POLITICAL ECONOMY OF FISCAL REFORMS. THE CASE OF EUROPEAN MONETARY UNION

A Thesis submitted by
Theodore Chatziapostolou

Supervisory Commitee

Emerita Professor Kosteletou Nikolina

Professor Papandreou Andreas

Vlassis Missos Research Fellow, Centre of Planning and Economic Research,

National and Kapodistrian University of Athens
Department of Economics
Athens 2023

This research is co-financed by Greece and the European Union (European Social Fund- ESF) through the Operational Programme «Human Resources Development, Education and Lifelong Learning» in the context of the project "Strengthening Human Resources Research Potential via Doctorate Research – 2nd Cycle" (MIS-5000432), implemented by the State Scholarships Foundation (IKY).

Operational Programme
Human Resources Development,
Education and Lifelong Learning

To my niece Helen

and my nephew Nicolas

with all my love

ABSTRACT

In recent years, the global economy has faced two major disturbances—the financial crisis of 2007–8 and the pandemic crisis. National governments attempted to revitalise economies by providing necessary financial support. Consequently, their debt soared to unparalleled levels. These developments highlighted the issue of government debt, which has again drawn the attention of economists. The issue of debt becomes more complicated when the analysis concerns the member states of a monetary union (especially in the European Monetary Union-EMU). In the case of EMU, though fiscal cooperation is essential for the stability of the union, it is quite complex. Recently, fiscal rules have been criticized for being too strict and recessionary. All the aforesaid issues are the source of inspiration for this thesis. The hypothesis we attempt to analyze is whether the same fiscal rules can be applied to all the countries of the EMU which have numerous *inter se* differences. The dominant approach is that fiscal control and prudence are imperative for the stability of the currency. We contribute to this discussion by analyzing fiscal design in monetary unions and assessing the framework of fiscal cooperation in the EMU. While the first part discusses fiscal policy, the second is assesses fiscal design in EMU and the final part develops a model for estimating final consumption expenditures and social benefit expenditures multipliers for three categories of countries, namely, big and small, countries with high debt and countries with low debt and open and less open countries. The findings indicate that final consumption multiplier is higher in small, less open and low debt countries. These findings are in accordance both with the relevant literature and the economic theory. Small economies are easier to mobilise factors of production, less open economies are characterised by smaller externalities of fiscal policy (i.e. less imports) and finally low debt countries have less expenses for servicing their debt.

As for the social benefits expenditures we see the opposite results that is, social benefits multipliers are higher in big, open, and high debt countries. Yet the differences among the countries are smaller. This could be explained on the ground that social benefits are targeted towards a specific group of

households which have distinctive and peculiar characteristics. More precisely, these households are, possibly, excluded from financial sector and any money allowance from the government is saved rather than spend, having thus, minor, or even negative impact on economic activity. Further, these household spend their limited income in services or in some primary goods that both are produced domestically. This kind of spendings have limited effects on imports.

In some cases, we report negative multiplier. As for the final consumption multiplier in open economies multiplier is negative. This is in accordance with economic theory given the high volume of imports. On the other hand, social benefit multiplier is negative in less open and small economies. A possible explanation for this is that in both groups of countries social benefits deprive resources from development. This crowding-out effect makes multipliers negative.

As for the size of multipliers findings showed, insignificant size of social benefits multiplier in big, small and less open economies. Moreover, in less open economies also final consumption multiplier is around zero. Yet in low debt countries both social expenditures and final consumption multipliers are high, while only final consumption multiplier is high in high debt and small countries.

These differences in the size of fiscal multipliers have some compelling effects on the structure of the economic governance. The analysis shows that common fiscal rules would not be suitable for every country, given that the role and the effectiveness of fiscal policy are not straightforward and depend on several factors (Part I), there are different frameworks for fiscal monitoring and EMU has several drawbacks in its fiscal design (Part II) and the size of multipliers varies substantially between countries (Part III). The evidence presented in this thesis suggests that the fiscal institutional and legal framework of EMU has neither been designed nor been effective to deal with such an enormous increase in public debt. To apply identical fiscal rules to different countries could ultimately revive the old discussion of the two-speed Europe, this time not in the framework of economic development but that of fiscal adjustment.

Keywords: Fiscal Policy, European Monetary Union, Fiscal Multipliers, Debt, Fiscal Rules

Introduction

Fiscal policy has always been a central issue of macroeconomic theory and policy. Its content, impact, and strength as a policy tool have formed the framework of economic debate. Since Keynes introduced state intervention, highlighting the liquidity trap as a market failure, this dilemma has always reappeared in times of economic contraction. When unregulated markets, the ideal environment for individuals to maximise their utility guided by individual self-interest, lead to inefficiencies, there has always been room for state intervention to foster economic activity. Under these circumstances, the state should supplement or substitute markets to restore economic activity. So, a government uses its sovereign power to conduct economic activity to a full-employment equilibrium. Yet, this is not always the case, especially in the framework of a monetary union. We proceed to discuss the implication of expansionary fiscal policy in a monetary union.

In recent decades, there has been substantial economic cooperation among states. To gain a competitive advantage, some countries decide to develop various forms of economic cooperation restricting their economic freedom. The higher the level of economic integration, the lower is the ability of a state to freely choose the mixture of economic policy. In a monetary union, there are solid arguments against a discretionary fiscal policy, the first of which relates to the interest rate. Economic theory shows that fiscal expansion increases interest rates, which may crowd out private investment. Yet, under perfect capital mobility and a common currency, the corrective mechanism of depreciation could restore equilibrium only temporarily. Further, the high debt of a member state might harm the credibility of the currency, increasing the cost of borrowing for the other member states. This might also depreciate the common currency and increase price levels, due to imported inflation. Finally,

the fiscal irresponsibility of a member state of a monetary union involves moral hazard i.e., that of a member increasing the debt for its own benefit, safe in the knowledge that it is protected against the risk of high debt and the other member states will bear the cost by bailing-out the irresponsible state. All the above arguments emphasise the need for fiscal discipline in a monetary union. The appropriate design of fiscal monitoring, the implementation of efficient rules and their enforcement in case of violation, are central issues for the stability of a monetary union.

This issue becomes more challenging due to recent developments. The pandemic crisis has triggered a deep global economic recession, and the shadow of debt has returned in full force. In the European Monetary Union, the activation of the general escape clause of the Stability and Growth Pact allowed member states to undertake necessary fiscal measures to support their economies. This expansionary economic policy triggered a surge in debt levels, which, in some eurozone member states, increased to well above 100%. The heterogeneous preferences relating to the fiscal policy have led to large differences in fiscal positions across the EMU countries, questioning the rule-based fiscal framework of EMU, exposing some member states to liquidity and solvency risks (Ferguson & Kane, 2020). In this scenario, there has been wide agreement that both fiscal rules and fiscal institutional framework need to be re-designed (Buti, Giudice, & Leandro, 2020; Della Posta & Tamborini, 2021) because, under the present incomplete economic governance, any economic measure taken by the European Union would fail (Howarth & Quaglia, 2021). While some studies focus on the asymmetry between the EU's decentralised fiscal policy and the centralised monetary policy (e.g., Verdun, 1996; Howarth & Verdun, 2020), others focus on the strict detailed policy prescriptions (Hodson, 2020) while yet others emphasise the intervention of the European

Commission which, under European Semester, has more authority to influence national policies (Bauer & Bekker, 2014; Savage & Verdun, 2016).

Inspired by the aforementioned developments, this thesis critically analyses the framework of fiscal cooperation and fiscal monitoring in a monetary union, focussing on the European Monetary Union. The question this thesis will address is, whether it is possible to apply the same rules of fiscal discipline to different countries of a monetary union. This is a crucial issue because, after the pandemic crisis, the EMU should restore fiscal rules (which have currently been suspended but are expected to be reinstated after 2022). But the re-activation of fiscal rules might impose fiscal restrictions and procyclical measures in the economies of the member states. This will have different impacts on the member states. This thesis will examine the impact of the austerity measures taken by some countries on the monetary union. In other words, is it possible to apply the same rules of fiscal austerity and what will be its effect not only on these countries but on the whole monetary union? We contribute to this discussion by computing and comparing fiscal multipliers, both for government consumption and for government social benefits in three distinct categories of countries. This will help us to analyse fiscal design in monetary unions and assess the framework of fiscal cooperation in the EMU. To address the aforemention questions, this thesis is divided into three parts.

In the first part of our thesis, we present the debate on fiscal policy, spread over two periods. The first period is dominated by the debate between Milton Friedman and David Meiselman on the one side and Albert Ando and Franco Modigliani on the other. The focus of the first period is on the role of fiscal and monetary policy as a policy tool. This period ends in the 1980s when the second period starts. At the beginning of the second period, there was

an attempt to re-examine fiscal policy and its relationship with the price level-hence its name, 'Fiscal Theory of the Price Level'. So, in the first part, we present the aforesaid debates as a sequence, which adds value to the relevant literature. In all, in the first part, we endeavour to analyse the theoretical foundations of the debate on fiscal policy.

The debate of the first period starts with the publication of Milton Friedman's "*The Quantity Theory of Money: A Restatement*" (1956) in which he endeavoured, in a rather controversial way as the critic of Patinkin (1969) showed, to restate some of the classical aspects of the quantity theory. A few years later, Milton Friedman and David Meiselman (1963) published a seminal article after the Commission on Money and Credit asked prominent economists to publish research on the monetary environment. This article opens the debate on fiscal and monetary policy. In this article, Friedman and Meiselman attempted to revive the quantity theory, pointing out that money supply is related more closely to aggregate income than to autonomous expenditures. Until then, the money supply was of minor importance because it was related to the needs of trade and was unpredictable. Friedman and Meiselman pointed out that money does count because it can be controlled accurately, can affect income and other important variables, and is stable and dependable with other assets. Moreover, countries that adopted the Keynesian policy of cheap money faced high inflation. The ideas presented in this article spawned a lively debate. Among the noteworthy critics are Donald Hester (1964), Albert Ando and Franco Modigliani (1965, 1976). Both focused on the misspecification of variables by Friedman and Meiselman.

The debate was revived in 1968 when Leonall C. Andersen and Jerry L. Jordan, economists of the Federal Reserve Bank of St. Louis, published a study supporting the approach of Friedman and Meiselman. This commenced the second round of fiscal-monetary

debate, where many scholars commented on the Andersen-Jordan (a.k.a. St. Louis) equation. Frank DeLeeuw and J. Kalchbrenner (1968) criticised the St. Louis equation on the ground that the definition of fiscal policy was not strictly exogenous. In 1971, William L. Silber, after running the St. Louis equation, found that fiscal policy was statistically significant in some periods, while in other periods, it was monetary policy that had significance. Edward Gramlich (1971), after reviewing the multiplier and elasticity estimates for monetary and fiscal policies, concluded that in all cases, monetary policy had a higher multiplier than fiscal policy. Stephen M. Goldfeld, Alan S. Blinder, John Kareken and William Poole (1972) criticised the St. Louis equation as econometrically unsound, given that it is difficult to determine endogenous and exogenous variables. J. W. Elliot (1975) adopted an empirical approach and argued that the difficulty of comparing multipliers is derived from the fact that money is stock while fiscal spending is flow. In 1977, Benjamin Friedman extended the period till the 2nd quarter of 1976 and found that fiscal policy was statistically significant. The study also found problems of heteroscedasticity. To overcome these problems, Keith Carlson (1978) modified the original St. Louis equation and instead of the first difference, he used the rate of change, removing heteroscedasticity. During the 1960s, the debate grew stronger and reached its climax in the 1990s.

At the beginning of the 1990s, a new insight into fiscal policy appeared with the publication of the seminal paper of Sargent and Wallace (1981), which claimed that even in an economy that follows monetarist assumptions, under certain circumstances, a monetary authority cannot control inflation. This assertion leaves room for the introduction of fiscal policy. This has been the direct opposite of the monetary contention that the price level is primarily controlled by monetary variables. Thus, the fiscal theory of the price level has re-ignited a long-standing debate in which no consensus exists.

The role of government debt in price level determination was analysed more by Sargent (1982), who introduced the crucial distinction between Ricardian and non-Ricardian regimes. Under the Ricardian regime, the issue of new interest-bearing bonds is always backed by future taxes to enable repayment of the bonds, while under the non-Ricardian regime, new interest-bearing bonds are planned to be repaid by increasing base money.

In support of the above ideas, Woodford went a step further. In contrast to the analysis of Sargent and Wallace, Woodford (1995, 1996) totally disconnected monetary policy from the determination of the price level, pointing out that an increase in the nominal value of the government's liabilities can be inflationary, even if it is not monetised.

These ideas offered the basis for a new approach to fiscal policy and the beginning of a new theoretical and empirical controversy relating to the Fiscal Theory of Price Level. This thesis supports the idea that the Fiscal Theory of Price Level is a continuation of the fiscal/monetary debate, and a comparison of the two debates will enable us to fully understand the groundwork of modern economic theory.

We identify four issues that comprise the basic parts of the Fiscal Theory of the Price Level. The first refers to whether bonds are net wealth. The effect of new bonds on income is crucial to assess the fiscal policy. Thus, an increase in the government's bonds is perceived as an increase in net wealth by households, which increases their consumption relative to savings. Yet, interest rates also increase and capital accumulation declines. The above ideas were first discussed before the debate of the Fiscal Theory of Price Level. Thus, Modigliani (1961) accepts, initially at least, the positive effects of fiscal policy. Thompson (1967), who assumed finite lives, supported this idea by arguing that the horizon of interest payments is longer than that of future taxes. Woodford (1998, 2001) pointed out that under a non-

Ricardian regime, bonds could be considered as net wealth. More precisely, if the government's surpluses diminish, then households feel wealthier and aggregate demand will increase. The idea of the positive effects of government bonds has been criticised because future taxes offset the positive effects of fiscal policy (Tobin, 1961, Bailey, 1962). Barro (1984) introduced transaction costs for the issuance of new bonds and tax collection and found the net wealth effect to be negative.

A second core component of the fiscal theory of the price level refers to equilibrium. More precisely, it asks whether a fiscal policy characterised as non-Ricardian could freely choose its future deficit and whether the resultant impact on the price level could restore equilibrium. Thus, is fiscal policy alone able to provoke a change in the price level that restores equilibrium? If so, then the impact of monetary policy on price level determination is neither a necessary nor a sufficient condition. This also highlights the relationship between fiscal and monetary policies. Eric Leeper (1990), to examine the relationship between fiscal and monetary policies, introduced an influential distinction between active and passive policy. An active authority 'pays no attention to the state of government debt and is free to set its control variable as it sees fit' (Leeper, 1990, p. 130) while a passive authority is constrained by an active authority's decisions. According to Woodford (1996), this is a rather theoretical case, given that the government should not follow its budget constraints, as households' behaviour reassures the government's balance. This is because, following Walras Law, it is assumed that if households' budgets are balanced, then the government's should be balanced too. McCallum (2000) showed that the fiscal solution is a bubble solution because debt explodes, violating transversality conditions which state that households will not lend to the government as the number of government bonds increases.

Another critical issue of the fiscal theory of the price level concerns budget constraints. The proponents of the fiscal theory claimed that budget constraint is not a condition that should restrict governments when deciding their fiscal programmes. In other words, governments should not cover their present deficit with future taxes. This does not mean that a government can freely generate a deficit. Equilibrium will be restored by an increase in the price level. Conversely, the opponents of the fiscal theory perceived budget constraint as a binding constraint that must always hold. In more technical terms, the former solves their model with the budget constraint as an extra equation, while the latter do so as a binding constraint. This also has political implications. If the budget constraint is a binding condition, then fiscal expansion should be followed by fiscal contraction, according to the Ricardian viewpoint. On the other hand, following the fiscal theory, this is not the case because equilibrium of the budget constraint will be restored by changes in the price level, leaving room for fiscal expansion, which is the non-Ricardian case.

A final aspect of the fiscal theory of the price level refers to the relationship between the agents of fiscal and monetary policies. This aspect shed light on the understanding of economic policy through a game theory approach, with each agent (i.e., the government and central bank) trying to follow its economic programme affecting that of the other agent. The analysis of this behaviour eventually determines the type of equilibrium to be reached.

We conclude this part by presenting empirical evidence for the US, UK, and EU. The empirical validation of the fiscal theory of the price level proved to be a difficult exercise. During the 1990s, several empirical studies attempted to clarify the existence of Ricardian or non-Ricardian fiscal policies. However, any attempt to test causality between several variables implies assumptions rooted in the regime that is tested. This makes any effort to

reach a comprehensive analysis fruitless. These difficulties raised some initial objections to attempts to test the suitability of the fiscal theory of the price level.

The second part is devoted to fiscal rules in the EMU, and is divided into two chapters. In the third chapter, we analyse the historical evolution of the EMU, focusing on the development of fiscal rules before and after the financial crisis of 2007-8. This analysis will help us to understand the economic structure of the EMU and the discussion on the Stability and Growth Pact. Further, we discuss how the financial crisis of 2007-8 affected fiscal cooperation and brought changes in the fiscal coordination of the EMU member-states. In brief, we may distinguish two periods. The first starts with the Werner Report, in 1970, and ends with the introduction of the common currency (euro) in 2002. Though the ideas and initiatives for the creation of the union were born in an agitated political and economic environment, its first decade proved to be successful in general. To analyse this, we revise some fundamental indicators (inflation, business cycle and employment). During the second decade after the implementation of the European EMU, the financial crisis, which started in the banking sector in the United States and immediately hit the European economy. The crisis revealed the fragile fiscal structure of the EMU. In this section, we analyse the fiscal dilemma that the EU faced during the financial crisis of 2007 – 08 and the implementation of the fiscal reforms.

The fourth chapter focuses on debt. To understand the reasons for the debt increase, we start by reviewing the discussion on debt accumulation. A salient issue of the theory of debt accumulation that should be analysed is the “common pool problem”. In the EMU’s framework, the European Budget is the common pool from which every member-state tries to benefit at the cost of others. The common pool problem “is promising and powerful in

explaining the emergence of large and persistent deficits" (Poterba & von Hagen, 1999). This approach pointed out that problems arise when the financing source is common property. In this view, any state has the incentive to take a larger part than its contribution to this common source. Put differently, the common pool problem reveals the free-riding behaviour. We divide the discussion into three main strands.

The first attempts to provide answers to the issue of debt accumulation date back to the work of Buchanan and Wagner (1977). A second strand on debt accumulation theory posits, in close relation to the first strand, that political parties, to serve specific interests, accumulate debt. The third strand of theories emphasises the role of voters and was first presented by Weingast (1981), who related high debt with geographically dispersed interests. Thus, each part claims a bigger share from the budget to satisfy the geographical interest.

We will proceed to analyse the case of debt in monetary unions, especially the EMU. In the case of the European Monetary Union, several flaws make fiscal cooperation essential for the stability of the union yet quite complex. According to Bordo and Jonung (1999), these flaws refer to the lack of a lender of the last resort, the lack of democratic control and accountability of ECB, the size of the European Union and the diversity of the economies, making the decision-making procedures difficult; finally, the absence of central coordination of fiscal policy makes the Union vulnerable to asymmetric shocks. Thus, the question is whether the task of fiscal discipline could be achieved either by imposing restrictive numerical fiscal rules, or by constructing procedural arrangements (i.e., assigning specific tasks to institutions such as the (common) Central Bank and/or fiscal institutions) or, finally, by leaving stabilisation to the corrective mechanism of the free market. These three alternatives are discussed below.

The proponents of the market mechanism argued that price signals can provide the incentives to discipline the fiscal behaviour of governments. When a country's borrowing becomes more expensive, the signal of the increase in the nominal interest rate of government bonds leads to a more restrictive fiscal position. An alternative market mechanism that could restore fiscal sustainability is the price level. This issue is discussed in depth in the first part of this thesis and as shown, the validity of the price mechanism is controversial. Yet, in the case of a monetary union, fiscal behaviour is based mainly on the solidarity of preserving the stability of the currency. Otherwise, a member state might expect a bail-out, ignoring the market signals.

An alternative for fiscal control through market mechanism are fiscal rules. The design of appropriate fiscal rules is heavily discussed, especially after the establishment of the European Monetary Union. Based on the relevant literature, we may distinguish two kinds of fiscal rules. First, there are policy rules imposed on economic institutions, mainly the Central Bank and the governments and seek to balance economic decisions between them and second, there are specific numerical targets imposed mainly on governments, to avoid fiscal profligacy. In the former case, a framework of policy coordination should be established, while in the latter, monitoring and sanction procedures should be enacted.

The third, and final part discusses the core issue of this thesis, namely fiscal multipliers and is divided into two chapters. In the sixth chapter, we review the debate on the fiscal multiplier. Recently, there has been increasing interest in re-estimating fiscal multipliers and simultaneously, examining the factors affecting the size of multipliers, which we place in two broad categories—business cycle and structural factors. The factors of the first category refer to the marginal propensity to consume, the output gap, the financial conditions of consumers,

anticipation of future increase in taxes to compensate debt increase, the impact on wealth, the composition of fiscal shocks, all of which affect fiscal multiplier. As for the second category, we may find factors such as the response of Central Banks being decisive for the effectiveness of fiscal policy, the fiscal sustainability of the economy, financial developments, the degree of openness and the exchange rate regime.

The estimation of fiscal multipliers has also been at the centre of the debate of Keynesian and Monetarist schools. The traditional Keynesian theory placed the government's spending at the centre of the stabilisation effort, given the high multipliers. A core argument of the Keynesian viewpoint was the liquidity trap, where interest rates are zero, preventing further reduction, thus making multipliers greater than unity. In the 1990s, the revival of the monetarist theory by Milton Friedman gave a different view. Based on two main arguments, of consumption being based on the permanent and not current income and the increase of the interest rate crowding out private investments, they downgraded the role of fiscal policy.

The above argument was strengthened by the New Classical approach which introduced the assumption of the rational expectation and the continuous market clearing. Based on this, rational agents, either consumers or investors, understand that debt-financing government spending ultimately will be paid by future taxes. Based on their expectations of an increase in future taxes, agents set aside part of their current income to pay future taxes, offsetting, this way, the effects of government spending on aggregate demand (Barro, 1989a).

The models of the New Classical tradition were developed further into Real Business Cycle (RBC) and Dynamic Stochastic General Equilibrium models. RBC models focussed on the ineffectiveness of government spending as a stabilisation tool. Assuming infinitely lived intertemporal optimising agents found negative or zero fiscal multipliers if government

spending is financed by debt and less than one multiplier if spending is financed by taxes. These results were expected, given that RBC models incorporate strict neoclassical assumptions.

Along the same lines, Dynamic Stochastic General Equilibrium (DSGE) models attempted to introduce some factors that could affect the estimation of the multipliers. More specifically, they investigated the structural characteristics of the economy, such as the degree of openness, the existence of rigidities, the presence of liquidity constraints, etc. Moreover, some models incorporated characteristics of the economic environment such as the role of monetary policy and the exchange rate regime. Finally, a different strand of this literature focused on the nature of fiscal shocks namely, the decision between government expenditure and taxes, whether shocks are permanent or temporary and the credibility of fiscal shocks.

The DSGE models also incorporated the New Keynesian assumptions in early 2000 and were referred to as NK-DSGE models. The incorporation of price rigidities and rule-of-thumb (non-Ricardian) consumers made the effects of government spending positive and significant, as with rigid prices, the real wage does not diminish (at least in the short run) and the income of non-Ricardian households increases, stimulating aggregate demand and output. We may identify two main strands of the relevant literature of NK-DSGE models. Some models incorporated liquidity constraint households, while others introduced the zero-lower bound of nominal interest rate, which characterises deep recession. The review of the DSGE models is concluded by presenting three major studies, the Smets-Wouters (2003) model developed by the European Central Bank, the Laxton-Pesenti (2003) model developed at the International Monetary Fund and finally, Ratto et al. (2009) European Commission model.

A second strand of the empirical literature for the estimation of fiscal multipliers is based on Vector Autoregression (VAR) models. The advantage of these models is that they are not based on a theoretical framework. Further, VAR models are easier to estimate and better incorporate non-linear behaviour especially when the economy deviates from its steady state. The last point is crucial, given that the recent literature indicated that multipliers are state-dependent i.e., they are affected by the state of the economy being larger vis-a-vis recession. We may identify two main strands of this literature. First, some models incorporate the business cycle (finding that the size of fiscal multipliers is different in expansion and recession with increasing values during a recession), and second, there are the studies that include structural characteristics such as the mixture of fiscal expansion, exchange rate regime, openness public indebtedness, etc). In the second chapter of the third part, we analyse the empirical evidence of the estimation of fiscal multipliers, especially in the European Union.

In the final chapter of the third part, we develop our model. We use a panel VAR model to estimate fiscal multipliers, controlling for three exogenous variables—the level of debt, openness, and the size of the country. We use yearly data for the period 2002–2019. We choose this period because the new currency was introduced in EMU in 2002 and we extend the period to 2019, to avoid including data from the turbulent time of the pandemic crisis. The entire dataset is collected from AMECO. The findings are in line with the relevant literature and show that the fiscal multiplier is higher in small, less-open countries with less debt, vis-a-vis other countries.

We will conclude this thesis with the policy implication these findings bear. The re-activation of fiscal rules in the EMU means that some countries should follow strict programmes of fiscal adjustments. Yet, as this thesis will attempt to show, *the effectiveness*

and the impact of fiscal policy depend on many factors (Part I), *there are several flaws in the design of the framework of fiscal policy in the EMU* (Part II) and *the fiscal multipliers that determine the potency of fiscal policy vary substantially across member-states* (Part III). This may cause **the multi-speed fiscal adjustment in Europe,** given that some countries will succeed in restoring their fiscal position faster and more effectively than others. This thesis will endeavour to contribute to this discussion of the appropriate fiscal programmes that should be implemented in EMU the day after the pandemic crisis.

Acknowledgments

Writing a thesis is an arduous task and the results of countless sacrifices not only for the researcher but also for his family. Expressing my gratitude to the people who have been supporting my effort all these years is the least I can do for them.

First, I would like to thank my supervisor Professor Nikolina Kosteletou who continuously provided encouragement and was always willing to assist in any way she could, throughout the research project.

Moreover, I would like to express my sincere gratitude from the bottom of my heart to my loving parents and especially to my mother Helen who have meant and continue to mean so much to me. This thesis (and many other achievements in my life) would not have been possible without her support.

Our family have recently welcomed new members. To my niece Helen and my nephew Nicolas, this thesis is dedicated with all my love and the hope that someday I will read their thesis.

Part I

Chapter 1: The Fiscal Policy Debate 1950-1980

1.1 Introduction

Modern economic thinking has been based on the critical discussion of the role of fiscal and monetary policy and most importantly of the relation between them. World War II left European economies devastated. An increasing demand for reconstruction and social assistance emerged. State intervention seemed more than ever necessary to meet these demands. Its role raised a lively debate that shaped modern economics. The debate between Milton Friedman and David Meiselman (FM) on one side and Ando and Modigliani (AM) on the other side, the so-called FM-AM debate, set the beginning of the new era of economics.

Shortly after WWII, Friedman (Friedman, 1948) opposed the idea of state intervention in the economy through active fiscal policy. His proposal focused on four elements. First, the monetary and banking system should abolish the right to create (or destroy) money so that monetary authority would be unable to finance the government's deficit. The other three elements refer to government. According to Friedman, government spending should be de-linked from economic fluctuations and should be oriented solely on the provision of public goods that people are willing to pay for, according to their needs and desires. Moreover, the programme of transfer payments should be clear and predetermined, and the recipients should be chosen in advance. As far as the tax system is concerned, it should be progressive and the taxable base should, mainly, be from income. The principle of balancing the budget should be the rule of fiscal policy. The above proposals provide stability for fiscal policy as well as an adequate framework for fiscal and monetary policy and 'largely [eliminate] the

uncertainty and undesirable political implication of discretionary action of government authority' (Friedman, 1948, p. 263). Eventually, all these outcomes will guarantee the optimum allocation of resources, removing from the economic system all the inefficiencies caused by state intervention.

1.2 Reintroducing Quantity Theory

In 1956, Friedman attempted to reintroduce the quantity theory of money in a new and controversial way. His article "The Quantity Theory of Money: A Restatement" (1956) endeavoured to restate some of the classical aspects of quantity theory. At the beginning of the article, Friedman gave a straightforward definition of quantity theory. In his words, 'the quantity theory is in the first instance a theory of the demand for money' (1956, p. 95). A major part of this paper was devoted to analysing the various types of wealth that an individual or a business may possess. Given that money is one kind of asset and, for enterprises, is a capital good, 'the theory of the demand for money is a special topic in the theory of capital' (1956, p. 95). As far as consumers are concerned, money demand depends on total wealth, price, and returns from total wealth based on tastes and preferences. Total wealth can take five forms. First, it can be money which enables consumers to purchase goods. It can also be bonds which have an annual sum that the owner receives (coupon) and also a price that may change. Another form of wealth is the equities which yield a nominal return. Further, there are physical goods which have an annual return in kind and not in money. A final form of total wealth is human capital. On the other hand, wealth is also held by companies. In this case, the forms that wealth can take are the same as with consumers. The only difference from a consumer's total wealth analysis is that interest rates represent

the cost of holding money by companies. Even though Friedman's approach seems to follow a Keynesian analysis, he tried to distinguish it on the grounds that his approach was not based on speculative demand for money. For Friedman, people (consumers or companies) do not substitute different forms of wealth based on speculation motives. Rather, his analysis used the opportunity cost of holding a dollar in one form instead of another. The decision to make changes in a portfolio is made when the cost of holding the dollar in a certain form exceeds the benefit of holding it in another form. As seen above, the factors that affect income referred to the returns from all forms of wealth other than the money held. To directly connect money supply with total income, the above factors should be income inelastic. If so, 'changes in money income mirror changes in the nominal quantity of money' (1956, p. 108), but Friedman continued by stating that 'it tells nothing about how much of any change in Y [i.e. income] is reflected in real output and how much in prices' (1956, p. 108). Thus, the debate on quantity theory refers to three different issues. First, it refers to the stability and importance of demand function. The quantity theorist accepts that money demand function is a stable function, unlike the Keynesian consumption function which is highly unstable. Moreover, demand function is of great importance because it determines variables such as the level of money income and prices. A second issue refers to the independence of the factors affecting money demand and money supply. Regarding this issue, Friedman pointed out that money supply is affected by technical, political, or psychological conditions. Finally, a core issue is the form that demand function takes in low interest rates. According to Keynesians, when interest rates hit a lower bound, the demand function becomes infinitely elastic; this means that any attempt to stimulate the economy by increasing the money supply proves to be unfruitful. For a quantity theorist, this is not the case because it is the money supply and money demand that determine interest rates and not the other way around.

The publication of Friedman's articles was an attempt to revive quantity theory and to oppose the prevailing Keynesian theory. The later task seemed rather problematic. As Patinkin put it, 'what Friedman has actually presented is an elegant exposition of the modern portfolio approach to the demand for money which, though it has some well-known (though largely underdeveloped) antecedents in the traditional theory, can only be seen as a continuation of the Keynesian theory of liquidity preference' (1969, p. 47). As has already been said, Friedman made clear that quantity theory is a theory of the demand for money. Thus, to establish his theory, Friedman followed Keynesian portfolio analysis. This was refuted by Patinkin, who pointed out that quantity theory is a theory that relates the quantity of money with aggregate demand for goods to, thus, the price level and/or output. Furthermore, Friedman invoked the Chicago tradition and considered his approach as an attempt to set down a model of the quantity theory that followed the oral tradition of the Chicago School. However, the Chicago tradition is primarily focused on the money supply as the basic tool to fine-tune money demand. A second disagreement concerned the stability of velocity. A central issue for economic policy is the instability of velocity given that it is strongly related with the disposition of individuals to hoard or dishoard. This, in turn, is determined by the changes in the price level and business proceeds. More analytically, if individuals expect an increase in prices and firms expect higher earnings, holdings will be decreased and consequently velocity will be increased. It is interesting that these expectations become self-fulfilling prophecies given that they trigger an actual increase in prices higher than expected, which in turn diminishes hoarding to a greater degree. This spiral of dishoarding feeds itself constantly, making velocity unstable. However, it is not clear whether the instability of velocity is due to variations in the price level or is attributed mainly to expectations or other factors that affect velocity (Patinkin, 1969). Banks play a vital role in this process by increasing

the money supply in booms and decreasing the money supply during depressions, contributing to the instability of velocity. For the above reasons, the government has the obligation to undertake countercyclical policies by either changing the money supply or enacting government spending to offset changes in velocity and to ensure full employment. In all, early quantity theorists focus on the relations between the stock of money and the flow of spending on goods and services, whereas Friedman's primary concern was to analyse the relations between the stock of money and the stock of other assets.

1.3 The First Round of the FM-AM Debate

In the late 1950s, the Commission on Money and Credit asked prominent economists to publish research on the monetary environment. Friedman and Meiselman's (1963) essay attracted much attention. The main conclusion was that money supply is related more closely to aggregate income than to autonomous expenditures are. Until then, money supply was of minor importance because it was related to the needs of trade and was unpredictable. Friedman and Meiselman pointed out that money does count because it can be controlled accurately, it can affect income and other important variables, and money is stable and dependable with other assets. Moreover, countries that adopted the Keynesian policy of cheap money faced high inflation, and 'only after some control was established over the stock of money and after the interest rates were allowed to have some degree of freedom was pressure on the price level relieved' (Friedman and Meiselman, 1963, p. 2). The main equation they analysed was

$$C = \alpha + VM + KA \qquad (1)$$

where *V* is the velocity, *M* is currency in public circulation + adjusted demand deposit + time deposit in commercial banks, *K* is the marginal multiplier -1, and *A* is the autonomous expenditures which consist of net private domestic investments + government deficit on income and product account + net foreign balance.

Another critical decision in FM's study is the chosen period. To decide this, they used three criteria. First, given that their attempt was to examine the short-term relative stability of velocity and the multiplier, the period should have been short-term. Second, the relation may differ according to the phase of the cycle so data should have covered the full cycle. Finally, the data was annual, providing a small number of observations to derive statistically meaningful results. Taking all the above into consideration, they decided to exclude the WWI period and WWII period and to examine 1903, 1913, 1920, 1929, 1939, 1948, and 1957. Their results for the US were 'remarkable, consistent and unambiguous' (Friedman and Meiselman, 1963, p. 10). More precisely, the income velocity of the circulation of money is more stable than the investment multiplier except in the years of the Great Depression. The relation of autonomous expenditures and consumption is much weaker and less consistent, and the partial correlation between them was in some cases negative while in other cases it was positive. However, both cases are close to zero.

The debate started after the publication of FM's paper. The debate lasted for the next few decades and determined modern macroeconomics. This is because, as we demonstrate below, an interesting part of the debate focused on the definition of the variables, and ultimately through technical details, the debate revealed the way economy functions (i.e. the relations between variables).

One of the first criticisms of FM's paper came from D. Hester. Hester's (1964) criticism was focused on four issues. First, the variables that were included in the autonomous expenditures were misleading. This is because the government deficit and foreign balance that were included in autonomous expenditures are not exogenous. Hester proposed a more elaborated model. In this model, 'autonomous expenditure equals the sum of government expenditure, net private domestic investment, and the trade balance. This measure is an improvement of FM's for it recognises the dependence of taxes on income' (1964, p. 366). Moreover, variables that were included in autonomous expenditures were not invariant throughout the period under study, given that the structure of taxation was changed fundamentally during the period that FM analysed. A second criticism is that although net investments are an ideal variable, a problem occurs with the measurements of depreciation. This biases the correlation coefficients towards zero. The choice of correlating the first difference for the period from 1930–1958 and not for sub-periods affected the results. Finally, investments are also determined by decisions by the Federal Reserve Open Market Committee and individual banks. These decisions are an increasing function of the level of national income. After expressing the above concerns, Hester (1964) continued re-developing the model by including taxes as a variable of income. With calculating the correlation coefficient of the improved autonomous expenditure with consumption and with the exemption of the sub-period from 1929–1939, the results were higher than those calculated by FM.

To the above criticism, FM replied (1964) by focusing on two points of the criticism worth answering. The first is the results from the selected period. Friedman and Meiselman pointed out that Hester used a shorter period to study. Even in this shorter period, if the sub-periods of 1929–1938 and 1933–1938 are excluded, the correlation coefficient of money to

consumption is still higher than the correlation coefficient of consumption to any form of autonomous expenditure. As far as the form of autonomous expenditure, FM argued that they examined all the alternative definitions that Hester (1964) proposed, except from the one that excludes inventory investments. Moreover, Hester did not give empirical evidence to support his own version of autonomous expenditure. Turning to the issue of neglecting taxes from income, FM replied that both their implicit consumption function and the government deficit that they included leave no space for assuming that taxes are autonomous in their model. In an attempt to clarify this, FM explained that they chose the after-tax income of consumers on a predominantly accrual basis for their consumption function. In this way, any change in government expenditure affects income under the above definition. Instead, Hester (1964) used disposable income which is the after-tax income of consumers on a predominantly cash basis which is not affected by government spending. Finally, FM concluded that the empirical evidence of their model and of Hester's model does not differ (1964).

