UNIVERSITA' DEGLI STUDI DI PADOVA

DIPARTIMENTO DI SCIENZE ECONOMICHE ED AZIENDALI "M.FANNO"

CORSO DI LAUREA MAGISTRALE IN
ECONOMICS AND FINANCE

TESI DI LAUREA

"Commitment versus discretion in the management of fiscal policy"

RELATORE:

CH.MO PROF. Lorenzo Forni

LAUREANDO: Alberto Volpin

MATRICOLA N. 1192124

ANNO ACCADEMICO 2020-2021

Il candidato dichiara che il presente lavoro è originale e non è già stato sottoposto, in tutto o in parte, per il conseguimento di un titolo accademico in altre Università italiane o straniere.

Il candidato dichiara altresì che tutti i materiali utilizzati durante la preparazione dell'elaborato sono stati indicati nel testo e nella sezione "Riferimenti bibliografici" e che le eventuali citazioni testuali sono individuabili attraverso l'esplicito richiamo alla pubblicazione originale.

The candidate declares that the present work is original and has not already been submitted, totally or in part, for the purposes of attaining an academic degree in other Italian or foreign universities. The candidate also declares that all the materials used during the preparation of the thesis have been explicitly indicated in the text and in the section "Bibliographical references" and that any textual citations can be identified through an explicit reference to the original publication.

Firma dello studente

Contents

List of tables

5

List of Figures

Introduction

The sustainability of fiscal policy is still one of the most debated issues in current macroeconomics. A disciplined and sound fiscal policy has a significant positive impact on economic growth, inflation, and macroeconomic stability. However, since the 1970s, fiscal deficits and rising public debt have been a common features of government budgetary positions. Many attempts have been done to control governments' propension towards excessive deficit and debt realizations.

Chapter I describes how, depending on the historical period, fiscal policymakers have tried to restore fiscal discipline in different ways: starting from the 1970s, many countries embarked in several fiscal consolidation programs, differently from the 1990s onwards, that were characterized by the widespread adoption of fiscal rules and the creation independent fiscal councils.

This shift from an unconstrained to a rule-based fiscal policy has been inspired by the revolution in monetary policy institutions and that took place in the 1980s and 1990s, characterized by establishment of independent and accountable central banks committed to policy rules.

The adoption of rules-based monetary policy finds its theoretical support in the works of Kydland and Prescott (1977) and Barro and Gordon (1983), which shows that the commitment to a specific inflation target eliminates the inflation bias, differently from the case without commitment in which the unconstrained policymaker is tempted to increase the level of inflation in an attempt to reduce unemployment below the natural level, though it results without success.

Chapter II focuses mainly on the advantages deriving from commitment, rather than discretion, both in monetary and in fiscal policy. In particular it is argued that, similarly to the case of monetary policy, in which the inflation bias is resolved through the commitment to a specific policy rule, even in fiscal policy the commitment solution may results in a reduction of the excessive deficit and debt bias.

Chapter III contains an empirical analysis performed on a sample of 22 Euro Area countries from 2005 to 2018 which suggests that fiscal rules and fiscal councils, interpreted as commitment devices, shape fiscal behaviours towards a higher fiscal discipline. More specifically, it is found that the presence of fiscal rules and independent fiscal councils is associated to higher general government primary balances.

In addition, it is found that fiscal rules and independent fiscal councils are also associated to less biased and more accurate fiscal forecasts. It is argued that the ability to dispose of precise

fiscal forecasts favours a more effective and conscious policy choice, which is again more likely to results in a lower deficit.

1 Fiscal policy trends: an overview

1.1 Fiscal Discipline: renew interest

The sustainability of fiscal policy is still one of the most debated issues in current macroeconomics. Fiscal policy has a significant impact on economic growth, inflation and macroeconomic stability.

Especially in favour of the macroeconomic stability, a disciplined and sound fiscal policy represents a pivotal element. Following the high debt levels experienced by several developed economies since the mid-1970s, see Azzimonti et al. (2014), in the aftermath of the 2007 global crisis, and certainly nowadays, after the unprecedented economic crisis linked with the spread of the Covid-19 Pandemic, an intense concern over the fiscal sustainability is predominant both in the academic literature and in the public policy debate.

Figure 1 shows the huge increase of government debt forecasted for the following years, due to the enormous increase in public expenditure put in place to contrast the catastrophic economic effects caused by the spread of the Coronavirus pandemic. Figure 1 also transmits the high level of economic uncertainty that characterizes the period we ae living: it is sufficient to look at the impressive differences between forecasts made in Autumn 2019 (before the pandemic), compared with the forecasts made after the pandemic outbreak (April and June 2020). Even more significant is the difference in forecasts between April and June 2020, even though the two periods in which forecasts are made are relatively close.

Figure 1: G20 Government Debt and Fiscal Balance Forecasts

G20 Government Debt Forecast   **G20 Forecasts**

Source: IMF Staff Estimates
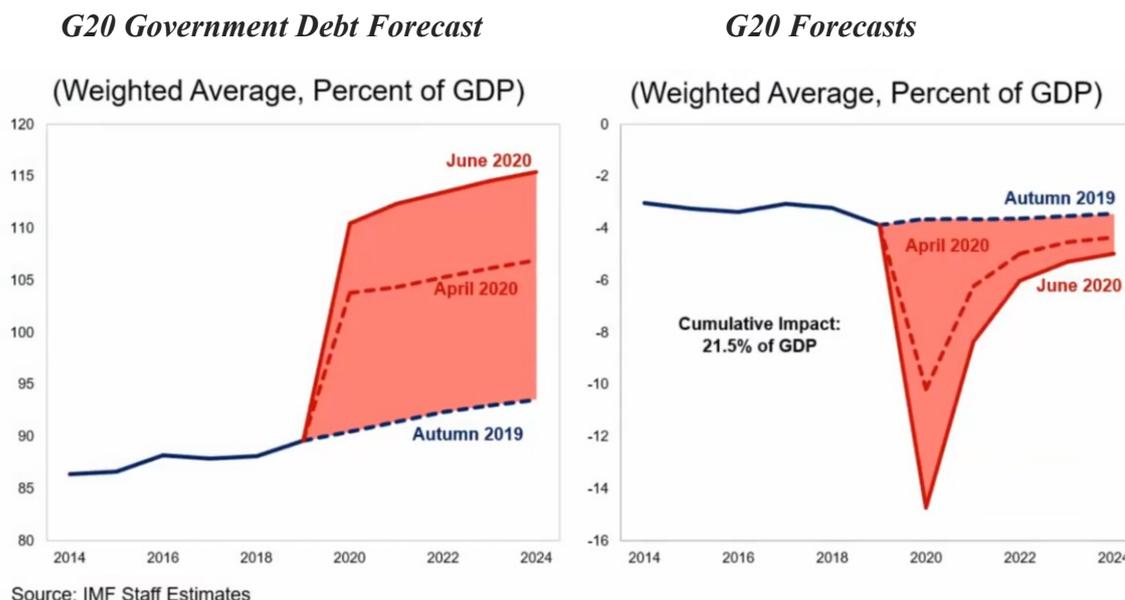
1.2   The Deficit Bias

But the build-up of public debt in most industrial countries is not a new story. It can be rooted back in the mid-1970s . The period since the 1970s has seen a rise in the share of government in economic activity in the advanced economies and the consequent widening of fiscal imbalances. In fact, the strong rise in government outlays was not matched by a commensurate improvement in revenue performance.

Tanzi and Schuknecht (1997) assert that government debt rose considerably over the past decades and this trend was generally accompanied by an expansion in the size of general government expenditures: as shown by the authors, the average size of public expenditure-to-GDP ratio o for a group of thirteen industrial countries increased in the 20th century from 12% of GDP in 1913 to 43% of GDP in 1990. At the end of the period, average public debt-to-GDP ratio was 79% for the big governments, 60% for medium-sized governments and 53% for small governments[1].

 Due to the difficulty of countries in containing government indebtedness, a large literature on the bias toward large deficits and excessive debt has developed.

The deficit bias is namely the tendency of governments to allow deficit and public debt levels to increase.

---

[1] Where big governments are defined as those with higher than 50%; medium-sized governments: between 40-50% and small governments: less than 40%

A central focus on the deficit bias has been the research on the main macroeconomic consequences provoked by excessive deficits and high and persistent public debts.

As Merola (2012) states, accumulating debt is not only and always a bad thing: on the one hand, in fact, it can help smooth real activity, but on the other hand it can create vulnerabilities and affect macroeconomic performance.

The good reasons governments to borrow are that public debt allows governments to smooth taxes in the face of cyclical revenue changes, and it increases the flexibility of the private sector in responding to variations in income and spending opportunities. Furthermore, it can help smooth consumption not only over the lifetime of individuals, but also across generations. Therefore, debt improves the efficiency of resources allocation and allows risks to be shifted to those most able to bear them.

However, the accumulation of debt certainly involves risks if done without prudence, hence a prerogative of public debt for not turning into a threat is to maintain it sustainable in the long run. Sutherland et al. (2012) argued that targeting a prudent debt level would provide a long-run anchor for fiscal policy. The literature, however, does not reach firm conclusions as to the desirable debt level, on the contrary it confirms that determining empirically the optimal level of debt is not straightforward.

The first drawback of high public debt levels is that they may have adverse effects on growth and inflation (Reinhart and Rogoff, 2010, Kumar and Woo, 2010 and Checherita and Rother, 2010). While it is known that the economic growth rate has a linear negative impact on the public debt-to-GDP ratio, also high levels of public debt are likely to be deleterious for growth, but potentially only after a certain threshold has been reached.

In the domain of fiscal policy, Égert (2010) individuates that high public debt levels can induce fiscal policy to become pro-cyclical and less effective. Procyclical fiscal policies, that is policies that are expansionary in booms and contractionary in recessions, are generally regarded as potentially damaging for welfare: they raise macroeconomic volatility, depress investment in real and human capital, hamper growth, and harm the poor (IMF, 1996). If expansionary fiscal policies in bad times are not fully offset in good times, they may further strengthen the bias towards deficit and lead to debt unsustainability.

As regards financial markets, high current and expected future debt can lead to debt financing problems, which can push up interest rates on government bonds.

An example for what just said is provided by Haugh et al. (2009), namely that interest rate spreads in the Euro Area are influenced by the level of the debt service ratio, with the characteristic of being higher when a country has a poor record of fiscal discipline.

The concept of excessive deficit and debt is inevitably linked with the concept of fiscal discipline: in fact, both theoretical and empirical literature suggests that a fundamental factor that determined the strong persistence of deficits, as well as the tremendous rise in public sector indebtedness, over the past decades in so many countries have been the inadequate fiscal discipline and weak fiscal management.

According to Kumar et al. (2007) fiscal discipline is in place when governments maintain fiscal positions that are consistent with macroeconomic stability and sustained economic growth. More specifically, a sustainable and disciplined fiscal policy is qualified by the avoidance of borrowing that exceeds the servicing capacity in order to prevent excessive debt accumulation. At the same time, policy needs to be judicious in pursuing resource allocation and distributional objectives, and in smoothing output fluctuations. Moreover, the authors define as a prudent fiscal behaviour the creation of budgetary cushions that permits to effectively respond to both adverse shocks and to deal with predictable fiscal pressures, such as those arising from population aging, without overly compromising the debt level.

To understand the current interest in fiscal policy sustainability, it is useful to recapitulate the broad fiscal trends that interested fiscal policy starting from the 1970s until nowadays.

More specifically, three distinguishable trends have been identified: the first one concerns the period of fiscal consolidations that began in the 1970s and continued until the 1990s; the second regards the generalized adoption of fiscal rules that mainly characterized the period from 1990 onwards. The third trend is the progressive creation of independent fiscal councils that followed the global financial crises of 2007-09 . At the end of the chapter, a brief space is dedicated to the current situation, in which fiscal rules have been temporarily suspended because of the Coronavirus pandemic and the related economic crisis.

1.3   Fiscal consolidations

The period since the 1970s has seen a rise in the share of government in economic activity in the advanced economies and the consequent widening of fiscal imbalances. In fact, the strong rise in government outlays was not matched by a commensurate improvement in revenue performance.

Due to the deterioration of public finances, from the mid-1970s onward, a number of countries implemented medium-term fiscal adjustment plans; these met with success in only some cases, however. In fact, between 1970 and 1995, out of the 74 episodes identified in IMF (1996), there were only 14 documented cases of successful fiscal adjustment in industrial countries. This period of fiscal consolidations has certainly stimulated the rise of a strand of literature which

explored the wide range of factors that that may determine the success or the unsuccess of fiscal policy.

1.4 The role of credibility in fiscal consolidations.

Several authors have put particular attention on the effects that a fiscal policy may produce on growth. Theoretically, the net effect of tight fiscal policy on growth is uncertain, even though for decades economists have put attention mainly to its negative Keynesian effects. According to the Keynesian view, fiscal consolidation undermines economic growth because it leads to a contraction of the aggregate demand. The fall in demand, as explained in Heylen and Everaert (2000), occurs either directly, when the government reduces its consumption or investment, or indirectly when households reduce their consumption due to higher taxes or lower transfers, which reduce their disposable income. Moreover, the fall in aggregate demand may be reinforced when private investment responds negatively to the (expected) fall in output caused by lower private consumption or government spending.

In the 1990s, however, this view has been heavily criticized. Several authors have advanced that fiscal consolidation may also generate expansionary demand effects. In particular, the attention has been put on the positive effects that a credible fiscal consolidation may generate on the economic agent's expectation. However, whether these positive effects are strong enough to compensate the negative Keynesian effects still remains uncertain. In this respect the literature points at the crucial role of the specific characteristics of the consolidation programme and at the circumstances in which consolidation takes place.

A strand of the literature on fiscal consolidations is indeed concentrated on the wide range of factors that may determine the success or the unsuccess of the fiscal consolidation process.

The definition of "successful" when dealing with fiscal consolidation varies depending on the authors. For example, Alesina and Perotti (1995, 1997) define as successful those fiscal adjustments which in three years produce a reduction of the debt-to-GDP ratio of at least 5%, while the IMF (1996), based on McDermott and Wescott (1996), calls "successful" those stabilizations that manage to reduce the debt-to-GDP ratio by at least 3% within two years and it terms "aggressive fiscal impulse" a tightening of the budget of at least 1.5 percentage points of GDP for at least 2 years.

Important factors to take into account when dealing with a fiscal consolidation are, for example, the composition of the fiscal measures (whether they are based on tax increases, rather than expenditure cuts), their size and speed of implementation, the economic context under which it is more favourable to start a consolidation process and the role of exchange rates' devaluations.

For instance, Alesina and Perotti (1995), and Von Hagen *et al.* (2002) focused on the importance of the composition of the fiscal adjustment. The authors found that consolidations based on expenditure cuts tend to be more effective than those that include a tax increase. Their view is that fiscal adjustment programmes that rely mainly on cutting government consumption -especially the wage bill and transfers- have a high probability of success, i.e. a high probability of generating strong economic growth and reducing the debt ratio. Programmes that rely mainly on tax rises and government investment cuts, on the other hand, are expected to fail. Alesina and Perotti argue that government wage bill and transfer cuts, in contrast to tax rises and investment cuts, benefit from favourable credibility and expectation effects on demand. Alesina and Perotti (1996) argue that governments which intervene in politically more delicate components of the budget (e.g. public employment or social security) signal that they are really serious about the fiscal adjustment. This makes raise their credibility and, consequently, reduces the risk premium (default risk, inflation risk) on government debt. As a result, also the real interest rate falls, and this reflects in a crowding-in in private investment. In addition to this, Giavazzi and Pagano (1990) sustain that the fall in interest rates may also cause a rise of asset prices and consequently of market value of private wealth, which would further boost private consumption. Besides the composition, also its size and duration have been found to be determinant for the success of the fiscal consolidation. Authors, like Giavazzi and Pagano (1995) and McDermott and Wescott (1996) focused on the idea that large and persistent fiscal adjustments have a better chance of success, whatever their composition. They sustain that differently from small and temporary adjustments, drastic and long-lasting ones are more effective because they manage to affect expectations by signalling that policy makers are seriously engaged in fighting debt and deficits. Second, drastic adjustments provide a stronger signal of a change in the policy regime and, thus, of future tax reductions. Hence, they will be accompanied by a more vigorous private consumption and investment growth, and thus by stronger output growth. Related to this aspect, Blanchard (1990) adds that drastic and persistent fiscal adjustments provide clarity, by reducing uncertainty about future fiscal policy, and may therefore reduce also precautionary savings. This should further support demand and output.

