
FISCAL DOMINANCE IN ADVANCED ECONOMIES: A POST-
COVID POSSIBILITY?

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Abstract:

The response to the Covid-19 pandemic has required an increase in public expenditure and further accommodative monetary measures. Combined with high public debt levels, this policy mix elicits concerns of fiscal dominance, under which monetary policy pursues debt sustainability over price stability. This dissertation reviews some of the literature on fiscal dominance, with the aim of understanding its existence since the Great Moderation and in the post-Covid world. A definition of the concept in the seminal contributions of Sargent and Wallace (1981), Leeper (1991) and an analysis of two historical cases are followed by a review of two theoretical approaches to the study of policy interactions under fiscal dominance. On one hand, based on its study of inflation as a joint monetary and fiscal phenomenon, the Fiscal Theory of the Price Level considers active fiscal policies and passive monetary policies compatible with price stability (Cochrane, 2005). On the other hand, the New Keynesian approach highlights the inflation volatility that results from passive monetary policies easing the debt burden (Schmitt-Grohé & Uribe, 2007). Both approaches stress the importance of policy interactions in achieving price stability. The study of these issues informs a subsequent discussion of how fiscal dominance concerns have existed since the Global Financial Crisis. They are associated with the failure of current institutional frameworks in accounting for the measures required during crises (the Euro Area being an example) and with proposals for money-financed fiscal stimuli to counter liquidity traps (Bartsch et al., 2020). The pandemic has made fiscal dominance especially relevant since (i) fiscal policies became credibly active, (ii) discussions of monetary-financing were renewed and (iii) central banks will need to manage both the debt overhang and the increase in inflation seen since early 2021. How this is done will determine the existence or absence of fiscal dominance.

JEL codes: E31, E52, E63, H63

Keywords: Fiscal-monetary policy interactions, fiscal dominance, fiscal theory of the price level, monetary financing, intertemporal budget constraint

Resumo:

A resposta à pandemia Covid-19 obrigou a um aumento de despesa pública e medidas monetárias acomodáticas adicionais. Aliada à acumulação de dívida pública, esta combinação de políticas gera receios de *fiscal dominance*, sob a qual a política monetária sacrifica a estabilidade de preços em prol da sustentabilidade da dívida. Procurando uma melhor compreensão deste fenómeno, a presente dissertação revê a literatura que cobre diferentes aspetos de *fiscal dominance*. À definição do conceito nos trabalhos seminais de Sargent and Wallace (1981), Leeper (1991) e à análise de dois casos históricos, segue-se uma revisão de duas abordagens teóricas ao estudo de interações entre política monetária e orçamental sob *fiscal dominance*. Por um lado, baseando-se no estudo de inflação como um fenómeno simultaneamente monetário e orçamental, a *Fiscal Theory of the Price Level* considera que políticas orçamentais ativas e políticas monetárias passivas são compatíveis com estabilidade de preços (Cochrane, 2005). Por outro lado, a abordagem Novo-Keynesiana evidencia a volatilidade de inflação decorrente de uma política monetária passiva que assegura a sustentabilidade da dívida (Schmitt-Grohé & Uribe, 2007). Ambas as abordagens frisam a importância das interações entre políticas para a estabilidade de preços. A dissertação termina com uma discussão dos receios de *fiscal dominance* desde a Grande Recessão, que se associam a propostas de monetização de expansões orçamentais ou ao facto de medidas tomadas em resposta a crises e interações entre políticas não terem o devido enquadramento institucional (como na Área Euro) (Bartsch et al., 2020). Os receios de *fiscal dominance* são particularmente relevantes durante a pandemia, pois (i) as políticas orçamentais tornaram-se credivelmente activas, (ii) renovou-se a discussão sobre monetização de dívida pública e (iii) os bancos centrais terão de gerir simultaneamente o combate à inflação registada desde 2021 e as elevadas acumulações de dívida pública.

Códigos JEL: E31, E52, E63, H63

Palavras-chave: Interações entre política monetária e fiscal, *fiscal dominance*, monetização, *Fiscal Theory of the Price Level*, restrição intertemporal orçamental

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1. Introduction

The Covid-19 pandemic came at a time when many advanced economies were still reeling from the effects of the Global Financial Crisis and, in the case of the European nations, the subsequent sovereign debt crisis. Public health measures, such as the government-imposed lockdowns, created an economic contraction that forced central banks to reinstate their expansionary and accommodative policies but also demanded enormous fiscal efforts from governments (European Central Bank, 2021, September 28). Sovereign debt skyrocketed and, even as recovery begins, large deficits will remain a reality in the foreseeable future.

In the aftermath of this surge, sustainability of debt has come into question, especially if the low interest rate environments (present from even before the pandemic) cease to exist and debt service becomes more onerous (Sims, 2016). This will largely depend on how monetary policy evolves going forward. Should inflation rise significantly above target and central banks begin tightening their monetary stance before the need for countercyclical fiscal policy has receded, governments may be forced to prematurely abandon macroeconomic stabilisation in favour of fiscal consolidation to stay solvent (European Central Bank, 2021, September 28). Such pressure may raise concerns regarding the possibility of central banks maintaining their accommodative stance in order to ensure debt stabilisation, even if it becomes overly inflationary (Bordo & Levy, 2021; Orphanides, 2013). This might, in turn, herald a move towards a regime of *fiscal dominance*, as opposed to one of *monetary dominance*, in which an independent central bank focuses solely on price stability.

Indeed, fiscal dominance has been increasingly rare since the end of the Great Inflation and the beginning of the Great Moderation. In the past, it had arisen either due to political factors (i.e., government pressure; wars...) or reliance on economic theory that proved inadequate for the situation, such as cost-push inflation that was unconnected with monetary expansion (Bordo & Levy, 2021). Since then, lessons have been learned, regarding the importance of central bank independence and credibility, the danger of monetising debt and the link between money supply and inflation, but the pandemic crisis (and the response to it) has been unprecedented and, so, perhaps a situation as unlikely (given the current consensus) as a regime of fiscal dominance cannot be ruled out, in one form or another.

This dissertation aims to provide an understanding of this phenomenon and consists of a review of the literature that has dealt with this subject from multiple perspectives. Section 2 defines the general concept and aspects of fiscal dominance in some of the earlier contributions on fiscal and monetary policy interactions. Section 3 reviews historical examples of fiscal dominance, namely, France's economic recovery following the First World War and U.S. monetary policy from 1940 to the 1970s. Combined, sections 4 and 5 provide some of the theoretical background for fiscal dominance. Section 4 covers, in greater detail, the seminal work of Sargent and Wallace (1981), "Unpleasant Monetarist Arithmetic", and the novel "Fiscal Theory of the Price Level" (or FTPL), which relies on a form of price level determination that is more directly connected to fiscal policy. Section 5 covers the study of fiscal dominance in the conventional New-Keynesian literature. Section 6 provides a qualitative analysis of fiscal and monetary policy interactions from the perspective of the institutional frameworks that govern the conduct of policy. It contains the main contribution of this dissertation: a discussion of how risks of fiscal dominance have manifested since the Global Financial Crisis of 2008, especially in a context in which the separation of central banks from governments has been thoroughly cemented. Section 7 concludes.

2. Fiscal dominance: definition

As a general concept, *fiscal dominance* typically arises when unchecked deficits and rising debt pressure the central bank to adopt an accommodative policy stance, in order to prevent a default or insolvency, at the cost of its price stability objective (European Central Bank, 2021, September 28). Its opposite, *monetary dominance*, refers to a situation in which an independent central bank focuses on its own objectives (namely, price stability) and leaves debt sustainability to the fiscal authorities. The details in which fiscal dominance has been portrayed and studied in the literature on fiscal-monetary policy interactions have changed slightly over the years.

Before delving further, however, one must recall what is known as the government's intertemporal budget constraint (IBC) or, alternatively (for those who do not see it as a constraint), the valuation equation for government debt. In this basic version, found in Cochrane (2022a), the left side corresponds to the real value of debt and the right side, to the present value of all future primary surpluses.

$$\frac{B_{t-1}}{P_t} = E_t \sum_{j=0}^{\infty} \beta^j s_{t+j} \quad (2.1)$$

The IBC states that the real value of government liabilities (i.e., nominal debt divided by the price level) must equal the present value of future real surpluses (Cochrane, 2005, 2011). It is a focal point in the literature on fiscal dominance and will be useful to keep in mind hereafter.

The term *fiscal dominance* itself was notably used in Sargent and Wallace (1981), which studied the link between fiscal policy and inflation in a purely monetarist environment, with rational expectations and perfect foresight. When fiscal policy is dominant, the fiscal authority acts first, independently setting current and future budgets, and, consequently (due to limitations on the debt-financing of deficits), determining how much seigniorage revenue the monetary authority must raise through the creation of base money. Conversely, under *monetary dominance*, the monetary authority sets the base money growth rates for all periods and fixes the revenue gained through seigniorage, thereby imposing discipline on the fiscal authority. Sargent and Wallace (1981) also highlighted the importance of these interactions for price stability by pointing to the limitations of a tight monetary policy in controlling the price level without the “cooperation” of its fiscal counterpart. In the face of surpluses that

fail to maintain the government's IBC, any attempts by the central bank to postpone the necessary money creation will lead to an even looser monetary stance being required (and expected by agents) in the future. Since, in that model, the current price level depends on base money today and for all future periods, this postponement also fails to contain current inflation.

Leeper (1991) considered how different combinations of *active* and *passive* authorities determined (or failed to determine) the price level, i.e., whether they could lead to a determinate rational-expectations equilibrium. An *active* policy authority sets its variables free from the constraints of government debt and a *passive* one must account for shocks to it. In this model, inflation could still be uniquely determined under a mix of an active fiscal authority, which does not adjust future taxes in the face of a debt shock, and a passive monetary one, whose behaviour was constrained by the need to finance those debt shocks, i.e., a situation of fiscal dominance. Unlike in Sargent and Wallace (1981), debt is not indexed to inflation (it is nominal) and monetary policy is conducted through an interest rate rule, not through control of money growth (Cochrane, 2022a). In fact, Leeper (1991) analyses a policy of pegged nominal interest rates, that do not respond to fiscal shocks, and direct taxes that do not respond to debt (they are exogenously set). Thus, here, fiscal dominance takes a slightly different form, but, like in Sargent and Wallace (1981), monetary policy's effect on inflation depends on the fiscal authority's decisions on future taxes and monetary contractions may, again, even raise current inflation.

Similarly, Woodford (2001) moves away from outright seigniorage targets set by the fiscal authority, instead arguing that fiscal dominance consists of a general pressure for monetary policy to maintain the value of government debt. This may be done by managing the prices and yields on government bonds through interest rate pegging or open market operations. A central bank may adopt a passive stance when it prioritises other objectives over price stability. For instance, during a financial crisis, the central bank may focus on the stability of the banking sector (Humpage, 2016), while, amidst a recession, it may focus on output stabilization, through lower interest rates or other expansionary policies (Leeper & Walker, 2012). In the periods following a recession, a fear of tightening monetary policy too early and/or too strongly may exist, especially if the ensuing aggravated debt service would prompt a fiscal consolidation from the government.

More frequently, a passive monetary stance (and fiscal dominance, overall) is the result of an onerous debt service which exceeds the country's ability to generate the required revenues or surpluses (Humpage, 2016), i.e., when a *fiscal limit* has been reached. In Sargent and Wallace (1981), the shift towards fiscal dominance occurred when debt-to-GDP reaches the upper bound on demand for bonds (itself dependent on the private sector's savings). The government could no longer sustain deficits through debt issuance, thus necessitating seigniorage (Leeper & Walker, 2012). However, a fiscal limit can stem from political economy considerations (e.g., democratically elected governments may be reluctant to raise taxes on voters) or it can be represented by a Laffer curve. By establishing a maximum value for tax revenues, the Laffer curve effectively imposes a limit on the present value of the surpluses that can be generated (Leeper & Walker, 2011).

Whichever its form, the main point conveyed by the fiscal limit is that fiscal policy may be unable (or unwilling) to uphold the government's intertemporal budget constraint, thus forcing the hand of the central bank. This is the typical scenario that leads to fiscal dominance, as will be evident in the historical cases presented in the following section.

3. Historical episodes of fiscal dominance

To complement the abstract definition of fiscal dominance, it will prove useful to showcase how it has manifested itself in practice. Two historical cases are particularly illustrative of the path towards that policy regime and of the aspects discussed in the previous section: U.S. monetary policy from 1940 to the 1970s and France's economic recovery following the First World War.

3.1. US monetary policy, 1940-1970s

The examples of pegged interest rates and bond price-support regimes given by Leeper (1991) and Woodford (2001), respectively, are taken precisely from the U.S. experience during and following the Second World War. In the lead-up to the country's formal entry into the conflict, the Federal Reserve attempted to persuade the government to fund the expected expenditures by resorting (mainly) to taxes and bond sales to the general public (so as to avoid the inflationary consequences of borrowing from a banking sector flush with excess reserves). However, the pressure to ease financing of the war effort resulted in the Fed relinquishing its independence, pegging interest rates of short and long-term Treasury bills (while also managing the yields on other government securities), cutting reserve requirements and committing to sizeable purchases of securities. The resulting inflationary tendencies were counteracted by rigorous price controls (Bordo & Levy, 2021; Humpage, 2016). This accommodative arrangement is common in wartime (Woodford, 2001), but was continued after the war, due to fears that a tighter monetary policy would make the management of public debt impossible and might bring about a recession (Humpage, 2016).