Another line of criticism was levelled by AM in 1964. Their criticism focused on three issues. First, the results of FM's model are of very little importance and empirically useless. To support this argument, AM emphasised three issues. The first point referred to the misspecification of the consumption function. More precisely, the income expenditure model developed by FM considered consumption as determined by the sum of net investments, net exports, and government deficit. To restore the validity of the model, additional variables (corporate retained earnings adjusted for inventors, an excess of wage accruals over disbursement, and government foreign transfer payments) should be included. However, according to AM, by doing this one ends up with a 'grievous misspecification of the consumption function, for we are not aware of any author having suggested that current

consumption is a linear function of current disposable income plus corporate savings plus statistical discrepancy plus excess of wage accrual over wage disbursement plus net government foreign transfer payments' (1964, p. 5). Another concern was the treatment of the war years during which the purchases of consumers' durables were not stable, and thus the same applies for the consumption function during those years. Hence, any test for this period is worthless. Finally, given that the consumption function has an error term, we cannot get a reliable estimate. This is because net investments, net exports, and government deficits, which according to FM were regarded as autonomous, are correlated with the residual error of the consumption function. Thus, any direct regression of consumption to net investments, net exports, and government deficits will yield biased estimates of the coefficient. To illustrate this point, AM took the example of the relation between consumption and deficits. The correlation between government spending and consumption is positive. Instead, if investments or the error term change, then correlation to consumption will be negative.

Following AM's criticism, M. DePrano and T. Mayer (1965) developed a similar criticism. More precisely, FM's study attempted to evaluate the predictive power of a rather simple version of both the quantity theory and the Keynesian theory. However, what is true for the simple version might not be true for the more sophisticated versions. Additionally, if the simple version of the two theories had been chosen, another problem would have occurred, namely, the problem of deciding the level of simplicity for both. Finally, both models represent extreme cases of the two theories. This means that quantity theory represented the relation between money income and stock of money and Keynesian theory represented income as a function only of autonomous expenditures. De Prano and Mayer discussed the difficulty of clearly defining which of the variables of autonomous expenditures, as defined by FM, are endogenous and which are exogenous. To support this idea, DePrano and Mayer

analysed three cases. The first case was the relation between investments and consumption. Even an increase in consumption can stimulate investments; this probably happens in the next year because of the lags involved in investments process. However, a problem also occurs when considering consumption as determined by the income of present and previous years. Under this consideration, an exogenous increase in consumption in the present year raises both consumption and investments in the next year. Thus, the correlation between consumption and investments in the second year are derived partly from the increase of consumption and partly from the increase of investments. A second problem occurred in the relations between consumption and investments in inventories. Indeed, an increase in consumption has a positive effect on inventory investments. On the other hand, an increase in consumption can lead to a disinvestment in inventories. Finally, government deficits are also partially endogenous. This is because an increase in consumption increases tax receipts, and the deficit falls. Instead, FM consider this as a decrease in autonomous expenditures, which in turn increases consumption. However, this gives a downward bias to the correlation coefficient. Apart from the theoretical analysis, DePrano and Mayer estimated correlation coefficients between various components of FM's autonomous expenditures with consumption. A first observation is that if inventories included in investment correlation coefficients decrease. This is explained by the fact that inventory investments are endogenous. Exports are clearly exogenous, but imports are endogenous. Thus, when imports are added separately, the correlation coefficient falls. The same happens when adding tax receipts, given that tax receipts are endogenous. In all, FM's findings are based on a rather arbitrary definition of autonomous expenditure. In an attempt to re-define autonomous expenditure, DePrano and Mayer treated autonomous expenditure as only plant and equipment investment, non-residential construction, residential constructions, government

expenditures on income and product accounts, and total exports, excluding from FM's analysis tax receipts, imports, and inventory investment. The results indicated the following:

1. For the whole period excluding the war years, both autonomous expenditures as we define them and money give good fits, with money somewhat better.
2. Including the war years lowers the correlation coefficient for money to some extent and reduces the correlation coefficients for our autonomous expenditures much more.
3. For the periods before and after the war, our autonomous expenditures do better than money for first differences, when the levels of the data are used.
4. For the sub-periods which include the war, money does much better than our autonomous expenditures.
5. In all periods fixed private domestic investment and fixed private domestic investment plus exports do extremely well. For first differences, they both have the highest correlation coefficients in most periods and generally perform better than money. For levels, they perform about the same as money—sometimes slightly worse and sometimes slightly better.
6. FM's concept of autonomous expenditures, with few exceptions, does worse than any of the other variables. (De Prano and Mayer 1965, p. 741–2)

DePrano and Mayer concluded that both the autonomous expenditures equation and the money equation are of equal importance in determining the level of consumption.

To the above assertion, FM (1965) identified both agreements and disagreements. As far as agreements are concerned, FM pointed out that at least all agreed with the basic relation, that is, that money supply determines nominal income in the short run. Another

point of agreement was the definition of money supply. The core disagreement referred to autonomous expenditures which '[are] still far from having any generally accepted empirical counterpart' (Friedman Meiselman, 1965, p. 754). In their reply, FM focused on three points of the criticism they received. The first point is that their concept of autonomous expenditure was poor which, second, gave biased results, and finally, the equations they used were too simple. Friedman and Meiselman accepted the first two points, but they argued that none of the critics proved either that their results were biased or that their approach was invalid. Given the lack of any specific statistical definition as to what is autonomous and what is an induced expenditure, the problem became more puzzling. The criticism of the biased results which were based on the wrong variables was not proved either in a theoretical or in an empirical way by AM or De Prano and Mayer. They just proved that, according to their measures of autonomous expenditures, FM's results were underestimated. More precisely, under AM's analysis, the correlation of their autonomous expenditures to consumption is higher than that of money supply to consumption. The same applied for the analysis of DePrano and Mayer where their results indicate a higher correlation of their autonomous expenditure to consumption. Another problem concerned the selected period that AM chose to analyse, that is, 1929–1958. This choice revealed two issues. The first issue referred to the period 1929–1939 in which FM termed it as exception period because in that period the income expenditure model prevailed. However, this consists of one third of the period analysed by AM and one seventh of the period of FM's analysis. Moreover, AM's analysis was split between 1929–41 and 1947–1958, which referred to a long-run period. Instead, FM analysed a short period. This choice was made clear given that, following FM,

> 'First, since the question at issue is mainly the short-term stability of the relations being compared, it seems desirable to make the comparisons for

> relatively short periods. Second, since the relations may differ at different phases of the cycle, it seems desirable that any one comparison should cover one or more complete cycles[...]. Third, since most of the available data are annual, single business cycles generally provide too small a number of observations to yield statistically meaningful results' (Friedman Meiselman 1963, p. 174–5).

As far as the simplicity of equations, FM claimed that they faced two choices: Either they developed a sophisticated model (including more variables in autonomous expenditure but applying it to a shorter period) or a simple version which gave them the ability to apply it to longer periods. Their choice was the second because 'the issue that divides economists is extremely basic and one that should lend itself to a common answer over a wide range of circumstances' (Friedman Meiselman, 1963, p. 168–70).

1.4 Second Round of the Debate: The Andersen Jordan (St. Louis) Equation

A few years later, a new insight made by Leonall C. Andersen and Jerry L. Jordan (Andersen-Jordan henceforth) of the Federal Reserve Bank of St. Louis shined a new light on the field. Andersen-Jordan used a reduced model to test three propositions concerning the relative importance of monetary and fiscal policies for economic stabilisation, that is, 'the response of economic activity to fiscal actions relative to that of monetary actions is (1) greater, (2) more predictable, and (3) faster' (1968, p. 29). Before proceeding to the results, we should first examine the variables used by the Andersen-Jordan model for fiscal and monetary actions. Monetary actions were measured by changes in monetary base and monetary stock. Money was defined as the nonbank public's holdings of demand deposits plus currency.

Changes in the money stock, apart from changes in the monetary base, reflect decisions of commercial banks to hold excess reserves, decisions of the nonbank public to hold currency and time deposits, and finally, decisions of the Treasury to hold demand deposits at commercial banks. On the side of fiscal actions, to avoid the circumstances of a recession where fiscal actions may have different impacts, Andersen-Jordan used the high-employment measures, that is, when the economy operates at full employment. Under this scenario, expenditures include both those for goods and services and those for transfer payments. Receipts reflect legislated changes in federal government tax rates, including Social Security taxes. The results of comparing the impact of fiscal and monetary actions in economic activity (Proposition 1) indicated that beta coefficients (that are more suitable because of the difference of the time dimension between the fiscal and monetary policy) of monetary actions were higher than those of fiscal actions. The sensitivity of economic activity to fiscal and monetary policy (Proposition 2) was also tested, and the results showed that the regression coefficient to standard error (*t*-value) is higher for monetary actions than it is for fiscal actions. This means that measures of monetary policy are more reliable to influence economic activity. Finally, testing the rapidity of economic activity's response to fiscal and monetary policy resulted in higher beta coefficients for monetary measures, which means that the impact of monetary policy to economic activity is faster than fiscal policy. In all, Andersen-Jordan tested the proposition that the impact of fiscal action to economic activity is larger, more predictable, and faster. None of these propositions were verified. These results were startling and revived the debate over the impact of fiscal and monetary policy on basic economic variables.

A couple of years later, J. Andersen returned to this issue with K. Carlson to estimate the effects of fiscal and monetary actions on total spending, output (real GNP), prices,

employment, and long-run and short-run interest rates (J. Andersen & K. Carlson, 1970). The fundamental building block of this model was the Andersen-Jordan equation. The new entrance of this equation was the interest rate equation in which interest rates were orderly related to past inflation, making this equation consistent with Fisherian theory in the sense that inflation is assimilated in the nominal interest rate. A further equation was needed to combine the unemployment rate. This equation combines a given potential GNP with actual GNP to provide an estimate of the unemployment rate. Finally, an equation was needed for the price level. For this purpose, they used an equation that combined the Phillips curve results with price expectations. More specifically, they used the coefficients on the inflation terms in the long-run interest rate equation as a measure of price expectations. The results of this model were the same as the Andersen-Jordan model and indicated the central role of monetary policy (measured in money stock) in affecting economic performance. On the other hand, the effects of fiscal policy, measured in high-employment federal expenditures, had primarily a short-run impact, and its effect faded-away within a year.

The work of Andersen-Jordan gathered the interest of many researchers and economists both in academia and in public policy. One of the first criticisms was developed by F. De Leeuw and J. Kalchbrenner (DeLeeuw and Kalchbrenner, 1969). In their comment, they focused on the exogeneity/endogeneity problem of the Andersen-Jordan reduced model. According to them, exogenous variables are those that first can be influenced only by policy makers and that second are not determined by endogenous variables (in statistical terms, exogenous variables must be independent of the disturbance term). If the first requirement is not met, it is not an effective policy tool. If the second is not met, it is hard to know which variable determines which. To overcome this problem, the Andersen-Jordan model used high-employment federal receipts to avoid the impact of an economic downturn,

and, for this, the impact of shrinking income to federal receipts. However, this was questioned by DeLeeuw and Kalchbrenner on the grounds that receipts could also be affected by increasing prices and, for that, government receipts are not strictly exogenous. To overcome this problem, DeLeeuw and Kalchbrenner introduced the multiplication of full-employment receipts by the ratio of this period's general price level to last period's general price level. In this way, the impact of inflation was eliminated.

The other exogenous variable that the Andersen-Jordan model analysed was monetary policy in the sense of a monetary base (and not in the sense of money supply). A monetary base can be incorporated into three components: un-borrowed reserves, borrowed reserves, and currency. To include all the above categories in a monetary base and still be exogenous seemed too demanding. As far as borrowed reserves were concerned, these were related to movements in business loans and interest rates. Thus, according to DeLeeuw and Kalchbrenner, the borrowing of banks should be excluded. Another reason for this is that movements in borrowing reserves offset by movements in un-borrowed reserves leaving, thus, the monetary base stable. The other component of monetary policy (i.e. currency) is determined by movements in income. Again, currency has a tendency to offset the results since an increase in currency implies a decrease in bank reserves. Thus, a base that excludes currency may be a more suitable variable. The results taken from these adjustments contradicted the results of the Andersen-Jordan equation. More precisely, even though the impact of monetary policy on economic activity remained important, the impact of fiscal policy, on the other hand, exerts 'a significant influence on GNP in the expected direction' (DeLeeuw and Kalchbrenner, 1969, p. 11).

Andersen-Jordan replied to the above criticism. First, they accepted the modification of introducing the price level in the measure of fiscal actions. On the other hand, they dissented on the modification of monetary policy. This is because DeLeeuw and Kalchbrenner (1969) did not include the Treasury in the monetary base. Doing this is like assuming that the balance sheet of the Treasury and of the Federal Reserve were consolidated. Thus, '[t]his failure to distinguish sources of the base from uses is a fundamental point of difference between these critics and ourselves' (Jordan and Andersen, 1969, p. 12). Furthermore, DeLeeuw and Kalchbrenner excluded borrowing reserves because, as said above, there is an offset between borrowed and un-borrowed reserves. Andersen-Jordan tested this assertion and, they stated, the 'results indicate very clearly that there was a strong negative "offset" between borrowed and un- borrowed reserves in the 15-year test period' (Jordan & Andersen, 1969 p. 15). Thus, there was no justification for excluding borrowed reserves. Therefore, DeLeeuw and Kalchbrenner used only un-borrowed reserves as a measure of monetary issues. This is criticised by Andersen-Jordan as arbitrary because they were not providing any justification, statistical or theoretical, for doing so.

A different perspective from the above debate was given by W. Silber (Silber, 1971). Silber pointed out that the debate is more political, reflecting ideology rather than economics. To support this idea, Silber re-examined the results using different time periods. Results remained about the same as those of the Andersen-Jordan model. Furthermore, Silber examined changes in the structural form of the economy and found that under the 'Kennedy–Johnson economics,' fiscal policy was more powerful in stimulating economy, yet under 'Eisenhower economics' (1953–1960), monetary policy was more significant than fiscal policy. Another finding of Silber's was that the highly debated definition of fiscal policy can affect results, presenting fiscal policy as either dominant or not.

Another interesting insight was made by E. Gramlich (1969). After revisiting the debate, he re-examined the issue, introducing new variables both in monetary and fiscal policy. Beginning with the latter, Gramlich attempted to present budget aspects that affect aggregated demand either directly or indirectly. Thus, he added government purchases, grants-in-aid, exports, and defence inventory adjustments. On the taxes side, he summed full-employment personal taxes, full-employment personal insurance contributions, less exogenous transfer payments to persons (all transfers to persons minus unemployment payments), and less interest payments. As for monetary policy, Gramlich (1969) tried to overcome the problem of endogeneity which was a central issue of the past definitions. To do this, Gramlich applied three alternative definitions: The monetary base was adjusted either by required reserve changes, for free reserves, or by adjusting base extracting borrowed reserves and currency. Another interesting point was the modification of the independent variable by introducing strikes that affect total products. Using as exogenous variable, the adjusted monetary base results indicated that monetary policy matters greatly (though not so much as in the Jordan-Andersen model but more than in the DeLeeuw and Kalchbrenner model), while the importance of fiscal policy increased (to a higher level than those of the Andersen-Jordan model but less than in the DeLeeuw and Kalchbrenner model). Another case that Gramlich examined was the use of free reserves as an exogenous variable. These results showed that fiscal policy was the dominant policy. An explanation for this was that free reserves do not affect much of the variables that determine GNP. A final case referred to the un-borrowed reserves as exogenous variables. In this case, both fiscal and monetary policy was significant.

A new insight in the debate appeared in 1973 from D. Poole and E. Kornblith (1973). Based on the single equation of each model, they used the same data to compare them on

equal footing. They also extended the data to the 1958–1970 period. Their findings showed that all models underpredict. Poole and Kornblith (1973) offered several plausible explanations to cast light on this negative bias. A first explanation pointed to the limited time period, given that 'The regression of consumption on M2 was meant to account for long-run effects' (Poole & Kornblith, 1973, p. 911). Another explanation is that the war years distort the M2 results. A further argument focused on the exclusion of taxes. Even this was a central criticism addressed to the FM definition of autonomous expenditures. None of the critics, they state, 'in fact did so, and so none of them took any account of income tax rates or of the revenues produced by income taxes' (Poole & Kornblith, 1973, p. 912). The results of their test concluded that none of the models dominated and each of them have their drawbacks.

W. Elliot (1975), in his study on the subject, raised another important point. He referred to the magnitude of the coefficients of both money supply (M) and high-employment federal government expenditures (E), which he stated, '[s]ince ΔYn ΔM and ΔE are all expressed in billions, the mi [M] and ei [E] are unit-neutral weights,' but, he continued, 'ΔM is the change in a stock-measured variable while ΔE is the change in a flow. In addition, the magnitude of M is typically considerably larger than the magnitude of E' (Elliot, 1975, p. 181–2). As has already been discussed, a core issue has been the choice of timeframe. Elliot (1975) also discussed this issue and examined lag periods reaching back four, eight, and 12 quarters, respectively. The results are not significantly different than those of Andersen-Jordan or Andersen and Carlson, which indicates that monetary measures are of higher importance to determine national income than are fiscal measures and that they are faster and larger. Elliot (1975) also examined the case of exogeneity using Sim's *F*-test. Results showed that monetary policy is exogenous in contrast with government spending, which was found to be bidirectional.

Nine years after the publication of the Andersen-Jordan model, a new insightful analysis appeared by Benjamin Friedman. B. Friedman (1977), using the same data as the Andersen-Jordan model but extending the period under study to 1976, found that fiscal policy was now statistically significant and more important in determining GNP. Another point that Friedman raised was the heteroscedasticity of the Andersen-Jordan model. The same problem was concerned with Carlson's model. In replying to Friedman, Carlson pointed out that the estimation of the arithmetic first difference form, which Friedman used, is 'suspect on statistical grounds' (Carlson, 1978, p. 18) given that there was evidence of a non-constant error variance (heteroscedasticity). To overcome this problem, Carlson (1978) re-estimated the St. Louis equation in a rate of change form. In this way, the least square assumptions were satisfied. Under this new formulation, results were in accordance with those of the St. Louis equation, and the hypothesis that the St. Louis equation believes in fiscal policy was rejected.

A further issue, raised by Stein (1980), was the problem of omitted variables. He tested the Andersen-Jordan model, and results indicated that the model was subjected to this problem. Particularly, there was an upward bias for monetary coefficients and a downward bias for fiscal coefficients. Stein concluded 'that the St. Louis equation is incapable of yielding accurate estimates of the true ceteris paribus monetary and fiscal multipliers' (Stein, 1980, p. 363).

A further improvement of the St. Louis equation was made by D. Batten and R. W. Hafer (1983). Batten and Hafer noted that the St. Louis equation incorporated only three variables (i.e. monetary measures, fiscal measures, and GNP), leaving aside all the other variables that could affect GNP. From a statistical point of view, this omission is a problem only if these omitted variables are correlated with the exogenous variables. One of them is

exports. Indeed, monetary and fiscal policy have a high impact on the external sector which in turn affects GNP. Thus, Batten and Hafer (1983) introduced exports in the St. Louis equation, taking quarterly data from six countries for the period January 1960 January 1982. Results confirmed St. Louis equation findings. In all countries, money growth had a significant and lasting effect on GNP. Only in the United Kingdom and France did fiscal policy have a significant impact.

As should already have been clear, the St. Louis equation gathered critical reviews for three distinct points: the exogeneity of the regressors, a narrow definition of regressors, and the time period (lag) of analysis. Previous studies examined those issues separately. E. Ahmed and J. M. Johannes (1984) attempted to examine those issues jointly. The reason for this was that 'testing joint sets of restrictions by testing individual sets of restrictions separately is tantamount to assuming that the joint confidence interval for all the sets of restrictions is identical to the intersection of the individual confidence intervals for the separate restriction sets' (Ahmed & Johannes, 1984, p. 515). They concluded that the St. Louis equation passed the test and that none of the above criticism seemed to be valid. Moreover, the findings confirmed that monetary policy holds a significant role in determining GNP. A second study that attempted to examine each one of the criticisms addressed against the St. Louis equation was carried out by D. S. Batten and D. L. Thornton (1986). To defend the Andersen-Jordan model, Batten and Thornton (1986) first attempted to examine the misspecification criticism. By subjecting the model to the Ramsey-Schmidt test for misspecification, the Saint Louis equation 'passed'. The second issue they tried to disentangle was the caveat of exogeneity. The results from the Chow test, Granger causality test, and Wu test demonstrated that the Andersen-Jordan model was free from endogeneity problems. Finally, a third criticism was for the variable used in the model. However, this was a subjective issue, and for every

commentator, there seemed to be a better variable. Thus, this was not a criticism open to discussion, and ultimately, 'Andersen and Jordan should be congratulated for providing one of the most, stable, lasting and robust equations in applied economics. […] [T]heir most important contribution is that they shook the foundations of conventional economic thought and subjected the results of standard applied economics to closer scrutiny' (Batten & Thornton, 1986, p. 16).

Chapter 2: A New Insight into the Role of the Government: The Fiscal Theory of the Price Level

2.1 The foundations of the new theory

The debate on the impact of fiscal policy and monetary policy, presented in the previous chapter, was re-introduced in early 1980s. A new insight attempted to shed more light on the effects of fiscal policy both on the function of an economy and on other economic variables. Traditional economic theory focuses on monetary policy as the primary factor of price determination, usually without introducing the role of fiscal policy. This point of view assumes that monetary authority sets its control variable, that is money supply, to manage the price level, without facing any constraint. On the other hand, fiscal authorities, constrained by their budget, set their future surpluses to reassure their solvency.

However, a new approach emerged in early 1980s that reshuffled the interaction between fiscal and monetary policy in the determination of the price level. A new strand of

research, in recent decades, known as fiscal theory of the price level, asserted that fiscal policy may influence price level. In a polar case, and under specific circumstances, this theory showed that fiscal variables can fully determine price level. This has been the direct opposite of the monetary contention that the price level is primarily controlled by monetary variables. Thus, the fiscal theory of the price level has aroused a long-standing debate on which no consensus exists.

To begin with, Sargent and Wallace (1981) claimed that even in an economy that follows monetarist assumptions (i.e. a monetary base is closely connected to the price level and a monetary authority that can raise revenue from money creation or seignorage), under certain circumstances, a monetary authority cannot control inflation. This assertion leaves room for the introduction of fiscal policy. Governments finance their budget in two ways, either by seigniorage (which means by increasing the money supply) or by issuing new bonds. The coordination of fiscal and monetary authority gives two alternatives. First, the central bank decides its monetary policy independently, binding the decision of the government to issue bonds. Alternatively, fiscal authorities could take the first step and decide their fiscal policy (deficit or surplus), part of which is financed by new bonds and the other part is covered by the central bank which covers the difference by increasing money stock. This latter case has two constrains. First, the public is willing to buy a certain amount of government bonds, setting an upper bound on the real stock of bonds. Second, the government is constrained by the interest rate it must pay for its bonds. As the government issues new bonds, the interest rate on bonds becomes greater than the economy's growth rate. This impedes the ability of the government to finance its budget, and eventually, monetary authorities must finance the government's deficit. In this case, 'monetary authority is unable to control either the growth rate of monetary base or inflation forever' (Sargent & Wallace, 1981). Even if the central bank

holds down the monetary base to control inflation as real stock of bonds grow, a deficit cannot be covered. The only option is the increase of the monetary base from the central bank, which in turn will increase inflation. Again, the decision of the central bank to control the price level will lead to future inflation. Sargent and Wallace wanted to highlight a coordination scheme where the decision of monetary policy to control inflation could be unattainable.

Shortly after the publication of Sargent and Wallace's paper, Willem Buiter (1982) criticised its findings. More specifically, the model, developed by Sargent and Wallace, treated the deficit as a whole, without separately analysing public expenses and taxes and without discerning variations in expenses. Buiter's model, on the other hand, classified population in two distinct categories. The first is the young and poor who hold a money balance as a store of value. The second is the young and rich who hold interest-bearing bonds and capital. This distinction is critical because 'the government is a net creditor to the rich citizens in the private sector [and] a net debtor to the poor citizens who hold its non-interest-bearing monetary base'' (Buiter, 1982, p.64). According to Buiter, the government is neither a creditor nor a debtor if we consider the private sector as a whole. Another line of criticism is levelled against the micro-foundation of the model. In Sargent and Wallace's model, money is controllable because they did not incorporate a variety of assets that represents money in the real-world economy and may affect the optimising choices of private and public agents. This also has the implication that inflation tax is a very minor source of government revenue. Furthermore, if inflation is incorporated into the (higher) interest payments, the crowding out effect is less than calculated, and it may also turn a nominal deficit into a real surplus. Another correction that must be considered is cyclical adjustment. In case of recession, debt increases whereas in case of growth, debt decreases. Finally, in Sargent and Wallace's model, the deficit

is attributed only either to public consumption or to the current account deficit but not to the capital formation by the public sector. To calculate this, the net public sector capital formation should be subtracted from total public spending.

In an attempt to clarify the debate, Smith (1982) introduced the distinction between monetarism and bondism. The policy that keeps public spending, tax rates, and the rate of money growth to fix and buy or sell bonds is characterised as a monetarist strategy whereas the policy that fixes public spending, taxes, and bonds and sells or buys money is characterised as bondism. Smith proved, using a dynamic IS-LM model, that monetarist strategy is unable to keep a zero-inflation steady state, in contrast with bondism which can help the economy to attain a non-inflationary steady state.

The role of government debt in price level determination is analysed more by Sargent (1982), who introduces the crucial distinction between Ricardian and non-Ricardian regimes. Under the Ricardian regime, the issuing of new interest-bearing bonds is always backed by future taxes so as the bonds to be repaid, while under the non-Ricardian regime, new interest-bearing bonds are planned to be repaid by increasing base money. This latter case implies that the monetary base and government bonds are perfect substitutes; otherwise, the government could not monetise the debt. It becomes obvious that this is a critical issue for the non-Ricardian regime to hold. This leads to the final question, that is, whether government deficit is inflationary or not. This depends on the regime one is in. In the Ricardian regime, current deficits are less inflationary than those in the non-Ricardian regime. However, even where monetary policy is tied to a K-percent rule, for money growth there are circumstances where this rule could not hold. First, when a taxation plan is not enough to cover outstanding debt, monetary policy must cover the difference, breaking the K-

percentage rule. Second, when fiscal policy selects first the path for the deficit, monetary authorities are induced to follow its path.

The idea of fiscal implications for price level determination was further developed by Aiyagari and Gertler (1985). Following Sargent's analysis, they analysed price level determination under Ricardian and non-Ricardian fiscal regimes. More precisely, under the Ricardian regime, the issuance of new bonds is backed by future taxes while in the non-Ricardian regime, debt is covered by money creation. Only under the Ricardian regime is the monetarist theory valid.[1] On the other hand, under the non-Ricardian regime, government bonds determine nominal variables, and the price level, inflation rate, and nominal interest rate are higher. Aiyagari and Gertler's (1985) model incorporated overlapping generations of two-period lived agents which are distinguished between old and young. There are also three assets: money, bonds, and equities. Thus, consumers' maximising behaviour consists of consumption demand for real balances and interest-bearing assets. On the other hand, the government finances its expenses, receiving lump-sum taxes (paid by consumers), money, and one period discount bonds. The choice between these defines the type of regime. If the government decides to back its bonds by direct taxes, the regime is Ricardian. Under the Ricardian regime, any change in the supply of bonds is backed with future taxes, leaving the price level unchanged. On the other hand, there is the non-Ricardian case where the government decides to cover expenses by money creation. In this case, the nominal interest rate will be unchanged, and the price level will increase to keep the money-to-debt ratio unchanged. It should be noted, though, that the reason for money increase matters. If money

[1] According to Aiyagari and Gertler there are four propositions that consists monetary theory. First, money is the only government liability which affects economic variable, second, money supply could be affected either by fiscal or monetary policy, third, money supply can fully determine price level finally, money growth rate covaries exactly with nominal interest rate. (Aiyagari, Gertler 1984 p. 19)

increases due to a temporary change in open market operation, then this will decrease nominal interest rates to equilibrate the money market and no change in price level will occur. Thus, increases in money supply must be due to increases in government bonds to characterise a fiscal regime as non-Ricardian.

In support of the above ideas, Woodford (1995, 1996) went a step further. In contrast to Sargent and Wallace's analysis, Woodford (1995, 1996) totally disconnected monetary policy from the determination of the price level. Sargent and Wallace (1981) claimed that a monetary contraction is inflationary because it increases government debt that eventually is monetised. Woodford, instead, pointed out that an increase in the nominal value of the government's liabilities can be inflationary even if it is not monetised. What is worse is that this first round of price level increases will be followed by a decrease in the real money supply which in turn will increase interest rates and government liabilities. This will force the price level to increase without bound.

Sims (1997) examined the plausibility of fiscal theory, analysing the ability of monetary policy to control inflation in two extreme cases. The first is under a liquidity trap and the second is when a sudden drop in demand for a government's liabilities occurs. Under the first case, where the price level spirals downward and nominal interest rates are close to zero, the real balance increases without bound. Thus, government lending also increases without bound. In the case of a sudden drop in the demand for government liabilities, an increase in inflation will occur. To avoid this, the central bank must sell government bonds. Thus, the public will switch their portfolios from money to government bonds and eventually restrain inflation. One can see in this case that an open market operation has a fiscal side effect. When the central bank sells bonds to the public, it increases interest expenses for the government,

forcing the government to increase taxes or cut expenses. In both the above cases, monetary policy is not capable on its own to control inflation. Fiscal co-operation is required.

The above analysis presents the general framework of the debate. However, the fiscal theory of the price level has raised extensive dispute both at the theoretical and technical level. There have been numerous models, each highlighting either different aspects of economic behaviour or institutional issues or incorporating different economic variables. To clarify this complex debate, we propose four issues that, in our view, consist the constituent parts of this theory. The first issue refers to whether government bonds could be perceived as net wealth. This issue had been discussed before the development of the fiscal theory of the price level and analysed the possibility of substitutability between government bonds and high-powered money. This is crucial for the fiscal theory as it connects the government's decision to the behaviour of economic agents. A second issue concerns equilibrium, a rather technical issue having, nevertheless, serious extension into the effects of policy decisions on the function of the entire economy. A further issue, probably the most debatable, is whether budget constraint that a government faces are a binding condition. Put differently, should government always equate its debt obligation with future taxes, bearing the responsibility to balance its budget or can it choose freely its fiscal programme, and in case of debt, will the price level balance the government's budget? Here, as in the previous issue, what is at stake is not only the function of a model but also the policy implications that have, mainly, a normative basis. Finally, an interesting strand of the debate over the fiscal theory used game theory analysis. This strand focused on the behaviour of monetary and fiscal authorities to shed more light on the coordination of the two players. In what follows, we analyse each of these issues.

2.2 Are the Government's Bonds Net Wealth?

As has already been mentioned, the issue of whether government bonds are net wealth has been a central issue of fiscal policy and was not developed in the framework of fiscal theory. However, the perfect substitutability between currency and bonds has been discussed in the framework of fiscal theory. The importance of whether government bonds are net wealth for fiscal theory is based on the impact of wealth on demand and on the price level. We analysed above that fiscal theory introduced the idea that fiscal theory may affect the price level, both by inducing monetary policy and by directly affecting the price level. In this latter case, the price level could restore equilibrium. Thus, the analysis of net wealth, even though developed before the emergence of the fiscal theory of the price level, is crucial for the validity of the fiscal theory of the price level.

The initial idea was put forth by Bryant and Wallace (1980). According to them, the difference between yields on two government liabilities, currency and bonds, is due to legal restrictions, 'which serve to separate markets, and the multiplicity of liabilities allow different prices (rate of return) to be offered in different markets' (Bryant & Wallace, 1980, p. 5). In the absence of legal restriction, arbitrage would wipe out yield differentials. In accordance with this, another crucial issue that is heavily debated is whether government debt is perceived as net wealth by the private sector. Modigliani (1961) pointed out that an increase in the government's bonds is perceived as an increase in net wealth by households, which increases their consumption relative to savings. However, as interest rates also increase, capital accumulation diminishes. Thus, Modigliani accepts the, initially at least, positive effects of fiscal policy. Thompson (1967), who assumed finite lives, supported this idea by arguing that

the horizon of interest payments is longer than the horizon of future taxes. In the same line of argument, Mundell (1971), based on the imperfections of capital markets, claimed that the discount rate of interest payments will be lower than that for tax liabilities. The issue was elaborated further by Blinder (1982) who introduced the relations between the wealth effect and capital accumulation. As far as the wealth effect is concerned, Blinder claimed that under bond financing of deficit, a new bond has a positive income effect, but also due to increases in the interest rate, there is an effect on demand for money which increases the interest rate more. Thus, the interest rate is increased both due to an increase in consumer spending and an increase in money demand. Thus, the effect on income seems to be ambiguous. If the deficit is financed by bonds, there is an increase in income until the induced tax brings the budget into balance. In the case of money finance, there is also a liquidity effect which makes income rise faster. For the second issue, capital accumulation, standard neo-classical economics has concluded that money finance is the better choice. However, this conclusion is not definite because wealth effects and interest elasticities should be taken into consideration. Thus, an increase in money supply lowers interest rates which induces a wealth effect which reduces the effects of the initial increase in money. Further, lower interest rates increase investments and income as well. The result is ambiguous because 'the wealth effects could be strong enough to offset the original effect of M on the LM curve' (Blinder, 1982, p. 8). The above discussion would give support to the fiscal theory of the price level on the grounds that if government bonds are net wealth, then agents would increase their consumption, which in turn would increase the price level, decreasing the real value of debt and restoring, eventually, the budget constraint.

The idea of positive effects of government bonds has been criticised on the grounds that future taxes offset the positive effects of fiscal policy. Tobin noted that

‘additional taxes which are necessary to carry the interest charges reduce the value of other components of private wealth’ (Tobin, 1971, p. 91). Bailey (1962) also supported this idea, asserting that ‘if future tax liabilities implicit in deficit financing are accurately foreseen, the level at which total tax receipt are set is immaterial; the behaviour of the community will be exactly the same as if the budget were continuously balanced’ (Bailey, 1962, p. 77). In the same line of argument, Barro (1974) developed an overlapping generation model. In this context, households behave as they are infinitely lived as there are intergenerational transfers. Thus, government bonds are not affected by net wealth. Net wealth effects could be positive if private capital markets are imperfect. Finally, Barro introduces transaction cost for the issuance of new bonds and for tax collection and found that the net wealth effect is negative.

Attempting to reconcile the quantity theory of money and the fiscal theory of the price level, Woodford (1995, 1996) claimed that quantity theory is based on a set of requirements that are not sufficient to define equilibrium. In other words, the equilibrium conditions posed by quantity theory are incomplete. Woodford insisted that fiscal policy can determine price level. For example, an increase in the price level reduces the real value of the government bonds held by the private sector. This also reduces the wealth of the private sector (this is the conventional wealth effect). The decrease of private wealth also decreases aggregate demand and as a result the price level is diminished. A change in the money supply by a monetary authority does not affect this mechanism. In this example, it is shown that fiscal policy and wealth effect determine the price level. Even if monetary aggregate is defined exogenously, the equilibrium conditions set by quantity theory are not enough to determine equilibrium. Thus, an extra condition involving fiscal theory is needed to uniquely determine the price level. In other words, the mechanism that .

.defines the price level must incorporate the role of government. It is because an increase in government liabilities or a future increase in the government deficit will cause households to believe that their budget has expanded (i.e. positive wealth effect) and their consumption will be increased. This would be inconsistent with equilibrium at the existing price level. There is only one special case where the price level could be determined under the quantity theory. This is the case of a Ricardian policy regime where the wealth effect does not exist, and thus only the quantity theory's factor plays a role in determining price level.

As we have seen, Barro (1984) refuted that government bonds are net wealth but did so on the grounds that fiscal policy is Ricardian. Thus, it is the Ricardian fiscal policy that makes bonds not net wealth. Woodford (1998, 2001) insisted that under a non-Ricardian regime, bonds could be considered as net wealth. More precisely, if the government's surpluses diminish, then households feel wealthier and aggregate demand will increase. As a result, the price level will increase, and the real value of households' assets will decrease up to the point where the real value of assets will be equal to the present value of future surpluses.