By the way, this hypothesis has not come out unscathed from critics: Alesina and Perotti (1996) have put forward just the opposite argument. They state that large spending cuts or tax increases may undermine the political survival of the governments which has committed to fiscal consolidation and, as a consequence, the credibility and expectation effects of large cuts may be reduced. Empirically, the available evidence seems to support the previous hypothesis: Giavazzi and Pagano's (1995) cross-country analysis shows that private consumption tends to

rise strongly during periods of large and persistent government spending cuts and tax increases. In the opposite case, when spending cuts and tax increases were neither large, nor persistent, the standard Keynesian effect of falling private consumption tended to be observed. In support to this, McDermott and Wescott (1996) found that it is more likely to reduce the debt ratio when the magnitude of the fiscal consolidation is large. As regards the appropriate moment to undertake a fiscal consolidation, Blanchard (1990) and Sutherland (1995) have proposed models which show that the fiscal consolidation is more effective when the economy is in a situation of emergency, i.e. when the debt ratio is very high or has risen strongly in little time. In this case, the explanation is that in economies in which consumers and investors are aware that the "day of reckoning" comes closer and that a fiscal crisis is likely to arise, a fiscal consolidation may generate some favourable expectation effects on private consumption and investment. According to the authors, at low and sustainable debt levels, current consumers face the burden of the fiscal adjustment (e.g. tax increases) without enjoying properly the benefits associated with the adjustment. Hence, in such situation, the negative Keynesian effects of fiscal policy contraction may then dominate. On the contrary, when the economy is close to the crisis, current consumers will understand that a fiscal adjustment "now" will reduce the probability of disruptive tax increases in the near future. So, the fiscal adjustment will strongly raise their permanent income and stimulate their consumption. As regards the role played by the economic situation (both domestic and international), Alesina and Perotti (1995) and McDermott and Wescott (1996) sustain that fiscal consolidation has a much higher probability of success if the international macroeconomic situation is supportive, i.e. characterized by high real output growth and low real interest rates, since with these conditions it is easier to reduce the public debt. On the other hand, to reduce debt ratios during a global recession is, of course, much harder, especially if at the same time interest rates are high. In support to this hypothesis, both Alesina and Perotti (1995) and McDermott and Wescott (1996) have empirically found that while in the early 1980s in the OECD the economic growth was low and real interest rates high, most of all attempts of fiscal consolidation typically failed. Instead, in the second half of the 1980s, which was a period marked by a high OECD economic growth , successful fiscal consolidations took place. Several authors (e.g. Giavazzi and Pagano, 1990; Alesina and Perotti, 1996; Perotti, 1996) have noted that the most of the just mentioned successful consolidation episodes of the '80s were preceded by, or coincided with, a sizeable devaluation followed by a pegging of the exchange rate. This was the case of Denmark (1983-86) and Ireland (1986-89) among others. From this observation one might derive the hypothesis that a devaluation contributes to the success of fiscal consolidation. By the way, Lambertini and Tavares (2000)

and Hjelm (2002) suggest that the effect of exchange rate (including both nominal and real) on the success of fiscal consolidations -albeit significant- is relatively small. In addition, Ahrend *et al.* (2006) have found that while the real exchange rate depreciation may favour the start and continuation of a fiscal consolidation, it may fail to favour the debt reduction significantly.

In fact, not only successful, but also many unsuccessful consolidation episodes were preceded by a devaluation: some examples are Italy (1982-83) and France (1983-87).

1.5   Fiscal Rules

After debt and expenditure ratios to GDP had been on an upward trend since the early 1970s, and economists had analysed these events in terms of deficit and spending biases, it became increasingly common for fiscal policy makers during the 1990s to voluntarily surrender some of their policy discretion by subjecting themselves to fiscal rules.

A widely used definition of fiscal rule is the one proposed by Kopits and Symanski (1998, p. 2), according to which a fiscal rule is :

"*a permanent constraint on fiscal policy, expressed in terms of a summary indicator of fiscal performance, such as the government budget deficit, borrowing, debt or a major component thereof*".

Fiscal rules are long-lasting constraints on fiscal policy whose role is to strengthen the credibility of fiscal policy over time and to provide commitment to fiscal discipline. These rules set numerical limits on a budgetary aggregate (e.g. level of public debt, deficit, growth of public expenditures). These constraints are useful to address deficit biases (that can lead to excessive debt levels) and procyclical policies (exacerbating economic cycles), ultimately helping promote more prudent and stabilizing fiscal policies.[2] At the same time, fiscal rules must be sufficiently flexible to manage unexpected economic or other large shocks (Eyraud et al., 2018). This is particularly relevant for rare events that can have very large fiscal and economic impacts, such as the current pandemic, and will likely require escape clauses to allow temporary deviations from the rules.

The main reasons that explained the adoption of fiscal rules comprise again the will of strengthening fiscal solvency and sustainability (i.e. attaining sustainable levels of government deficits and public debt), contributing to macroeconomic (or cyclical) stabilization (i.e. reducing fiscal policy pro-cyclicality or raising policy counter-cyclicality), see Schmidt-Hebbel and Soto (2017).

As figure 2 shows, the worldwide spread adoption of fiscal rules started in the 1990s, as part of significant reforms of fiscal frameworks in many industrial and emerging/developing countries.

Figure 2 - Adoption of fiscal rules for period 1985-2015
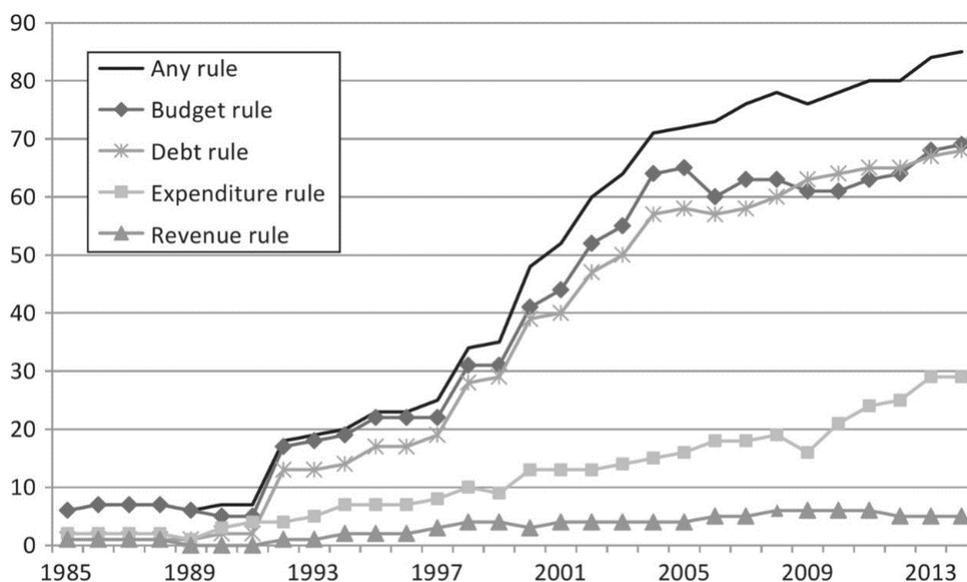
Source: IMF fiscal rules dataset (2015)

This shift in fiscal frameworks was certainly inspired by the revolution in monetary policy institutions and that took place in the 1980s and 1990s. the need of Reforms of central banks and their monetary policy came after the 1970s Great Inflation, and the positive policy experience of the independent Fed and Bundesbank lead many to establish independent and accountable central banks since the 1980s. The mandate of the newly independent central banks consisted in the conduct of the monetary policy under conditions of transparency and accountability, in order to raise policy effectiveness, increase economic efficiency, and strengthen democratic accountability. The failures of unconstrained fiscal policies and the lack of appropriate fiscal institutions, summed with the successful rule-based monetary policies conducted by independent central banks – have led since the 1990s to wide adoption of fiscal restrictions and fiscal rules, reforms of fiscal policy frameworks, in industrial and emerging countries.

The extensive literature on fiscal rules allows to identify four general objectives of fiscal rules and restrictions, in order to overcome the failures that characterize the behaviour of unconstrained fiscal policy. The first is to strengthen fiscal solvency and sustainability by contrasting unstainable levels of government deficits and public debt.

The second is to contribute to the macroeconomic (or cyclical) stabilization by reducing the damaging fiscal policy pro-cyclicality and enforcing policy counter-cyclicality. The third is to strengthen fiscal policy design and execution and make them more resilient to government failures by strengthening the political economy of fiscal policy decisions and budgetary procedures. The fourth and final is to improve intergenerational equity.

However, imposing fiscal rules and restrictions also implies costs, especially in the rules implemented is badly or too narrowly defined. As a matter of fact, if a fiscal rule is to strict and rigid, without a clear and predetermined escape clause[2], may results in a "straitjacketed" fiscal policy when severe macroeconomic or budget shocks of an unexpected type or magnitude materialize, as expressed by Hughes-Hallett and Lewis (2005).

Hence the compliance with the rules during unforeseen events could have large macroeconomic costs, by limiting the policymaker's flexibility and forcing this one to either to incur in the rule or to suspend the enforcement of the rule. As example, during and after the 2008–9 global financial crisis, the EU's unconditional Stability and Growth Pact (SGP) ceilings on fiscal deficit and debt levels were almost systematically violated, leading to the adoption of a new set of fiscal rules and procedures (the "six-pack," "two-pack," and fiscal compact). Therefore, countries that face very high levels of macroeconomic and budget volatility can refrain from adopting fiscal rules and restrictions in order to preserve more flexibility to face an unforeseen shock.

Nowadays, European governments recurred to the activation of the escape clauses in order to respond promptly and with the highest degree of flexibility to the economic consequences of the Coronavirus crisis.

1.6   Types of fiscal rules:

Policy experience and the literature, see as examples Kopits and Symansky (1998) and Morris et al. (2006), suggest that fiscal rules should be clearly defined, oriented to their policy objectives, transparent, simple, flexible enough in to avoid policy paralysis, consistent with budgetary and macroeconomic reality, enforceable, and efficient.

In general, fiscal rules should be applied to different government levels and in different shapes and forms. National governments establish national rules on their budgets, in contrast to sub-national rules established at state or provincial level. Supranational rules, instead, are established at the level of a union of sovereign states, such as the EU.

---

[2]escape clause: a part of a contract that allows a person to get out of the contract in a particular situation.

Fiscal rules, as said before, consist in quantitative constraints on fiscal policy that are based on numerical targets, which are established for a given fiscal indicator or budget aggregate.

Numerical targets may be set unconditionally, as they are in the EU's Maastricht Treaty unconditional debt at 60% of GDP and deficit ceilings at 3% of GDP, or may be conditional on certain macroeconomic aggregates, like for example government spending targeted to estimates of potential GDP levels and of long-term commodity prices or commodity fund assets (as it happens in Chile and Norway).

Different types of fiscal rules can be distinguished according to the budgetary aggregate to which they refer. Schaechter et al.(2012) identifies four main categories of rules: (i) Debt rules that set an explicit limit or target on public debt in percent of GDP, (ii) Budget balance rules that set an explicit limit or target on the budget balance in percent of GDP. The targets can be set on the overall budget balance, the primary budget balance (excluding net interest payments), or the recurrent budget balance (this is the golden rule, which targets the overall balance net of capital expenditure). The budget balance measure can be specified as actual balance, cyclically adjusted or structural balance, or "over the business cycle balance." (iii) Expenditure rules that set limits on total, primary, or current spending. They are set in absolute or growth terms, or in percent of GDP. (iv) Revenue rules that set ceilings or floors on government revenue. They are set in absolute or growth terms, or in percent of GDP.

Schaechter et al. (2012) also concentrate on the different advantages and drawbacks that each type of rules implies. For example, debt and balance rules are renown for providing a close link to the policy objective of debt sustainability, but do not favour cyclical stabilization policies. This could contribute to fiscal policy pro-cyclicality. On the contrary, expenditure and revenue rules enhance cyclical stabilization, but they are not directly linked to debt sustainability. That is why many countries combine more than one type fiscal rule, so that their overall effect on fiscal policy might be positive.

In contrast with numeral rules, the fiscal rules' framework may also be characterized by the so-called "procedural rules", which clearly regulate the attributes and interactions of subjects that take part in the budget process. Their main aim is to enhance transparency, accountability, and good fiscal management.

1.7   Independent Fiscal Councils (IFCs)

The deep fiscal surge of government deficits and debts left by the Global Financial Crisis of 2007–09 shook confidence in public debt sustainability. Faced with mixed records about the effectiveness of numerical fiscal rules, many governments decided to create national nonpartisan fiscal institutions, typically referred to as fiscal councils or parliamentary budget offices, to further strengthen the institutional framework, shaping fiscal policy and boost the credibility of their commitment to meet their obligations in full and to act virtuously after the crisis.

Figure 3 – Number of fiscal councils
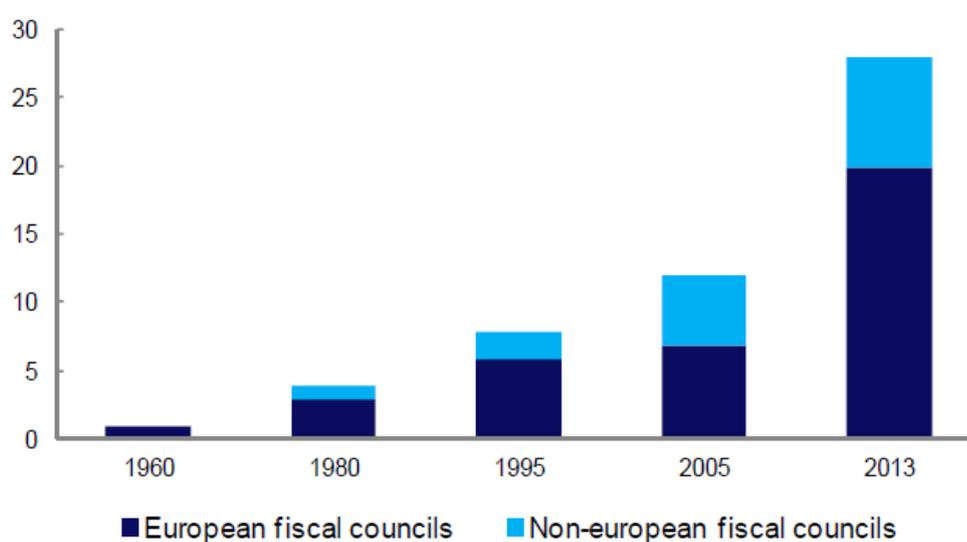
Source: IMF Fiscal Council Dataset.

IFCs were initially viewed as a parallel to the delegation of monetary policy to independent central banks with the remit of eliminating inflation bias. The delegation of fiscal policy to an independent fiscal authority should have worked similarly as a method of counteracting deficit bias.

However, the idea of delegating actual fiscal decisions to independent experts was never put into practice. That happened because, as fiscal decisions, differently from monetary-policy decisions, are certainly much more redistributive, and hence more political. So, a stand must be taken on exactly which taxes or government expenditures to intervene.

Therefore the academic discussion, see for example OECD (2014), focused instead to independent fiscal councils without decision-making power but with a role of "fiscal watchdog", whose main remit is to keep under observation potential fiscal risks and alert, if necessary, politicians and voters. Therefore, as stated by Calmfors (2015), independent fiscal council's aim is to influence policy either directly, through inputs into the decision-making process, or indirectly through analysis and participation in the public discussion.

A fiscal watchdog can counteract several of the mechanisms that may strengthen the bias of fiscal policy towards deficit. More specifically, IFCs are expected to:

(i) *Provide better information,* both to politicians and voters. This could decrease "fiscal illusion" and increase general awareness of the government's intertemporal budget constraint.

(ii) *Reduce informational asymmetries* between the government and the electorate by providing accurate information on actual deficits and by making them more conscious as regards deficit' long-run consequences.

(iii) *produce the macroeconomic and fiscal forecasts* or assess the government's own forecast. In this way they have the ability to impede government to deliberately use over-optimistic growth forecasts to justify deficits for example.

(v) *Raise the reputation cost for a government of deficits* by providing more accurate estimates of them and outlining the future consequences.

(vi) in addition, a fiscal council could help *identify and warn against unsustainable booms* that when bursting can trigger fiscal crises.

Many early academic proposals, such as Wyplosz (2005), saw independent fiscal institutions as a substitute for rules, allowing discretionary policymaking with more flexibility than rules. However, in practice fiscal councils usually coexist with rules, so it seems more appropriate to consider them as complements.

