK 338 billion.

A controversial measure was the *Riksbank*'s purchases of corporate bonds. These were announced during the early stages of the pandemic but were not completed until September 2020. In 2020 and 2021, the value of these purchases summed to SEK 12 billion, i.e., a relatively small amount. More than half of these bonds were issued by real estate firms. In addition, local government bonds were purchased at a steady rate throughout the crisis. These holdings reached SEK 124 billion at the end of May 2022, and were still at that level at the end of November 2022.

The *Riksbank*'s explicit aim when purchasing covered and corporate bonds was to arrest and reverse the rise in the spread between these and central government bonds. As a result of concerns about the consequences of the pandemic, the spreads had grown rapidly in March 2020. An uncontrolled further increase might have triggered a banking and housing market crisis. The spreads then fell rapidly and in summer 2020 were already lower than before the pandemic. It is conceivable that the announced purchases of covered and corporate bonds had an effect even before any purchases were actually completed. It is also possible that a more appropriate strategy would have been to make the purchases conditional on the developments in financial markets. Under such a scheme, the purchases of corporate bonds might not have been needed and the purchases of covered bonds could have been phased out much earlier. As shown in Figure 1.1, the *Riksbank* had begun to raise the policy rate at this time, which means that it is difficult to claim that it was at its effective lower bound when the purchases were made. This raises the question of whether these and other asset

purchases were justified (see also Walentin 2022). Without further research, it is difficult to have a well-founded view on these issues. We must also keep in mind that decisions during the pandemic were made under immense pressure.

The measures taken by the government, the *Riksbank* and other government agencies to mitigate the economic consequences of the pandemic were powerful, fast and involved many new tools. The combined measures, together with similar efforts in other countries, were in all probability crucial for the economic effects of the pandemic being considerably smaller than initially feared. The feedback mechanisms that could have created a global depression were avoided. The Corona Commission (2022) has carried out extensive studies on the effects in more detail. However, there is a great need for more research into the short- and long-term effects of the measures taken.

The interaction between fiscal and monetary policy naturally functioned differently during the COVID-19 crisis than under normal business cycle fluctuations. As emphasised above, when the task is primarily to stabilise demand, the two types of policy are (imperfect) substitutes for one another. However, during the COVID-19 crisis, they largely functioned as complements. A key objective of fiscal policy was to insure households and businesses against large drops in income. This task could not be accomplished by monetary policy. On the other hand, the *Riksbank* played a key role in providing liquidity and in preventing explosive increases in interest rate spreads on mortgage and corporate bonds, which could have triggered a financial crisis.

The purpose of this report is not to analyse how the crisis was handled during the pandemic. We therefore settle for the following assessments. First, the fiscal and monetary policy frameworks did not present any obstacles to rapid and robust crisis management. Second, these frameworks were crucial for maintaining confidence in Sweden's public finances and price stability throughout the crisis. Third, we do not see any significant problems with the coordination of the measures taken. The *Riksbank* did implement measures that bordered on, or exceeded, the limit of what should be considered monetary policy. This includes its purchases of mortgage and corporate bonds. The need for fast and powerful policy responses at the onset of an acute financial crisis clearly suggests that the

Riksbank should be able to take such measures in the future as well. However, these should only be resorted to when safeguarding the functioning of the financial system in exceptionally serious crises.

5 The stabilisation policy mix in the future

Section 3 described the prevailing view on the balance between fiscal and monetary policy in recent decades. According to this view, monetary policy should have the primary responsibility for macroeconomic stabilisation, while discretionary fiscal policy should normally be avoided. However, following the global financial crisis and subsequent recession, a more positive attitude to the use of fiscal policy as a stabilisation policy instrument can be discerned among economists and economic policymakers alike.[64] As described in Section 4.5, fiscal policy measures also played a central role in Sweden during the COVID-19 pandemic in 2020/21. The same applied in other advanced economies.

This section discusses how one should view the future roles of fiscal and monetary policy in light of both recent experiences and novel research. We discuss how the assessment of both monetary and fiscal policy has changed. Section 5.1 describes monetary policy considerations, focusing on concerns about its effectiveness in an environment where nominal interest rates are low in a normal business cycle. Section 5.2 focuses on the risk of expansionary monetary policy potentially leading to financial instability linked to the housing market. Section 5.3 discusses the opportunities as well as the risks of relying more heavily on fiscal policy as a stabilisation policy instrument. Section 5.4 deals with the specific challenges facing stabilisation policy in the current stagflation situation.

[64] Lagarde (2016), Auerbach (2019), Blanchard and Summers (2019), Lagerwall (2019), Blanchard (2021b) and Jansson (2021) are some examples.

5.1 Monetary policy considerations

Real interest rates in Sweden have followed a downward trend since the beginning of the 1990s. This reflects international developments. With free capital mobility, there is little scope for differences in the expected real yield on financial investments between countries: such differences are predicated on expectations of changes in real exchange rates. The established explanation for the fall in real interest rates in the world economy is that *neutral* real interest rates – real interest rates on safe financial investments that are consistent with output being at its potential level and stable inflation – have fallen.

A number of studies have used various methods to estimate neutral real interest rates (or trends in real interest rates that can be interpreted as a measure of them) and have found evidence of sharp declines in recent decades, although the conclusions on the timing and size vary. Some studies date the start of the declines to the beginning of the 1980s, others to the 1990s or even later in connection with the outbreak of the global financial crisis in 2007–08. The fall in the global neutral real interest rate has been estimated at 2–3 percentage points and the level in recent years to 0–1 per cent.[65] As we concluded in Section 3.1.4, Armelius et al. (2018) find an even greater reduction in the neutral real interest rate for Sweden: from 3 per cent in 1995 to almost -2 per cent in 2017. Rachel and Smith (2015, 2017) also document a decline in the global neutral real interest rate of around 5 percentage points. According to Armelius et al., the US neutral real interest rate is a key explanatory factor for the corresponding Swedish rate.

Studies of the global neutral real interest rate are typically based on the assumption that it is determined by the balance between saving and investment in the world economy. It has been argued that the propensity to save has risen while the propensity to invest has fallen.[66]

The increase in the propensity to save has been explained by growth being lower than expected (which requires more savings if a certain desired future level of consumption is to be maintained), an increase in the proportion of the world's working-age population

[65] Lundvall (2020) is an overview of relevant studies.
[66] See for example Rachel and Smith (2015, 2017), Lundvall (2020), and Blanchard (2021b).

(when people save) and in life expectancy (leading to more years in retirement); a high level of saving in China and other emerging economies following the Asian financial crisis of the late 1990s (to build up precautionary savings against future crises) and a more uneven distribution of incomes in advanced economies (high-income earners save a larger share of their income than low-income earners).

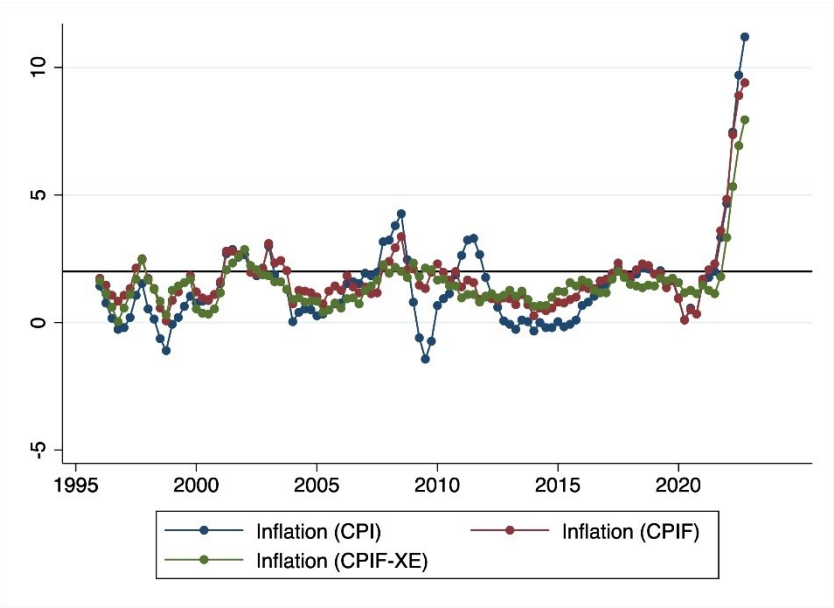
A lower demand for funds to invest may have been due to lower relative prices of investment goods (in combination with the cost-cutting effect of this having been greater than the tendency towards volume increases resulting from lower prices) and a reduction in public investment.

A further explanation put forward for the decline in neutral real interest rates is that higher demand for assets with low perceived risk relative to their supply has raised risk premia. Real interest rates on government bonds, for example, have thus fallen relative to the real yield on high-risk investments such as corporate bonds and stocks.

Projections of the future development of neutral real interest rates are highly uncertain, even though several of the determining factors can be forecast. It has been argued that the demographic trend with a larger proportion of older people who are no longer working will mean a *demographic reversal* that will reduce the propensity to save again.[67] However, a counter-argument is that a continued increase in life expectancy, and thus probably in years of retirement with lower income than during working life, requires greater savings in order to maintain consumption during the last part of the life cycle.[68] But it has also been argued that the demographic trend with a lower share of the population in working age will decrease investment because it will become less profitable when there is less labour with which to combine capital. This reduction in investment has been estimated to be greater than any potential reduction in saving (Auclert et al. 2021).

[67] See for example Goodhart and Pradhan (2020), and Lane (2020).
[68] Blanchard (2021b).

Figure 5.1 Annual inflation 1996–2022, per cent



Note: Inflation in terms of the consumer price index (CPI), the consumer price index with a fixed interest rate (CPIF) and the consumer price index excluding energy prices (CPIF-XE). Quarterly data. The horizontal line shows the inflation target.
Source: Statistics Sweden (2022).

Other factors discussed are that saving in emerging economies may be lower in the future and public investment may be higher due, for example, to the need for more climate-neutral production and adaptation to climate change. Furthermore, larger budget deficits and higher government indebtedness in many countries may contribute to lower savings in the world economy.[69] The most common view seems to be that neutral real interest rates are likely to remain low for the foreseeable future, even though they may increase somewhat.[70] This assessment is supported by the fact that historically, trends in the real interest rate have often been

[69] Greater net borrowing in the public sector means lower total net lending if it is not fully counteracted by higher private savings (see the discussion on Ricardian equivalence in Section 2.2.1). Higher government indebtedness means larger private net financial wealth (to the extent that households do not take the fact into account that – through future tax increases, or reductions in government transfers – they will ultimately have to bear the costs of servicing the government debt) and thus higher private consumption and lower private saving (Blanchard 2021b).
[70] See for example Rachel and Smith (2015, 2017), Blanchard (2021b) and the Riksbank (2021b).

persistent.[71] Our somewhat conservative conclusion is that it is not possible to make reliable forecasts for the future neutral real interest rate, but that the likelihood of it remaining low is sufficiently large that stabilisation policy must be prepared for it. This assessment is not affected by the process of interest rate hikes in advanced economies that occurred in 2022, and which probably will continue in the beginning of 2023, in order to dampen high inflation (see Figure 5.1). This process is about raising policy rates relative to the neutral interest rate and does not therefore provide any information on the long-term behaviour of the latter.

A low neutral real interest rate combined with low inflation entails major risks that, in recessions, monetary policy will be constrained by the effective lower bound on the short-term nominal rate: it may then become impossible to reach a negative real interest rate low enough to stimulate demand. The traditional view used to be that nominal interest rates cannot be lowered below zero, since households and firms would then have incentives to hold cash instead of bonds or bank deposits which yield negative returns. At a zero interest rate, cash therefore becomes a perfect substitute for bonds and bank deposits: the central bank's bond purchases then do not lead to their prices rising. This is equivalent to the effective nominal interest rate on bonds not being able to fall. The economy then finds itself in a *liquidity trap*.

In a widely quoted paper, Kiley and Roberts (2017) analyse the risk of monetary policy being limited by a zero lower bound through simulations in two commonly used macroeconomic models of the US economy. With a neutral real interest rate of 1 per cent and an inflation target of 2 per cent – and consequently a neutral nominal policy rate or *federal funds rate* of 3 per cent – and a simple Taylor rule used to set the interest rate, they find that the optimal policy rate will lie below zero 30–40 per cent of the time. Such episodes will be 2–3 years long on average. The average GDP gap is between -1 and -2 per cent and average inflation between 0 and 1 per cent. These may well be underestimates. In Sweden, the policy rate was zero or negative from October 2014 to May 2022, i.e., for more than seven years.

Others have used the term *secular stagnation* to characterise the problem. Summers (2016), and Rachel and Summers (2019) are two

[71] See Hamilton et al. (2016) and Del Negro et al. (2019).

notable contributions. They emphasise an increased propensity to save combined with a reduction in the propensity to invest potentially leading to a situation of *permanent* under-utilisation of resources and low growth because – as a result of an effective lower bound on the nominal interest rate – the real interest rate would then remain continuously above the neutral level, i.e., the level consistent with sufficient demand to achieve full resource utilisation.

In principle, monetary policy can handle the situation described above in three different ways, discussed below. Section 5.1.1 discusses how negative policy rates can be used to test where the effective lower bound on interest rates lies. Section 5.1.2 focuses on the central bank's options for using quantitative easing when the policy rate hits its effective lower bound. Section 5.1.3 analyses the alternative of giving monetary policy more room for manoeuvre by changing its objectives.

5.1.1 Negative policy rates

The central banks of Denmark, Japan, Switzerland and Sweden, as well as the ECB in the euro area, have used slightly negative policy rates over the past decade. The *Riksbank*'s repo rate was lowered stepwise between February 2015 and February 2017 from 0 to -0.5 per cent. Thereafter, the repo rate remained at -0.5 per cent until January 2019, when it was raised to -0.25 per cent. It was only in January 2020 that it was raised to zero again. It is evidently possible to lower a central bank's policy rate below zero. This is why monetary policy research no longer discusses a *zero lower bound (ZLB)*, but an *effective lower bound (ELB)* on interest rates.

According to the earlier approach, as soon as policy rates became negative, banks would exchange their deposits in central banks for cash in order to avoid having to pay for their reserves. But that did not happen. The explanation is, of course, the costs – for secure storage and secure transfers – associated with switching to cash. The same reasoning applies to deposits in the banking system, especially for firms with large deposits and large payments. But even for households, it would be difficult to switch to cash transactions on a large scale. In Sweden in particular, the use of cash has followed a downward trend and most payments are now made digitally: in many

places it is even impossible to pay with cash. Therefore, in all probability there is some scope for negative deposit rates for households too without this triggering any major adjustments. But we do not know where that limit is.[72]

Negative policy rates seem to trigger more or less complete pass-through onto money market interest rates, i.e., interest rates on the interbank market and on securities with short maturities issued by the government, banks and non-financial corporations. The interest rate cuts also seem to have been passed on to banks' deposit rates until they reached zero. But deposit rates for private individuals never became negative. This reduced the stimulatory effects on the economy, but probably not by much, because a lower deposit rate has both a positive substitution effect and a negative income effect on the consumption of savers. For firms, the picture is more fragmented. But in the euro area and Denmark, deposit rates for firms have been negative.[73]

A controversial question has been how the banks' lending rates were affected by the negative policy rates. Lending rates are probably a more important channel than deposit rates. For households that are not liquidity-constrained, both the substitution and income effects of lower interest rates contribute to higher consumption. For liquidity-constrained households, there is a positive cash flow effect (see Section 2.3.1). Several studies for the euro area find that negative policy rates were passed on to lending rates, although according to some the pass-through was less than when positive policy rates were lowered (Tenreyro 2021).

There has been a debate on how the negative policy rates in Sweden affected lending rates. According to Eggertsson et al. (2018, 2019), the four repo rate cuts between December 2013 and May 2015 (from 0.75 to -0.5 per cent) led to lower *listed* mortgage rates at the

[72] There is a discussion of how negative interest rates could be maintained even when such a limit is passed. One possibility would be 'punitive taxation' of cash, whereby its value as legal tender would gradually depreciate according to its date of issue (or where cash issued at a given point in time loses its legal tender value if the holder of the cash does not pay a fee). Another proposal is simply to abolish cash (or at least high-denomination bank notes) as legal tender. See for example Gesell (1906), Buiter and Panigirtzlou (2003), and Rogoff (2014). In our opinion, it is highly doubtful whether decisions of this kind would gain the legitimacy needed for implementation.