The post-war period was marred by tensions between the Treasury and the Fed, as the former strove to maintain the subordination of monetary policy as long as it deemed necessary (by veto of interest rate increases and by the pace of the retiring of debt held by the central bank), while the latter sought to take whatever measures it could to fight inflation (such as raising short-term interest rates). Interestingly, as Woodford (2001) points out, in the first half of 1949, the Fed interpreted its bond-price support obligations as requiring it to prevent increases in bond prices, through the sale of large amounts of its own bond holdings (a contractionary policy that was criticised).

In some aspects, the Fed's continuing intervention in debt-management stemmed from technical considerations. Until 1973, most government securities were not auctioned off, but rather sold to the public at a price determined by the Treasury. If it did not match the market-clearing price, an issuance might fail, an outcome all the more likely if monetary policy was not conducive to its success. This brought about the "Even-keel" policy of refraining from changes regarding interest rates, open market operations or reserve requirements during Treasury funding operations. When the Treasury began moving to auctions of debt securities, the need for this intervention (or lack thereof) ceased.

More frequently, constraints on the Fed's freedom to pursue its own policy objectives came from political pressure for monetary policy easing in periods of recession (e.g., after the oil shocks of the 1970s) or of increased expenditures and deficits (the Vietnam War, the "Great Society" welfare programs...), but the belief in the effectiveness of wage and price controls (which would curb cost-push driven inflation) and the Keynesian views of many policy makers, within the administrations and the Fed, also explains the priority given to employment, over price stability, in the latter's policy-making (Bordo & Levy, 2021). The persistent problems with inflation would only end after 1979, when the Fed (under chair Paul Volcker) was able to pursue a sustained (until 1982) and aggressive monetary tightening that shifted the deeply engrained inflationary expectations. It succeeded in reducing inflation from 12 per cent in October 1979 to 3.8 per cent in December 1982 (Bordo & Levy, 2021).

3.2. Post-WWI France

France's experience in fiscal dominance came in the aftermath of the First World War and owed much to political factors. Wartime funding had been assured by a combination of debt issuance, the Banque de France's purchase of bills and its short-term interest rate pegging. By the end of the war, the country had been left with a high debt-to-GDP ratio (a large portion of which was short-term debt), high deficits, a price level which had doubled and a depreciated currency. Resumption of the gold standard, at a pre-war parity, was seen as the desirable goal of policy. This required a significant deflation to achieve and, consequently, a sizeable fiscal consolidation, since monetisation of debt had largely been responsible for the greatly expanded monetary base.

However, there were some obstacles. On one hand, fiscal demands were great. The country needed to finance reconstruction and compensation to the victims of the war, while, simultaneously, the government had pledged itself to steady repayment of the short-term debt soaked up by the Banque de France (Bordo & Hautcoeur, 2007). On the other hand, commitment was lacking. Many believed that the burden of reconstruction should fall on Germany. When this idea became unfeasible, disagreement over implementation of increased taxation (as indirect taxes or a capital levy) and political instability postponed any action. The result was a continuation of short-term debt issuance, purchased largely by the central bank (i.e., a continuation of active fiscal policy and passive monetary policies), high inflation, capital flight and further currency depreciation (Bordo & Levy, 2021).

The Banque de France had been a strong advocate of stabilisation at pre-war parity. In fact, at least until 1923, monetary policy boasted heightened short-term interest rates, a stabilising nominal exchange rate and restrained inflation (Bordo & Hautcoeur, 2007). Though that would change (inflation, in particular, would balloon in the ensuing years), the mix of active fiscal policy and passive monetary policy arose from government dysfunctionality and not from constraints directly imposed by the Treasury, as in the U.S. (Bordo & Levy, 2021). As in Sargent and Wallace (1981), when faced with a worsening fiscal situation and a lack of private demand for short-term debt, the central bank was forced to ensure solvency. Thus, the lethargy of the fiscal authority and political economy considerations were as conducive to fiscal dominance as direct political pressure.

This stalemate ended in 1926, when the government of Raymond Poincaré cut expenditures, raised indirect taxes (as opposed to the capital levy which had prompted the capital flight) and stabilised the franc, returning it to the gold standard at an 80% depreciated rate, a compromise which did not, in the end, hinder the recovery of credibility after 1926 (Bordo & Hautcoeur, 2007).

With a better grasp of what fiscal dominance is (as a general concept and historically), one can discuss how it has been studied by economic theory since the seminal contributions of Sargent and Wallace (1981). The conventional New-Keynesian literature has dealt with the topic (as covered in section 5), but one theory in particular has been specifically associated with fiscal dominance, the Fiscal Theory of the Price Level (or FTPL).

4. Fiscal Theory of the Price Level

Though the FTPL is distinct from the “Unpleasant Monetarist Arithmetic” of Sargent and Wallace (1981), its proponents view the latter as a precursor (Cochrane, 2022a). The following version of the IBC is found in Leeper and Walker (2012) and serves to illustrate the key points of the “Unpleasant Monetarist Arithmetic” of Sargent and Wallace (1981), which will be useful to understand the development of the FTPL.

$$v_{t-1} = \sum_{j=1}^{\infty} \beta^j E \left[\tau_{t+j} - z_{t+j} + \frac{M_{t+j} - M_{t+j-1}}{P_{t+j}} \right] \quad (4.1)$$

The left side of the equation corresponds to real debt (v_{t-1}), outstanding at the end of period $t-1$. The right-side corresponds to the present expected value of primary surpluses, defined as tax revenues (τ_{t+j}) net of transfer payments (z_{t+j}), plus seigniorage revenues obtained from an increase in the money base ($\frac{M_{t+j} - M_{t+j-1}}{P_{t+j}}$). Sargent and Wallace (1981) showed how, under fiscal dominance, changes in debt or the expected value of primary surpluses are met with changes to base money and to the revenue earned through seigniorage, i.e., changes to $\frac{M_{t+j} - M_{t+j-1}}{P_{t+j}}$.

Beyond fiscal adjustments and this seigniorage component, there is no other mechanism for the IBC to be upheld. Since it must always be upheld, it acts as a constraint on fiscal policy (as the name suggests).

The main question that Sargent and Wallace (1981) pose is how can fiscal policy determine inflation. Since, in a monetarist environment, inflation is a monetary phenomenon (Woodford, 2001), that can only occur insofar as fiscal policy is able to influence the course of monetary policy, which controls the growth of monetary aggregates.

This influence is manifested in a subordination of the central bank to the fiscal authority and results in outright monetisation of debt. When the fiscal authority does not set its budgets in a way that upholds the IBC on its own, the central bank intervenes and sacrifices its price stability objective in favour of debt sustainability. It is forced to increase money supply either presently or at some point in the future, which will inevitably generate inflation, in accordance with the Quantity Theory. The idea of policy interactions is, thus, a game between the two authorities, where one moves first and is able to constrain the other.

In order to avoid high and fiscally-driven inflation, the central bank must maintain its course of action and refrain from monetisation of debt, thereby compelling the fiscal authority to resolve its debt problems through fiscal adjustments (Sargent & Wallace, 1981).

Although it remains an important contribution to the study of policy interactions, the relevance of certain aspects of “Unpleasant Monetarist Arithmetic” has waned over the years. Central bank independence has been cemented as the optimal arrangement in the pursuit of price stability and, so, the possibility of monetisation is removed (Leeper & Walker, 2012). Partly due to this, seigniorage accounts for a very small fraction of government revenue in advanced economies (Leeper, 1991; Woodford, 2001).

The existence of only real (inflation-indexed) debt is a particularly important assumption in the framework of Sargent and Wallace (1981), as it prevents price levels from affecting the real value of debt. Much like the reliance on seigniorage revenues, that is also something not seen in practice, as most government debt issued in advanced economies is nominal (Leeper & Walker, 2012). If nominal debt, rather than real debt, is considered, then the IBC shown above is altered:

$$\frac{B_{t-1}}{P_t} = \sum_{j=1}^{\infty} \beta^j E \left[\tau_{t+j} - z_{t+j} + \frac{M_{t+j} - M_{t+j-1}}{P_{t+j}} \right] \quad (4.2)$$

The left side of the equation corresponds to nominal debt outstanding at the end of period $t-1$, B_{t-1} , divided by the price level at period t , P_t . By introducing nominal debt, the IBC may also be satisfied through changes to the price level, P_t , and the real value of debt. “Inflating away” debt is argued to have contributed towards restoring fiscal balance during the historical episodes described in the previous section (Aizenman & Marion, 2011; Bordo & Levy, 2021).

Through the IBC, a direct link between fiscal policy variables (amount of nominal debt and surpluses) and inflation could be established and this forms the basis of a new theory on the formation of the price level itself, the Fiscal Theory of the Price Level, henceforth, the FTPL (Leeper & Walker, 2012). The remainder of this subsection will analyse how the FTPL differs from the “Unpleasant Monetarist Arithmetic” approach and how it may be a useful framework with which to study fiscal dominance.

Cochrane (2005) argues that at the core of the FTPL is the idea that the value of money stems from its acceptance as a means for payment of taxes, and not from its importance as

a means of exchange, as in the monetarist approach (Bassetto, 2002). This means the price level is not solely determined in the way envisaged by the Quantity Theory and inflation may not be a solely monetary phenomenon (Cochrane, 2022a).

According to Cochrane (2005), the commitment undertaken by the government when it issues nominal debt is to repay the holder a certain amount of currency, so nominal debt is a claim to a nominal payoff. The real value of that payoff is affected by certain factors, namely the price level and the real primary surpluses (which are meant to ensure service and repayment of debt) (Leeper & Walker, 2012; Woodford, 1994). The IBC expresses the relation between the real value of debt and those factors. The FTPL's proponents regard the IBC as a market-clearing condition, not as a constraint to always be upheld. It is labelled a *government debt valuation equation* and must hold only in equilibrium.¹ Therefore, whenever the real value of public debt and the present value of the primary surpluses are not equal, the price level itself will adjust in order to lead the valuation equation back to equilibrium (Cochrane, 2022a).

What exactly is the mechanism behind this reasoning? Inflation stems from an excess of money in relation to the amount of goods sought (Cochrane, 2005), albeit with some nuances. In its most basic form, the mechanism is known as a *wealth effect* on private expenditure (Cochrane, 2011). For example, if the government increased nominal debt without changes to the primary surpluses, the present value of future primary surpluses would be lower than the real value of government debt (without changes in the price level). Households would believe that the same amount of assets in their possession (which mostly comprise government liabilities) would enable them to demand more goods and services. This excess of aggregate demand (over what the economy can provide) would lead to a rise in prices which would reduce the real value of government debt until it matched the present value of expected surpluses. The households would no longer believe themselves to be as wealthy and, thus, public and private expenditure would be reduced to effectively match the provision of goods and services within the economy (Woodford, 2001).

Another perspective of the wealth effect is to view the demand for goods as the “mirror image” of demand for government bonds (Davig et al., 2011, p. 40). In the case

¹ Part of the reason for this different label is to remove the association of the IBC with a constraint on policy (Cochrane, 2022a). Therefore, in the remainder of this section on the FTPL, the terms *government debt valuation equation* or *valuation equation* will be used instead of *intertemporal budget constraint* or IBC.

described above, rather than a belief in their own augmented wealth, households view government debt as less valuable and, consequently, desire to hold less of it. They achieve this by converting it into increased consumption of goods, which drives up prices (Cochrane, 2018).

The wealth effect does not rely on agents being irrational, nor on the assumption that agents are always Ricardian. In the FTPL's models, agents are forward-looking and have rational expectations, but, with merely nominal debt, they may rationally assume that debt issuance will not have the real backing of surpluses, under certain circumstances.² Indeed, the wealth effect only exists if households believe themselves to be wealthier (i.e., if they do not expect higher taxes in the future). As can be seen in the version of the valuation equation, in Leeper and Walker (2012) and shown above, the right-hand side does not correspond solely to current surpluses, but to the present value of an expected sequence of surpluses, in all future periods.

How, then, do fiscal and monetary policies interact in this framework? The FTPL's models do not completely disregard the relation between the supply and demand of money. Both the money demand function of the Quantity Theory and the government debt valuation equation must hold in equilibrium and neither is seen, on its own, as sufficient to determine the price level (Sims, 1994; Woodford, 1995). Whether the price level is ultimately determined by the monetary authority (through the money demand function) and then validated by the fiscal authority (through the valuation equation), or vice-versa, is a matter of policy coordination and consistency (Cochrane, 2011). Indeed, the main conclusion of Leeper (1991) is that price determinacy necessitates at least one policy being active and the other being passive.

On one hand, this means that an *active* monetary authority, which sets the price level through the money-demand function, will need the backing of a *passive* fiscal authority that validates that price level through the valuation equation. It does so by credibly committing to generate sufficient revenue to service and stabilize debt, at whatever price level is determined by monetary policy. In this instance, nominal debt increases are accompanied by

² Conversely, with real debt, issuance is necessarily accompanied by a commitment to higher surpluses in the future, so this is what agents expect (Cochrane, 2011).

higher taxes in the future. The wealth effect cannot exist and, thus, monetary policy retains its control over inflation (Cochrane, 2011).

On the other hand, it means that an active fiscal policy and a passive monetary policy would also be a consistent combination of policies (Cochrane, 2018). Such an alternative will be developed further in the ensuing paragraphs.

It is important to stress how this differs from Sargent and Wallace (1981). According to the “Unpleasant Monetarist Arithmetic” approach, only in a monetary-dominant regime (with an active monetary policy) is the central bank able to independently manage the monetary aggregates in a manner that ensures price stability. Fiscal dominance is associated with high and volatile inflation, since the central bank is forced to monetise to ensure solvency and, thus, cannot manage the growth of base money in a way that is conducive to stable prices (Cochrane, 2022a).