In fact, Beetsma and Debrun (2016), suggest that many independent fiscal councils' characteristics are strongly complementary to fiscal rules. For example, deficit bias may be weakened by fiscal rules and fiscal councils separately, and this effect may be greater when both are present.

Fiscal rule provides a clear benchmark for fiscal councils in the judgement of a certain policy. In addition, the existence of fiscal councils could also influence how rules are formulated. There is a fundamental trade-off between simple rules (such as a ceiling on the actual deficit), which are easy to verify but may be inadequate in many situations because of their inflexibility, and

more complex rules result more adequate because of their flexibility but also more difficult to verify. Monitoring by independent and competent experts could permit the rules to be more complex but at the same time more effective.

1.8 Fiscal Rules during the Coronavirus pandemic

With the outbreak of the coronavirus pandemic and the related economic crisis, many countries decided to suspend their fiscal rules.

In particular, to face the economic downturn deriving from the crisis, governments recurred to a huge increase in public budget deficit. For example, as reported in the IMF's Special Series on Fiscal Policies to Respond to Covid-19 (IMF 2020a), the European Union has activated its general escape clause, which allows members states to temporarily stop any measures they had to implement to meet their targets.

The European decision to suspend any fiscal commitment proved the importance of having well-designed escape clauses, that not only they allow for a prompt response to shocks, but also they establish strong governments fiscal credibility in times of crisis.

In fact, escape clauses define a clear plan on how to proceed in the case of an unexpected severe crisis, allow to commit in advance to exceeding certain fiscal limits in very specific and unprecedented cases, but also provide the government with an opportunity to lay out a credible plan to return to compliance after the shock.

The coronavirus outbreak revealed the weakness of current fiscal rules to flexibly adjust to unexpected shocks. The proposals for a revision of the fiscal framework are increasing: an authorative one was recently advanced by Blanchard et al. (2020), who find existing fiscal rules lacking and propose rather a shift to new fiscal standards that also consider changes in economic conditions. In particular it is criticised that current fiscal rules are written only as a function of debt, deficit levels and national output gaps, while it should be necessary that they count also EU-level output gaps, constraints on monetary policy, growth expectations, current and expected interest costs, and institutional and political capacity for future fiscal adjustment. In this way, fiscal standards should better accommodate the specific needs of individual countries and improve the effectiveness of their fiscal policy.

However, caution is always needed when changing fiscal rules as there are costs. For example, frequent revisions may signal weak government commitment to fiscal discipline and have adverse market reactions and should ensure the new rules are consistent with forward-looking policy goals like debt sustainability and stability.

This said, it is certainly important that fiscal rules include contingencies to accommodate large and effective fiscal responses to severe and unprecedented crises, but it is equally important that fiscal rules will provide clear guidance for building up savings in times of exceptional positive shocks. The COVID-19 outbreak has led to wider deficits and higher sovereign debt, and when times will be better, it is imperative that fiscal rules ensure that governments save more and pay down excess debt accumulated during crises.

2 Commitment versus discretion in monetary and fiscal policy

This chapter divides into three sections: the first section introduces the time-inconsistency problem of optimal policies and the related debate in the choice between commitment and discretion. The second and the third section address the time-inconsistency problem in the context of monetary and fiscal policy respectively.

2.1 Commitment vs Discretion: Theoretical Background

The time inconsistency of optimal policy finds its basis on the seminal paper of Kydland and Prescott (1977). Their work evolves from the critique advanced by Robert Lucas in the mid-1970s, which sustains that when performing policy evaluations it is necessary to consider the interactions between government policies and private agents' expectations and emphasises that rational agents' decisions are also based on their expectations about future policies. To make an example, the agents choose how much to consume and save on the basis of their expectations about future taxes and monetary instruments. This aspect has raised the interest in developing economic models capable of taking into account these types of strategic interactions between private agents and the policymaker. Major contribution in the investigation of this topic has been given by papers of Kydland and Prescott (1977), and Barro and Gordon (1983), which analysed government decision problems where agents' decisions are based on rational expectations about future e policies and clarified the importance of policymakers' credibility.

Kydland and Prescott (1977) formulated a stringent requirement of rationality in the mid-late 1970s, for which rational and forward-looking agents have the capability to recognize the difference between a credible and a non-credible policy rule. The authors consider a policymaker who makes policy plans in order to maximize the welfare of its citizens and they show that the resulting policy decisions suffer of time-inconsistency. It means that, that in a world of forward-looking rational agents, an optimal policy announced at time t = 0 ceases to be optimal at every future point in time, t > 0. This creates the incentive of the policymaker to re-optimize and renege on earlier policy promises, since he is moved by the objective of achieving a higher social welfare.

People will form their expectations of future policy on the basis of the known incentive of the government to deviate from announcements, and consequently the initial plan will not be

credible, unless the government is forced in advance to keep its promises, by making binding commitments that prevent him to change his policies at a future date. When policy plans are not credible, rational agents realize that future policies will not necessarily coincide with the announced plans and they will adjust their expectations on the basis of the policy-maker's incentives to deviate . An economic equilibrium, under this more demanding definition of rationality, consists of optimal and mutually consistent private decisions, as well as a policy rule which is the equilibrium outcome of a policy selection game.

Commitment is the ability to keep on past promises, no matter what the particular current situation is. The lack of commitment, discretion, implies that a policymaker is allowed to change policy depending on current circumstances and to disregard any past promises. Because the discretionary planner does not make any binding commitments, one may think that that discretion offers more flexibility and that it is way more preferable with respect to a framework in which the policymaker is obliged to "tie hands" in front of past promises. But the authors, through the use of several examples, have demonstrated that the social welfare that a policymaker can obtain when it is committed on past promises is generally higher than the welfare under discretion.

In other words, the optimal policy under commitment is time-consistent, while under discretion it is time-inconsistent, because the government has incentive to deviate from previously announced policy. Further, the time inconsistent policy under discretion usually implies welfare losses relative to the optimal policy under commitment.

An optimal but time inconsistent policy rule will not be believed by rational private agents, reason for which time inconsistency implies lack of credibility.

One of the scopes of this line of research is to emphasizes the benefits of commitment relative to discretion, namely the benefit of having institutions that make it difficult to renege on policy promises. Irreversible commitments are valuable because they lend credibility to policy and enable the policymaker to influence private sector expectations.

If the policy rule is selected by the government once and for all, without subsequent re-planning, then rational private agents will adapt their expectation, by taking this policy rule into account, and this is the end of the story. But if instead policy choice is sequential, and it is made period after period, then the policymaker is subject to an incentive constraint. Private expectations will not adjust to any pre-announced policy rule. Rational expectations will instead reflect the equilibrium policy choice of future periods. Therefore, current policy decisions will be able to influence future expectations only to the extent that current policies affect future equilibrium

outcomes. This incentive constraint limits what the government can achieve and results in reduced welfare, compared to the situation in which binding policy commitments are feasible.

2.2 Commitment vs Discretion: Monetary Policy

Time inconsistency is a generic issue for policymakers in all areas, even though the literature has mostly related this problem to the monetary policy framework. Following the fundamental paper by Kyland and Prescott, Barro and Gordon (1983), gave a fundamental contribution in the debate between commitment and discretion in the problem of time inconsistency that may affects monetary policy decisions. Thanks to these two authors, the credibility of monetary policy became an important topic of interest. In particular, the main issue was to find if there may be macroeconomic gains from enhancing credibility either by formal commitment to a policy rule or by introducing some kind of institutional arrangements that achieve the same scope.

Barro and Gordon describe a discretionary monetary regime in which the policymaker in a first moment put in place a series of monetary rules that influence people' s expectations on the inflation level that will prevail on the future period (the expected inflation). But once these expectations are formed, the monetary authority has the temptation to deviate from the rule previously announced, by printing more money and create more inflation than people expect. This happens because surprise inflation brings benefits like the expansion in the economic activity and the reduction of the unemployment rate below its natural level, as well as a decrease in the real value of the government's nominal liabilities.

However, since people foresee that the policymaker has incentives to "cheat" in order to create benefits from inflation shocks, they will modulate their expectations such that inflation's surprises -and the associated benefits- are systematically ruled out in equilibrium. In this case, the potential possibility of creating inflation shocks makes people' s inflation expectations going upwards, which ex-post it translates in an equilibrium in which the average rates of inflation and monetary growth -and the corresponding costs of inflation- will be higher than otherwise.

More specifically, Barro and Gordon suppose that the monetary authority has two objectives, namely the level of inflation (π) and unemployment (u), and that its preferences are expressed by a loss utility function $L(\pi,u)$. The authority final scope is to minimize this function, under the constraint represented by the Phillips curve. Figure 4 better depicts the problem of time inconsistency examined by the authors. Suppose that the initial situation is represented by point A, in which unemployment is at its natural level and current and expected inflation are both equal to zero. Remark that in this point the loss of the authority corresponds to Lp. However,

this situation is not optimal for the authority, that would minimize its loss function in point B, which can be obtained by increasing the rate of monetary supply, conditioned to the fact that private agents' expectations remain unchanged. If this happens, it means that the authority has managed to "cheat" individuals, the unemployment will be below the natural rate and inflation will be a little higher. The problem arises because rational and forward-looking individuals will fully understand that the authority has the incentive to deviate from the promised plan and behaving in an opportunistic way, so that they will respond accordingly by modifying their expectations in the hypothesis that the supply of money will grow exactly as planned by the authority when passing from point A to point B.

That is why point B will never be reached by the system, but rather point C will be the new equilibrium, characterized by unemployment at its natural level, but at the expense of an even higher rate of inflation (current and expected). In point C, the loss function of the authority is certainly higher with respect to the initial point A, since unemployment is the same but there is greater inflation.

Hence, the best monetary policy, however, is the one that leads to point B, but the problem is that it is also a time-inconsistent policy, and due to the presence of rational individuals, such policy ends to generate a worse position with respect to the initial one, and it is also worse than the situation desired.

Since the first best equilibrium (in which individuals are cheated, in point B) cannot be reached by the monetary authority, in order to avoid the discretional behaviour it should be better to constraint on remaining in point A (a second best position) thanks to a commitment device.

Under commitment, the central bank would inform the public that it will keep inflation at a predetermined level. Knowing that the central bank is capable of honouring its promises, the public will believe the central bank and expect the inflation rate to be pi-star. With no surprises, inflation will be pi-star, and output will attain its potential level, which is somewhat below its desired level. A policymaker who lacks the ability to commit to achieve an inflation target can't do better, meaning that he can't increase output enough at the expense of some surprise inflation and making everyone better off and all that occurs in the end is more inflation and no additional output. So, under both commitment and discretion, output remains at the potential level, but commitment achieves this result without any inflationary bias.

This example makes clear the long-run benefits of commitment and of devising institutional arrangements that prevent the central bank from using discretionary policy .

The solution of this example of monetary policy is in line with the general principle of the optimal policy literature, according to which a policy implemented under commitment usually results -at least from an *ex ante* perspective- in a higher welfare than under discretion.

Figure 4 - Representation of the Barro-Gordon model
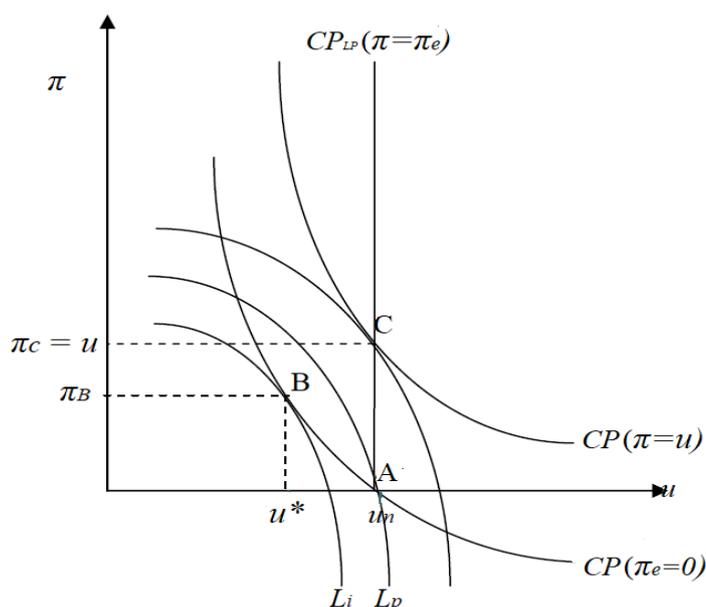
Supporters of discretion may argue that, differently from the *ex-ante* perspective, for which the solution with commitment dominates the one under discretion, *ex-post* it may be different. In fact, binding commitments could restrict the response of the policymaker to possible shocks that may arise in the economy. Thus, discretion could provide a major flexibility and effectiveness in facing unpredicted events.

Dotsey (2008) compares the response to shocks under commitment and discretion, and he does so in a monetary policy framework. According to the author, one of the major challenges of central banks should be the ability to respond to economic shocks and limit their effects on economic volatility, and that intuitively more discretion of the monetary policymakers should allow to respond to each situation as it arises while, promises to keep inflation at some targeted rate are constraining.

However, Dotsey sustains that the notion for which commitment limits the policymaker from reacting optimally to economic shocks is actually mistaken. The ability to keep promises and

act on the basis of past promises allows a central bank operating under a policy of commitment to influence expectations in a desirable way that the discretionary planner cannot. Hence, a policymaker who can commit possesses another tool to work with, and not only can achieve all the outcomes of a policy under discretion, but it can also achieve outcomes unobtainable under discretion.: the committed policymaker cannot do worse than the discretionary planner is valid at least from an *ex-ante* perspective. On the contrary, the discretionary planner, because he makes decisions period by period and no promises, he does not have a similar ability to influence expectations.

This point is considered in the famous paper written by Clarida *et al* (1999)**,** who use a New Keynesian model to prove the gains deriving from commitment in the mitigation of the so-called "stabilization bias", for which inflation is more volatile and much harder to stabilize under discretion. This model is substantially characterized by two equations: the IS curve and the Phillips curve. As regards the IS curve, a high real interest rates imply lower demand for consumption and investment, while greater future economic activity implies both an increase in current consumption through a wealth effect and more investment.

The model's second component is the already mentioned Phillips curve that relates current inflation to future expected inflation and to the level of output. If future inflation is expected to be high, firms will want to raise prices more aggressively today, so that their prices do not get too far out of line with the behaviour of prices in general. This leads to greater inflation today. Also, when the level of output is high, firms' costs of production rise, and as a result, firms pass on some of these additional costs to consumers. The result is higher inflation. The economy is in equilibrium when the level of the real interest rate and inflation implies that output demand is equal to output supply.

Importantly, in the model, monetary policy can affect the level of output. Underpinning this model of the economy is the feature that prices and wages are costly to adjust. These costs may involve the resources used in acquiring information, the resources employed in figuring out exactly what the correct price or wage is, and the resources needed to change prices. These costs imply that firms and workers will not immediately and fully react to changes in monetary policy. As in our previous example, in which unanticipated changes in policy affected the economy, here anticipated changes in policy affect the economy as well. They do so because it takes time for the price system to fully respond to changes in policy. Thus, the central bank can move output and inflation around in response to an economic shock.

To answer whether a discretionary policymaker or a committed policymaker perform better, Dotsey (2008), basing on the model of Clarida *et al.*, examines how both types of policymakers

and the economy respond to an aggregate supply shock. Figure 4 shows the model's economic responses to a 1% shock to the inflation rate. Starting from the assumption that the public does not like inflation above the target level, and that the central bank's objective is to to maximize public's welfare, the policy response is a monetary contraction, i.e. the central bank raises the nominal interest rate (panel a). From the figure it is clear that, under discretion, the interest rate must be raised by approximately 50 basis points more than under commitment. As a result, output declines more under discretionary policy (panel b), but the effect of this more aggressive tightening under discretion has less influence on the inflation level (panel c). On the other hand, the policy under commitment experiences a smaller rise in inflation and a more rapid return of inflation to the target level, with less loss of output. Policy also does not need to be as aggressive because inflation doesn't rise as much.

Hence, the committed policymaker achieves the best outcome in both dynamics: less inflation increases due to the shock and less output loss, and all this by contemporaneously acting less aggressively. The explanation is that under commitment, individuals consider the policymaker's promise to bring inflation down and to not exploit the output gains arising from inflation. As a result, expectations of inflation do not increase as much under commitment, and firms don't raise their current prices as aggressively as they would in an environment characterized by discretion (panel d).

