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MACROECONOMIC EQUILIBRIUMS, CRISES AND FISCAL POLICY

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Abstract

Macroeconomic crises are common as well as economically, socially and politically costly. Fiscal policy plays an important role in alleviating the costs of the crisis. However, recent experiences suggest that the public finances often are unprepared for a crisis. Deficits and debt levels prior to the crisis are commonly too high, limiting the government's ability to respond to the crisis. In this paper, we argue that theoretical macroeconomic models focus on stable equilibriums, may partially explain why governments underestimate the risk of economic crises and carry too much debt prior to such events. In the standard equilibrium models, crises are one-off events caused by external factors. These macro-models thus neither predict nor expect a future crisis, which creates a false impression of long-run economic stability. Using forecast data, we demonstrate how the equilibrium perspective dominates macroeconomic thinking and how it contributes to too-high debt ratios prior to a crisis. We end the paper by discussing how to design fiscal policy rules based on a crisis rather than an equilibrium approach.

Key words: crisis; equilibrium; macroeconomic models; fiscal policy, national debt, fiscal frameworks
Jel codes: E17; E37; E62; E63

Introduction

Macroeconomic crises are common. High-income countries have experienced at least three major crises during the first two decades of the 21st century: the international financial crisis of 2007–09, the European debt crisis of 2011–13, and the Covid-19 pandemic of 2020. Crises are even more common among low- and middle-income countries (Reinhart and Rogoff, 2009). Crises are costly to society: they reduce output and cause higher unemployment (Reinhart and Rogoff, 2009; Andersson and Karpestam, 2014). The costs are not only economic: health outcomes deteriorate and suicide rates increase (Economou et al., 2013; Reeves et al., 2012). Political populism and extremism also tend to grow in the aftermath of crises (Eichengreen, 2018; Funke et al., 2016).

Fiscal policies play an important role in limiting the effects of macroeconomic crises on society. Increased public spending and lower taxes during the crisis limit the impact on the real economy, which in turn contributes to reducing the negative social and political impacts of the crisis. Similarly, government support to banks and financial markets during a financial crisis may stop the crisis from spreading to the rest of the economy. Supporting the economy is expensive, and public debts grow rapidly as a result (Balduzzi et al., 2020). High debt levels increase the risk of fiscal crisis following the original crisis, especially among countries with relatively high public debts before the crisis. A sovereign debt crisis on top of the original crisis worsens the real economic, social and political problems a country may face (McManus and Ozkan, 2015).

One explanation for weak public finances is the deficit-bias hypothesis, which states that governments run large deficits due to political competition (Hallerberg and von Hagen, 1999; Velasco, 2000) and limited concern for the effect of the public debt on future generations (Alesina and Tabellini, 1990; Beetsma and Uhlig, 1999). The solution to the problem is to construct fiscal policy rules that limit how much the government can borrow and provide supervision of long-run stability of the public finances through strategies such as independent fiscal policy councils (Krogstrup and Wyplosz, 2010; Jonung, 2018).

Another possible explanation, are that most theoretical macroeconomic models are built on the assumption of a stable equilibrium, which the economy gravitates towards in the long-run. Crises are treated as one-off external and exogenous events resulting from mistakes or bad luck

(Stiglitz, 2011). Because cries are perceived as an external event, the models never predict that a crisis may occur in the future. All that the models can do is to map out a possible path back to the equilibrium once a crisis has occurred. However, even here the models struggle, as they tend to overestimate the speed of recovery and underestimate the long-run damage to the economy (Cerra and Saxena, 2008; Andersson and Karpestam, 2014).

The focus on equilibriums and the lack of a crisis perspective affects the conduct and monitoring of fiscal policies. Economic models are used to evaluate the effects of economic policies and to generate a forecast of the economy in the future. Forecasts are in turn used to design and monitor fiscal policies. The equilibrium perspective also has an indirect effect on fiscal policy, as most economists are trained to think in terms of stable equilibriums, which affect their views of how the economy functions and how it may behave in the future. By focusing on stable equilibriums and reducing crises to rare external events, the risk of a future crisis is underestimated. Governments take on too much debt during normal times, leaving them unprepared once the crisis strikes.

We illustrate how the equilibrium perspective dominates economic thinking and affects fiscal policy using GDP forecasts from the OECD and the European Commission. Forecasts represent the joint judgement of qualitative models and personal judgements of the future state of the economy (OECD, 2016). They broadly capture the consensus view among economists at the time of how the economy will develop in the future. Our analysis shows that forecasts are highly influenced by the equilibrium perspective. Growth is expected to return to a historical average relatively quickly—often within a year or two. The forecasts never predict a crisis. The forecasts also tend to overestimate the speed of recovery during a crisis. In the second part of the paper, we illustrate how growth forecasts affect fiscal policy and may lead to too-high government debt levels before the crisis. We end the paper with a discussion of how to design fiscal rules based on a crisis rather than an equilibrium perspective.

Equilibrium models and crises

Predicting the outcome using equilibrium models

Most mainstream macroeconomic models are either partial equilibrium models that studies how an individual market behaves, or general-equilibrium models that studies how several markets interact. An economic equilibrium is a situation where i) supply and demand are balanced and

ii) the market outcome will not change unless there is some unexpected external factor that disrupts the market. There are different kinds of equilibrium models, and the equilibrium is not always economically efficient. Models may also include the possibility of more than one equilibrium. The purpose of equilibrium models is to mathematically derive the economic outcome and to use the model to make predictions of how the economy will respond, for example, to a change in policy or technology.

Macroeconomic general-equilibrium models include several interacting markets such as the goods market, the labour market and the money market. The general equilibrium requires that all markets are in equilibrium at the same time and that their respective equilibriums are compatible with each other. Simply put, these models, similar to many other models, consist of a households that consume, save and supply labour; firms that produce goods and invest in new capital and technology; and policymakers in charge of economic policies. The behaviour of each actor is modelled using the representative agent approach, i.e. all households are expected to behave in the same way, as are all firms and policymakers. Each actor is rational and behaves according to a pre-defined decision rule: i.e. households maximize utility and firms maximize profits. Based on these components and rules for how different actors interact, it is possible to derive the equilibrium solutions, i.e. the economic outcome.

A key feature of the equilibrium is that it is stable unless there is an external force, e.g. a shock such as a new unexpected technological discovery, in which case the economy moves to a new equilibrium. The new equilibrium is stable, given the new circumstances, until there is another external shock. One of the main purposes of these models is to allow, for example policymakers, to evaluate the effects of a new policy ceteris paribus in a world with several markets and actors. Without a stable equilibrium, such predictions become difficult. While the equilibrium is a necessity for the purpose of the model, it is also a limitation. It limits the applicability of the models during a time of crisis when the economy is anything but stable.

Examples of such macroeconomic models are the dynamic stochastic general equilibrium (DSGE) models that have come popular both in academia and the policy world (Blanchard, 2018).[1] Macroeconomic theory in general, but not least the DSGE models, were heavily criticised following the international financial crisis of 2007–09 for having failed to predict the crisis and its economic effects. The critique followed three main lines. The first line of criticism focused on the models' unrealistic assumptions, and that they fail to incorporate important

aspects of economic behaviour (see e.g. Colander et al., 2009; Romer, 2016; Stiglitz, 2011; 2018a).[2] Here the critique focused on the assumptions of rationality and homogeneity among the actors. As the assumptions were unrealistic, the model's prediction would obviously be poor according to the critique.

The second line of criticism highlighted that the models require external, and by the model unpredictable, shocks to generate change (Kay and King, 2020). As the model cannot explain the forces of unforeseen events such as a crisis, the model's prediction of how the economy will develop in the future is only accurate for a situation when nothing happens. Such models cannot help us to understand why crises occur or help us predict that a crisis is likely to occur in the future.[3]

The third line of criticism focused on how the models were applied by economists. Kay and King (2020), for example, argue that economists trusted the models' predictions too much and failed to recognize their limitations. Colander et al. (2009) emphasize that economists failed to communicate the limitations of their models, leading to a misplaced trust in the models' predictions among policymakers and the public.

Over time, the attempts have been made to correct some of the models weaknesses (Blanchard, 2016; 2018). However, the models still rely on a stable equilibrium as a key building block.

Macroeconomic crises

The theoretical focus on equilibriums has left the field of crises less explored, at least from a theoretical point of view. What constitutes a crisis lacks a clear theoretical definition. The most common definition of a crisis is an event that leads to a major economic loss. It could be a loss of output (a depression) or a large decline in asset prices (a financial crisis). The main cause of the crisis may vary from economic factors to wars and natural disasters like the present corona pandemic.