2.3 Could the price level adequately restore equilibrium?

A second core component of the fiscal theory of the price level refers to equilibrium. More precisely, it asks whether a fiscal policy that is characterised as non-Ricardian could freely chose its future deficit and whether the impact that has on the price level could restore equilibrium. Thus, is fiscal policy alone able to provoke a change in the price level that restores equilibrium? If so, then the impact of monetary policy on price level determination is neither a necessary nor a sufficient condition. This also brings forth the relations between fiscal and monetary policy.

Eric Leeper (1990), in an attempt to examine the relations between fiscal and monetary policies, introduced an influential distinction between active and passive policy. An active authority 'pays no attention to the state of government debt and is free to set its control variable as it sees fit' (Leeper, 1990, p. 130) while a passive authority is constrained by an active authority's decisions. Leeper distinguishes four distinct cases. In the first case, monetary policy plays the central role for price level determination and fiscal policy is constrained by both monetary policy and the private sector's maximising behaviour. Thus, inflation and nominal interest rates depend entirely on monetary policy which can control inflation. This corresponds to Aiyagari and Gertler's polar Ricardian case. The second case describes an active fiscal authority which freely decides the level of debt without backing it with future taxes. Thus, monetary authority passively follows fiscal policy and is unable to define the price level. This is because if taxes are not raised to back debt, an increase in the nominal interest rate should occur to induce households to hold government debt. To avoid this, monetary authority expands the money supply now and generates tax revenues to balance the budget. This is studied in Woodford (1988) and assumes pegged nominal interest rates and exogenous direct taxes. Besides those, there are two more cases. First, there is the case where both policies are passive and are constrained by the budget. This is the Sargent and Wallace (1981) case where the price level is indeterminate. In the last case, both policies are active and seek to determine the price level, disregarding budget constraints. Under this the system, we get two unstable solutions because 'there is not a money-growth process that ensures consumers will hold government debt unless the policy shocks are related in a way that violates the assumption of mutually uncorrelated shocks' (Leeper, 1990, p. 139).

In general, Woodford (1996) identified three channels by which equilibrium is restored. First is the diminishing of the real value of existing nominal government bonds due

to inflation. Second is an increase in revenues by seignorage, and finally, there is a diminishing of the real debt service burden. None of the above circumstances involves the intervention of monetary policy. The only case where quantity theory is valid is the case of the Ricardian regime where the present value of future primary government surpluses must equal the value of outstanding government debt. According to Woodford, this is a rather theoretical case given that the government should not follow its budget constraints. The reason is that households' behaviour reassures the government's balance. This is because, following Walras Law, it is assumed that if households' budgets are balanced then the government's should also be balanced, too.

The fiscal theory of the price level has also raised objections. Buiter (1997) criticised fiscal theory and Woodford's model as invalid 'because it represents a "solution" to an ill-posed general equilibrium problem' (Buiter, 1997). Buiter addressed two lines of disagreement. The first is that Woodford's model implies that the government's budget constraint holds only in equilibrium and not for all sequences of the price level and interest rates. Both households' budget constraints and the government's budget constraints must hold not only in equilibrium but also out of equilibrium sequences for these constraints to co-determine endogenous variables. Another line of criticism derives from the over-determination of the fiscal model. The reason is that if the sequence of real public spending and the sequence of real taxes are exogenous, t.hen the sequence of the real debt cannot be determined (in more technical words, the sequence of real public debt is non-stationary). This means that government solvency constraint should not be satisfied.

Another criticism of the fiscal theory was made by McCallum (2000). The main criticism is based on the validity of the fiscal theory. Mc Callum proposed an alternative

solution for the model that is in line with monetarist properties. McCallum showed that the fiscal solution is a bubble solution because debt explodes, violating transversality conditions which state that households will not lend to the government as the number of government bonds increases.

Another interesting insight was introduced by Phelan and Kocherlakota (1999), who developed a model of infinite, discrete time where the price path rapidly increases and money becomes valueless. Thus, optimising households hold a positive but shrinking real balance, and the economy enters a situation of speculative hyperinflation. To reach equilibrium, the government is introduced. If a government follows a Ricardian fiscal policy, which means that the present value of taxes equals government debt held by households, net wealth remains constant, and for that, the government's policy cannot affect the price path. Instead, if a policy is non-Ricardian, some price path that cannot fulfil the government's budget constraint must be rejected. Thus, 'a Non-Ricardian policy is an equilibrium rejection device' (Phelan and Kocherlakota, 1999, p. 20).

The fiscal theory of the price level was further developed by Cochrane (1998), who incorporated the maturity structure of the debt as an additional issue to the debate. Findings indicate that in the case of long-term debt, the nominal value of the debt is not fixed but depends on nominal bond prices which depend on expected future inflation. Under this circumstance, if future surpluses are expected to decline, then expectations for future inflation will appear. This will decrease the relative price of nominal debt, leaving the current price level unaffected. On the other hand, if debt is short-term, the nominal value of debt is fixed, and any change in future surpluses cannot change the price of the debt. In this case, a change in the price level is the only way to find a new equilibrium.

2.4 Is Budget Constraint a Constraint Condition?

Another critical issue of the fiscal theory of the price level concerned the budget constraint. The proponents of the fiscal theory claimed that the budget constraint is not a condition that should restrict governments when deciding their fiscal programmes. In other words, governments should not cover their present deficit with future taxes. This does not mean that a government can freely generate a deficit. Equilibrium will be restored by an increase in the price level. On the other side of the camp, the opponents of the fiscal theory perceived budget constraint as a binding constraint that must always hold. In more technical terms, the former solves their model with the budget constraint as an extra equation while the latter do so as a binding constraint. This also has political extensions. If the budget constraint is a binding condition, then fiscal expansion should be followed by fiscal contraction. This is the Ricardian point of view. On the other hand, following the fiscal theory, this is not the case because equilibrium of the budget constraint will be restored by changes in the price level, leaving room for fiscal expansion. This is the non-Ricardian case.

Sargent (1982) pointed out a critical difference between the debt of a private firm and that of government. More precisely, the government can create debt entirely unbacked in the form of fiat money while a private firm's debt must always be backed. The government's debt is based on the future taxes that the government plans to levy, which is not always the case. Further, private debt is not dominated by the value of another asset. The government, on the other hand, issues debt denominated in the value of money that the same institution issues. According to Sargent, 'the ways […] in which one explains these two "facts" are sensitive matters in macroeconomics' (Sargent, 1982, p.4).

In the same line of argument, Woodford (1998, 2001), pointed out that taxation is an exogenous variable and independent from endogenous variables (such as goods prices, asset prices, or the value of public debt). Under a non-Ricardian regime, any fiscal disturbances have wealth effects and determine the price level. For example, a tax cut without any expectations for future tax increases will increase consumption at a level greater than total output. This will increase prices. Thus, the case is not that fiscal policy induces monetary expansion which in turn increases the price level. Instead, an increase in the public deficit will increase the price level which in turn will increase public desire for real balance and money supply (Woodford, 2001, p. 674–5). In all, the government's budget constraint holds due to change in prices that affect the real government debt, equilibrating in this way real public debt with the present value of future government budget surpluses under the condition that private agents are optimisers and the market clears. For any anti-inflationary policy, a fiscal policy should also be taken into consideration. The reason is that a monetary authority could not be sure that fiscal authorities will follow a Ricardian policy or, alternatively, remain committed to a non-Ricardian policy. In the case of deviation from fiscal discipline, even monetary policy will be unable to stabilise economy. In contrast to the model of Sargent and Wallace (1981), who assumed an upper limit of government debt beyond which the central bank should be involved, increasing the money supply increases in this way the price level. Woodford (2001) pointed out that fiscal policy alone has the capacity to affect the price level. Thus, if the central bank is committed to low inflation, fiscal policy must be Ricardian to control inflation. Instead, if fiscal policy is non-Ricardian, the only way to reach equilibrium is through changes in the price level. Another core issue that Woodford dealt with is the necessity for a fiscal policy to be strictly Ricardian. This brings us to another issue at stake in this debate: should a fiscal policy be Ricardian? The government is not a private agent that

must decide within the limits of its budget constraints. The government has the choice of borrowing and rolling over its debt in contrast to households that, due to unlimited needs, prefer to borrow and consume more and more. This impedes, in this way, determining any market clearing prices. Such a problem is of little importance in a general equilibrium framework, and as said above, a policy could be non-Ricardian and still have rational expectations equilibrium. Moreover, for private agents, prices are given. Instead, the government is a central player making decisions that could change equilibrium prices. Thus, the government could decide whether (or not) to follow a Ricardian or a non-Ricardian policy, according to the price level it desires.

Sims (1999) also supported this idea by comparing debt which is issued by private companies and debt which is issued by public authorities. A first difference is that the private sector has a limited capacity to collect revenues. The government, on the other hand, can increase taxes to cover its expenses. Even if this is not the case, there is a mechanism that is able to balance the government's budget. More precisely, a private company's debt cannot affect the price level. Instead, if a government's current real value of debt is not balanced by the discounted present value of real future primary surpluses, then the price level will be affected in a way that re-balances the government's budget. A further difference lies in the fact that the private sector cannot produce 'money' to repay its debt instead of the government which is able to issue new 'paper' at nearly zero cost.

Cochrane (2001) pointed out that government decides to issue bonds according to its needs and to pay its debt on the nominal value, not the other way around. Put differently, it is not the price level that forces the government to issue bonds. Neither debt is paid according to the price level. The choice for the issuance of debt is taken without any consideration of

the price level, and there is no constraint in this decision. All the above indicates that the government is not subjected to any constraint when deciding for its bonds. However, the government must repay its debt, and for that reason, it must increase surpluses when it increases the issuance of bonds. If surpluses are less that the value of bonds, then the government must increase the money supply which in turn increases prices. Thus, the government should not increase surpluses given that the role of equilibrium is undertaken by the price level. The above does not mean that the government should be totally indifferent to its solvency. Any decision to increase debt without increasing surpluses will end up in default because outstanding government debt will be devalued.

One of the most significant opponents of the fiscal theory was Willem Buiter. In 'The Fallacy of the Fiscal Theory of the Price Level' (Buiter 1999), Buiter sought to 'put an end to this fruitless line of enquiry by demonstrating the nature and origins of the fallacy' (1999, p. 1). Buiter claimed that fiscal theory is not only theoretically fallacious but also politically harmful, given that it allows a government to exogenously decide primary surpluses plus seignorage, and solvency is achieved by changes in the price level. To support this view, Buiter developed two lines of arguments. First, he pointed out that a budget constraint must hold for all endogenous variables and not only in equilibrium. When a model implies that a government exogenously decides its primary surpluses without taking into consideration its budget constraint, it is ill-posed because default is not ruled out. Buiter also claimed that the price level cannot play the equilibrate role that fiscal theory ascribes to the price level.

Following his previous argument (that budget constraint is a constraint that must be followed by any agents—households, firms, and the government—and that holds universally and not only in equilibrium), Buiter (2001) re-considered the distinction between Ricardian

and non-Ricardian policy and distinguished three cases: the Ricardian regime with contract fulfilment, the Ricardian regime without contract fulfilment, and the non-Ricardian regime. The first regime 'is a set of sequences for real public spending, […] net real taxes […] and either a sequence of nominal money stock […] or a sequence of nominal interest rate […] which identically satisfies the government's inter-temporal budget constraint and ensures that all outstanding contractual debt are met exactly' (Buiter, 2001, p. 16). Under the above setting, any rule for taxes that satisfies inter-temporal budget constraints is appropriate. This is the Sargent and Wallace (1981) model. The second case was illustrated by Woodford (Woodford, 1995) and Cochrane (Cochrane, 1999). In this case, the inter-temporal budget constraint is satisfied but the contractual debt obligations do not have to be met exactly. The last case is the non-Ricardian case which is characterised by an exogenous nominal money rule (or exogenous non-negative sequence of nominal interest rate), exogenous sequence of real public spending, and exogenous sequence of real net taxes. A non-Ricardian case is overdetermined, and an inter-temporal budget constraint is satisfied only in equilibrium.

2.5 A Game Theory Approach of the Fiscal Theory of the Price Level

A final aspect of the fiscal theory of the price level referred to the relations between the agents of fiscal and monetary policy. More precisely, this aspect attempted to shed light on the understanding of economic policy through a game theory approach in which each individual agent (i.e. the government and central bank) trying to follow its economic programme affects the economic programme of the other agent. The analysis of this behaviour eventually determines what kind of equilibrium will be reached.

Niepelt (2002) gave a different interpretation of the results of fiscal theory. He pointed out that non-Ricardian policy is inconsistent with rational expectation equilibrium. This is because a non-Ricardian policy that set the initial price level could not operate again to pin down the price level, leaving, thus, inflation indeterminate. Once the price level is fixed to the level that ensures solvency of a government, there is no need to change. This makes the policy Ricardian. Thus, the policy can be non-Ricardian at the start and becomes Ricardian afterwards. Moreover, the initial decision that affects the price level and the real value of debt operates as a 'surprise'. The unanticipated price level is inconsistent with rational expectations. Thus, fiscal theory can operate only at the beginning of a period.

Following Leeper's analysis, Evans and Honkapohja (2007) set a model to discuss the possibility of rational expectation equilibrium solutions under a combination of fiscal and monetary policy rules. Evans and Honkapohja's analysis is based on active and passive monetary and fiscal policies. More precisely, an active fiscal policy means that additional tax revenue is not sufficient to cover interest payments of debt. On the other hand, an active monetary policy means that an increase in the rate of inflation increases the real interest rate. Under the above specification, there are four policy combinations. If both monetary and fiscal policies are passive, then there is no least square rational expectation stable solution. If monetary policy is active and fiscal policy is passive, then a monetarist least square solution is possible. In the alternative case where fiscal policy is active and monetary policy is passive, a fiscal least square stable solution is possible. If both policies are passive, there is no solution. In all, the fiscal theory of the price level is valid under specific circumstances, that is, when monetary policy is passive and fiscal policy is non-Ricardian.

Chapter 3 Empirical Evidence

3.1 Introduction

The empirical validation of the fiscal theory of the price level proved to be a difficult exercise. During the 1990s, several empirical studies attempted to clarify the existence of Ricardian or non-Ricardian fiscal policies. However, any attempt to test causality between several variables implies assumptions that were rooted in the regime that is tested. This makes any effort to reach a comprehensive analysis an unattainable task. These difficultieraised some initial objections of any attempt to test the suitability of the fiscal theory of the price level. Woodford (1995) pointed out that all monetary variables (monetary regimes, monetary rules, and money demand) cannot determine the price level, which is determined only by fiscal policy. One of the most prominent critics of the fiscal theory, Willem Buiter, also contended this, saying that 'the governments inter-temporal budget constraint is a constraint on the government instrument that must be satisfied for all admissible values of the economy-wide endogenous variables' (Buiter, 1999, p.21). Thus, any empirical approach that attempts to corelate the government's budget constraint with primary surpluses will not be conclusive of the fiscal regime.

Testing on empirical grounds the fiscal theory of the price level is not an easy task. Based on the assumptions of the fiscal theory of the price level, one should directly test the relations between the price level and debt. This approach, to our knowledge, is applied only in Afonso's (2002) paper as a supplement test. This is because the test of such a kind would mean the acceptance of both the fiscal theory of the price level assumptions and fully flexible prices, which are both objectionable. On the other hand, testing monetary behaviour would be spurious in the sense that eventually the results would show the consistency of monetary

rules with the fiscal theory of the price level and not the relations of fiscal policy with either the price level (under a non-Ricardian regime) or future surpluses (under a Ricardian regime). Further, as Clarida et al. (1998) pointed out, Taylor-type monetary policy observed in many industrialised countries rules out the fiscal theory of t

he price level. Another problem with testing the fiscal theory of the price level is that equilibrium holds under both regimes. What differs between them is the causal link between prices and surpluses: 'under a non-Ricardian regime, equilibrium is restored with prices adjusting to expected surpluses, and under a Ricardian regime, equilibrium is restored with expected surpluses responding to the price level' (Sala, 2004, p. 3). Put differently, the answer lies in the causality and not in the correlation.

Another problem with testing the fiscal theory of the price level concerns the discretionary character of fiscal policy. In some instances, fiscal policy could be countercyclical and not non-Ricardian. Further, fiscal policy is susceptible to political preference that forms its character.

For the reasons mentioned abov

e, most of the following research tests the fiscal theory of the price level by regressing fiscal variables.

Even though it is not possible to assess the fiscal regime in equilibrium, the adjustment process of the fiscal variable might give an answer to this question. Thus, equilibrium being reached through changes in the price level or through future surpluses would be a possible method to reach a conclusion about fiscal regime. More specifically, in a Ricardian fiscal

environment, fiscal sustainability is achieved through budget surpluses that stabilise the debt-to-GDP ratio under acceptable limits. On the other hand, i

f the fiscal regime is non-Ricardian, an increase in the debt-to-GDP ratio will increase aggregate demand and the price level and, eventually, will restore the real value of the government liabilities to its equilibrium level.

3.2 Evidence from the USA and UK

Bohn (1998) follows the widely implemented test of the correlation of surplus to debt to examine the fiscal behaviour of the government. To this end, he used data from the US during the period from 1916–1995 for surpluses and debt-to-GDP ratios. The results show a positive correlation that indicates the Ricardian nature and the sustainability of fiscal policy, even though in some periods there were high fiscal deficits due to war and cyclical reasons.

Sala (2004) developed a dynamic general equilibrium model in the new neo-classical tradition and a VAR analysis to test the fiscal regime in the US during the period from 1960–2003. For the period from 1960–1979, results showed that fiscal policy is non-Ricardian. At the end of the 1980s, there was increasing concern for the sustainability of the debt. In this period, there was a negative response of the real interest rate to a tax shock, indicating a swift to a Ricardian regime.

Apart from the classification of the regime into the two categories (fiscal and monetary), an interesting issue also concerns the change between the two regimes. This was the focus of the work of Favero and Monacelli (2005) and the work of Davig and Leeper (2006), which are analysed below.

To test fiscal policy in the US economy for the period from 1960–2002, Favero and Monacelli (2005) employed a Markow-switching regression method. This model involves multiple equations that can characterise the time series behaviours in different regimes, allowing one to examine the changes of a regime endogenously. Further, they specified a specific target level at which the primary deficit should converge. Thus, it is crucial to identify such a target level. This target level incorporates a fiscal gap so as to capture the cyclical component of fiscal policy. Second, there is the debt-stabilising deficit, that is, 'that level of the primary deficit that would be consistent […] with constant government debt' (Favero and Monacelli, 2005, p. 3). Thus, according to them, the rule is the elasticity of the primary deficit to the debt-stabilising deficit, which characterises the fiscal regime as either active or passive. The results showed that in the US there have been two fiscal regimes. The first extended from 1960 until the early 1990s and was characterised by a sharp increase of the debt-to-GDP ratio, followed by destabilising behaviour for the debt-stabilising rule and by little concern for the stabilisation of output. This period's fiscal policy could be characterised as non-Ricardian. In the early 1990s, the status of fiscal policy changed as primary deficits were aligned with debt stabilisation and with the stabilisation of the output. Until the beginning of the 2000s, there was a steady decline in in the debt-to-GDP ratio. The regime changed again in 2001 as the Bush Administration had little concern for fiscal stabilisation.

Using the same methodology, Davig and Leeper (2006) examined a model where monetary policy follows a Taylor rule (for the US economy using quarterly data from February 1948–January 2004, that is, the nominal interest rate is determined by inflation, the output level, and a fiscal policy that adjusts taxes on government debt and other variables. The central issue for them is not to test which of the two theories are valid but to uncover the relation between the two regimes. Their analysis found th. at there were periods with active

monetary and passive fiscal policy and periods with passive monetary and active fiscal policy. There are also periods where both policies were passive or both were active. Particularly, monetary policy was passive from 1948 to October 1979, with a short period from 1959–1960 when monetary policy was active. Further, monetary policy was passive shortly after the two recessions of 1991 and 2001. It is more complicated with fiscal policy which was intensely changed from passive to active. After the WWII, there were 12 fiscal regime changes, beginning with active; then the period from 1950–51 became passive, and from the mid-1950s to the mid-1960s, fiscal policy turned passive. From 1979–1981, fiscal policy became active again. From the mid-1980s to 2001, fiscal policy turned active, and finally in the period from 2002–2003, fiscal policy became active again.

3.3. Evidence from the EU

The European Monetary Union (EMU) has provided a fruitful framework for the assessment of the fiscal theory of the price level. This *sui generis* environment has drawn the attention of economist who focus on the need for fiscal constraint imposed by Maastricht criteria. Indeed, the problem of the EMU is not whether a country follows a Ricardian or a non-Ricardian fiscal rule but mostly what would be the effects of the functioning of the whole union if a country chooses a non-Ricardian fiscal policy. One of the proponents of this theory, Christofer Sims (1999) argued that 'a commitment [to fiscal discipline] is plausible in a country with a single monetary authority and a single fiscal authority. But in EMU a coordination problem would arise' (Sims, 1999, p. 424). This is because members state of the EMU must preserve the value of the common currency. Thus, if a country behaves in fiscally irresponsible way, then another country should raise taxes for the debt-to-GDP ratio to be equal with the

future surpluses of the union. Here two problems arise. First, no country will be willing to undertake this role, and second, small countries are unable to undertake such a role. This is a vote for Maastricht criteria. Sims (1999) analysed two scenarios. First, in the case of deflation, interest rates approach zero, making active monetary policy and passive fiscal policy untenable. What is needed is a fiscal stimulus by reducing primary surpluses. However, if Maastricht criteria are strictly followed, this is forbidden, thus driving economies in the wrong direction. Under this situation, even the fiscal stimulus of one country could benefit the other economies. This brings us to t.e second scenario. If the Maastricht criteria are broken once by a country, then a free-riding problem arises. More precisely, to achieve political gains for itself, a country could increase debt spreading inflation for other countries. Thus, this country should be forced to undergo fiscal contraction. Again, the rules and mechanisms of fiscal discipline should be enforced.

Woodford (1996) set up a different model. Based on complete risk sharing, he assumed a homogeneous consumer. In doing so, he considered a uniform consumer's budget set without taking into consideration the effects of taxes on the consumer's country of residence. Even with different assumptions, the results remain the same as with Sims (1997, 1999). In particular, the increase of debt in one country must be backed by increasing surpluses in other countries: 'the only way thatgovernment 1 can act in order to minimise the macroeconomic instability resulting from fiscal instability of country 2 is for it to adjust the size of its own budget deficit *inversely* with that of government 2' (Woodford, 1996, p. 32).

Another interesting empirical study was done by Melitz (1997). Using pooled data for 15 members of the EU (except Luxembourg) and five OECD countries, Melitz attempted to

empirically assesses the relations between fiscal and monetary authorities. To do this, he correlated public debt to primary budget deficits.

His findings concern three issues: first, the responses to public debt; second, the interaction between fiscal and monetary policy; and finally, the responses to economic fluctuations. As far as the first issue is concerned, the results indicate that taxes increase when the debt burden increase. Further, according to the estimates, expenditures also fall. The relations between fiscal and monetary policy in the EMU need more attention. This is because member states could finance their budgets from a broader capital market at a lower cost. This may relax fiscal discipline, especially of the less-disciplined countries. Under this situation, monetary policy should be restrictive, increasing interest rates and appreciating the currency. This will fight inflation and will permit the countries to finance their budget through the rest-of-the-world savings. In all, fiscal and monetary authority interact negatively. The alternative view was that of Sargent and Wallace (1981) who pointed out that fiscal expansion will be followed by monetary expansion, supporting the idea that fiscal and monetary policy move in the same direction. The results argue in favour of the first view, that is, that fiscal and monetary policy are negatively corelated in OECD countries. This becomes crucial in the EMU environment, given that a coordination between two policies is important because 'there may be some benefit from [the] EMU simply by virtue of the weakening of the influence of fiscal authorities over monetary policy' (Melitz, 1997, p. 4) Finally, the impact of the business cycle on fiscal and monetary policy is as expected. Both monetary and fiscal policy stabilise the economic cycle with a one-year lag. An interesting finding concerns the response of fiscal policy to current economic activity. On the one hand, taxes are stabilising, but government expenses are destabilising. Thus, a positive shock in aggregate output increases taxes but also increases expenditures.

Andreas Thams (2007) applies a Bayesian VAR analysis with sign restrictions on the impulse responses to estimate the relations between surpluses and public debt for two European countries, Germany and Spain. For Germany, the findings indicate that, for the period from 1970–1998, a positive shock in the ratio surpluses to GDP led to a negative response in the ratio liabilities to GDP. The impact of this relation is significant and persistent for a period of five years. Moreover, the impulse response of long-term interest rates is distributed around zero. This means that the liabilities-to-GDP ratio strongly reacts after a fiscal shock, leaving the interest rate unaffected. All the above indicates that the policy is Ricardian. The same pattern characterises Spain as well. The liabilities-to-GDP ratio is negatively corelated to the surplus-to-GDP ratio. However, surprisingly, the interest rate does not remain unaffected. Instead, there is a strong positive response of the interest rate. There are two interpretations of this. First, the reaction of future liabilities is not strong enough to cancel out any effect on interest rates. Second, even though Spanish policy is Ricardian during the period under consideration, individuals have a positive expectation that fiscal policy could become non-Ricardian in the near future. In general, this study also showed that Ricardian policy characterises German and Spanish fiscal policy.

Ballabriga and Martinez-Mongay (2006) surveyed the fiscal behaviour of the countries in the EMU and of the UK, the US, and Japan for the period from 1977–2005. They regress primary surplus to debt and including two components that, according to them, affect fiscal policy, namely, the response of fiscal policy to the cyclical state of the economy (as represented by the output gap) and the primary surplus gap (which represents the inertia of fiscal policy). Findings showed that in all countries there is a positive reaction of primary surpluses to debt stock, which is statistically significant, except in Germany, Greece, France, Ireland, Austria, and Finland. Only in Japan the estimate is negative but not significant. In

cases where the estimates is significant, the reaction function of the primary balance to the output gap is positive, indicating countercyclical fiscal policy. This refers to the EU member states not in the euro area. In Belgium, Germany, and Ireland, the correlation is negative but not significant. In most cases, the explanatory power of the model is high where 75% or more of the primary surplus changes are explained by debt. This case refers to Belgium, Greece, Spain, Italy, Finland, Denmark, Sweden, the UK, the US, and Japan, whereas in Germany, France, and Austria the explanatory variable is poor. All things considered, a positive response of the primary surplus to debt is a sufficient condition of the sustainability of fiscal policy. In general, the estimation suggests that fiscal policy is sustainable in most countries.

Rubio, Roldan, and Esteve (2009) regressed the ratio of primary budget surplus to GDP on the ratio of government debt to GDP for EMU countries for the period from 1970–2005. The positive estimators consist of a sufficient conditioCreeBn for the solvency. That is, government satisfies its budget constraint. In all cases, except for Finland, the estimated regression coefficients were always positive and significant. This indicates that a Ricardian or monetary dominance regime prevails. However, in equilibrium, the conditions of fiscal solvency are valid under both fiscal dominance and monetary dominance regimes. To disentangle this, Rubio, Roldan, and Esteve analysed how fiscal sustainability is achieved. As already mentioned, in a Ricardian (monetary dominance) regime, the equilibrium is reached through changes in primary surpluses, while in a non-Ricardian (fiscal dominance) regime, the equilibrium is restored by changes in the price level. To distinguish the two regimes, Rubio, Roldan, and Esteve ran Granger causalittests between primary surpluses and debt. The results were not indicative to draw a firm conclusion. Finally, using a VAR analysis, they compute impulse response functions of the debt-to-GDP ratio and surplus-to-GDP ratio. The results showed a negative response of the debt-to-GDP ratio when the surplus-to-GDP ratio had been

positive. In sum, the analysis of Rubio, Roldan, and Esteve found no clear evidence that supported the fiscal theory of the price level, but they conclude that 'the main assertions of [the fiscal policy of the price level] would seem rather extreme and have been somewhat softened later on by some of their main proponents' (see, e.g. Woodford, 2003).

Creel and Bihan (2006) used a bivariate VAR model for the US, Germany, France, Italy, and the UK. Their model followed the model of Canzoneri, Cumby, and Diba (2001), incorporating structural balance data. Assuming a fiscal policy of the price level regime, they distinguished between structural and cyclical components of primary surpluses to examine if producing empirical impulse response functions allows for lagged cross-correlation between both components. Their results showed that in the US and UK from 1960–70, the net public debt-to-GDP ratio decreased, although the public deficit tended to increase in the same period. This could be interpreted either as consistent with the fiscal policy of the price level regime or as resulting from the high inflation and negative real interest rates of that period. Until the 1980s, the deficit-to-GDP ratio in both countries was swung, and the debt-to-GDP ratio increased, which seems to validate the fiscal policy of the price level regime. On the other hand, in France, Germany, and Italy, the public debt-to-GDP ratio stopped increasing at the end of 1990s. This trend was due to the Stability and Growth Pact that reversed expectations for future primary surpluses. In all, the model showed that the impulse response function of the VAR model validated the Ricardian regime.

Another attempt to empirically test the fiscal policy of the price level was made by Afonso (2002). In line with the point of view of previous researchers (that it is difficult to test fiscal variables to test the plausibility of either Ricardian or non-Ricardian regimes because in equilibrium fiscal constraint always holds), Afonso used panel data for the primary budget

surplus as a percentage of GDP and for the debt-to-GDP ratio for EU-15 countries for the period from 1970–2001. To introduce each country's characteristic allowed changes in autonomous terms for each country. The reaction of primary surpluses to debt could classify countries as Ricardian or non-Ricardian. Results showed that when debt increased, governments also increased budget surpluses, following, in other words, a Ricardian fiscal policy. Afonso also used an alternative method of estimation. Given that, according to non-Ricardian specification, when a government raises taxes and thus increases the surplus, there should be a decrease in the price level. Thus, to test the plausibility of non-Ricardian hypothesis, there must be a negative correlation between prices and fiscal revenues. Instead, if prices are independent of fiscal revenues, then fiscal policy is Ricardian. The findings from this test also reaffirms the Ricardian policy, given that there is no statistically significant relation of the price level to fiscal revenues. The results are confirmed both in the fiscal effects and random effects models.

Conclusion

The fundamental ideas of modern economic thinking were developed shortly after WWII. The necessity of reconstructing the devastated economies, the urgent need for social protection, and international political developments justified the active role of the state. Keynes had already given the recipe, and it was the time to apply it. The core issue of this economic debate was the role of the state and fiscal policy on the one hand, and the role of the central banks and monetary policy on the other hand. Thus, to understand the role of fiscal policy, a review of this debate is essential. The seminal essay by FM (1963) set the beginning of the first round of the debate, and the influential paper by Sargent and Walace

(1981) initiated the second round. The economic literature separately analyses the debate between FM and AM, which lasted from the early 1950s to the early 1980s, and the debate on the fiscal theory of the price level, which lasted from in the early 1980s to the present. Our attempt is to show that there has been a strong connection between them and to present the latter as a sequel of the former. The emphasis of the first round was to clarify the content of basic variables, that is, stock of money, autonomous expenditure, and others. A second characteristic of the first round was the lack of data and inadequate technical methods. Thus, critics focused on these issues. However, even under these circumstances, this debate succeeded in casting a light on crucial issues that shaped modern economics, namely, the relation between fiscal and monetary policy. On the other hand, this debate adopted a dichotomous approach. Scholars have sought to conclude either to support fiscal or to support monetary policy and sought to highlight the emphasis on the strength that each policy has on the other variables, especially income and the level of price.

The second round took a step forward, seeking to shed light on the relation between fiscal and monetary policy in a rather cooperative approach. Attempting to reintroduce fiscal policy as a tool of controlling the price level broke the old dichotomy. Having more advanced technical methods and data available, this new idea was quickly tested for different countries. Other approaches (i.e. game theory and stability) were implemented, giving a different aspect to this new theory.

In all, there are no studies, at least to our knowledge, that synthetically combine and present the two debates. This is the added value of the first part, to analyse and compare from a rather different angle the evolution of the relations of fiscal and monetary policy through two major economic debates. This will provide us with a concrete theoretical basis

to construct our mathematical and econometric part, which follows in the second part, and to discuss the role of fiscal policy in the framework of the EMU in the conclusion.

Part II

Chapter 4 The historical evolution of EMU: A Synopsis

4.1 The first period: The Road to European Economic Unification. From the Werner Report to the Maastricht Treaty

The final days of the Bretton Woods fixed exchange rate system in the early 1970s signalled the first attempts towards the economic or, more precisely, monetary unification of Europe. Under the Bretton Woods system, which began shortly after World War II, the international monetary system was based on a stable and adjustable exchange rate regime wherein occasional devaluation was allo

wed to correct disequilibria in the balance of payments. Thus, all major industrial countries pegged their currencies to the US dollar, and the dollar had a fixed price of $35 per ounce of gold to avoid the n-th currency problem. However, the drawbacks of this system and the immense turbulence of world economy in the late 1960s and early 1970s set the Bretton Woods system under severe pressure and ultimately led to the collapse of the fixed exchange rate regime. As far as the former is concerned, any system of fixed exchange rates suffers, more or less, from the same problems. Limiting the adjustments of under- or over-valued currencies, prevents the freedom of central banks to adjust interest rates. This ultimately requires reserves to support the economy if the currency comes under pressure. This issue has been heavily debated, and each analysis has shed light on specific aspects for the cause

of economic turmoil of that period. However, it is widely agreed that oil shocks, competitiveness issues that set balance of payments under serious distress, political developments – such as the collapse of former USSR and China applying far-reaching market economy reforms after Deng Xiaoping succeeded Mao Zedong – and new technology that has been applied in the production have been major causes that contributed to the collapse of the Bretton Woods system.

In this stormy period, the idea of European economic unification began to take shape. The first efforts towards the unification dates back to 1969, which was when the European Commission released a memorandum on the coordination of economic policies and monetary cooperation within the community and 'recognized the need for fuller alignment of economic policies in the Community and for an examination of the scope for intensifying monetary cooperation' (Bulletin of the European Communities, 1969, p. 3). Based on this memorandum, the European Economic Community (EEC) summit in Hague decided to create the Economic and Monetary Union (EMU). For this purpose, a group of experts, led by the Prime Minister and Minister of Finance of Luxembourg Pierre Werner, prepared the first plan in 1970, proposing to proceed to the economic unification in stages throughout the 1970s. This initiative proved short-lived because, as explained above, the 1970s constituted a turbulent period. However, the plan was not totally abandoned. In 1972 the 'snake in the tunnel' was established, which aimed to create a mechanism of limited managed floating exchange rates. However, any attempt of this kind has always been self-defeating due to the impossible trinity: Analytically, it is impossible to have all three of the following at the same time: a fixed foreign exchange rate, free capital movement (absence of capital controls) and an independent monetary policy conducted by the national central bank. A further problem with the 'snake' was that the currencies of more vulnerable economies could not devaluate

themselves to tackle the balance of payments problems. Thus, weak-currency countries, not having enough financial support to protect their currency from speculative attacks, had to follow the restrictive policy and drive their economies into deeper recession. For the above reasons, Great Britain, France and Italy left the 'snake', and by 1979, only Germany, the Netherlands, Norway, Belgium, Sweden, Luxemburg, and Denmark remained in this system. However, the idea of European economic unification did not fade. A more comprehensive initiative during this period was the establishment of the European Monetary System (EMS) in March 1979, in which eight out of nine European countries (after the opt-out of Great Britain) participated. At the heart of this mechanism was the Exchange Rate Mechanism (ERM). This mechanism normalised the exchange rates between European countries. This was achieved by the institution of European Currency Unit (ECU) which was a weighted average of each participating currency. Each currency was expressed in terms of the ECU and only a fluctuation of ± 2,25% was allowed (except for the British pound, Spanish peseta, Portuguese escudo and Italian lira where the margin was ± 6%).

During the 1980s, efforts towards economic integration began again. In 1986, the first amendment of the Treaty of Rome – the Single European Act – called for removing all barriers of trade, capital movements and labour migration within Europe by the end of 1992. The circumstances were opportune, and a few years later, in 1989, the Delors Committee issued a report in which it was stated that 'a single market requires a single currency' and proposed the transition into a single currency in three stages. In the first stage the task was to widen the participation in the ERM. The second stage included the narrowing of the margin of exchange rate and the transfer of certain national macroeconomic policies to the European authority. Finally, in the last stage the establishment of a European System of Central Banks would replace national banks in the conduct of monetary policy, and the introduction of a

single currency would take place (replacing the national currencies). On a theoretical basis, the need for common currency was justified again by the impossible trinity. Free capital movements and fixed exchange rates were to be accompanied by the transfer of the national monetary policy to a single monetary authority. Thus, the establishment of a European System of Central Banks and a European Central Bank (ECB) seemed inevitable.