The stability of inflation expectations under commitment implies that policy does not have to be as aggressive in order to bring down inflation, and as a result, output does not have to decline by as much. Therefore, contrary to intuition, the constraint of having to abide by past promises actually allows the committed policymaker to achieve superior economic outcomes in response to economic disturbances.

Commitment's superiority to discretion can be further characterized by investigating what kind of inflation and output trade-offs confront the economy under the two different types of policy. In this model, to some extent, the variability of inflation is inversely proportional to the variability output. Therefore, the more the policymaker tries to limit the volatility of inflation, the greater the volatility of output will be, and vice versa. It results that the policymaker possesses a whole menu of attainable combinations of output variability and inflation variability to choose from. Figure graphs the choices available to each type of policymaker. Because people dislike volatility in both output and inflation, points that lie closer to the origin are preferred. The principle for which under commitment the economy can achieve better outcomes than under discretion is represented in Figure 5, where the trade-off under commitment lies everywhere below the curve under discretion, meaning that for any given level of variability in

inflation, the committed policymaker can obtain less variability in output than the discretionary planner. Similarly, for any degree of volatility in output, the committed planner can generate less volatility in inflation.
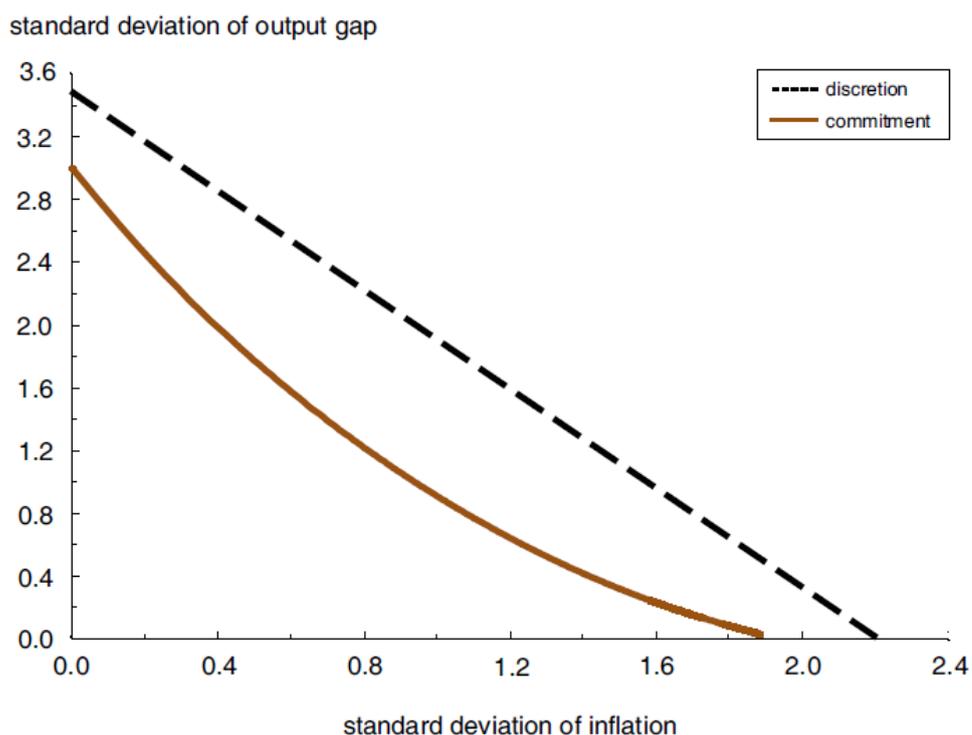
Thus, not only will the economy achieve a lower average rate of inflation under commitment, but it will also experience less volatile inflation

Figure 5 - Economic responses under commitment and discretion
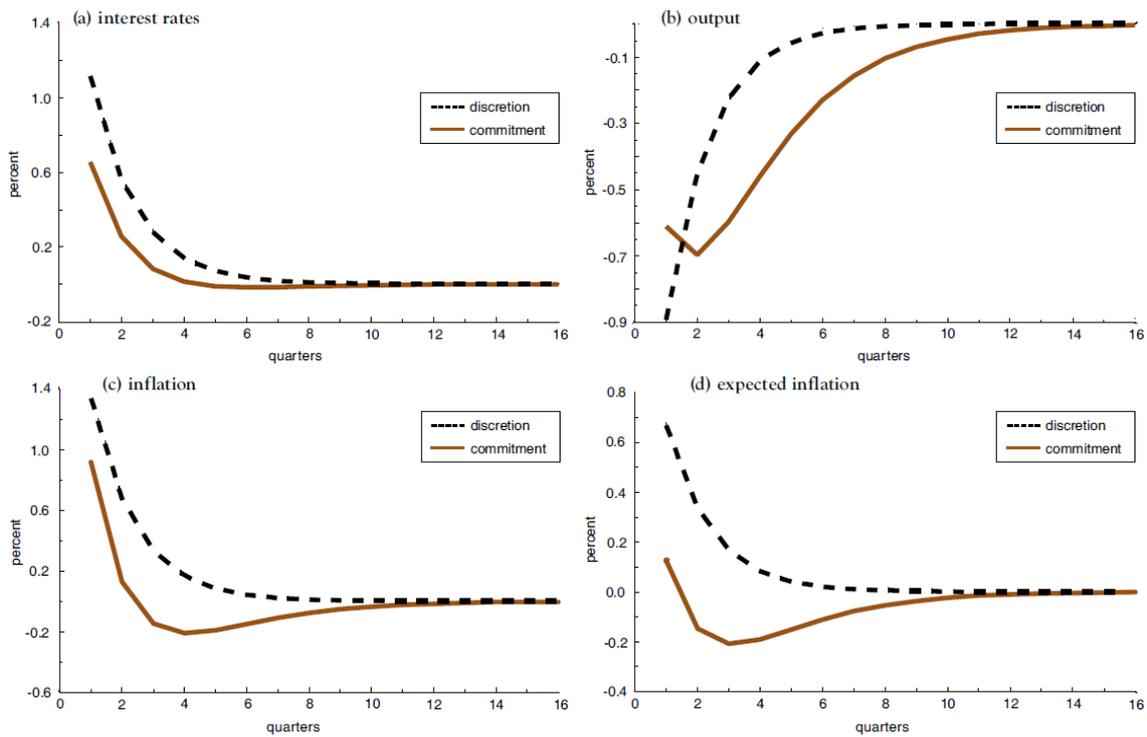
Source: Dotsey (2008)

Figure 6 - Output and inflation trade-off

standard deviation of output gap

standard deviation of inflation

Source: Dotsey (2008)

There is a large body of literature that studies how a monetary authority will choose monetary policy under various assumptions about its objectives and the social welfare function. Barro and Gordon (1983), Kenneth Rogoff (1985a), Lars E. Svensson (1997) and the related literature suggest that governments should delegate monetary policy to a central bank that is instrument independent and appropriately conservative. A central bank is instrument independent if it has full control over the instruments of monetary policy; by appropriately conservative, this literature means that the central bank's output and/or inflation targets should be lower than the socially optimal ones and that the central bank should put more weight on inflation stabilization and less on output stabilization than society does. Central bank independence and conservatism eliminate the inflation bias of monetary policy that results from the incentive to exploit surprise inflation to raise output in the short run above its natural level, which is typically assumed to be inefficiently low.

As mentioned in chapter I, the demonstration effects of successful rule-based monetary policies conducted by independent central banks inspired the adoption of rules also in the domain of fiscal policy. In the next section, we investigate the rationale behind the fact that countries tie

the hands of their fiscal policymakers by putting in place fiscal rules and restrictions that limit the degree of fiscal policy discretion.

2.3 Commitment versus Discretion: Fiscal policy

The "commitment versus discretion" approach applied to the case of monetary policy (Kydland and Prescott, 1977; Barro and Gordon, 1983) supports the use of fixed rules, which eliminate the inflationary bias generated by the authority's incentive to behave opportunistically for trying to stabilize output above the natural level rather than commit themselves to maintain a low and stable rate of inflation. Forward-looking, rational agents understand this incentive and anticipate the behaviour of monetary authorities and the correct rate of future inflation that will prevail in future. The result of this game between rational agents and monetary authorities is the achievement of a suboptimal (third best) equilibrium where output is at its natural level and the rate of inflation is higher than under commitment. Hence, monetary policy is dynamically inconsistent, and this provides a strong argument in favour of a rule constraining the central bank to pursue a low and stable inflation rate.

Less interest has been put in considering the Kydland-Prescott framework of dynamic inconsistency to fiscal policy framework. Similarly to monetary policy's inflation bias, even fiscal policy may suffer by a bias due to time inconsistency: the so-called "deficit bias", which is the tendency for the government to rise public debt, as already said in chapter I.

In particular, there may be for the government the incentive to over-use fiscal deficits as a tool to raise aggregate demand, and therefore output and employment in the short run, since prices and wages are slow to adjust to unanticipated shocks. This mechanism is similar to the one that causes the inflation bias for monetary policy under unconstrained discretionary policymaking. In equilibrium, when rational expectations have adjusted to the "opportunistic" government behaviour, such fiscal policy results only in deficits, without any output and employment benefits. This phenomenon has given a new stimulus to the economic debate about debt sustainability and the opportunity to adopt commitment approach rather than discretion in the conduct of fiscal policy, since as theory suggest, the equilibrium that results under discretion generally implies a lower welfare than the case in which the government can credibly commit itself *ex ante* to a specific policy.

If rules can be made credible in the sense that the government is expected to follow them, "rules" give higher welfare than discretion.

An attempt to justify the introduction of a fiscal rule using a time-inconsistency approach has been studied in a work by Dixit and Lambertini (2003), in which a monetary and a fiscal

authority have different target levels of the same two objectives (output and inflation). The authors show that commitment by both authorities is optimal, so that discretion in fiscal policy always generates inferior outcomes.

A paper by Bianchi and Menegatti (2012) deals with the dynamic inconsistency of fiscal policy and it manages to provide a possible explanation for the deficit bias. These authors consider a government that pursues two different goals: output and debt stabilization, under the constraint given by the equation describing debt dynamics and the hypothesis of the existence of a risk premium on the yield of public bonds tied to the possibility of a default.

They label Y* as the desired level of output and Δb* as the optimal value of debt dynamics and they assume that:

$$Y^* > Y_t$$

because of the existence of distortions in the tax system and in the labour market; and that:

$$\Delta_b^* = 0$$

as sufficient condition for debt sustainability.

They also suppose that the output is an increasing function of the level of deficit, namely:

$$Yt = f(Dt)$$

The optimal level of deficit, labelled as D_{opt} is the one that permits to achieve the desired output, which may or not coincide with the necessary deficit that insure debt stabilization (D_{st}). Now, if the target level of output is supposed to be greater than the actual output, then:

$$Y^* > f(D_{st}),$$

which introduces a trade-off between the goal of reaching the desired output level and that of stabilizing public debt.

It implies that the optimal level of deficit, D_{opt} is actually higher than the level of deficit sufficient for the debt stabilization D_{st}, meaning that the government chooses to increase the deficit in order to push output closer to its desired level.

This behaviour, which stems from the assumed trade-off between the two conflicting objectives of output and debt stabilization is the source of dynamic inconsistency.

In the case of discretion, private agents assume that the government will pursue public debt stabilization and hence choose the subsequent level of deficit given government's preferences summarized by by the loss function $L(D_t)$.

In the case in which the government announcement is trusted (the so- called case of "fooling"), the Government announcement of debt stabilization is assumed to be believed. The Government then will choose the optimal level of deficit D_t under the condition $\Delta_b^* = 0$.

However, since $Y^* > f(D_{st})$, we have that the deficit under fooling (D_f) is higher than D_{st}. This means that agents expectations about debt stabilization ($\Delta b = 0$) are wrong, since the Government choice implies that $\Delta b > 0$, meaning that it prefers to reach the desired level of output at the expense of an increase in deficit.

On the contrary, if agents are forward-looking and rational, as prescribed by Kydland and Prescott, then, D_f cannot be an equilibrium level of D_t.

In fact, if agents have rational expectations, they will not trust the Government announcement and will instead anticipate its actual choice and behaviour: agents will anticipate the growth of public debt and will ask for a risk premium that will increase the interest rate paid on public bonds. Such increase in interest payment will raise the Government loss with respect to the case of fooling.

To see whether commitment may reduce or not the Government loss, they compute analytically the difference between the government loss function under commitment $L(D_c)$ and under discretion $L(D_d)$[3] and they find an uncommon result: commitment to debt stabilization is superior to discretion only when the public debt–GDP is higher than a certain threshold. If the debt-output ratio in the economy is small, then discretion is preferable, while, on the contrary, commitment is a better alternative for highly indebted economies.

This occurs because the two choices involve differentiated advantages: discretion entails larger interest payments due to the risk premium but a level of output closer to the desired value, while commitment implies lower interest payments, due to the absence of the risk premium, but also a lower level of output.

It is interesting to notice that their conclusion partly differs from that obtained in the application of the dynamic inconsistency approach to monetary policy. As pointed out by Barro and Gordon (1983), in the case of monetary policy, discretion generates an inflation bias with an unchanged output, thus, in that context, commitment is always preferable (the second-best solution). In the case of fiscal policy, the difference in the conclusion is due to the fact that in their model the equilibrium level of output is higher under discretion because of the positive effects of fiscal policy on production.

Hence, in general commitment can either reduce or increase the loss function: if the debt-output ratio in the economy is small, then discretion is preferable, while, on the contrary, commitment is a better alternative for highly indebted economies.

---

[3] Where D_c and D_d are respectively the levels of deficits under the commitment and the discretion hypothesis.

Badinger and Reuter (2015) summarize many other factors that exacerbate the bias towards deficit under discretion. In particular they individuate:

(i) *Common pool theory*, according to which many decision makers involved in the budgetary process may be lobbied by or depend on specific interest groups. As a consequence, the likelihood of spending and large deficits increases the greater the decision makers' conflict of interests.

(ii) *Information asymmetry*: decision makers usually have more information on the true fiscal position than voters, which can be used for (promising) spending increases or tax cuts before elections, creating a political business cycle (see Brender and Drazen, 2005; Shi and Svensson, 2006).

(iii) *Impatience and short-sightedness*: Governments tend to discount future events (e.g., future public spending) or future election periods at a higher rate than voters because politicians may lose their office in the short-run (see for example Woo, 2005)

(iv) *Political competition*: Governments, anticipating the possibility of being replaced in the future, have an incentive to reduce the room for fiscal manoeuvre for future governments by accumulating debt (Persson and Svensson, 1989; Alesina and Tabellini, 1990) .

For all these reasons, unconstrained fiscal policy is likely to result in excessively high deficits, below of what would be socially optimal.

Another rationale for binding the budgetary process, unrelated to the deficit bias, has been put forward by Fathàs and Mihov (2006). The find that macroeconomic volatility is linked to discretionary fiscal policy. They argue that fiscal constraints lead to lower volatility with respect to discretionary fiscal policy, lower output volatility and thereby lower macroeconomic volatility.

Another strand of literature focuses on a different issue in the optimal fiscal policy literature: the distribution of the tax burden between labour income and capital income, which is different depending on the degree to which the government can commit to the announced policy. However in this fiscal policy literature it holds that a planner with full-commitment can -in general- achieve a higher welfare than a planner with no-commitment, and the reason behind this is that a planner with a better commitment technology can always mimic the allocations of a planner with a worse commitment technology, but the converse is not true.

The problem consists in the decision of the policymaker between the labour and the capital income tax rate. Suppose that at time t the government chooses the tax rates on capital income

and labour income. At time t-1 the government announced a certain tax policy of the private sector made investment decisions believing the government. It is a well-known result from Ramsey (1927) that optimal taxation requires higher rates on less elastic tax base. This means that since the tax base of capital income is totally inelastic at time t (since it was determined by investment at t-1), it would be optimal for the government to tax capital at the maximum level. However a rational private agents understands that capital income will be taxed heavily, and this would discourage them to make any investment at t-1 ($x_{t-1} = 0$), which would result in devastating outcome for society as a whole, due to the inability of the government to commit to tax policy.

However, if the government is able to commit to a certain level of capital tax rate. say 30%, then the private sector would rationally expect it and will make investments accordingly ($x_{t-1} > 0$).