The often ad hoc definitions of an economic crisis are illustrated by the literature on crises. For example, Boucher Breuer and McDermott (2013) define a depression as a decline in per capita income of 20 per cent or more. Barro and Ursua (2008) use a lower threshold of 10 per cent decline in income, while Reddy and Minoiu (2009) look at periods of no or negative growth. Reinhart and Rogoff (2009) define six different types of financial crises based on similar, more

or less ad hoc criteria.[4] Take for example their definition of banking crises as either i) a bank run that leads to the closure, merging, or takeover by the public sector of one or more financial institutions, or if there are no bank runs, ii) the closure, merging, takeover, or large-scale government assistance provided to an important financial institution that marks the start of a string of similar outcomes for other institutions. Laeven and Valencia (2012), on the other hand, define a banking crisis as having occurred if at least three out of the following six criteria are satisfied: i) extensive liquidity support, ii) bank restructuring gross costs at least 3 per cent of GDP, iii) significant bank nationalizations, iv) significant guarantees put in place, v) significant asset purchases, and vi) deposit freezes and/or bank holidays. The definitions are similar and aim to capture a banking sector in distress. However, the definition offered by Reinhart and Rogoff (2009) is broader and captures additional banking crises, compared to the Laeven and Valencia (2012) definition.

Irrespective of the definition of a large loss, the empirical evidence suggests that crises are common. Figure 1 illustrates output crises (Panel A) and banking crises (Panel B) for 23 developed high-income countries.[5] We define an output crisis in two different ways: i) GDP per capita declines by two per cent per year or more in a given year, or ii) GDP per capita declines by 5 per cent or more in a given year. These definitions are purely subjective and only used to illustrate the occurrence of relatively large declines in output. We also illustrate banking crises as defined by Reinhart and Rogoff (2009), and Laeven and Valencia (2012). The sample for the growth crises stretches from 1870 to 2016. The sample for the Reinhart and Rogoff banking crises extends from 1800 to 2010, and that for the Laeven and Valencia banking crises extends from 1970 to 2010.

Two features stand out from Figure 1. First, crises are frequent, irrespective of definition. Often growth crises and banking crises coincide. Second, until 1950 at least one country faced a crisis in a given year. There are few years with no country facing a crisis. After the 1950s, there are periods with no crises, and in particular, banking crises are rare from the end of the Second World War until the late 1970s. This was a period of relatively strict banking regulations. From the 1980s and onwards the frequency of banking crises increases again. A major difference compared to the pre-1950 period is that crises tend to become more global over time.

[Figure 1 here]

The economic effects of these crises are severe—not just in the short run but also in the long-run. The economy will recover some of the lost ground; however, severe crises commonly shift the economy to a lower growth trajectory, thereby inflicting permanent losses on the economy (Cerra and Saxena, 2008; Andersson and Karpestam, 2014).[6] This stands in contrast to business cycles, for which the effect is only short-term and cancels out over time. While it is possible to ignore business cycles in the long-run modelling of the economy, we cannot ignore the effects of major economic crises.

Crises are notoriously difficult to predict, despite being common. Early warning systems to detect the risk of events such as a financial crisis (see e.g. Kaminsky et al., 1998; Borio and Drehman, 2009; Alessi and Detken, 2011) tend to have low power. Indicators may predict a heightened risk for a future crisis, but they seldom predict when the crisis will occur, how severe it will be, or how long it will last (Spange, 2010). The irregular and complex nature of crises is one reason why they are difficult to incorporate in equilibrium models, where an actor follows a predictable rule of behaviour.

Macroeconomic forecasts: Return to the equilibrium

A simple way to illustrate how the equilibrium concept dominates economic thinking is to study forecast of major macroeconomic aggregates such as GDP. Forecasts reflect the joint judgement of both economic and statistical models, and economists' qualitative judgements. The OECD (2016), for example, writes that "forecasts are not directly generated from a single global model, but instead rely heavily on expert judgment which is informed by inputs from a range of different models, with forecasts subjected to repeated peer review". Similarly, the European Commission (2020a) writes that "forecasts are not based on a centralised econometric model, but are analyses made by experts at the Directorate General for Economic and Financial Affairs, using models and field knowledge". Forecasts are thus more than just the outcome of one specific model. They broadly represent the thinking among economists. Forecasts also play an important role in the design of economic policies and the evaluation of the long-run sustainability of the public finances (European Commission, 2016; 2019).

Government growth forecasts often overestimates growth due to political pressures (Jonung and Larch, 2004). Overly optimistic growth forecasts allow the government to spend and borrow more while pretending that it follows a sustainable fiscal path. Such a bias in the growth forecast could affect our analysis. However, the OECD has no direct influence on the design of

the fiscal policies, and any potential bias is likely to be small. The forecasts from the European Commission, on the other hand, may suffer from such a bias since the Commission has some influence on the design of fiscal policies. But, a main task for the Commission is to ensure that individual countries follow the fiscal rules stipulated in the Growth and Stability Pact, which should limit the size of any potential bias. In summation, the forecasts studied in this paper is likely to represent the respective organizations' best guess of how the economy will develop in the future without any obvious bias due to political pressures.

Data sample

We collect GDP growth forecasts from the OECD and the European Commission. Each organization produces two sets of forecasts, one during the spring and one during the summer. We reply on the spring estimates published by the OECD in the *Economic Outlook Volume 1* each year, and on the European Commission's *European Economic Forecast*. Each publication includes two forecasts: one for the incumbent year and one for the following year. Here we focus on the forecast for the next year. Each forecast is based on information available up until the time of publication. However, it takes time to prepare the reports, and there is a lag between the end of a period and the availability of data covering that period. Consequently, the GDP forecasts for next year are in effect a forecast of GDP two years into the future. A two-year time frame does not represent the long run, but it does provide an overview of how the economy is expected to develop over more than one year.

The OECD forecasts cover the period 1989 to 2019, and the European Commission forecasts cover the period 1999 to 2019. The sample period is eventful and includes several major economic events such as the European exchange rate crisis of 1992–93, the dot-com bubble of 2000, the international financial crisis of 2007–09, and the euro debt crisis of 2010–15. For many countries, the period also includes a secular decline in the trend growth rate.

Both the OECD and the EU Commission publish forecasts for several countries. For simplicity, we focus on six countries representing a wide range of different types of economies: Greece, Italy, Spain, Sweden, the United Kingdom and the United States. Greece, Italy and Spain represent Southern European countries that have adopted the euro, were heavily affected by the international financial crisis, and suffered from a debt crisis in the early 2010s. Sweden is a small open economy with its own currency that remained relatively unaffected by the international financial crisis but did experience a domestic banking crisis in 1991–93 and a

fiscal crisis in the mid-1990s. The United Kingdom and the United States are two large economies. Both were relatively highly affected by the international financial crisis but avoided a full-scale sovereign debt crisis in the 2010s. However, both countries suffered from a minor fiscal crisis for a brief period. Greece, Italy, the United Kingdom and the United States have experienced a decline in the trend growth rate, while trend growth in Spain and Sweden is relatively stable over time.

Analysis of the GDP forecasts

Figure 2 illustrates the actual GDP growth rate (black dotted line), the OECD forecast (black line) and the EU Commission forecast (grey line). Each country is represented by a separate panel. From the figure, we can observe a few general tendencies. First, the correlation between the OECD forecast and the EU commission forecast is high: between 0.85 (United States) and 0.96 (Greece). Each organization may have its own models and professional forecasters, yet their predictions tend to coincide. There is clear evidence of herd behaviour when it comes to forecasting.

Second, there are some year-to-year variations in the growth forecast—often no more than a few tenths of a percentage point. However, excluding these minor variations, the forecast tends to be relatively stable over long periods, in line with the assumption of a stable long-run equilibrium. Third, the forecast struggles to pick up changes in the underlying trend growth rate. For example, the Italian growth trend declined following the exchange rate crisis in 1992/93. The GDP forecasts, however, expected growth to return to the 1980s level every year until the early 2000s. Prior to the burst of the dot-com bubble in 2000, growth was relatively high in Spain, Sweden, the United Kingdom and the United States. The forecasts, on the other hand, consistently indicated the return to the lower growth rate these countries had experienced prior to the boom. It the 2010s, following the international financial crisis, growth remained low in most countries compared to previous decades. Notably, the United States experienced a decline in the average growth rate by up to 1 percentage point per year. Again, it took the forecasts several years to pick up this decline. For the United States, the OECD forecasts overestimated the US growth rate for six consecutive years.

[FIGURE 2 here]

Fourth, the forecast never predicts a major crisis. This is unsurprising, given how difficult it is to predict crises. The forecasts also struggle to predict the outcome during a crisis: they consistently overestimate the speed of recovery. For example, the speed of recovery was

overestimated for Sweden in 1991–94, Italy in 1991–94 and 2008–2017, Greece in 2009–2019, Spain in 2008–2013 and the United States in 2010–2018.