[73] See the overview by Tenreyro (2021). Altavilla et al. (2020) find that banks in the euro area with strong balance sheets applied negative deposit rates to firms without this leading to a reduction in deposits. According to both this study and a study for Denmark (Abildgren and Kuchler 2020), negative interest rates stimulate both investment and employment.

same time as deposit rates fell. However, after the latter had come close to zero and remained 'stuck' there, the two further cuts in the negative repo rate in July 2015 (from -0.25 to -0.35 per cent) and February 2016 (from -0.35 to -0.5 per cent) had no further effect on the listed mortgage rates. But Erikson and Vestin (2019) argue convincingly that it is the interest rates *actually paid* on new and renegotiated mortgages and other loans that are relevant and find that these fell – although with a certain time lag. They investigate a longer period which also includes the two repo rate increases in January 2019 (from -0.5 to -0.25 per cent) and in January 2020 (from -0.5 to 0 per cent). According to their analysis, there is a high co-variation between the repo rate and the average interest rate actually paid on all new loans from banks and other lenders.[74]

Brunnermeier and Koby (2018) develop a theoretical model according to which there may exist a *reversal interest rate* at which further cuts in a (negative) policy rate lead to a decline rather than an increase in bank lending, and therefore have contractionary effects on aggregate demand. This conclusion is based on policy rate cuts causing a bigger fall in the banks' interest income – from deposits in the central bank and holdings of various securities – than in their interest expenditure for deposits. If the reduced net interest income means lower profits, binding capital requirements may force banks to reduce their lending. However, this conclusion has been questioned.[75] Some empirical studies find that negative policy rates instead seem to raise banks' profits. This can occur through several mechanisms such as lower costs for market financing, capital gains on bonds, and reduced credit losses when the economy is stimulated.

In summary, the reductions in policy rates to negative levels appear to have had stimulatory effects. Although it cannot be ruled out that the effects have been somewhat weaker than in the case of interest rate cuts above zero, the conclusion is that monetary policy with negative interest rates functioned roughly as normal. In a recession, it is also likely that interest rates can be made even more negative than has been tested to date without triggering a large-scale switch to cash. Where such a *technical* effective lower bound on interest rates lies is difficult to say. But most likely the main

[74] The interest rates actually paid deviate from the listed rates, as the banks regularly give interest rate discounts to their borrowers. The time series for the two types of interest rate can therefore develop differently, especially in the short term.
[75] For example see Repullo (2020a, 2020b) and Tenreyro (2021).

constraint on negative interest rates is rather the difficulties of convincing the population of their *legitimacy*, because it is seen as unreasonable to have to 'pay to save' and 'get paid to borrow' (for example see Jansson 2018). In their evaluation of Swedish monetary policy from 2015–20, Flug and Honohan (2022) emphasise a concern within the *Riksbank* that households facing negative deposit rates in the banks could undermine public support for its policy as a probable explanation for the abandonment of the negative policy rate in January 2020. Our assessment is that the *Riksbank* – like most other central banks – will be reluctant to use negative policy rates in the future.

5.1.2 Quantitative easing

Other unconventional monetary policy instruments such as balance sheet operations, i.e., quantitative easing (QE), offer an alternative or complement to negative policy rates. The empirical literature on the effects of unconventional monetary policy has grown as data have become available. Much of this research analyses quantitative easing, forward guidance and negative policy rates jointly (see Borio and Zabai 2016, Kuttner 2018, Bhattarai and Neely 2022, and Sims and Wu 2021). The reason is partly that it is difficult to disentangle the effects of different measures because they are often implemented simultaneously.[76]

In the empirical research on QE, there are three main approaches: literature reviews and meta analyses, econometric studies such as estimates of VAR models and analyses of panel data, and quantitative simulations using DSGE models.

Borio and Zabai (2016) summarise the literature on the quantitative easing pursued by the Fed, ECB, Bank of Japan and Bank of England. The conclusion is that QE has had clear effects on financial variables, such as the yield on bonds with longer maturities, but that it is difficult to identify the effects on output and inflation. One option is to quantify the purchases of securities and then estimate the effects econometrically. Weale and Wieladek (2016) construct monthly time series of announced central bank purchases

[76] The effects of negative policy rates are discussed in Section 5.1.1 and we limit ourselves here to the effects of quantitative easing. For an overview of the literature on forward guidance, see Borio and Zabai (2016) and the studies they refer to.

of government bonds in the UK and the US in 2009–14 and estimate the effects on real GDP and consumer prices using Bayesian VAR models. Their conclusion is that bond purchases of 1 per cent of GDP lead to statistically significant increases in GDP and the consumer price index by about 0.6 per cent in the USA. The reported effects for the UK are about half that magnitude.

Another option is to use theoretical models to investigate the effects of QE. Borio and Zabai (2016) note that this approach is particularly useful if we are interested in studying mechanisms, but that other empirical approaches are better if the aim is to quantify the effects of different balance sheet operations. Gertler and Karadi (2013) study the effects of different asset purchases in a New Keynesian model calibrated to mimic the US economy and find positive effects on inflation and GDP. Sims and Wu (2021) construct a DSGE model to evaluate different types of unconventional monetary policy measures. Their conclusion is that QE can act as a substitute for changes in interest rates when the policy rate is at the effective lower bound. If, for example, the economy suffers a credit shock at the effective lower bound, quantitative easing – which in their model is determined endogenously according to a modified Taylor rule – can mitigate the effects in a similar way to conventional interest rate changes. QE then prevents long-term interest rates from rising, which maintains the level of investment and means that monetary policy affects the level of activity in a similar way as in normal times. Sims and Wu also analyse the pace at which a central bank can reduce the size of its balance sheet when the business cycle picks up and warn against risks associated with phasing out bond holdings.

Analysing the effects of QE is particularly difficult in small open economies, as outcomes are strongly influenced by simultaneous measures in other countries. Using a Bayesian VAR model, Di Casola and Stockhammar (2021) estimate the empirical effects of the *Riksbank*'s and the ECB's quantitative easing measures in the years 2015–18 on various Swedish macroeconomic outcomes. It is concluded that the *Riksbank's* measures had the intended effects in the form of GDP being stimulated, unemployment falling, and the exchange rate depreciating, but that the effects on inflation are ambiguous. The ECB's bond purchases contributed to higher levels of activity as well as higher inflation, also in Sweden. This was partly

due to the fact that the *Riksbank* responded to the ECB's policy by implementing similar measures. However, since the period studied is short, these results should be interpreted with caution.

Di Casola and Stockhammar (2021) also note that the *Riksbank*'s quantitative easing pushed up the prices of stocks and housing. This can pose risks to financial stability and is often put forward as a negative side-effect of quantitative easing. Weale and Wieladek (2021a, 2021b) use Bayesian methods to estimate VAR models for the euro area, the UK and the US, and study various side-effects, such as on housing prices and credit to the private sector. Their conclusion is that QE and changes in the policy rate have similar effects. According to Weale's and Wieladek's analysis, the effects on financial markets in the last decade would have been similar if central banks had instead been able to lower policy rates: it is the falling trend in the neutral interest rate that has given rise to the side-effects rather than QE per se.

Fabo et al. (2021) compare studies of QE carried out by researchers at central banks to those of researchers in academia. Central bank studies generally find that QE is a more effective measure than do studies carried out by independent academics. The authors claim that this difference persists even if one controls for the choice of model (DSGE or VAR) and quality (measured as the number of citations and whether the paper is published or not).

In summary, the research shows that the effects of QE on macroeconomic outcomes that are central for stabilisation policy – inflation and economic activity – are difficult to estimate and thus uncertain. Borio and Zabai (2016) therefore argue that unconventional measures should only be used under special circumstances, and point out that the more the central banks exhaust different possibilities, the poorer their ability may be to deal with future crises. Furthermore, Hesse et al. (2018) note that the benefits of quantitative easing are probably greater in crises than in normal times. For example, the effects of bond purchases on long-term interest rates are likely to be greater when there is considerable uncertainty in financial markets. The signalling effect of QE that we describe in Section 2 is probably also weaker when interest rates have been at their effective lower bound for a long time.

Quantitative easing may also have consequences for the functioning of the bond market. Blix Grimaldi et al. (2021) study

the effects of the *Riksbank*'s bond purchases on various measures of the Swedish bond market's liquidity, i.e., indicators of how quickly and easily a bond can be traded at market price. It is not obvious what effects to expect. When the central bank buys large volumes of bonds, the demand for them increases, which stimulates trade in them. However, since central banks often hold government bonds until maturity, the volumes available to other investors decrease. This may make it more difficult for actors who normally hold safe assets in their portfolios. The study finds that the *Riksbank*'s bond purchases initially improved liquidity in the market, but that liquidity was adversely affected when the bank's holdings as a proportion of the total volume of outstanding bonds became large. The National Debt Office (2018) notes that the *Riksbank*'s bond purchases contributed to decreasing turnover in the bond market even before the pandemic. This made the market less deep and thus less attractive to foreign investors.

A complication caused by central bank purchases of central government bonds is that monetary policy can come into conflict with *government debt policy*.[77] The latter is usually seen as part of fiscal policy broadly defined. This is reasonable because the management of government debt has consequences for fiscal policy's room for manoeuvre in the future.

In Sweden, the National Debt Office borrows by issuing treasury bills and bonds within the framework of its maturities mandate, which is determined by the government in annual guidelines. According to the Budget Act, the objective of government debt policy is to manage debt "so as to minimise the long-term cost of the debt while taking the risk associated with management into account", i.e., balancing costs against risk. At the same time, debt management "shall be conducted such that it complies with the requirements posed by monetary policy" (Chapter 5, Article 5 of the Budget Act).

Central bank purchases of central government bonds for monetary policy purposes mean that the average term to maturity of

[77] This has been highlighted by among others Greenwood et al. (2014), who argue that in a way that was inefficient for the economy, the Fed and the Treasury in the US counteracted each other's efforts regarding the maturity of consolidated government borrowing during the global financial crisis and the subsequent recession (2008–14): the Treasury then tried to reduce the financial risk of the consolidated central government by extending maturities, while the Fed shortened them through its bond purchases (QE).

the consolidated central government's (the central government and the central bank) borrowing is reduced. The money with which the bonds are paid add to the banks' accounts in the central bank collecting an interest rate that follows the policy rate. Thus long-term borrowing for the consolidated central government is replaced by short-term borrowing, i.e., the central bank is engaging in maturity transformation (see Section 2.3.3). This entails increased interest rate and capital loss risks.[78] Thus, a fiscal policy decision made within the political system is shifted to the unelected officials on the central bank's executive board. The appropriateness of this is questionable.[79]

The new *Sveriges Riksbank* Act does contain a general provision that the *Riksbank* shall always apply the principle of proportionality. Measures must not be "more far-reaching than necessary" and the intended result must be "in reasonable proportion to the costs and risks that the measure leads to for the *Riksbank*'s and the state's finances" (Chapter 1, Article 8). But it is also made clear that even in the future it can be anticipated that the *Riksbank* will need to buy government securities in situations where monetary policy is limited by an effective lower bound on the interest rate.

If the central bank trades in financial instruments other than government securities, the financial risks increase, and credit and resource allocation in the economy are affected to a greater degree. The latter was certainly true for the *Riksbank*'s purchases of covered bonds (mortgage bonds) during the 2020–21 pandemic. By lowering long-term mortgage rates, these purchases contributed to the high demand for owned dwellings (Flug and Honohan 2022). The purchases of corporate bonds and other commercial papers entailed a redistribution of financing that benefitted larger firms. The quantitative easing described can be deemed outside of what is normally seen as a central bank's mandate, falling more within the domain of fiscal policy. According to the new *Sveriges Riksbank* Act, such purchases should therefore only be made "if there are exceptional grounds" (Chapter 2, Article 5). In other words, this presumes that the *Riksbank* has made the assessment that other

[78] See Greenwood et al. (2014) and Bernanke (2019, 2020).
[79] For similar reasons, Englund et al. (2019) argued against the *Riksbank* having the right to raise large loans via the National Debt Office as a precautionary method in order to increase foreign currency reserves to mitigate possible future financial crises.

monetary policy measures are not sufficiently effective or are disproportionate.

In conclusion, the new *Sveriges Riksbank* Act does entail constraints on the *Riksbank*'s balance sheet operations in government securities and, above all, in other securities. But in our opinion, it nevertheless implies considerable risks that decisions that, as a matter of principle, should be made by the political system will be consigned to the *Riksbank*.

A new problem facing the *Riksbank*, like other central banks, is how these large bond holdings should be handled in the situation of high inflation and tighter monetary policy that now (January 2023) prevails. The question is at what pace securities holdings should be reduced and how this should be coordinated with policy rate hikes. Past experience of such *quantitative tightening* (QT) is very limited. After the securities purchases that followed in the wake of the global financial crisis, it was only the Fed, in 2017–19, that managed to start phasing out its bond holdings. In addition, this was a slow process that was interrupted when the pandemic struck in 2020 (Forbes 2021).

Conventional wisdom among central banks seems to be that when monetary policy is to be tightened after a period of QE, this should begin with a policy rate increase. Bond holdings should gradually be phased out only after an economic upswing has been consolidated (Skingsley 2022). However, it is highly unclear why this would be the optimal strategy. One reason could be that knowledge about how changes in the policy rate affect resource utilisation and inflation is much greater than about how QT fares in this regard. In a situation where the risks of higher inflation becoming entrenched are deemed to be great, this argument may carry particular weight. But it may also be prudent in such a situation to use several tools to tighten monetary policy, so that long rates are raised in parity with short rates (see Forbes 2021, 2022 for a discussion of various considerations).

A further aspect is that it may be difficult to phase out the bond holdings in time before the next recession if the central bank waits too long to start the process. There are strong arguments for why a central bank should not, except in extreme crisis situations, pursue policy that affects risk premia in financial markets, because this can

override market signals. This suggests that holdings of mortgage and corporate bonds in particular should be phased out rapidly.

Skingsley (2022) argues that the *Riksbank* should not pursue QT by selling bonds but just gradually reduce its holdings by allowing them to mature. Because the remaining terms to maturity are short, in a few years' time this would mean a liquidation of the bonds acquired through previous purchases. We are critical of this approach. It is difficult to see why such a policy would be optimal, when one considers the effects on interest rates and aggregate demand as well as matters of principle concerning how large the securities holdings of a central bank ought to be, and thus to what extent various risk premia are affected. There is no reason to believe that during the QE phase, the central bank was able to buy a set of securities with precisely the maturity structure that would lead to an optimal reduction in these holdings during the QT phase.

5.1.3 Better conditions for monetary policy

Another way of increasing the efficiency of monetary policy in economic downturns is to create better conditions for it to operate. The most obvious way to reduce the risk that the policy rate will hit the effective lower bound is to raise the inflation target. Provided that this leads to higher inflation, at a given neutral real interest rate, on average the nominal interest rate will be higher and thus the scope for decreasing it in recessions greater. The economy will then more rarely hit the effective lower bound. In the international debate, an inflation target of 3 or 4 per cent instead of 2, which is the most common target, has therefore been proposed.[80]

A higher inflation target is often perceived as a substitute for quantitative easing. That might well be the case. However, it could also be seen as a complement that makes bond purchases more effective. The reason is that the scope for decreases becomes larger also for long-term rates, since these too will generally be higher in a normal situation (see Gagnon and Collins 2019).

The choice of 2 per cent as the inflation target in many countries was not preceded by any deeper analysis; it was crudely arrived at as

[80] For example, Blanchard et al. (2013), Ball (2014, 2017), Krugman (2014), Andrade et al. (2019), Galí (2020b) and Blanchard (2022).

a compromise between various considerations.[81] On the one hand, inflation makes price comparisons difficult and individuals can make erroneous decisions due to money illusion, i.e., they find it difficult to distinguish between changes in nominal and in real terms. On the other hand, inflation makes it easier to change relative wages when necessary, as the need for nominal wage cuts – which from experience are difficult to achieve – then decreases. In addition, there has been a perception that the consumer price indices in many countries have not correctly reflected changes in the quality of consumption goods and have therefore overestimated price increases.

New Keynesian analyses

In New Keynesian analyses, inflation incurs economic costs because nominal price rigidities mean that firms only update their prices occasionally. The higher is inflation, the greater the price dispersion due to such inertia. As a consequence relative prices do not truly reflect relative marginal costs, since the former are also influenced by the timing of price changes. Some firms' prices are too high, while other firms' prices are too low. The former then encounter lower demand and produce too little, and the latter encounter higher demand and produce too much. The composition of output and the allocation of resources will therefore be inefficient. If there is no effective lower bound on interest rates, in standard models the optimal inflation rate will be zero, because the problem of price differences that are not economically justified will then disappear. With an effective lower bound on interest rates, some inflation will be optimal. The resource allocation losses incurred due to inefficient price dispersion may be offset by the economic gains stemming from smaller losses in output resulting from unutilised resources if the effective lower bound on interest rates binds less frequently.

Another reason why a positive inflation rate can be optimal in New Keynesian models relates to trends in relative prices over the product life cycle. Adam and Weber (2022) find that the relative price of most products falls over time because the productivity in their production increases over the product's life cycle. General

[81] See Apel et al. (2017).

inflation therefore leads to the trend in relative prices better reflecting the trend in relative production costs, and thus to a better allocation of resources than if relative prices can only change occasionally due to nominal price changes. According to Adam and Weber, this mechanism means that the optimal rate of inflation in the UK has increased over time and was 2.6 per cent in 2016.

A common assumption in simple New Keynesian models is that the frequency of price changes is exogenous and that in any period, there is an exogenously given probability that a firm will change its product price (so called *Calvo pricing*).[82] A more reasonable assumption is that prices will change more frequently in the event of higher inflation. The revenue from the price increases in relation to the actual costs incurred by price changes (menu costs) will then be higher. In line with this, Nakamura et al. (2018) find a higher frequency of price changes in the US during periods of high inflation. But the price adjustments were not larger. This goes against higher inflation tangibly increasing price dispersion and thus incurring large resource allocation costs.