The FTPL offers a different perspective on regimes with an active fiscal policy and a passive monetary one (identifiable as fiscal dominance): that this type of policy mix is compatible with price determinacy and stability (Cochrane, 2005). The theory relies on a wealth effect, and not on monetisation, to explain how inflation may be directly determined by fiscal policy and this wealth effect can lead to inflation even if the central bank refrains from monetisation. Therefore, unlike in Sargent and Wallace (1981), refraining from monetisation is not a sufficient condition for controlled inflation. In fact, in models such as those of Woodford (2001), maintaining an active monetary policy in the face of an active fiscal policy generally leads to price indeterminacy. When it does lead to a determined equilibrium, it involves either a deflationary or inflationary spiral.

In short, one of the major contributions of the FTPL is the study of policy mixes or regimes comparable to fiscal dominance and under a new form of price determination. This is the main reason for its inclusion in this dissertation. The following sub-sections will delve further into the characterization of fiscal and monetary policies under the FTPL.

4.1. Fiscal policy under the FTPL

The characterisation of fiscal policy under the FTPL depends on how the government debt valuation equation is upheld. The following example of the equation is given in Cochrane (2022a):

$$\frac{B_{t-1}}{P_t} = E_t \sum_{j=0}^{\infty} \beta^j s_{t+j} \quad (4.3)$$

If fiscal policy upholds the valuation equation by adjusting primary surpluses, for any given price level, it is characterised as passive or *Ricardian*. If it does not, it is active or *Non-Ricardian* (Woodford, 1995).³ Note that there may be slight differences in the exact rule associated with each policy stance. Woodford (1995) considers that a passive or Ricardian fiscal policy rule will make the expected present value of surpluses vary with the price level. However, Cochrane (2022a) clarifies that active or Non-Ricardian fiscal policy rules can still be dependent on the price level and on variables such as output and employment (i.e., not completely fixed), just not in such a way that focuses on maintaining the valuation equation in a “one-for-one” manner.⁴

To give an example of a passive and an active policy rule, consider the tax rule used in Leeper and Walker (2012):

$$\tau_t = \tau^* + \gamma \left(\frac{B_{t-1}}{P_{t-1}} - b^* \right) \quad (4.4)$$

where τ_t are lump-sum taxes (with τ^* being their steady state level), b^* is a target for real debt, B_{t-1} is nominal debt and P_{t-1} is the price level. When the policy parameter γ is greater than the net real interest rate, an increase in government debt brings about higher future taxes in order to stabilize it around its real target.⁵ This is a passive rule. The active rule (or, rather, the extreme example of one) is a policy that is completely unresponsive to debt and, so, has $\gamma = 0$ and $\tau_t = \tau^* > 0$.

The study of “fiscally-dominant” regimes through the lens of the FTPL assumes that such an active fiscal policy is a logical and coherent possibility, i.e., that the valuation equation

³ In fact, the terms *Ricardian* and *Non-Ricardian* are also used to define the policy mix or regime in general, not just fiscal policy. A *Ricardian* regime encompasses the combination of a passive fiscal policy and an active monetary one. A *Non-Ricardian* regime refers to an active fiscal policy and a passive monetary one.

⁴ In Woodford (1995), the term itself, *Ricardian*, is used due to the fact that, with *Ricardian* fiscal policies, government debt (and its evolution) is irrelevant in determining the price level in equilibrium and real quantities (such as the real interest rate).

⁵ Leeper and Walker (2012) note that fiscal policy rules may also consist of setting transfers, though, in this instance, the budgetary rule concerns only taxation (with transfers evolving according to a stochastic process).

does not constitute a constraint on the fiscal authority. This idea was alluded to previously and it is important to elaborate on it.

Why, then, isn't the government subject to a budget constraint, in the form of the valuation equation, in the same way as other economic agents? To answer this question, Woodford (2001) surmised that a government has a special "large-agent" status that sets it apart from other, smaller, agents in the economy. Its decisions can affect equilibrium conditions; therefore, an optimizing government will assess which policy commitments lead to the most desirable outcome (without being subject to a given price level or budget constraint).

Cochrane (2005), however, argues that this large-agent advantage is not necessary. Instead, he highlights that a government defines the terms of the securities it sells and that the commitment underpinning nominal debt is to repay the holder a certain amount of currency, i.e., a government's debt is a promise to deliver another set of liabilities it issues. This can, technically, always be done, even when the valuation equation does not hold. A government has control over the currency in which it redeems debt and it retains the possibility of printing more of its currency to do so. This is the main difference between the government and other agents of the economy.

From this, it is possible to conclude that there are situations in which the valuation equation may represent a constraint, namely, when dealing with real debt. If debt is denominated in a foreign currency or in a commodity over which the government has no control (e.g., gold), then it is constrained in a manner similar to private agents. Issuance of real debt is equivalent to a commitment to a passive or Ricardian fiscal policy (Cochrane, 2005).

In this context, central bank independence is, in essence, a fiscal commitment. A central bank which removes the possibility of monetisation leaves a fiscal authority with only two options to face debt sustainability issues: a default or a fiscal adjustment (Cochrane, 2022a).

Having discussed how fiscal policy can be active, the focus of the next sub-section will be the role of monetary policy within the FTPL, particularly what does a passive monetary policy imply and under what circumstances it may (or may not) be able to target inflation.

4.2. Monetary policy under the FTPL

In Leeper and Walker (2012), monetary policy is defined by an interest rate rule:

$$R_t^{-1} = R^{*-1} + \alpha \left(\frac{P_{t-1}}{P_t} - \frac{1}{\pi^*} \right) \quad (4.5)$$

When parameter α is zero (an extreme case), monetary policy is unresponsive to deviations of inflation from its target, $\left(\frac{P_{t-1}}{P_t} - \frac{1}{\pi^*} \right)$, and sets the interest rate at its own target, R^{*-1} . It does not explicitly react to debt, but it does not allow inflation to aggravate debt service through increased nominal interest rates (Leeper & Walker, 2012). This interest rate peg is one example of a passive policy which would be compatible with an active fiscal policy.

However, under the FTPL, what does this passive stance mean for a monetary authority's control over inflation? Could the central bank still manage inflation through changes to the nominal interest rate peg? Leeper and Walker (2012) initially show that it cannot.⁶ In a Non-Ricardian regime, the expression which yields the equilibrium price level is:⁷

$$P_t = \frac{R^* B_{t-1}}{\left(\frac{1}{1-\beta} \right) \tau^* - E_t \sum_{j=0}^{\infty} \beta^j z_{t+j}} \quad (4.6)$$

The denominator corresponds to the expected present value of primary surpluses from period t onward (which is considered to be exogenous) and the numerator corresponds to the interest payments received by households on the government debt they hold. A higher interest rate peg, a change to R^* , without an increase in taxes, leads to greater interest payments, $R^* B_{t-1}$, and, thus, greater nominal wealth for households. These believe themselves to be wealthier and the wealth effect occurs as described before. Monetary policy loses the backing of fiscal policy when the latter is active and, so, loses its ability to control current inflation.

⁶ Leeper and Walker (2012) label a Ricardian or monetary-dominant regime as a “M regime” and a Non-Ricardian or fiscally-dominant one as a “F regime”. For simplicity, the terms Ricardian and Non-Ricardian will continue to be used hereafter.

⁷ It is obtained by imposing an active tax rule on an “intertemporal equilibrium condition” (the name given to the debt valuation equation) and using the government's flow budget constraint, to solve for the price level. See Leeper and Walker (2012, p.11-12) for the necessary derivations.

If one allows for the possibility of regime change due to the existence of a fiscal limit, then monetary policy no longer has that capability even in an initial Ricardian regime. In Leeper and Walker (2012), this is modelled as the Ricardian regime being in place until period T , when taxes reach a maximum value. After this, the fiscal-monetary policy mix becomes Non-Ricardian (since a fiscal adjustment cannot be carried out through increased taxation). The debt valuation equation is now:

$$\frac{B_0}{P_0} = E_0 \sum_{j=1}^{T-1} \beta^j s_j + E_0 \sum_{j=T}^{\infty} \beta^j s_j \quad (4.7)$$

The right-hand side of the equation is divided between the present value of surpluses, s_t , before period T (when the tax rule is Ricardian or passive) and of those after period T (when taxation is set at the maximum value, τ^{max}). Surpluses (taxes, τ_t , net of transfers, z_t) are defined in the following manner:

$$s_t = \begin{cases} \tau^* - \gamma \left(\frac{B_{t-1}}{P_{t-1}} - b^* \right) - z_t, & t = 0, 1, \dots, T-1 \\ \tau^{max} - z_t, & t = T, \dots, \infty \end{cases} \quad (4.8)$$

Leeper and Walker (2012) conclude that, even before the fiscal limit is reached in period T , the equilibrium price level behaves in a manner similar to that under a Non-Ricardian regime. This is due to the fact that agents are forward-looking and formulate expectations about fiscal policy in the long-run, i.e., that, after period T , higher transfers, for example, will not lead to a higher present value of taxation (which has already reached its maximum value). Leeper and Walker (2012) also conclude that, when faced with such a fiscal limit, the attempt to maintain active monetary and fiscal policies results in greater deviations of debt and inflation from their targets.

The main point is that expectations determine the nature of fiscal policy and, thus, given the need for consistency between it and its counterpart, they also determine the effectiveness of monetary policy. As stated previously, refraining from monetisation and maintaining an active stance is not sufficient to avoid losing control over inflation (Cochrane, 2011). Non-Ricardian fiscal expectations may derail any attempt to pursue a typical Taylor rule for monetary policy, as is argued to have been the case of Brazil in the 1980s (Woodford, 2001).

In light of these conclusions, a switch to a passive monetary policy may be seen as a method to preserve price stability, given the circumstances, rather than a mere subordination of the central bank to the fiscal authority, as was the historical case of fiscal dominance. However, despite this rationale for such a monetary policy, authors such as Woodford (2001) suggest that, faced with a choice of policy regime, restraining agents' expectations regarding fiscal policy in order to enable an active, anti-inflationary, monetary policy might be a better course of action, particularly if the alternative (accommodating Non-Ricardian fiscal expectations) possibly involves explosive debt dynamics.

Nevertheless, though susceptible to these constraints, monetary policy is not relegated to the realm of ineffectuality under this *fiscal* theory of the price level (Cochrane, 2018).

Most basic models of the FTPL consider only short-term (one-period) debt. This means, for example, that current price levels must always jump in response to changes in the present value of primary surpluses. However, the theory's models could be given other features in order to achieve more realistic inflation dynamics. Frictions such as money demand, sticky prices and irrational expectations are some possibilities, but long-term debt is a particularly important addition. It allows for more realistic inflation dynamics and for a proper analysis of the capabilities of a monetary authority regarding inflation control under the FTPL (Cochrane, 2018; Leeper & Walker, 2012). As shown in Cochrane (2018), with long-term debt, the valuation equation becomes:

$$\frac{\sum_{j=0}^{\infty} Q_t^{(t+j)} B_{t-1}^{(t+j)}}{P_t} = E_t \sum_{j=0}^{\infty} \beta^j s_{t+j} \quad (4.9)$$

where $B_{t-1}^{(t+j)}$ is the quantity of nominal, zero coupon, bonds, outstanding at the beginning of period t , which reach maturity at period $t + j$, and $Q_t^{(t+j)}$ is the nominal price of those bonds, at period t . Maturing bonds pay 1 unit of currency ($Q_t^t = 1$). It is for this reason that, when only one-period debt is considered, nominal bond prices do not appear in the valuation equation. $\beta = \frac{1}{1+r}$ is a real discount factor, with real interest rate, r . The nominal bond prices, $Q_t^{(t+j)}$, that are introduced become another mechanism through which the valuation equation can be upheld in equilibrium. Consequently, policies which affect nominal bond prices are available to the monetary authority as tools to control current or future price levels through the valuation equation.

To simplify the following illustration of how monetary policy can have greater control over the price level, two assumptions will be made: the real interest rate, r , is constant (which means β is also constant) and there is risk neutrality. Additionally, the relation between the nominal interest rate and inflation is given by the Fisher equation:

$$\frac{1}{1+i_t} = \frac{1}{1+r} E_t \left(\frac{P_t}{P_{t+1}} \right) \quad (4.10)$$

The nominal bond price is defined as:

$$Q_t^{(t+j)} = \beta^j E_t \left(\frac{P_t}{P_{t+j}} \right) \quad (4.11)$$

With this in mind, at period t , a bond that matures in period $t+1$ (i.e., $j = 1$) has a nominal price of:

$$Q_t^{(t+1)} = \beta E_t \left(\frac{P_t}{P_{t+1}} \right) \quad (4.12)$$

Recalling the Fisher equation (4.10) and that $\beta = \frac{1}{1+r}$, the nominal price of this bond can be re-written as:

$$Q_t^{(t+1)} = \frac{1}{1+i_t} \quad (4.13)$$

Generalising to bonds of other maturities and if the nominal interest rate were always set as equal to i , a bond that matures at period $t+j$ has, at period t , a nominal price of:

$$Q_t^{(t+j)} = \frac{1}{(1+i)^j} \quad (4.14)$$

How does this impact interest rate policy?⁸ Cochrane (2018), expanding on the work of Sims (2011) and using a frictionless version of the latter's model, shows how higher interest rates can reduce inflation, albeit temporarily. Consider that the nominal interest rate was initially equal to the real interest rate, r (which is constant). Therefore, there was no variation in the price level, as per the Fisher equation (4.10). All else constant, a rise in nominal interest rates will lower the price of bonds at the current period, $Q_t^{(t+j)}$, resulting in a fall in the price level, P_t , so as to uphold the valuation equation. Cochrane (2018) stresses

⁸ The preceding equations may be found Cochrane (2018, p. 357-358).

that, with a constant real interest rate, the nominal interest rate rise cannot impact aggregate demand, so a reduction in the latter cannot be the origin of this deflationary effect. Rather, the value of government debt is reduced (through the reduction in nominal bond prices) and a wealth effect is generated.