Fifth, the only time the forecast is accurate over a longer period is when the economy is relatively stable in terms of a stable average growth rate with only modest business cycle fluctuations. Among the six countries, only Sweden in 2000–2019 qualifies as such a case. Forecasts based on the equilibrium perspective provide accurate forecasts only when the economy is stable, which tends to be the exception rather than the rule.

A further illustration of how economic thinking is influenced by the equilibrium perspective is shown in Figure 3. This figure illustrates the expected change in the growth rate between the two forecast points: the incumbent year and the next year. An arrow pointing upwards implies that the growth rate is expected to increase from the incumbent to the next year, and an arrow pointing downwards implies that the growth rate is expected to decrease. Given the similarity between the OECD forecasts and the European Commission forecasts, we focus on the OECD forecasts as they cover a longer period.

According to the arrows, the forecasts over the two years are consistently pointing towards a return towards an average growth rate. If actual growth is below the average, the arrow points upwards indicating that growth is expected to accelerate. If actual growth is above the average, the arrow points downwards indicating that growth is expected to decelerate. In other words, growth is expected to move towards the average (equilibrium) growth rate over time. During a crisis, growth is often far below the average. The return to the average is thus expected to take longer than two years: the arrow does not reach all the way to the average value. However, the direction of travel towards the average is clear. The empirical evidence suggests that the expected speed of recovery is too high. Actual growth tends to stay below the average for a relatively long period. The overestimation of the speed of recovery is mostly visible for Greece in 2009–2013, but the same tendency is true for Spain in 2009–2014 and for Sweden in 1991–1993. It is also visible, although to a lesser degree, for the United States in 2009–2011 and for the United Kingdom in 1990–1993 and 2009–2012.

[Figure 3 here]

Table 1 summarizes the average forecasting error for the forecast for the next year (i.e. forecast two years into the future). Column 1 presents the forecasting error for the full sample period,

column 2 presents the forecasting error for the period prior to the international financial crisis of 1990–2007, column 3 presents the forecasting error during the international financial crisis of 2008–2010, and column 4 presents the forecasting error for the post-financial crisis period of 2011–2019.

As expected, the forecasting error is the largest during the crisis (column 3) and the years following the crisis (column 4). The error is the smallest for Sweden, which avoided a banking crisis during the international financial crisis. In summation, the table confirms that the likelihood and the consequences of crises are consistently underestimated by the forecasts.

[Table 1 here]

Fiscal policy

The public debt-to-GDP ratio

Fiscal crises or even sovereign debt crises, when the government defaults on some of its debts, are common from a historical perspective (Reinhart and Rogoff, 2009). Similar to a financial crisis, they are caused by too much debt. Figure 4 illustrates the public debt in relation to GDP, the debt-to-GDP ratio, from 1995 to 2019 for the six countries included in our study. The public debt is measured using the Maastricht debt for the European countries and the Federal debt for the United States.[7] Most countries opted to stabilize the debt-to-GDP ratio (debt ratio) prior to the financial crisis, despite relatively high economic growth. Greece and Italy stabilized the debt ratio at close to 100 per cent of GDP, while the United States chose 60 per cent and the United Kingdom chose 40 per cent. Breaking this pattern are Spain and Sweden, which reduced their debt ratios from close to 65 per cent in 1995 to approximately 40 per cent in 2007. Following the crisis, the debt ratio increased substantially in all countries except Sweden, which unlike the other countries managed to avoid a domestic banking crisis. The rising debts became a problem for the two most indebted countries, Greece and Italy, which faced a severe fiscal crisis in the early 2010s.[8] Spain, the United Kingdom and the United States also faced a tough fiscal situation in the early 2010s due to the rising debt levels. However, they avoided a full-scale fiscal crisis.

[Figure 4 here]

After the financial crisis, countries have continued with the policy of stabilizing the debt ratio, now at a higher level compared to before the financial crisis. The Greek debt ratio fluctuates around 175 per cent of GDP, the Italian fluctuates around 130 per cent, and the Spanish and the

United States debt ratios fluctuate around 100 per cent, similar to the level where Greece and Italy kept their debt levels prior to 2007. The United Kingdom has chosen a rate of 85 per cent, while the Swedish debt ratio remains at 35 per cent. The expected increase in the public debt ratio due to the Covid-19 pandemic in 2020 of 15 to 20 per cent in the euro area and the United States (European Commission, 2020b; Congressional Budget Office, 2020) will further increase the already historically high debt ratios.

The dynamics of the public debt during the last 25 years is clear: the debt ratio is flat during normal times and increases quickly to new record levels, where it is maintained until the next crisis, when it rises yet again. When the debt level becomes too high, there is a fiscal crisis. This pattern raises questions: Why do so few countries reduce the debt when the economy is growing? Why do countries choose a policy of debt-ratio stabilization that leave them less prepared for future crises?

Stabilization of the debt ratio: Economic crises

Stabilizing the public debt ratio is a prerequisite for long-run sustainable public finances. A debt level that grows quicker than the economy will eventually cause a fiscal crisis. The size of the debt ratio is determined by several factors: the level of the nominal debt, the GDP growth rate, the interest rate and the primary budget balance. The primary balance is the difference between current tax revenues and current public expenditures net of interest payments. One way to illustrate the change in the public debt over time is through the following equation,

$$s_t = s_{t-1} + \left(\frac{r_t - g_t}{1+g_t}\right) \times s_{t-1} - p_t, \quad (1)$$

where s is the public debt-to-GDP ratio, r is the real interest rate, g is the GDP growth rate, and p is the primary budget balance in relation to GDP. Time is denoted by t. The debt ratio declines (increases): i) if the primary balance is positive (negative) and ii) if growth is higher (lower) than the real interest rate. In other words, it is possible to stabilize the debt ratio while still running a primary budget deficit as long as the GDP growth rate is high and the interest rate is low. Countries that stabilized the debt ratio prior to 2007 (Figure 3) relied mostly on relatively high growth and declining interest rates to keep the debt ratio constant. The primary budget balance was on average negative for most countries.

During major economic crises, the debt ratio increases substantially. In peacetime, banking crises have among the largest effects on the public debt. The “average” banking crisis increases

the debt ratio by 30 to 50 percentage points (Reinhart and Rogoff, 2009; Laeven and Valencia, 2012). A large banking crisis such as the Irish crisis of 2008–12 may increase the public debt by up to 80 percentage points. Part of the increase in the public debt is due to government support to the banking sector to avoid a meltdown of the financial system. Another part of the increase is caused by higher spending and lower revenues due to the recession and the rise in unemployment. A third part is due to the decline in GDP. For example, the Greek debt, measured by the Maastricht debt, was 301 billion euros in 2009. It increased by a modest 30 billion euros until 2019, when the nominal debt was 331 billion euros. The increase in the debt ratio was much higher, from 127 per cent in 2009 to 177 per cent in 2019. The main reason for the increase in the debt ratio was not the increase in the nominal debt but the decline in GDP, from 238 billion euros in 2009 to 187 billion euros in 2019. A change in the size of the economy can have a large effect on the debt ratio even if the nominal debt stays relatively stable.

An increase in the interest rate can have a similar effect on the public debt ratio, as increased borrowing or a decline in GDP. Figure 5 illustrates the 10-year government bond yield (interest rate) during the time of the euro debt crisis of 2010–2015. The yield began to increase in 2010 as the debt ratios rose, as the international capital markets lost trust in the national governments. The loss of trust was mostly directed towards already heavily indebted countries prior to the crisis. However, the United Kingdom and the United States also experienced a small increase in the interest rate in the latter half of 2010. The yield on Italian and Spanish bonds increased by 3 percentage points.[9] The yield on Greek bonds increased by 25 percentage points.

A higher interest rate implies that the government either has to borrow more to cover the rising cost of servicing the debt or increase the primary balance to cover the increasing cost. With a debt ratio of 100 per cent of GDP and no economic growth, an increase in the interest rate by 3 percentage points implies that the government has either to increase borrowing corresponding to 3 per cent of GDP or increase the primary budget balance by 3 per cent of GDP. With an already high budget deficit, an additional 3 per cent of GDP borrowing accelerates the fiscal crisis. An increase in the primary budget balance of 3 per cent of GDP to compensate for the increased interest costs without increasing the public debt is politically difficult to achieve. For example, the highest primary budget balance Germany recorded between 1991 and 2019 was 2.5 per cent. Furthermore, increasing the primary balance during a crisis or the recovery phase drains the economy of economic resources that worsens the crisis or slows down the economic recovery. Lower growth in turn increases the debt ratio.