In a model for the US economy, Blanco (2021) estimates that the optimal inflation rate is between 3 and 4 per cent in the presence of firm-specific productivity shocks and risks of hitting a zero lower bound. Higher inflation only causes small increases in resource allocation costs because it makes firms that experience unexpected cost hikes change their prices more rapidly. Carlsson and Westermark (2016) design a model – also calibrated to reflect the US economy – which combines the costs of higher inflation in the form of reduced use of cash for transaction purposes and increased price dispersion, with the benefits that it will be easier to reduce real wages, and thus to avoid layoffs, in firms that are exposed to negative productivity shocks but where such adjustments are difficult to achieve due to nominal wage rigidities.[83] The optimum inflation rate in the model is between 1 and 2 per cent depending on the precise assumptions. However, the analysis does not take any effective

[82] The assumption was introduced by Calvo (1983).

[83] According to Milton Friedman's classic analysis, the socially optimal *rate of deflation* is equal to the real interest rate on government bonds (Friedman 1969). The reason is that the real private return on cash holdings (money) will then be the same as on bonds. The private marginal cost of holding money, which facilitates economic transactions, rather than holding less liquid bonds will then be zero, which is also the social marginal cost (since money can be produced virtually without any cost by the central bank). Economic actors will then choose to hold the optimum amount of money given by the marginal revenue also being zero.

lower bound on interest rates into account. But Kiley and Roberts (2017) do. Their simulations are based on conventional objective functions (loss functions) for the Fed, with inflation and the GDP gap as variables. The conclusion from their simulations is that the optimal inflation target is between 2 and 4 per cent, depending on the exact assumptions made.

One objection that has been raised against a higher inflation target increasing the effectiveness of monetary policy is that even though the risk of hitting the effective lower bound on interest rates decreases, the level of activity could fall more sharply if the economy were to end up in such a situation nevertheless (Mertens and Ravn 2014). The reason is that a higher inflation target – and therefore expectations of higher inflation in the future than otherwise – can make firms more reluctant to lower their prices in a recession and thereby contribute to sharp drops in demand and output. We are uncertain about the weight that should be attached to this argument, because it seems to be based on the assumption that the frequency of price changes is not affected by the extent of changes occurring in the economy.

Timing of a change in the inflation target and conceivable problems

If the inflation target is to be raised, a key question is under what circumstances this is ideally done. The need is greatest in a recession when the effective lower bound on interest rates binds. But this is also a situation in which it is difficult to influence inflation expectations through an increase in the target. These expectations are, of course, low precisely because the central bank's options for expansionary policy are limited and inflation is therefore low. If, in such a situation, raising the inflation target were to succeed in raising inflation expectations, real interest rates would decrease, which would stimulate the economy. However, there is a considerable risk that a higher inflation target will not be perceived as credible if policy has failed to achieve even the current target. Thus, raising the inflation target in such a situation can have little effect.

In a situation where the inflation target has been achieved, the prospects of a higher inflation target leading to higher inflation expectations are greater, but even then, the central bank must be able

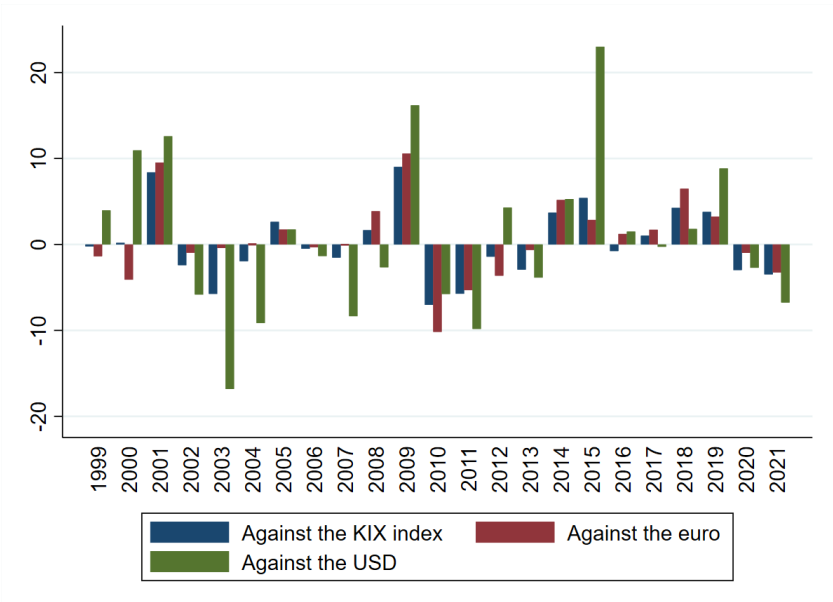
to convince the agents in the economy that it is capable of achieving higher inflation. The possibility of adjusting inflation expectations to a higher target ought to be greatest if inflation – and short-run inflation expectations – already lie above the current target. But then there is instead a risk that further increases in the target level might be anticipated. This may lead to a de-anchoring of inflation expectations and thus to inflation rising too much. The danger is particularly great if inflation is far above the target. An increase in the inflation target can then be seen as an indication that the monetary policy goals are being adjusted to compensate for past failures and lead to fears that this will be repeated in the future. In a situation like the one at the time of writing (January 2023), with inflation around 10 per cent in Sweden, it is thus obvious that the inflation target should not be raised.

The most appropriate time for raising the inflation target ought to be when both actual and expected inflation are only moderately above the current target and actual inflation is on its way down. The prospects ought to then be ideal for inflation expectations to adjust to a higher target and neither be too low nor too high. Such a situation could arise when inflation has fallen back towards the inflation target.

It has been pointed out that it would be easiest to gain legitimacy for higher inflation targets if these were implemented in a coordinated manner by many countries simultaneously (for example, see Jansson 2018). But this would probably be difficult to achieve. However, there is nothing to prevent a country with a floating exchange rate from raising its inflation target on its own. If that country chooses, and then achieves higher inflation than in other countries, according to established exchange rate theory, this will mean a gradual depreciation of the country's currency (compared to a situation without such a change in the monetary regime). A disadvantage may be that international price comparisons then become more difficult. But according to established reasoning on purchasing power parity, an increase in inflation by, say, 1 percentage point should only mean a depreciation in the effective exchange rate (against an appropriate currency basket) of 1 per cent per year. This is a minor change compared to the fluctuations in exchange rates that occur constantly, especially against individual currencies, and therefore should not make any great difference (see

Figure 5.2). In addition, real exchange rates do, of course, change over time according to trends due to differences in productivity growth, shifts in demand, etc. This means that even if countries maintain the same inflation targets, trends in the nominal exchange rate may arise. Furthermore, it is not clear whether the 2 per cent target applied in many countries really means the same inflation rate, since the methods of aggregating different prices into a price index sometimes vary greatly (Boppart et al. 2022).[84]

Figure 5.2 Annual change in the krona exchange rate 1999–2021, per cent



Note: The change in exchange rate against the exchange rate index KIX, the US dollar (USD) and the euro.
Source: The *Riksbank*.

[84] In light of our discussion above, it is difficult to understand why an inflation target different to that in other countries is sometimes categorically rejected. One example is Flug and Honohan (2022) in their assessment of the *Riksbank*'s monetary policy 2015–20. They conclude, without any analysis, that it would be "a mistake for a small open advanced economy like Sweden to adopt an inflation target that is markedly different from that of its major trading partners, especially because of the continuous pressure that would be placed on the exchange rate" (page 34). This formulation is also unclear because it does not clarify what is meant by a *markedly different* inflation target. The international debate on what is an appropriate level for the inflation target has, of course, been about small changes.

The most certain way to ensure that a higher inflation target really impacts actual inflation is to coordinate a change in the target with wage formation. As wages constitute the largest part of GDP, there is a strong co-variation between wage increases and value-added price increases, and thus between wage increases and consumer price increases (Gottfries 2018). It is difficult for a central bank to change the rate of inflation unless there is a change in the rate of wage increases. The strong coordination of wage bargaining in Sweden suggests that a change in the inflation target that is coordinated with the wage negotiation rounds could have rapid effects on actual inflation. This reasoning is closely aligned with Blanchard and Posen's (2015) earlier discussion about utilising the centralisation of wage formation in Japan (with tripartite negotiations between unions, employers and government) to achieve higher inflation there – in that case to help reduce the government debt ratio.

Coordinating an increase in the inflation target with wage bargaining requires a consensus between the *Riksbank* and the labour market parties. However, this could be difficult to achieve. In previous years with inflation below the inflation target, there was no consensus on how monetary policy and pay agreements could work together to achieve the current target.[85] The parties in the manufacturing sector who determine the benchmark for wage increases that serves as a norm for the rest of the economy, have largely chosen to be guided by wage increases in competitor countries rather than by the inflation target (Swedish Labour Policy Council 2015, Calmfors 2018, Gottfries 2018, Calmfors et al. 2019). This is particularly true of the employer side. In addition, it appears that more notice is taken of foreign wage increases in national currencies than in a common currency. The reason seems to be that the parties in the manufacturing sector do not want temporary exchange rate fluctuations to affect wage formation (Swedish Unions within Industry 2015). The parties may well prove reluctant initially to take into account an anticipated depreciation of the currency that might follow from the inflation target being higher in Sweden than in our competitor countries. There is some evidence to suggest that the parties view exchange rate developments as exogenous in their deliberations. If so, this means that they view wage increases in national currencies as decisive for the evolution of Sweden's

[85] See, for example, Teknikföretagen (2020).

competitiveness.[86] If they act on the basis of this view, it becomes more difficult for Sweden alone to change the inflation target.[87]

Alternative formulations of the price stability objective

One objection to raising the inflation target is that it entails higher resource allocation costs as a result of permanently higher inflation to handle the problem of interest rates hitting the effective lower bound which arises only occasionally (Bernanke 2019). Some analyses have indicated that a *make-up monetary policy strategy* can be better for the economy (Krugman 1998, Eggertsson and Woodford 2003, Werning 2011). This means that after a period when interest rates have hit the effective lower bound, the central bank commits for some time to keeping the interest rate lower than it otherwise would have done. The make-up period should be longer, the greater the accumulated deviations are from the negative interest rate that the central bank would have chosen to set – had it been possible – and thus the greater the accumulated deviations from the inflation and GDP targets (potential output) are. One possibility is to calculate a shadow interest rate that is dependent on these deviations, and not to return to normal interest rate setting until the shadow rate rises above zero (Kiley and Roberts 2017, Bernanke 2019). The idea is that expectations of such a policy will counteract the reduction in activity and inflation during the period when the interest rate is at the effective lower bound.

A *price level target* would function in a similar way.[88] This means a target for price growth over time. Periods with lower (higher) price increases than the target level should then be offset by periods with higher (lower) price increases. This means that the real interest rate will be lower than would otherwise be the case in periods with an effective lower bound on interest rates, since expected future inflation will be higher. The re-assessment by the *Federal Reserve* in

[86] See, for example, Enegren (2011), Apel et al. (2017), and Gottfries (2018).
[87] In its role as an employer, the central government could influence the wage bargaining rounds through agreements that are adjusted to a higher inflation target (which, according to the new *Sveriges Riksbank* Act, must be approved by the *Riksdag*). However, according to current practice – and negotiation agreements – the parties on the public sector side are required to follow the benchmark for wage increases established by the manufacturing sector, so active attempts by central government to change this norm of behaviour would constitute a departure from the current model of wage formation (Calmfors 2018, Calmfors et al. 2019).
[88] See Svensson (1999), Gaspar et al. (2007) and Williams (2017).

2020 of its monetary policy strategy can be characterised as a shift towards a price level target (Federal Open Market Committee 2022). The price stability objective is now formulated as "inflation that averages 2 percent over time", while making it clear that "when inflation has been running persistently below 2 percent, appropriate monetary policy will likely aim to achieve inflation moderately above 2 percent for some time".[89]

Bernanke (2019) has proposed a way of combining inflation and price level targets so that the central bank normally has an inflation target of 2 per cent. However, in situations where the policy rate is at its effective lower bound (zero), a *necessary* condition for raising the interest rate again should be that the average rate of inflation since the time the effective lower bound was hit is 2 per cent. Then the inflation target should be replaced by a temporary price level target that is sustained until it is reached, after which there should be a return to inflation targeting again. However, according to the proposal, achieving the temporary price level target must not be a *sufficient* condition for raising the interest rate. It should also be a requirement that average inflation has stabilised at 2 per cent and that the level of activity is satisfactorily high.

Higher inflation targets versus alternative formulations of the price stability objective

The alternative formulations of the central bank's price stability objective discussed above have some theoretical advantages over a higher inflation target. But there are also obvious objections. A first is that a policy of higher inflation after a recession may suffer from a time-inconsistency problem. Once the business cycle has improved, a central bank has a strong incentive to deviate from the policy announced while still in the recession. This is particularly true if the recession has been deep, since in that case it may have required promises of expansionary monetary policy for a sustained period of time to have sufficient effects on expectations (for example, see Ball 2017). The time-inconsistency problem poses a great risk that an

[89] Another important change in the strategy was that monetary policy should strive to reduce 'shortfalls' rather than 'deviations' in employment from its "maximum level" (sustainable level). This means that policy should react to "high unemployment" but not to "particularly low unemployment unless inflation is threatening the economy" (Bullard 2021).

announced make-up monetary policy strategy will not be credible and therefore will not have the intended stimulatory effects in a recession. Alternatively, the strategy may lead to the central bank waiting too long to raise the interest rate once the business cycle has strengthened, which may lead to inflation rising so much that it will entail high costs to contain it again. This may have happened in the US, for example, in 2021 and early 2022 when inflation was allowed to take off, and perhaps also in the UK and the euro area.

A second objection is that the alternative formulations are more complex than an inflation target and can therefore be more difficult to communicate and get different agents in the economy to comprehend. This applies in particular to proposals to implement a make-up monetary policy strategy after a deep recession, and alternating between inflation and price level targets. Consequently, the central bank will strive for different rates of inflation at different times – that is, in practice, have different inflation targets for different years – which can make it more difficult for households, firms and investors to form short-term inflation expectations. A price level target alone is easier to understand, but this will also in practice mean that the central bank will have different inflation targets for different years. On the other hand, a credible price level target makes it easier to form inflation expectations for longer periods.

The 'practical' objections to the alternative price-stability objectives set out above must be seen in light of it also being difficult to achieve a broad understanding for higher inflation being advisable in order to reduce the risk that the effective lower bound on interest rates will bind. The public probably generally think of all price increases as being bad, and that higher inflation should therefore always be avoided. Many people might find arguments about real interest rates, an effective lower bound on interest rates and the neutral interest rate abstract and difficult to comprehend. But it is also a reasonable conclusion that if a 2 per cent inflation rate was considered optimal when the inflation target was introduced, applying the same reasoning then as now, the optimal rate of inflation should have risen if the probability of monetary policy being constrained by an effective lower bound on interest rates has increased. Our overall assessment is that a slightly higher inflation

target is preferable to the alternative formulations of the price stability objective discussed above.

5.2 Risks of financial instability linked to the housing market

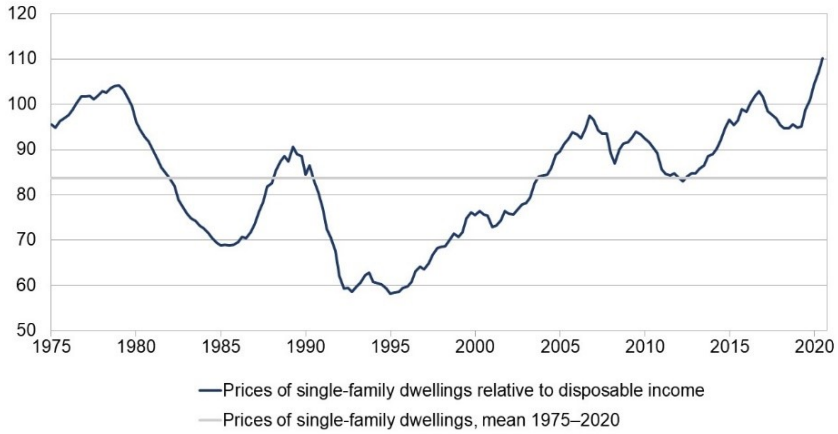
The declining trend in neutral interest rates (see Section 5.1), which also caused a similar fall in mortgage rates, led to hikes in house prices (until the end of 2021). The negative correlation between these prices and interest rates is natural. Since interest payments are an important component of the cost of home ownership with a mortgage, demand for such housing increases as interest rates go down. If the supply of housing cannot respond quickly to this increase in demand, prices must increase, as occurred (see Figure 5.3). The higher prices reflect a combination of higher demand, inelastic supply, and very low productivity growth in housing production.

Higher prices also increase demand for loans, and given that banks and other financial institutions supply credit, household gross debt grows relative to income. Since the mid-1990s, households' total debt in relation to their income has also increased. Lower interest rates have made it possible to take on larger debts without the interest payments' share of income increasing. On the contrary, as shown in Figure 5.4, there is a negative trend in interest payments' share of disposable income. However, most of this fall occurred during the 1990s when nominal interest rates fell greatly.