To summarize, here are the possible outcomes under lack of commitment and with commitment:

	Gov. Unable to Commit	Gov. Able to Commit
Announced policy at $t-1$	$\tau_{kt} = 30\%$	$\tau_{kt} = 30\%$
Government policy at time t	Optimal policy: $\tau_{kt} = 100\%$	Rule: $\tau_{kt} = 30\%$
Outcome for society	Bad, $x_{t-1} = 0$	Good, $x_{t-1} > 0$

Hence, the commitment hypothesis certainly improves the predictability of the fiscal policy choice, by reducing the uncertainty regarding the future capital tax rate. This allows private agents to invest a higher portion on their wealth on investment, closer to the optimal investment level that they would achieve under full certainty. An allocation of private agents' wealth between consumption and investment closer to the optimal allocation under certainty permits them to achieve an overall welfare level which is higher with respect to the level of welfare reachable under discretion. One of the most famous results in Chamley (1986) and Judd (1985) is that under the assumption of full-commitment, the optimal tax rate on capital income does tend to zero in the long-run and all the tax burden falls on labour. Their model solves the government's problem that seeks to finance an exogenous stream of government expenses through distortionary, flat-rate taxes on capital and labour earnings. The government's objective is to maximize the representative household's welfare subject to raising the required revenue and, as just said, the government has the ability to fully commit to future tax rates. However, Chamley (1986) himself, also state that this argument may not be sustainable under an

environment without commitment, because – as said- the policymaker (or better the government in this case) may be tempted to raise revenues by future levies on capital.

The problem in which the government chooses its policy under discretion is examined by, among others, Benhabib and Rustichini (1986). They consider a model with competitive agents and a benevolent government that must tax capital and labour income to finance an exogenous stream of government spending in an environment without commitment. This government selects the optimal time-consistent taxes by choosing the policy that maximizes the individual's welfare subject to the standard feasibility and implementability constraints and an incentive compatibility constraint that embeds the future governments' incentives. This constraint says that, for all future governments, the welfare value of continuing with the policy that the current government announces must be at least as large as the welfare value of deviating from that policy. Any policy that satisfies this constraint is clearly time-consistent. For simplification purposes, the authors restrict attention to economies where governments cannot issue debt. In this context, they obtain that optimal capital taxes, under discretion, may be different from zero at steady state. In particular, they show that once capital is accumulated, it is sunk, and taxing capital is no longer distortionary. Hence, once capital is accumulated, a policymaker under discretion would set a capital income tax greater than zero.

A more recent paper by Debortoli and Nunes (2010) deals with the classical fiscal policy problem of optimal distribution of the taxation burden between labour and capital income too, but it points out that both the commitment and the discretion's approaches used to tackle optimal policy problems are, to some extent, unrealistic.

In fact, the commitment approach doesn't take into consideration the possibility that the policymaker may default on past promises, while the discretionary approach rules out the possibility that a policymaker can effectively keep a promise, without reneging it at some point. That is why they introduce the certainly more realistic setting of "loose commitment", in which some policymaker's promises are fulfilled, while others are not or occasionally revised *in itinere*. This approach goes beyond the binary view of commitment and discretion and it better reflects, as mentioned, some situations that happens in real life, like for example the fact that a government may want to fulfil its promises but doesn't care of previous government's promises, or that even if governments commit to future plans, they may be obliged to default on past promises because some particular events arise like induced political instability or increased pressure from the overall society.

The alternation of governments has been considered originally by Alesina and Tabellini (1990) and Persson and Svensson (1989): it concerns the limited time span of governments, which implies that a government cannot commit to its successors, so that the presence of political turnover constitute a natural limitation of the policymakers' commitment horizon. Their time inconsistency hypothesis states that when a government is uncertain of re-election, or knows with certainty that it will not be re-elected, it will want to increase the debt above what is socially optimal to strategically influence the options of a future government, which may not want to spend according to the preferences of the present one.

However, back to the Debortoli and Nunes' loose commitment, the authors state that current promises will be kept only with some probability, otherwise they will be revised. The authors characterize the properties of labour and capital income taxes under this setting and they find out that even though the probability ok keeping promises is high, such tax rates are close to the values that prevail under the non-commitment assumption. Hence, the probability, even a small one, of re-optimization of the optimal policy largely affect the final outcome. In particular, contrary to Judd (1985) and Chamley (1986), who sustain that under full-commitment it is optimal not to tax capital in the long-run, Debortoli and Nunes find that under loose commitment the average capital tax rate is positive.

The authors analyse the differences in the general level of welfare under the three cases until now considered: the result is in line with what said before, and namely that a planner with full-commitment can achieve, in general, a higher welfare than a planner with no-commitment. Debortoli and Nunes emphasise this concept by explaining that a planner with a better commitment technology is always able to mimic the allocations of a planner with a worse commitment technology. They further investigate this point by computing how the welfare - measured in consumption equivalent variation-changes by changing the level of commitment (labelled π) from absence of commitment ($\pi=0$) to full-commitment ($\pi=1$) with $0 < \pi \leq 1$.

According to their calibration, from no-commitment to full-commitment, the welfare improvement reflects into an increase in private consumption of 3.60%. Interestingly, at quite high level of commitment (say $\pi = 0.75$), the welfare gains with respect to no-commitment are 1.88% of consumption, which amounts to roughly 50% of the total gains of passing from no-commitment to full-commitment, meaning that most of the gains from enhancing commitment can only be achieved when π is already high (see Figure 7).

Figure 7 - Welfare gains commitment

	Full-com.	Loose com.			No-com.
		$\pi = 0.75$	$\pi = 0.5$	$\pi = 0.25$	
Welfare gains (% CEV)	3.60	1.88	0.95	0.37	0
Relative to total gains	1.00	0.52	0.26	0.10	0

Note: The table reports the welfare gains of passing from no-commitment to a degree of commitment π. The first line reports the consumption equivalent variation (CEV), while the second line reports the relative gain with respect to passing from no-commitment to full-commitment.

Source: Debortoli, D., Nunes, R. (2010)

Another, more recent paper by Clymo and Lanteri (2020) also aims to mitigate the unrealistic treats characterising the full commitment and the no-commitment approaches . The authors point out that the assumptions underlying FC and NC policies appear hard to reconcile with the fact that policymakers are in power for a limited amount of time, inherit their predecessors' plans, and they possess a degree of commitment over a finite future horizon.

That's why they study the fiscal policy when successive benevolent governments inherit the plans of their predecessors and formulate plans for a finite future horizon. They call this formulation "Limited-Time Commitment" (LTC), which implies that governments cannot commit into the infinite future, but instead only possess the ability to commit for a finite period of time. To study the effects deriving from different degrees of commitment on welfare, the authors exploit numerical methods and study a specification of their benchmark model calibrated to the US economy. Their key finding is that, even in the absence of equivalence between LTC and FC, a short commitment horizon leads to substantial welfare gains relative to the absence of any fiscal commitment. They assume that labour supply is inelastic, and governments choose the level of government spending to be financed using only capital income taxes and subject to a balanced budget rule.

The source of time inconsistency in this model is that government spending, which is valued by households, can only be financed with capital income taxation, which distorts the incentives to invest. In fact, governments have the incentive to promise low public good provision ex-ante to encourage investment, for then raising capital taxes ex-post to fund higher government spending. The authors compare steady-state allocations, policies and welfare when the government has FC, NC, and LTC with one, two, and three years of commitment. The model shows two key results.

First, increasing the number of periods of commitment with LTC quickly brings the equilibrium closer to FC. Accordingly, taxes fall, and capital, consumption and output increase with the

number of periods of commitment. Clymo and Lanteri also estimate the welfare losses relative to FC as the fraction of steady-state consumption that would make the representative household indifferent between living in these economies with various degree of commitment and living in the FC economy. From FC to NC, the permanent consumption falls by 9.3%. What strikes is that just three years of commitment are enough to bring the model remarkably close to FC, with a recover of two thirds of the welfare losses from NC.

Secondly, they find that the largest welfare gains from limited commitment are from introducing the first period of commitment. Over a third of the welfare loss can be recovered by imposing a single year of commitment to fiscal policy. As extra periods of commitment are added, welfare continues to increase, although at a decreasing marginal rate: the marginal welfare gain from adding the third year of commitment is 37% of the gain from adding the first year of commitment. Thus, we find that the largest marginal welfare gains come from the ability to commit over short horizons, and that the marginal gains from longer commitment horizons are smaller.

Related to this, they suppose initially that the government has no ability to commit and then they investigate the effects of the introduction of an unexpected constitutional reform that imposes fiscal commitment: the governments must announce policies one year in advance, and always respect these plans. In order to evaluate the effects of this reform, they analyse the whole transition path to the LTC steady state. Figure 8 shows the paths of capital, private consumption, public consumption and the tax rate. The solid red line shows the transition of interest, and the dashed blue line illustrates the counterfactual NC steady state. Capital gradually increases in response to the lower taxes under LTC. Interestingly, the LTC government decides to overshoot the decrease in taxes (and hence spending) at the beginning of the transition in order to foster faster capital accumulation. The overall welfare benefit of this reform, accounting for the transition, is equal to 1.8% of permanent consumption.

Figure 8 - Introduction of a "constitutional reform" and transition from NC to LTC
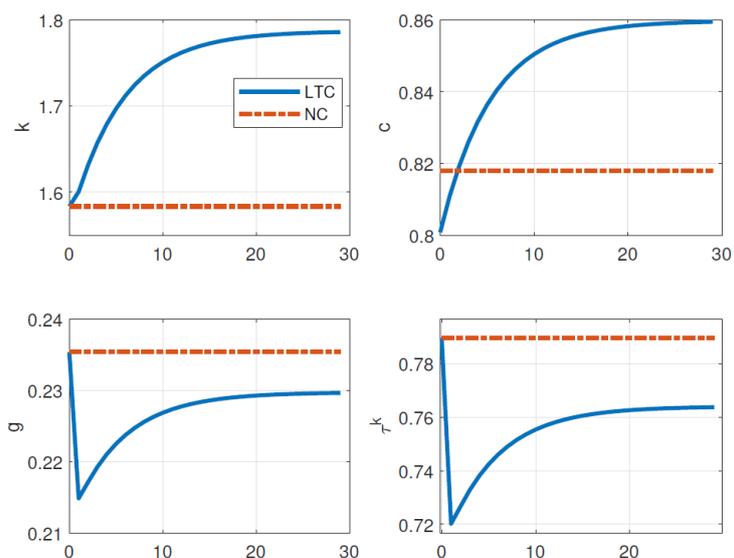
Deterministic transitional dynamics from NC steady-state (dashed-dotted red) to LTC steady-state with one year of commitment (solid blue). Top left panel: capital stock, k_t; top right: private consumption, c_t; bottom left: government spending, g_t; bottom right: tax rate, τ_t^k.

Source: Clymo, A., Lanteri, A. (2020)

3 Empirical analysis

In a perfect world of fully informed policymakers exclusively oriented to achieve the maximum level of social welfare, complete discretion would enable them to optimally respond to changing circumstances at any time. Instead, the real world is characterized by information asymmetries and time-inconsistency. Moreover, the policy behaviour is notoriously influenced by many other considerations than the pure social welfare maximization. This is why , in many democratic systems policy discretion has been constrained in order to prevent undesirable policy outcomes. As already explained, a clear example of effort to tie the hands of fiscal policymakers is the introduction of numerical rules expressed in terms of deficit caps, public debt limits, and expenditure ceilings (see Kopits and Symansky, 1998). But, as pointed by Beetsema at al. (2018), it is true that while many countries subject fiscal decisions to formal policy rules, it is also true that weak compliance and widespread attempts to flout fiscal rules have raised doubts about their effectiveness. This led more and more countries to introduce new institutional mechanisms, in the form fiscal councils, to better anchor future fiscal decisions in sustainable fiscal trajectories (see Chapter I).

The cost of discretion is that the equilibrium that results implies low welfare, lower than the case in which the government could credibly commit itself *ex ante* to a specific policy. If rules can be made credible in the sense that the government is expected to follow them, "rules" give higher welfare than discretion.
Hence, commitment is said to be welfare enhancing. Anyway, it is not perfectly clear how fiscal rules, to interpret as a commitment device, can bring an improvement of welfare.

This chapter proposes an application of commitment in fiscal policy. By using fiscal rules and fiscal commitment as commitment devices, the objective of this chapter is to explore whether their use lead to some beneficial effects and how they may translate into a welfare increase.

To analyse the potential impact of a rule-based fiscal framework on fiscal policy, I will study the effect of fiscal rules and fiscal councils on fiscal performance in section I, and their impact on the forecasting performance in section II.

3.1 SECTION I: FISCAL PERFORMANCE

The adoption of fiscal rules has been considered as the instrument of choice to deal with deficit bias. As noted above, most of the literature on fiscal institutions implicitly accepts the validity of what we term the "commitment" hypothesis: that is the presumption that rules or institutions shape policymakers' incentives in a way that leads them to mimic a socially-optimal solution, better than what would result under complete discretion and people form their expectations of future policy on the basis of the known incentive of the government to deviate from announcements. In other words, institutional changes, including the adoption of a rules-based framework, or the setting up of an independent agency is assumed to be followed by an improvement in fiscal performance.

In this section, such improvements in fiscal performance have been translated into the hypothesis that more stringent rules framework and institutions should be associated with higher primary balances on average. This is consistent with the idea that a higher commitment in fiscal policy leads to a better fiscal discipline, differently from a discretionary fiscal policy which is more likely to suffer of the biases deriving from fiscal indiscipline, like for example the bias towards deficit. Hence the expectation is that countries with a higher level of commitment, namely with more stringent rules and an independent fiscal council in place, will have on average better general government primary balance than countries with lower levels of commitment.

3.1.1   The European Commission Fiscal Rule Index

Before turning to the examination of the impact of fiscal rules and fiscal councils on general government primary balance, here is a brief description on the index used to measure the strength of fiscal rules in place for every Euro Area country . The European Commission's (EC) allows the access to a detailed dataset containing information on domestic fiscal rules in force for period 1990-2018 for 28 EU countries. In the dataset, each numerical fiscal rule is classified as either a budget balance, debt, expenditure, and revenue rules. In addition, the dataset specifies for each rule the governmental level in which it applies (central, regional, and local, general government, and social security). But what it is most important for the analysis is that for each rule, the EC assigns a numerical "Fiscal Rule Strength Index" (FRSI). This index is a weighted average of five rule criteria: i) the statutory base of the rule, ii) how much room the rule allows in setting or revising objectives, iii) the nature and independence of the monitoring and enforcement body, iv) the enforcement mechanisms of the rule, and v) the visibility of the rule in the media. Then, on the basis of the FRSI for each rule, a comprehensive time-varying Fiscal Rule Index (FRI) for each Member State is constructed by multiplying the FRSI by the

fraction of general government finances covered by the rule. If only one rule is in force in a country in a given year, the simple product between the FRSI and the fraction of finances covered is enough to determine the FRI for that year. However, if multiple rules apply to the same government sector, they are ranked by the product of the fraction of government finances they cover and their FRSIs; the strongest rule covering each government sector is given a weight of 1, the second 1/2, the third 1/3, and so on in order to take into account the decreasing marginal effect of multiple rules applying to the same governmental level. The FRI results - in this case- from the sum of the weighted rules.[4]

3.1.2 Data and Empirical set-up

The empirical analysis is performed on a cross-country panel data covering 22 European countries[5] over the period 2005-2018. Data on all the variables used are taken from the European Commission website[6].

From a preliminary look at the data, it results that the simple correlation between the average Fiscal Rule Index (FRI) and the average general government primary balance is positive and equal to 0.43, suggesting that -in general- countries with stronger fiscal rules in place are characterized by higher primary balance (see Figure 9). This first result is consistent with the hypothesis stated above for which fiscal rules, as commitment devices, improve the fiscal performance through the enhancement of fiscal discipline. Figure 9 pictures however a simple correlation: it is worth noting that it could be that more fiscally conservative countries that pays more attention to their level of deficit also have stronger fiscal rules in place, there may be a reverse causality.