[Figure 5 here]

Both a decline in GDP and rising interest rates can have a significant effect on the debt ratio, not just the primary balance. Once a fiscal crisis begins, there is no easy way to end it. The country can default on its debt or ask for an international bailout. Central banks can monetize the debt by printing money and buying government bonds. One aim of the European Central Bank's programme of quantitative easing, implemented in 2012, was to reduce high yields on government bonds to avoid an aggravation of the euro debt crisis and a potential collapse of the euro (Draghi, 2012).[10] Bond yields did decline after the programme began easing the debt crisis; see Figure 5. However, the long-run situation was not resolved, and the debt ratio remained at record levels. The monetization gave governments the opportunity to maintain the high debt ratios rather than to reduce them and prepare the public finances for a future crisis, which came in 2020. There were also additional negative side effects of the monetization, such as increased asset prices and private debt levels (Huston and Spencer, 2017; Andersson and Jonung, 2020).

Stabilization of the debt ratio: A macroeconomic equilibrium

The equilibrium perspective affects how fiscal policy is conducted and evaluated. A common approach to test the long-run sustainability of the public finances is to forecast future expenditures and revenues. Expenditure forecasts are primarily based on expected demographic changes such as the number of working-age people and the number of seniors. Revenue forecasts are generated based on estimates of future GDP (see e.g. European Commission, 2007; 2020c; Office for Budget Responsibility, 2018). A common assumption, in line with the assumption of a stable long-run equilibrium, is that growth and interest rates are constant in the future. The constant long-run growth rate does not take the possibility of a future crisis into account.

The assumption of a stable long-run growth rate obviously affects the design of fiscal policy, fiscal targets, and the evaluation of the public finances. It is relatively easy to calculate the future debt ratio with the help of the forecasted growth rate and interest rate and Equation 1. The equation also reveals the size of the necessary primary budget balance to stabilize the debt ratio at a given level, conditioned on the forecasted growth and interest rate. In a stable economy, the government may choose a relatively high debt-ratio target, as there is no need to prepare the public finances for a future crisis. From a political point of view, this allows the

government to avoid making tough but necessary decisions to lower the debt ratio. Countries are left unprepared when the crisis hits the economy. This may explain the persistently high debt ratios illustrated in Figure 4.

The equilibrium perspective also affects the design of economic policies during macroeconomic crises. The forecasts illustrated in Figures 1 and 2 show that the economy in each crisis is expected to return to the equilibrium growth rate relatively quickly. In other words, the economy is expected to recover from the crisis at a fast pace, often with limited support from the government. The need for economic policies to support the recovery is reduced when the economy is expected to correct itself. Consequently, policymakers cut back the economic support too quickly, stifling the recovery. Weak public finances prior to the crisis contribute to this behaviour, as the need to stabilize the public finances to avoid a crisis becomes imminent early in the crisis. Fiscal policy becomes pro-cyclical rather than counter-cyclical and contributes to the destabilization rather than the stabilization of the economy (McManus and Ozkan, 2015).

Part of the decline in Greek GDP following the international financial crisis was caused by the austerity program introduced to deal with the debt crisis. According to the forecasts on which the program was based, the economy was expected to grow by 2 to 2.5 per cent per year starting in 2013 and to maintain this level thereafter (European Commission, 2011; 2012). Growth was expected to remain stable, although the plan called for the Greek government to increase the primary budget balance from a deficit of 5 per cent in 2010 to a surplus of between 3.5 and 4.5 per cent of GDP.[11] The actual outcome was that growth until 2019 never reached 2 per cent and was even negative in 2013, 2015 and 2016. The fiscal policies designed to deal with the Greek fiscal crisis are likely to have made the situation worse by drastically reducing demand in an already weak economy, causing major economic, social and political damage (Economou et al., 2013; Alexiou and Nellis, 2016). The effects were not limited to Greece; they also contributed to growing political conflicts among the euro area members (Andersson, 2020).

Stabilizing the debt ratio: A crisis perspective

Each crisis is different, and policy lessons from the previous crisis are not always appropriate in dealing with a new crisis (Jonung, 2015). Because each crisis tends to have its own complex dynamics, it is notoriously difficult to forecast both the timing and the economic effects of crises (Spange, 2010). Redesigning mainstream macroeconomic models to incorporate crises

as an integrated part of the model is difficult. Attempts have been made (see e.g. Christiano et al., 2018). However, crises are difficult to incorporate into models where equilibrium and representative agents are two key building blocks (Stiglitz, 2018a).

To avoid future fiscal crises following a major macroeconomic crisis, the solution lies less in alternative economic models, although such are clearly needed, but in how fiscal policy and fiscal targets are designed. Rather than basing the policy and targets on the equilibrium concept, the formulation should take as its starting point the fact that economic crises are common, and they have large economic, social and political consequences unless the government takes immediate and strong action to limit the crisis from spreading throughout society. Here fiscal policy plays an important role in stabilizing society during the crisis, but it can only do so if it has a sufficiently large fiscal space prior to the crisis (Obstfelt, 2013; Andersson and Jonung, 2019a). Without sufficient fiscal space, the government may aggravate the economic, social and political consequences of the crisis.

There are two main ways of creating sufficient fiscal space. One is to build up a "rainy-day" fund or a sovereign wealth fund during normal times (Andersson and Jonung, 2019b). When the crisis hits the economy, the government can draw on the saved resources. The other alternative is to reduce the public-debt ratio during normal times, which allows the government to borrow during the crisis without facing a fiscal crisis (Andersson and Jonung, 2019a). For a small economy that struggles to borrow internationally or lacks the credibility to access low-interest-rate loans, a "rainy-day" fund is probably the best alternative. However, large public savings in a fund may drain the economy of resources that limits public spending in key areas. For most countries, reducing the public debt ratio through strong economic growth and a moderate surplus is likely the best alternative.

The target for the debt ratio should be set low enough to allow the government to increase the public debt by 30 to 50 percentage points during the crisis without increasing the risk of a future fiscal crisis. This is the average increase in the debt during major economic crises in peacetime (Andersson and Jonung, 2019a). The first step in finding the appropriate debt ratio is thus to find the maximum level of debt the government can maintain without negative side effects.[12] The second step is simply to subtract the fiscal cost of a major economic crisis. For Sweden, Andersson and Jonung (2019a) derive a debt ratio of between 20 and 30 per cent of GDP as an appropriate debt target. This is substantially lower than the 60 per cent maximum debt level

defined in the European Union's Growth and Stability Pact. The level of 60 per cent as the pre-crisis debt target is likely too high to avoid a fiscal crisis. An increase in the debt ratio by 50 percentage points to 110 per cent is close to the debt level of Greece and Italy in 2009. An increase in the debt ratio by 80 percentage points, similar to Ireland in 2009, would lead to a debt ratio of 140 per cent after the crisis—well above the Italian debt level in 2019. Although a 60 per cent target prior to the crisis is likely too high, the choice of debt target is likely to be country-specific.

A debt target set at a low level has several advantages: First, it prepares the public finances for a crisis, and thereby contributes indirectly to reducing the negative consequences crises have on society. Second, it is easy to monitor and easy to implement. Third, it does not rely on uncertain economic forecasts. It is thereby possible to rely less on macroeconomic models and assumptions of stable long-run equilibriums.

On the negative side, a low public debt ratio may hurt the economy by reducing economic growth if demand is suppressed by high taxation and low public demand. Any reduction of the debt ratio should thus take place while the economy is growing. A steady declining debt ratio during times of growth is unlikely to reduce growth. Debt ratios declined steadily from the end of the Second World War until the 1970s, while growth remained high. More recently, Sweden reduced its debt ratio from 75 per cent in 1995 to 35 per cent in 2019 (Figure 4), without any obvious negative growth effects.[13] In fact, average Swedish GDP growth averaged 2.3 per cent per year between 2000 and 2019, compared to 2.1 per cent in the United States, 1.8 per cent in the United Kingdom, and 1.4 per cent in the euro area. The tax revenues-to-GDP ratio fell from 49 to 42 per cent of GDP, at the same time as real public consumption grew by 29 per cent in real terms. While sustainable public finances and a declining debt ratio did not stifle growth, it did provide Sweden with ample room to support the economy throughout the international financial crisis and the recovery phase without facing a fiscal crisis. In addition, while the Covid-19 pandemic has pushed the debt ratio above 100 per cent in the euro area and the United States, the Swedish debt level is expected to peak at 45 per cent (European Commission, 2020b). While other countries will struggle with the consequences of the pandemic on the public finances, Sweden is in the position to further stimulate the economy in the coming years should it prove necessary.