Lower interest rates naturally lead to larger balance sheets in the economy. In principle, this is not an expression of imbalances. However, it does not mean that lower interest rates, higher asset prices and larger balance sheets are without problems. Risks can increase for individual households. Lower interest rates lead to fluctuations in the fundamental value of an asset having a greater impact on its price and thus on the owner's balance sheet. Capital gains and capital losses for individual households become larger. If, for example, the attractiveness of living in a particular residential area decreases, it leads to higher capital losses for these homeowners if the interest rate is low than if it is high.

This can be illustrated more formally by a simple example. Suppose an asset generates a constant flow of services with a net value v. Think of a tenant-owned apartment at an address where many people want to live. The net value of the housing services generated is the market value per year of living in this apartment after the costs of maintenance, fees, etc. – but not interest – have been deducted. According to the theory, the price of the apartment in an equilibrium with stable interest rates will then be such that the interest expenses should the apartment be fully mortgaged correspond to the flow of services.[90] If the value of the apartment is P and the real interest rate is r then $Pr = v$. If we divide both sides of the equation by r, then $P = v/r$. A lower interest rate thus gives a higher price in equilibrium. The logic is simple. With lower interest rates, buyers can and are willing to pay more to gain access to the services provided by the asset. The price will then be higher.

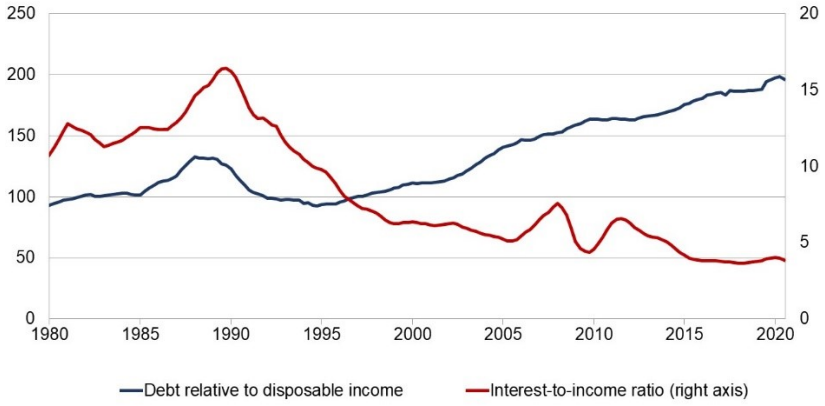
Figure 5.3 Prices of single-family dwellings relative to disposable income 1975–2021, index



Note: Prices of single-family dwellings based on Statistics Sweden's real estate price index for one- or two-dwelling buildings. Index = 100 in 1980.
Source: Swedish Financial Supervisory Authority (2021).

[90] Of course, the model can be made more complicated, for example by taking into account uncertainty, amortisation requirements, variable interest rates, that supply is not fixed but depends on price, etc. However, the main message will be the same, even with such changes in the assumptions.

Figure 5.4 Household debt and interest payments relative to disposable income 1980–2021, per cent



Note: Household debt relative to disposable income, and interest expenditure relative to disposable income (interest-to-income ratio).
Source: Swedish Financial Supervisory Authority (2021).

The effect on the price of a change in the market value of the service flow generated will be greater when the interest rate is low. Assume that the net value of owning a particular apartment is SEK 5 000 per month, i.e., SEK 60 000 per year. With a real interest rate of 4 per cent, the price would then be SEK 1 500 000 and with a 1 per cent interest rate it would be SEK 6 000 000. Say that the market value of the housing services falls by SEK 1 000, for example because a residence tax is introduced or something happens that makes the dwelling less attractive (like a hike in energy costs). With an interest rate of 4 per cent, the market value of the dwelling is reduced to SEK 1 200 000, i.e., by SEK 300 000. But if the interest rate is 1 per cent, the fall will be four times as large, SEK 1 200 000: from SEK 6 000 000 to SEK 4 800 000. The individual financial risks associated with ownership become greater in a low-interest economy. It is also easy to show with a similar example that an increase in the interest rate leads to a larger fall in prices if the interest rate rises from a low level rather than a high level.

At the time of writing (January 2023), this mechanism is illustrated by the large fall in Swedish house prices over the last year. The average price of an owner-occupied house fell from 4.1 million SEK in February 2022 to 3.6 million in November the same year. The fall of almost half a million SEK is close in size to the Swedish

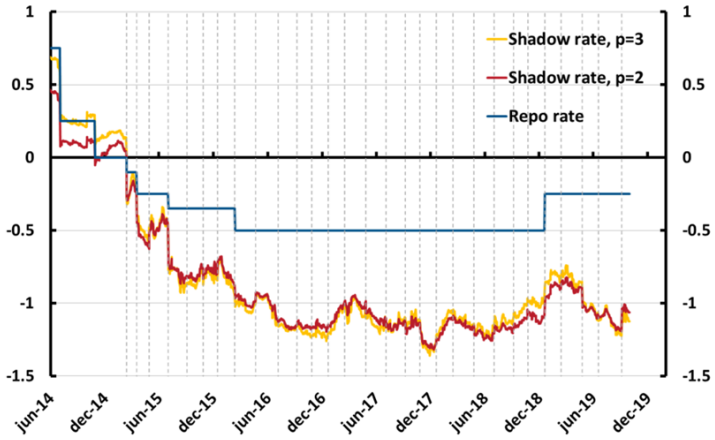
yearly GDP per capita. The large fall reflects the interest rate increases in 2022 but also the fact that expectations of higher energy bills following Russia's war in Ukraine has an effect on house prices that is amplified by the low neutral interest rates.

It is not *a priori* obvious that a general fall in the prices of dwellings must lead to reduced consumption. The reason is that lower house prices also mean that the cost of housing falls for new entrants to the housing market. For a household that owns its home and plans to live there for a long time, the living cost is not affected by a temporary fall in the prices of dwellings. The household's financial scope for consuming other goods is therefore not reduced.

Empirical studies show, however, that house prices do affect aggregate consumption (for example see Carroll et al. 2011). The main reason is that significant shares of dwelling owners in all income groups are liquidity-constrained and would like to borrow more than they do. The constraint that prevents a higher level of indebtedness is directly related to the value of the dwellings that constitute collateral for loans. Higher values of dwellings make it possible to borrow more and vice versa. The larger the share of households that are credit-constrained in this way, the greater the effect that fluctuations in the prices of dwellings will have on aggregate consumption. This is an example of a Level 1 amplification mechanism according to the classification system in Section 3.2.3.

If monetary policy lowers interest rates over a longer period, hazards of this kind would arise. On the other hand, as discussed in Section 3.2.3, the risks that falling housing prices would trigger more serious amplification mechanisms are small. This is because the probability that the banks will suffer large capital losses on house loans appears to be low in Sweden. According to the Swedish Financial Supervisory Authority's assessments, most households with mortgages are well equipped to cope with interest rate rises.

Figure 5.5 Policy rate and shadow rate for Sweden 2014–19



Note: The policy rate refers to the rate that was called the repo rate during the period. The parameter p=2,3 specifies the number of underlying variables, *pricing factors*, in the model.
Source: De Rezende and Ristiniemi (2020).

It is also doubtful whether monetary policy was a material reason for the long period of falling interest rates. As demonstrated in Section 4.3, during certain periods monetary policy has led to interest rates lower than the neutral rate, which has added to the rise in house prices. 2015–21, the *Riksbank* also pursued expansionary monetary policy through purchases of bonds and other unconventional measures. To analyse how expansionary monetary policy actually was during this period, De Rezende and Ristiniemi (2020) calculate a *shadow rate*. It shows what the policy rate would have been under the monetary policy conducted if the quantitative easing carried out at the time had also been taken into account. Figure 5.5 shows that the *Riksbank*'s bond purchases may have led to stimulatory effects corresponding to a policy rate cut of 0.5–1 percentage points. However, there is no convincing evidence that real estate prices and household debt would have evolved in a fundamentally different way if monetary policy had been consistently neutral in recent decades. On the other hand, stabilisation policy would not have functioned as well, and confidence in the inflation target would have been jeopardised.

5.3 Considerations with regard to discretionary fiscal policy

As discussed above, the fall in the neutral real interest rate has limited the scope for monetary policy to stimulate the economy in recessions through policy rate cuts, even though it is probably possible to have slightly lower negative interest rates than have been tried to date. In this situation, like other central banks the *Riksbank* purchased long-term bonds on a large scale. Such quantitative easing would appear to have expansionary effects but may also be troublesome (see Section 5.1.2). There is considerable uncertainty about the magnitude of these effects. The financial risk to the consolidated government (also including the central bank) rises when purchases of government securities shorten the term to maturity of government borrowing. The purchase of mortgage and corporate bonds increases the risks even more. In addition, it relaxes the boundary between fiscal and monetary policy, as such purchases, and the associated changes in risk premia, affect credit and resource allocation in the economy. Decisions that are fundamentally political in nature are thus transferred to non-political officials on the executive board of the *Riksbank*. We therefore argue that quantitative easing should not be a monetary policy instrument used to counter normal cyclical fluctuations.

However, in a situation that could lead to a financial crisis, it is important that the *Riksbank* can intervene with large purchases of assets in order to prevent a financial collapse. The concerted action of the world's central banks at the onset of the pandemic in the spring of 2020 was probably a key explanation as to why a financial crisis could be avoided. Without rapid intervention, risk premia on many assets could have exploded, with horrific economic consequences. However, in normal times, premia on risky assets are key to ensuring that investments and risk are well balanced. When risk premia rise in more ordinary situations, it is therefore very important to prevent expectations arising that the *Riksbank* will react by purchasing assets. Market actors would then focus on the *Riksbank*'s actions instead of analysing actual risks. That would pave the way for what could develop into financial crises in the future. The boundary between normal changes in risk premia and those that may escalate into financial crises cannot, of course, be defined in

legislation. However, the *Riksbank* should make it clear that it will normally exercise restraint in intervening in financial markets. This is also the meaning of the new *Sveriges Riksbank* Act's requirement that there must be 'exceptional grounds' for the *Riksbank* to buy or sell financial instruments other than government securities.

The low interest rates that prevailed until 2022 meant that fluctuations in expected future revenue streams from various assets have had bigger effects on asset prices, as have changes in interest rates (such as the recent hikes). Furthermore, low interest rates can create incentives for agents chasing returns in financial markets taking excessive risks. These risks are substantial, but as highlighted in Section 5.2, the fall in the neutral interest rate has contributed more to the low interest rates in recent years than monetary policy. Therefore, measures other than changes in monetary policy are required to manage risks in financial markets.

The earlier downward trend in interest rates has also had consequences for distributional policy. To the extent that low interest rates led to rising share prices, households with the highest incomes have benefited, while rising housing prices mainly have benefited middle-income earners.[91] What is clear is that the fall in interest rates benefited indebted households holding these assets. The expansionary monetary policy contributed to this. But it is also mainly low-income earners who benefit if expansionary monetary policy contributes to higher employment. The groups described are affected in a reverse way by the monetary policy tightening that has taken place since early 2022. To sum up, when it comes to the income and wealth distributions, the fall in the neutral real interest rate has been of much greater importance than monetary policy measures.

Considerations such as those above have led to many economists arguing that fiscal policy ought to play a greater role in stabilisation policy than according to the earlier conventional wisdom (see, for example, Summers 2016, Blanchard and Summers 2019, Rachel and Summers 2019, Lagerwall 2019, Jansson 2021 and Blanchard 2023). If more expansionary fiscal policy were to replace monetary policy stimulus measures in recessions, employment could be maintained without the wealth effects that the latter imply. In this context,

[91] There is plenty of evidence that shareholdings account for a larger proportion of the assets of high-income than of lower-income earners. For example, see Søgaard (2018).

many economists have also emphasised that it is not just the *need* for stabilisation policy to play a greater role in fiscal policy that has increased. The *possibilities* for this have also been expanded, as lower real interest rates diminish the risks involved in increased government borrowing as a result of fiscal stimulus measures. In addition, lower interest expenditure means that the scope for having lower primary net lending (lower taxes or higher primary expenditure) – which has a greater impact on demand than interest payments – increases. Also, the fiscal multipliers are larger when the economy is at its effective lower bound on interest rates, since expansionary fiscal policy measures do not then trigger any countervailing interest rate reactions (see Section 2.1). Finally, the many fiscal policy measures implemented during the pandemic – in a series of supplementary budgets in Sweden – showed that decisions on such measures can be made quickly.

Our assessment is that these arguments are reasonable. But they ignore the fact that more discretionary fiscal policy does not automatically have to be stabilising. As shown in Section 4.2, past discretionary fiscal policy measures have not been systematically countercyclical. They seem to have been largely driven by reasons other than stabilising the business cycle. Therefore, changes in the fiscal framework may be necessary in order to make discretionary fiscal policy more countercyclical. We will return to this below. What is clear, however, is that the fiscal rules did not prevent powerful and costly measures during the acute COVID-19 crisis. To create scope for such policies, there is no need for changes in the fiscal policy framework. But it should also be noted that the *Riksbank*'s rapid response to the crisis in March 2020 could hardly have been replaced by fiscal policy measures.

5.3.1 Fiscal policy and the neutral real interest rate

One way of looking at the interaction between fiscal policy and monetary policy is that the former can affect the neutral real interest rate and thus the probability that an effective lower bound on interest rates will bind. Blanchard (2023) argues that generally more expansionary fiscal policy is needed to keep the neutral real interest rate sufficiently above the effective lower bound and thus ensure

that there is sufficient scope for interest rate cuts in bad times.[92] We discussed this in Section 3.1.4 and noted that permanently larger budget deficits and a higher level of government indebtedness in the global economy as a whole would have such long-term effects. The same would apply to a permanently more expansionary fiscal policy in countries so large – think of the US – that the conditions there affect the world as a whole. But we also noted that permanently lower government net lending in Sweden, which is a small open economy, is not likely to affect our neutral real interest rate in the long term, because it is determined at the global level. Instead, net exports would decrease as a result of a real appreciation of the krona.

A relevant question is to what extent domestic fiscal policy can affect the Swedish neutral real interest rate in the short and medium term. This is analysed in Box 5.1 using a textbook model of a small open economy. According to this model, temporarily more expansionary fiscal policy raises the neutral real interest rate as long as this expansion is in place. On the other hand, a permanent change in policy has no such effect. This contradicts the idea that a systematically more expansionary fiscal policy with lower net lending would alter the conditions for monetary policy even in the short term. Our conclusion is based on the assumption of interest rate parity, and that this condition constitutes a good explanatory model for the exchange rate (see Box 2.5). Interest rate parity assumes that domestic and foreign assets are perfect substitutes for each other. To the extent that this does not apply, deviations from interest rate parity may occur. In that case, permanent changes in general government net lending would affect the neutral real interest rate. But there is reason to believe that this effect would be small.

Box 5.1 Fiscal policy and the neutral real interest rate

The relationship between fiscal policy and the neutral real interest rate in the short and medium term can be analysed using two equations. Equation (5.1) is a reduced-form equilibrium condition for the goods market. According to this equation, output depends negatively on the real interest rate, r, and structural net lending, F^*, and positively on the real exchange rate, Q (foreign price level measured in domestic currency divided by domestic price level, so

[92] See also Summers (2016) and Rachel and Summers (2019) for similar reasoning.

that a higher real exchange rate means a real depreciation, which leads to higher net exports). Equation (5.2) is the real interest rate parity condition from Box 2.5, where r^f is the foreign real interest rate and Q^e the expected real exchange rate.

$$Y_t = Y(r_t, F_t^*, Q_t) \tag{5.1}$$

$$r_t = r_t^f + \frac{Q_{t+1}^e - Q_t}{Q_t}. \tag{5.2}$$

Assume that output initially is equal to potential output, so that $Y_t = Y^*$, where Y^* is potential output; and that the real interest rate is equal to the foreign rate so that $r_t = r_t^f$. Assume further that F_t^* is lowered only temporarily, but that the real interest rate is kept unchanged. In that case, it is rational to not expect that the future real exchange rate, Q_{t+1}^e, will change. Consequently, Q_t is not changed either because $r_t = r_t^f$ presumes that $Q_{t+1}^e - Q_t = 0$. Thus Y_t rises above Y^*. This is equivalent to r_t being below the neutral real interest rate, r_t^*, i.e., the real interest rate that keeps output at its potential level in period t. For $Y_t = Y^*$ to apply, obviously the real interest rate must temporarily rise above the foreign rate r_t^f, i.e., the neutral real interest rate temporarily increases. This can only happen if $Q_{t+1}^e - Q_t > 0$. Since Q_{t+1}^e is assumed to be unchanged, it must mean that Q_t falls, i.e., there is an immediate real appreciation (probably mainly because the nominal exchange rate appreciates) – which over time will cause an equally large depreciation.

Now instead suppose that the reduction in government net lending is permanent. Assume further, as above, that the real interest rate is kept unchanged, so that $r_t = r_t^f$. However, if the real interest rate remains unchanged in the future, output at the potential level is predicated on a lower real exchange rate (that it appreciates) in the long term. With rational expectations, the expected exchange rate adjusts to this. However, as $r_t = r_t^f$ implies that $Q_{t+1}^e - Q_t = 0$, it means an immediate real appreciation to the new and expected equilibrium level (again probably mainly through a nominal appreciation), so that Y remains at the potential level, Y^*. Consequently, the neutral real interest rate does not increase even in the short run in that case.