---

[4] Namely: FRI= (rule weight) *(coverage of general government finances) *(FRSI). See also Frenkel et al. (2012)

[5] Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia ,Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom

[6] Available at: https://ec.europa.eu/info/statistics/economic-forecasts-and-trends_en

Figure 9 - Correlation between the average Fiscal Rule Index (FRI) and the average general government primary balance
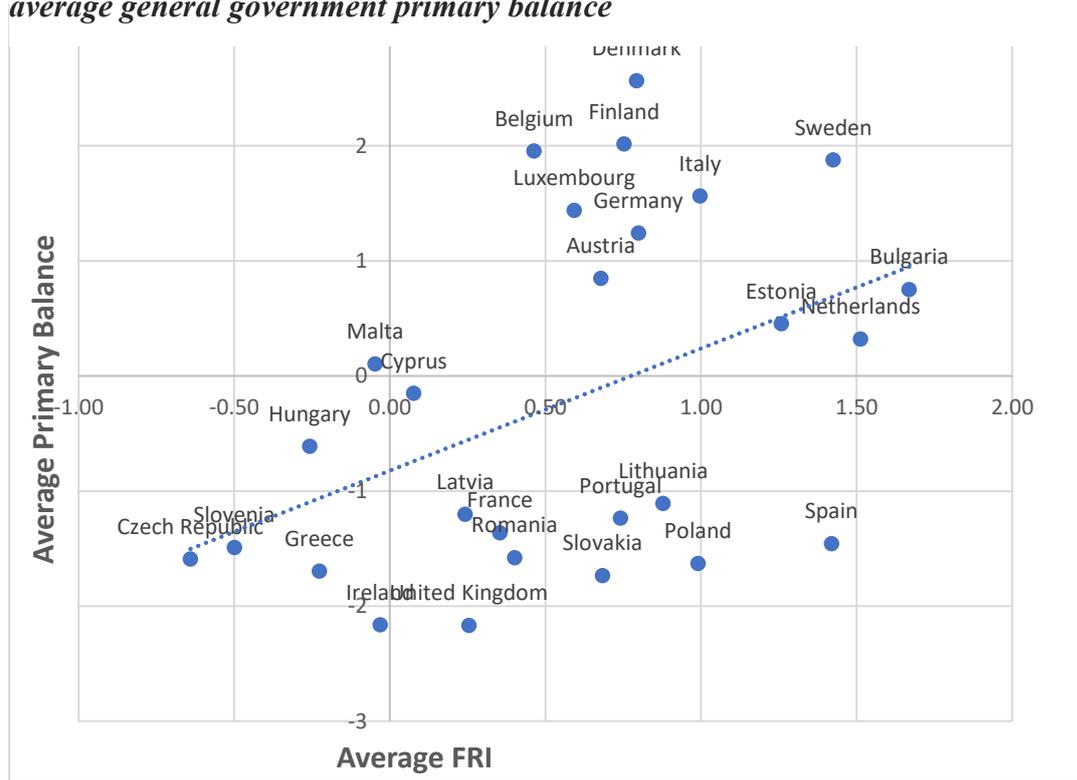
To investigate further the impact of fiscal rules and fiscal councils on general government primary balances , we rely on the model proposed by Debrun and Kinda (2014):

$$PB_{i,t} = \beta_0 + \beta_1 PB_{i,t-1} + \Sigma_k \beta_k x_{k,i,t-1} + \varphi_1 FRI_{i,t} + \varphi_2 FC_{i,t} + \lambda_t + \varepsilon_{i,t} \ (1)$$

where the dependent variable is the general government primary budget balance (PB) for country i at time t , which is regressed on its one-year lagged value ($PB_{i,t-1}$) to allow for persistence, a vector of covariates (x_k), the fiscal rule index (FRI) of country i at time t, a dummy variable for Fiscal Councils (FC) equal 1 if the country has instituted a fiscal council and 0 otherwise, and finally the year fixed effect (λ_t) and the error term $\varepsilon_{i,t}$. The vector of covariates $x_{i,t-1}$ includes some standard determinants of the general government primary balance, such as the lagged gross debt to capture long-term solvency constraint, and the lagged output gap to control for the cyclicality of fiscal policy. The estimation of the dynamic specification (1) is done using a standard Ordinary Least Square (OLS) estimator.

3.1.3 Results

Table 1 shows that OLS point estimates reveal a positive correlation between fiscal rules and the primary balance. The coefficient φ_1 is positive and significant, suggesting an improvement in the primary balance equal to 0.407 percent of GDP when countries have fiscal rules in place. More precisely it indicates that countries with better designed and stringent fiscal rules exhibit a stronger fiscal performance. This result is in line with the past literature, see for example Debrun et al. (2008) who found a statistically significant, robust, and causal relationship between their fiscal rule index and the cyclically-adjusted primary balance, using a sample of European Union countries. It is consistent also with more recent papers: see for instance Heinemann et al. (2018) and Caselli at al. (2020), who show that countries with fiscal rules have, on average, higher fiscal balances with respect to countries without fiscal rules.

In addition to the positive relation between fiscal rules and fiscal performance, the results also suggest that the mere existence of fiscal councils is conducive to stronger fiscal balances. The coefficient φ_2 is, in fact positive, and significant. According to the results, the presence of a fiscal council should improve the primary balance of 0.834 % of GDP: this suggests that, in general, fiscal councils effectively complement and reinforce the discipline-enhancing role of numerical fiscal rules. In fact, the potential impact of fiscal councils when the fiscal framework, particularly fiscal targets and objectives, are clearly defined through numerical rules, is strong. The existence of numerical fiscal rules could indeed facilitate the task of the fiscal council by providing a simple and transparent benchmark to assess fiscal performance.

This is a point in favour of our initial commitment hypothesis for which fiscal rules improve countries' fiscal performance. A greater fiscal performance surely implies a minor propension towards deficit bias. This can consequently lead countries to control their debts and keep them in a sustainable path.

Debt sustainability for a country has for sure positive effects: it first helps in reducing macroeconomic uncertainty. To exactly quantify the impact of a lower macroeconomic uncertainty on social welfare is hard. Here we limit to say that lower macroeconomic uncertainty combined with better fiscal discipline allow a country to gain higher credibility at the international level, which may convert in a reduction of the cost of debt for example. In the world of private agents, economic theory suggests that uncertainty has a detrimental effect on economic activity by giving agents the incentive to postpone investment, consumption and employment decisions until uncertainty is resolved, and by pushing up the cost of capital through increased risk premia. Bloom (2009) shows indeed that higher uncertainty increases

the real-option value to waiting, leading to a dramatic reduction of investment rates. Minor uncertainty and the conduction of a sound fiscal policy can make private agents closer to invest and consume at their optimal level, by reducing their portion of precautionary savings that would certainly be larger under uncertainty.

Table 1 - Fiscal Rules, Fiscal councils and Fiscal Performance

Ols results

Dependent variable: Primary Balance (i,t)	
Primary Balance (i,t-1)	0,661*** (0.346)
Debt (i,t-1)	0.003 (0.003)
Output gap (i,t-1)	-0.002 (0.003)
Fiscal Rule Index (i, t)	0.407*** (0.150)
Fiscal Council (i, t)	0.834*** (0.263)
Time dummies	Yes
Observations	458
Adjusted R^2	0.648

***significant at 0.01, **significant at 0.05, *significant at 0.1

3.2 SECTION II: FORECASTING PERFORMANCE

3.2.1 *Fiscal forecasts bias towards overoptimism*

The best-known macroeconomic example on time inconsistency is probably the "inflation bias" result of Barro and Gordon (1983) reported in Chapter II.

In that example, the starting condition is that the target inflation rate is zero and people also expect a zero-inflation rate too. So, the government has the incentive to choose an inflation rate above zero in order to lower unemployment below the natural rate and move it closer to the socially optimal target. But private agents anticipate this incentive and won't believe that the zero-inflation announcement will be respected. The result is that in equilibrium the inflation rate is sub-optimally high. If the government could have credibly committed itself to respect the zero inflation, not only the welfare would be higher, as already pointed out, but also the government policy would have been, from the beginning, more predictable and without possibility of being affected or distorted by some incentives. As it results that the commitment solution should increase the predictability of inflation policy, in this section we explore the possibility that credible fiscal rules and institutions, in their quality of commitment instruments, may also improve welfare by increasing the predictability of fiscal policy. To do so, we investigate the effect that fiscal rules and institutions have on the quality of budget balance forecasts. Countries with a lower degree of fiscal commitment -that is with higher discretion- are expected to be more subject to the incentive to deviate from the initial fiscal plan. Deviations from the original plan will make their fiscal policy less predictable. Hence, the hypothesis is that a lower predictability will translates into higher forecast errors. On the contrary, countries characterized by a high level of fiscal commitment will tend to "stick" with the plans, and consequently the forecast error should be lower due to a higher predictability of the fiscal policy.

Econometric studies have already shown that government budget forecasts in many countries are overly optimistic on average. Jonung and Larch (2006) find that budget agencies in the EU systematically overestimate the economic growth rate and, as a consequence, the other fiscal aggregates.

Similarly, Beetsma et al (2009) find that realized budget balances among Euro Area countries on average fall short of official ex ante plans, as well as Marinheiro (2010) finds that the forecasts of European fiscal authorities are systematically too optimistic.

The objective of this section is to explore the effect of fiscal rules and fiscal councils on the overoptimistic bias of fiscal forecasts. In addition, the purpose is also to investigate which beneficial effect may derive by an alleviation of this bias.

3.2.2 *Data*

The data for this empirical analysis come from the European Commission' s economic forecasts, which are published at least twice a year (spring and autumn) in the European Commission's website. These fully-fledged forecasts concentrate on the Member States, the euro area and the EU, but also include the outlook for the candidate countries as well as some of the world's major economies.

In general, "spring forecasts" extend to the current and the next year, while "autumn forecasts" contain forecasts for the current and the two following years; both cover about 180 variables.

For the empirical analysis, spring forecasts made at year *t* for year *t+1* for the general government primary balance have been used. The sample covers 22 euro area countries for period 2005-2015.

The primary balance forecasts were necessary to compute the primary balance forecast error (PBFE). The PBFE is defined as the forecasted primary balance minus actual primary balance. More specifically, as in Frenkel and Schreger (2012), the $PBFE_{t+1}$ equals to the difference between the forecast of the general government primary balance made in year *t* for year t+1 (labelled as $FPB_{t+1,t}$) and the realized general government primary balance in year *t+1* (PB_{t+1}).

Hence:

$$PBFE_{t+1} = FPB_{t+1,t} - PB_{t+1}$$

When the forecast error is positive, it means that the forecast has been too optimistic, that is to say the forecasted primary balance has been higher than what it actually realized for the following year. Vice versa, if the forecast error is negative, it means that forecasts have been overly pessimistic or -at least- prudent.

The Mean Forecast Error (MFE) measures the average error by which forecasts differ from outcomes. It shows whether systematic over- or under-prediction is present. Since positive and negative forecast errors can offset each other, it tends to minimize the overall size of the error.

$$MFE_{i,t} = \frac{1}{T}\sum_{t=1}^{T} FE_{i,t}$$

Figure 10 plots the mean of the one-year primary balance forecast error for the Euro Area countries in the sample for period 2005-2018.

Figure 10 - Mean of 1 year ahead primary balance forecast error (PBFE) by Euro Area country
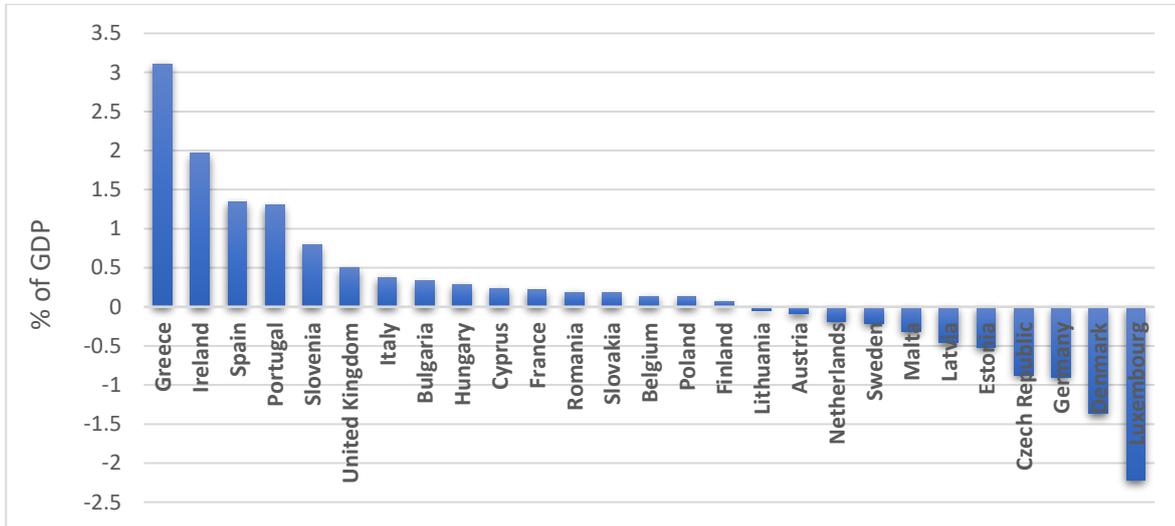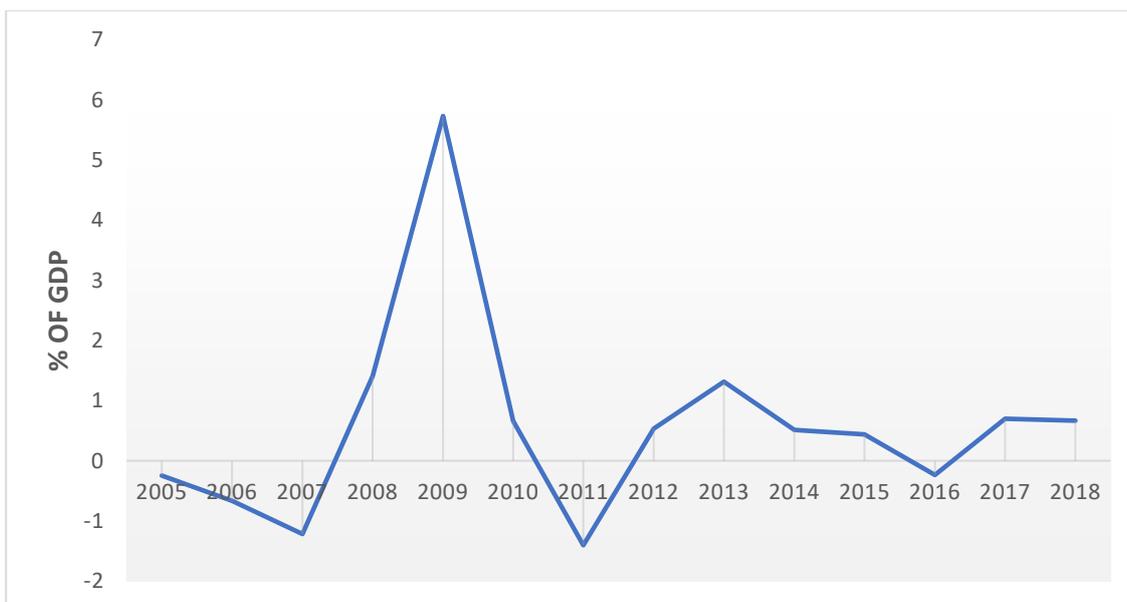

Figure 11 plots instead the mean primary balance forecast error by year for Euro Area countries. The figure shows that during the majority of the sample period, especially during period of crisis and uncertainty, mean forecast errors tended to be up-ward biased.

Figure 11 – Mean of 1 year ahead primary balance forecast error (PBFE) by year for Euro Area countries

3.2.3 Empirical set-up

The reference model for this empirical section comes again from Debrun and Kinda (2014). The objective of the model is to investigate the impact of fiscal rules and fiscal councils on the forecast error. The dependent variable is the above-mentioned Primary Balance Forecast error (*PBFE*) for country *i* and year *t*, regressed on the Output gap (*OG*) for country *i* at time *t-1*, the EC Fiscal Rule Index (FRI) and the dummy variable for the presence of fiscal councils (*FC*), both contemporaneous to the dependent variable (at time *t* and for country *i*). In addition, the year fixed effects necessary to control for common time-varying shocks is included (λ_t). Hence, the equation to be estimated is the following:

$$PBFE_{i,t} = \beta_0 + \beta_1 OG_{i,t-1} + \varphi_1 FRI_{i,t} + \varphi_2 FC_{i,t} + \lambda_t + \varepsilon_{i,t} \ (2)$$

The estimation of the dynamic specification (2) is done using a standard Ordinary Least Square (OLS) estimator.

3.2.4 Results

As Table 2 shows, the more fiscal rules are likely to bind (as captured by an increase in the fiscal rule index), the less the budget balance forecast are optimistic. This is confirmed by the coefficient φ_1 , that appears negative and statistically significant at the 5% level.

The presence of independent fiscal councils further lowers the bias in the primary balance forecasts, even though this is confirmed by a negative coefficient (φ_2) statistically significant at only the 10% level.