Conclusions: Being prepared for the next crisis

Macroeconomic crises are common, yet public finances are seldom prepared for the crisis and its economic, social, political and fiscal effects. In many cases, weak public finances before the crisis contribute to worsen the effects of the macroeconomic crisis. There are many possible explanations for weak public finances. One of them, which is seldom discussed, is the dominating role equilibriums play in theoretical macroeconomics. The equilibrium approach to understand the economy yields a biased view of economic stability. The risk of a future macroeconomic crisis is underestimated. This critique is not new. However, only limited progress has been made to incorporate crises as an endogenous component of the mainstream macroeconomic models. The equilibrium perspective still heavily influences economic thinking and economic policies.

Most of the economic literature on crises is empirical. There are lessons to learn from historical crises. However, each crisis tends to have its own unique causes and dynamics, which makes it difficult to incorporate crises as part of a mathematical model. From a policy perspective, a simple solution to incorporate the crisis perspective into the design of fiscal policy rules is to set a debt-ratio target coupled with a yearly surplus target until the debt-ratio target is reached. A low debt prior to the crisis provides fiscal space to deal with the crisis without a fiscal crisis. The economic recovery will be quicker, and the social and political consequences of the macroeconomic crisis will be smaller. This will lead to higher welfare over the long term.

The first two decades of the 21st century are decades of crises. It is time for macroeconomic thinking and macroeconomic policies to incorporate a crisis perspective, not just an equilibrium perspective to a much greater extent than in the past.

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[1] For a description of DSGE models, see e.g. Christiano et al. (2010).

[2] For a defence of the models, see e.g. Blanchard (2016) and Lindé (2018).

[3] There are models that include crises outside the mainstream models. For example, crises are a key component in Schumpeter's (1939) business cycle theory. Chaos theory also explains crises as being caused by the economy itself rather than external forces (see e.g. Faggini and Parizale, 2012).

[4] The six crises are inflation, currency, asset, banking, external debt and domestic debt.

[5] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, South Korea, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and United States.

[6] Crises may also have some positive effects such as growth-enhancing reforms that strengthen the stability of the economy over the long run (Andersson, 2016). However, the gains from such reforms are often insufficient to cover for the losses.

[7] The Maastricht debt covers the entire public sector: national, regional and local governments as well as the social security systems.

[8] For information about the euro debt crisis, see e.g. Stiglitz (2018b) and Tooze (2018).

[9] Sweden suffered from a similar situation in the 1990s despite having its own currency (Andersson and Jonung, 2019a).

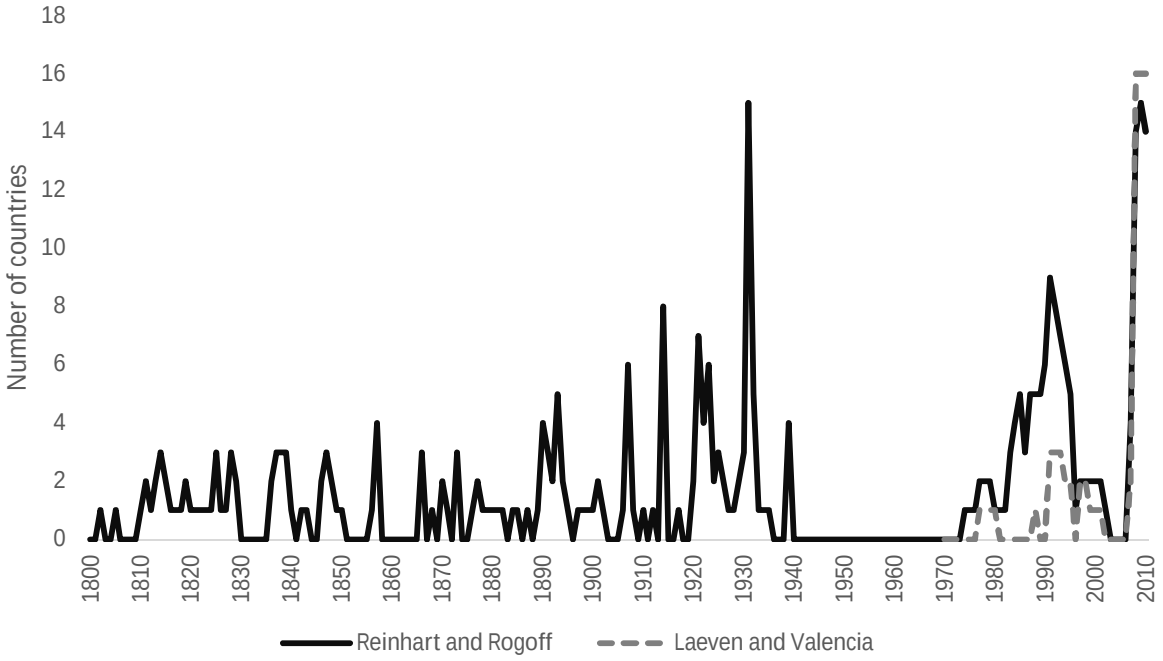
[10] Draghi argued that the increase in bond yields were the outcome of "unfounded fears on the part of investors".

[11] The assumptions were criticized at the time, yet the criticisms had no effect on the actual policies; see e.g. Varoufakis (2017).

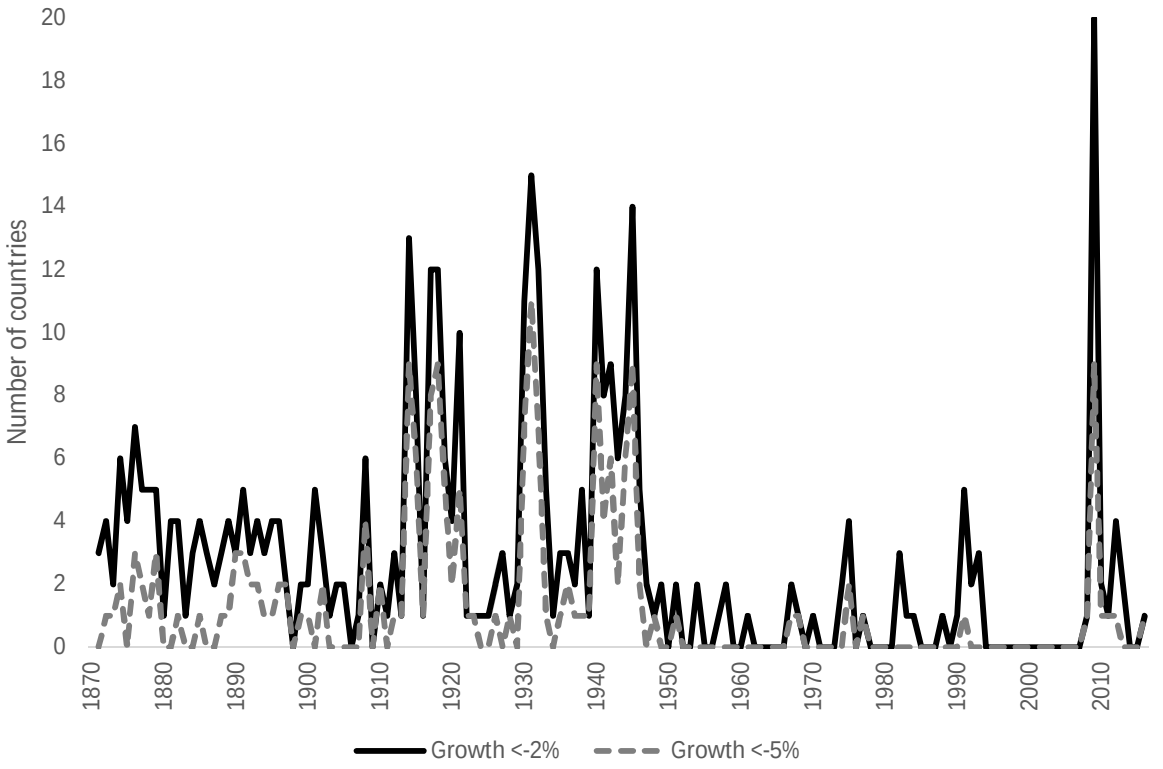
[12] How much debt a country can maintain is likely to vary from country to country. Most estimates fall in the range of 70 to 90 per cent of GDP (Barrett, 2018; Fall et al., 2015; Reinhart and Rogoff, 2010). However, there are those who argue that higher debt ratios are possible, as long as interest rates and inflation are low (Blanchard, 2019; Mitchell et al., 2019).

[13] Sweden introduced a surplus target in 2001 of 1 per cent of GDP over the business cycle. The aim was to reduce the public debt to lower interest costs, and to prepare the public finances for demographic change. Preparing for a future crisis was not one of the explicit motives (Andersson and Jonung, 2019a).

Figure 1: Banking crises, 1800–2010, and growth crises, 1871–2016.