The above conclusions can be seen as a variant of the classic Mundell-Fleming analysis that fiscal policy can be ineffective under a floating exchange rate (see, for example, Krugman et al. 2018). A critical assumption is that expectations of the future exchange rate are based on the assumption that it will adjust so that in the long term output will coincide with the potential level. Another critical assumption is that domestic and foreign interest-bearing assets are perfect substitutes for one another. To the extent that they are not, the existence of risk premia may result in deviations from the interest rate parity condition. However, these are usually assumed to be small in the analytical models used by central banks, ministries of finance, and various forecasting institutions.

5.3.2 The role of the automatic stabilisers

A substitute for more active fiscal policy, when the objective is to stabilise the business cycle, is to strengthen the automatic stabilisers. As discussed in Section 2.2.2, these stabilisers have weakened over time in Sweden. The balanced-budget requirement for local governments also means that the automatic stabilisers are probably substantially weaker than according to conventional calculations. This is particularly true in recessions.

The usual argument in favour of automatic stabilisers is that they reduce the risks of fiscal policy being misused and have faster effects than other stabilisation policy instruments (see, for example, Blinder 2016, Auerbach 2019, Blanchard and Summers 2019, Blanchard 2021b). But this reasoning must be nuanced. If a negative supply shock lowers potential GDP more than actual GDP, resulting in a positive GDP gap, the gap is not stabilised by the automatic stabilisers. Instead, they contribute to a larger gap. As far as the speed of the automatic stabilisers is concerned, of course they start to operate immediately when a shock occurs. This is an obvious advantage in the event of unexpected cyclical fluctuations. However, in the event of anticipated shocks – for example triggered by a downturn abroad which is likely to gradually be amplified – discretionary policy has the advantage of being able to act on the basis of forecasts.

Despite the above caveats, we share the view that stronger automatic stabilisers would be valuable. But a complication is that the strength of the automatic stabilisers is usually a by-product of considerations other than business cycle stabilisation. This applies, for example, to the progressivity of the tax system, which is likely to depend primarily on trade-offs between economic efficiency and income equality objectives.

Section 2.2.2 discusses the role of unemployment insurance as an automatic stabiliser. This follows from payments of unemployment benefits automatically rising in recessions when more people are unemployed. Since the unemployed to a large extent can be assumed to be liquidity-constrained, the marginal propensity to consume for paid unemployment benefits is high (close to 1) – most or all of the payments are used for consumption expenditure that sustains demand. From this point of view, high unemployment benefits are advisable. But on the other hand, it has negative supply effects. The incentives for the unemployed to look for work in an effective way decrease and the wage level tends to rise because the alternative income for those out of work rises.

A *cyclically dependent unemployment insurance* can be a way of better balancing the stabilising effects on the business cycle of high unemployment benefits, via the effects on aggregate demand, and the negative effects on supply. The idea is that the insurance is made more generous in recessions than in booms in terms of the benefit level, the maximum duration of benefits or coverage. In this way, transfers to households with a high propensity to consume increase more when the business cycle is weakened than would otherwise be the case. At the same time, the negative supply effects on employment resulting from weaker incentives to search for employment is likely to be less important in a recession, when the number of job vacancies is limited anyway, than in a boom when job search behaviour ought to play a greater role for the flow from unemployment to employment (Andersen and Svarer 2009, Fiscal Policy Council 2009).[93]

[93] Landais et al. (2018) argue in favour of cyclically dependent unemployment insurance for reasons other than the effect on aggregate demand. According to their analysis, the labour market is not tight enough in recessions, i.e., job vacancies are too few relative to the number of effective job seekers, whereas the reverse applies in booms, while higher unemployment benefits always *increase*, not decrease, tightness in the labour market. The latter result is due

Through discretionary decisions, many countries made unemployment insurance more generous during both the global financial crisis of 2008–10 and the COVID-19 crisis of 2020–21. This was also the case in Sweden during the pandemic, when the qualification requirements were relaxed so that more people were eligible for unemployment benefits while both the basic amount and the ceiling were raised. The problem with such discretionary decisions is that it can be difficult to make the insurance less generous again once the business cycle improves: for 2023 the "temporary" changes in the Swedish unemployment insurance are still in place although, according to the original decision when they were introduced, they should have been phased out by the end of 2022. Such phasing-out is probably easier to achieve with a regulatory system that stipulates *automatic* changes contingent on the cyclical situation.

Over the years, various proposals on *automatic variations in central government grants to local governments* have been presented. The aim has been to reduce the risk that procyclical expenditure changes by municipalities and regions amplify cyclical fluctuations.[94] A conceivable model would be to allow automatic variations in the central government grants to local governments to *compensate* for deviations – both upwards and downwards – in the growth of their tax base (taxable income) from an average of previous years. A less ambitious system would be to *guarantee* the local-government sector a minimum rate of increase in its revenue corresponding to what it would obtain with an unchanged average tax rate, when the tax base increases at a certain minimum rate (lower than the average increase in previous years). These automatic stabilisers would then only operate in recessions, but it is also in these situations that the need for them is the greatest (see Section 2.2.2). If the aim is to substantially strengthen the automatic stabilisers, it would of course be possible to let central government grants to the local-government

to a mechanism whereby more generous benefits, which decrease job search intensity, reduce competition for the jobs available and thus increase the likelihood that the unemployed will find employment. The authors' empirical results suggest that this mechanism is more important than the conventional one – that higher unemployment benefits raise the wage level and thereby make it less profitable for firms to hire.

[94] For example, see STEMU (2002), Fiscal Policy Council (2009), Spara i goda tider – för en stabil kommunal verksamhet (2011) (Saving in the Good Times – for Stability in Local-government Activities), and Utredningen om en effektiv ekonomistyrning i kommuner och regioner (2021) (Inquiry into Effective Financial Management in Municipalities and Regions).

sector vary so much that, given unchanged tax rates, its total revenue is not only prevented from falling (rising) but actually increases (decreases) in a recession (boom).

The new system to support short-time work introduced in 2020 acts as an automatic stabiliser because all firms who fulfil the criteria of being affected by temporary and serious financial difficulties caused by a circumstance beyond the employer's control have access to the system (see Section 2.2.2). We are critical of this set-up because it risks hampering desirable structural change. The older parallel system that has existed since 2014, which can only be activated by a discretionary government decision following an assessment by the National Institute of Economic Research that the economy is in a particularly deep recession, constitutes a better trade-off between the objective of stabilising the business cycle and employment on the one hand, and not hindering growth-promoting structural change on the other. This system constitutes a semi-automatic stabiliser, since there is a ready-made support mechanism but a discretionary decision is required to trigger it. A similar model could also be applied to other areas, in terms of both specific taxes and certain public expenditure. There may be reason to examine in more detail whether fiscal policy should have access to a larger set of measures prepared in advance which could be activated in different economic situations to either stimulate or tighten demand. An advantage of these kinds of measures is that they speed up the fiscal policy decision-making process. A disadvantage is that they may increase the risk of fiscal stimulus measures being overused in situations with only minor negative cyclical disturbances (see also Section 6.4). The potential usefulness of stronger semi-automatic stabilisers is greater in the event of severe economic downturns, but the latter are usually triggered by special circumstances. This may make it difficult to specify appropriate fiscal policy measures in advance.

5.4 Stabilisation policy in a stagflation situation

In the period 2000–20, inflation was not a problem in either the Swedish economy or other advanced economies. In Sweden, inflation during most years in this period did not reach the inflation

target of 2 per cent per year (see Figure 5.5). This was the case in particular during 2011–16 and led to unconventional monetary policy measures in the form of negative policy rates and quantitative easing that have been discussed above (see Box 2.6 and Sections 5.1.1 and 5.1.2). In 2020, CPIF inflation was as low as 0.5 per cent, partly because energy prices were weak and partly because the pandemic hit aggregate demand much harder – as a result of involuntary saving when opportunities to consume many services were reduced – than supply.

However, the inflation situation changed dramatically in 2021-22. Inflation rose both internationally and in Sweden. This was due to a number of factors and included shifts in demand between industries, a faster recovery than expected, and continuing COVID-19 restrictions in China, for example. On top of this, in the US in particular, strong fiscal policy stimulus not just in 2020, but also in 2021, amplified the highly expansionary monetary policy. Since then, international price increases have been spurred by price hikes for oil, natural gas, raw materials and food in connection with the war in Ukraine which broke out at the end of February 2022.

There are many parallels between the inflation developments in 2021–22 and world inflation in 1973–74. At that time too, very expansionary fiscal and monetary policy in the US – to finance the Vietnam War and Lyndon Johnson's social welfare programme (the 'war against poverty')– played a major role. Then came the big oil price hikes in connection with the Arab countries' oil embargo on the Western world following the Yom Kippur War in 1973 and the Iran–Iraq war in 1979–80.

International inflation in 1973–74 was imported into Sweden (see Calmfors 2021). An important reason was that Sweden, following the collapse of the Bretton Woods system in 1973, had maintained a fixed exchange rate against the German D-mark (and other important European currencies). It was therefore not possible to tighten monetary policy. An expansionary fiscal policy was conducted simultaneously, including a temporary reduction in VAT in 1974 and support for firms to produce more than they could sell to build up their stocks of final goods (which were – wrongly – believed to be easy to sell when the business cycle picked up). This was the so-called *bridging policy*. It contributed to inflation also taking off in Sweden in 1974. The collectively bargained wage

increases were relatively low in that year in relation to inflation, but wage drift (local wage increases in excess of the central wage agreements) ended up being high. This changed relative wages between different groups during a period when inflation expectations rose. This resulted in high wage increases in the central collective agreements in 1975–76. The average annual wage cost increases during the period 1974–76 were close to 20 per cent. It was the beginning of a long period – which lasted until the beginning of the 1990s – of inflation, devaluations and weak output growth. This trend culminated in a severe unemployment and government debt crisis in 1991–93. It was only then that the spiral of inflation and devaluations in the Swedish economy came to a halt.

How should one view the Swedish stagflation crisis in the 1970s? A reasonable conclusion is that too much emphasis was placed on stabilising the level of activity in a situation with severe supply shocks. The 1970s policy focused primarily on keeping up aggregate demand through fiscal policy stimulus measures at a time when oil price increases were reducing real incomes. However, the fact that the increase in energy prices also had a negative effect on potential output was overlooked. It is therefore likely that a positive GDP gap nevertheless arose, which contributed to higher inflation. It increased further when inflation expectations began to rise.[95]

A lesson from the experiences of the 1970s should be that in a stagflation situation, stabilisation policy must not be so expansive that a large positive GDP gap spurs inflation. As discussed in Section 3, a given GDP gap can be achieved through many different combinations of fiscal and monetary policies. Under stagflation, fiscal policy measures for reasons other than stimulating demand may be justifiable. Even if they lead to a positive GDP gap, negative supply shocks will likely cause unemployment, which results in major welfare losses for those affected. Through various mechanisms of exclusion, higher unemployment can also become entrenched in the long term. There may be grounds for counteracting this by means of various measures, such as support for short-time work, or other types of subsidised employment that directly promote employment. It may also be desirable for fiscal policy to play an *insurance role* by maintaining real income for low-income groups with little or no buffer savings. These measures are not

[95] See also Section 2.1.

primarily aimed at stimulating aggregate demand, but this is nevertheless a side-effect. It may therefore be appropriate to combine them with a contractionary monetary policy.

Expansionary fiscal policy, combined with contractionary monetary policy during a period of stagflation is more justifiable the stronger the government's net financial position is, the lower its debt ratio, and the more important counteracting high asset prices and high private indebtedness is deemed to be. Nevertheless, the middle-of-the-road principle for stabilisation policy discussed in Section 3.2.1 should apply. Fiscal measures to counter higher unemployment and to insure low-income households against large drops in real income should not lead to monetary policy being so contractionary that it causes severe strains on highly indebted households and firms, with consequent risks of financial instability.

Where reductions in real income are due to higher international prices for fossil fuel and other energy of the kind that occurred at the end of 2021 and in 2022, fiscal policy initiatives to insure against these should primarily be of a *lump sum type* and not be linked to electricity and fuel consumption. Reduced fuel taxes and subsidies in proportion to electricity use mean that market price signals about the scarcity of these resources are disabled. When many countries act in a similar way, the effect on consumer prices will be small. Instead, the main effect is to keep producer prices up.

Our knowledge of the level of equilibrium unemployment, at which inflation gradually begins to rise – and whether there is a clearly defined such level at all – is incomplete. Therefore, it is sometimes argued that aggregate demand policy should be designed so that it gradually tests whether lower unemployment levels can be achieved without inflation taking off (for example, see Holden 2004, 2017). Stabilisation policy with this focus may be advisable when inflation has been below or close to the inflation target for a long time – as was the case before the pandemic.

The equivalent of the described strategy in the current situation (January 2023) would be to wait before tightening demand policy and instead test whether the rise in inflation is temporary (Tuvhag 2022). But this policy is risky when supply shocks have pushed up inflation substantially above the inflation target. There is then a great danger that inflation expectations will rise. If this were to happen and trigger a price–wage spiral, the future costs in terms of

unemployment required to contain this process would be very high. These risks are clearly illustrated by experiences in the 1980s, when the inflation processes in the US and the UK were only stopped by sharp monetary policy tightenings, which resulted in double-digit unemployment rates. Sweden's experiences from the 1990s crisis are similar: a sharp rise in unemployment was required to dampen inflation. In light of this, there is much to suggest that it is better to take the risk of tightening demand too much than of tightening it too little in the current inflation situation.

A safer way to address the employment problems that can arise in connection with tightening monetary policy is implementing *structural reforms* aimed at improving the functioning of the labour market (see, for example, the Fiscal Policy Council 2022). As employment problems are very much concentrated to vulnerable groups – the low-skilled in general and the low-skilled foreign-born in particular, the disabled, and older people who have lost their jobs – measures to support and promote employment should focus mainly on them. We do not take a stand on what are the most appropriate measures here, but simply note that there is wide-ranging discussion on this, which includes various education and training programmes, more effective matching initiatives in labour market policy, subsidised employment, stricter requirements for receiving welfare benefits and benefit levels, how employment protection is designed, and minimum wage levels. The optimal mix of such structural measures depends to a large extent on the weights placed on different effects when employment objectives must be traded off against distributional policy objectives.[96]

The current collective agreement model, with the industry setting the benchmark wage, is usually seen as a strong barrier to excessive wage increases, and thus runaway inflation (Calmfors et al. 2019). The system was established in the late 1990s with the stated intention of breaking the previous high wage and price inflation. The labour market parties seem determined to ensure that Sweden does not end up in such a situation again. But it is also important not to overestimate the wage-setting system's resilience to such a development if price increases become too high. It is worth recalling that before the inflation of the 1970s, Sweden also had a system of

[96] For example, see Calmfors and Sánchez Gassen (2019) on the effectiveness of various measures to get foreign-born people into jobs and the goal conflicts that arise.

collective agreements, at the time strongly centralised with dominant roles for SAF (the Swedish Employers' Confederation) and LO (the Swedish Trade Union Confederation), which was seen as a guarantee for economically responsible wage-bargaining behaviour. But when stabilisation policy unleashed strong impulses to increase prices and wages, wage moderation became impossible.

6 Concluding discussion

This section summarises our conclusions. Section 6.1 addresses the roles of fiscal and monetary policy when it comes to stabilising the business cycle, while Section 6.2 raises the question of whether fiscal policy should also be given the explicit task of helping to achieve the inflation target. Section 6.3 discusses briefly whether there are institutional obstacles to an effective interaction between monetary and fiscal policy. Section 6.4 focuses on the risks of mis- and overuse of fiscal policy and possible barriers to this. Section 6.5 discusses the level of the inflation target. Finally, Section 6.6 deals with the relationship between different conceivable changes to the stabilisation policy guidelines.

6.1 General business cycle stabilisation

According to our analysis in Section 5.3, there are arguments in favour of fiscal policy playing a greater role in stabilising output and employment, especially during recessions, than previously suggested by conventional wisdom. In our opinion, however, the principal rule should still be that minor cyclical fluctuations should primarily be stabilised by monetary policy and fiscal policy's automatic stabilisers. As emphasised in Section 5.3, the latter should be strengthened. This can be done by automatically varying central government grants to local governments so that they compensate for variations in the sector's tax base. Cyclically dependent unemployment insurance, more generous in recessions than in booms, is also a possibility. However, it is important to design the systems to minimise the risk of supply shocks leading to destabilising effects on the business cycle and public finances.

But there are also reasons why discretionary fiscal policy should supplement monetary policy in stabilising resource utilisation in protracted recessions. There should be clear guidelines for this, but there are currently none. Guidelines of this kind were included in the 2011 Fiscal Framework Communication from the government to the parliament but are absent in the most recent communication of 2018.[97] This is unfortunate, not least because, since the outbreak of the pandemic in 2020, fiscal policy has become increasingly active in stabilising the business cycle and in insuring both households and firms against loss of income.