With a constant real interest rate, the Fisher equation (4.10) indicates that a permanent rise in nominal interest rates is, eventually, followed by inflation, even though there is an initial, downward, price level jump. Though this is a simpler illustration, Sims (2011) had observed this phenomenon in a more complex, new-Keynesian model and originally referred to this a “stepping on a rake” effect. This is how an increase in the nominal interest rate can have a deflationary effect, albeit at the cost of higher future price levels (i.e., future inflation).

Taking equation (4.14) and allowing for nominal interest rates to be changed from period to period, the nominal bond price may be expressed in terms of the full spectrum of interest rates:⁹

$$Q_t^{(t+j)} = E_t \left(\prod_{k=0}^{j-1} \frac{1}{(1 + i_{t+k})} \right) \quad (4.15)$$

One can now analyse how interventions focusing on longer-term interest rates, such as forward guidance and quantitative easing, are possible.

Forward guidance operates through announcements of a certain path for future interest rates. It has immediate effects on the current price level, due to its effect on nominal bond prices at period t , as per equation (4.15). Note that this effect is tied to the announcement of the interest rate rise, not the rise itself. The maturity structure of debt is particularly relevant for forward guidance, though, since the nominal prices of long-term debt will only decline or increase if that debt reaches maturity after the interest rate change is put into effect (Cochrane, 2018, 2022a).

Open-market operations and quantitative easing will also function through the nominal bond prices in the valuation equation. By buying and selling short and long-term bonds, monetary policy affects their nominal prices and may alter the overall maturity structure of outstanding debt. In fact, alterations of the maturity structure (by monetary or

⁹ This equation may be found in Cochrane (2018, p. 362), where it expresses the connection between expected future one-period interest rates and long-term bond prices via a term structure of interest rates, under perfect foresight.

fiscal authorities) may be used to prevent shocks to surpluses from leading to an increase or decrease in the general price level (Cochrane, 2001). Thus, the existence of long-term debt allows inflation to be smoothed out over time (Cochrane, 2022a).

As can be seen, in the FTPL's Non-Ricardian regimes, central banks need not relinquish their role in the pursuit of price stability. They have ample tools at their disposal to influence inflation through the government debt valuation equation, without requiring any accompanying fiscal policy interventions.

4.3. Criticism to the FTPL

This section related to the FTPL intended to cover some of its basic aspects and to discuss how its study of Non-Ricardian regimes can be applied to the study of fiscal dominance. However, the theory has been subject to criticism over the years and it is equally important to include part of that critique in this exposition. In particular, the view that the valuation equation does not constitute a constraint on policy is one of the main points of contention, as is the feasibility of Non-Ricardian policies.

Buiter (2002) and Buiter and Sibert (2018) argue that the government's budget constraint is an implication of real resource constraints and the intertemporal budget constraint of households. They reaffirm that the consequence of a government not obeying its budget constraint (and not meeting its debt obligations) is either a fiscal adjustment, a default or hyperinflation through excessive monetisation. Additionally, Buiter and Sibert (2018) contend that the existence of default risk is not modelled appropriately due to the fact that, with the valuation equation upheld in equilibrium, sovereign debt is priced at its contractual value (using a discount factor that is free of default risk). This might not occur for Non-Ricardian fiscal policies.

Bassetto (2002), by modelling the economy as a game and, thus, being able to analyse all possible strategies and actions of each of the players (households and the government), also states that the possibility of a debt crisis is not adequately considered in the FTPL. He concludes that governments cannot credibly commit to a sequence of primary surpluses where the level of taxation does not match spending, since private agents may refuse to lend the funds needed to cover those primary deficits.

Finally, Niepelt (2004) points out that, in the FTPL's models, the link between the price level and a Non-Ricardian fiscal policy depends on an unanticipated revaluation of government liabilities that are already held by households, in a predetermined amount. However, despite its importance for fiscal price determination, there is no modelling for how this initial stock of outstanding government liabilities came to exist. If households have rational expectations, they would have bought the initial amount of government debt expecting a certain sequence of primary surpluses to back it (and to deliver a certain rate of return). A Non-Ricardian fiscal policy that sets arbitrary sequences of primary surpluses could not be expected to deliver that backing and, thus, it is not a feasible policy. Agents would not hold debt that does not deliver the returns they expect. Only a Ricardian fiscal policy would be compatible with the ideas of an initial stock of outstanding government liabilities and of consistently rational agents. Therefore, fiscal policy is necessarily Ricardian and the valuation equation does constitute a constraint (Niepelt, 2004).

These criticisms, which point to the idea of Non-Ricardian fiscal policies being unfeasible, have implications for the use of the FTPL as a framework to analyse fiscal dominance.

According to Buiter and Sibert (2018), the association of fiscal dominance with the FTPL should not be made. They explain that a Ricardian budgetary rule determines how the combination of real taxes, public spending, nominal money stock and interest rates uphold the valuation equation in all circumstances (on and off equilibrium). For this to happen and for solvency to be ensured, these policy variables cannot be set independently, as Sargent and Wallace (1981) made clear, and the question of whether there is monetary or fiscal dominance is a question of whether it is fiscal policy (public spending or taxation) or monetary policy (money issuance) that is determined residually. Thus, fiscal dominance is a situation that can occur in the context of a Ricardian budgetary rule.

Niepelt (2004) concludes, unequivocally, that, without the link between Non-Ricardian fiscal policy and the price level, the FTPL does not offer any particular insights into policy interactions beyond those of Sargent and Wallace (1981).

5. Fiscal dominance in the New Keynesian literature

Beyond Sargent and Wallace (1981) and the FTPL, the subject of fiscal dominance has been amply discussed in the conventional New Keynesian (NK) approach, despite its usual assumption of a passive fiscal policy (Kirsanova et al., 2009; Woodford, 2003).

Though the NK approach likewise draws on the seminal contributions of Sargent and Wallace (1981) and Leeper (1991), it is distinct from the FTPL since inflation is only fiscally-driven insofar as the conduct of fiscal policy affects monetary policy. Also, in the standard NK models, there are no similar wealth effects nor prices that change in order to uphold a valuation equation.

The NK approach is also distinct from Sargent and Wallace (1981) as it pertains to how monetary policy may affect the factors governing debt dynamics, such as the effective real interest rate (Dufrénot et al., 2018), not how it obtains revenues from seigniorage. Moreover, debt is considered in nominal terms and monetary policy is conducted through the setting of nominal interest rates, unlike in Sargent and Wallace (1981), where monetary policy is conducted through the control of monetary aggregates and debt is indexed (or real).

Indeed, the NK literature focuses more on monetary policy being driven by the objective of debt sustainability and on some of the fiscal effects of monetary policy, which may be illustrated through two equations.¹⁰ The first, taken from Orphanides (2017, p. 2), is an example of a simple debt dynamics equation for public debt:

$$\Delta b_t = (r - g)b_{t-1} + d_t \quad (5.1)$$

where b_{t-1} is the debt-to-GDP ratio in period $t-1$; d_t is the primary-deficit-to-GDP in period t ; r is the real interest rate (itself dependant on the nominal interest rate and on inflation) and g is the real growth rate. It illustrates the potential impact of real and nominal interest rates set by the central bank on debt service, as well as the impact of growth rates on the debt-to-GDP ratios (Orphanides, 2017).

The second is found in Reis (2016a) and represents the resource constraint of the fiscal authority or its *fiscal burden*. It is presented in the form of an inequality, so as to reflect a “no-Ponzi scheme” condition on government debt:

¹⁰ This is also in contrast to the FTPL, the focus of which is, arguably, on Non-Ricardian fiscal policy.

$$\Phi_t = E_t \left[\sum_{j=0}^{\infty} m_{t,t+j} \left(\frac{\delta_{t+j} B_t^j}{p_{t+j}} \right) \right] \leq E_t \left[\sum_{j=0}^{\infty} m_{t,t+j} (f_{t+j} + d_{t+j}) \right] \quad (5.2)$$

Φ_t is the fiscal burden and it is equal to the expected present value of payments promised by the government (the left side of the inequality) (Reis, 2016a). B_t^j are the nominal, zero coupon, bonds outstanding at period t which mature at period j . δ_{t+j} is the repayment rate of the bonds (i.e., a way to account for the possibility of sovereign default) and p_{t+j} is the price level.¹¹ The right-hand side of the inequality reflects the resources available to the government to meet its obligations, with f_{t+j} being fiscal surpluses and d_{t+j} the real transfers from the central bank to the government. Finally, $m_{t,t+j}$ is a stochastic discount factor. With this inequality, one may see that the central bank can alleviate the fiscal burden through a higher price level, p_{t+j} (which eases the burden of upholding the government's nominal commitments) and through increased transfers to the government, d_{t+j} , of which seigniorage revenues are an example.

In most of the theoretical literature that will be discussed in the following pages, monetary policy mainly contributes towards debt sustainability by pursuing higher inflation or by lowering nominal interest rates. Within the NK literature, there were, nonetheless, different motivations behind the study of fiscally-dominant regimes. Prior to the Global Financial Crisis of 2008 (hereafter, GFC), authors such as Benigno and Woodford (2006) and Schmitt-Grohé and Uribe (2007) assessed whether passive monetary policies and active fiscal policies could be considered an optimal policy mix, to be adopted in all circumstances. After the GFC, monetary interventions in support of solvency would be studied as temporary responses to large accumulations of public debt that fiscal policy cannot manage on its own (Bianchi & Melosi, 2019; Dufrénot et al., 2018; Reis, 2016b). The goal of this section is, then, to showcase the portrayal of fiscal dominance in the New Keynesian literature and its assessment of the desirability of such a policy mix from a welfare point of view.

¹¹ For example, $\delta_{t+j} = 1$ would mean there is no sovereign default.

5.1. Optimal policies

In the early 2000s, there was considerable study of optimal monetary policies (taken separately or jointly, with their fiscal counterpart) in models with nominal rigidities. The more common conclusion was that combinations of active monetary policies (which would strive for price stability and would also be responsible for stabilisation of the business cycle) coupled with passive fiscal policies (which would strive for debt sustainability and have a limited role in business cycle stabilisation) were the closest to the fully optimal policy mix, in terms of welfare and inflation volatility (Kirsanova et al., 2009). How did, then, fiscal dominance become a subject of discussion within this literature?

On one hand, the incorporation of distortionary taxes in the models as the only source of government revenue gave some reason for scrutiny of the aforementioned policy arrangement (Kirsanova et al., 2009). The possibility of tax-related distortions in the aggregate supply relation (Benigno & Woodford, 2003) or on agents' leisure/labour choices (Schmitt-Grohé & Uribe, 2004, 2007) meant that there could be incentives for the fiscal authority to smooth taxes over the business cycle. In turn, this would require government financing to come from the use of unexpected inflation as a lump-sum tax on nominal wealth, i.e., it would require monetary policy to also ensure intertemporal government solvency (Schmitt-Grohé & Uribe, 2004). Such a mix of active fiscal and passive monetary policies was, in fact, feasible. Leeper (1991) had reached that conclusion in a model with lump-sum taxes and Schmitt-Grohé and Uribe (2007) would confirm this was also the case in models with sticky prices and distortionary taxation.¹²

On the other hand, the passive fiscal stance usually assumed in theoretical discussions of optimal monetary policy (e.g., Woodford (2003)) might not be possible, for example, due to political economy factors (Kirsanova et al., 2009). Consequently, some authors highlighted the importance of the assumptions regarding fiscal regimes and studied their effects on the optimisation of monetary policy. They assessed whether, in the face of an active fiscal policy, a passive monetary policy could be optimal and, conversely, whether an optimal monetary policy would continue to aggressively target and stabilise inflation under those same

¹² Price stickiness may be implemented in more than one way. For example, in Schmitt-Grohé and Uribe (2007) and Benigno and Woodford (2003), it takes the form of, in each period, a fraction of firms not being permitted to optimally choose the prices of the goods produced. In Schmitt-Grohé and Uribe (2004), it stems from the existence of price adjustment costs.

circumstances (Benigno & Woodford, 2006; Kirsanova et al., 2009; Kumhof et al., 2010; Schmitt-Grohé & Uribe, 2000, 2007). For both of these reasons, an assessment of the desirability of a fiscally-dominant policy mix was merited within this strand of literature.

These analyses of the optimality of policy mixes (among which, fiscal dominance) require two steps: setting a benchmark for optimised policy and defining how each policy authority uses its instruments.

Regarding the first step, under optimal policy, the authorities seek to maximise agents' utility, from which measures of social welfare are derived (Kirsanova et al., 2009). This optimal policy problem can either be solved by characterising a Ramsey optimal equilibrium within the model (Kumhof et al., 2010; Schmitt-Grohé & Uribe, 2004, 2005, 2007) or through an associated linear-quadratic problem (Benigno & Woodford, 2003; Kirsanova & Wren-Lewis, 2012).¹³ Different policy mixes are then compared to the solution to the optimal policy problem, on the basis of welfare and other factors such as inflation volatility.

Regarding the second step, the monetary and fiscal authorities follow simple rules relating their respective policy instruments to certain macroeconomic indicators, as originally done by Leeper (1991). Unlike what occurs under the full optimisation of each policy, simple rules can account for institutional rigidities in policy-making (Kirsanova & Wren-Lewis, 2012) and are less model-dependent, as they can approximate optimal policy rules in a wider range of models. More importantly, given the greater ease in comprehending them (Taylor, 1999), simple rules clarify the stances of the fiscal and monetary authorities. Therefore, the following pages will present the type of policy rules frequently considered in the literature on optimal policy.