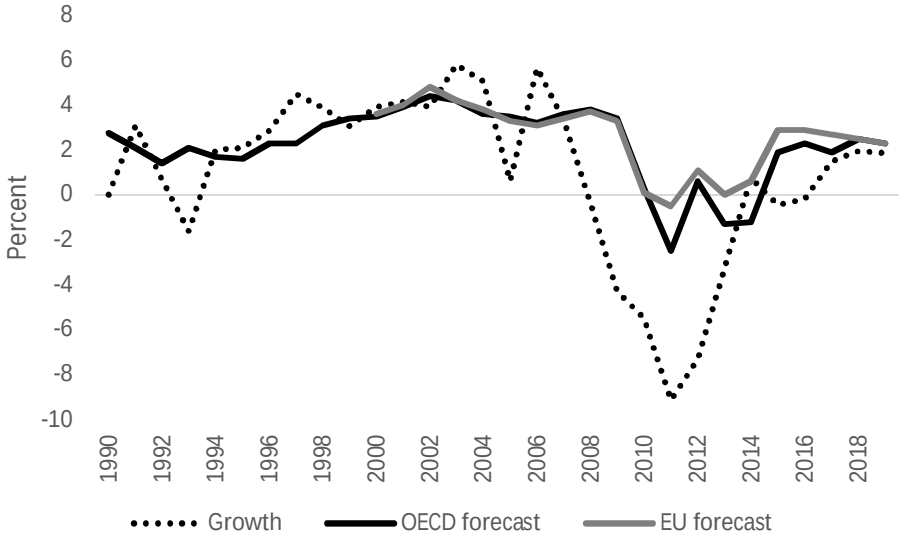


Panel A: Banking crises.

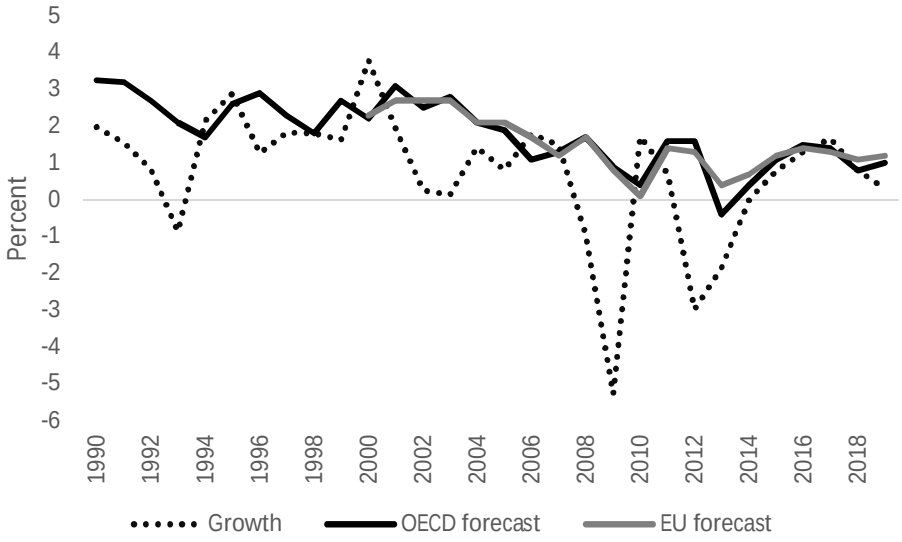


Panel B: Growth crises.
Sources: Reinhart and Rogoff (2010), Leaven and Valencia (2012), and Bolt et al. (2018), own estimates.

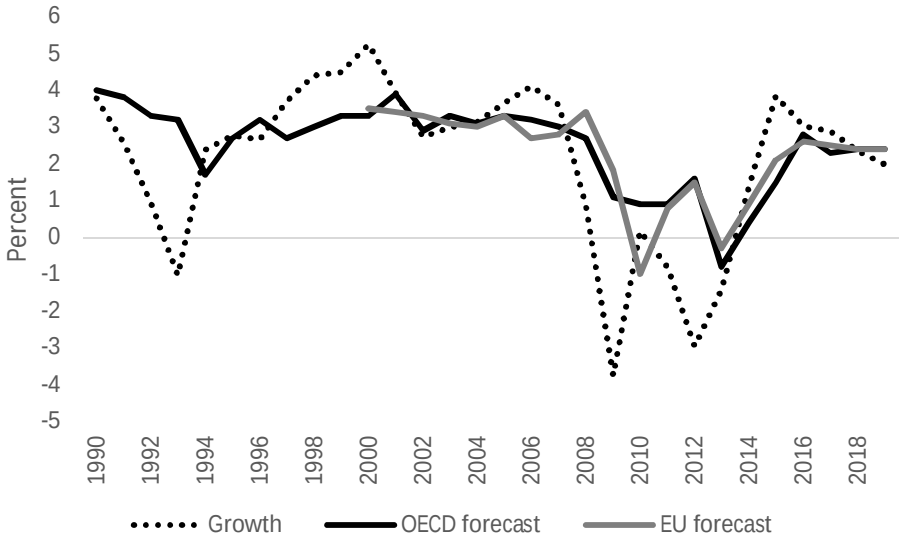
Figure 2: GDP growth and OECD forecast from the spring of the previous year, 1989–2019.