A business cycle situation where the policy rate of the *Riksbank* is close to zero while there are unutilised resources (a negative GDP gap) indicates that expansionary fiscal policy, i.e., structural net lending below the surplus target, may be desirable in order to assist monetary policy. Fiscal policy guidelines could establish that, provided it does not entail public-finance risks, when monetary policy is constrained by the effective lower bound on interest rates, fiscal policy should normally be tasked with achieving the demand stimulus that would have resulted from lowering the policy rate (if that had been possible). Such fiscal policy can be justified by a general ambition to keep both monetary and fiscal policy 'middle-of-the-road', thus avoiding extreme solutions (see Section 3.2.1). More specifically, fiscal policy guidelines of this kind would reduce the need for unconventional monetary policy measures such as extensive quantitative easing.

In recessions, if the government debt interest rate is below the growth rate in the economy, a deterioration in the public sector's net financial wealth position as a result of a more expansionary fiscal policy during recessions would be unproblematic: the long-term fiscal space would not decrease (see Section 3.1.1). And even if the relationship between the government debt interest rate and the growth rate were to be reversed, the financial position of the Swedish public sector is so strong that a reduction in net financial wealth and an increase in the consolidated gross debt by 10–20 percentage points of GDP would still mean very strong public finances. The effects on future primary net lending would be limited.

However, an increase in government debt always entails risks of limiting fiscal policy's room for manoeuvre in the future. If the debt

[97] Regeringen (2011, 2018). See also Section 3.2.4.

ratio were to increase continuously, a risky level would sooner or later be reached that would impede further borrowing, thus making it difficult to manage crises that arise. Although low neutral real interest rates have probably led to this level being higher than previously, where it lies is genuinely difficult to assess. Despite the risk-free real interest rates during the COVID-19 crisis being negative, it is likely that several euro countries with high levels of government debt would have found it difficult to roll over their debts on their own. The fact that there is a level of government debt that financial markets regard as unsustainable means that every increase in government debt has potential costs in the sense that further increases can become more difficult.

Discretionary fiscal policy should also help to stabilise resource utilisation in the event of serious overheating so that extreme interest rate hikes are not then required. These would hit heavily indebted households and firms hard, which could have destabilising effects on financial markets and asset prices. The task of fiscal policy to supplement monetary policy should be seen as equally important in the case of serious overheating of the economy as in recessions.

6.2 Should fiscal policy take inflation into account?

The overall objective of the *Riksbank*'s monetary policy is to maintain low and stable inflation. But monetary policy should also stabilise output and employment. The *Riksbank* thus has dual macroeconomic objectives. According to previous guidelines, there has been a discrepancy here in relation to fiscal policy. The previous Fiscal Framework Communication stated that, in certain situations. fiscal policy may need to supplement monetary policy when it comes to stabilising aggregate demand (Regeringen 2011). On the other hand, fiscal policy was assigned no other role in relation to inflation than that it "should not *impede* (our emphasis) the *Riksbank*'s efforts to maintain low and stable inflation" (page 33).

Like monetary policy, fiscal policy affects economic activity as well as inflation. One example when fiscal policy could have helped the *Riksbank* meet the inflation target is the period 2015–19, when the policy rate was zero or negative at the same time as large-scale asset purchases were made (see Section 4.3). Although fiscal policy

was expansionary during several of these years – with structural net lending below the surplus target (2016–18) despite positive GDP gaps according to the National Institute of Economic Research – an even more expansionary policy would have made things easier for the *Riksbank*. Another cautionary tale is Biden's large fiscal stimulus package in the US in 2021, which contributed to driving up inflation far above the levels sought by the US Federal Reserve (Summers 2021, Blanchard 2021, 2023). In this context, there is a risk of an imbalance arising in the opposite direction because, following negative supply shocks, the central bank may need to implement very large interest rate hikes due to the highly stimulating effect of previous fiscal policy.

One possibility could be to expand the stabilising role of fiscal policy to *support* – not just avoid impeding – monetary policy in pursuing the inflation target when there are major deviations from it. This could be a supplementary stabilisation policy objective for fiscal policy in addition to the objective of helping to stabilise resource utilisation when the *Riksbank*'s changes in the policy rate are insufficient. It is not generally possible to say whether such an extension of the fiscal policy objectives would make the policy more expansionary or less so in a recession. In a situation with a positive GDP gap but inflation significantly below the target, fiscal policy would be more expansionary. In a situation with an estimated positive GDP gap but significantly higher inflation than the target, fiscal policy would instead be more contractionary.

An alternative to an explicit task for fiscal policy to support monetary policy in the event of major deviations from the inflation target is for these deviations to be taken into account to a greater extent than they are at present when assessing the GDP gap. The GDP gap is notoriously difficult to estimate and attempts are often characterised by subsequent major revisions. However, significantly lower (higher) inflation than the target in a situation where the GDP gap is deemed positive (negative) may indicate that the estimate of the gap is inaccurate.

6.3 Forms of interaction between fiscal and monetary policy

The current economic policy regime means that the *Riksbank* is responsible for monetary policy, while the government and the *Riksdag* (Swedish Parliament) decide on fiscal policy. The independence of the *Riksbank* is assured, *inter alia*, by a dual instructions ban: the members of the bank's executive board are not allowed to receive instructions from the government, and the latter is not allowed to give such instructions (see Section 3.1 for more detail). However, there are no formal obstacles to the *Riksbank* having views on fiscal policy. This is consistent with the conditions in other countries.

A key question is whether the current institutional conditions might prevent effective policy coordination. An interesting analysis of this is Eggertsson (2006). In his model, under normal circumstances, it is appropriate for the government to design fiscal policy on the basis of a social welfare function, while the central bank determines monetary policy on the basis of narrower objectives (the stabilisation of inflation and economic activity). This is how the time-inconsistency problem that would otherwise arise, if the government could expect the central bank to finance budget deficits ex post via its "printing press" (Calvo 1978), is dealt with. However, the arrangement is suboptimal if the economy is exposed to a deflationary shock and ends up at the effective lower bound on interest rates. A prerequisite for effective stabilisation via budget deficits is then explicit coordination of fiscal and monetary policy. In this situation, according to the analysis, the government and central bank should maximise the same social welfare function. In that case, the central bank takes into account that it can contain the costs of the rising public debt through monetary financing of the debt. The expansionary fiscal policy then creates expectations about future inflation, which reduces real interest rates thus stimulating demand, and also raises expectations about future increases in income, which further boosts demand. This conclusion supports the theoretical hypothesis that the need for cooperation between fiscal and monetary policy increases in a crisis (see also Bernanke 2003).

The Fiscal Policy Council (2021) notes that – despite the dual instructions ban – formalised talks occur between the European

Central Bank (ECB) and representatives of EU political bodies. An interesting parallel in Sweden is the Financial Stability Board, where representatives of the government, the *Riksbank*, the Financial Supervisory Authority and the National Debt Office discuss financial stability. It should then also be possible for the government and the *Riksbank*, in certain situations, to hold talks on fiscal and monetary policy without compromising the independence of the *Riksbank*. However, it is difficult to have any conception of how much this would change in practice. During the COVID-19 crisis, there seemed to be no serious coordination problems. But one might ask whether more cooperation during the years prior to the pandemic would have resulted in a different stabilisation policy mix: a more expansionary fiscal policy in exchange for a less expansionary monetary policy (see Section 6.1). The situation of inflation being above the target, which at the time of writing (January 2023) characterises the Swedish economy, may also impose new demands on the interaction between monetary and fiscal policy if a desirable policy mix is to be achieved. It would presumably be unfortunate if a tightening of monetary policy aimed at dampening inflation were to be neutralised by expansionary fiscal policy. The result could be an even more contractionary monetary policy and unnecessarily large falls in house prices.

6.4 Barriers against misuse of fiscal policy

According to our empirical analysis in Section 4.2, there appears to be no countercyclical pattern for the discretionary fiscal policy earlier conducted in Sweden: we find no significant relationship between the deviation of structural net lending from the surplus target and the GDP gap. It is therefore not evident that more active fiscal policy will mean more stabilisation of the business cycle.

It is even conceivable that the practice established during the 2020–21 pandemic – which continued in supplementary budget bills in 2022 – may have shifted decision-making norms in the sense that politicians have become more willing to extend selective support to groups exposed to negative real income shocks as a consequence of price changes in individual areas or other events. Committee initiatives in the *Riksdag* that mean higher expenditures or lower

revenues during the current fiscal year are not subject to the same rules, requiring the initiatives to be financed by other budgetary changes, that apply when the government's budget bill is being considered in the parliament (but which have also started being eroded).[98] This entails risks of discretionary fiscal policy shaped too much by objectives other than business cycle stabilisation and resulting in a general deficit bias. The Fiscal Policy Council (2022) warns against such a development. A common hypothesis has been that the risk of large budget deficits increases with minority governments, which are likely to be prevalent in Sweden also in the future.[99]

In the international discussion, various proposals have been put forward on how to overcome the risks of more active fiscal policy leading to an excessive build-up of public debt or ill-timed (from the point of view of cyclical stabilisation) measures. Several of these proposals entail giving the central bank more influence over fiscal policy. Bartsch et al. (2019) recommend the establishment of an emergency fiscal facility, the size of which should be determined by the political system, while the central bank should decide when and to what extent the facility should be used. Yates (2020) introduces the idea that, when the policy rate hits the effective lower bound, a central bank should notify its government how much more it would have preferred to lower the policy rate if this had been possible. The central bank would quite simply 'place an order' for a fiscal policy stimulus, the size of which corresponds to the missing interest rate cut. The government does not need to heed the request, but would be subject to a *comply-or-explain* clause. In this context, it should be noted that there are fiscal policy instruments that operate in a similar way to changes in interest rates: taxation of capital revenue and interest deductions, as well as temporary changes in VAT.[100]

A less far-reaching proposal is made in Section 6.1 concerning fiscal policy guidelines which would establish that expansionary discretionary fiscal policy should be the norm in economic downturns when the *Riksbank*'s policy rate has approached zero. The guidelines could also stipulate that during booms, fiscal policy should be conducted so as to avoid very high interest rates.

[98] See, for example, Ekholm (2021).
[99] However, subsequent empirical research for the OECD countries has not found support for this hypothesis (Potrafke 2019).
[100] See STEMU (2002) and Finocchiaro et al. (2016).

Some interesting ideas on improved conditions for a cyclically well-balanced fiscal policy stance were contained in the report from the STEMU government commission (2002). It proposed a Fiscal Policy Council tasked with monitoring business cycle developments and that, on the basis of guidelines formulated by the government, would make public recommendations on fiscal policy measures, justified on stabilisation grounds. According to the proposal, the council would therefore even *recommend fiscal measures ex ante*, rather than, as is the case with the current Fiscal Policy Council, only *evaluate the policy conducted ex post*.

The STEMU proposal was a softer variant of proposals circulating at the time in the international debate whereby the political system would delegate fiscal policy decisions to stabilise the business cycle (e.g., variations in certain taxes over the course of the business cycle around values decided by parliament) to an independent council of experts (see, for example, Blinder 1997, Ball 1997, Business Council of Australia 1999, Seidman 2001 and Calmfors 2003, 2005). The commission's proposal applied should Sweden adopt the euro, i.e., a situation in which it would not be possible, just as with an effective lower bound on interest rates, to adjust the interest rate level in Sweden to cyclical developments here. The main idea behind the proposal was that if fiscal policy were to be based on recommendations from an advisory council of experts, it would reduce the risk of excessive stimulus in recessions, and insufficient tightening in booms.

In our opinion, it would be desirable for the Fiscal Policy Council to play a more active role by making recommendations in advance to the government and the *Riksdag* on how fiscal policy should be designed in relation to the cyclical situation. The council could do this on its own initiative. However, the recommendations would carry greater weight if giving them was a clear part of the council's instructions. In addition, a practice could be that the *Riksbank* should inform the government and the *Riksdag* when it assesses that the monetary policy instruments at its disposal are not sufficient to stabilise the economy and achieve the inflation target – or must be used in such an extreme way that major adverse side effects would arise – and that monetary policy therefore needs to be supported by fiscal policy.

Another option is that the government should *seek* the views of the Fiscal Policy Council before the budget bill is presented to the *Riksdag*, similar to the way in which views on draft legislation are sought from the Council on Legislation. The *Riksbank* and the National Institute of Economic Research could also be given the opportunity to express their views. The same could apply in connection with major supplementary budgets during the financial year. Such assessments could also be sought in connection with more extensive initiatives in the Committee on Finance. These views would then primarily concern the consequences of the initiatives for stabilisation policy and public finances, i.e., if the resulting structural net lending in relation to the surplus target is justified by the cyclical situation.

An important part of these assessments should address whether the government's estimates of the GDP gap are reasonable. Today, relatively mechanical methods are used to calculate this (see Section 2.1). During the COVID-19 crisis, it became clear that these methods do not provide sufficient guidance for stabilisation policy when the economy is hit by major supply shocks. The same is true in the current situation (January 2023), when hikes in prices of fossil fuels, semiconductors, raw materials and food, among other things, are causing stagflation problems. The assessments provided in such situations should also take note of to what extent general demand stimulus measures are likely to be effective in counteracting possible employment problems. During the two decades prior to the COVID-19 pandemic, positive supply shocks in the form of offshoring, digitalisation and an increase in labour supply may have contributed to potential GDP being underestimated and thus the GDP gap being overestimated.

There have been proposals that the remit of the Fiscal Policy Council should be expanded to cover both fiscal and monetary policy (Holmlund et al. 2014, Svensson 2014b). This could help to improve the interaction between these two policies by placing the issue higher on the agenda. In our opinion, the lack of a forum in Sweden for a structured discussion of the balance between monetary and fiscal policy is an obvious shortcoming. The Fiscal Policy Council could be usefully given the task of evaluating the stabilisation policy mix – ex ante and ex post.

6.5 The inflation target

Section 5.1.3 discussed the level of the inflation target. A higher target would mean that nominal interest rates are normally higher and thus can fall by more in recessions. The risk of hitting the effective lower bound on interest rates, and hence not be able to achieve sufficiently stimulative real interest rates, would then be smaller. This would reduce the need for the *Riksbank* to use major balance sheet operations (quantitative easing) in such situations, and for fiscal policy to take a major responsibility for business cycle stabilisation.

When the current 2 per cent target was introduced, it was not preceded by any deep analysis – it was crudely arrived at. The risk that the economy could end up in situations where an effective lower bound on interest rates would limit the possibilities of monetary policy was hardly taken into account: it was seen mainly as a theoretical curiosity. That it has now become apparent that this can happen is a strong reason to reconsider the inflation target. An increase to, for instance, 3 per cent may be desirable. It would provide additional room for interest rate cuts in economic downturns if the neutral real interest rate continues to be low, which is a common forecast (notwithstanding the present interest rate hikes). If the neutral real interest rate rises instead, such a limited increase in the inflation target would not have any tangible drawbacks.

A common objection to Sweden raising the inflation target by itself is that it would entail a gradual depreciation of the Swedish krona that would make international price comparisons more difficult and therefore have negative effects on economic efficiency. This argument can hardly be given any weight, since under a floating exchange rate there are large fluctuations in the effective exchange rate (against an appropriate composite currency index) occurring all the time, and even greater fluctuations against individual currencies. Moreover, it is very uncertain whether the 2 per cent target that is applied in many countries actually means the same rate of inflation, since the methods for measuring aggregate price changes vary widely between countries.

How would a potential increase in the inflation target be implemented? According to the new *Sveriges Riksbank* Act, the

Riksbank has an exclusive right of initiative. The *Riksbank* can then decide on a change only after it has been approved by the *Riksdag*. Adapting to a new higher target would be facilitated by a consensus with the labour market parties on the desirability of the change. This can hardly be achieved unless the decision is preceded by comprehensive public debate and considerable educational efforts on the part of the *Riksbank* – and others. As emphasised in Section 5.1.3, an increase in the target would probably be easier to implement in a situation where both actual and anticipated inflation are slightly above the current target but on their way down, so that it is obvious that the change is not being implemented because policy has lost control over inflation. This means that an increase in the inflation target is not relevant in the current situation (January 2023) with high inflation and fears of rising inflation expectations. A review of the inflation target will only become relevant once inflation is under control again.

6.6 The relationship between different changes to stabilisation policy guidelines

Any changes in individual areas of stabilisation policy have implications for how one ought to think about other areas. The more we are willing to accept the *Riksbank* making use of large-scale asset purchases, the less the need for changes. And conversely, there is greater need for other changes the more we want to avoid major balance sheet operations in the future.

Stronger automatic stabilisers mean less need for discretionary fiscal policy to supplement monetary policy in the event of demand shocks, and thus less need to build barriers against the misuse of fiscal policy. At the same time, it must be borne in mind that the automatic stabilisers only facilitate stabilisation policy in the wake of demand shocks. In the case of supply shocks that affect potential GDP more than actual GDP, automatic stabilisers can instead exacerbate the imbalances and thereby increase the need for discretionary fiscal policy decisions.

The more one is prepared to rely on fiscal policy to stabilise the business cycle, the less reason there is for reconsidering the inflation target. But the more sceptical one is about the possibilities of

implementing carefully crafted fiscal policy measures, and the greater the confidence in the potential efficacy of interest rate policy, the stronger the argument is to expand the *Riksbank*'s room for manoeuvre by raising the inflation target.