Fiscal policy variables such as tax rates, tax revenues or spending may be set as a function of the deviations of outstanding debt from a certain level (Kirsanova & Wren-Lewis, 2012; Kumhof et al., 2010; Schmitt-Grohé & Uribe, 2007). This creates fiscal feedback rules. For example, in Kumhof et al. (2010), the fiscal authority sets the tax rate, τ_t , according to the following rule:

$$\tau_t = \tau^* + \phi_a^\tau * (a_{t-1} - a^*) \quad (5.3)$$

¹³ For details on the approach with a linear-quadratic framework, see section 2 of Benigno and Woodford (2003, p. 10-18). For an example of the characterization of a Ramsey steady state, see Schmitt-Grohé and Uribe (2005, p. 26-36).

where τ^* and a^* are the fiscal authority's targets for the tax rate and total government debt (respectively). These target values (for the fiscal rule and the monetary one showcased further below) are equal to those of the non-stochastic steady state of a Ramsey optimal policy problem.

Most significantly, ϕ_a^τ is the parameter that determines the policy rule's response to deviations of lagged government debt, a_{t-1} .¹⁴ That is, it will determine whether fiscal policy is active (as under fiscal dominance) or passive. The more common example of an active fiscal policy (and of fiscal dominance) is a completely exogenous tax rule where $\phi_a^\tau = 0$. However, a fiscal authority may be considered active if it simply does not respond to debt enough to prevent it from exploding, i.e., ϕ_a^τ falls below a certain reference value. Conversely, if ϕ_a^τ were above it, then fiscal policy could ensure solvency on its own.¹⁵ The exact numerical value of this reference point is dependent on the target or steady-state values for the nominal interest rate and for inflation, increasing with higher nominal interest rates (since this implies greater interest payments) and with lower inflation (which does not erode the value of debt as much).¹⁶

For its part, monetary policy may be implemented through a rule for nominal interest rates. In the standard Taylor-type rules used in, for example, Schmitt-Grohé and Uribe (2007) and Kumhof et al. (2010), the nominal interest rate is set as a function of the deviations of inflation and output from their targets. In the case of Kumhof et al. (2010), it assumes the form:

$$\ln\left(\frac{R_t}{R^*}\right) = \phi_\pi^R * \ln\left(\frac{\pi_t}{\pi^*}\right) + \phi_y^R * \ln\left(\frac{y_t}{y^*}\right) \quad (5.4)$$

where R^* , π^* and y^* are the target-values for the gross nominal interest rate, inflation and output, respectively.

¹⁴ The rule responds to lagged debt (in period $t-1$, instead of period t) due to the assumption that fiscal policy needs time to be implemented (Kumhof et al., 2010).

¹⁵ The interval for which solvency is assured by fiscal policy is obtained analytically by combining the tax rule and the government's budget constraint. In relation to this particular example, see Appendix B of Kumhof et al. (2010) for calculations and relevant assumptions. For the specific calibration of their model, fiscal dominance is present when $\phi_a^\tau < 0.232$.

¹⁶ Like the equations in the beginning of this section, this illustrates how changing nominal interest rates and inflation can ease or increase the fiscal burden, since the higher the reference value is, the more responsive taxation must be to debt fluctuations in order to ensure solvency on its own.

ϕ_π^R determines how interest rates respond to deviations of inflation from their target and, thus, indicates whether monetary policy is active (as under monetary dominance) or passive (as under fiscal dominance). A standard Taylor Rule will aggressively respond to inflation deviations ($\phi_\pi^R > 1$) and will respond to a lesser degree to output. Conversely, a passive stance from the monetary authority (which is associated with fiscal dominance) would be reflected in a muted or even negative response of nominal interest rates to inflation (i.e., $\phi_\pi^R < 0$).¹⁷

The subordination of the monetary authority to its fiscal counterpart might be reflected in other ways. Kumhof et al. (2010) specifically allow for an explicit reaction of nominal interest rates to government debt. In this case, the policy rule followed by the central bank becomes:

$$\ln\left(\frac{R_t}{R^*}\right) = \phi_\pi^R * \ln\left(\frac{\pi_t}{\pi^*}\right) + \phi_y^R * \ln\left(\frac{y_t}{y^*}\right) + \phi_a^R * \frac{(a_{t-j} - a^*)}{y^*} \quad (5.5)$$

where a^* is the target value for total government debt and ϕ_a^R is the parameter that determines the response of the nominal interest rates to fluctuations in the debt-to-output ratio.¹⁸ This allows for a different illustration of a monetary policy that must contend with an active fiscal authority.

As Kumhof et al. (2010) surmised, this addition could open the possibility of monetary policy being able to account for the evolution of public debt without sacrificing its ability to target inflation, that is, without necessarily requiring that $\phi_\pi^R \leq 0$ (which was one of the questions that had spurred the study of fiscal dominance in this literature). However, while including a response to fiscal variables such as debt marginally increases welfare when the central bank must contend with an exogenous tax rate rule (where $\phi_a^T = 0$), the modified monetary policy rules either require a negative coefficient on inflation to optimally minimise welfare loss (relative to the Ramsey optimal policy regime) or, if they envisage an aggressive response to inflation (i.e., $\phi_\pi^R > 1$), violate a zero lower bound on nominal interest rates too

¹⁷ The parameter that dictates the response to the output gap, ϕ_y^R , does not appear important in determining the monetary policy stance. The interest rate rule considered in the original work of Leeper (1991) responds solely to inflation, whereas, in Kumhof et al. (2010), the type of response to the output gap does not significantly affect results and, thus, the authors focus on the case where $\phi_y^R = 0$. Schmitt-Grohé and Uribe (2007), in their study of optimal monetary policy, find that interest rate rules with a non-null response to output imply higher welfare costs and, therefore, an optimal interest rate rule will not factor in such a response.

¹⁸ Such a monetary policy rule encompasses the baseline Taylor rule, in which $\phi_a^R = 0$.

frequently and are, thus, not implementable.¹⁹ In fact, the more the central bank attempts to aggressively respond to inflation with this modified rule, the greater the volatility of all economic variables, inflation included (Kumhof et al., 2010).

In the end, inflation volatility largely explains the broadly similar conclusions of these studies of fiscal dominance: maintaining or moving to a Ricardian or monetary-dominant regime is much more beneficial than any scenario with an active fiscal authority and a passive monetary one (Kirsanova et al., 2009; Kirsanova & Wren-Lewis, 2012; Schmitt-Grohé & Uribe, 2007), with or without a modified interest rate rule, as in Kumhof et al. (2010).

Using unexpected inflation as a lump-sum tax on nominal wealth (a reduction in the real value of debt) leads to high inflation volatility, which, under sticky prices, has a negative effect on welfare. This may stem from increased price dispersion which is inefficient. This negative impact on welfare is greater than any stemming from the use of distortionary taxes, even in response to shocks that affect the government's budget constraint (Benigno & Woodford, 2003; Schmitt-Grohé & Uribe, 2004, 2007). Even a small degree of price stickiness moves the optimal inflation volatility close to zero (so as to minimise price dispersion) and, thus, makes government financing through unexpected inflation undesirable (Schmitt-Grohé & Uribe, 2004). Moreover, price stickiness might limit the government's ability to issue real state-contingent debt (which can be "inflated away") in the first place (Schmitt-Grohé & Uribe, 2007).

Thus far, the NK approach confirms that a passive monetary policy is capable of stabilising debt when fiscal policy is active (Kirsanova & Wren-Lewis, 2012) and, more importantly, that such a regime does lead to a determinate, rational expectations equilibrium, as confirmed by Leeper (1991) and, later, by Schmitt-Grohé and Uribe (2007). This idea is shared with the FTPL, not least because both the FTPL and the NK approach to fiscal dominance stem from the work of Leeper (1991).

However, having established the feasibility of fiscal dominance as a policy mix, the literature covered in this section then assesses the optimality of a fiscally-dominant regime where monetary policy would contribute towards debt sustainability. In this aspect, the

¹⁹ In Kumhof et al. (2010), as in Schmitt-Grohé and Uribe (2007), this zero-lower-bound condition is imposed by limiting the volatility of nominal interest rates relative to their target. In Schmitt-Grohé and Uribe (2007), the exact condition is $2\sigma_R < R^*$, where σ_R is the unconditional standard deviation of the nominal interest rate. In Kumhof et al. (2010), the exact condition is only slightly different: $E \ln(R) \geq 2\sigma_R$.

conclusions of the NK approach are in the same spirit of those of Sargent and Wallace (1981). It is under a Ricardian regime (or monetary dominance) that welfare loss and inflation volatility are minimised. Without needing to stabilise debt in response to shocks, the monetary authority can aggressively respond to deviations of inflation from its target and, consequently, it effectively anchors inflation expectations. Ultimately, this anchoring of expectations dictates the central bank's ability to successfully target inflation, something that is not possible under outright fiscal dominance (Kumhof et al., 2010).

However, even if a fiscally-dominant regime is not optimal in all circumstances, might there be some situations in which it is optimal or, at least, desirable?

5.2. Regime switching

From the end of the Great Moderation to the current Covid-19 pandemic, aspects of the theoretical analysis of fiscal dominance in the NK approach underwent some changes. Though the focus on monetary policy within that regime remained, the contribution of the monetary authorities to debt sustainability was studied as a deliberate (and temporary) response to the large accumulation of public debt and high debt-to-GDP ratios seen since the GFC and the European sovereign debt crisis.

With a large enough initial stock of debt, Kirsanova and Wren-Lewis (2012) concluded that, even under optimal fiscal feedback, optimal monetary policy would not be active, since interest rate changes could have a sizeable effect on the government's budget constraint. After the GFC, given the possibility that fiscal policy alone might be unable to stabilise debt (especially if further deficits and spending were needed in the future), there was renewed interest in so-called “debt liquidation” strategies which could keep real interest rates low (i.e., induce “financial repression”) and “inflate away” the real value of debt (Aizenman & Marion, 2011; Dufrénot et al., 2018; Hilscher et al., 2022; Reinhart & Sbrancia, 2015; Reis, 2016a).²⁰

²⁰ Parallels were drawn to the past experience of many advanced economies after the end of Second World War (particularly, the U.S.), when low real interest rates had been key to reducing the debt burden (Aizenman & Marion, 2011). However, part of that financial repression had also been maintained until the 1980s via capital controls and other forms of regulation, as Reinhart and Sbrancia (2015) show, not just monetary policy.

Indeed, in the face of debt traps and in the absence of sound fiscal policy, financial repression may be an alternative to outright monetisation (Orphanides, 2017).²¹

Even if temporary, these measures constitute a move to a regime of fiscal dominance and, thus, part of the literature on policy interactions focused on modelling how such regime changes (isolated or recurring) could occur in DSGE models. It studied how both policy authorities would interact in the event of a shock that, for example, imposed a fiscal limit; which regimes would arise from that interaction and what the consequences of this (and the ensuing accumulations of public debt) would be for the central bank's pursuit of price stability (Bianchi & Melosi, 2019; Davig & Leeper, 2011; Davig et al., 2011; Reis, 2016b).

Whereas Sargent and Wallace (1981) had used a deterministic model to study policy interactions (Leeper, 1991) and the papers covered in the previous subsection had fixed one regime or the other permanently, this strand of literature included the possibility of regime change (Bianchi & Melosi, 2019; Davig & Leeper, 2006, 2011). More specifically, regime-switching processes are applied to the parameters which dictate the monetary policy's response to inflation and the fiscal policy's response to debt. Thus, a policy authority's stance may alternate recurrently between active and passive, with the values for the aforementioned parameters changing accordingly (Bianchi & Melosi, 2019; Davig & Leeper, 2007)

Regime change may occur at the point where the debt burden and fiscal stress are so large that fiscal adjustments are no longer possible or willingly conducted. As a result, passive monetary policies become a real possibility. For example, in Davig et al. (2011), a growth in transfers is initially financed by debt issuance, backed by increased taxation. Eventually, public debt grows past the point where taxation can support it and the economy hits a fiscal limit (e.g., the top of a Laffer curve or a political economy constraint).²²

Some contributions in this literature on regime change draw on elements from the FTPL, namely the existence of wealth effects and the presence of the government's IBC as an equilibrium condition (Davig & Leeper, 2011; Davig et al., 2011). Nonetheless, both the FTPL and non-FTPL literature share the idea that, when regime change is possible, agents'

²¹ Unconventional monetary policies (UMPs, hereafter) such as quantitative easing (QE) and forward guidance could play an important role in this regard (Orphanides, 2017), given that their effects on long-term interest rates and on inflation could contribute towards sustainable debt dynamics, as in Dufrénot et al. (2018, p. 337).

²² This growth in transfers is an example of how, instead of specific shocks or crises, fiscal imbalances can be associated with more long-term issues stemming from demographic and social pressures (e.g., the funding of social security programs) – see e.g., Davig et al. (2010).

expectations regarding the solution to the fiscal stress ultimately dictate the effectiveness of policies and the path of macroeconomic variables (Bianchi & Ilut, 2017; Bianchi & Melosi, 2017; Davig & Leeper, 2007; Leeper & Walker, 2011). Thus, the optimality of an active monetary policy (and therefore, the undesirability of fiscal dominance) is dependent on the expectations of agents regarding the policy mix that will exist in the future.

Bianchi and Melosi (2019) do not incorporate features of the FTPL and, so, are a good example of the importance of expectations in a New Keynesian setting. In their model, the increase in the debt-to-GDP ratio (which makes regime change possible) is the result of an attempted fiscal stimulus in response to a large negative demand shock (which triggers a recession).²³ Immediately after the end of that period of low demand, a temporary conflict between the two policy authorities ensues, during which both intend to adopt an active stance.²⁴ In the face of this, agents may either expect the conflict to end in fiscal dominance or monetary dominance.