Over-optimistic budget forecasts are very dangerous because they may lead to an underestimation of budget deficits. It means that budget deficits are usually expected lower than what will actually be. Over-optimism in budget deficit forecasting have unfavourable consequences: as a matter of fact, if deficit forecasts are underestimated, then governments will have lower incentive to consolidate the budget and deficit will be higher than what could have been with a proper consolidation based on unbiased forecasts. The bias towards over-optimism of fiscal forecasts may be a candidate cause of the often-mentioned deficit bias. Fiscal rules and fiscal councils, through their ability in reducing over-optimism in official fiscal forecasts, allows again to alleviate the deficit bias and bring the beneficial effects described in the previous section. More generally, regarding the sound public finances debate, Jonung et al. (2006) show that budget forecast errors have contributed to the increase of structural deficits in the European Union countries. Repeated over-estimation of revenues and/or underestimation of expenditures could have resulted in considerable debt accumulation. The authors add that the

burden of a higher public debt may decrease the funds available for the provision of public goods, with a consequent negative impact on social welfare.

Table 2 Fiscal Rules, Fiscal Councils and Primary Balance Forecast errors.

Ols results

Dependent variable: Primary Balance Forecast Error (i,t)	
Output gap (i,t-1)	-0.101* (0.058)
Fiscal Rule Index (i,t)	-0.459** (0.205)
Fiscal Council (i,t)	-0.655* (0.355)
Time dummies	Yes
Observations	241
Adjusted R^2	0.369

***significant at 0.01, **significant at 0.05, *significant at 0.1

### 3.2.5 The accuracy of Forecasts

While the previous regression highlights the role of fiscal rules and councils in reducing the distortions in budgetary forecasting, the next specification aims at assessing whether fiscal rules and fiscal councils – considered as before as commitment devices- can improve the information contents of official forecasts or equivalently, their accuracy. More specifically, in this case "accuracy" is meant as the closeness, in quantitative terms, of the forecast in comparison to the actual outcome. The chosen metric for forecast accuracy is the mean absolute forecast error. The Mean Absolute Forecast Error (MAFE) measures the average absolute difference between the forecast and the outturn. Since positive and negative errors no longer cancel each other out,

it represents a more accurate measure of the average forecast error than the Mean Forecast Error used to detect forecasts' bias in the previous section.

$$MAFE_{i,t} = \frac{1}{T}\sum_{t=1}^{T}|FE_{i,t}|$$

Figure 12 provides a visual representation of the one year-ahead Mean Forecast Error for Euro Area Countries in the sample for period 2005-2018

Figure 12 Mean of 1-year ahead absolute primary balance forecast error for Euro Area countries
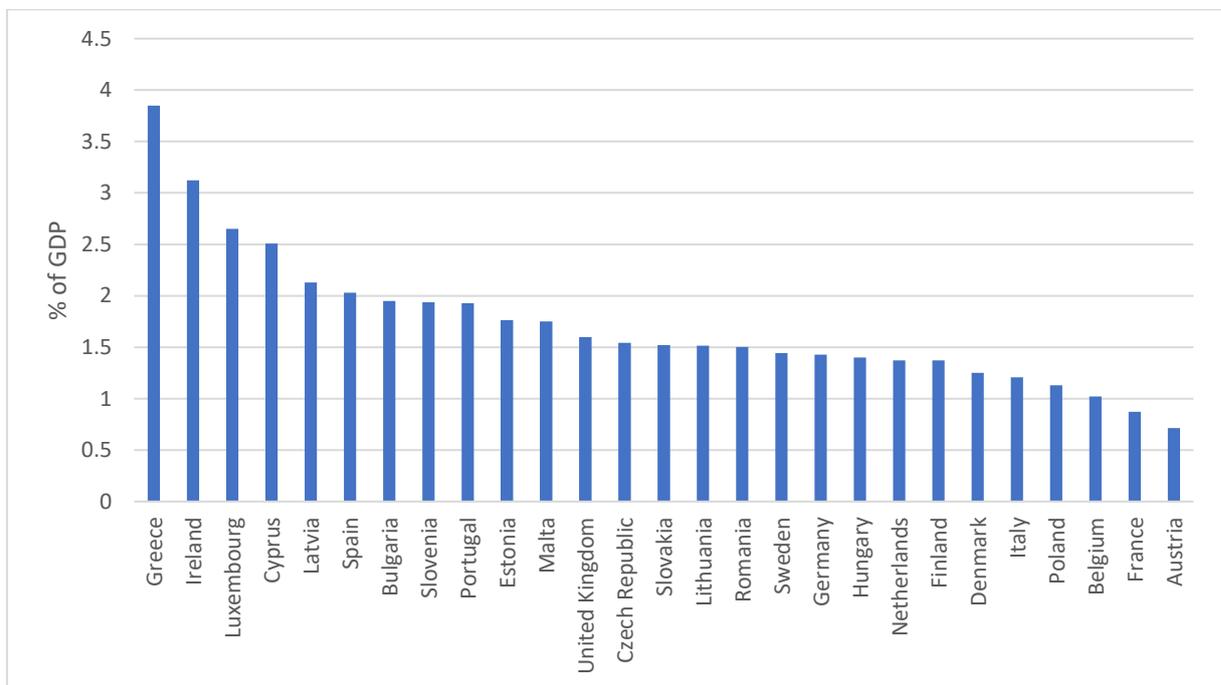

From Figure 13, instead, an initial descriptive analysis of data shows that the correlation between the mean absolute forecast error (MAFE) by country and the average Fiscal Rule Index by country is negative (-0.23). Though the correlation is not highly negative, it suggests that the higher is the Fiscal Rule Index – that is to say the more stringent the rules are for a certain country- the more accurate is the fiscal forecast (always for the general government primary balance).

Figure 13 - Correlation between the mean absolute forecast error (MAFE) by country and the average Fiscal Rule Index by country
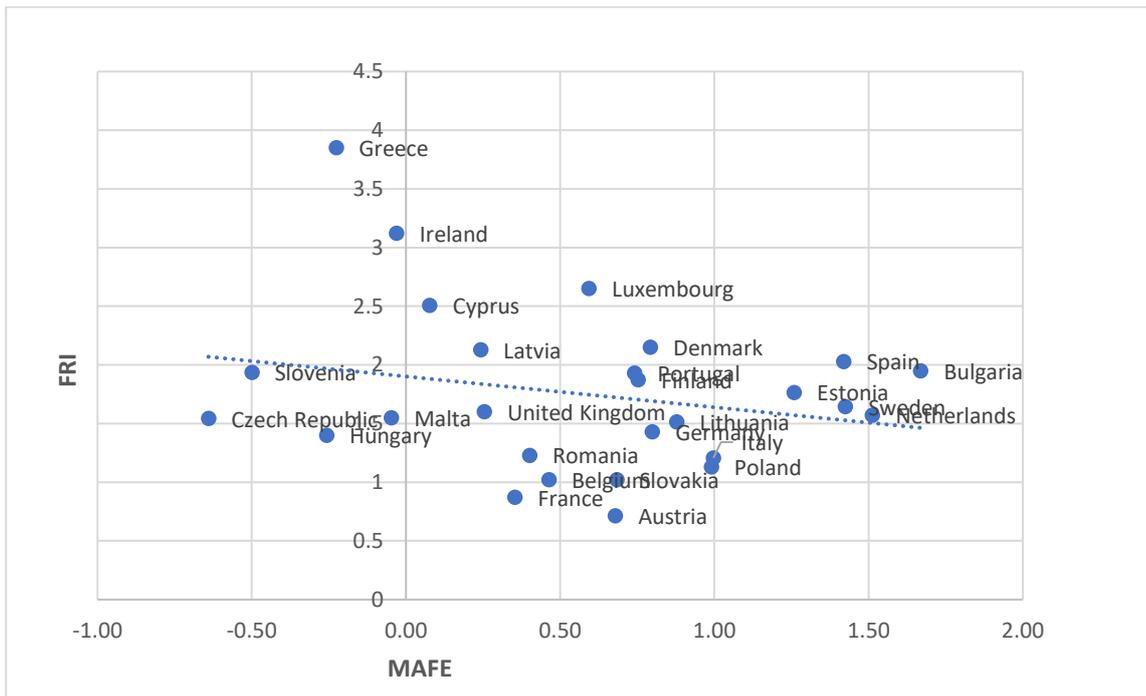
Another intuition from the descriptive analysis is visible in Figure 14, and it regards the ability of Fiscal Councils in favouring the precision of fiscal forecasts. The presence of a fiscal council is associated with a reduction of almost one percentage point of GDP on average for general government primary balance absolute forecasts errors.

Figure 14 - Mean Absolute Forecast Error for Primary Balance
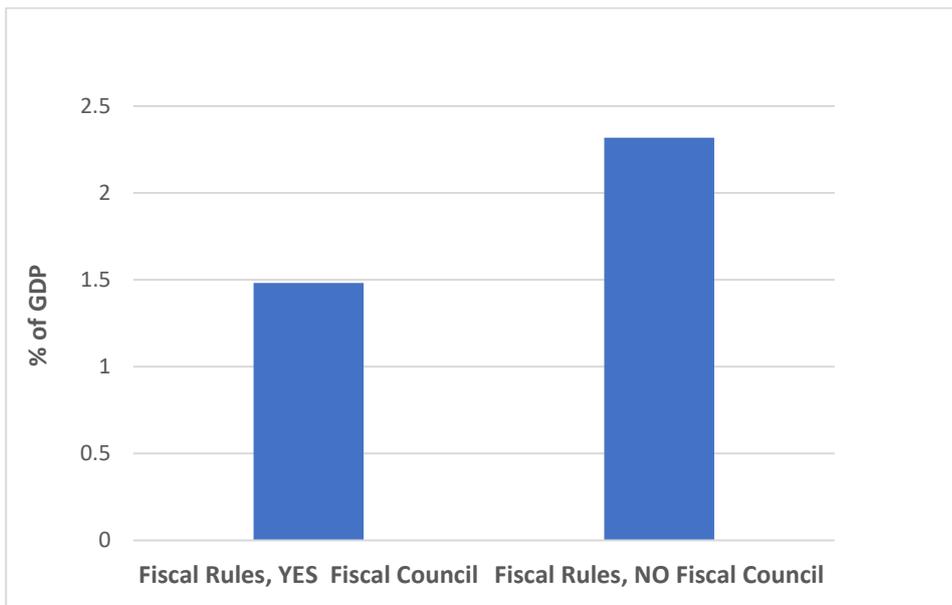
The corresponding regression model is the following:

$$ABS(PBFE_{i,t}) = \beta_0 + \beta_1 OG_{i,t-1} + \varphi_1 FRI_{i,t} + \varphi_2 FC_{i,t} + \lambda_t + \varepsilon_{i,t} \ (3)$$

where $ABS(PBFE_{i,t})$ represents the absolute value of $PBFE_{i,t}$. The estimation of the dynamic specification (3) is done using a standard Ordinary Least Square (OLS) estimator.

3.2.6 Results

Results of regression (3) are presented in Table 3. The strength of fiscal rules does not appear to fully translate into more accurate primary balance forecasts. In fact, the estimated coefficient of the fiscal rule index is negative, though not statistically significant.

The dummy variable for the presence of a fiscal councils has the expected negative coefficient, meaning that the presence of a fiscal council tends to favour the production of more precise and accurate forecasts. This is coherent with the fact that one of the main fiscal councils' remits is the preparation of independent and precise forecasts.

In order to be effective, fiscal policy decisions must be based on accurate monitoring and forecasting. The ability to dispose of accurate fiscal forecasts favours a more effective and conscious policy choice, above all in the case in which such forecasts suggest the need for a timely corrective action. In addition, private agents' expectations and behaviours are influenced by forecasts, which permit them to have a more shaped idea of their near future. This, again, allows them to make better informed decisions as regards their optimal level of investment and consumption. This likely brings them to reach a higher level of welfare.

Table 3 - Fiscal Rules, Fiscal Councils and Absolute Primary Balance Forecast errors.

Ols results

Dependent variable: Absolute Primary Balance Forecast Error (i,t)	
Output gap	-0.124***
(i,t-1)	(0.047)
Fiscal Rule Index	-0.158
(i,t)	(0.205)
Fiscal Council	-0.642**
(i,t)	(0.289)
Time dummies	Yes
Observations	241
Adjusted R^2	0.369

***significant at 0.01, **significant at 0.05, *significant at 0.1

Conclusions

This thesis underlines the growing interest attributed to the concept of fiscal discipline and its essential role in the containment of governments' propension toward the so-called "deficit bias". Starting from the 1970s several advanced and emerging countries embarked into medium-large fiscal consolidations programs in order to reduce or stabilize their sovereign debt, even though few of them proved their efficacy. For example, as reported by IMF (1996), in the period between 1970 and 1995, out of the 74 fiscal consolidation's attempts, only 14 documented cases resulted in a successful fiscal adjustment in industrial countries.

In the 1980s and 1990s the revolution in monetary policy institutions and rules has inspired a paradigm shift also in fiscal frameworks. from 1990s onwards, governments started the adoption of fiscal restrictions and rules started spreading around the world.

Reforms of monetary policy frameworks characterized by establishment of independent and accountable central banks committed to policy rules were motivated in the contemporaneous theoretical work in favour of independent central banking and the welfare dominance of rules over discretion (Kydland and Prescott, 1977; Barro and Gordon, 1983).

The positive results obtained with the new monetary policy framework, combined with countries' growing excess debt accumulation led from 1990s onwards governments to adopt fiscal restrictions and rules as commitment devices devoted to improving fiscal discipline. Many years later, especially after the 2007–09 global financial crisis that weakened confidence in public debt sustainability, many governments established independent fiscal councils in order to strengthen the fiscal framework and boost the credibility of their commitment to meet their obligations.

From the theoretical point of view, the management of fiscal policy both under commitment and discretion emerge in the model of Bianchi and Menegatti (2007), according to which commitment, in general, can either reduce or increase the government loss function: if the debt-output ratio in the economy is small, then discretion is preferable, while, commitment is a better alternative for highly indebted economies.

However, Badinger and Reuter (2015) point out how a discretionary fiscal policy can exacerbate the excess deficit and debt bias.

The rest of the literature taken into consideration in chapter II deals with the "commitment versus discretion" debate in the government choice of the capital income tax and labour tax, which agree on the fact that commitment hypothesis, *ex ante*, produce a welfare solution that is

always superior to the one under discretion. Hence commitment is said to be welfare-enhancing since private agents can allocate their wealth between investments and consumption in a better than under discretion.

The empirical analysis in chapter III, performed using data inherent to 22 Euro Area countries for the period 2005-2018, suggests that fiscal rules and fiscal councils, interpreted as commitment devices, are associated with stronger fiscal performance as well as less biased and more accurate fiscal forecasts.

The improvement in fiscal performance results from the first regression, in which general governments' primary balance are regressed on some control variables and the two variables of interest: (i) the fiscal rule index, a variable representing the strength of countries fiscal rules and (ii) the dummy variable on the presence of a fiscal council in a specific country.

The two coefficient of interest resulted positive and statistically significant, meaning that in general countries with stronger and the more stringent fiscal rules, and that in addition have a fiscal council in place, are characterized by higher general government primary balance.

This result may suggest that countries that constrain their fiscal policy through the adoption of good commitment instruments are less prone to realize excess deficit and debt.

For a country, having deficit and debt level on a sustainable paths can surely bring positive effects. It lowers macroeconomic uncertainty, that combined with better fiscal discipline allows a country to gain higher credibility at the international level, which may convert in a reduction of the cost of debt for example. In the world of private agents, instead, economic theory suggests that uncertainty has a detrimental effect on economic activity by giving agents the incentive to postpone investment, consumption and employment decisions until uncertainty is resolved. A lower macroeconomic uncertainty may increase social welfare by permitting agents to allocate their wealth between consumption and investment in a way that is welfare-improved with respect to the case of high uncertainty, where a larger part of the wealth is destined to precautionary savings.

The second and third regression show that well-designed fiscal rules and councils are associated with less biased and more accurate forecasts (it is worth noting that for the accuracy of forecasts, the coefficient of the fiscal rules index is not significant). The ability to dispose of precise fiscal forecasts favours a more effective and conscious policy choice, which is again more likely to results in a lower deficit . Moreover, private agents' expectations and behaviours are certainly influenced by forecasts, that -if more precise- permit them to have a more shaped idea of the near future. This, again, allows them to make better informed decisions as regards their level of investment and consumption, and this likely brings them to reach a higher level of welfare.