Based on the above considerations, the European Economic Community decided at the Strasburg Summit in December 1989 to call an Inter-Governmental Conference to negotiate a possible Treaty amendment. This led to the new Treaty of the European Union, accepted by the European Economic Community Summit in Maastricht in December 1991, which, in turn, established the European Union (EU) and was officially signed on 7 February 1992. The road for a new common currency was open. The most significant part of the Maastricht Treaty, from the economic perspective, was the convergence criteria that a country should fulfil to join the euro area. These criteria refer to the inflation rate, exchange rate stability, long-run interest rate of government's bonds and the sound public finance. To be specific, the average inflation was to be no more than 1.5% above the rate of the three best performing member states, and, in general, the price performance had to be sustainable. The currency of the candidate country was to participate in ERM II for at least two years without severe fluctuations, i.e. without devaluing against the euro. The long-run interest rate was to be no more than two percentage points above the rate of the three best performing member states in terms of price stability. Finally, a country was not to be under excessive deficit procedure, i.e. a country's fiscal deficit was to be below 3% of the gross domestic product (GDP) and the government's debt below 60% of GDP.

Even though there was strong political and economic support for the need of a common currency, mainly due to geopolitical developments of that period – reunification of

Germany and the demise of Soviet bloc, followed by the disintegration of Soviet Union – the task proved to be much more complicated. The referendum for the ratification of the Maastricht Treaty in Denmark on 2 June 1992 was disapproved. A year later, in May 1993, a second referendum approved the Maastricht Treaty. In the same year, the French referendum only narrowly accepted the new Treaty (50,8%); in the UK, it barely passed in the Parliament. The period before the beginning of the second stage proved to be economically rough as well, partly due to the political troubles described above. The initial instability of the new exchange rate environment exposed several currencies to speculative attacks. This resulted in the devaluation of the British pound and the Italian lira in September 1992, which then led to their withdrawal from the ERM. Subsequently, a wave of devaluation affected Spain, Portugal and Ireland. Further, Finland, Norway and Sweden abandoned the fixed parity with ECU. The French franc faced several devaluations as well. Eventually, under these speculative pressures, the margin of the ERM was widened from ± 2,25% to ± 15% against central parity. The first stage of monetary unification, which ended as planned in December 1993, proved quite dubious and the future of European economic integration proved to be a rather precarious task.

The second stage (1 January 1994 – 31 December 1998) was characterised by more tranquil economic conditions. During this period, several institutions were set up to prepare the launch of the new currency. The European Monetary Institute(EMI) marked the beginning of the second stage. The main tasks of the EMI were to facilitate the communication among central banks, coordinate their monetary policy and undertake the necessary measures to establish the European System of Central Banks, which would oversee the single monetary policy upon the single currency's introduction.

During the second stage, a third amendment of the Treaty of Rome was agreed upon. In June 1997, the European Council adopted the most debatable and controversial agreement, the well-known Stability and Growth Pact. Its scope was to complement the function of European Monetary Union and, specifically, to maintain the budgetary discipline of the member states of EMU. It consisted of two regulations – the preventive arm (Regulation (EC) No 1466/97) and corrective arm – that clarified the implementation of the excessive debt procedure (Regulation (EC) No 1467/97). The former supported EU governments to achieve a sound fiscal policy. Each member state would submit either a stability programme (for euro area countries) or a convergence programme (for non-euro area countries) to outline the accordance of their fiscal policy with the medium-term budgetary objectives. The corrective arm was activated when a country infringed the deficit threshold of 3% or breached the debt level of 60% of GDP without taking the appropriate fiscal measure to restore it to the point of reference. Under these circumstances, the Excessive Debt Procedure was launched, as detailed under Art. 126 of the Treaty. Countries subject to the Excessive Debt Procedure were given a six-month period to take all the effective measures to comply with the fiscal targets. Failure to do so led to a stringent sanction in the form of a non-interest deposit of 0,2% of the GDP. With continued non-compliance, countries would face further sanction by a temporary suspension of the Structural and Investment Funds and a fine of 0,2% of the GDP.

In January 1999, the third and final stage of the European Monetary Union commenced. The exchange rate of the initial 11 participant member states was irrevocably fixed and the monetary policy was passed to the ECB, which undertook the responsibility to conduct a single monetary policy with the task of maintaining price stability so as to keep '…inflation below, but close to 2% over the medium term' (ECB, 2011, p. 7) and safeguard the value of the euro. To effectuate the objective, ECB followed the two-pillar strategy involving

monetary and economic analyses. The economic analysis consisted of reviewing developments in the overall output, the demand and labour market conditions, a broad range of price and cost indicators, fiscal policy and the balance of payments for the euro area. In contrast, the monetary analysis was focused on the long-term and in-depth analysis of monetary and credit aggregates to assess their impact on future inflation.

At the end of February 1998, the European governments released their macroeconomic reports for 1997, and 11 member states (German, France, Italy, Luxembourg, Netherlands, Belgium, Austria, Finland, Portugal, Spain and Ireland) fulfilled the fiscal and inflation requirements to participate in the initial stage of the European and Monetary Union. Greece also met the criteria and became the 12th member of the EMU. In January 2002, the new notes and coins began to circulate alongside the national currency, and by July 2002, the changeover to the euro was completed.

4.2 Evaluating the First Decade of the EMU

The launch of the European Monetary Union constantly draws the attention of economists. Due to its incomplete economic structure, a lively debate started regarding the future of this peculiar monetary union. Even though the ideas and initiatives for the creation of the union took place in an agitated political and economic environment, its first decade proved to be successful in general. In this section, we revise some fundamental indicators (inflation, business cycle and employment). An extensive analysis of the fiscal policy, which is the central issue of this thesis, is presented in Chapter 2.

To begin with, inflation has been a major problem during the 1970s and 1980s. The same period saw the emergence of liberal ideas that shifted the focus of economic policy from unemployment to inflation. Since then, inflation has been in the spotlight of economic policy.

This was a concern of the European economic policy as well. Interest in the control of inflation was introduced both in the Maastricht Treaty's criteria and the ECB monetary policy. The inflation performance indicated the efficacy of institutional arrangement of euro areas. Over the first 10 years, the average inflation remained close to the benchmark of 2% (with the exception of 2007 – 08). Notably, another issue was the decline of price volatility. These findings are summarised in the graph below.

Figure 1

Inflation in the Euro Area

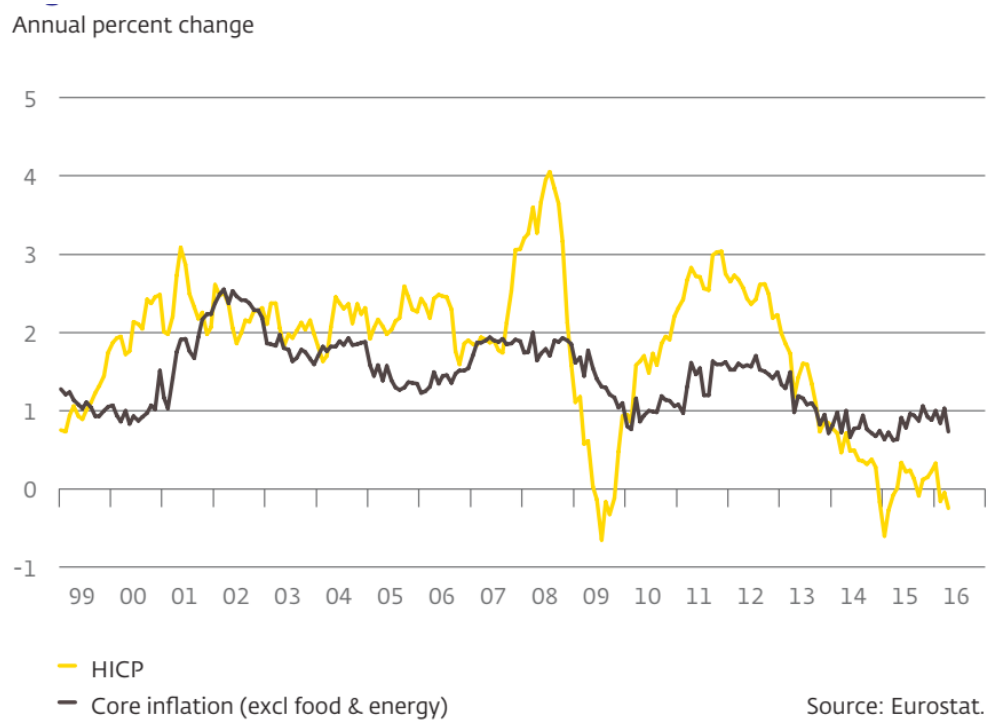
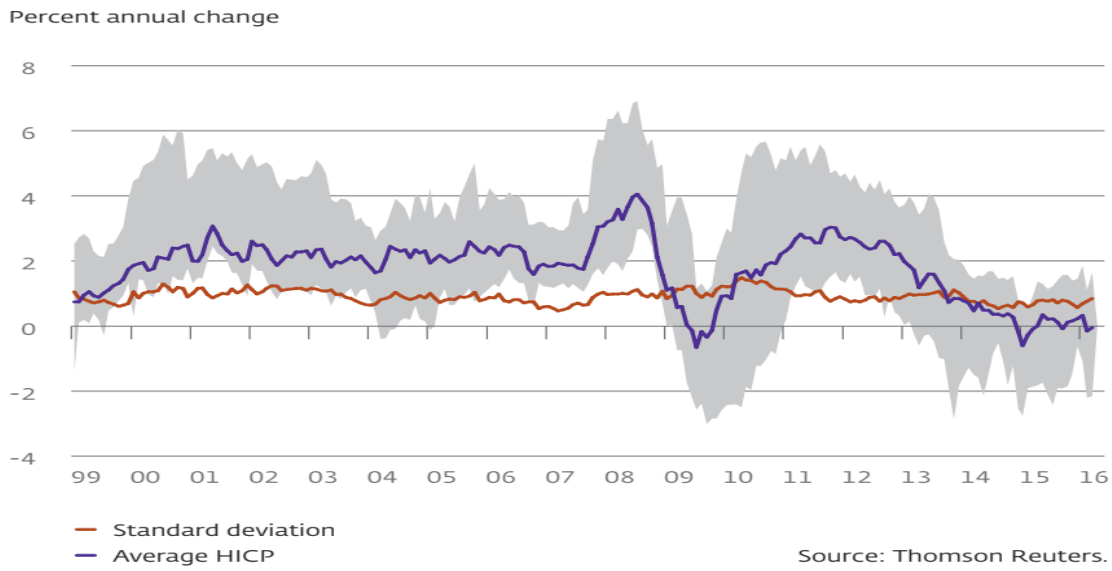


Figure 2



EMU Inflation Variation

Several studies showed that EMU provided the stimulus for increasing the foreign direct investments between member states as well as from countries abroad (see, e.g. Petroulas, 2005; Foad, 2007; Baldwin et al., 2008). This is related to the issue of convergence between member states of a monetary union, which attracted much of the debate. Part of the literature before the establishment of the euro was critically focused on the ability of the EMU to normalise asymmetric economic fluctuations (Cohen & Wyplosz, 1989; Weber, 1990). On the other hand, Frankel and Rose (1996), using data from 20 industrialised countries, showed that as the volume of trade increased the more synchronised the business cycles became. Although the studies did not support the convergence argument, ultimately, EMU succeeded in synchronising the business cycles between member states. As Table 1 indicates,

there was an increase in the mean intra-euro area correlation both in GDP and in industrial production.

Table 1

Mean Intra-Euro-Area Correlation in Consecutive Years

Item	Period		
GDP		1989–1998	1999–2008
		0.56	0.60
IP	1978–1986	1989–1997	1999–2007
	0.48	0.59	0.61

GDP = gross domestic product, IP = industrial production.

Source: European Commission.

Another interesting finding is that eurozone economies were found to recover faster from instances of downturn, such as the dot-com bubble in early 2000 and the consequences of terrorist attacks of 9/11, compared with previous downturns and the US, as shown in Table 2.

Table 2

Two Indicators of the Severity of Downturns

	Period			
Indicator/Area	1980s	1990s	2000s	Average
Number of consecutive quarters with a negative gap				
Euro Area	26	26	16	23
United States	11	27	15	18
Sum of consecutive negative output gaps (% of GDP)				
Euro Area	−7.6	−5.8	−2.7	−5.4
United States	−8.5	−7.1	−3.0	−6.2

Note: Downturns after peaks in 1980Q1, 1991Q4, and 2000Q4. The sum of consecutive negative output gaps measures the cumulative output loss while output is below potential.

Source: European Commission..

The overall macroeconomic stability was reflected in the labour market. In the first decade of the eurozone, 16 million new jobs were created, manifesting the structural reforms that countries induced to undertake as well as a favourable macroeconomic environment. The following table (Table 3) summarises the basic macroeconomic indicators.

Table 3

Macroeconomic Performance Indicators

		Period Average					
		Euro Area		Denmark, Sweden, UK		United States	
Item	**Unit**	1989–1998	1999–2008	1989–1998	1999–2008	1989–1998	1999–2008
Real GDP	% rate of change	2.2	2.1	2.0	2.7	3.0	2.6
Real GDP per capita	% rate of change	1.9	1.6	1.7	2.2	1.8	1.6
Real GDP per capita	index, US = 100	73.0	72.0	74.0	76.0	100.0	100.0
Employment	% rate of change	0.6	1.3	0.1	0.9	1.5	1.0
Labor productivity	% rate of change	1.9	0.8	1.9	1.8	1.5	1.6
Unemployment	% of labor force	9.3	8.3	7.9	5.2	5.8	5.0
Inflation	%	3.3	2.2	3.4	1.7	3.3	2.8
Fiscal balance	% of GDP	−4.3	−1.7	−3.6	−0.9	−3.3	−2.5
Gross public debt	% of GDP	68.6	68.6	48.7	43.0	67.8	60.7
Long-term interest rate	%	8.1	4.4	8.6	4.9	7.1	4.8
Real long-term interest rate	%	4.7	2.4	4.2	3.3	4.3	2.4

GDP = gross domestic product.

Source: European Commission, OECD.

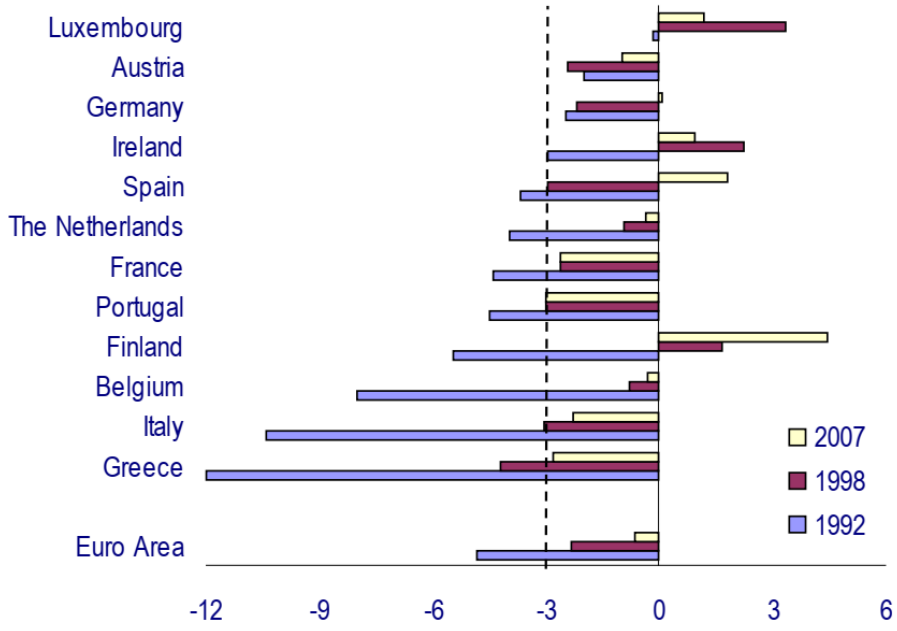
The final issue for the assessment of the first 10 years of the eurozone was the development in fiscal policy. As previously mentioned, fiscal discipline was one of the criteria of the Maastricht Treaty and the focus of the Stability and Growth Pact. This indicates the importance of fiscal policy for the success of the eurozone. Thus, in the early years of European Monetary Union, the member states took all the necessary measures to tackle the problems of high deficit and debt. The strong political support and the states' willingness to participate in the eurozone from the very first stage compelled them to take initiatives for fiscal consolidation. With these measures, the eurozone witnessed an improvement in the fiscal condition of its member states during the initial years. However, this was a short-lived

situation as we will see later on in this chapter. The figure below shows the fiscal position of the 12 member states of European Monetary union in 1992, 1998 and 2007.

Figure 3

Fiscal Position, 1992, 1998 and 2007 (% of GDP)

Figure 2: Fiscal Position, 1992, 1998, and 2007 (% of GDP)



Source: European Commission.

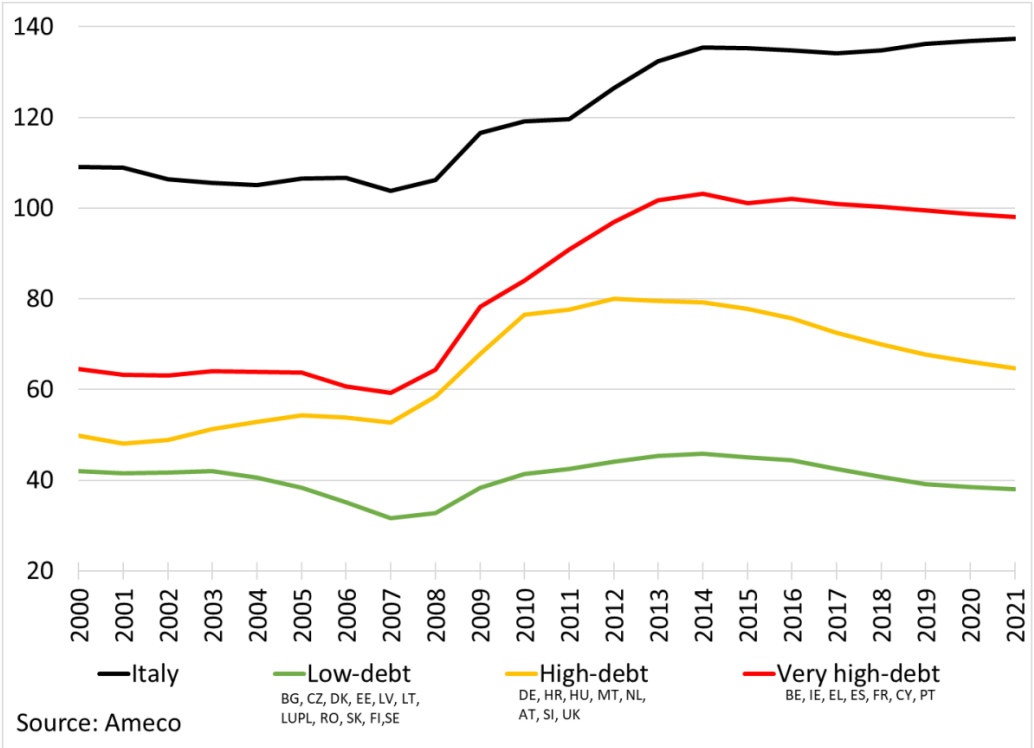
4.3 (Incomplete) Economic vs Monetary Union. The Fiscal Reforms of the Second Decade

In this section, we analyse the fiscal dilemma that the EU faced during the financial crisis of 2007 – 08 and the enforcement of the fiscal reforms.

During the second decade following the implementation of the European EMU, the financial crisis, which started in the banking sector in the United States and immediately hit European economy, prevailed. The crisis revealed the fragile fiscal structure of EMU. The combat of this crisis meant substantial budget injection for the bailout of banking institutions and big industries that constituted the pillars of national economies along with aggressive countercyclical fiscal policies. The above, in combination with a sharp decrease of the GDP, led to a rapid increase in the public debt to GDP. The graph below summarises the fiscal position of EU countries.

Figure 4

Debt Ratio by Groups of Member States (% of GDP)



Apart from the increase in the debt-to-GDP ratio from 2008 onwards, an interesting finding from the Figure 4 is the increased spread of the debt-to-GDP ratio in the years following the financial crisis. These rough fiscal developments reveal the inadequacy of the

fiscal cooperation until then. There had been significant scepticism about the efficacy of fiscal cooperation in the EU, both in theoretical and practical grounds, even before the crisis. The dire economic developments that revealed the fragility of economic governance led to a fundamental change in economic cooperation. The EU reacted by implementing a wide range of measures to enhance fiscal consolidation, restore economic growth and combat unemployment. The pillars of these changes were the 'Six-Pack' (a set of European legislative measures consisting of five Regulations and one Directive – Regulations 1175/2011, 1177/2011 and 1173/2011 and Directive 2011/85 EU – that was passed as law in December 2011) and the 'Two-Pack' (a set of two Regulations – Regulations 1176/2011 and 1174/2011 – that entered into force in May 2013). Both initiatives were applied in the context of the European Semester, which coordinates and surveys the economic policy of the EU member states on an annual basis. In particular, 'Six-Pack' consisted of two branches – one that improved the fiscal policy that reformed the Stability and Growth Pact, which, in turn, enforced fiscal discipline by guaranteeing that the sanctions will be imposed timely and consistently, yet without changing the numerical rules set by the Treaty of Amsterdam; and another that introduced the surveillance of macroeconomic imbalances. Under the new fiscal rules, public debt ceiling remained as established by the Stability and Growth Pact but became more operational. Thus, if the public debt of a member state exceeded 60% of its GDP and was not sufficiently reduced (i.e., by at least 5% a year for a period of three years), it would be placed in Excessive Deficit Procedure. The deficit rule was complemented by a new rule concerning public expenses. According to this, public spending was monitored so as to increase at a lesser rate than the medium-term increase of GDP, unless covered by revenues. Moreover, structural deficit was not to exceed 0.5% of GDP (or 1% in cases where debt-to-GDP ratio was below 60%). This new numerical task would help monitor and avoid the breach

of the deficit target of 3% and, in turn, assist the governments to save in good times to be able to stimulate the economy in bad times. To follow these rules, member states were to establish automatic correction mechanisms in the form of national laws that clarified how and when this breach would be corrected in case of a violation of the structural deficit ceiling. This new fiscal framework provided to member states the necessary incentives to implement structural transformations that promoted investments, increased productivity and strengthened their economy. However, in the case of an unexpectedly sharp decrease in growth, the above rules would become more flexible by giving more time to the member states to correct their fiscal position.

Improvements were also made in the enforcement of the new rules. Member states submitted their annual Stability (for EMU member states) or Convergence (for non-EMU member states) Programmes in April, and the Commission released Country-Specific Recommendations each spring. If member states violated the fiscal criteria (either deficit or debt), they were placed in the Excessive Deficit Procedures and closely monitored and were given a specific period to correct the deviation. Failure to do so could result in fines of 0,2% of the GDP. The realisation of the effects of fiscal deficit of one EMU member state to other member states led the Commission to introduce an additional cycle of surveillance. More precisely, member states of the EMU would present in mid-October the Draft Budgetary Plans for the following year, and the Commission would present an opinion. This allowed the Commission to have an early control over the national budget before it was adopted. To strengthen the monitoring of the fiscal status when a member state of entered the Excessive Deficit Procedure, it was obligatory to present an Economic Partnership Programme detailing the fiscal and structural reforms that this state would follow to correct its deficit position.

As experience and theory indicated in a regime of pegged exchange rates, a rescue mechanism must be established to finance any member states. This role was undertaken in the Bretton Woods system by the International Monetary Fund. One of the flaws of the EMU was the lack of any such institution. The rationale was that the existence of any institution of such kind would enforce free-riding behaviour of the member states, thereby relaxing their fiscal discipline. To reinforce fiscal discipline, a no-bail-out clause was introduced in Article 125 of the Treaty on the Functioning of the European Union. Further, the ECB was forbidden to finance any member states. These restrictions provided the framework for fiscal discipline. When the financial crisis emerged, it became obvious that no country could be fully responsible for its fiscal position. Globalisation revealed the fragility of the national economies. The European Monetary Union was not prepared for such a situation. Thus, the creation of a financial institution with the task of financing member states was revealed as the only solution. The first attempts to establish funding programmes were made on May 2010 with the creation of European Financial Stability Facility (EFSF) and European Financial Stabilisation Mechanism (EFSM). The two mechanisms were replaced on 27 September 2012 by a permanent institution – the European Stability Mechanism (ESM) – located in Luxembourg, and it operated under public international law to safeguard and provide financial assistance in eurozone member states. To avoid free-riding behaviour and minimise the common-pool problems, all ESM financial assistance to its member states was linked to the implementation of policy conditions specified in a Memorandum of Understanding (MoU).

Another innovation introduced with the 'Six-Pack' was the Macroeconomic Imbalances Procedure. The aim was to monitor and prevent economic developments that may threaten the economic viability of both a particular member state and the eurozone.

Based on the main variables and some other indicators, the Commission monitored the economic performance of member states and released its Alert Mechanism Report each November, identifying which states needed further screening. For these countries, the Commission would undertake in-depth reviews, which were published in the spring and were part of the European Semester Country Reports, seeking to identify the severity of the imbalances. The Commission might release country-specific recommendations issued in May proposing recommendations for the countries facing macroeconomic imbalances. Failure to adequately address these imbalances by a member state would potentially lead the Commission to launch the Excessive Imbalance Procedure, which meant that the member states were to adopt a corrective action plan with deadlines. The Commission would then screen the implementation of these actions throughout the year. Failure to do so would potentially lead to sanctions amounting to 0,1% of GDP.

Austerity measures, indicated by the abovementioned rules, adopted by many eurozone countries which faced high levels of public debt, rising borrowing costs, and high concerns about their ability to service their debt obligations. In response to these challenges and as a condition for financial assistance from international institutions like the European Commission, the European Central Bank (ECB), and the International Monetary Fund (IMF), some countries implemented austerity measures to address their fiscal imbalances.

The key features of austerity measures in the EMU include:

1. Spending Cuts: Austerity measures often involved reductions in government spending across various sectors, including public services, education, healthcare, and welfare programs. These spending cuts aimed to bring down overall government expenditures and narrow budget deficits.

2. Tax Increases: Some countries raised taxes to generate additional revenue and help reduce budget shortfalls. These tax increases could target income taxes, consumption taxes (e.g., VAT), corporate taxes, or other sources of government revenue.
3. Labor Market Reforms: To improve competitiveness and labour market flexibility, some countries implemented reforms related to wages, working hours, and labour regulations. These measures were aimed at boosting productivity and encouraging job creation.

4. Pension and Social Security Reforms: Reforms to pension systems and social security programs were often pursued to address the long-term sustainability of public finances.
5. Privatization: Some countries sought to privatize state-owned enterprises and assets to raise funds and reduce the burden on the public sector.

The rationale behind austerity measures was to restore market confidence, reduce borrowing costs, and bring about fiscal consolidation, ultimately aiming to put countries on a more sustainable fiscal path. However, the implementation of austerity policies often came under criticism due to their potential negative impacts on economic growth, employment, and social welfare.

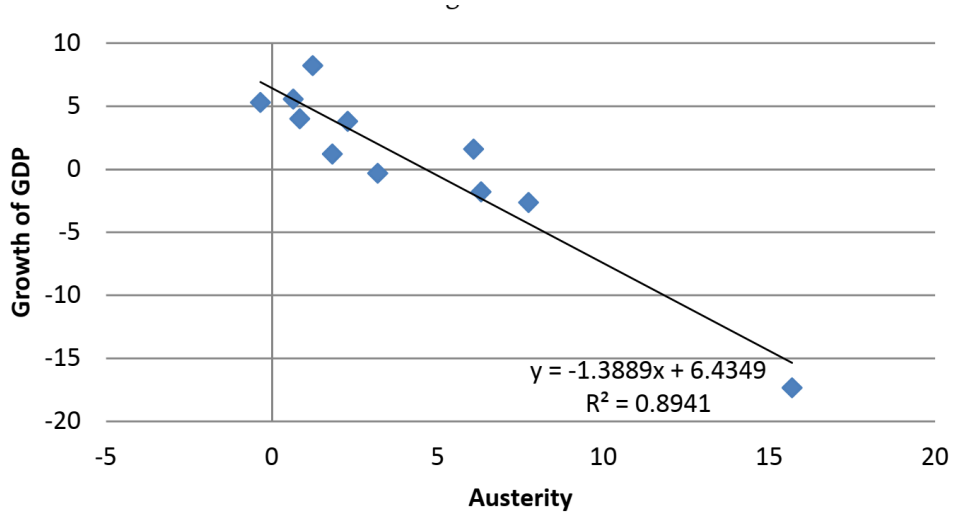
However, the implementation and effectiveness of austerity measures and budget balance policies have been subjects of debate. Critics argue that strict adherence to austerity during economic downturns can exacerbate recessionary pressures and hinder growth, leading to a counterproductive cycle of declining revenues and increasing deficits. Thus, severe austerity measures could lead to a contraction in economic activity, making it difficult for countries to generate sufficient revenue to repay debts. Moreover, the reduction in

government spending and social programs could adversely affect vulnerable populations and exacerbate income inequality. On the other hand, Proponents argue that responsible fiscal management is crucial for the long-term stability of public finances and the overall health of the economy.

It is difficult to have a conclusive answer to whether Fiscal Adjustments Programmes had been part of the solution or part of the problem. This is because austerity brought a severe recession which triggered fiscal imbalances, increase both debt-to-GDP ratio and borrowing cost. We may further examine this issue based on empirical evidence to disentangle the relations between austerity and budget balance, and austerity and decline in GDP. We start from the latter.

In the graph below we see a strong negative relation, between austerity and GDP. More precisely, the stronger the austerity programme, the deeper the decline in GDP. The estimated equation suggests that on average for every 1% increase in austerity, output declines by 1.4%. This is in line with the results obtained by other researchers and the IMF, indicating that the fiscal multiplier exceeds 1 (see Auerbach &Gorodnichenko, 2011; Blanchard & Leigh, 2013).

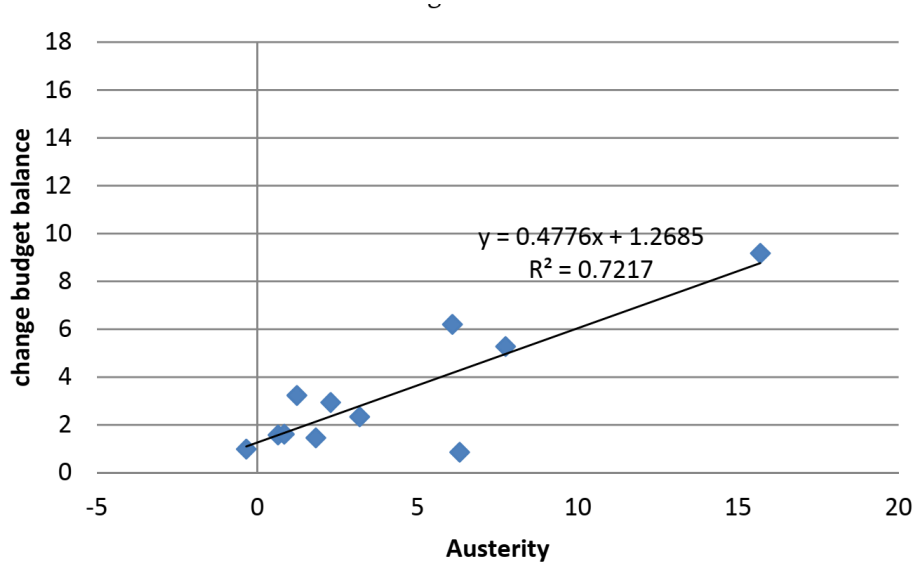
Cumulative GDP Growth and Austerity during 2009-12



Sources: IMF, Fiscal Monitor Database, April 2013 and European Commission, AMECO.

A second issue concern the relation between austerity and budget balance. In the graph below the austerity measure is depicted on the horizontal axis and the change in the overall government budget balance on the vertical axis. The regression line indicates that, on average, a 1% increase in austerity has only affected by 0.5% the budget balance. Put this differently, we need a 2% at least austerity measures to improve the budget balance by 1%. If we combine this with the previous findings of the fiscal multiplier of 1.4, this also means a drop in GDP by 2.8%. In all, countries should sacrifice a 2,8% of GDP to have a 1% improvement of their budget balance.

Change in Budget balance (%GDP) and Austerity during 2009-12



Source: IMF, Fiscal Monitor Database, April 2013.

Even though this thesis focuses on fiscal policy we should also briefly examine the role of European Central Bank (ECB). ECB's involvement started with the program called Outright Monetary Transactions. Outright Monetary Transactions (OMT) was a program introduced by the European Central Bank (ECB) in September 2012 during the height of the European

sovereign debt crisis. The main purpose of OMT was to provide a backstop and stabilize the government bond markets of eurozone countries that were facing financial difficulties.

The eurozone crisis was characterized by concerns over the ability of some member states to service their sovereign debts, leading to rising borrowing costs and financial instability. To address this, the ECB under its then-President Mario Draghi announced the OMT program as a potential tool to support troubled member states and restore market confidence.

The key features of the Outright Monetary Transactions program were:

1. Unlimited Bond Purchases: The ECB committed to buying government bonds of troubled eurozone countries in the secondary market without any pre-specified limit. This meant that the ECB could intervene as needed to prevent a surge in borrowing costs for those countries.
2. Conditionality: OMT was designed to be conditional upon a requesting country agreeing to a formal assistance program with the European Stability Mechanism (ESM). The ESM is a financial assistance mechanism for eurozone countries facing financial difficulties, providing financial support in exchange for implementing specific fiscal and structural reforms.
3. Seniority: The ECB stated that OMT would be conducted on a pari passu basis, meaning it would not have preferred creditor status. This implied that the ECB would not be repaid before other private or official creditors if a country defaulted on its debt.

However, despite its announcement, the OMT program was never actually implemented. The mere announcement of the program had a significant impact on market sentiment, and bond yields for troubled eurozone countries like Spain and Italy decreased,

easing their financial stress. The program was seen as a "lender of last resort" commitment from the ECB, which helped to calm markets at a crucial time in the crisis.

The OMT program was controversial and faced legal challenges in the German Constitutional Court, with some arguing that it overstepped the ECB's mandate. Ultimately, the European Court of Justice ruled in favor of the program, stating that it was within the ECB's powers to implement OMT under certain conditions.

Further ECB launched Quantitative Easing (QE) programmes. QE is a monetary policy tool which stimulates the economy and achieve specific policy objectives. QE involves the ECB buying financial assets, typically government bonds or other securities, from the market to increase the money supply and lower long-term interest rates.

The ECB implemented several QE programmes in response to the global financial crisis of 2008 and the subsequent European sovereign debt crisis that began in 2010. The ECB's QE program, known as the Asset Purchase Program (APP), was launched in March 2015 and went through several iterations, adapting to the changing economic conditions in the Eurozone.

The key features of the ECB's QE program include:

1. Asset Purchases: The ECB purchased a predetermined amount of government bonds and other eligible assets from the open market. By buying these assets, the ECB injected money into the financial system, which increased liquidity and aimed to stimulate lending and investment.
2. Sovereign Bonds and Other Assets: The APP included the purchase of sovereign bonds issued by eurozone countries, as well as bonds issued by certain European institutions and private sector securities, such as covered bonds and asset-backed securities.
3. Conditionalities and Limits: The ECB's QE program was subject to certain conditions and limitations. For instance, the central bank set a monthly purchase target and also

restricted the share of a specific country's debt that could be purchased. Additionally, the ECB employed a capital key rule, which meant that the purchases were distributed among eurozone countries in proportion to their respective economic sizes.

4. Duration and Flexibility: The program's duration and scope were flexible, allowing the ECB to adjust its size and duration depending on the economic conditions and inflation outlook in the Eurozone.

The goal of the ECB's QE was to boost economic growth, support inflation, and counter deflationary pressures. By reducing long-term interest rates and providing ample liquidity to financial markets, the ECB aimed to encourage borrowing, investment, and spending, thus supporting overall economic activity.