If agents expect fiscal dominance at the end of the institutional conflict, they will not anticipate future fiscal adjustments, but rather that debt will be inflated away by the monetary authority. Consequently, inflation expectations increase, which an active monetary authority will attempt to curb. However, the resulting increases in real interest rates not only directly aggravate the debt service, but also worsen the recession brought on by the demand shock. Both factors bring added debt accumulation. Since debt is still expected to be inflated away, this warrants further tightening from the monetary authority (Bianchi & Melosi, 2019).

In the end, with expectations of a fiscally-dominant resolution, an active monetary stance during the institutional conflict is ineffectual and causes macroeconomic variables to display explosive dynamics. If there were an immediate shift to the fiscally-dominant regime (i.e., if there were no conflict period), debt-to-output would grow more moderately, the recession during the low demand period would be less severe and a boom would ensue when

²³ This stimulus is effectively carried out under a fiscally-dominant regime, since, during the recession, the monetary and the fiscal authority are temporarily less responsive to inflation and to debt, respectively.

²⁴ In Leeper (1991), a regime in which both policies are active is not possible, as it cannot lead to a stationary rational expectations equilibrium. However, this only applies when this policy mix is assumed to be permanent. Bianchi and Melosi (2019) argue that such an equilibrium is possible if it is perceived to be temporary by agents, i.e., that it will inevitably end in a fiscally-dominant mix or a monetary-dominant one. This is a noteworthy feature of their model, as it allows a more thorough (and illustrative) analysis of the consequences of conflicting policies. Greater detail is given of this particular paper for precisely this reason.

the demand shock faded. A welfare-based comparison, similar to those of sub-section 5.1., confirms that the immediate shift to fiscal dominance would be preferable since it avoids a period of conflict marred by inflation and output volatility (Bianchi & Melosi, 2019).

Despite this, in either scenario (an immediate or a post-conflict shift to fiscal dominance), monetary policy would be incapable of maintaining low inflation. In fact, from a welfare point of view, a monetary-dominant resolution to the conflict is preferable since it ensures macroeconomic stability in the long-term, i.e., output and inflation closer to their targets. However, this is only possible if agents expect a regime of monetary dominance to prevail (Bianchi & Melosi, 2019).

In conclusion, though it differs from it in certain features (monetary policy is conducted through interest rates and a passive monetary authority does not rely on seigniorage revenues), the NK approach reaches a similar conclusion to Sargent and Wallace (1981): fiscal dominance is undesirable as a policy mix because it leads to higher inflation volatility than under monetary dominance. Only under monetary dominance can a central bank effectively target inflation. Like Sargent and Wallace (1981) and, indeed, the FTPL, the NK approach also recognises that an active monetary policy leads to indeterminacy when faced with an active fiscal policy (Leeper, 1991; Schmitt-Grohé & Uribe, 2007) or (when regime change is possible) is ineffectual when it must contend with unfavourable agents' expectations. This is particularly relevant when high accumulations of debt can be the reason behind expectations of a fiscally-dominant regime being in place (Bianchi & Melosi, 2019; Davig et al., 2011).

Fundamentally, regardless of the approach adopted, the study of fiscal dominance serves as a reminder of the importance of policy interactions, something that had been somewhat overlooked during the Great Moderation (Reichlin et al., 2021). Indeed, the solution to the problems witnessed since the GFC (high and unsustainable debt levels, but also liquidity traps and lower bounds on nominal interest rates) require policy coordination (Bartsch et al., 2020; Sims, 2016). However, achieving it may not be as straightforward in practice. As will be discussed in the following section, attempts to do so face their own problems and raise important questions regarding the nature of policy-making institutions.

6. Threats of fiscal dominance after the GFC

Beyond the aspects covered thus far, it is important to analyse how fiscal dominance fits into the recent context of policy interactions and describe some of the evidence and further risks of fiscal dominance since the Global Financial Crisis of 2008 (GFC), the European sovereign debt crisis and in the wake of the Covid-19 pandemic.

The main argument in this section is that there has been no formal regime change nor any subordination of central banks to governments (Schnabel, 2020). Rather, concerns of fiscal dominance are mainly associated with gaps or omissions in the institutional background of monetary and fiscal policies regarding their interactions. Sub-section 6.2 will focus on the Euro Area as the most interesting and relevant example. The need to protect the ECB from outside influences (particularly, from dysfunctional national fiscal policies) was embedded in the European Monetary Union's founding treaties, as argued by Rostagno et al. (2019, p. 52). This explains the greater sensitivity in the Euro Area to any losses of the ECB's independence, but also why points of policy interaction such as the fiscal backing of the ECB's balance sheet, a monetary backstop to fiscal policy (monetary financing is prohibited by the Treaty of Maastricht) or the overall coordination of policy responses during a crisis were not clarified (Reichlin et al., 2021). This contrasts with countries that are not a part of monetary unions (e.g., the U.K. and U.S.), where policy coordination is more easily achieved, such institutional gaps are not as evident (Bartsch et al., 2020; Corsetti et al., 2019) and, thus, concerns of fiscal dominance are tied to specific measures, such as unconventional monetary policies (UMPs, hereafter) or proposals of monetary financing (Turner, 2015).

6.1. Policy interactions and fiscal dominance

During the Great Moderation that predated the GFC, policy separation was seen as paramount in achieving low inflation and smoother business cycles, with an independent central bank focusing on price stability and the governments on public debt sustainability (i.e., monetary dominance). Fiscal and monetary policy were seen as substitutes (Bartsch et al., 2020) and the latter as sufficient for macroeconomic stabilisation (Corsetti et al., 2019). This assignment of responsibilities provides credibility to policy authorities (hence its importance), but the GFC, the European sovereign debt crisis and Covid-19 have highlighted the complementarity of fiscal and monetary policies (Chadha et al., 2021). On their own,

monetary authorities were able to address financial instability (another of their major concerns) but not consistently hit their inflation targets, nor deliver the stimulus needed for further growth (Agur et al., 2022; Bartsch et al., 2020; Corsetti et al., 2019).

The economic turmoil since the GFC has proven that policy coordination is required to achieve a more effective macroeconomic and financial stabilisation during severe crises. The ability to mutually provide additional “policy space” (as Bartsch et al. (2020, p. 1) refer to it) is particularly relevant in the presence of limiting factors such as high-debt-to-GDP ratios, enlarged central banks’ balance sheets and a lower bound on nominal interest rates (Bartsch et al., 2020; Orphanides, 2016). On one hand, monetary policy can ease the burden of public debt and prevent self-fulfilling debt crises (Corsetti & Dedola, 2016), thus removing some of the constraints on countercyclical fiscal policy. On the other hand, governments can provide fiscal backing to central banks, protecting them from insolvency due to the potential losses incurred by their operations, especially, balance sheet policies (Bartsch et al., 2020; Kuttner, 2018; Reichlin et al., 2021).

Nevertheless, a credible commitment to price stability is indispensable to enable these benefits and a return to normality when the crisis has abated. On one hand, if debt sustainability is not assured, fiscal policy cannot ensure the central bank’s solvency. On the other hand, the central bank cannot provide a backstop for public debt if its balance sheet is already large and it cannot anchor inflation expectations. Higher expected inflation results in higher inflation premia, which raise the borrowing costs for governments. If agents expect the central bank to continuously resort to higher inflation to maintain the government’s solvency, a self-fulfilling cycle is created which continuously worsens borrowing costs and makes a central bank backstop ineffective (Bartsch et al., 2020).

Attempting to exploit these interactions and complementarities may lead to instances where the separation between policies and between mandates becomes blurred. Further down, an extreme situation of merged policies will be discussed (monetary financing), but the introduction of UMPs, in the attempt to gain additional policy space, provides a sufficiently clear example of how interconnected the actions of fiscal and monetary authorities are and how fiscal dominance may become a concern (Bartsch et al., 2020; Bhattarai & Neely, 2022; Blommestein & Turner, 2012).

As many economies reached the lower bound on nominal interest rates and uncertainty led to a decline in asset substitutability across the maturity spectrum, short-term interest rate

policy became less effective and UMPs (particularly, balance sheet policies) became an alternative tool to provide liquidity to the financial sector.²⁵ They aimed to signal the intention of keeping future short-term interest rates low and to lower long-term interest rates (Kuttner, 2018; Reichlin et al., 2021). UMPs afforded additional policy space to monetary policy in the face of a lower bound on nominal interest rates (Bartsch et al., 2020).

However, lowering the yields of safe assets with longer maturities, removing financial frictions and ensuring favourable financing conditions often involves intervening in the sovereign debt market, due to the connection of those risk-free yields with those of long-term government bonds (Turner, 2011). The ensuing effects on debt management create concerns of moral hazard (Reichlin et al., 2021). Moreover, the central bank's balance sheet occasionally became a part of policies traditionally assigned to governments. For instance, in the U.S., this included (i) the purchase of mortgage backed securities under QE in November of 2008, which aimed at stabilising the mortgage market and may be seen as a bailout to a sector of the economy or as credit policy (Bordo & Levy, 2021; Orphanides, 2016); (ii) the Municipal Lending Facility, which enabled the purchase of state and municipal bonds; and (iii) the Mainstreet Lending Program, which focused on direct lending to small and medium-sized businesses (Bartsch et al., 2020; Bordo & Levy, 2021).²⁶ Purchases of private assets in particular may elicit perceptions of central bank aid to certain sectors (Bernanke, 2020).

For their part, fiscal authorities and debt management offices (which have operational autonomy over public debt management) have taken advantage of the favourable conditions created by monetary policy to either reduce the cost of servicing debt or to lengthen its maturity (Blommestein & Turner, 2012; Turner, 2011). Debt management is, therefore, endogenous to monetary conditions and, simultaneously, influences the course of monetary policy through its effects on the maturity structure. For instance, Reichlin et al. (2021) stress that the effectiveness of long-term bond purchases in the secondary market (QE) is dependent on the response of the fiscal authority. If the latter matches its issuance of long-term bonds to the central bank's asset purchases, then there is no shortening of the maturity of debt held by the private sector and no effect on yields (Blommestein & Turner, 2012). Thus, policy coordination also allows the removal of hindrances to countercyclical policies.

²⁵ That is, assets of different maturities became imperfect substitutes. As argued long ago by, e.g., Turner (2011), this may be due to uncertainty over future interest rates, itself a consequence of higher debt-to-GDP ratios.

²⁶ The latter two were introduced during the Covid-19 pandemic.

Under an adequate policy mix, the aforementioned complementarities are harnessed and both authorities gain policy space (especially during adverse shocks). Simultaneously, a credible commitment to long-term price stability and public debt sustainability is preserved, as is the institutional and operational independence of each authority. These are crucial elements to policy effectiveness (Bartsch et al., 2020). Insofar as it constitutes an inadequate policy mix, fiscal dominance may be the result of a failure to meet both of these criteria. Absence of independence and a credible commitment to price stability are known features of this policy mix, but a situation in which the institutional framework does not properly account for the interactions of policies is equally conducive to fears of fiscal dominance (Bartsch et al., 2020). Therefore, the following sub-sections will analyse how instances of fiscal dominance may be associated with either situation, beginning with the latter.

6.2. Institutional gaps: The Euro Area

The association of UMPs with a less defined separation of mandates may be tied to a greater perception of the capabilities of monetary policy (Orphanides, 2013). Indeed, even with no alterations in mandates, some of the actions of central banks in advanced economies were motivated by concerns beyond strict price stability (though connected to it in some way), especially financial stability (Blommestein & Turner, 2012; Mishkin, 2017; Reichlin et al., 2021).²⁷ Whether due to a recognition of the speed and efficacy of a monetary authority's interventions, as opposed to its fiscal counterpart (Orphanides, 2016), or a greater awareness of the interactions between it and goals beyond price stability, monetary policy was given a broader scope of action than previously (Blommestein & Turner, 2012).

In these circumstances, Orphanides (2013) put forward the possibility of an “over-burdening” of monetary policy with achieving multiple goals, which could ultimately lead to its diminished effectiveness.²⁸ The Euro Area is a concrete example of this over-reliance on

²⁷ Wyplosz (2019) states that fiscal dominance may arise when an independent central bank is forced to respond to issues created by the fiscal authority. When the central bank is forced to address financial instability, possibly at the expense of its other objectives, it is possible to speak of *financial dominance* (Bartsch et al., 2020). Nevertheless, financial instability is also relevant to a discussion of fiscal dominance, since it may burden the government budget with bailouts and other measures, thus, compromising debt sustainability. Accordingly, Humpage (2016) regards the need to preserve financial stability as one of the key factors which fostered fiscal dominance in the U.S., in the post-war era.

²⁸ One of these secondary goals could be contributing to debt sustainability.

monetary policy (Bartsch et al., 2020), a potential by-product of an institutional framework that constrains the exploitation of complementarities on the side of fiscal policy and on the side of monetary policy (as alluded to previously and will be detailed below).

Regarding the former, there is the view that an aggregate fiscal stance that could contribute towards macroeconomic stabilisation in the Euro Area was not properly achieved during the sovereign debt crisis. This could partly be attributed to the lack of a monetary backstop to fiscal policy and the difficulty of monetary policy in creating fiscal policy space, problems that, in turn, arise from the lack of a solid and integrated institutional background for monetary and fiscal policy (Bartsch et al., 2020; Corsetti et al., 2019).

The Treaty of Maastricht had cemented a regime of monetary dominance within the Euro Area. In order to secure the ECB's independence, its ability to act as lender of last resort to governments was limited (monetary financing of government debt was prohibited). Fiscal discipline on the part of national governments was imperative and would be ensured by the rules of the Stability and Growth Pact and a "no-bailout" clause (Dell'Ariccia et al., 2018; Reichlin et al., 2021; Wyplosz, 2019). However, the absence of a monetary backstop to fiscal policy made it difficult to counter self-fulfilling debt dynamics (to which members of a currency union are more vulnerable) (De Grauwe & Ji, 2013; Reichlin et al., 2021).