With the Coronavirus pandemic and the related economic crisis, in the majority of countries fiscal rules have been suspended to allow governments to promptly intervene through welfare measures and mitigate the economic effect of the crisis. Their suspension has turned on critics with respect to their low adaptation to sudden economic shocks and made rise proposals for a revision of the fiscal framework. However, the effectiveness of fiscal rules and fiscal councils or, more in general, of a constrained fiscal policy, has to remain central in the debate, especially when we will leave the current crisis behind and countries will find their public debt level at its highest.

References

Ahrend, R., Catte, P., Price, R. (2006) Interactions between Monetary and Fiscal Policy: How Monetary Conditions Affect Fiscal Consolidation. OECD Economics Working Paper No. 2006/49, Available at SSRN: <https://ssrn.com/abstract=1010655>

Alesina, A. and Tabellini, G. (1990), `A positive theory of fiscal deficits and government debt', Review of Economic Studies 57, 403-14.

Alesina, A., Perotti, R. (1995) Fiscal expansions and adjustments in OECD countries. Economic Policy 21: 205-24

Alesina, A., Perotti, R. (1996) *Fiscal adjustments in OECD countries: Composition and macroeconomic effects*. Working Paper. National Bureau of Economic Research, nr. 5730

Alesina, A., Perotti, R. (1997) Fiscal Adjustments in OECD Countries: Composition and Macroeconomic Effects. IMF Econ Rev 44, pp.210–248. https://doi.org/10.2307/3867543

Azzimonti, M., De Francisco, E., Quadrini, V. (2014) Financial Globalization, Inequality, and the Rising Public Debt. The American Economic Review, 104(8), 2267-2302. Retrieved February 5, 2021, from http://www.jstor.org/stable/42920889

Badinger, H., Reuter, W. (2015). *The Case for Fiscal Rules*. Department of Economics Working Papers wuwp204, Vienna University of Economics and Business, Department of Economics.

Barro, R.J, Gordon, D.B., (1983*) Rules, discretion and reputation in a model of monetary policy*, J. Monet. Econ. 12 (1) 101–121

Beetsma, R., Debrun X., Fang, X., ; Kim,Y., Lledo, V., Mbaye, S., Zhang, X. (2018) *Independent Fiscal Councils: Recent Trends and Performance.* USA: International Monetary Fund.

Beetsma, R., Debrun, X. (2016) Fiscal Councils: Rationale and Effectiveness. IMF Working Paper No. 16/86, Available at SSRN: https://ssrn.com/abstract=2882650

Beetsma, R., Giuliodori, M. Wierts, P. (2009) Planning to Cheat: EU Fiscal Policy in Real Time. Economic Policy 24, 60, 753-804. Available at: www.jstor.org/stable/40272536

Benhabib, J., Rustichini, A. (1997) *Optimal taxes without commitment*. J. Econ. Theory 77 231–259

Brender, A. and Drazen, A. (2005), `Political budget cycles in new versus established democracies', Journal of Monetary Economics 52(7), 1271-1295.

Bianchi, C., Menegatti, M. (2012) Rules versus discretion in fiscal policy. The Manchester School, 80: 603-629. doi:10.1111/j.1467-9957.2011.02240.x

Blanchard, O. (1990) *Comment on Giavazzi and Pagano*. In S. Fischer (Ed.), NBER macroeconomics annual, pp. 111-116. Cambridge, MA: MIT Press

Blanchard, O. J., Leandro, A., and Zettelmeyer, J. (2020). Redesigning EU fiscal rules: From rules to standards. Paper presented at the 72nd Economic Policy Panel Meeting, available at https://www.economic-policy.org/wp-content/uploads/2020/10/9100_Redesigning-EU-Fiscal-Rules.pdf

Blöchliger, H., Song D., Sutherland D. (2012) Fiscal Consolidation: Part 4. Case Studies of Large Fiscal Consolidation Episodes. OECD Economics Department Working Papers, No. 935 Paris: OECD Publishing. DOI:10.2139/ssrn.1612407

Bloom, N. (2009) The Impact of Uncertainty Shocks. Econometrica, 77: 623-685. Available at: https://doi.org/10.3982/ECTA6248

Broadbent, B., Daly, K. (2010) *Limiting the Fall-Out from Fiscal Adjustment.* Global Economics Paper No: 195. Goldman Sachs Economics, Commodities and Strategy Research.

Calmfors, L. (2015) The Roles of Fiscal Rules, Fiscal Councils and Fiscal Union in EU Integration . Available at SSRN: https://ssrn.com/abstract=2642723

Canofari, P., Piergallini, A., Piersanti, G. (2020). The Fallacy of Fiscal Discipline. Macroeconomic Dynamics, Cambridge University Press, vol. 24(1), pages 55-68, January. Available at: https://ideas.repec.org/a/cup/macdyn/v24y2020i1p55-68_4.html

Caselli, F., Reynaud, J. (2020) *Do fiscal rules cause better fiscal balances? A new instrumental variable strategy*. European Journal of Political Economy,Volume 63.

Chamley, C., (1986) *Optimal taxation of capital income in general equilibrium with infinite lives*, Econometrica 54 (3) 607–622.

Clarida, R., Jordi G., Gertler M. (1999*) The Science of Monetary Policy: A New Keynesian Perspective*. Journal of Economic Literature, 37 (4): 1661-1707. DOI: 10.1257/jel.37.4.166

Clymo, A., Lanteri, A. (2020) Fiscal Policy with Limited-Time Commitment. The Economic Journal, Volume 130, Issue 627, April 2020, Pages 623–652, https://doi.org/10.1093/ej/uez066)

Debortoli, D., Nunes, R. (2010) *Fiscal policy under loose commitment*. Journal of Economic Theory, Volume 145, Issue 3, , Pages 1005-1032, ISSN 0022-0531,

Debrun, X., Kinda, T. (2014) Strengthening Post-Crisis Fiscal Credibility: Fiscal Councils on the Rise—A New Dataset. USA: International Monetary Fund. https://doi.org/10.1111/1475-5890.12130

Debrun, X., Kumar, M. S. (2007) *Fiscal Rules, Fiscal Councils and All That:*

Debrun, X., Moulin, L., Turrini, A., Ayuso-i-Casals, J., Kumar, M. S. (2008) *Tied to the debt on economic growth - an empirical investigation for the euro area.* ECBWorking

Dixit, A., Lambertini, L. (2003) Interactions of Commitment and Discretion in Monetary and Fiscal Policies. The American Economic Review, 93(5), 1522-1542. Retrieved October 21, 2020, from http://www.jstor.org/stable/3132140

Dotsey, Michael. (2008). *Commitment Versus Discretion in Monetary Policy*. Business Review. 1-8

Drazen A. (2004) Fiscal Rules from a Political Economy Perspective. Palgrave Macmillan, London. https://doi.org/10.1057/9781137001573_2

Égert, B. (2010) Fiscal Policy Reaction to the Cycle in the OECD: Pro- or Counter-cyclical?. Economics Department Working Paper No. 763.Paris: Organisation for Economic Co-operation and Development. Available at http://www.oecd-ilibrary.org/economics/fiscal-policy-reaction-to-the-cycle-inthe-oecd_5kmft7pthb27-en

European Commission website: https://ec.europa.eu/info/statistics/economic-forecasts-and-trends_en

Eyraud, L., Debrun, X., Hodge, A., Lledo, V., Pattillo, C., (2018) Second-Generation Fiscal Rules; Balancing Simplicity, Flexibility, and Enforceability. No 2018/004, IMF Staff Discussion Notes, International Monetary Fund. Aivalable at https://EconPapers.repec.org/RePEc:imf:imfsdn:2018/004

Fathàs, A. and Mihov, I. (2006), `The macroeconomic effects of fiscal rules in the US states', Journal of Public Economics 90(1-2), 101-117.

Favero, C., Mei, P. (2019) Austerity and public debt dynamics. Center For Economicic Policy Researc(CEPR):https://cepr.org/active/publications/discussion_papers/dp.php?dpno=14072

Fiscal Policy: Current Issues and Challenges, Papers presented at the Banca d'Italia

Frankel, J., Schreger, J. (2012) Over-optimistic official forecasts and fiscal rules in the eurozone. Review of World Economics 2013, no. 149 (2013): 247-272. Available at SSRN: https://ssrn.com/abstract=2127548

Giavazzi, E and Pagano, M. (1990) *Can severe fiscal contractions be expansionary? Tales of two small European countries*. In S. Fischer (Ed.), NBER macroeconomics annual 1990, 75-122. Cambridge, MA: MIT Press.

Giavazzi, F., Pagano, M. (1995) *Non-Keynesian effects of fiscal policy changes: International evidence and the Swedish experience*. Working Paper. National Bureau of Economic Research, nr. 5332.

Haugh, D.,Ollivaud, P., Turner, D. (2009) What Drives Sovereign Risk Premiums? An Analysis of Recent Evidence from the Euro Area. OECD Economics Department Working Papers, No. 718, OECD Publishing, Paris, https://doi.org/10.1787/222675756166.

Heinemann, F., Moessinger, M.D., Yeter, M. (2018) Do fiscal rules constrain fiscal policy? A meta-regression analysis. European Journal of Political Economy,Volume 51, 69–92. https://doi.org/10.1016/j.ejpoleco.2017.03.008

Heylen, F., Everaert, G. (2000) *Success and failure of fiscal consolidation in the OECD: A multivariate analysis*, pp. 103-124. *Public Choice* 105.

Hjelm, G. (2002) Effect of Fiscal Contraction: The Importance of Preceding Exchange Rate Movements. The Scandinavian Journal of Economics 104:3, pp. 423–441. <https://doi.org/10.1111/1467-9442.00295>

Hughes-Hallet, A., Lewis, J. (2005) *Fiscal Discipline before and after EMU - Permanent Weight Loss or Crash Diet?*. Vanderbilt University Department of Economics Working Papers 0516, Vanderbilt University Department of Economics.

IMF (1996). Fiscal challenges facing industrial countries. *World Economic Outlook* May: 44–

IMF (2020a). Fiscal Rules, Escape Clauses, and Large Shocks. IMF's Special Series on Fiscal Policies to Respond to COVID-19. Available at: https://www.imf.org/en/Publications/SPROLLs/covid19-special-notes

Jonung, L., Kiander, J., Vartia, P. (2009) *The great financial crisis in Finland and Sweden: The nordic experience of financial liberalization*. Cheltenham: Edward Elgar Publishing.

Jonung, L., Larch, M. (2006) Improving Fiscal Policy in the EU: The Case for Independent Forecasts. Economic Policy, vol. 21, no. 47, 2006, pp. 491–534. JSTOR, www.jstor.org/stable/3874052

Judd, K. (1985) *Redistributive taxation in a simple perfect foresight model*. J. Public Econ. 28 (1) 59–83

Kopits, G., Symanski, S. (1998), "Fiscal Policy Rules", IMF Occasional paper 162, International Monetary Fund, Washington.

Kumar, M., & Ter-Minassian, T. (2007). Fiscal Discipline: Key Issues and Overview. In Promoting Fiscal Discipline. USA: IMF. doi: https://doi.org/10.5089/9781589066090.071

Kumar, M., Leigh, D., Plekhanov, A. (2007) Fiscal Adjustments: Determinants and Macroeconomic Consequences. IMF Working Paper No. 07/178, Available at SSRN: https://ssrn.com/abstract=1007927

Kumar, M., Woo, J. (2010) Public Debt and Growth. IMF Working Paper No. 10/174, Available at SSRN: https://ssrn.com/abstract=1653188

Kydland, F.E., Prescott, E.C. (1977) *Rules rather than discretion: The inconsistency of optimal plans*. J. Polit. Economy 85 (3) 473–491.

Lambertini, L., Tavares, J. (2000) *Exchange Rates and Fiscal Adjustments: Evidence from the OECD and Implications for the EMU*.). Available at SSRN: https://ssrn.com/abstract=240028 or http://dx.doi.org/10.2139/ssrn.240028

Marinheiro, C. (2010) The Stability and Growth Pact, Fiscal Policy Institutions and Stabilization in Europe. International Economics and Economic Policy. Springer, vol. 5(1), pp. 189-207. https://doi.org/10.1007/s10368-008-0110-3

Debrun, X., Moulin, L., Turrini, A., Ayuso-i-Casals, J., Kumar, M. S. (2008) *Tied to the Mast? National Fiscal Rules in the European Union*. Economic Policy 23(4): 299–362.

McDermott, J., Wescott, R. (1996) *An empirical analysis of fiscal adjustments. Working Paper*. International Monetary Paper, WP/96/59

Merola, R. (2012) Debt and Macroeconomic Stability: Case studies. OECD Economics Department Working Papers, No. 1004, OECD Publishing, Paris, https://doi.org/10.1787/5k8xb76b34r7-en

Morris, R., Ongena, H., Schuknecht, L. (2006) The Reform and Implementation of the Stability and Growth. ECB Occasional Paper No. 47. Available at SSRN: https://ssrn.com/abstract=807424

OECD (2014), *Recommendations of the Council on Principles for Independent Fiscal Institutions,* Paris: OECD Publishing.

Persson, T. and Svensson, L. (1989), `Why a stubborn conservative would run a deficit: policy with time-inconsistent preferences', Quarterly Journal of Economics 104, 325-45

Persson, T., Tabellini, G. (1995) *Monetary and Fiscal Policy. Vol. 1, Credibility.* The MIT Press Cambridge, Massachusetts London, England

Ramsey, F. (1927) A Contribution to the Theory of Taxation. The Economic Journal, vol. 37, no. 145, 1927, pp. 47–61. www.jstor.org/stable/2222721. Accessed 21 Oct. 2020.

Reinhart*. C.,* Rogoff, K. *(*2010)*. Growth in a Time of Debt*. American Economic Review. American Economic Association, vol. 100(2), pages 573-78, May.

Rogoff, K. (1985) *The Optimal Degree of Commitment to an Intermediate Monetary Target*. *The Quarterly Journal of Economics*, Volume 100, Issue 4, November 1985, Pages 1169–1189, https://doi.org/10.2307/1885679

Schaechter, A., Kinda, T., Budina, N., Weber, A. (2012) Fiscal Rules in Response to the Crisis-Toward the 'Next-Generation' Rules: A New Dataset. IMF Working Paper No. 12/187. Available at SSRN: https://ssrn.com/abstract=2169733

Shi, M. Svensson, J. (2006) *Political budget cycles: Do they differ across countries and why?.* Journal of Public Economics 90, 1367-1389.

Schmidt-Hebbel, K., Soto, R. (2017). Fiscal Rules in the World. Cambridge University Press. doi:https://doi.org/10.1017/9781316675861.004

Sutherland, D., Hoeller, P. (2012) *Debt and Macroeconomic Stability: An Overview of the Literature and Some Empirics*. OECD Economics Department Working Paper No. 1006, Available at SSRN: https://ssrn.com/abstract=2188941 or

Svensson, L. (1997) *Inflation forecast targeting: Implementing and monitoring inflation targets.* European Economic Review, Volume 41, Issue 6, Pages 1111-1146, https://doi.org/10.1016/S0014-2921(96)00055-4

Tabellini, G. (2005) *Finn Kydland and Edward Prescott's Contribution to the Theory of Macroeconomic*. PolicyScand. J. of Economics 107(2), 203–216, DOI: 10.1111/j.1467-9442.2005.00404.x

Tanzi, V., Schuknecht, L. (1997) R*econsidering the Fiscal Role of Government: The International Perspective.* American Economic Review, American Economic Association, vol. 87(2), pages 164-168, May

Ter-Minassian, T. (2007) Fiscal Rules for Subnational Governments: Can They Promote Fiscal Discipline? OECD Journal on Budgeting, vol. 6/3, https://doi.org/10.1787/budget-v6-art17-en.

Von Hagen, J., Hallett, A., Strauch, R. (2002) *Budgetary Consolidation in Europe: Quality, Economic Conditions, and Persistence*. Journal of the Japanese and International Economies, Volume 16, Issue 4, Pages 512-535, Available at: https://doi.org/10.1006/jjie.2002.0516

Wierts, P., 2008. *Fiscal rules and fiscal outcomes in EMU—theory and evidence*. PhD Thesis. University of Reading. workshop held in Perugia, 29–31 March 2007, pp. 479–512.

Woo, J. (2005), `Social polarization, fiscal instability and growth', European Economic Review 49(6), 1451-1477.

Wyplosz, C. (2005) Fiscal policy: institutions versus rules. National Institute Economic Review, no. 191 pp. 64-78. Accessed October 21, 2020. http://www.jstor.org/stable/23876949