Our assessment is that there are good reasons to avoid major balance sheet operations on the part of the *Riksbank*. We believe that strengthening the automatic stabilisers would be worthwhile, but that this is insufficient if the objective is to significantly expand the possibilities of using fiscal policy to stabilise demand in protracted recessions. Considerable discretionary fiscal stimulus may be required in such situations for fiscal policy to contribute effectively to stabilisation. But this also means greater risks of fiscal stimulus being mis- and overused. These risks can be reduced, however, if fiscal policy decisions are based on independent assessments to a greater extent than today. More of these assessments would increase the possibility of using discretionary fiscal policy to stabilise the business cycle. But without a greater role for independent assessments, a more active use of fiscal policy for stabilisation purposes can be risky. Furthermore, as emphasised above, the COVID-19 pandemic appears to have led to a relaxation in fiscal discipline.

In summary, at present there are no clear guidelines for what role fiscal policy should play in stabilisation policy. Such guidelines are needed. The automatic stabilisers in fiscal policy should be strengthened, mainly through a system whereby there is counter-cyclical variation in central government grants to local governments. The guidelines should clarify that monetary policy and the automatic stabilisers should normally be responsible for business cycle stabilisation, but also that discretionary fiscal policy – unless fiscal sustainability considerations dictate otherwise – should support monetary policy in the event of severe demand shocks so that the latter is not overloaded. Fiscal policy should be of such a magnitude that large-scale asset purchases in recessions and extreme interest rate hikes in booms can be avoided.

Clearer guidelines for fiscal policy as a stabilisation policy instrument, as well as a greater role for independent assessments when decisions are to be made, can reduce the risks of its mis- and overuse. Nevertheless, a key tenet of effective fiscal policy must be a political willingness to respect the economic policy frameworks.

These frameworks enabled powerful policy responses during the COVID-19 crisis. The necessary measures in the acute stage of the crisis could be implemented without being constrained by a fear of their consequences for the long-term sustainability of public finances. This was valuable during the pandemic, but economic policy cannot be conducted in this way in normal times. To preserve fiscal policy's room for manoeuvre in the future, it is crucial to return to a coherent budget process, where the overall fiscal stance and government net lending are determined explicitly instead of being the result of a series of individual and uncoordinated decisions. The political parties in the *Riksdag* must all act responsibly in this regard.

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Appendix

A.1 Notation

Table A.1 List of variables and parameters

Designation	Description
Variable	
D^T	Total outstanding government debt
D^{CB}	Central bank holdings of government bonds
D	Government debt not held by the central bank
G	Government expenditure
G^S	Central government expenditure excluding central government grants to local governments
G^K	Local government expenditure
T	Total tax revenue
t	Tax rate
t^S	Central government tax rate
t^K	Local government tax rate
S	Government primary net lending
F	Government net lending
F^*	Government structural net lending
B	Central government grants to local governments
Y	GDP
Y^*	Potential GDP
γ	Real GDP growth
ρ	Nominal GDP growth
X^{CB}	Transfers from the central bank to the government (Treasury)
M	Banknotes and coins
H	The banks' reserves in the central bank
Z	Seignorage
P	Price level
π	Inflation
π^e	Expected inflation
π^*	Inflation target
π^f	Foreign inflation

Designation	Description
π^{ef}	Expected foreign inflation
i	Nominal interest rate
i^D	Nominal interest rate on government debt
i^H	Nominal interest rate on the banks' reserves in the central bank
i^f	Nominal foreign interest rate
r	Real interest rate
r^f	Foreign real interest rate
r^*	Neutral real interest rate (equilibrium real interest rate)
E	Nominal exchange rate: domestic currency per unit of foreign currency
E^e	Expected nominal exchange rate
Q	Real exchange rate: relative price between foreign and domestic products
Q^e	Expected real exchange rate
c	Consumption of a representative household
y	Logarithmic GDP
y^*	Logarithmic potential GDP
a	Government's stockholdings as a share of GDP
n	Government's dividend income as a percentage of its stockholdings
v	Revenue flow from asset
$\hat{y}$	Activity (output) target
u	Budget deficit
Parameter	
β	Discount rate
ϵ_i	Elasticity between tax revenue from tax base *i* and this tax base
ϵ_Y^G	Elasticity between government expenditure and GDP
λ_π	Central bank's weight for inflation's deviation from target level in the Taylor rule
λ_y	Central bank's weight for GDP gap in the Taylor rule
ϕ	Weight for deviations from the activity (output) target in society's loss function
φ	Weight for deviations from the equilibrium real interest rate in society's loss function
μ	Weight for budget deficits in society's loss function
α	Effect of budget deficit on level of activity
δ	Effect of a deviation from the equilibrium real interest rate on the level of activity
η	Effect of GDP gap on inflation

Note: For several variables, lower-case letters denote quantities as shares of GDP, so that $x \equiv X/Y$. When also X appears in the text, the corresponding x is not in the table. The variables a, n och u appear only as shares of GDP in the report and are therefore included on this form. Three exceptions to the principle that lower-case letters denote shares of GDP are the variables *c, y* and y^* which denote the variables listed in the table.

A.2 Monetary and fiscal policy: Time-inconsistency and coordination problems

Assume that society's loss function is:

$$L = \frac{1}{2}[\pi^2 + \phi(y - \hat{y})^2 + \varphi(r - r^*)^2 + \mu u^2], \qquad \text{(A.1)}$$

where π is inflation, y is the level of activity (output), $\hat{y}$ is the level of activity (output) target, r is the real interest rate, r^* is the equilibrium real interest rate, u is the budget deficit, and $\phi > 0, \varphi > 0$ and $\mu > 0$ are parameters. The economy is described by the following equations:

$$r = i - \pi^e \qquad \text{(A.2)}$$

$$y = y^* + \alpha u - \delta(r - r^*) \qquad \text{(A.3)}$$

$$\pi = \pi^e + \eta(y - y^*), \qquad \text{(A.4)}$$

where i is the nominal interest rate, π^e is expected inflation, y^* is the potential level of activity (output), and $\alpha > 0, \delta > 0$ and $\eta > 0$ are parameters. (A.2) defines the real interest rate, (A.3) shows how the level of activity is determined from the demand side, and (A.4) is an expectations-augmented Phillips curve.

A.2.1 Complete coordination

Assume first that the government determines both the budget deficit, u, and the nominal interest rate, i, by minimising the social loss function, taking expected inflation as given. Alternatively, this coordination case can be interpreted as the government deciding the budget deficit and the central bank the interest rate, but that the two agents have the same preference function. The policy is thus assumed to be discretionary and is decided after inflation expectations have formed and affected inflation – binding commitments on policy are not possible. We get:

$$\frac{\partial L}{\partial u} = \eta\alpha\pi + \phi\alpha(y - \hat{y}) + \mu u = 0 \qquad \text{(A.5)}$$

$$\frac{\partial L}{\partial i} = -\delta\eta\pi - \delta\phi(y - \hat{y}) + \varphi(r - r^*) = 0. \quad \text{(A.6)}$$

In equilibrium with rational expectations, so that $\pi = \pi^e$, according to (A.4), $y = y^*$, i.e., the level of activity, will be the potential level. If we utilise this, (A.3), (A.5) and (A.6) imply:

$$\pi = \frac{\phi}{\eta}(\hat{y} - y^*) \quad \text{(A.7)}$$

$$r = r^* \quad \text{(A.8)}$$

$$u = 0. \quad \text{(A.9)}$$

According to (A.7), there is an *inflation bias*, so that $\pi > 0$ if $\hat{y} > y^*$, i.e., if the activity target exceeds the potential level. The inflation is due to a time-inconsistency problem. Once inflation expectations have been established, the government has an incentive to allow inflation in order to increase the level of activity. In an equilibrium with rational expectations (perfect foresight), the agents in the economy understand the government's underlying motives and therefore expect precisely the inflation that the government chooses to allow. Therefore, the level of activity coincides with the potential level. While inflation becomes inefficiently high, the government has an incentive to coordinate fiscal and monetary policy so that $u = 0$ and $r = r^*$, i.e., so that the budget is balanced and the real interest rate equals the equilibrium rate. That way, social welfare losses are avoided from the budget balance and real interest rates deviating from their desired levels.

A.2.2 Delegated monetary policy

Now assume that the government determines only fiscal policy, and delegates monetary policy to an independent central bank. The government's loss function is assumed to be:

$$L_G = \frac{1}{2}[\pi^2 + \phi(y - \hat{y})^2 + \mu u^2]. \quad \text{(A.10)}$$

The central bank's loss function is:

$$L_{CB} = \frac{1}{2}[\pi^2 + \phi(y - y^*)^2 + \varphi(r - r^*)^2]. \qquad \text{(A.11)}$$

The government does not concern itself with the real interest rate level and the central bank does not concern itself with the budget balance. Furthermore, the central bank's objective for activity is the potential level and not the desired level according to society's (and the government's) loss function. In other respects, the two loss functions coincide with society's loss function.

The government now chooses the budget deficit u, so that (A.10) is minimised, while the central bank chooses the nominal interest rate i, so that (A.11) is minimised. As above, expected inflation is assumed to be given. Furthermore, in its minimisation, the government takes i as given and the central bank takes u as given (a Nash equilibrium) in its minimisation. This gives:

$$\frac{\partial L_G}{\partial u} = \eta\alpha\pi + \phi\alpha(y - \hat{y}) + \mu u = 0 \qquad \text{(A.12)}$$

$$\frac{\partial L_{CB}}{\partial i} = -\delta\eta\pi - \delta\phi(y - y^*) + \varphi(r - r^*) = 0. \qquad \text{(A.13)}$$

We once again utilise that $\pi = \pi^e$ in an equilibrium with rational expectations and that this implies $y = y^*$. (A.3), (A.12) and (A.13) then imply:

$$\pi = \frac{\phi}{\eta} \cdot \frac{\alpha^2\varphi}{\alpha^2\varphi + \delta^2\mu}\,(\hat{y} - y^*) \qquad \text{(A.14)}$$

$$r = r^* + \frac{\delta\phi\alpha^2}{\alpha^2\varphi + \delta^2\mu}\,(\hat{y} - y^*) \qquad \text{(A.15)}$$

$$u = \frac{\delta^2\phi\alpha}{\alpha^2\varphi + \delta^2\mu}\,(\hat{y} - y^*). \qquad \text{(A.16)}$$

(A.14) indicates an inflation bias also here if $\hat{y} > y^*$. But it is smaller than in the coordination case because $\alpha^2\varphi/(\alpha^2\varphi + \delta^2\mu) < 1$. This is because now only the government has an incentive to allow inflation to try to increase activity above its potential level, while

fiscal policy is held back by an aspiration to avoid excessive budget deficits.

The fact that inflation is lower in this case than in the coordination case is a win for social efficiency. But efficiency losses also arise because $r > r^*$ and $u > 0$. Due to the lack of coordination of fiscal and monetary policy, the government chooses a budget deficit that in equilibrium is balanced by the central bank opting for a higher real interest rate than the equilibrium rate.

It is not in general possible to say whether the delegation case results in a lower or higher social loss than the coordination case. This depends, in a complex way, on parameter values.

The interaction between the government's fiscal policy and the central bank's monetary policy could also be analysed as Stackelberg equilibria, where one agent takes the lead and the other follows. One common view is that the government should then be seen as the leader and the central bank as the follower because fiscal policy is established for one fiscal year at a time, while monetary policy can be changed at short notice. In that case, the central bank can always react to fiscal policy. The government must therefore take monetary policy's reaction into account when designing fiscal policy. However, this approach becomes less relevant the more frequently fiscal policy decisions are made during the fiscal year, which is the direction that has been taken in recent years in Sweden. We have also analysed the described Stackelberg equilibrium. However, it is not possible to draw any general conclusions on how the macroeconomic outcome in this equilibrium relate to the outcomes in the coordination and Nash equilibria above, since this too depends, in a complex way, on the magnitudes of the parameters.[101]

A.3 Additional graphical analysis of how fiscal and monetary policy have been conducted

Here, the graphical analysis in Section 4 is repeated using alternative measures of resource utilisation and real interest rates.

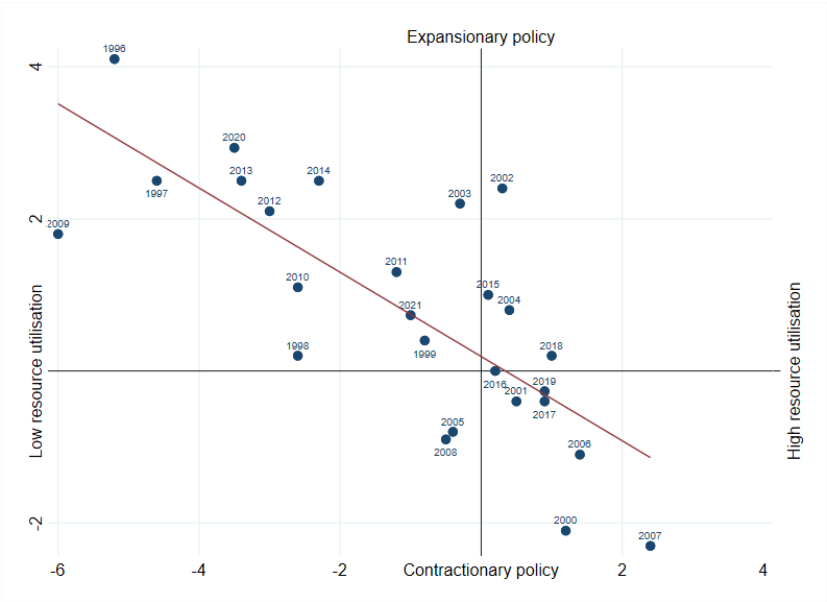
[101] There are previous analyses of Stackelberg equilibria in the game between government and the central bank, but the conclusions there appear to be very model-specific and not robust to various changes in the basic assumptions (see, for example, Dixit and Lambertini 2001, 2003, and Lambertini and Rovelli 2003).

Figures A.1 and A.2 show the correlation between, on the one hand, net lending and structural net lending and, on the other hand, resource utilisation, when the latter is based on the National Institute of Economic Research's (NIER) measures instead of the estimates in Armelius et al. (2018). The figures show that the co-variation is roughly the same as in Figures 4.6 and 4.7 in the main analysis. However, the estimates of the GDP gap differ quite a bit between Armelius et al. (2018) and NIER. A comparison between, for example, Figures 4.7 and A.2 shows that more years can be classified as procyclical when NIER's measures are used. If we focus on the years in which fiscal policy has been contractionary despite low resource utilisation, Figure 4.7 shows that this only occurs in 2005 and 2009, but in Figure A.2 it is additionally found to occur in 2008 and 2010.

In Figures A.3–A.6, we repeat the analysis in Figures 4.10 and 4.11, but use the alternative measure of the real interest rate based on inflation expectations according to Prospera and/or NIER's estimates of the GDP gap. The results are not appreciably affected by which measure of the GDP gap we use. However, the results are sensitive to whether we use the real interest rate in Armelius et al. (2018) or our own estimate. In the latter case, the correlation is slightly positive between the difference between the neutral real interest rate and the real interest rate on the one hand, and the GDP gap on the other. The positive slopes of the regression lines in Figures A.3, A.4 and A.6 are largely explained by the observations for 1996, when monetary policy appears to be much more restrictive with the alternative measure of the real interest rate than in Figures 4.10 and 4.11. It is not obvious why these measures differ, but the difference is probably related to how inflation expectations are measured.

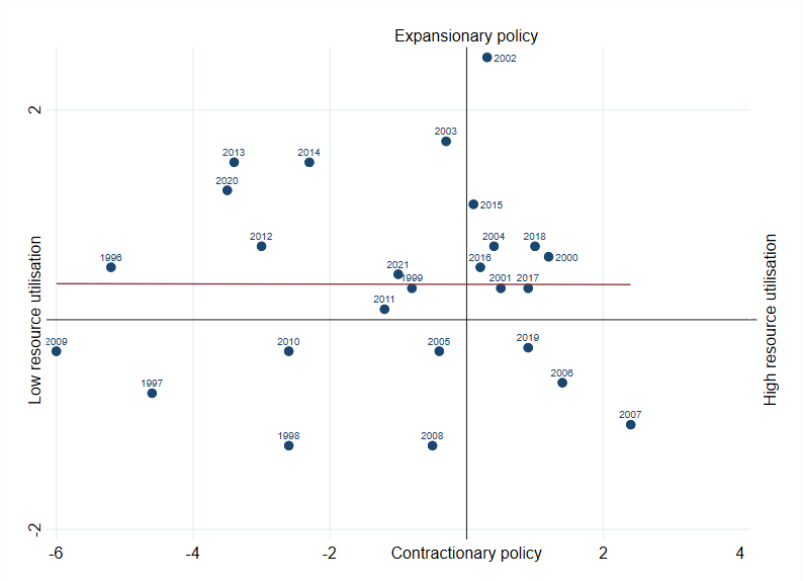
Unlike Figures 4.12 and 4.13 in the main text, Figures A.7–A.8 show a negative co-variation between fiscal and monetary policy, i.e., sdivergent policies, when we use the alternative real interest rate measure instead of the estimates from Armelius et al. (2018). However, again the negative correlation seems to be driven by 1996, when fiscal policy was strongly expansionary but monetary policy was restrictive.