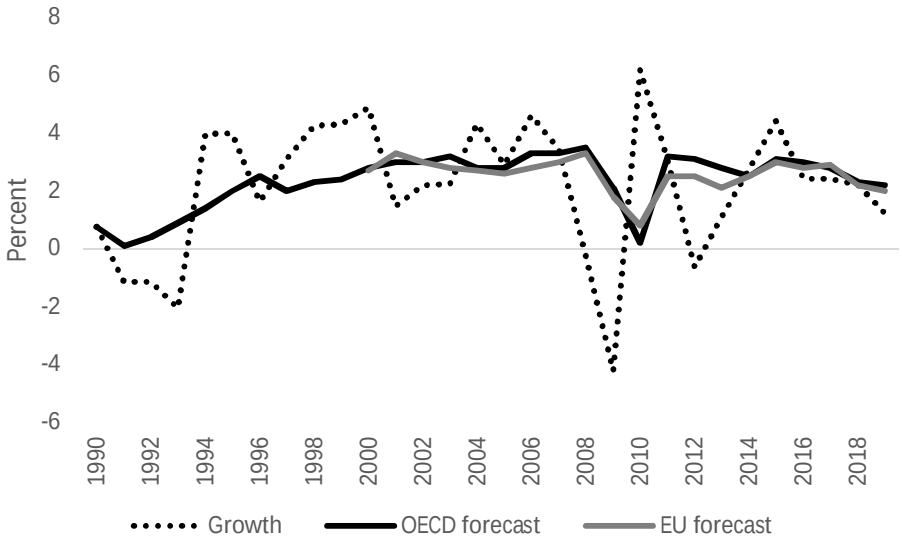
Panel A: Greece



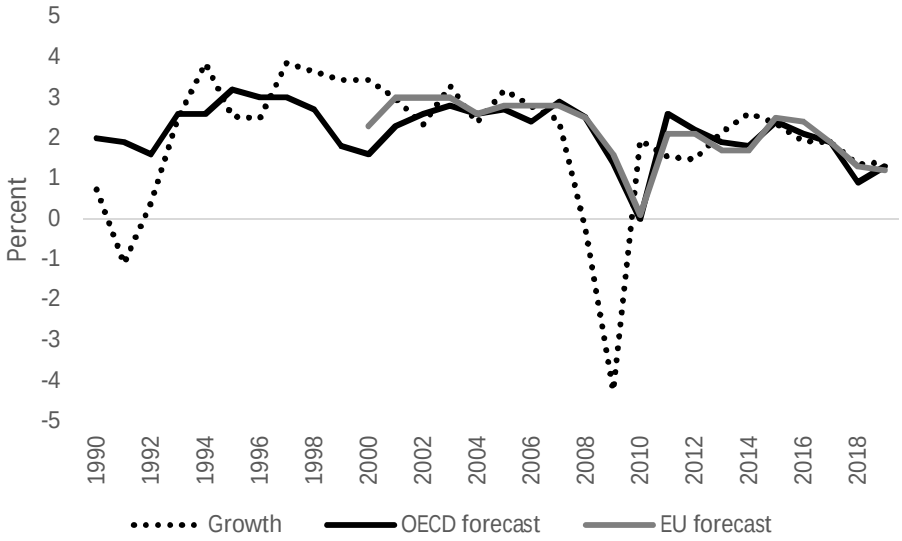
Panel B: Italy



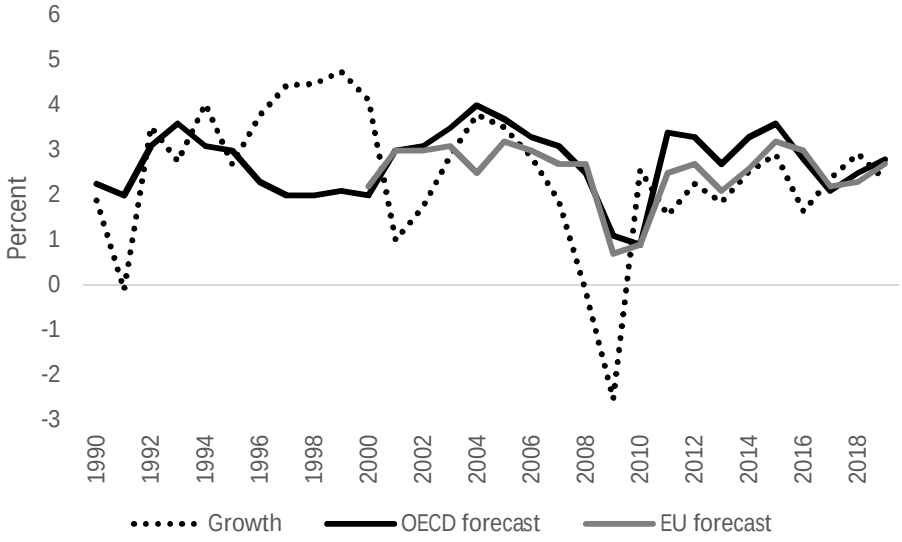
Panel C: Spain



Panel D: Sweden



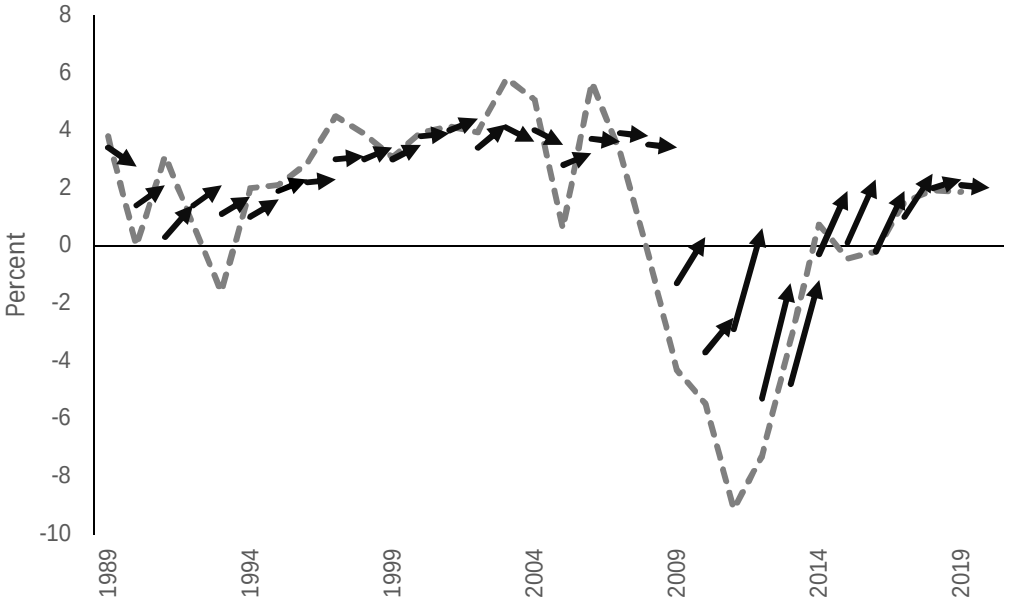
Panel E: United Kingdom



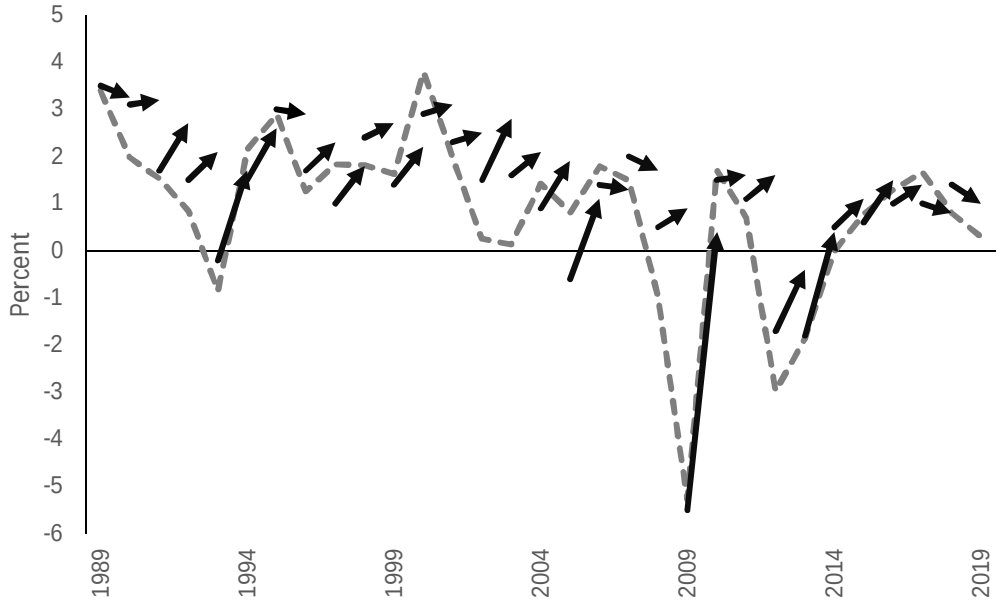
Panel F: United States

Sources: European Commission and OECD.

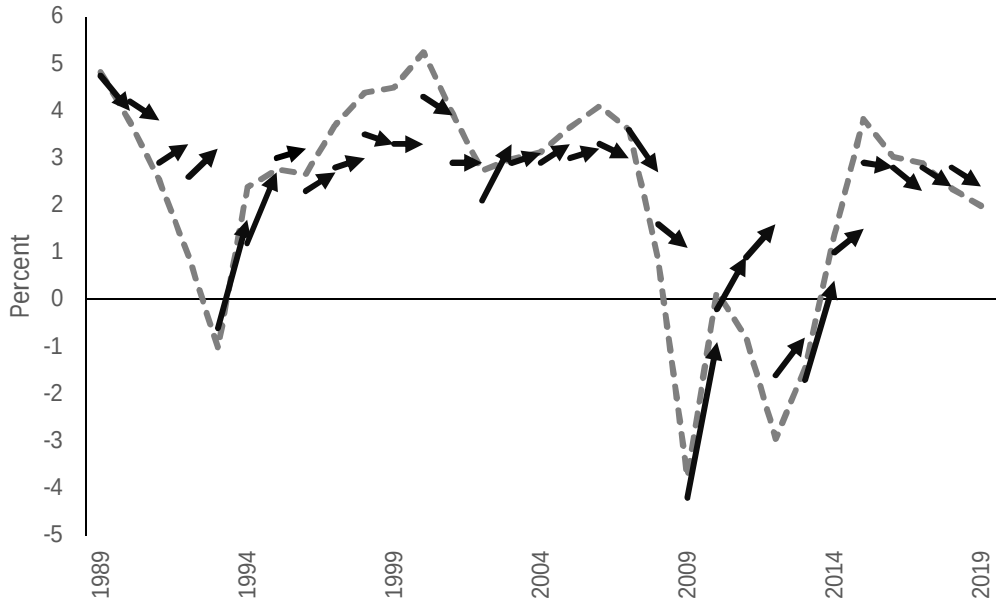
Figure 3: GDP growth and the OECD GDP forecast for the present and next year, 1989–2019.