As with any monetary policy tool, QE has its supporters and critics. Supporters argue that it can be an effective tool to provide stimulus when interest rates are already low and conventional monetary policy measures may have limited impact. Critics, on the other hand, have raised concerns about potential side effects, such as creating asset price bubbles or distorting financial markets.

The fiscal cooperation in EMU faced new challenges after the pandemic crisis. This crisis had different characteristic from the financial crisis of 2007-8 yet a similarity, a new round of debt increase. The depth of the pandemic crisis and its duration differ substantially among member states. The idiosyncratic characteristics of their health system, social behaviour, compliance with the new rules, the participation of the people in vaccination are some, though crucial, factors that explain the effects of this crisis to economic activity.

As with the financial crisis, pandemic crisis also tested the limits of fiscal cooperation in EMU. As national governments must intervene and support economic activity the debt rules of EMU seemed, once again, outdated. Under that circumstances we may identify two

alternatives, either the supranational level should provide governments with the necessary funds or fiscal rules should be abandoned so as to give to the national level the necessary fiscal space to avoid severe recession. The former alternative would entail two problems. First, in EU level there is no fund for such a circumstance. On the other hand, European Stability Mechanism could undertake this role. Yet according to its statute any financial assistance programme from ESM should be accompanied by Memorandum of Understanding (MoU) detailing the reforms and adjustments to be carried out. Previous experience, especially this of Greece showed that these adjustments programmes have been recessionary. Ultimately, this option was rejected. The other option is to activate the general escape clause. The Stability and Growth Pact included two clauses that allow Member States to undertake appropriate budgetary measures, without constrained by the numerical targets of the Pact when exceptional circumstances occur. The first is the 'unusual events clause', while the second is termed the 'general escape clause'. Both clauses allow deviation from parts of the Stability and Growth Pact's preventive or corrective arms, either because an unusual event outside the control of one or more Member States has a major impact on the financial position of the general government, or because the euro area or the Union faces a severe economic downturn.

The activation of the general escape clause had both positive and negative effects. On the positive side, member states allowed to apply their fiscal programmes according to the problems of their economies. Yet, their debt increased, and the end of that crisis left member states of EMU with higher and quite different levels of debt among countries. As the pandemic crisis came to an end EMU faced an existential dilemma. Either the old rules will be activated again, or it must seek new rules. In the former case member states should implement strict fiscal programmes that might be proved recessionary as happened during financial crisis. In

the latter case, EU should take a step closer to an economic integration and boost economic development of the member states. In this direction is the Next Generation EU initiative. This is a temporary instrument to support economic recovery from the coronavirus pandemic and build a greener, more digital and more resilient future.

On the other hand EU also took an important initiative known as Next Generation EU. Next Generation EU, officially known as the Recovery and Resilience Facility, was initiated in response to the unprecedented economic and social challenges posed by the COVID-19 pandemic. The pandemic led to widespread disruptions in economies, healthcare systems, and daily life across the European Union member states. In light of these challenges, the European Union recognized the need for a coordinated and comprehensive response to support recovery, mitigate the negative impacts of the pandemic, and promote long-term resilience. The key reasons for initiating Next Generation EU are as follows:

Economic Crisis: The COVID-19 pandemic led to a severe economic crisis characterized by recessions, reduced consumer spending, disrupted supply chains, and increased unemployment. Member states faced an urgent need for financial resources to stabilize their economies and facilitate recovery.

Humanitarian and Healthcare Impact: The pandemic strained healthcare systems, necessitating emergency measures to respond to the health crisis. Funding was needed to bolster healthcare infrastructure, procure medical supplies, and ensure sufficient capacity to treat COVID-19 patients.

Social Challenges: The pandemic had profound social consequences, including increased poverty, inequality, and social vulnerability. Many citizens faced income loss and reduced access to essential services, such as education and social support.

Cross-Border Nature of the Crisis: The pandemic highlighted the interconnectedness of European economies and societies. The economic impact of the crisis was not confined to individual member states; rather, it affected the entire European Union due to its integrated economic structure.

Need for Coordinated Response: Member states recognized the importance of a united and coordinated response to effectively address the crisis. A collective approach could maximize resources, share best practices, and ensure a fair distribution of support.

Support for Reforms and Resilience: Next Generation EU aimed not only to provide immediate relief but also to support member states in implementing necessary reforms that would enhance their long-term resilience, promote sustainable growth, and address structural weaknesses.

Promotion of Common Goals: The recovery plan emphasized common goals such as the green and digital transitions. By investing in renewable energy, climate action, and digital innovation, the plan aimed to advance shared EU objectives.

EU Solidarity: The pandemic underscored the importance of solidarity among member states during times of crisis. Next Generation EU represented a demonstration of solidarity by providing financial assistance to those member states most affected by the pandemic.

Overall, Next Generation EU was initiated to provide a substantial and coordinated response to the multifaceted challenges posed by the COVID-19 pandemic. It aimed to support economic recovery, strengthen healthcare systems, address social impacts, and promote sustainable development, while also reinforcing the principles of unity and solidarity within the European Union.

It is worth noting that many scholars in the field believe that Next Generation is a step closer to the issuance of Eurobonds. Next Generation EU and "eurobonds" are related concepts within the context of the European Union's efforts to address economic challenges, especially those posed by the COVID-19 pandemic. However, they are distinct ideas with different implications.

Next Generation EU involves the issuance of EU debt to fund the recovery plan, which is somewhat reminiscent of the concept of eurobonds. However, Next Generation EU is a specific response to the exceptional circumstances of the COVID-19 pandemic and is designed to provide targeted support for recovery and resilience. It represents a temporary and crisis-specific measure.

On the other hand, eurobonds represent a broader and more permanent mechanism for jointly issuing debt across the eurozone, which could have implications for fiscal integration and economic governance. As of my knowledge cutoff date in September 2021, the concept of eurobonds has been a topic of discussion and debate within the EU, but the issuance of eurobonds has not been implemented.

We will close this part with a general overview of some of the discussions and potential areas for revision that have been debated in the past:

1. **Flexibility in Fiscal Rules**: There have been discussions about introducing greater flexibility into the fiscal rules of the SGP. Given that strict adherence to deficit and debt limits during periods of economic downturn may hinder necessary fiscal stimulus measures. This could be achieved by allowing more discretion for member countries to deviate from fiscal targets under certain conditions, such as during severe economic crises.

2. **Investment Exemptions**: Another line of argument focuses on exempting certain types of public investments from deficit calculations. This would encourage member states to invest in areas like infrastructure, education, and research without immediately impacting their deficit targets.

3. **Macroeconomic Conditions**: There have been calls to take into account broader macroeconomic conditions and indicators when assessing the fiscal health of member countries. This would allow for a more nuanced understanding of a country's fiscal position and its potential impact on the overall eurozone economy.

4. **Debt Reduction Path**: Some proposals have focused on emphasizing a sustainable reduction in public debt over time rather than strict deficit limits. This would allow countries with relatively high debt levels to gradually bring down their debt-to-GDP ratios without being penalized for temporary deviations from deficit targets.

5. **Common Eurozone Fiscal Capacity**: Discussions about creating a common fiscal capacity for the eurozone have also taken place. This could involve the establishment of a eurozone-wide fiscal stabilization mechanism to provide financial support to member countries during economic shocks.

6. **Enhanced Monitoring and Surveillance**: Another proposal refers to strengthen the monitoring and surveillance mechanisms to ensure that countries are implementing necessary structural reforms and addressing macroeconomic imbalances.

The above presentation indicates that the revision of the Stability and Growth Pact provided a wider framework for the monitoring of not only the deficit but also the general macroeconomic position of each member state. A mechanism of fiscal discipline had to

address two main issues. First, it had to mitigate any free-riding behaviour stemming from the common-pool problem. More precisely, any member state of the EMU would have the rational motivation to increase their welfare by increasing public expenses, which may threaten the stability of the currency union. To avoid such an instability, the EU would have to bail out the fiscally irresponsible member state. Thus, the task of fiscal coordination needed to be twofold – to monitor the fiscal policy and prevent any increase of deficit; and, in the case of a breach of the rules, to impose the adequate sanctions. With the above-mentioned developments in the fiscal coordination, the EU tried to reinforce the preventive and corrective arms of the Stability and Growth Pact to address both issues. But how effective was the new fiscal framework? To better understand fiscal issues, it is important to address three questions: First, what are the leading factors for debt accumulation? Second, especially in a monetary union, is there a need for fiscal constraints on member states? Finally, what are the necessary characteristics of the rules for the fiscal policy to be effective?

Chapter 5: Debt in a Monetary Union

5.1 Why Nations Accumulate Debt

A salient issue of the theory of debt accumulation that should be analysed is the 'common pool problem'. The common pool problem 'is promising and powerful in explaining the emergence of large and persistent deficits' (Poterba & von Hagen, 1999). This approach pointed out that problems arise when the financing source is a common property. Under this

view, anyone has the incentive to take a larger part than its contribution to this common source. Put differently, the common pool problem reveals the free riding behaviour. The existing literature on this topic can be divided into three main strands. The first attempts to provide answers to debt accumulation dates to the work of Buchanan and Wagner (1977). The Political Business Cycl

e explains debt as an effort of governments to manipulate public spending with the purpose of be re-elected. This opportunistic behaviour is based on the assumption that voters do not fully understand the policy implication of large deficits. Thus, they overestimate present consumption and underestimate future tax burden. This 'fiscal illusion' (Alesina & Perotti, 1994) is the basis of debt accumulation. This approach has been criticised on the basis that voters are not deluded by opportunistic politicians. This argument was developed by Rogoff (1990), who pointed out that voters cannot observe the projects undertaken by governments, due to which they cannot properly assess the purpose of deficit creation, but they do observe the increase of debt.

A second strand on the debt accumulation theory posits, in close relation to the first strand, that political parties accumulate debt in an attempt to serve specific interests. This political approach has been highly debated and offered many different interpretations. One of these focused on distinct preferences that politicians have. In an attempt to tie the hand of their successors, political parties create high deficits according to their preferences. Alessina and Tabellini (1990) developed a model with two political parties with different preferences on the composition of public spending. The incumbent has the incentive to spend more on the goods they prefer and passes the cost of repayment into the future government. In the same line of argument, Persson and Svensson (1989) presented a model wherein the officials differ in their views about the optimal size of the budget. Accordingly, the current

officials, who prefer a small deficit, would cut taxes to compel the next government to keep the spending down. The more the level of polarisation between political parties the more will be the strength of the predictive power of both models. The empirical test of these theories was the point of numerous articles. To measure the degree of polarisation, Stein et al. (1998) examined the relationship between electoral systems and fiscal performance for countries in Latin America for the period of 1990 – 1995. Findings indicated that countries with more proportional electoral system and more political parties produce larger deficits. Amorin and Borsani (2004) examined a series of indicators, including .he ideology of the government, the degree of centralization of budget institutions and election time. Results showed that right-wing governments with stability of ministers produced balance budgets. Generally, the results illustrated a weak empirical support for the above theories, due to political, legal and economic differences between the countries.

A third strand of theories emphasises the role of voters. This approach was first presented by Weingast (1981) who related high debt with geographically dispersed interests. Thus, each part claims a bigger share from the budget to satisfy the geographical interest. Similarly, Alessina and Tabellini (2005) pointed out that the same results could be observed in an economy during a boom period. This is because groups with competing interest strive for increased resources and consequently, the d

ebt soars. Distributional conflicts have also provided the grounding for the influential theory of Alesina and Drazen (1991), who elaborated a model where the cost of fiscal stabilisation is unequally shared between different groups. Therefore, each group seeks to avoid the cost of stabilisation. Thus, a 'war of attrition' arises. This situation lasts until one of the groups concedes. This group is considered as the first loser, and afterwards a second round starts involving the remaining groups. Therefore, according to Alessina and Drazen

(1991), this conflict is a zero-sum game. Following these authors' work, Velasco (2000) modified the 'war of attrition' approach, pointing out that reforms for fiscal stabilisation are taken when the cost of extra deficit makes delays unfavorable for all groups.

5.2 Debt Monitoring in the Monetary Union

The issue of debt becomes more complicated when the analysis concerns member states of a monetary union. In the case of EMU, several flaws make the need for fiscal cooperation essential for the stability of the union, but they are quite complex. According to Bordo and Jonung (1999) these flaws concern the lack of a lender of last resort, the lack of democratic control and accountability of ECB, the size of EU and the diversity of the economies that make the decisin-making procedures difficult and, finally, the absence of central coordination of fiscal policy that makes the union vulnerable to asymmetric shocks. Thus, the need for fiscal prudence is imperative, and the question is whether this task could be achieved either by imposing restrictive numerical fiscal rules, by constructing procedural arrangements (i.e. assigning specific task to institutions such as (common) central bank and/or fiscal institutions) or, finally, by leaving stabilisation to the corrective mechanism of free market. We analyse these alternatives below.

Starting from the last choice, the proponents of market mechanism argued that price signals can provide the incentives to discipline the fiscal behaviour of the governments. For example, in case of an efficient financial market (and ignoring taxation), differences in the nominal interest rates on public debt captures three components, namely the expected risk of currency depreciation, exchange rate risk premium and national default risk premium. Thus, when a country's borrowing becomes more expensive, the signal of the increase in the nominal interest rate of government bonds leads to a more restrictive fiscal position. An

alternative market mechanism that could restore fiscal sustainability is the price level. This issue has been discussed in depth in the first part of this thesis, and as was shown, the validity of the price mechanism is controversial. Advocates of market mechanism assume that markets, especially financial markets, are frictionless. Lane (1993) identified four conditions that must be met for market discipline to be effective: The capital market should not be restrictive, lenders should be fully informed on the borrowers' liabilities, the borrowers must respond to the market signals and, finally, there should be no anticipation of bail out. The last condition is critical and has been the focus of much research. For example, Feld et al. (2013) found that, under a credible no-bail out regime risk, the premia of the cantons of Switzerland reduced by about 25 basis points. Another interesting insight in the field was provided by Bernoth et al. (2012), who analysed the impact of fiscal policy on interest rates in the eurozone and found that spreads of eurozone countries versus Germany and the US were positively correlated by debt and debt service ratio. Thus, credit markets monitor fiscal performance and exert disciplinary pressure on governments (p. 20).

However, markets are anything but perfect. As Lamfalussy (1989) stressed in the Delors Report 'a government may be less responsive in the short run to an increase in the cost of its borrowing resulting from market anticipations of future debt problems because it might feel that higher debt service payments can be met by raising taxes and/or, perhaps, by monetizing the deficit' (p.125). In the case of a monetary union, the fiscal behaviour is based mainly on the solidarity of preserving the stability of the currency. Otherwise, a member state might expect a bail out by ignoring the market signals. This is the main reason for the failure of market discipline. A further implication of market mechanism refers to the inability of the interest to accurately reflect fiscal policy developments. This becomes clearer in times of economic distress as market signals –with regard to prices or interest rates – tend to

overreact, or, as the Delors Report put it, 'rather than leading to a gradual adaptation of borrowing costs, market views about the creditworthiness of official borrowers tend to change abruptly and result in the closure of access to market financing' (p. 20). To analyse this, Bergman et al. (2013) conducted a research on the four southwest euro area periphery countries (Portugal, Ireland, Italy and Spain) and found that market signals are unreliable and inconsistent. Aizenman et al. (2011) reached the same conclusion by estimating the pricing of sovereign risk for 60 countries based on fiscal space (debt/tax, deficits/tax) and other economic fundamentals over the years 2005 – 10. Their results indicate that, the market 'price' default risk of countries in the eurozone periphery was higher than the other countries in 2010. This may be partly explained by the fact that the market discounts future, and not current, fiscal developments. Another explanation is the market's inability to effectively assess the risk in the eurozone periphery. De Grauwe and Ji (2013) focused on the relation between the spread of government bonds of the eurozone and the default risks which in turn is determined by several fundamental variables. Among them, the most critical one was the government debt-to-GDP ratio. During the period 2000 – 08, these fundamental variables diverged between countries of the eurozone; yet, the spreads were remarkably close. In the aftermath of the financial crisis, the spread differences are quite divergent at a level that could not be explained by the differences of fundamental variables. Thus, the question is whether the market mispriced the default risk before or after the crisis. This under-estimation (or over-estimation) of default risk makes 'government bond markets in a monetary union are more fragile and more susceptible to self-fulfilling liquidity crises' (DeGrauwe & Ji, 2013, p. 878).

As highlighted above, an alternative for fiscal control through market mechanism are fiscal rules. The design of appropriate fiscal rules has been heavily debated especially after

the establishment of European Monetary Union. Based on the relevant literature, we may distinguish two kinds of fiscal rules. First, there are policy rules that are imposed on economic institutions, mainly in the central bank and governments, that seek to balance the economic decision between them. Second, there are specific numerical targets imposed mainly on the governments to avoid fiscal profligacy. In the former case, a schema of policy coordination should be established, while in the latter, monitoring and sanction procedures should be enacted.

Considering the former, the coordination between fiscal and monetary policy confronts the externalities –positive or negative – that fiscal policy may impose in other countries of a monetary union. Examples of positive externality are public goods that a country finances, which may have positive spill-over effects on another country. Another example of positive externality is the fiscal expansion of a country, which increases consumption and imports, thereby supporting exports and production and diminishing unemployment in other economies. Examples of negative externalities include other economies potentially suffering from increases in interest rates and the cost of a government's borrowing due to the fiscal expansion of a country. One way to tackle these externalities is to assign specific tasks on (common) central bank and/or the governments as an instrument to avoid excessive debts. According to Dixit and Lambertini (2003), the agreement between the central bank and fiscal authorities on the appropriate level of inflation and output reassures ideal equilibrium 'without the need for monetary commitment, irrespective of which authority moves first and despite any disagreement about the relative weights of the two set of objectives' (p. 13). Under this framework any additional fiscal rules may be proved counterproductive. The importance of fiscal policy was further highlighted by Kirsanova et al. (2007). According to them, if output increases in one country in the monetary

union and falls in another country, then inflation will gradually appear in the first country. This inflation inertia will diminish the real interest rate which, in turn, will further increase output and inflation. Given that the nominal interest rate does not change, the monetary policy will not change either. Therefore, fiscal policy is the only way to stabilise an economy. Moreover, due to lower interest rate, real government debt will decrease leaving room for further increase in government spending. Thus, the reaction of fiscal policy to debt will be proved inflationary. Again, constraints on fiscal policy might be counterproductive – fiscal policy provides a valid policy for inflation and output but is destabilising when reacting to a government's debt changes. The effects of fiscal policy on output and debt sustainability has also been examined by Furceri and Mourougane (2010). Based on empirical evidence, they found that an increase in public investments increases the GDP by 1,1%. The same results were derived by public consumption as well, though. in a smaller degree, and public transfers have the smallest impact on GDP. As far as taxes are concerned, a decrease in tax wage increases employment and output by 0,4% in the first year while in the long run the impact vanishes and also increases the debt-to-GDP ratio by 0.8% after 10 years. Finally, a cut in consumption tax increases the GDP by 0,25%. In sum, fiscal policy is an effective tool to boost economy; however, the impact varies according to the fiscal instrument. The above analysis highlights the effects of fiscal policy and provides the theoretical framework for the coordination of fiscal and monetary policy.

A further implication of monetary union is the response to shocks. If shocks are not idiosyncratic, the response of fiscal and/or monetary authority could be reacted uniformly and support the economy. In the opposite case, a country needs to fully control fiscal and monetary policies to respond appropriately to fiscal shocks. The loss of monetary autonomy due to participation in a monetary union may prove to be precarious. Thus, the appropriate

reaction of economic policy is determined by the relations between fiscal and monetary policies. A strand of literature attempts to shed light on the issue of coordination between fiscal and monetary policy. Kooper and Kempf (2000) distinguished three cases. In the first case, the fiscal policy is constrained, and the stabilisation policy is undertaken by the central bank, which has the authority to print and allocate money in decentralised fiscal authorities. This case is optimal under the condition of identical shocks between economies. The second case involves both the fiscal and monetary policy being constrained. Adding more constraints does not improve the welfare as stabilisation tools are completely lacking. Finally, if fiscal authorities decide their fiscal policy in a non-cooperative manner and the central bank passively finances th.eir debt, the result will be high inflation. Along the same lines, Beetsma and Limburg (1995) pointed out that when the central bank is unable to commit and the government is myopic (i.e. the fiscal policy does not reflect the preference of the society), monetary unification leads to excessive debt. Thus, the second-best solution is to make the central bank more conservative (i.e. attach higher priority to price stability). If the central bank is conservative and governments are myopic, further fiscal restraints should be imposed. A different angle of the relations between common central banks and governments was given by Beetsma and Bovenger (1995) who introduced the size of a monetary union as an explanatory variable of the coordination of fiscal and monetary policies. In particular, as monetary union becomes larger, the fiscal position of specific member states to create inflation in a monetary union diminishes. This will discipline the fiscal behaviour of member states and improve welfare as it restrains inflation, public spending and public debt. However, this model does not introduce the relevant magnitude of each economy, i.e. the fiscal position of big economies may influence inflation on a larger scope and determine monetary decisions or fiscal rules. This is the central hypothesis that this thesis attempts to highlight.

The above discussion presents the choices and tasks that should be assigned in monetary (central bank) and fiscal (governments) policies so that a monetary union can enable the improvement of welfare. An alternative to framing economic policy decisions is to set fiscal rules. In most cases this is done through numerical targets that each country of a monetary union must follow. The debt ceiling rules must be simple and straightforward. Moreover, they must be accompanied by monitoring procedures that do not create considerable bureaucratic cost. Finally, a necessary supplement of the fiscal rules are the sanctions that must be imposed on the countries that violate the rules. All three elements of fiscal policy described above are necessary and sufficient conditions for the efficient functioning of a monetary union. However, the competence to successfully establish such a framework is questionable and has led to a lively debate. Nevertheless, even if fiscal rules are well established, a further issue concerns the cost of imposing fiscal constraint in the member countries of a monetary union, jeopardising in this manner their economic viability.

All things considered, fiscal design is at the core of monetary unions; yet, guaranteeing the stability of currency and economic efficiency is far from being an easy task. This is because numerical targets create incentives of achieving them at any cost. In his ten commandments of fiscal rules in EMU, Buiter (2003) elucidated the characteristics of fiscal rules, namely that fiscal rules should be simple, ensure solvency, be neutral, establish efficient coordination between government and central banks, avoid cyclical behaviour, be achievable in the long-run, be efficient both in EU and member states level, be credible, ensure enforceability and allow for differences in economic structure and initial conditions. As seen, Buiter (2003) did not refer to elasticity in the case of dire economic conditions. What was ruled out instead was the cyclical behaviour of fiscal policy. In this manner, fiscal policy serves the need of stability of the monetary union but not the stability of a particular economy. On the other hand, the

idiosyncratic character of fiscal policy spreads negative externalities in the monetary union. Inman (1996) identified six characteristics for the success of fiscal rules, namely there must be ex post deficit accounting, the policies must be suspended by a simple majority rule, enforced by a politically independent authority, allow the participation of all member to the monitoring of the violation of rules, be accompanied by sanctions and, finally, with costly amendments of the rules. Thus, the balance of dealing with asymmetric shocks and the preservation of the stability of a monetary union is the bet that fiscal design must win. This balance should take into consideration the trade-offs between simplicity and flexibility, simplicity and adequacy as well as flexibility and enforceability. (Buti & van den Noord, 2004). Even if fiscal rules are appropriately designed and have all the above-mentioned characteristics, there are several exogenous features that might open a window for breaching those rules (Von Hagen, 2002). The use of off-budget funds allows a government to deviate from fiscal rules and serve special interests. Further, fiscal rules might be diverted by certain exogenous economic developments that affect public spending and taxes i.e. the indexation may increase public spending. Moreover, some spending is difficult to be managed because they are either mandatory from non-financial laws or inelastic (e.g. defence spending). The exact definition of the constituent elements of a budget should be made a part of fiscal rules (i.e. what should be included in the public spending, how deficit and debt are calculated etc.). This will avoid substitution of debt instruments (Von Hagen, 1991) as governments bypass fiscal rules. Kiewiet and Szakalay (1996) identified that the borrowing of constraints is associated with the larger debt of sub-central entities (municipalities). A final substitution effect was analysed by Von Hagen and Eichengreen (1996), who found that central governments tend to have a higher debt-to-GDP ratio when strict numerical constraints are imposed in the sub-government. In the case of a monetary union, if taxes are in the control

of the member states, the no-bail-out rules should be strong and straightforward. This is because if taxes remain decentralised, any sub-central government has the financial means to collect revenues to service its own debt. Otherwise sub-central governments will ask either for financing or for a bail out. This will further increase free-riding behaviour on the part of sub-central governments.

The above discussion reveals that fiscal rules involve not only economic issues but also the political environment, the administrative structure and social preferences. The above discussion attempted to separately analyse the three aspects of fiscal policy (namely institutional cooperation, numerical tasks and market mechanism); yet, they should not be perceived as distinct. In the real world, these aspects act concurrently. Thus, the question is whether they act appropriately. The key issue to assess fiscal policy in the framework of a monetary union is to examine whether shocks are idiosyncratic or affect the monetary union altogether. In the first case and under strict no-bail-out rules, as in the case of EMU, individual member states are left with only one option – to implement pro-cyclical fiscal policies in case of violation of the fiscal rules. On the other hand, if shocks affect the monetary union altogether, the options are to activate a general escape clause or to bail out or both. In the case of a bail out, the fiscal rules will not be violated but institutional cooperation should be re-defined, and central banks should act together with fiscal authorities so that expansionary policies are fully effective. On the other hand, the former option restores fiscal policy at a national level. This might jeopardise the stability of the currency if member states overreact. When fiscal rules are re-activated, fiscal consolidation might prove a difficult task. Under this circumstance, stringent fiscal rules will force member states to pro-cyclical measures that might prove ineffective both for member states and for the union in total. A crucial issue is to examine whether it is possible to impose front-loaded programmes of fiscal adjustments to

all countries of a monetary union and how this will affect the union as a whole. This was the working case of this thesis.

Part III

Chapter 6: Measuring Fiscal Multipliers

6.1 Introduction

The financial and pandemic crises have again brought to the forefront an age-old issue of macroeconomics – the need and effectiveness of fiscal policy. One of the overarching issues that has shaped the debate over the effectiveness of fiscal policy is the size of fiscal multipliers. Recently, there has been an increasing interest to re-estimate fiscal multipliers and examine the factors that may affect the size of multipliers at the same time. As analysed below, we may find two broad categories of factors that affect multipliers – business cycle and structural factors. Starting from the former, the recession caused by the financial crises of 2007-–08 offered a new framework to re-estimate fiscal multipliers. There were several studies that showed that fiscal multipliers are higher during recession than in normal times. Moreover, there has been an interest to identify and analyse the leading factors that affect the size of fiscal multipliers.

6.2 Factors that affect the size of Multipliers

The first factor that may affect the strength of fiscal policy is the marginal propensity to consume. This was one of the first factors that was analysed shortly after the publication of the General Theory (Smithies, 1948, Stone and Stone, 1938). In general, the analysis

indicated that the higher the marginal propensity, the higher the fiscal multiplier. This is because a greater part of the income that is generated by fiscal expansion is consumed. Yet, this is a necessary but not a sufficient condition. In an open economy, part of the income is devoted to imports. Therefore, import spending is a leakage out of the circular flow of income. This is measured by the income elasticity of demand for imports that shows the extent to which changes in national income will affect the value of imports. On the whole, the propensity to consume is a positive factor of the fiscal multiplier, whereas the propensity to import is a negative factor.

Another factor refers to the size of the output gap. As stated above, during a deep recession, fiscal multipliers become higher, but when the economy is close to full employment, multipliers have limited effects on the real economy. Moreover, when consumers anticipate future increase in taxes to compensate debt increase, they do not spend the earned income, thereby decreasing the multipliers. Multipliers are also affected by the financial conditions of consumers. So, if consumers are liquidity constrained (or are non-Ricardian as analysed), they tend to spend a greater part of their income. Consequently, if the fiscal policy is targeted towards them, then the multipliers will be higher. This is shown in Gali et al. (2007), who included a share of financially constrained consumers, thereby exhibiting consumption increases in response to an increase in the government's spending, consequently leading to a higher multiplier. Another element of the fiscal multiplier refers to the impact on wealth. As revealed by Hall (2009), if the effect of wealth is negative and large, then households reduce consumption and increase labour supply. This, in turn, reduces the aggregate demand and offsets the increase in public demand and eventually, the increase in output is less than the increase in government consumption. The composition of fiscal shocks also affects the fiscal multiplier. Government expenditure shocks are higher than tax shocks

in case of short-term multipliers as estimated by Coenen et al. (2012). Furthermore, Woodford (2011) demonstrated that nominal rigidities in price and wages lead to a higher multiplier considering that, for instance, firms react to an increase in aggregate demand by increasing output and not prices.

Apart from the factors mentioned above, recent literature also focuses on some institutional factors. First, as we have noticed in the previous part, the response of Central Banks is decisive as far as the effectiveness of fiscal policy is concerned. Thus, the policy of Central Bank should not counteract the fiscal policy by increasing the interest rate and crowding-out domestic investments, thereby offsetting the effects of fiscal policy. Leeper et al. (2011) demonstrated that the reaction of interest rate to expected inflation in the Taylor rule environment is decisive by affecting about 10% of the impact multipliers. The same conclusion was reached by Christiano et al. (2011) in the case of Keynesian liquidity trap. Furthermore, fiscal policy could jeopardize fiscal sustainability and consequently the effects on the real economy could be smaller. Financial development is another factor that affects multipliers. In countries with limited access to financial markets, governments can finance deficit at a high cost that negatively affects fiscal multipliers. Multipliers are also affected by the external side of the economy. Corsetti and Mueller (2012a) showed that fiscal multipliers are lower in an economy with a high degree of openness due to leakages that a fiscal policy bears on the external sector, namely increase of imports and decrease of exports. Furthermore, the exchange rate regime also plays a role. In particular, the fixed exchange rate regime magnifies multipliers given that monetary policy should be accommodative to maintain the exchange rate at parity.

6.3 Keynes vs Monetarists and the Dynamic Stochastic General Equilibrium Models for estimating Fiscal Multipliers

As analysed in the first part of this thesis, fiscal policy had raised a lively debate between Keynesians and Monetarists between 1960 and 1970. The traditional Keynesian theory placed the government's spending at the centre of the stabilization effort given the high multipliers. A core argument of the Keynesian point of view was the liquidity trap wherein interest rates are zero preventing further reduction, thereby making multipliers greater than unity. This leaves room for government intervention. This is due to the impact of government spending on inflation. With a fixed nominal interest rate, an increase in government spending increases inflation and reduces real interest rate, which in turn increases current spending and consumption and creates a feedback loop.

In the 1960's, the revival of the monetarist theory by Milton Friedman provided a different view. It was based on two major arguments: first, consumption is based on the permanent income and not on the current income; second, the increase of the interest rate crowds out private investments, so they downgraded the role of fiscal policy. Eventually, the economy will return to the natural level of unemployment having accumulated a high level of debt.

The above argument was strengthened by the New Classical approach that introduced the assumption of the rational expectation and the continuous market clearing. Based on this, rational agents, either consumers or investors, understand that debt-financing government spending will eventually be paid by future taxes. Based on their expectations of an increase of the future taxes, agents set aside part of their current income to save up to pay future taxes

offsetting and in this way the effects of government spending on aggregate demand (Barro, 1989a). The models of the New Classical tradition were further developed into Real Business Cycle (RBC) and Dynamic Stochastic General Equilibrium models (DSGE). RBC models bolstered the ineffectiveness of government spending as a stabilization tool. Assuming infinitely lived intertemporal optimizing agents found negative or zero fiscal multipliers if governments spending was financed by debt and less than one multiplier if spending was financed by taxes. These results were expected given that RBC models incorporate strict neoclassical assumptions. On the other hand, Dynamic Stochastic General Equilibrium models attempted to introduce some factors that could affect the estimation of the multipliers. More specifically, the models investigated structural characteristics of the economy, such as the degree of openness, the existence of rigidities, the presence of liquidity constraint, etc. Moreover, some models incorporated characteristics of the economic environment such as the role of monetary policy and the exchange rate regime. Finally, a different strand of this literature focused on the nature of fiscal shocks, namely the decision between government expenditure and taxes, whether the shocks were permanent or temporary, and the credibility of fiscal shocks.

On the other hand, the New Keynesian theory disputed the New Classical approach on the ground that rational behaviour and expectations that New Classical approach is based on are part of the market failures. The prerequisite of the Ricardian equivalence is that capital market must be perfect. However, if some individuals are finance-constrained, their consumption choices are formed based on their current income and not on their permanent income. Therefore, the existence of these kinds of consumers strengthens the effects of government spending on aggregate demand and restoring output, thereby proving the

efficiency of fiscal policy. This approach introduced the distinction between Ricardian and non-Ricardian behaviour, which was analysed in depth in the first part of this thesis.

The New Keynesian approach was introduced in the Dynamic Stochastic General Equilibrium models in early 2000 referred to as NK-DSGE models. The incorporation of price rigidities and rule-of-thumb (non-Ricardian) consumers made the effects of government spending positive and significant. This is because real wage does not diminish (at least in the short run) with rigid prices and the income of non-Ricardian households increases, thereby stimulating aggregate demand and output. This idea was contested by Giavazzi and Pagano (1990) who coined the term ''expansionary fiscal contraction''. Through analysing Denmark and Ireland during 1980s, they support that economic growth and private consumption are positively correlated. Based on this finding, they supported that fiscal contraction has a positive impact on private consumption and output. Moreover, an anticipation of further reduction of government spending and taxation stimulates the private consumption even more.

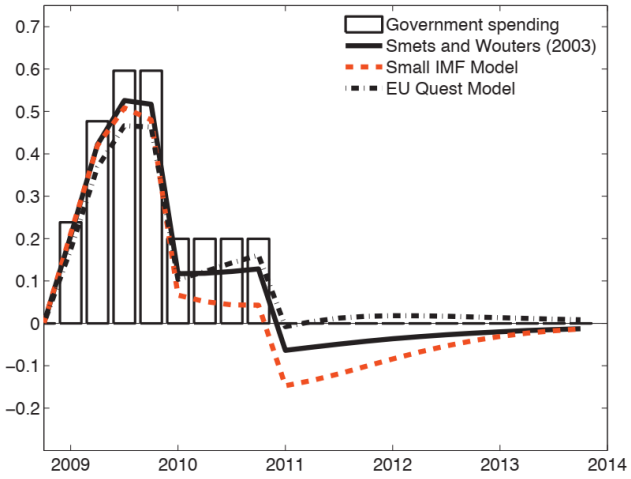
The core argument of NK-DSGE models is based on the traditional Keynesian theory that, as stated above, when nominal interest hits zero, lower bound monetary policy is ineffective and consequently, as NK-DSGE models demonstrated, the real interest rate rises and the economy enters in a deflationary loop. Under the above circumstances, fiscal policy could positively affect prices, decrease real interest rate, and eventually increase output, which drives the economy back to full employment. We may identify two main strands of the relevant literature of NK-DSGE models. On one hand, there are the models that incorporate liquidity constraint households. Eggertson and Krugman (2012) developed an NK-DSGE model wherein households are financially constrained. They showed that fiscal policy can ease these

constraints and promote households spending. This argument is backed by Turini et al. (2012) who claimed that households are also constrained by the depreciation of their collateral. Again, fiscal policy restores consumers spending and has a positive effect on output. The other strand introduced the zero-lower bound of nominal interest rate that characterises deep recession. The work of Eggertsson (2011), Woodford (2011), Cristiano et al. (2011) showed that fiscal multipliers can be greater than unity (reaching a level between 3 and 5) at the zero-lower bound. However, none of the research incorporated the non-conventional monetary measures that a Central Bank could undertake to directly increase liquidity. We will conclude the review of the DSGE literature by presenting three major studies: the Smets-Wouters (2003) model developed by European Central Bank, the Laxton-Pesenti (2003) model developed at the International Monetary Fund and the Ratto et al. (2009) European Commission model. The Laxton-Pesenti model includes two countries, the Euro area and the Czech Republic. It assumes forward-looking rational expectation agents (firms and households), monopolistic competition, and rigidities in goods and labour market. Also, this model allows import substitution to a small degree given that Czech Republic is a small country compared to the Euro area. The model indicates that GDP increases as government spending increases but to a lesser degree during the period 2009–2010 and returns to a baseline at the end of 2010. The interesting finding is that GDP falls below baseline after 2010. The Smets–Wouters (2003) model had the same setup as that of Laxton and Pesenti (2003) and reached the same conclusion. However, Ratto et al. model provided a more in-depth treatment of government intervention. The model introduced policy rules for government expenditure as well as capital and income taxes. Moreover, Ratto et al. (2009) model incorporated rule-of-thumb households that consist of 35% of the European households. The

results were similar to those of the other two models; yet, without having a negative impact on GDP. The findings are summarized by Cwik and Wieland (2011) in the table below:

Figure 1: Estimated GDP impact of government spending stimulus

New-Keynesian DSGE models of ECB, IMF and EU researchers



Notes: Quarterly annualized government spending is depicted by the bars in percent of GDP: 0.24 in 2009Q1, 0.48 in 2009Q2, 0.60 in 2009Q3 and 2009Q4 and 0.20 in 2010.