Moreover, with policies being directed towards the Euro Area as a whole, heterogenous financial and economic conditions across member-states could make the ECB's stance inadequately tight for some and overly accommodative for others. During the sovereign debt crisis, this hampered the ECB's ability to create fiscal policy space and, thus, allow national governments to adopt a more expansionary fiscal stance to complement monetary policy (Bartsch et al., 2020). As financial market segmentation grew along national lines and as sovereign spreads widened (Reichlin et al., 2021), countries with weak fundamentals faced higher risk premia and, thus, undertook fiscal consolidations. Countries viewed as less risky refrained from an expansionary fiscal policy as well, either due to precaution or due to the fact that the ECB's monetary policy was sufficient for their own recovery. Thus, the union-wide fiscal stance was insufficient to contribute towards economic stabilisation during the sovereign debt crisis (Bartsch et al., 2020; Corsetti et al., 2019).

The problem of self-fulfilling debt dynamics was ameliorated by the ECB's intervention after 2012, particularly after the announcement of the Outright Monetary Transactions (OMT) programme, which signalled a commitment to provide monetary

backing.²⁹ Though it prevented a liquidity crisis from developing into a solvency crisis that could have endangered the Euro Area itself (Mishkin, 2017; Orphanides, 2016; Reichlin et al., 2021), it did not alter the aggregate fiscal stance of the Euro Area, as the OMT programme was conditional on countries agreeing to programmes of the European Stability Mechanism (Corsetti et al., 2019).

These limitations on fiscal policy meant there was greater reliance on the ECB to carry out an effective stabilisation. However, the leveraging of policy complementarities was also hindered on the monetary policy side by factors related to fiscal dominance and which will be addressed in the following paragraphs: lack of clarity regarding some details of the ECB's mandate; political interference in monetary policy; perceived threats to the ECB's independence and the fiscal backing of the ECB's balance sheet.

The first limiting factor stems from the lack of clarity in the statutes of the ECB on the connection between the primary objective of price stability and possible secondary objectives, namely, financial stability and the distributional consequences of monetary policy in the Euro Area. Reichlin et al. (2021) argue that it is not clear how the interplay between different policy objectives is balanced and how that judgement affects the manner in which the ECB uses its policy instruments (such as quantitative easing). This doubt as to the central bank's intentions naturally leads to concerns of fiscal dominance. For instance, the OMT programme was meant to reinstate monetary policy transmission in the face of increasing financial fragmentation, but some regard it as an attempt to bypass the ECB's limitations on being a lender of last resort to governments (Wyplosz, 2019).³⁰ Others, such as Mishkin (2017), go even further and equate it to effective monetisation, despite the conditionality of a country's adherence to it.

Limitations owing to the next two factors, political interference (or what may be viewed as such) and the ECB's own perception of threats to its independence, are tied to a concern that the ECB's interventions may violate the Treaty and will generate complacency among national governments of the Euro Area in upholding fiscal sustainability. When

²⁹ It is worthwhile to note that the OMT programme was never implemented. The readiness of the ECB to conduct possibly unlimited purchases of government bonds was sufficient to forestall self-fulfilling debt dynamics and to restrain the increase in sovereign spreads (Reichlin et al., 2021; Bartsch et al., 2020).

³⁰ In fact, the adoption of unconventional monetary policies in general may be regarded as means to implement necessary measures within the limits of the Treaty on the Functioning of the European Union (Dell'Ariccia et al., 2018; Wyplosz, 2019).

governments are fiscally constrained, the easing of the debt burden provided by monetary policy may, indeed, be difficult to relinquish (Blommestein & Turner, 2012; Mishkin, 2017).

Regarding political interference (the second factor mentioned), the typical scenario of politically-driven fiscal dominance involves pressure from a government for a central bank to adopt an overly accommodative monetary policy. As there is no single government in the euro area that has sufficient influence to alter the course of monetary policy, nor an equivalent, union-wide, fiscal authority, the ECB is less susceptible to this issue (Blanchard et al., 2013). Another reason for this lack of leverage may be the low amount of risk-sharing within the Eurosystem. Most assets purchased under special programmes are held by the national central banks, not the ECB itself. Therefore, its balance sheet is not as vulnerable to sovereign default risk from any single country and there is a smaller incentive for strategic default, on the part of governments, at the expense of the ECB (Reichlin et al., 2021).

While there are many political threats to the formal or institutional independence of the ECB, there may be political constraints on its operational independence, i.e., the central bank's autonomy to use its policy tools. According to Wyplosz (2019), the reluctance of the ECB over the OMT programme was partly due to the opposition of some Euro Area governments, whose approval was deemed necessary. This, and the subsequent legal challenges to the decision of announcing the OMT programme, may constitute an equally relevant constraint on the monetary authority's operational independence. Thus, in this case, fiscal dominance may be associated with an insufficiently accommodative monetary stance.

If borne by the ECB itself, perceptions of a threatened independence (the third factor mentioned) may be self-reinforcing. Studying the effects of central bank communication on fiscal policy, Marozzi (2021) finds that, during large scale asset purchases, concerns over moral hazard have led the ECB to advocate a more restrained fiscal policy stance, in order to avert free-riding from national governments and to maintain its independence. Surprise changes in the ECB's "communicated degree of fiscal policy accommodation" (DFPA) (Marozzi, 2021, p. 3) in the vicinity of the sovereign debt crisis are found to have contributed to lower inflation and output, particularly in the group of countries labelled "South" (Italy, Spain, Portugal, Malta, Greece and Ireland). These countries are found to increase government spending as they internalise the effects of asset purchases, so this may explain the ECB's reaction (Marozzi, 2021). Nonetheless, with its "fiscal" stance depressing output and inflation, the unconventional monetary policies which sparked fears of a threatened

independence may need to be in place for longer, thus, reinforcing and prolonging those very same fears (Bénassy-Quéré & Weder di Mauro, 2020; Dell'Ariccia et al., 2018).

Finally, there is the issue of fiscal backing of a central bank's balance sheet. Since 2015, with the start of the Asset Purchases Programme (APP), the ECB's balance sheet has expanded considerably, exposing the ECB to various forms of risk, particularly sovereign risk. Moreover, maturity mismatches between assets and liabilities, as well as uncertainty over the future relevance of seigniorage revenues, have increased the likelihood of net income losses in the ECB's balance sheet (Bartsch et al., 2020; Reichlin et al., 2021; Reis, 2016a). However, despite the implications of these problems for central bank solvency and the conduct of monetary policy, there is no clear provision for how fiscal support may be given to the Eurosystem from the national governments of the Euro Area. Reichlin et al. (2021) and Corsetti and Dedola (2016) point out that, although national central banks are required by the Treaty to be adequately capitalised and net income gained by the ECB must be distributed to the national central banks (who pass it on to their governments), it is not the explicit responsibility of Euro Area governments to provide a recapitalisation to the Eurosystem as a whole, if it becomes necessary. This contrasts with countries such as the U.S. and U.K. where the possibility of recapitalisation and fiscal support for monetary policy operations has been duly considered (Bartsch et al., 2020; Haas et al., 2020). For example, the Federal Reserve can withhold future disbursements to the Treasury in order to cover losses from negative net income in a given period (Reis, 2016a).

Therefore, unlike other central banks in advanced economies, the ECB may have difficulty in sustaining the significant capital losses that may result from its UMPs. This has consequences for the conduct of monetary policy. First, a central bank that lacks fiscal backing may be reluctant to expand its balance sheet or conduct other policies (e.g., raising refinancing rates) which, though necessary to meet its inflation target, may have a negative impact on its net worth (Bartsch et al., 2020; Reichlin et al., 2021). In these circumstances, it may also be unable to provide the necessary liquidity backstop to the fiscal authority (Corsetti & Dedola, 2016). Second, in an attempt to stave off insolvency, a central bank may seek to gain further revenue from seigniorage and aim for a higher inflation target, thus de-anchoring inflation expectations (Corsetti & Dedola, 2016). Third (and more specifically related to fiscal dominance), if there are no institutional rules outlining in what situations governments and

treasuries may be called upon to recapitalise the central bank, then it is possible that, when requested, such aid may come at the cost of the latter's independence (Bartsch et al., 2020).

As can be seen, gaps in the policymaking institutional framework regarding certain policy interactions are as conducive to fears of fiscal dominance as a formal subordination of the central bank to the fiscal authority. Such inadequacies of the policy mix are connected to an inability to harness the interactions of fiscal and monetary policy, which, in turn, may be due to a desire to maintain strict policy separation (Rostagno et al., 2019). Nevertheless, since the GFC, there have been examples of attempts to exploit policy interactions that, as under fiscal dominance, compromise central bank independence and, thus, the achievement of price stability and debt sustainability in the long-term.

6.3. Sacrificing the long-term: a return of monetisation?

A common feature of fiscal dominance is the subordination of the monetary authority to its fiscal counterpart and, like the institutional gaps discussed previously, it can also lead to an inadequate policy mix. In this case, the interaction between policies comes at the cost of the credibility of their commitment to long-term goals of price stability and debt sustainability. In the past, such a policy mix often implied there was little separation between monetary and fiscal policy institutions (Bartsch et al., 2020), but, in recent times, independent central banks in advanced economies still face political interferences (Wyplosz, 2019). In particular, since the GFC, there have been clear cases of governments co-opting monetary policy instruments for other ends, including, for example, the appropriation of Federal Reserve assets in order to fund the Consumer Financial Protection Bureau, in 2010, and the Highway Trust Fund, in 2015, as well as pressures for the foreign exchange reserves of the Swiss National Bank to be used for “extra-monetary” purposes (Bordo & Levy, 2021; Plosser, 2017). However, there is one measure which involves a considerable risk of a central bank acting as a fiscal agent: monetary financing or *helicopter money* (Bartsch et al., 2020).

Monetary financing involves a permanent increase in the monetary base to finance a tax cut or expenditure increase, either through direct transfers to the government or through purchases of newly-issued debt. Asset purchases are an integral part of both monetary financing and of quantitative easing; however, unlike quantitative easing, the increase in the monetary base from monetary financing is permanent, i.e., not reversed when certain policy

goals are achieved (e.g., inflation reaching its target and the economy recovering to its potential (Turner, 2015). The intentions of the central bank distinguish the two policy tools and explain the different effect each may have on agents' expectations regarding future economic conditions (Agur et al., 2022; Blanchard & Pisani-Ferry, 2020).

Regarding the theoretical background of the discussion, there is support for the effectiveness of monetary financing in achieving desired outcomes (Turner, 2015). The intuition for how monetary financing is modelled may be immediately grasped by analysing an example of a government's flow budget constraint, found in Galí (2020a):

$$G_t + \mathcal{B}_{t-1}\mathcal{R}_{t-1} = T_t + \mathcal{B}_t + \Delta M_t/P_t \quad (6.1)$$

where G_t is real government purchases, \mathcal{B}_t is real government debt outstanding (nominal one-period bonds), \mathcal{R}_{t-1} is the gross real interest rate, T_t is lump-sum taxation and $\Delta M_t/P_t$ is seigniorage revenue. Under a money-financed fiscal program, the intended fiscal stimulus (whether in the form of greater spending, G_t , or as a tax cut, T_t) is financed by an increase in seigniorage revenues through money growth, $\Delta M_t/P_t$, not by an issuance in debt, (i.e., an increase in \mathcal{B}_t).

Galí (2020a) and English et al. (2017) analyse the effects of a money-financed fiscal expansion in sticky price New Keynesian DSGE models. In both of them, the monetary authority follows a money supply rule according to which money growth is set to ensure financing of a stimulus program through seigniorage. Conversely, under a debt-financed fiscal program, the monetary authority is assumed to continue targeting inflation (with money supply adjusting as needed to obtain an interest rate which stabilises inflation).

Debt-financed fiscal stimuli are found to have little to no effect on variables other than debt and taxes, mainly due to the existence of Ricardian Equivalence (Galí, 2020a). In the case of an increase in government spending, the direct (yet small) boost to aggregate demand is offset by a monetary contraction from the inflation-targeting central bank, which reduces private consumption (English et al., 2017; Galí, 2020a).

For their part, money-financed stimuli are found to have significant effects on different variables. On one hand, Ricardian equivalence does not apply for money-financed tax cuts. Since the central bank raises seigniorage revenues to finance the stimulus, agents do not expect a future adjustment in taxes and, consequently, view tax cuts as an increase in wealth that enables greater consumption (Galí, 2020a). On the other hand, increased liquidity from

an accommodative monetary authority lowers nominal and real interest rates in the presence of sticky prices, further contributing to increased aggregate demand (English et al., 2017; Galí, 2020a). As a result of both of these factors, the money-financed stimuli lead to a rise in output and inflation, as well as a decline in debt-to-GDP due to lower debt service (a consequence of lower real interest rates) and the expansion in output (English et al., 2017).

While, during the Great Moderation, monetary financing had been anathema to monetary dominance, in the years between the GFC and the Covid-19 pandemic, it was increasingly seen as a means for advanced economies to escape a liquidity trap (Agur et al., 2022; Turner, 2015).³¹ Accordingly, the effects of money-financed stimuli are also studied when nominal interest rates are at the zero lower bound.

Small differences exist in the findings on spending-based stimuli. English et al. (2017) finds that a debt-financed spending stimulus still has no impact on output and inflation. On the contrary, Galí (2020a) finds that, in a liquidity trap, a debt-financed spending stimulus effectively counters the negative demand shock through a lowering of real interest rates. This is, itself, due to the fact that the direct boost to aggregate demand induces an increase in inflation and, at the same time, is not met with a contractionary monetary policy (nominal interest rates are at the ZLB). For this reason, in a liquidity trap, there is a much smaller difference between a debt-financed stimulus in spending and a money-financed one.