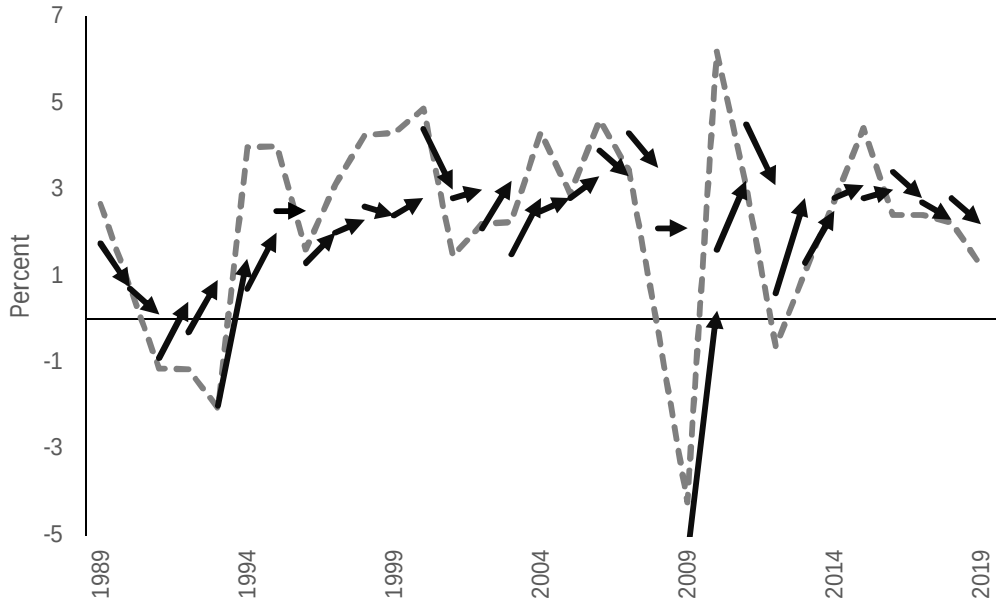
Panel A: Greece



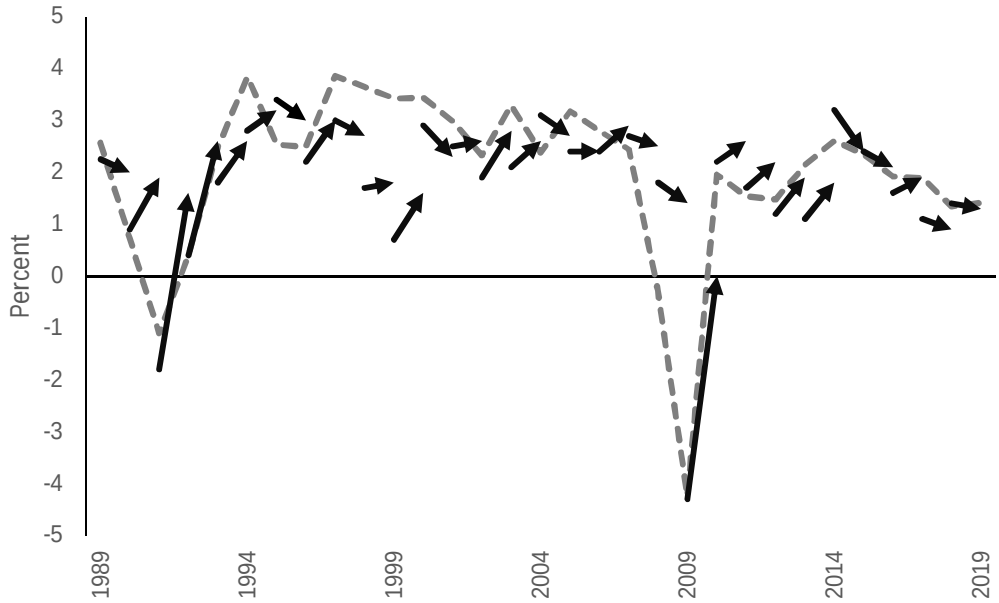
Panel B: Italy



Panel C: Spain



Panel D: Sweden

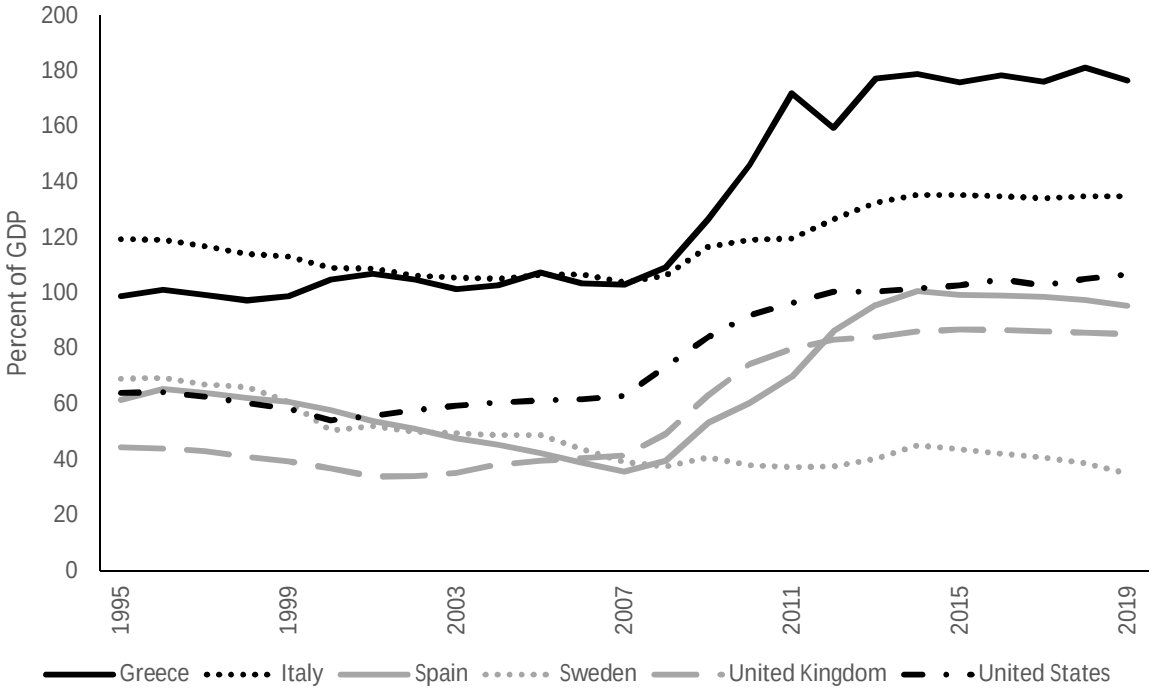


Panel E: United Kingdom.

Panel F: United States

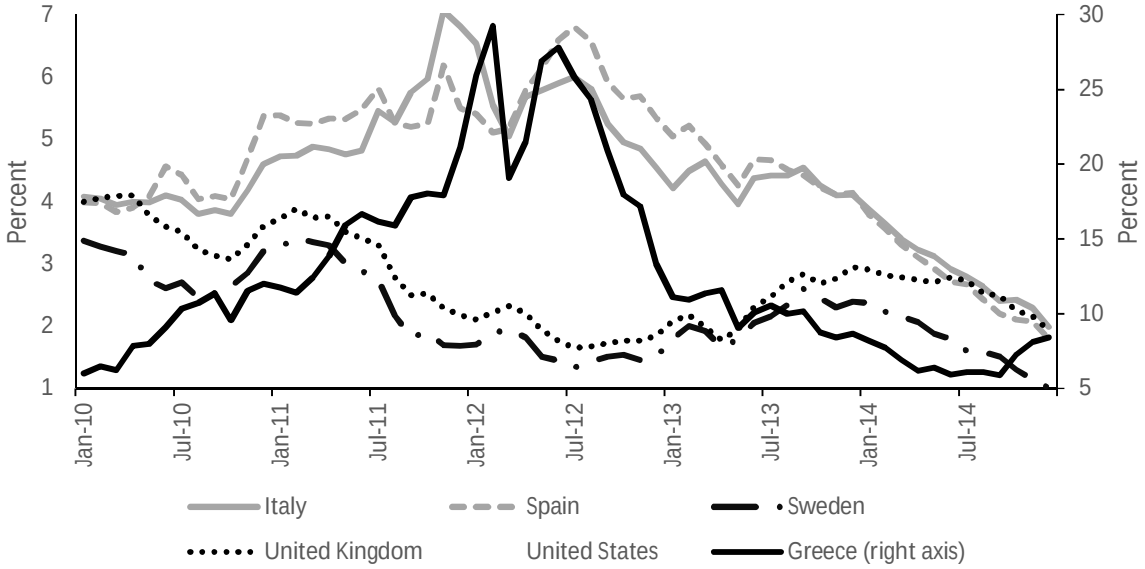
Source: OECD.

Figure 4: Public debt-to-GDP ratios.



Sources: Eurostat and St Louis Federal Reserve.

Figure 5. Ten-year government bond yields during the euro debt crisis, 2010–2014.



Source: OECD.

	Full sample 1990–2019 OCED	Prior financial crisis 1990-2007 OECD	Crisis years 2008–2010 OECD	Post financial crisis 2011–2019 OECD
Greece	+1.3	0.0	+5.9	+2.3
Italy	+1.0	+0.9	+2.5	+0.9
Spain	+0.4	+0.1	+2.5	+0.4
Sweden	+0.2	-0.3	+1.4	+0.7
United Kingdom	+0.2	0.0	+2.2	0.0
United States	+0.3	-0.2	+1.5	+0.7

Table 1. Forecasting error.
Note: a positive sign implies that the growth forecast was too high.