Source: Cwik, T., & Wieland, V. (2011), p. 14

6.4 Vector Autoregressive Models for Estimating Fiscal Multipliers and Fiscal Consolidation in EMU

A second strand of the empirical literature for the estimation of fiscal multipliers is based on Vector Autoregression (VAR) models. The advantage of these models is that they are not based on theoretical frameworks. Furthermore, VAR models are easier to estimate and better incorporate non-linear behaviour, especially when the economy deviates from its steady state. The previous aspect is crucial given that recent literature indicated that multipliers are state dependent, i.e., they are affected by the state of the economy being larger in times of recession. This is in line with Keynesian theory, which emphasizes the fiscal expansion as a more suitable policy to restore full employment. The downward stickiness of prices and wages, mainly due to institutional factors, allows the fiscal expansion to affect

output and employment, thereby making the multiplier higher. Moreover, fiscal multipliers are smaller when the financial position of a government is weak. These are the features that characterize economies in the present times.

In the past several years, researchers in the field have shown an increasing interest in using VAR models for the estimation of multipliers. We may identify two main strands of this literature. First, there are models that incorporate business cycle; second, there are studies that include structural characteristics. Auerbach and Gorodnichenko (2012), using regime-switching VARs, estimated the impact of fiscal adjustment on the United States, Europe, and Japan allowing fiscal multipliers to vary across recessions and booms. It was found that the size of fiscal multipliers is different during expansion and recession with increasing values during recession. Batini et el. (2012), following the same line of argument using regime-switching models for United States, found large differences in the size of spending multipliers during recessions and expansions with fiscal policy being considerably more effective in recessions than in expansions. Riera-Crichton et al. (2015), using non-linear methods, estimated that multipliers are even higher reaching 3,1 in extreme recessions. The above results are also validated by the work of Silva et al. (2013), which showed that public spending multiplier is positive in recessions whereas smaller in expansions. Therefore, the tax multiplier is also higher in recessions. On the other hand, the study of Ramey and Zubairy (2018) for the United States did not conclude a multiplier below unity with a statistically significant difference of the values of multipliers during a period of economic stack estimating. However, during periods of zero lower bound interest rates, results are more mixed and multipliers could be as high as 1,5 under certain specifications.

The other strand of the literature focused on the structural characteristic of the economy for the estimation of the multiplier. Blanchard and Perotti (1999), using a mixed structural VAR, estimated effects of shocks in government spending and taxes on US activity in the post-war period, thereby incorporating institutional information about the tax and transfer systems so as to identify the automatic response of taxes and spending to economic activity. The results showed that government spending have a positive effect on GDP, while taxes have a negative effect on it. A further finding indicated that an increase in both spending and taxes have a negative effect on investment spending. Ilzetski et al. (2012), based on a novel quarterly dataset of government expenditure in 44 countries, showed that the impact of government expenditure shocks depends on country characteristics such as the level of development, exchange rate regime, openness to trade, and public indebtedness. A positive spending shock affects output to a greater degree in industrial countries than in developing countries; fiscal multipliers are larger under a fixed exchange rate regime and are near zero under a floating exchange rates regime; additionally, fiscal multipliers are smaller in open economies than in closed economies, and are negative in high-debt countries. A similar conclusion was reaffirmed in the study of Hory (2016). Based on a sample of 48 emerging and advanced economies, Hory estimated that emerging market economies have smaller fiscal multipliers than advanced economies. Hory (2016) also included factors such as imports, public debt, savings, unemployment, and financial development and found that all of the factors respond in the same way in the cases of both emerging and advanced economies. Finally, the leading structural factor that affects the efficiency of fiscal policy is public debt for emerging market economies and openness to trade for advanced economies. Chian Koh (2017), using an annual data set of 120 countries over the period 1960–2014, also confirmed these findings. More specifically, Chian Koh (2017) examined four structural characteristics of

the economies that included the level of debt, the level of financial development, the financial conditions, and the business cycle and found that fiscal multipliers are larger in advanced economies when debt is low and the economy faces financial crises or recession. Corsetti et al. (2012), using a panel of OECD countries, examined how the effects of government spending vary with the economic environment, i.e., the exchange rate regime, public indebtedness, and health of the financial system. They showed that currency regimes affect the value of fiscal multipliers and output and consumption multipliers are higher in times of financial crisis. Born, Jussen, and Muller (2013) also analysed fiscal multipliers under fixed and floating exchange rate regimes using a panel Vector Autoregression Model for OECD countries. Their finding indicated that government spending multipliers are considerably higher under fixed exchange rate regimes.

The basic weakness of these types of models is the lack of data given that periods of deep recession do not occur very often and so it is difficult to estimate the non-linearity of the multiplier. Furthermore, the reduced-form VAR is quite simple; they only include total spending, net taxes, and output and therefore are prone to omitted variable biases. VAR models have also received a lot of criticism for the 'fiscal foresight problem' (Leeper et al. 2008). If agents are forward looking, they can anticipate changes in fiscal policy. Thus, the effects of fiscal shocks appeared before the implementation of fiscal decisions. In other words, there is a lag that may lead to biased estimation of fiscal multipliers.

Chapter 7: The Model

7.1 Introduction

During the period of financial crises, there has been a revived interest in the effects of fiscal policy. At the beginning of the financial crises, industrialised countries undertook fiscal measures to dampen the economic consequences of economic recession. This was supported even by the International Monetary Fund (Refer Blancard, Cotarreli, Spilimpbergo, Symansky 2008). The table below summarizes the fiscal stimulus packages in the European Union:

Table 1: Overview of the fiscal stimulus packages in the euro area

	Total fiscal package (bln Euro)		Spending (bln Euro)		Total fiscal package (percent of GDP)		Spending (percent of GDP)	
country	*2009*	*2010*	*2009*	*2010*	*2009*	*2010*	*2009*	*2010*
Austria	4.9	4.6	1.4	1	1.71	1.63	0.48	0.35
Belgium	1.3	1.2	0.7	0.7	0.36	0.33	0.20	0.20
Germany	39.4	49.4	17	11.7	1.58	1.97	0.68	0.47
Greece	0	0	0	0	0.00	0.00	0.00	0.00
Spain	26.8	14.7	11	0	2.44	1.34	1.00	0.00
Finland	2.4	2.4	0.4	0.4	1.25	1.25	0.23	0.23
France	17	4	12.4	4	0.87	0.2	0.63	0.2
Ireland	0	0	0	0	0.00	0.00	0.00	0.00
Italy	-0.3	-0.8	0.2	0.1	-0.02	-0.05	0.01	0.00
Netherlands	3.1	2.9	0	0	0.53	0.49	0.00	0.00
Portugal	1	0.4	0.6	0.4	0.6	0.21	0.36	0.21
EU-11	95.5	78.6	43.6	18.3	1.04	0.86	0.48	0.20

Source: Saha and von Weizsäcker (2009) "Estimating the size of the European stimulus packages for 2009 An Update" and the stability programs provided by the finance ministries for the European Commission.

However, the fiscal effort was short-lived. The increase of government debt changed the priorities of the economic policy. The initial fiscal expansion for combating the economic recovery soon resulted in fiscal consolidation. The austerity measures that some countries imposed so as to control their deficits proved highly recessive. Especially in European Monetary Union, the Stability and Growth Pact provide the framework for fiscal consolidation. As observed in the second part, the Stability and Growth Pact serve four objectives. First, the pact ensures that national fiscal policies will not threaten the objective

of the Central Bank, namely price stability and protect the credibility of the common currency. Second, it prevents negative externalities on the other member states of European Monetary Union. Third, budget surpluses allow countries to use discretionary fiscal policy when needed, which is necessary especially in the absence of other corrective mechanisms such as interest rates or nominal exchange rates. Finally, sound public finance strengthens catch-up effects, thereby reassuring the convergence of the economies.

The fear that fiscal diversion might endanger fiscal sustainability of the Eurozone countries resulted in a debt crisis, which led to fiscal austerity measures. The high debt of the Southern countries together with their structural problems initiated Economic Adjustments Programmes that imposed front-loaded fiscal measures with the task to deal with high debts and enhance confidence of the local economies. Therefore, countries should rapidly engage in fiscal consolidation efforts in a recessionary environment. These measures reached an unparalleled level in the case of Greece. Moreover, the Programmes of Economic Adjustments applied in Spain, Portugal, Ireland, and Greece, along with the general framework of fiscal austerity created negative spill-over effects throughout the European Economy (IMF 2010). Fiscal contraction was targeted towards the compliance with the numerical tasks of 3% for public deficit and 60% of public debt was imposed in the reformed Treaty on Stability, Coordination and Governance signed in 2012 that forced countries to achieve 1/20th of the adjustment yearly until 2032 to achieve the target. Under these developments, the dilemma that many economies faced concerned the attainment of long-run fiscal sustainability, and the avoidance of deep recession that the fiscal efforts created. This dilemma was addressed by Blanchard and Leigh (2013, 2014) and the International Monetary Fund (IMF 2010) in their influential research that showed that larger than the expected fiscal consolidation was associated with lower growth rates. Barrel et al. (2012) also

attempted to analyse the effects of fiscal consolidation controlling the size of debt stock, the political will to deal with the size of debt and the costs of consolidation. Based on a series of simulations using the National Institute Global Econometric Model (NiGEM) in 18 OECD economies, they found that fiscal multipliers are negative when fiscal policy is restrictive because it reduces growth in the short run in almost all countries. A lower debt stock reduces pressure on real interest rates and consequently may increase output in the long term. The larger the economy, the greater is the effect. The above findings are summarized in the table below:

Article	Sample	Period	Method	Shock	Signal	Control Factor	Impact Multiplier	Cumulative Multiplier
Riera-Crichton, Vegh and Vuletin (2014)	OECD	1986-2008	LSDV (linear local projections)	Government Expenditure	:	:	0.31	0.40
					:	Expansion	0.09	0.09
					:	Recession	0.73	1.25
					:	Extreme Expansion	≈0	≈0
					:	Extreme Recession	1.25	2.08
					+	:	0.49	1.36
					-	:	≈0	≈0
					+	Expansion	1.13	1.25
					-	Expansion	≈0	≈0
					+	Recession	0.68	2.28
					-	Recession	0.76	0.79
Auerbach and Gorodnichenko (2012)	OECD	1985-2008	SVAR	Government Expenditure	+	:	:	0.31
			Direct Projections		+	:	:	0.46
			Direct Projections (FE)		+	Expansion	:	-0.20
			Direct Projections (FE)		+	Recession	:	0.46
Barrel et al (2012)	OECD	2010-2012	NiGEM	Government Consumption	-	Temporary Innovations	-0.63	:
				Indirect Taxes	+	Temporary Innovations	-0,09	:
				Direct Taxes	+	Temporary Innovations	-0,14	:
				Government Consumption	-	Permanent Consolidation	-0,58	:
				Indirect Taxes	+	Permanent Consolidation	-0,08	:
				Direct Taxes	+	Permanent Consolidation	-0,12	:
Born, Jüben and Müller (2012)	OECD	1985-2011	SVAR	Government Expenditure	+	Fixed Exchange Rate	1.25	1.00
					+	Floating Exchange Rate	0.45	0.55
Ilzetzki et al (2011)	20 High-income 24 Developing	1960-2007	SVAR	Government Expenditure	+	High-Income	0.37	0.80
					+	Developing	-0.21	0.18
					+	Predetermined Exchange Rate	0.09	1.50
					+	Flexible Exhange Rate	-0.30	≈0
					+	Open Econ.	0.02	1.29
					+	Closed Econ.	-0.28	-0.75
					+	High Debt	≈0	-2.30
				Government Investment	+	High-Income	0.41	1.15
					+	Developing	0.57	0.75
Zubairy (2010)	USA	1958-2008	DSGE	Government Expenditure	+	:	1.12	0.85
				Labor Tax	-	:	0.13	0.34
				Capital Tax	-	:	0.33	0.36
Blanchard and Perotti (2002)	USA	1960-1997	SVAR	Government Expenditure	+	:	0.84	1.29
				Taxes	+	:	-0.69	-0.78

Source: Afonso, A., & Leal, F. S. (2019). Fiscal multipliers in the Eurozone: an SVAR analysis. *Applied Economics*, *51*(51), 5577-5593. p. 13

7.2 The Model

Our aim is to develop a panel VAR model for the estimation of fiscal multipliers. While we endeavoured to estimate fiscal multipliers for taxes and public investments, no statistically significant result was reached. One of the reasons for this is that both taxes and public investment are affected by the structural characteristics of economies.

In a generalized framework, the model can written as follows:

$$\boldsymbol{Z_{it} = \Gamma_0 + \Gamma_1 Z_{it-1} + f_i + d_t + e_{it}}$$

Where, Z_{it} is a set of five variable vectors: DGDP, DGFE, DSE, DDGDP, DSIZE and DOPEN. DGDP is the first difference of the natural log of the real GDP. DGFE is calculated as the first difference of Government Final consumption. DSE is calculated as the first difference of Social Consumption Expenditure. Similarly, DDGDP is the first difference of Debt to GDP, DSIZE is the first difference of the size of the country, and DOPEN is the first difference of the openness of the country.

DGDP and DGFE is considered to be endogenous in the first model and DDGDP, DSIZE and DOPEN are considered to be exogenous variables in the model. Similarly in Model-2, DGDP and DSE are endogenous, whereas, DDGDP, DSIZE and DOPEN are considered as exogenous variables in the PVAR framework. $\boldsymbol{f_i}$ denotes the fixed effects variable that arrests the unobserved individual heterogeneity, $\boldsymbol{d_t}$ signifies the forward mean-differencing or referred as the Helmert procedure (Arellano & Bover, 1995). It has been done to reserve the orthogonality between transformed variables and lagged regressors.

The analysis has been extended to generate IRF after estimating the PVAR. This is due to the fact that IRF can provide more information by measuring the time profile of the effect

of shocks at a given point in time on the expected or future values of variables in a dynamic system. The old Cholesky method of generating IRF is subject to a priori ordering of the variables based on economic theory, making it difficult to predict. Because the analysis uses annual data, it is difficult to assume that one endogenous variable will influence another with a one-year lag.

An overarching issue in the estimation of multipliers is the direction of causation among government expenses and output. Thus, government expenses could affect output, but output could also affect government expenses. There are two approaches in the relevant literature to disentangle this identification problem. The first, is the SVAR approach was introduced by Blanchard and Perotti (2002) and later has been used by many researchers (e.g. Auerbach and Gorodnichenko, 1012, Ilzetski et al., 2011). This method has been applied in to aggregated data of government expenditure, public investments, and output (growth) and solves the identification problem by using institutional information to identify the effect of taxes and government spending to output. This method is criticized on the ground that both government expenditures and taxes are anticipated and thus the results are not robust (see for example Ramey, 2011, Ramey and Shapiro, 1998, Romer and Romer, 2010). On the other hand, to solve the identification problem Barro (1981) suggested an alternative approach. He used the military expenses which are clearly exogenous and are not affected by economic activity. This method was further developed by Ramey and Shapiro (1998). The present study attempts to overcome the identification problem using Generalised Impulse Response Function (GIRF) to the estimated Panel Vector Autoregression model.

Thus, the generalised IRF (GIRF) has been investigated because it is ordering invariant and is based on the historical covariance structure of idiosyncratic shocks. The GIRF was

developed by Koop, Pesaran, and Potter (1996) and is applicable to both linear and nonlinear models. Pesaran and Shin (1998) used GIRF to solve unrestricted and co-integrated VAR problems, claiming that the results are more robust than standard orthogonalized methods. Orthogonalized impulse responses can be estimated using a variety of reparametrizations, but there is no guidance on which of these parameterizations should be used. The GIRFs, on the other hand, are one-of-a-kind and fully account for the historical patterns of correlations observed among the various shocks.

Finally, for the unit root test we choose Im-Pesaran-Shin test which is a more elaborated test than the traditional Augmented Dickey-Fuller. This test allows for heteroskedasticity, serial correlation, and non-normality, and heterogeneity of trends. In essence is a combination of independent Dickey-Fuller tests for these N regressions.

Calculation of Fiscal Multiplier

Fiscal multiplier is defined as the change in real output caused by a one-unit increase in a fiscal variable. The magnitude of multipliers can vary drastically across time horizons. Following Blanchard and Perotti (2002), the impact multiplier is measured as:

$k_t = \frac{IRF_{(dg-dy)_t}}{IRF_{(dg-dg)_t} * b_1}$ and the cumulative multiplier is defined as $k_t = \frac{CIRF_{(dg-dy)_t}}{CIRF_{(dg-dg)_t} * b_2}$

Where, $IRF_{(dg-dy)_t}$ is the IRF of GDP growth rate to a shock to government spending or social sector spending growth rate at time t.

$IRF_{(dg-dg)_t}$ is the response of government spending or social sector spending growth rate to its own shock at time t.

b_1 is the ratio of government spending to GDP ratio, on average over various countries for the entire period.

b_2 is the ratio of social sector spending to GDP ratio, on average over various countries for the entire period.

The prefix C is for cumulative response and T denotes an extended time period.

Cumulative multiplier at time T measures the outcome of fiscal policy at a longer forecast horizon and can be termed as long-run multiplier. The study takes an extended time period of 10 years to report the long-run multiplier.

The Dataset

We use yearly data for the period 2002–2019. We choose this period because the new currency was introduced in EMU in 2002 and we extend the period until 2019 to avoid including data from the turbulent time of the pandemic crisis. The entire dataset is collected from AMECO.

All data are in real terms with some of them being found in real terms and other is transformed in real terms using GDP deflator.

The table below explain the data (in parenthesis are the codes of the variables from AMECO's dataset).

Variable	Explanation
Real GDP	GDP at constant Prices (OVGD)
Gross Public Debt	Government debt means the total gross debt at nominal value outstanding at the end of the year of the sector of general government with the exemption of those liabilities the corresponding financial assets of which are held by the sector of general government. (UDGG)
Final Consumption Expenditures of General Government	Final Consumption Expenditures of General Government is the sum of Collective consumption expenditures and social transfers in kind provided by the general government (UCTG0)
Social Benefits other than in kind of General government	Social Benefits other than in kind of General government (UYTGH)
Imports at constant prices	Imports of goods and services at constant prices (OMGS)
Exports at Constant Prices	Exports of goods and services at constant prices (OXGS)
Openness	(Real Imports + Real Exports)/ GDP
Size	Real GDP of a country/ Real GDP of EMU

Our attempt is to estimate the impact of government's final consumption expenditures and social benefits expenditures (both as defined in the table above), controlling for exogenous key variables, namely debt to GDP ratio, openness, and size of the country. This choice has both theoretical and practical justification. The former is based on the relevant literature. Most of the research in the filed of fiscal multipliers has included debt to GDP ratio, openness, labour market rigidities, business cycle phase, exchange rate regime and development. More analytically, the effect of the level of public debt to government's consumption multiplier has been analysed by Ilzetzki et al. (2013), Hory (2016), Deskar-Skrbic and Simovic (2015), and Contreras Banco and Battelle (2014). The effect of trade openness to fiscal multipliers has also draw the attention of economist (e.g. Ilzetzki et al. (2013), Deskar-Skrbic and Simovic (2015), Deskar-Skrbic et al. (2014), Kraay 2013, OECD (2009), Silva et al. (2013). Labour market rigidities has been analysed by Cole and Ohanian (2004) and Gorodnichenko et al. (2014). After financial crises a new insight for the determinant of fiscal multipliers has developed. The business cycle proved to had a significant effect on the size of multipliers (Kraay 2013, OECD (2009), Silva et al. (2013), Corsetti et al. (2012), Muir and Weber (2013), Grdovicknip (2014). Fiscal Multipliers has also been affected by exchange rate regime as analysed by Ilzetzki et al. (2013), Kraay 2013, Contreras Banco and Battelle (2014). Another determinant of fiscal multipliers is development which has been the focus of the research of Ilzetzki et al. (2013), Kraay 2013, Contreras Banco and Battelle (2014), Hory (2016). Furthermore, our research seek to shed light on the diversification of the European economies and these factors are indicative of this diversification. Moreover our choice to include these factors was justified also by our research results which shows that these three factors affect significantly multipliers.

We divide our sample in three categories of countries, namely, big countries and small countries, countries with low debt and countries with high debt, open countries and less open countries. For each group we run the appropriate test (stationarity, stability, Akaike information criterion-AIC-, Bayesian information criterion -BIC-, Hannan–Quinn information criterion -HQ). For SVAR models the most important test is stability test. The stability test is an essential step in the panel structural vector autoregressive (PSVAR) model to ensure the reliability and validity of the estimated model. The stability test is performed to examine whether the estimated model is stable over time and whether it provides consistent and meaningful results.

Here are some key reasons why the stability test is important in the PSVAR model:

Reliable inference: A stable model ensures that the estimated coefficients are reliable and can be used for inference. If the model is unstable, the coefficients may change drastically over time, making it difficult to draw meaningful conclusions or make accurate predictions.

Consistency of causal relationships: The stability test helps to assess the consistency of causal relationships between variables over time. In a PSVAR model, identifying the correct causal relationships is crucial for understanding the dynamics among the variables. If the model is unstable, the causal relationships estimated from the model may not be consistent, leading to unreliable and misleading interpretations.

Robustness of policy analysis: Stability is particularly important when using the PSVAR model for policy analysis. Policymakers rely on the model's results to evaluate the impact of policy interventions. An unstable model can produce unreliable policy recommendations, which may have adverse consequences if implemented.

Validity of forecasts: Stability is also crucial for generating accurate and reliable forecasts using the PSVAR model. If the model is unstable, the forecasts may exhibit high volatility and lack predictive power, making them less useful for decision-making purposes.

To perform the stability test in the PSVAR model, various techniques are available, such as examining the eigenvalues of the coefficient matrix, checking the stationarity of the estimated model, or conducting recursive estimation over different time periods. These methods help assess the stability of the model and determine whether adjustments or improvements are necessary to achieve a stable and meaningful estimation.

In summary, the stability test is crucial in the PSVAR model to ensure reliable inference, consistency of causal relationships, robustness of policy analysis, and validity of forecasts. By verifying the stability of the estimated model, researchers can have confidence for the results.

After running the appropriate test, we compute fiscal multipliers both for government's final consumption expenditures and social benefits expenditure for each group separately and then we compare the results. We start with open and less open countries.

7.2.1 Fiscal Multipliers for Open and Less Open Countries

As far as openness is concerned, there are a lot of indicators for openness. First, we need to clarify that by openness we mean trade openness, in contrast with financial or economic openness. Thus, for trade openness, the relevant literature uses four different indicators. First, the World Bank uses the export share/import share/trade share (exports + imports) indicator. This is a simple indicator that expresses import/export/trade volume as a percentage of nominal GDP calculated for 199 countries from 1960. This is a continuous

indicator and the results are expressed as a percentage of nominal GDP. Second, a very similar indicator is the Real Trade Share that was developed by Alcala and Ciccone (2004) and it used the real GDP at PPP. The results are expressed as a percentage of real GDP. The calculations are made for 173 countries for the period 1960–2014. Tang (2011) developed the Generalised Trade Openness Index that represents the trade volume as a share of GDP for the countries. The difference is that GDP is not included in nominal values, but is defined by CES-function of the country's GDP and the GDP of the rest of the world. The results are continuous and the scale is 0–100. Tang (2011) uses 167 countries for the period 1960–2016. Another indicator is the Composite Trade Share developed by Squalli and Wilson (2011) for 231 countries for the period 1977–2016. This is the trade volume (exports + imports) as a share of GDP that is adjusted by World Trade Share. Finally, Li et al. (2004) developed the Adjusted Trade Share that calculated the imports divided by GDP and adjusted for the nation's share in world production. Li et al. (2004) used 233 countries for the period 1960–2016.

We use the World Bank's indicator for trade openness for two reasons: its simplicity and its straightforward results. Thus, we calculate (import + export)/GDP for each country of EMU and take the average for the period 2002–2019. The results are summarized in the table below:

Country	***OPENNESS*** ***(Average (import+exports)/ GDP***
Belgium	1.697885
Germany	0.877403
Estonia	1.624752
Ireland	2.023187
Greece	0.685237

Spain	0.652593
France	0.664827
Italy	0.61248
Cyprus	1.424018
Latvia	1.204607
Lithouania	1.445988
Luxembourg	3.800397
Malta	3.101549
Netherlands	1.531066
Austria	1.134377
Portugal	0.836911
Slovenia	1.544905
Slovakia	1.816997
Finland	0.861888
Average	**1.44953**

In the last row, we calculate the average and define the countries whose values are above this average as open. So open countries are Slovakia, Slovenia, Netherlands, Malta, Luxembourg, Ireland, Estonia, Belgium. The rest are less open countries. We will procced with the subgroup of open countries.

Table 1 Summary Statistics for Open Countries

Variable	*Obs*	*Mean*	*Std. dev.*	*Min*	*Max*
GDP	144	183.0285	223.2699	6.1	757.3
Debt	144	121.7256	162.2452	0.725953	459.4758
DebttoGDP	144	0.495622	0.31235	0.036597	1.200736
Final Consumption	144	40.11771	54.75842	1.162791	186.3128

Open	144	1.848737	0.70129	0.880282	3.607908
Size	144	0.017819	0.021668	0.000657	0.066565
Social Benefits	144	23.03167	27.306	0.750939	81.29353

One of the main findings of the table above is the variability of each variable if we compare the minimum and maximum values in this subgroup.

Table 2 Correlation Matrix for Open Countries

	lgdp_d1	lfinal~1	lsocia~1	ldebt_d1	size_d1	open_d1
lgdp_d1	1.0000					
lfinalc_d1	0.1376	1.0000				
lsocialc_d1	-0.2767	0.3003	1.0000			
ldebt_d1	-0.4459	-0.1832	0.1884	1.0000		
size_d1	0.5480	-0.0268	-0.2037	-0.2342	1.0000	
open_d1	0.2670	-0.1301	-0.2885	-0.1248	0.0571	1.0000

The correlation matrix indicates that debt, size and openness are negatively correlated with GDP, and size and openness are also negatively correlated with social benefits expenditures. Moreover the higher correlation is between size and GDP.

The next step is to test stationarity. To do this we run the Im-Pesaran-Shin test for stationarity.

Table 3 Unit Root Test (Im–Pesaran–Shin unit-root test) for Open Countries

Variables	*IPS ADF test (t bar statistic)*
size	-0.6934 (0.9958)
D(Size)	-3.0426 (0.0001)

GDP	-0.4709
	(0.9996)
D(GDP)	-3.1062
	(0.0000)
Final Consumption	-0.9654
Expenditure	(0.9626)
Difference(Final	-3.2358
Consumption	(0.0000)
Expenditure)	
Social Benefits	-1.5684
	(0.3839)
Difference(Social	-3.3711
Benefits)	(0.0001)
Real Debt	-1.1047
	(0.9006)
Difference (Real	-3.2631
Debt)	(0.0000)
open	-0.7992
	(0.9877)
Difference(open)	-3.6569
	(0.0000)

Note: The critical values for 1%, 5%, and 10% are defined as -2.080, -1.910, and -1.820 respectively.

The results shows that none of the timeseries are stationary. Transforming the series in first difference the timeseries becomes stationary.

The next step is to choose the appropriate lag length for both models. To do this we perform the MBIC, MAIC, and MQIC test.

Table 4 Model 1 Final Consumption Expenditure Test for Stationarity

Lag Selection Criterial for Model 1 (lgdp lfinalc)

Lag	CD	J	J-pvalue	MBIC	MAIC	MQIC
1	0.999983	16.82732	0.396855	-49.7148	-15.1727	-28.7806
2	0.999971	12.67667	0.392973	-37.2299	-11.3233	-21.5293
3	0.999717	1.243981	0.996188	-32.0271	-14.756	-21.56
4	0.999045	0.3316	0.987684	-16.3039	-7.6684	-11.0704

Table 5 Model 2 Social Benefits Expenditures test for stationarity

Lag Selection Criterial for Model 2 (lgdp lsociaexpend)

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.999989	20.35164	0.204799	-46.1905	-11.6484	-25.2563
2	0.999983	12.42015	0.412554	-37.4865	-11.5799	-21.7858
3	0.999988	14.55074	0.068493	-18.7203	-1.44926	-8.2532
4	0.999947	3.887292	0.421474	-12.7482	-4.11271	-7.51468

For both models the smallest values indicates that the first order panel VAR is the most suitable model.

Before proceeding to the Impulse Response Function, we test the model stability, i.e the eigenvalue test which has to do with the roots of the companion matrix.

Figure 1 Stability Test Model 1

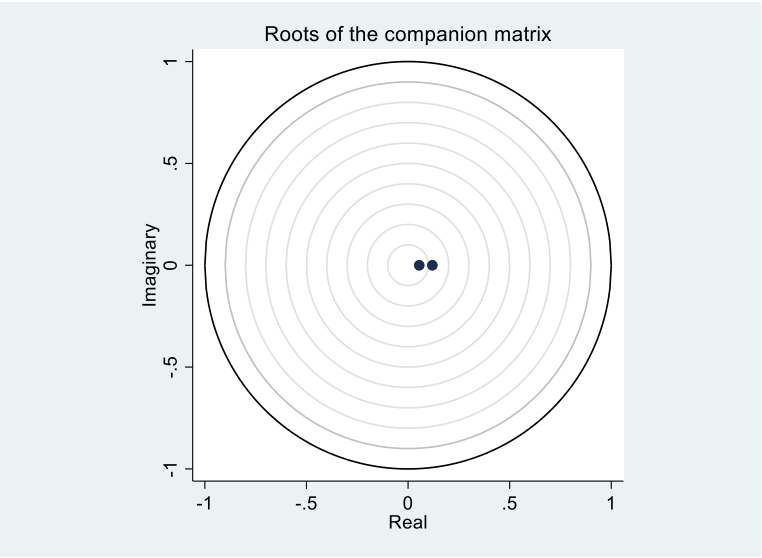
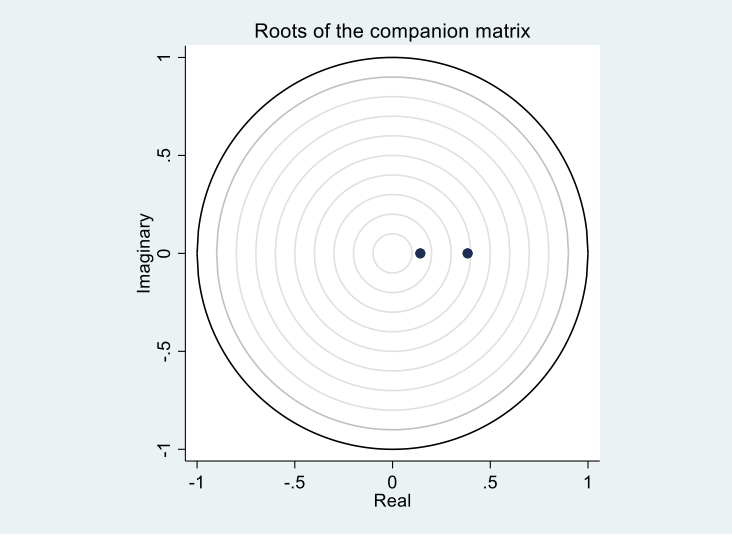


Figure 2 Stability Test Model-2



As it can be seen from the tables below both model eigenvalues are in the circle of the unit. This means that the model is stable over time.

Now we are ready to procced to impulse response function and based on this to calculate fiscal multipliers.

Figure 3 Impulse Response for Open Countries

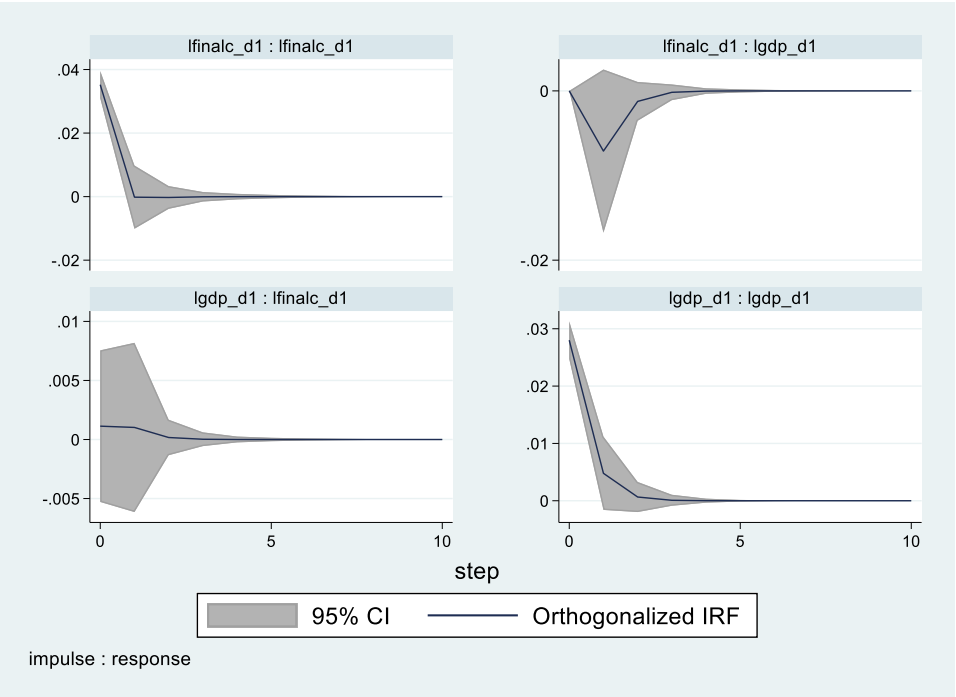
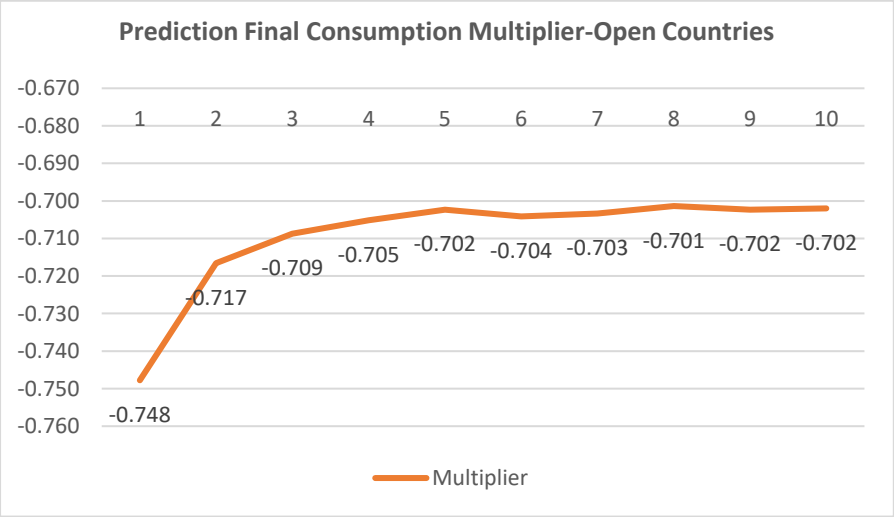
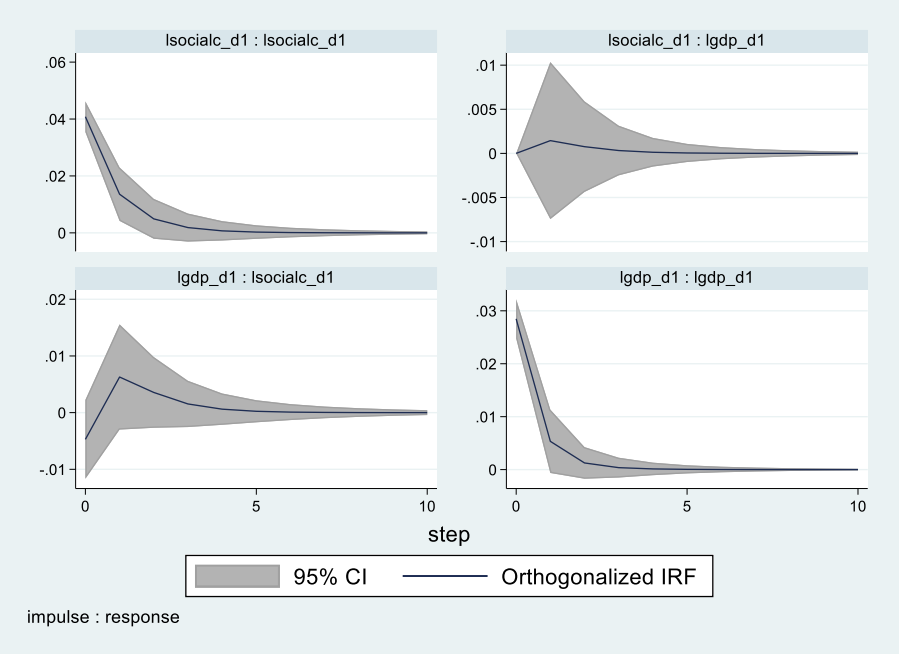


Figure 4 Prediction for Final Consumption Multiplier for Open countries

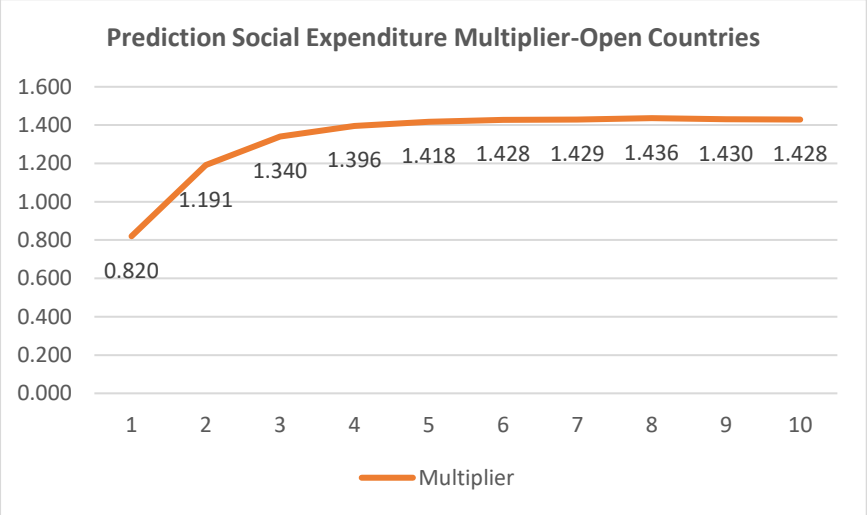


We proceed with the social expenditure multiplier

Figure 6 Social Expenditure Multiplier for Open Countries-Model-2



Graph 7 Prediction for Social Expenditures Multipliers for Open Countries



Comparing the above findings, we see that Social expenditure Multiplier is positive and Higher than Final consumption Multiplier which is negative. This is consistent with economic theory because government's consumption expenditures increase imports and

has negative effect in domestic GDP. On the other hand, social benefits expenditures increase domestic consumption and has a positive effect on GDP. The explanation for this is that Social Benefits expenditures are directed to more vulnerable which buy services, i.e. medical services, which are produced domestically.