In summary, with fiscal policy constrained by high accumulations of debt and with monetary policy constrained by an effective interest rate lower bound (as well as the exhaustion of most of its other policy tools), a money-financed fiscal stimulus could promote further growth and raise inflation expectations without the increase in debt and future tax burdens that a debt-financed stimulus entails (English et al., 2017; Galí, 2020a; Turner, 2015).

Nevertheless, there are dangers in monetary financing. The required deviations from inflation targets bear a risk of fiscal dominance if the authorities pressure the central bank to resort to this tool when economic conditions do not warrant it (Turner, 2015). Using monetary financing as a backstop for fiscal policy (rather than fiscal stimulus) is also prone to abuse, since it may be difficult to distinguish whether an increase in sovereign spreads is motivated by self-fulfilling dynamics or by a country's economic fundamentals (Agur et al.,

³¹ In fact, Japan had already been facing this situation since the 1990s and it was in that context that some of the earlier calls for monetary financing were made (Agur et al., 2022).

2022). Regardless, excessive use of monetary financing leads to de-anchored inflation expectations, possibly leading to hyperinflation (Bartsch et al., 2019). Moreover, the desired inflation increase may only materialise after the economy has exited the liquidity trap. Thus, even if monetary financing were a one-off measure, returning inflation to its target afterwards and re-anchoring expectations would be all the more difficult (English et al., 2017).

This propensity for misuse is seen as outweighing any potential benefits and, thus, monetary financing is often prohibited altogether. Turner (2015) states that the main challenge for it to be viewed as a less controversial tool (albeit, one to be used as a last-resort) has less to do with technical aspects and more with governance, i.e., its integration into an institutional framework that restricts its use to extraordinary circumstances. The Covid-19 pandemic was seen as an example of such circumstances (Galí, 2020b; Kapoor & Buiter, 2020; Yashiv, 2020) and, thus, it renewed a discussion around the implementation of monetary financing as a one-off measure without endangering central bank independence.

On the fiscal side, monetary finance must be associated with a specific stimulus measure and not with current expenditures or structural deficits. One can consider tax cuts and infrastructure investments with more long-term effects (Turner, 2015) or, more specifically, in the context of the Covid-19 pandemic, funding for expenses with healthcare (e.g., purchases of protective equipment and testing), protection of jobs and assistance to firms and households (e.g., the European Commission's SURE programme) (Yashiv, 2020).

On the side of monetary policy, the central bank should decide when and how much monetary financing is necessary for macroeconomic stabilisation. For example, it may conclude that the inflation target cannot be reached through its standard policy instruments. In those circumstances, the central bank itself could implement the measure (Turner, 2015) or it could make the necessary means available to the fiscal authorities (for example, in the form of an emergency lending facility) who would then determine whether or not to carry it out. Regarding the former possibility, one may even consider the implementation of helicopter money through direct transfers from the central bank to households. However, this may raise questions of political legitimacy, since it would be the central bank that determines where funds are applied and not an elected legislature or government (Bernanke, 2016). Finally, the monetary authority would also specify when to terminate such an extraordinary measure. Meeting a certain target for inflation (to which both authorities would, ideally, be committed) is one possibility (Bartsch et al., 2020; Bartsch et al., 2019).

Bartsch et al. (2019) analyse the options for implementing monetary financing in the Eurozone, Japan and the UK, but the proposal for the U.S., originally put forward by Bernanke (2016), is illustrative of the framework that may be set up. It involves the creation of a special Treasury Account in the Federal Reserve, into which funds could be placed to finance a certain fiscal program, but only if the Federal Open Market Committee deemed a money-financed fiscal stimulus necessary. The U.S. Congress and the Administration would then choose whether or not to use the funding provided and how to apply it. For its part, the Federal Reserve would retain the ability to withdraw unused funds at any time or empty the account altogether, especially when it judged that monetary financing is no longer necessary. Thus, monetary financing would require the assent of both policy authorities, but, above all, the central bank (English et al., 2017).

In the end, even with such rules in place, proponents of monetary financing stress that the degree to which its use is acceptable would depend on the concrete circumstances of the time and on the cost of pre-emptively excluding it as an option altogether (Bernanke, 2016; Galí, 2020b; Kapoor & Buiter, 2020; Turner, 2015). Unlike the low growth and inflation witnessed after the GFC in some regions (particularly, Japan and the Euro Area), the unprecedented crisis of the Covid-19 pandemic provided a more compelling justification for monetary financing. However, the inability to completely eliminate any chance of misuse make it, at best, a last resort option (Turner, 2015).

6.4. Fiscal dominance after the GFC: taking stock

In conclusion, this section showed how the threat of fiscal dominance has resurfaced since the end of the Great Moderation. Unlike in the historical episodes reviewed in section 3, the discussion of fiscal dominance no longer entails an actual shift to a regime that subordinates central banks to governments. Rather, it is fundamentally tied to the fact that the prevailing institutional frameworks did not envisage the unprecedented circumstances of the GFC and subsequent crises, nor the measures that were deemed necessary as a response.

The European Monetary Union is a noteworthy example of this. On one hand, the lack of a solid institutional background that integrates monetary and fiscal policy is more noticeable and has been amply discussed (for example, the absence of fiscal backing to the ECB's balance sheet, of fiscal and monetary policy coordination and of a monetary backstop

for fiscal policy) (Corsetti et al., 2019; Orphanides, 2020). On the other hand, strict policy separation has been an important building block of the Euro Area, imbedded in its founding treaties to safeguard the ECB's pursuit of price stability from national fiscal imbalances. This reflects a heightened sensitivity to undue influences on the ECB and a desire to protect its independence (Rostagno et al., 2019). Thus, in the Euro Area, the extraordinary monetary measures taken during the crisis (which partly aimed to overcome the shortcomings of the union-wide fiscal policy stance) were not duly envisaged within the mandate of the ECB and were especially susceptible to scrutiny regarding their implications for policy separation.

Nevertheless, gaps in the institutional frameworks regarding the employment of new policy tools were present in many advanced economies (Bernanke, 2020). Bartsch et al. (2020) point to an observational equivalence between policy congruence in response to crises and monetisation of deficits.³² For example, assets purchases in the sovereign debt market may seem similar to financing a government, even if they are meant to address financial frictions (Reichlin et al., 2021).

However, as Reichlin et al. (2021) and Bartsch et al. (2019) put it, recognising the interplay of fiscal and monetary policy does not imply forfeiting the latter's independence. Avoiding (mis)perceptions of a fiscally-dominated monetary policy in the modern context does not entail strict interpretations of mandate separation, but rather a better understanding of the tools available to central banks and how to make the necessary interventions (e.g., asset purchases under QE) less discretionary (Bernanke, 2020; Kuttner, 2018).

Removing sources of ambiguity in treaties or mandates (for example, the issue of fiscal backing of the ECB), defining the means through which policy coordination may be promoted and establishing clear criteria for a return to normality when stabilisation is achieved are critical issues. These would ultimately enhance the effectiveness of macroeconomic stabilisation, not only allowing complementarities to be harnessed when necessary but also maintaining the credible commitment of independent monetary and fiscal authorities to their long-term goals of price stability and public debt sustainability, respectively (Bartsch et al., 2020; Reichlin et al., 2021).

³² Bartsch et al. (2020) define a policy mix as *congruent* when monetary and fiscal policy are both countercyclical. When both are pro-cyclical, the policy mix is *destabilising* and, when one is pro-cyclical and the other is countercyclical, it is *divergent*.

7. Conclusion

This dissertation sought to review the literature on fiscal dominance, to better understand this phenomenon in various aspects, namely, its theoretical background, its historical manifestations and its presence in the modern context of policy interactions.

Section 2 outlined the general concept of fiscal dominance following the seminal contributions of Sargent and Wallace (1981) and Leeper (1991). Whether it specifically involves generating seigniorage revenues to directly finance fiscal policy (Sargent & Wallace, 1981) or using interest rate policy to uphold an intertemporal budget constraint and maintain the real value of debt (Leeper, 1991; Woodford, 2001), fiscal dominance is defined by an active fiscal policy that does not ensure solvency on its own (either due to political economy considerations or the existence of a fiscal limit) and a monetary authority that prioritises debt sustainability over price stability. This reflects the subordination of the central bank to the fiscal authority's goals and, as illustrated by the two historical cases in section 3, may be the outcome of deliberate political pressure from the Treasury or by force of circumstances such as an overly onerous debt service (Bordo & Levy, 2021).

Sargent and Wallace's (1981) emphasis on inflation-indexed debt, seigniorage revenue and control of monetary aggregates has less resonance today. Thus, sections 4 and 5 covered the more recent contributions of the FTPL and the New Keynesian literature (respectively) to the study of the implications of fiscal dominance for inflation management.

The FTPL (section 4) studies fiscal dominance as a regime that is compatible with price stability, consistent with the theory's view of inflation as a joint fiscal and monetary phenomenon. Under fiscal dominance, inflation is determined by the active fiscal policy as wealth effects lead to price level adjustments that uphold a valuation equation for government debt in equilibrium. The passive monetary policy retains some control over the timing of fiscally-driven inflation through its effect on long-term bond prices (Cochrane, 2022a). However, the criticisms of the FTPL discussed at the end of section 4 raise questions over its validity as a framework with which to study fiscal dominance.

The New-Keynesian (NK) approach (section 5) posits that using a passive monetary policy to ease the debt burden is not optimal, since it leads to de-anchored inflation expectations which prevent successful inflation-targeting. For this reason, fiscal dominance

generally exhibits higher and more volatile inflation than monetary dominance, making it an undesirable policy mix from a welfare perspective (Kumhof et al., 2010).³³

Section 6 addressed the broader issue of fiscal and monetary policy interactions and discussed how, despite the prevalence of monetary dominance and central bank independence (Schnabel, 2020), fiscal dominance has been a concern since the GFC. It argued that this was largely due to (i) the prevailing institutional frameworks failing to account for interactions between fiscal and monetary policy (with the Euro Area as an example of these institutional gaps) (Bartsch et al., 2020) and (ii) concerns over proposals for money-financed fiscal stimuli to overcome liquidity traps (Turner, 2015).

However, as stated in the introduction, the motivation for this dissertation was the combination of deficits, debt accumulations and monetary easing that specifically resulted from the Covid-19 pandemic. The greater relevance of fiscal dominance in this context (relative to the post-GFC period) is tied to the difference in agents' expectations regarding monetary and fiscal policy, an important factor for both the FTPL and the New-Keynesian approach (Bianchi & Melosi, 2019; Leeper & Walker, 2012).

The pandemic has lent credibility to the active fiscal stance pursued in most advanced economies in a way that, previously, only a major conflict could (English et al., 2017; Woodford, 2001). Beyond the scale of the deficits and debt accumulation (unseen since the Second World War) (Bordo & Levy, 2021), there was a perception that the present fiscal expansion would not be reversed in the immediate future, as an increase in spending was seen as necessary to fund healthcare, to maintain social safety nets and to support the eventual recovery of the economy. A concrete example of this commitment was the Eurogroup's decision, in March 2020, to suspend the rules of the Stability and Growth Pact (Bénassy-Quéré & Weder di Mauro, 2020), a measure that resembles the moratorium on fiscal budget rules that Sims (2016) had suggested for an effective fiscal expansion in the Euro Area that could overcome a liquidity trap.

On the monetary policy side, there was a continuation or reactivation of the monetary easing adopted after the 2008 and European sovereign debt crises, on an equal or greater scale (Haas et al., 2020). With some central banks already constrained by an effective lower

³³ In the NK approach, it is the monetary authority that allows unexpected inflation to occur in order to ensure intertemporal solvency (Kumhof et al., 2010), not a wealth effect that adjusts the price level to uphold the IBC as a na equilibrium condition, as in the FTPL.

bound before the appearance of Covid-19, concerns over the possible use of monetary financing were added to those already associated with UMPs (Blanchard & Pisani-Ferry, 2020; Schnabel, 2020). For instance, in the U.K., on April 9th 2020, the Bank of England activated a short-term lending facility (“Ways and Means advances to HM Government”) under which it can directly provide liquidity to HM Treasury. The measure is not new (it was last activated in 2008) but is an example of the notable policy coordination that occurred in response to the pandemic (Haas et al., 2020) and which, as Bartsch et al. (2020) argues, may be mistaken for monetisation.

Beyond this qualitative analysis, there exist a number of empirical methodologies for identifying the existence of Ricardian and Non-Ricardian regimes. These analyse the correlation between the evolution of debt and primary surpluses (Canzoneri et al., 2001), between debt and nominal interest rates (Ahmed et al., 2021) or between the fiscal burden and inflation expectations (European Central Bank, 2021, September 28). Though not covered in this dissertation, a review of these methodologies and their application could be a subject for future works.

In any case, currently, the presence of fiscal dominance is not tied to formal policy regimes, but rather to the specific actions of policy-makers, as seen in section 6. The post-GFC monetary easing did not result in significantly higher inflation, which remained well below target in economies such as the Euro Area and Japan (Dell'Ariccia et al., 2018). However, since early 2021, inflation has begun increasing (Cochrane, 2022b) and, thus, in the post-pandemic world, the existence of fiscal dominance will depend on how central banks balance the public debt overhang with their price stability mandates (Buiter, 2022). Even if the latter is prioritised, lower inflation cannot be achieved by monetary policy alone, especially if there are expectations of accommodative monetary stances and of a lack of future fiscal adjustments (Bianchi & Melosi, 2019). Policy coordination is necessary in order to achieve price stability. Present in Sargent and Wallace (1981), the FTPL and the NK approach, this is the most important conclusion from our study of fiscal dominance.

8. References

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