Figure A.1 Net lending and resource utilisation 1996–2021



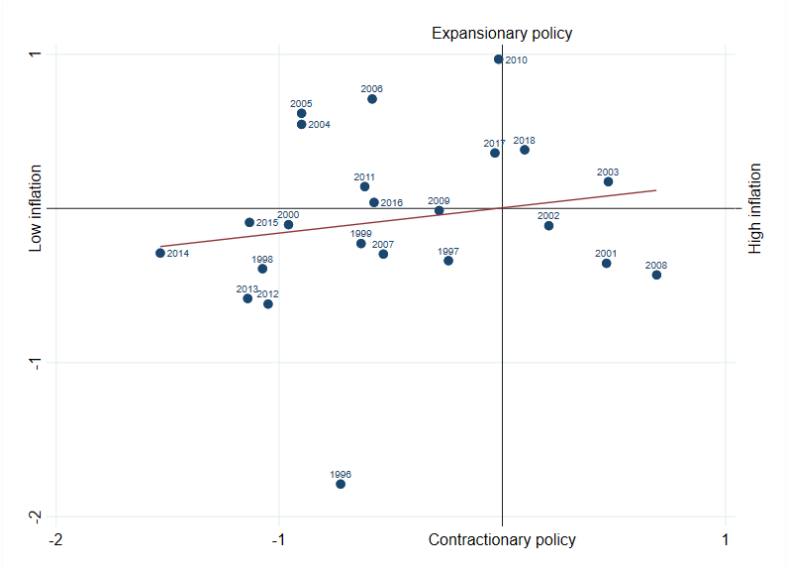
Note: The x-axis shows the National Institute of Economic Research's GDP gap. The y-axis shows the difference between the surplus target and net lending. The line shows the estimated linear relationship.

Figure A.2 Structural net lending and resource utilisation 1996–2021



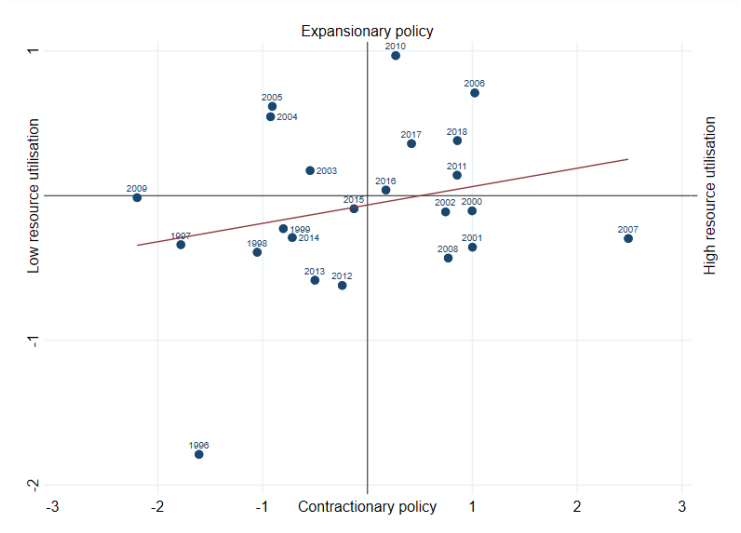
Note: The x-axis shows the National Institute of Economic Research's GDP gap. The y-axis shows the difference between the surplus target and structural net lending. The line shows the estimated linear relationship.

Figure A.3 Real policy rate and deviations from the inflation target 1996–2018



Note: The x-axis shows inflation's deviation from the inflation target. The y-axis shows the difference between the neutral real interest rate and real interest rate when the latter is based on our own calculations. The line shows the estimated linear relationship.

Figure A.4 Real policy rate and resource utilisation 1996–2018

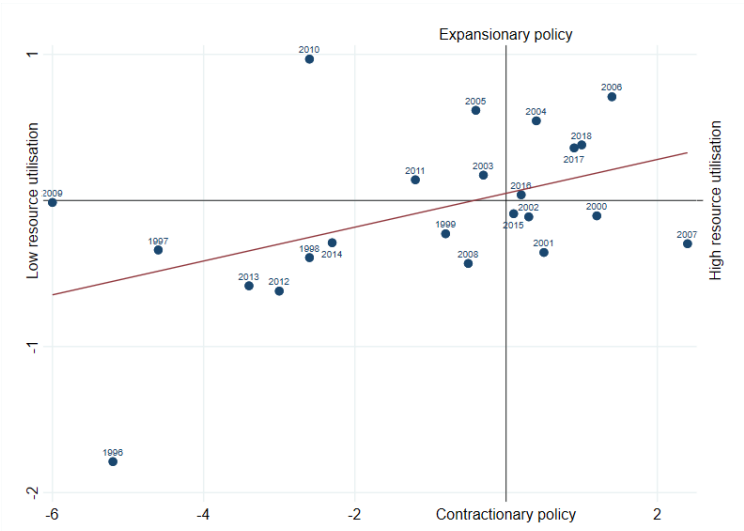


Note: The x-axis shows the GDP gap estimated by Armelius et al. (2018). The y-axis shows the difference between the neutral real interest rate and real interest rate when the latter is based on our own calculations. The line shows the estimated linear relationship.

Figure A.5 Real policy rate and resource utilisation 1996–2018

Note: The x-axis shows the GDP gap estimated by the National Institute of Economic Research. The y-axis shows the difference between the neutral real interest rate and the real interest rate when the latter is based on Armelius et al. (2018) The line shows the estimated linear relationships.

Figure A.6 Real policy rate and resource utilisation 1996–2018

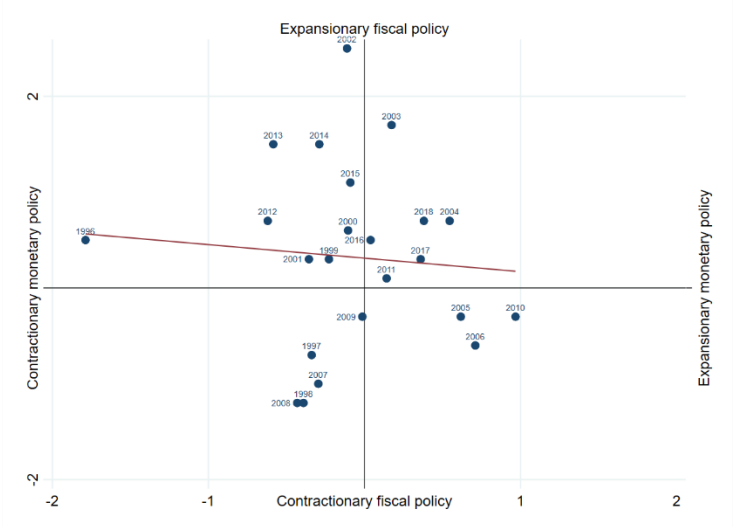


Note: The x-axis shows the GDP gap estimated by the National Institute of Economic Research. The y-axis shows the difference between the neutral real interest rate and the real interest rate when the latter is based on our own calculations. The line shows the estimated linear relationship.

Figure A.7 Net lending and deviations from the neutral real interest rate 1996–2018

Note: The x-axis shows the difference between the neutral real interest rate and the real interest rate when the latter is based on our own calculations. The y-axis shows the difference between the surplus target and net lending. The line shows the estimated linear relationship.

Figure A.8 Structural net lending and deviations from the neutral real interest rate 1996–2018



Note: The x-axis shows the difference between the neutral real interest rate and the real interest rate when the latter is based on our own calculations. The y-axis shows the difference between the surplus target and structural net lending. The line shows the estimated linear relationship.

A.4 Estimated relationships for fiscal and monetary policy

Table A.2 Ex-post estimates with the difference between the surplus target and net lending as the dependent variable 1996–2021

	(1)	(2)	(3)	(4)	(5)
Constant	0.67**	0.54	0.76**	1.34	2.76*
	(0.27)	(0.40)	(0.35)	(1.63)	(1.34)
GDP gap	-0.96***		-0.99***	-1.04***	-0.97***
	(0.24)		(0.26)	(0.31)	(0.26)
Deviation from inflation target		-0.52	0.19	0.20	0.21
		(0.51)	(0.48)	(0.49)	(0.45)
Debt ratio				-0.01	
				(0.03)	
Lagged debt ratio					-0.04
					(0.03)
N	23	26	23	23	22

Note: GDP gap according to Armelius et al. (2018). Estimates that include the GDP gap cover the period 1996–2018. The debt ratio refers to the consolidated gross government debt (Maastricht debt) as a share of GDP. Standard errors in parentheses. Significance codes: * p<0.10, ** p<0.05, *** p<0.01.

Table A.3 Ex-post estimates with the difference between the surplus target and structural net lending as the dependent variable 1996–2021

	(1)	(2)	(3)	(4)	(5)
Constant	0.32	0.24	0.26	0.89	1.16
	(0.20)	(0.23)	(0.27)	(1.25)	(1.16)
GDP gap	-0.04		-0.02	-0.09	-0.06
	(0.19)		(0.20)	(0.24)	(0.22)
Deviation from inflation target		-0.22	-0.14	-0.13	-0.13
		(0.30)	(0.37)	(0.38)	(0.38)
Debt ratio				-0.01	
				(0.03)	
Lagged debt ratio					-0.02
					(0.02)
N	23	26	23	23	22

Note: The expected GDP gap and expected deviation from the inflation target are obtained from the budget bill for each year. Estimates that include the GDP gap cover the period 1996–2018. The debt ratio refers to the consolidated gross government debt (Maastricht debt) as a share of GDP. Standard errors in parentheses. Significance codes: * p<0.10, ** p<0.05, *** p<0.01.

Table A.4 Ex-post estimates with the difference between the surplus target and structural net lending as the dependent variable 1996–2021

	(1)	(2)	(3)	(4)	(5)
Constant	0.41	0.91**	0.37	-2.68	2.61
	(0.37)	(0.37)	(0.40)	(2.96)	(2.89)
Expected GDP gap	-0.31*		-0.25	-0.31	-0.21
	(0.17)		(0.22)	(0.23)	(0.23)
Expected deviation from inflation target		0.30	-0.26	-0.11	-0.35
		(0.46)	(0.70)	(0.72)	(0.72)
Debt ratio				0.07	
				(0.07)	
Lagged debt ratio					-0.05
					(0.07)
N	20	26	20	20	20

Note: GDP gap according to Armelius et al. (2018). Estimates that include the GDP gap cover the period 1996–2018. The debt ratio refers to the consolidated gross government debt (Maastricht debt) as a share of GDP. Standard errors in parentheses. Significance codes: * p<0.10, ** p<0.05, *** p<0.01.

Table A.5 Ex-ante estimates with the difference between the surplus target and structural net lending as the dependent variable 1996–2021

	(1)	(2)	(3)	(4)	(5)
Constant	0.39	0.21	0.25	-3.64*	-1.27
	(0.26)	(0.21)	(0.27)	(1.81)	(1.94)
Expected GDP gap	-0.05		0.10	0.03	0.07
	(0.12)		(0.15)	(0.14)	(0.16)
Expected deviation from inflation target		-0.32	-0.74	-0.55	-0.68
		(0.26)	(0.47)	(0.44)	(0.48)
Debt ratio				0.09**	
				(0.04)	
Lagged debt ratio					0.04
					(0.05)
N	20	26	20	20	20

Note: The expected GDP gap and expected deviation from the inflation target are derived from the budget bill for each year. Estimates that include the GDP gap cover the period 2002–21. The debt ratio refers to the consolidated gross government debt (Maastricht debt) as a share of GDP. Standard errors in parentheses. Significance codes: * p<0.10, ** p<0.05, *** p<0.01.

Table A.6 Ex-post estimates with the difference between the neutral real interest rate and the real interest rate as the dependent variable 1996–2018

	(1)	(2)	(3)	(4)	(5)
Constant	0.01	-0.14	-0.09	0.10	
	(0.13)	(0.18)	(0.16)	(0.12)	
GDP gap	-0.34***		-0.31**	-0.60***	-0.32**
	(0.12)		(0.12)	(0.11)	(0.12)
Deviation from inflation target		-0.38	-0.21	0.12	-0.14
		(0.24)	(0.23)	(0.19)	(0.17)
Debt ratio				0.09**	
				(0.04)	
Lagged dependent variable				0.58***	
				(0.17)	
N	23	23	23	22	23

Note: The real interest rate, the neutral real interest rate and the GDP gap are taken from Armelius et al. (2018). Standard errors in parentheses. Significance codes: * p<0.10, ** p<0.05, *** p<0.01.

Table A.7 Ex-ante estimates with the difference between the neutral real interest rate and the real interest rate as the dependent variable 1996–2018

	(1)	(2)	(3)	(4)	(5)
Constant	-0.24	-0.17	-0.33*	-0.40*	
	(0.20)	(0.14)	(0.18)	(0.20)	
Expected GDP gap	-0.18*		-0.04	-0.02	0.01
	(0.09)		(0.11)	(0.11)	(0.11)
Expected deviation from inflation target		-0.53***	-0.62*	-0.81**	-0.49
		(0.17)	(0.30)	(0.37)	(0.31)
Lagged dependent variable				-0.23	
				(0.26)	
N	17	23	17	17	17

Note: The real interest rate and the neutral real interest rate are taken from Armelius et al. (2018). The expected GDP gap and the expected deviation from the inflation target are taken from the budget bill for each year. Estimates that include the GDP gap cover the period 2002–18. Standard errors in parentheses. Significance codes: * p<0.10, ** p<0.05, *** p<0.01.

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- A Rear View on the Road Ahead – a Report on Labour Market Establishment to the Expert Group on Public Economics
- As Safe as Can Be? A Report on Social Insurance and Welfare to the Expert Group on Public Economics
- Stability in the Balance – a Report on the Roles of Fiscal and Monetary Policy to the Expert Group on Public Economic (Swedish version)

2021

- In the Time of Pandemic – an ESO Anthology of Social Science Reflections
- An Unfortunate Loss? A Report on the Inheritance Tax to the Expert Group on Public Economics
- No Advertising Please. A Report on Government Agencies' Communication to the Expert Group on Public Economics
- Prove Me Wrong – a Report on Evidence-based Policy to the Expert Group on Public Economics
- With Joint Forces. A Report on Contractual Municipal Cooperation to the Expert Group on Public Economics
- The Dynamics of Economic Crises – a Report on Business and Structural Transformations to the Expert Group on Public Economics
- Delayed Self-Support. A Report on Labour Market Integration of Women Born Abroad to the Expert Group on Public Economics

2020

- Early Efforts for Future Gains – a Report on Social Investments to the Expert Group on Public Economics
- Gender Equality Counts – a Report on the Changing Position of Women in Working Life to the Expert Group on Public Economics
- Carrots, Not Sticks – a Report on Incentives for Municipal Efficiency to the Expert Group on Public Economics
- High voltage – a Report on Power Grids and Secure Energy Delivery to the Expert Group on Public Economics
- Education online – a Report on the Digital Transformation in Higher Education to the Expert Group on Public Economics
- Crucial Goals – a Report on Labour Market Targets to the Expert Group on Public Economics.
- Our Future Tax System – a Report on a Comprehensive Tax Reform to the Expert Group on Public Economics

2019

- Same, Same but Different – An ESO Anthology about Equity in Schools
- Tax the Sins Away – a Report on Alcohol-, Tobacco- and Gambling Policies to the Expert Group on Public Economics
- Mind the Margin – a Report on Reformed Income Taxation to the Expert Group on Public Economics
- Swedish Taxes and the EU Law – a Report to the Expert Group on Public Economics
- Mind the Gap – a Report on Means and Objectives in the Transport Sector to the Expert Group on Public Economics
- Problem-Oriented Policing in Sweden – a Report to the Expert Group on Public Economics
- Bang for the Buck – a Report on Sweden's Military Equipment Supply to the Expert Group on Public Economics
- Care in Comparison – a Report on Hospital Care in Sweden and in Selected OECD Countries to the Expert Group on Public Economics

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- Labor Market Integration of Refugees in Sweden – a Report to the Expert Group on Public Economics
- To Protect Enough – a Report on the Environmental Objective Sustainable Forests to the Expert Group on Public Economics
- Reconsidering Economic Impact Assessments – a Report to the Expert Group on Public Economics
- Digitalization and Health Care a Report to the Swedish Government´s Expert Group on Public Economics
- Data in your own Hands – a Report on Person-centered Health Accounts to the Expert Group on Public Economics

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- The Role of the State and Municipalities in Ensuring Housing for All – a Report to the Expert Group on Public Economics
- Children's Background and Learning Outcomes – a Report to the Expert Group on Public Economics
- Yes Box! A Report on a New Model for Capital and Residential Property Taxation to the Expert Group on Public Economics
- Different Gender, Different Pay – a Report to the Expert Group on Public Economics on Discrimination on the Labour Market
- More Gender Equal Pensions – a Report to the Expert Group on Public Economics
- Inspiration for Integration – a Report to the Expert Group on Public Economics
- Bridging research and politics – a collection of writings from new ESO's 10 year anniversary

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