We continue with the sub-group of less open countries. We start with the table of summary statistics.

Table 6 Summary Statistics for Less Open Countries

Variable	Obs	Mean	Std. Dev.	Min	Max
lgdp_d1	187	.0148819	.0370521	-.1602211	.1156845
lfinalc_d1	187	.0146659	.0411183	-.1811754	.1344029
lsocialc_d1	187	.025099	.0480349	-.1199474	.2888282
ldebt_d1	187	.0413072	.0963768	-.1519837	.7557169
size_d1	187	-.0001098	.0012587	-.0037365	.0061211
open_d1	187	.0189037	.0392237	-.1046793	.169238

Here again economic variables have a small deviation and small variation as indicated by std. dev, min and max respectivelly.

Table 7 Correlation Matrix for Less Open Countries

	lgdp_d1	lfinal~1	lsocia~1	ldebt_d1	size_d1	open_d1
lgdp_d1	1.0000					
lfinalc_d1	0.5596	1.0000				
lsocialc_d1	-0.1402	0.1701	1.0000			
ldebt_d1	-0.5147	-0.2487	0.3056	1.0000		
size_d1	0.2897	0.2657	0.0321	-0.0142	1.0000	
open_d1	0.3801	-0.1308	-0.4021	-0.2588	0.0282	1.0000

The main findings from the table above is a high negative correlation between debt and GDP and a significant positive correlation between final consumption expenditures and GDP.

Table 8 Unit Root Test (Im–Pesaran–Shin unit-root test) for less open countries

Variables	*IPS ADF test (t bar statistic)*
size	-1.3543
	(0.6792)
D(Size)	-2.4236
	(0.0010)
GDP	-1.0612
	(0.9424)
D(GDP)	-2.7296
	(0.0001)
Final Consumption	-1.7511
Expenditure	(0.4293)
Difference(Final	-2.3368
Consumption	(0.0020)
Expenditure)	
Social Benefits	-1.9932
	(0.1044)
Difference(Social	-2.6991
Benefits)	(0.0001)
Real Debt	-1.1271
	(0.9082)
Difference (Real	-2.5259
Debt)	(0.0006)
open	-0.4876
	(0.9887)
Difference(open)	-4.2089
	(0.0000)

Note: The critical values for 1%, 5%, and 10% are defined as -2.080, -1.910, and -1.820 respectively.

As with open countries the stationarity test indicates that the timeseries for less open countries is not stationary. The IM-Pesaran-Shin test on the first differences shows that the timeseries stationary. So we procced with lag selection.

Table 9 Model 1 Lag Selection Criteria for less open countries

Lag Selection Criterial for Model 1 (lgdp lfinalc)

Lag	CD	J	J-pvalue	MBIC	MAIC	MQIC
1	0.999996	12.60956	0.701062	-59.0278	-19.39044	-35.35935
2	0.999991	10.19817	0.59858	-43.5299	-13.80183	-25.77851
3	0.999983	0.605104	0.999726	-35.2136	-15.3949	-23.37935
4	0.999966	1.920648	0.750351	-15.9887	-6.079352	-10.07158

Table 9 Model 2 Lag Selection Criteria for less open countries

Lag Selection Criterial for Model 2 (lgdp lsociaexpend)

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.999997	10.03566	0.86476	-61.6017	-21.96434	-37.93325
2	0.999995	4.327326	0.97678	-49.4007	-19.67267	-31.64936
3	0.999994	5.100247	0.74681	-30.7185	-10.89975	-18.88421
4	0.999963	1.629425	0.803494	-16.2799	-6.370575	-10.3628

Analysing the MBIC, MAIC and MQIC criterion we see that the first lag is the best choice for both models. The final step before the Impulse Response Function is the stability test which we report in the below graphs.

Figure 8 Stability Test for Less Open Countries Model 1

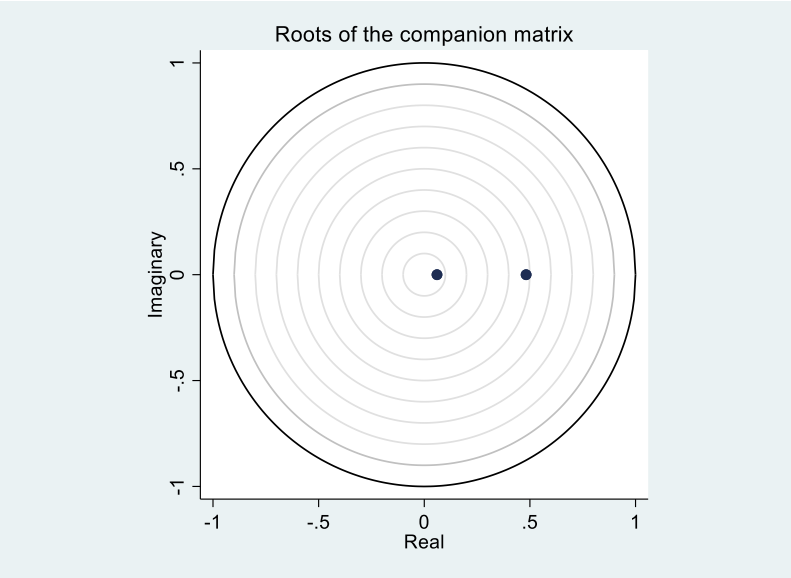
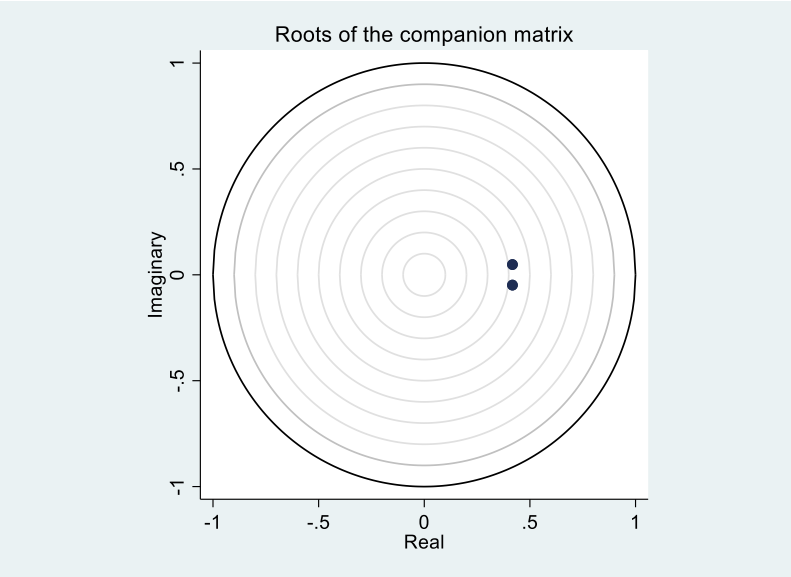
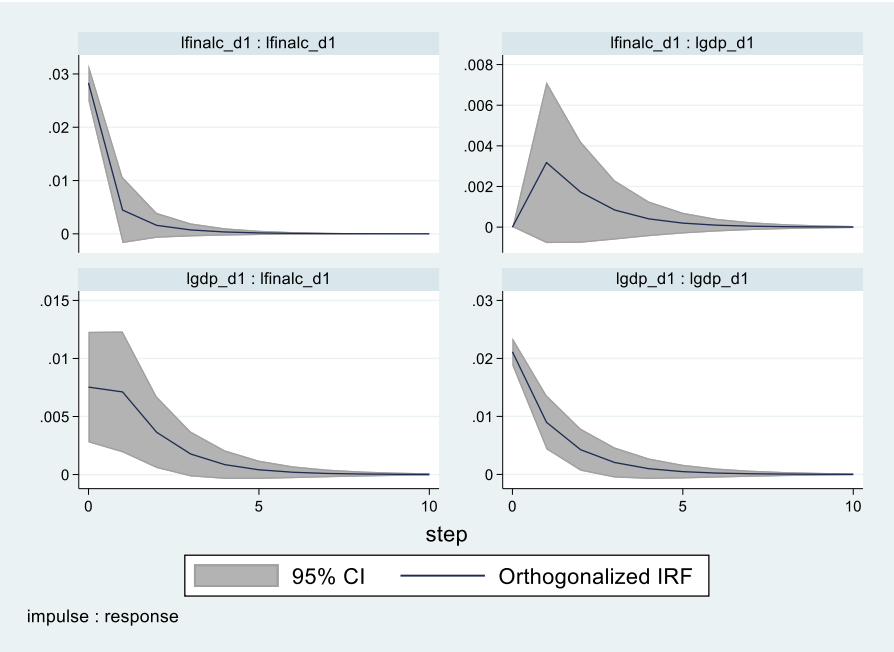


Figure 9 Stability Test for less Open Countries Model-2



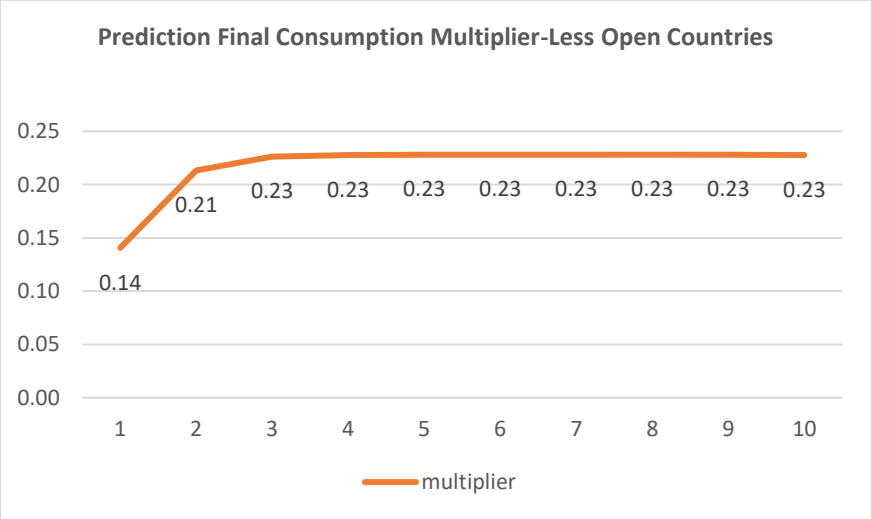
The graphs above show that in both models the roots of the Companion Matrix is within unity so we conclude that our model is stable.

Figure 10 Impulse Response for Less Open Countries



Based on the Impulse Response Function we compute the government's final consumption multiplier. We see that the multiplier is positive and very small, having a small increase in the second year and is stable then on.

Figure 11 Prediction Government Consumption Multiplier for Less Open Countries



We proceed with the Impulse Response Function and the calculation of social expenditure multiplier.

Figure 12 Social Expenditure Multiplier for Less Open Countries-Model-2

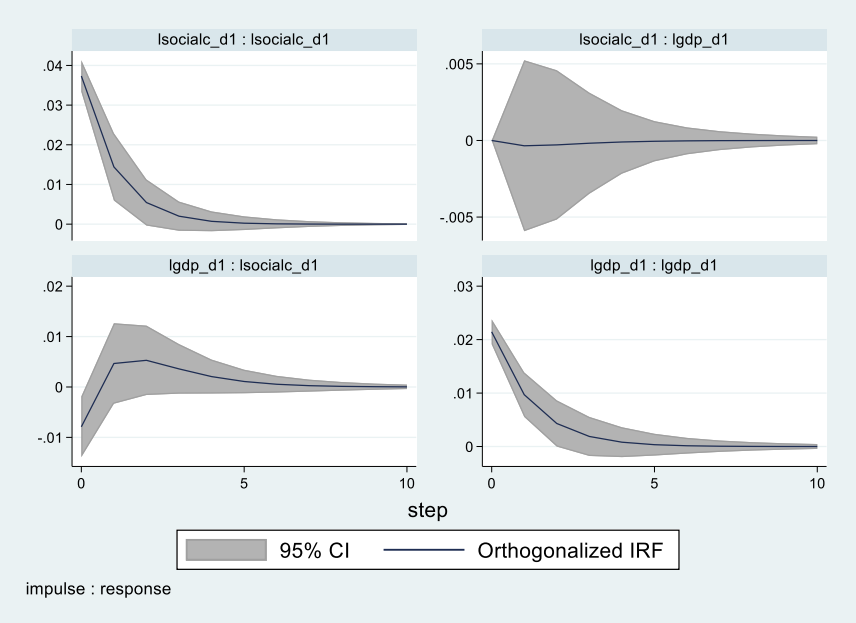
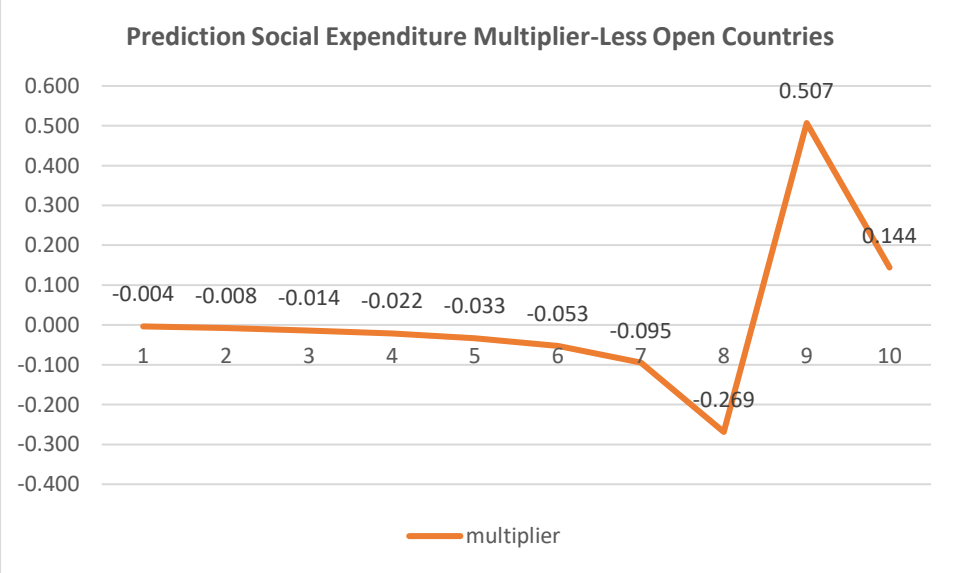


Figure 13 Prediction for Social Benefits Expenditure Multiplier for Less Open Countries



The above graph indicates that, as with the group of open countries, the social expenditure multiplier has small impact on GDP, while Final Consumption Multiplier is

positive, yet very small. The positive effect is due to small volume of imports that characterises less open countries.

Comparing multipliers for open and less open countries we see that in open countries the final consumption multiplier is negative while in less open countries is positive. This is consistent with economic theory and is based on the volume of imports which in open countries is higher than in less open countries. In both subgroups of countries this multiplier is small. As for the social expenditure multiplier in open countries is positive while is negative and negligible in less open countries. This has a reasonable explanation given that social benefit expenditures are targeted towards low-income individuals or households that consume primarily services that produced by domestic economy. Another line of explanation could be that vulnerable households are spend part of their income and save the rest for unexpected circumstances.

7.2.3. Fiscal Multiplier for Big and Small Countries

The second explanatory variable is the size of the country. To our knowledge, no study has investigated the relations between size of a country and fiscal multiplier. In case of a monetary union, this is a core issue because if the mechanism and rules of fiscal discipline are the same for each country and the multiplier is found to be dependent on the size of a country, then it would be easier for some countries to restore its fiscal position, while for some countries, either fiscal austerity must last longer or fiscal discipline must be more dire and consequently more recessionary. To address this issue, we construct a new variable. We define the size as the nominal GDP of each country as a share of the GDP of the whole monetary union, and then we calculate an average for the period 2002–2019 for each country. The results are summarized in the following table:

Table 10 Big and Small Countries

Country	***SIZE***
	%GDP$_{country}$/GDP$_{EMU}$ (%average 2002-2019)
Belgium	3.4199%
Germany	25.2119%
Estonia	0.1510%
Ireland	1.9240%
Greece	1.8118%
Spain	9.6647%
France	18.0807%
Italy	14.5319%
Cyprus	0.1572%
Latvia	0.1872%
Lithuania	0.2827%
Luxembourg	0.3831%
Malta	0.0688%
Netherlands	5.9410%
Austria	2.7569%
Portugal	1.5783%
Slovenia	0.3220%
Slovakia	0.6448%
Finland	1.7560%
Average	**4.6776%**

In the last row, we calculate the average and define big countries as those whose values are above this average and small countries as the ones whose values are below this average. The results seem to follow intuition given that the big countries include Germany,

France, Italy, Spain, Netherlands, and the rest (Belgium, Austria, Ireland, Greece, Finland, Portugal, Slovakia, Luxemburg, Slovenia, Lithuania, Latvia, Cyprus, Estonia, and Malta).

Fiscal Multiplier for Big Countries

Following the same methodology as with the open and less open countries we will start with the table with summary statistics.

Table 11 Summary Statistics for Big Countries

Variable	Obs	Mean	Std. Dev.	Min	Max
lgdp_d1	85	.0110939	.0201061	-.0586257	.0409613
lfinalc_d1	85	.0146514	.0221416	-.06429	.0743675
lsocialc_d1	85	.0176011	.0214365	-.0353708	.1226721
ldebt_d1	85	.0268887	.0615707	-.0631294	.2626958
size_d1	85	-.0001859	.0018235	-.0037365	.0061211
open_d1	85	.0160043	.028767	-.0685408	.1242931

From the table above we can see that there is a small standard deviation and small differences between variables.

Table 12 Correlation Matrix for Big Countries

	lgdp_d1	lfinal~1	lsocia~1	ldebt_d1	size_d1	open_d1
lgdp_d1	1.0000					
lfinalc_d1	0.2488	1.0000				
lsocialc_d1	-0.4066	0.3727	1.0000			
ldebt_d1	-0.4225	-0.1730	0.4171	1.0000		
size_d1	0.4200	0.4349	-0.0277	0.0225	1.0000	
open_d1	0.5374	-0.2564	-0.4825	-0.2576	0.0094	1.0000

The table above shows that there is a high negative correlation between social benefits and debt to GDP. Also there is a high positive correlation between size and openness to GDP, size to final consumption expenditures and debt to social expenditures.

We proceed to test stationarity using Im-Pesaran-Shin test.

Table 13 Unit Root Test (Im–Pesaran–Shin unit-root test) for Big Countries

Variables	*IPS ADF test (t bar statistic)*
size	-0.9079
	(0.9241)
D(Size)	-2.5402
	0.0092)
GDP	-0.7222
	(0.9748)
D(GDP)	-3.1338
	(0.0009)
Final Consumption	-1.3153
Expenditure	(0.7519)
Difference(Final	-2.3587
Consumption	(0.0238)
Expenditure)	
Social Benefits	-1.3248
	(0.6652)
Difference(Social	-2.3165
Benefits)	(0.0302)
Real Debt	-1.0617
	(0.8630)
Difference (Real	-2.6542
Debt)	(0.0065)
open	-0.7885
	(0.9603)
Difference(open)	-4.2029
	(0.0000)

Note: The critical values for 1%, 5%, and 10% are defined as -2.080, -1.910, and -1.820 respectively.

As the table indicates even though the timeseries is not stationary the first difference transformation shows that the dataset is stationary. So, we proceed with lag selection.

Table 14 Lag Selection Criteria for Big Countries Final Consumption Model 1

Lag Selection Criterial for Model 1 (lgdp lfinalc)

Lag	CD	J	J-pvalue	MBIC	MAIC	MQIC
1	0.999996	23.14287	0.109968	-35.8792	-8.85713	-18.6275
2	0.999995	9.439879	0.66497	-34.8267	-14.5601	-21.8879
3	0.999997	8.582826	0.3787	-20.9282	-7.41717	-12.3023
4	0.999994	2.160795	0.706213	-12.5947	-5.83921	-8.28179

Table 15 Lag Selection Criteria for Big Countries Social Expenditures Model 2

Lag Selection Criterial for Model 2 (lgdp lsociaexpend)

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.999978	11.17677	0.798445	-47.8453	-20.8232	-30.5936
2	0.999995	12.97754	0.370675	-31.289	-11.0225	-18.3502
3	0.999997	7.990207	0.434427	-21.5208	-8.00979	-12.895
4	0.9999	0.000236	1	-22.133	-11.9998	-15.6636

In the first model the most appropriate is the two-lag model while the second model criteria indicates that lag 1 is the best model. We continue with stability test.

Figure 14 Stability Test for Big Countries Final Consumption Model 1

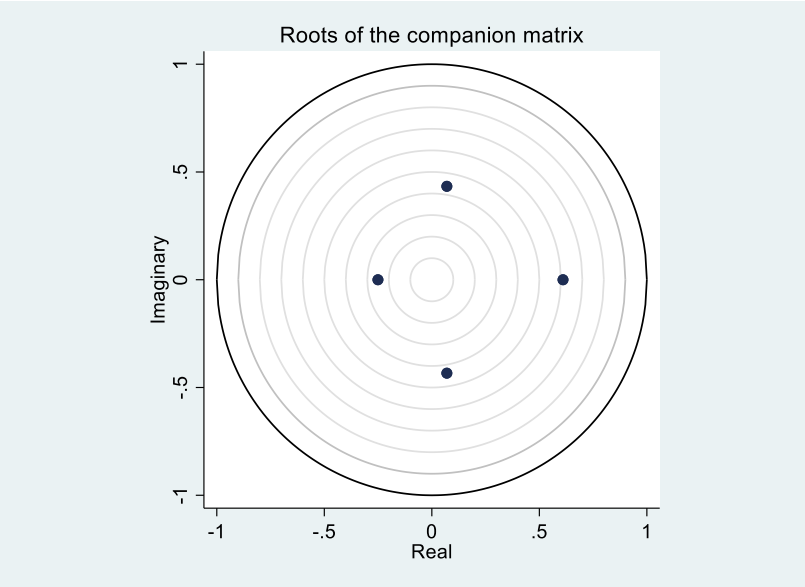
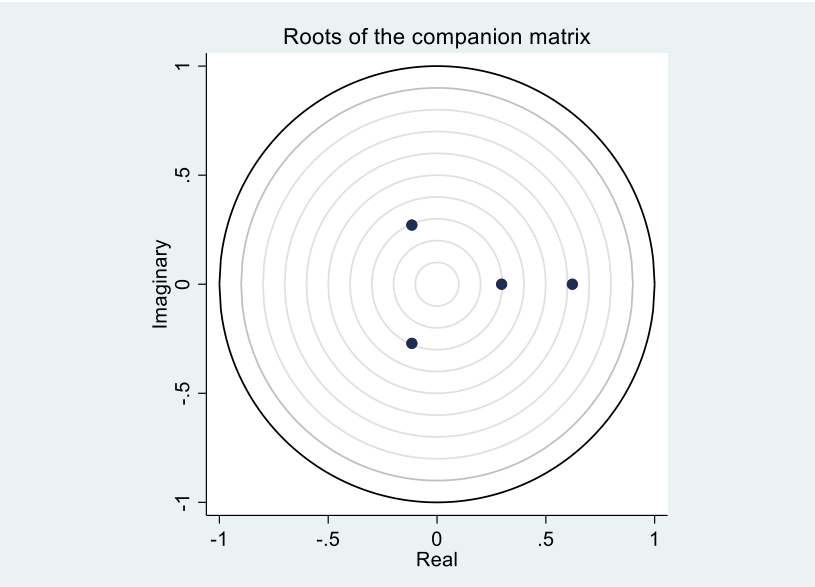


Figure 15 S Stability Test for Big Countries Social Expenditures Model 2



The graphs above shows that both models are stable, and this allows us to proceed to Impulse Response Function and the calculation of multipliers

Figure 16 Impulse Response Function Final Expenditures for Big Countries Model 1

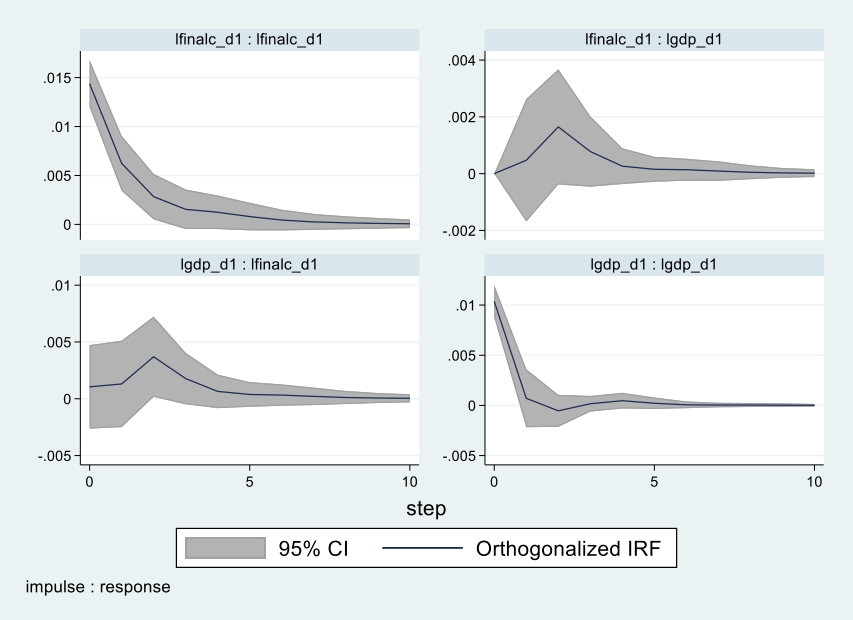
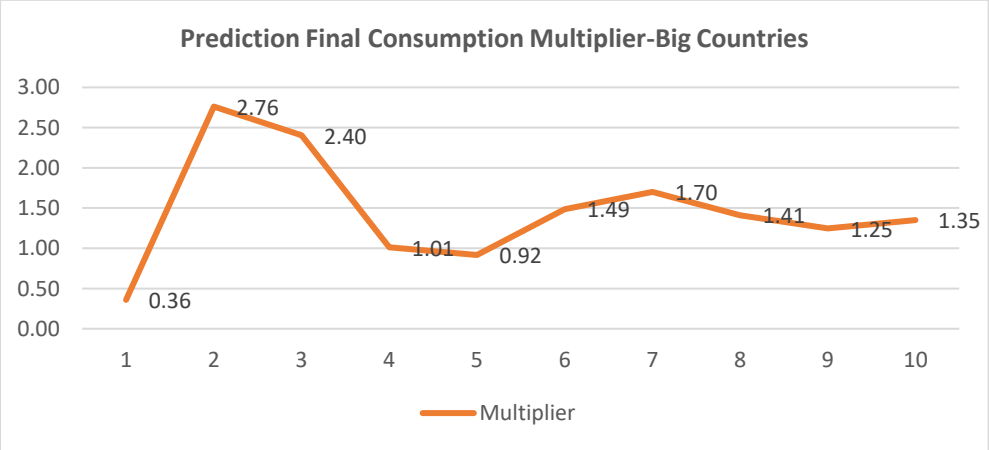


Figure 17 Prediction for Final Consumption Multiplier for Big Countries-Model1



As we can see final consumption multiplier for big countries increases steeply after the first year and from second year starts to decline. This trend follows economic theory because big countries could mobilise resources for a long period and so any increase in government consumption has this positive and significant effect on output. A further explanation is that in big countries income streams from several resources. So, any increase of income due to government expenditure is spent more easily affecting thus, economic activity.

Figure 18 Impulse Response Function Social Expenditure Multiplier for Big Countries-Model-2

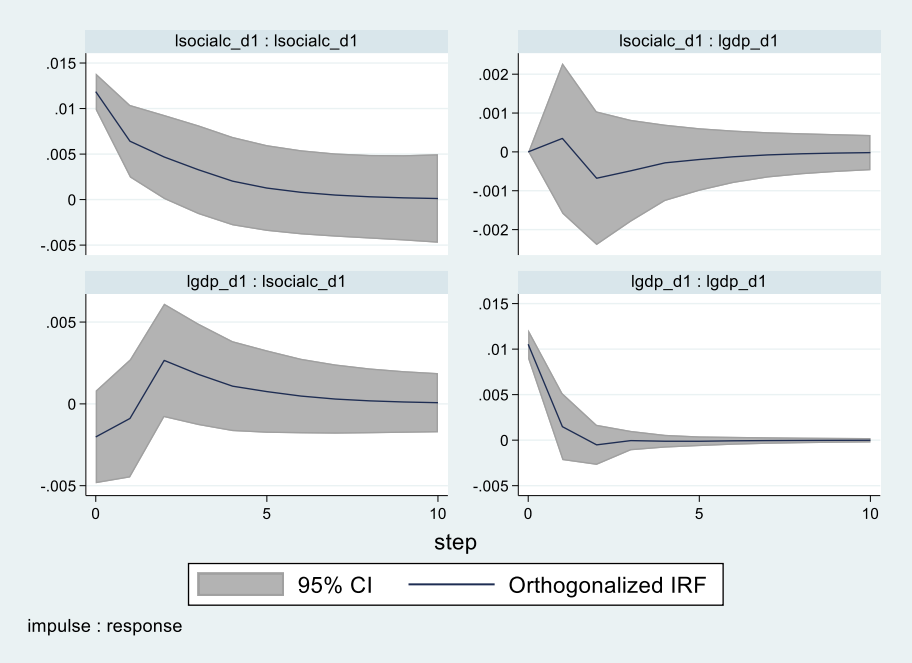
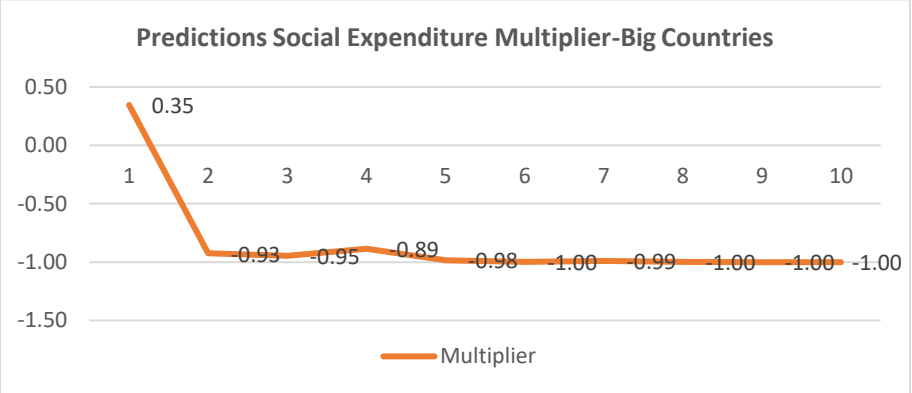


Figure 19 Prediction for Social Expenditures Multiplier for Big Countries



Instead of the significant effect of final consumption multiplier social expenditures multipliers are smaller and their effect on total output is very small and after three years becomes negative. This is because resources are allocated from development to social protection.

We continue with Small Countries.

Table 16 Summary Statistics for Small Countries

Variable	Obs	Mean	Std. Dev.	Min	Max
lgdp_d1	238	.024626	.0427963	-.1602211	.2247624
lfinalc_d1	238	.0223514	.0443197	-.1811754	.1406654
lsocialc_d1	238	.0288418	.0526094	-.1199474	.2888282
ldebt_d1	238	.0508824	.1178226	-.1519837	.7557169
size_d1	238	.000077	.0004677	-.0024786	.0046215
open_d1	238	.033086	.0765379	-.2027383	.4023783

The summary statistics table shows again a small standard deviation of all economic variables.

Table 17 Correlation Matrix for Small Countries

	lgdp_d1	lfinal~1	lsocia~1	ldebt_d1	size_d1	open_d1
lgdp_d1	1.0000					
lfinalc_d1	0.4115	1.0000				
lsocialc_d1	-0.1966	0.2011	1.0000			
ldebt_d1	-0.4937	-0.2221	0.2295	1.0000		
size_d1	0.5879	0.2411	-0.0547	-0.2041	1.0000	
open_d1	0.2821	-0.0856	-0.2997	-0.1592	0.0947	1.0000

Table 17 of correlation shows a high correlation between main economic variables namely, final consumption and social benefits to GDP. Also there is a negative correlation between debt and social consumption expenditures to GDP.

Table 18 Unit Root Test (Im–Pesaran–Shin unit-root test) for Small Countries

Variables	*IPS ADF test (t bar statistic)*
size	-1.1360
	(0.9395)
D(Size)	-2.7357
	0.0000)
GDP	-0.8450
	(0.9973)
D(GDP)	-2.8005
	(0.0000)
Final Consumption	-1.4578
Expenditure	(0.7830)
Difference(Final	-2.8427
Consumption	(0.0000)
Expenditure)	
Social Benefits	-1.9892
	(0.0557)
Difference(Social	-3.2198
Benefits)	(0.0000)
Real Debt	-1.1377
	(0.9327)
Difference (Real	-2.9014
Debt)	(0.0000)
open	-0.5581
	(0.9903)
Difference(open)	-3.8956
	(0.0000)

Note: The critical values for 1%, 5%, and 10% are defined as -2.080, -1.910, and -1.820 respectively.

The Im–Pesaran–Shin unit-root test for stationarity shows that the timeseries is not stationary. So we take the first differences and the test shows that timeseries becomes stationary. We continue with lag selection

Table 19 Lag Selection Criteria for Small Countries Final Consumption Model 1

Lag Selection Criterial for Model 1 (lgdp lfinalc)

Lag	CD	J	J-pvalue	MBIC	MAIC	MQIC
1	0.999965	20.44351	0.430511	-71.2558	-19.5565	-40.4678
2	0.999935	11.54594	0.774601	-61.8135	-20.4541	-37.1831
3	0.999685	11.02381	0.526879	-43.9958	-12.9762	-25.523
4	0.999785	7.123621	0.523356	-29.5561	-8.87638	-17.2409

Table 19 Lag Selection Criteria for Small Countries Social Expenditure Model 2

Lag Selection Criterial for Model 2 (lgdp lsociaexpend)

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.999975	19.1673	0.510977	-72.5321	-20.8327	-41.744
2	0.999975	16.92567	0.390423	-56.4338	-15.0743	-31.8034
3	0.999979	11.3186	0.50183	-43.701	-12.6814	-25.2282
4	0.999954	9.034187	0.33942	-27.6456	-6.96581	-15.3303

The MBIC MAIC and MQIC test indicates that lag 1 is the best choice for both models

Figure 20-Stability Test for Small Countries Final Consumption Model 1

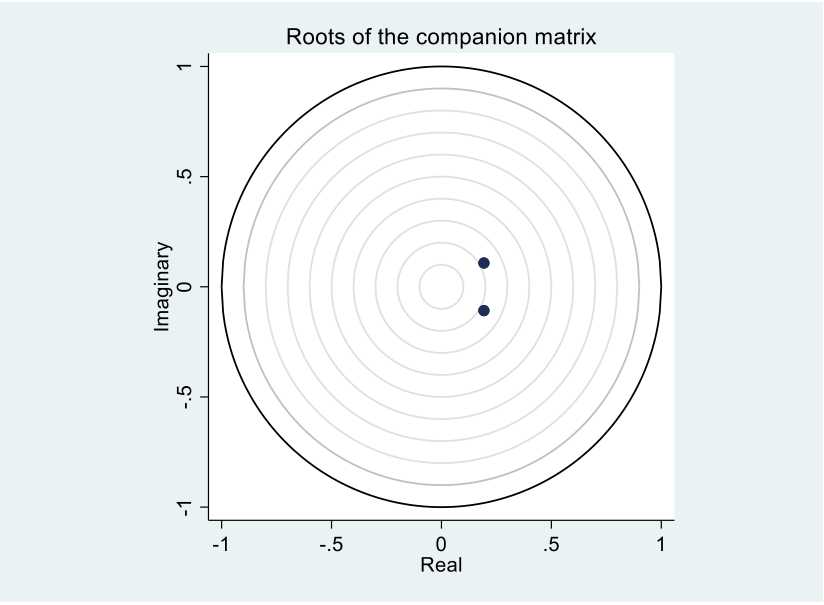
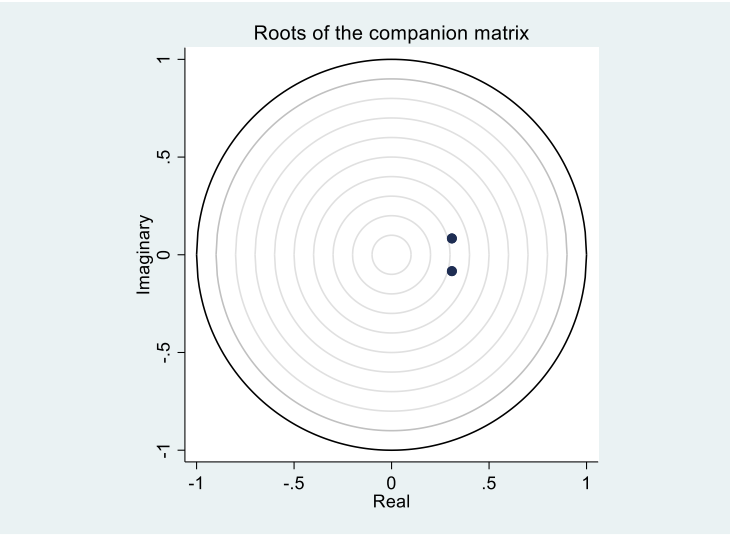


Figure 21 Stability Test for Small Countries Social Expenditures Model 2



The roots of the companion matrix is within unity so both models are stable. We proceed with Impulse response function from which we compute fiscal multipliers.

Figure 22 Impulse Response Function for Small Countries Final Consumption Model 1

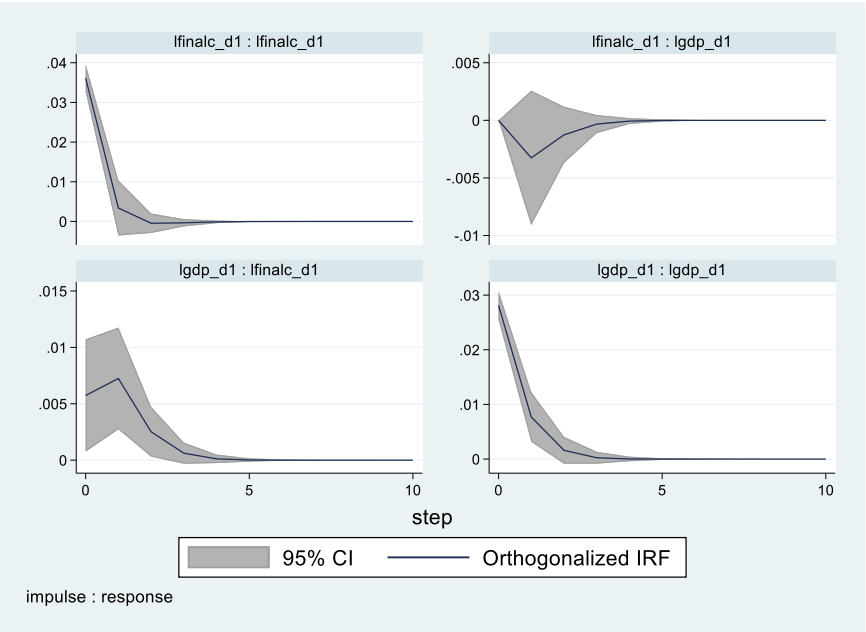
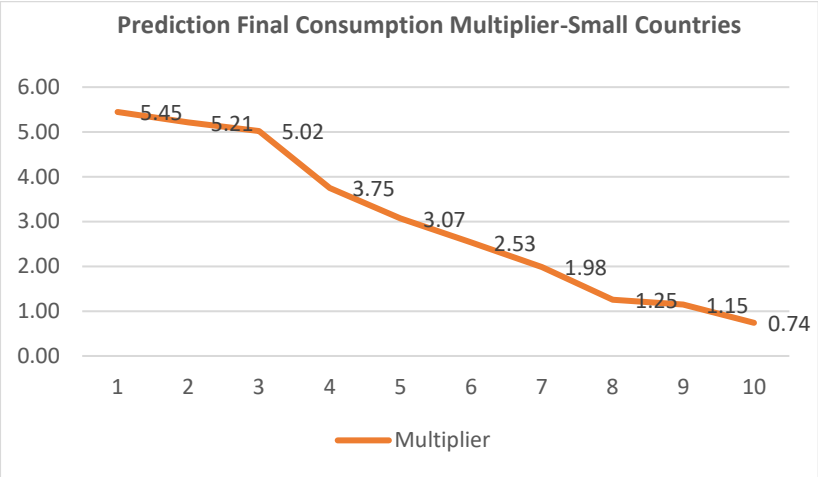


Figure 23 Prediction Final Consumption Multiplier for Small Countries



The interesting finding for government's final consumption multiplier is that is very high and reduces steadily. Small countries can easier mobilise resources and this explains the high multiplier.

Figure 24 Impulse Response Function for Small Countries Social Expenditures Model 2

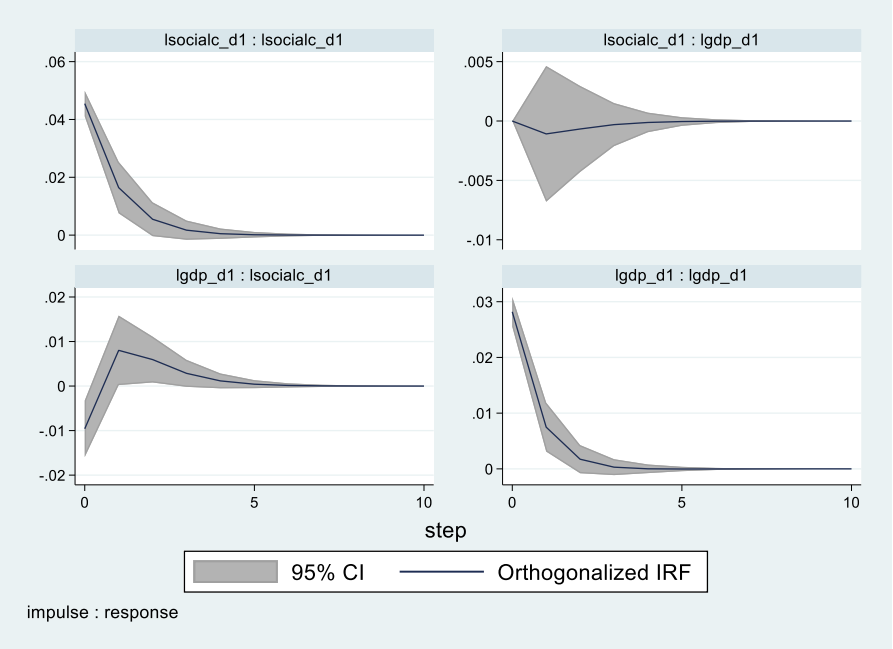
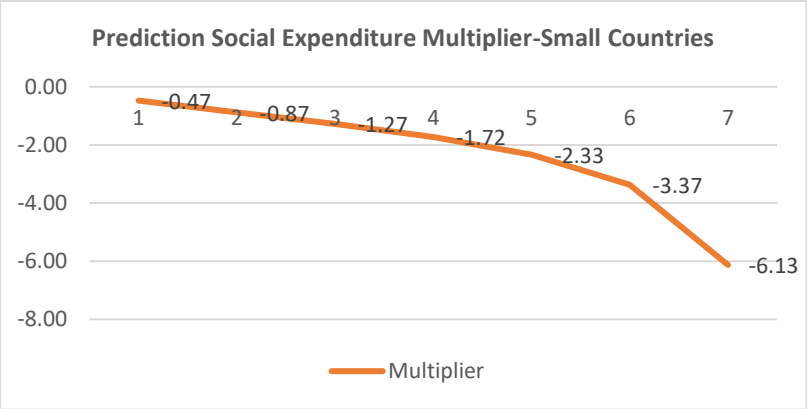


Figure 25 Social Expenditure Multiplier for Small Countries



On the other hand, social expenditures multiplier is negative. In small countries the allocation of resources in favour of social benefits deprives resources from development making thus, multipliers negative. Another reason refers to the existence of non-Ricardian households which have not access to the financial sector. Thus, any money transfer from government is rather saved than spend to come up against unexpected future expenses.

7.2.4. Fiscal Multipliers for High and Low Debt Countries

The first variable is straightforward. In order to analyse the impact of debt on fiscal multipliers, we distinguish two levels of debt to GDP ratios – countries with debt to GDP ratio less than 60%, and countries with debt to GDP ratio above 60%. This choice follows Maastricht criterion for debt level. This has also been justified by the influential work of Rogoff and Reinhart (2010). Rogoff and Reinhart showed that low levels of external debt (below 60%) do not impede economic growth whereas when debt to GDP levels exceeds 90%, economic growth is slowed. According to this analysis, we present a table with the average Debt/GDP ratio during the period 2002–2019 for the 19 member states of EMU.

Table 20 High and Low Debt Countries

Country	***Average %Debt/GDP 2002-2019***
Belgium	100.16
Germany	69.46
Estonia	7.23
Ireland	63.64
Greece	144.80
Spain	69.88
France	82.17
Italy	120.20
Cyprus	76.57
Latvia	29.63
Lithuania	29.88
Luxembourg	16.32
Malta	61.23
Netherlands	55.87

Austria	75.02
Portugal	100.47
Slovenia	48.47
Slovakia	43.89
Finland	49.07

The table shows that only 4 countries (Portugal, Belgium, Greece and Italy) had a Debt/GDP ratio level of above 100% during the period 2002–2019. Seven countries have an average ratio of Debt/GDP between 60% and 90%, namely Germany, Spain, France, Austria, Malta, Cyprus, and Ireland. Finally, Finland, Slovakia, Netherlands, Slovenia, Luxembourg, Lithuania, Latvia, and Estonia have a Debt to GDP ratio below 60%, which is the threshold of the Maastricht treaty.

We start with high debt countries.

Table 21 Summary Statistics for High Debt Countries

Variable	Obs	Mean	Std. Dev.	Min	Max
lgdp_d1	187	.0169192	.033972	-.106853	.2247624
lfinalc_d1	187	.015362	.039988	-.1191802	.1406654
lsocialc_d1	187	.0216616	.0387719	-.1029549	.1555836
ldebt_d1	187	.045505	.1810242	-.1519837	2.175381
size_d1	187	-.0000399	.0013305	-.0037365	.0061211
open_d1	187	.0222462	.0661133	-.1955882	.4023783

As with previous subgroups of countries variations in economic variables remains low between high debt countries with the exemption of the debt where there is a high standard deviation and a big difference between min and max values.

Table 22 Correlation Matrix for High Debt Countries

	lgdp_d1	lfinal~1	lsocia~1	ldebt_d1	size_d1	open_d1
lgdp_d1	1.0000					
lfinalc_d1	0.3773	1.0000				
lsocialc_d1	-0.0721	0.4002	1.0000			
ldebt_d1	-0.1295	0.0890	0.0620	1.0000		
size_d1	0.4297	0.2444	-0.0081	-0.0280	1.0000	
open_d1	0.1638	-0.1193	-0.2355	-0.0499	0.0490	1.0000

Correlation matrix shows a low corelation between all variables. We report a small negative correlation between both social expenditures and debt to GDP, and size and openness to debt and social expenditures.

Table 23 Unit Root Test (Im–Pesaran–Shin unit-root test) for High Debt Countries

Variables	*IPS ADF test (t bar statistic)*
size	-0.5882 (0.9997)
D(Size)	-2.5115 (0.0005)
GDP	0.0256 (0.9999)
D(GDP)	-2.7555 (0.0001)
Final Consumption Expenditure	-0.9684 (0.9726)

Difference(Final	-2.4652
Consumption	(0.0007)
Expenditure)	
Social Benefits	-1.5449
	(0.5037)
Difference(Social	-3.0059
Benefits)	(0.0000)
Real Debt	-1.0235
	(0.9653)
Difference (Real	-2.5724
Debt)	(0.0008)
open	-0.3216
	(0.9993)
Difference(open)	-3.8703
	(0.0000)

Note: The critical values for 1%, 5%, and 10% are defined as -2.080, -1.910, and -1.820 respectively.

The Im-Pesaran-Shin test for stationarity shows that timeseries is not stationary. Taking the first difference timeseries becomes stationary. We continue with lag selection

Table 24 Lag Selection Criteria for High Debt Countries Final Consumption Model 1

Lag Selection Criterial for Model 1 (lgdp lfinalc)

Lag	CD	J	J-pvalue	MBIC	MAIC	MQIC
1	0.999983	11.67516	0.766023	-59.9622	-20.3248	-36.294
2	0.999974	7.356897	0.833156	-46.3711	-16.6431	-28.62
3	0.999964	6.618453	0.578301	-29.2002	-9.38155	-17.366
4	0.999949	2.924697	0.570505	-14.9847	-5.0753	-9.0675

Table 25 Lag Selection Criteria for High Debt Countries Social Expenditures Model 2

Lag Selection Criterial for Model 2 (lgdp lsociaexpend)

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.999993	17.96145	0.326159	53.67594	14.03855	30.0075
2	0.99999	12.85201	0.379888	40.87603	11.14799	23.1247
3	0.999985	11.6633	0.166871	-24.1554	4.336701	12.3212
4	0.999981	4.422809	0.351799	13.48654	3.577191	7.56942

MBIC, MAIC and MQIC test indicates that the first lag is the best choice for both models

Figure 20 Stability Test for High Debt Countries Final Consumption -Model 1

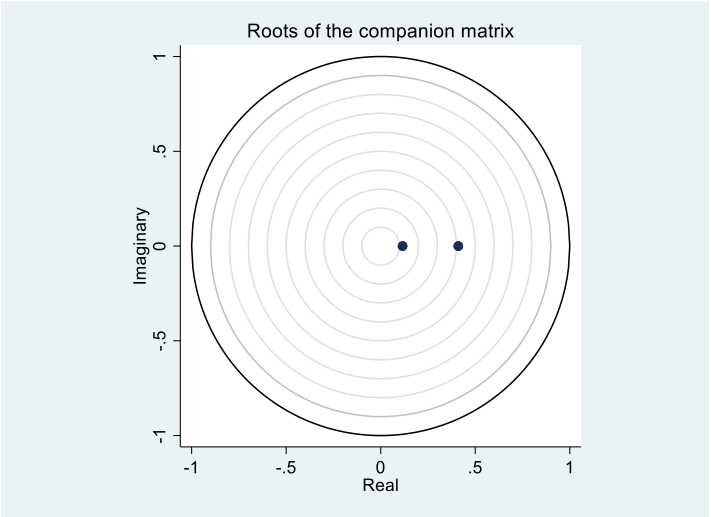
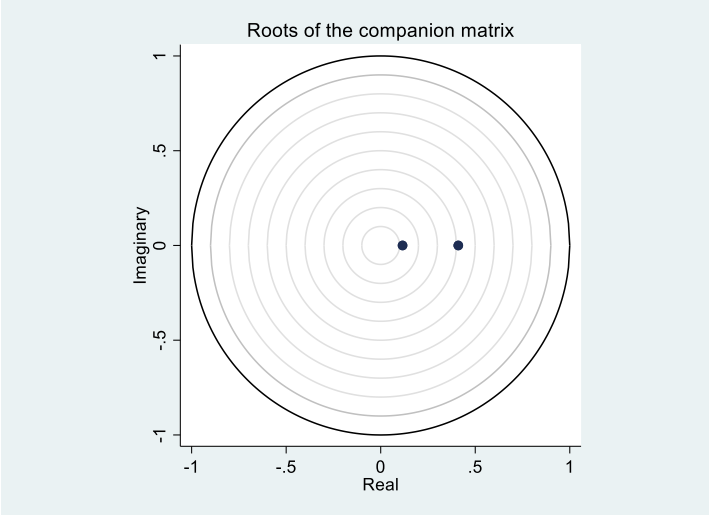


Figure 21 Stability Test for High Debt Countries Final Consumption -Model 1



The roots of the companion matrix shows that our model is stable.

Figure 22 Impulse Response Function for High Debt Countries Final Consumption-Model1

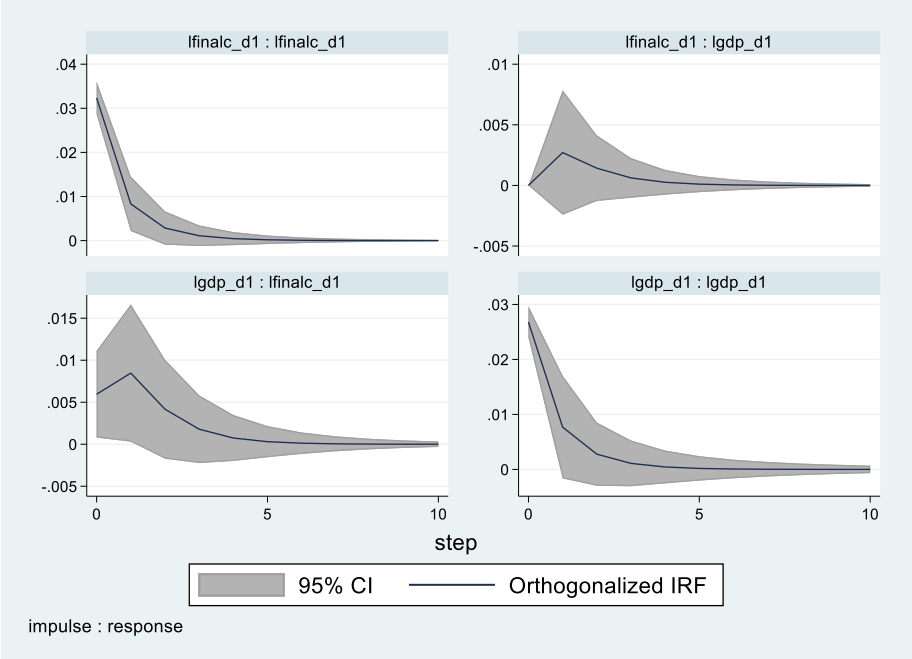
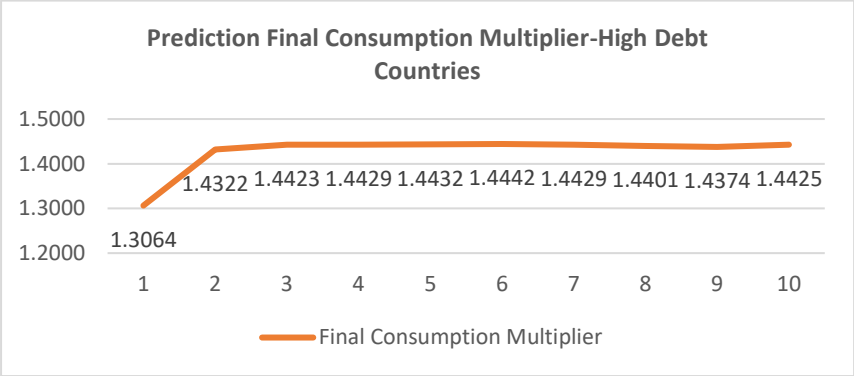


Figure 23 Prediction Final Consumption Multiplier for High Debt Countries -Model 1



As seen from the graph above government's final consumption multiplier is 1,3 and slightly increases after the first year and remains stable then on.

Figure 24 Impulse Response Function for High Debt Countries Social Expenditures-Model 2

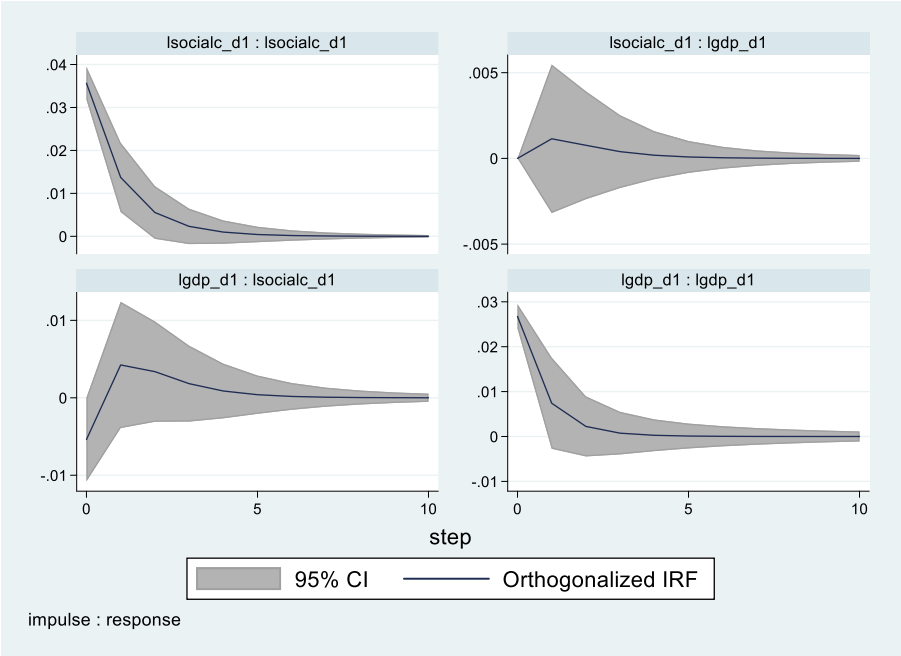
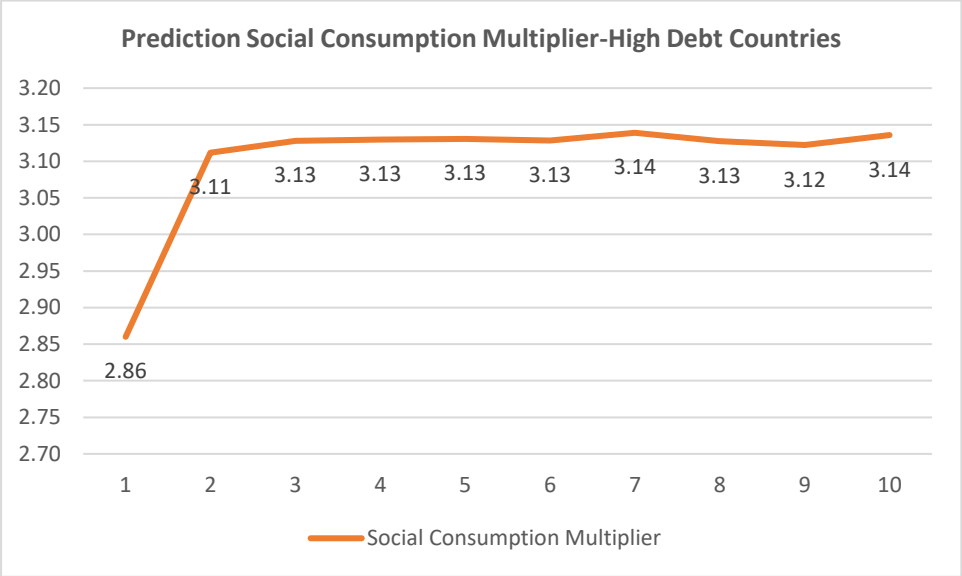


Figure 25 Prediction Social Expenditures Multiplier for High Debt Countries -Model 2



As for social benefits expenditures we see that is high in the first year and increases after the first year. Comparing the two multipliers we conclude that social expenditure multipliers is higher than final consumption multiplier. This could be explained on the ground that social benefit expenditures are targeted in low income households that have lower tax obligations. Instead, final consumption multiplier is lower due to high taxes that characterises private consumption diminishing thus the effect on final product.

We proceed with low debt countries.

Table 20 Summary Statistics for Low Debt Countries

Variable	Obs	Mean	Std. Dev.	Min	Max
lgdp_d1	136	.0267653	.0436486	-.1602211	.1156845
lfinalc_d1	136	.0271493	.0386875	-.1811754	.1099372
lsocialc_d1	136	.0316901	.0554462	-.1199474	.2888282
ldebt_d1	136	.0594221	.1368549	-.1369615	.7557169
size_d1	136	.0000734	.0001965	-.0007997	.0011228
open_d1	136	.0373146	.0691358	-.2027383	.2163807

We see from the above table that main variables have small standard deviation and also small difference between min and max values

Table 21 Correlation Matrix for Low Debt Countries

	lgdp_d1	lfinal~1	lsocia~1	ldebt_d1	size_d1	open_d1
lgdp_d1	1.0000					
lfinalc_d1	0.4226	1.0000				
lsocialc_d1	-0.3067	0.0231	1.0000			
ldebt_d1	-0.5361	-0.3396	0.2239	1.0000		
size_d1	0.5224	0.2550	-0.1607	-0.2496	1.0000	
open_d1	0.4404	-0.0821	-0.3840	-0.2042	0.1031	1.0000

The correlation matrix indicates a small negative correlation between debt and social benefits to GDP, size and openness to social expenditures, and finally debt and openness to final consumption.

Table 22 Unit Root Test (Im–Pesaran–Shin unit-root test) for Low Debt Countries

Variables	*IPS ADF test (t bar statistic)*
size	-1.7467 (0.2021)
D(Size)	-2.9218 (0.0005)
GDP	-0.9259 (0.9691)
D(GDP)	-2.9305 (0.0001)

Final Consumption Expenditure	-0.8761 (0.9942)
Difference(Final Consumption Expenditure)	-2.9465 (0.0001)
Social Benefits	-1.5449 (0.5037)
Difference(Social Benefits)	-3.0053 (0.0000)
Real Debt	-1.0243 (0.9643)
Difference (Real Debt)	-2.5724 (0.0008)
open	-0.3216 (0.9993)
Difference(open)	-4.1225 (0.0000)

Note: The critical values for 1%, 5%, and 10% are defined as -2.080, -1.910, and -1.820 respectively.

The unit root test shows that the first difference time series is stationary.

Table 23 Lag Selection Criteria for Low Debt Countries Final Consumption Model 1

Lag Selection Criterial for Model 1 (lgdp lfinalc)

Lag	CD	J	J-pvalue	MBIC	MAIC	MQIC
1	0.999993	15.18009	0.51149	-51.362	-16.8199	-30.4278
2	0.999992	11.001	0.528833	-38.9056	-12.999	-23.2049
3	0.999996	8.311511	0.403648	-24.9596	-7.68849	-14.4924
4	0.999946	0.367376	0.98506	-16.2682	-7.63262	-11.0346

Table 23 Lag Selection Criteria for Low Debt Countries Social Expenditure Model 2

Lag Selection Criterial for Model 2 (lgdp lsociaexpend)

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.9999852	15.63167	0.4789499	-50.91046	-16.36833	"-29.97622
2	0.9999918	10.22479	0.5962468	-39.6818	-13.77521	"-23.98112
3	0.9999877	4.919268	0.766169	-28.3518	-11.08073	"-17.88468
4	0.9999579	1.030567	0.9051261	-15.60496	-6.969433	"-10.37141

The test for lag selection shows that lag 1 is the best choice for both models.

Figure 26 Stability Test for Low Debt Countries Final Consumption Model 1

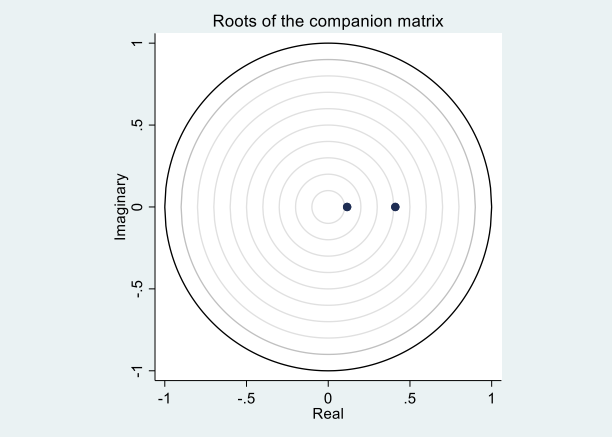
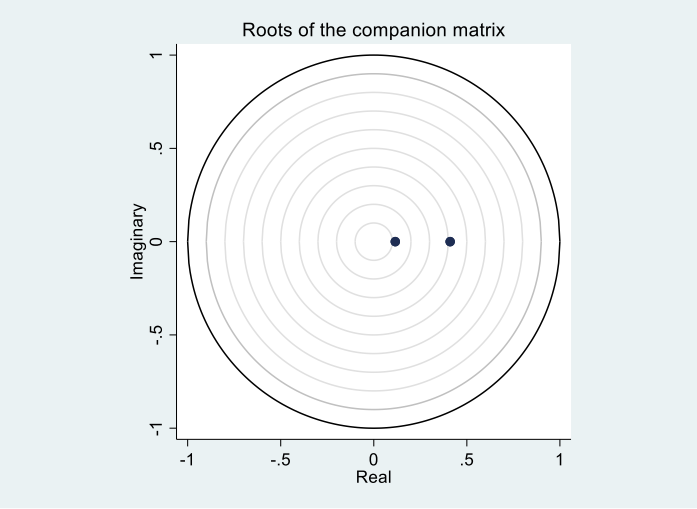


Figure 26 Stability Test for Low Debt Countries Social Expenditures Model 2



Both models are stable as indicated from the unit root test for stability. We continue with Impulse response function from which we compute the multipliers.

Figure 27 Impulse Response Function for Low Debt Countries Final Consumption Model 1

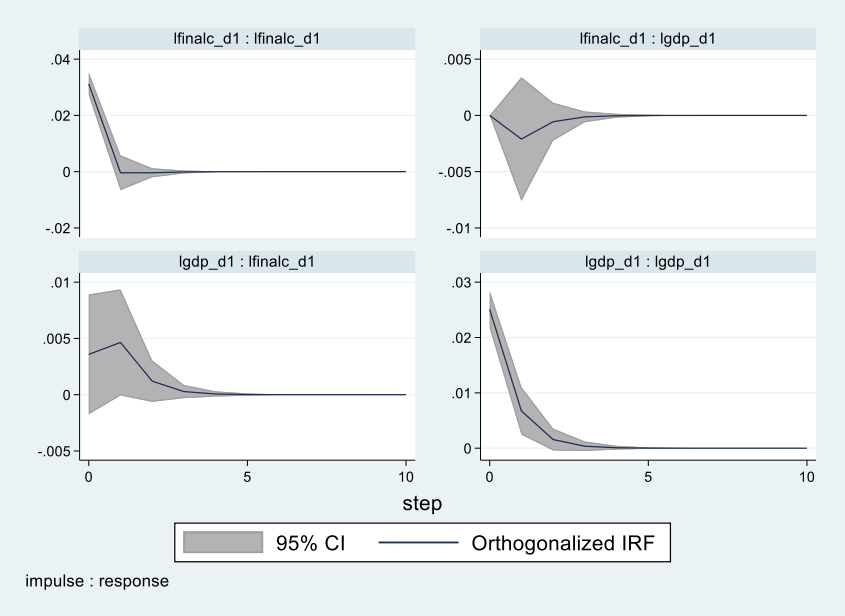
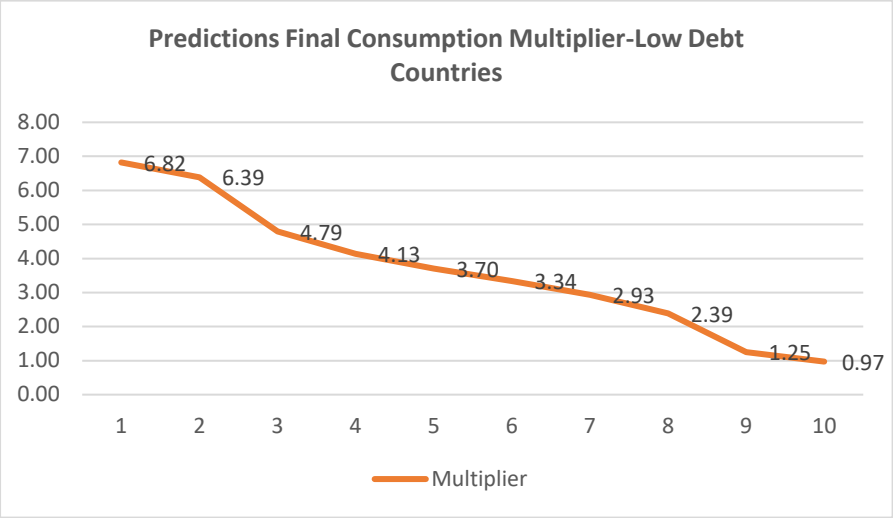
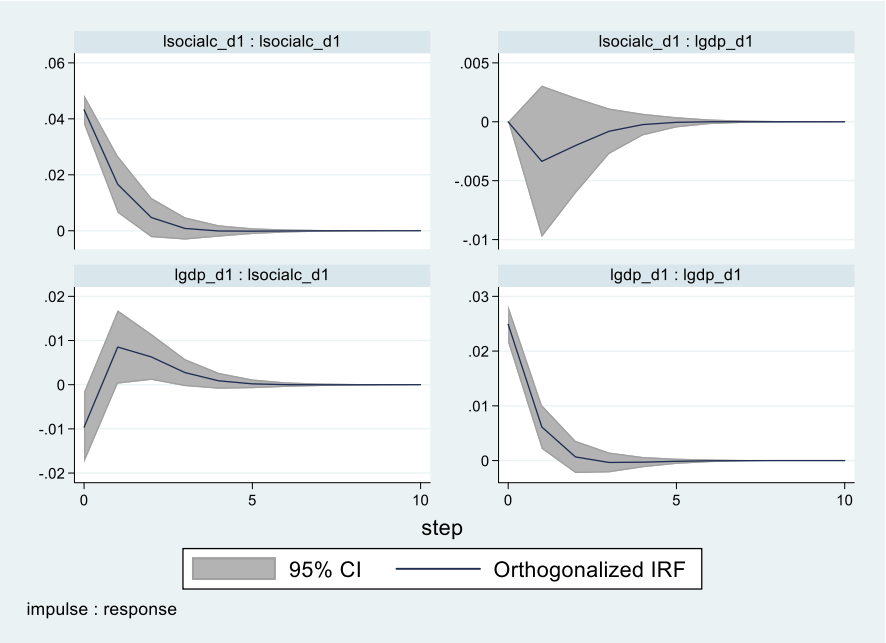


Figure 29 Prediction Final Consumption Multiplier for Low Debt Countries-Model1

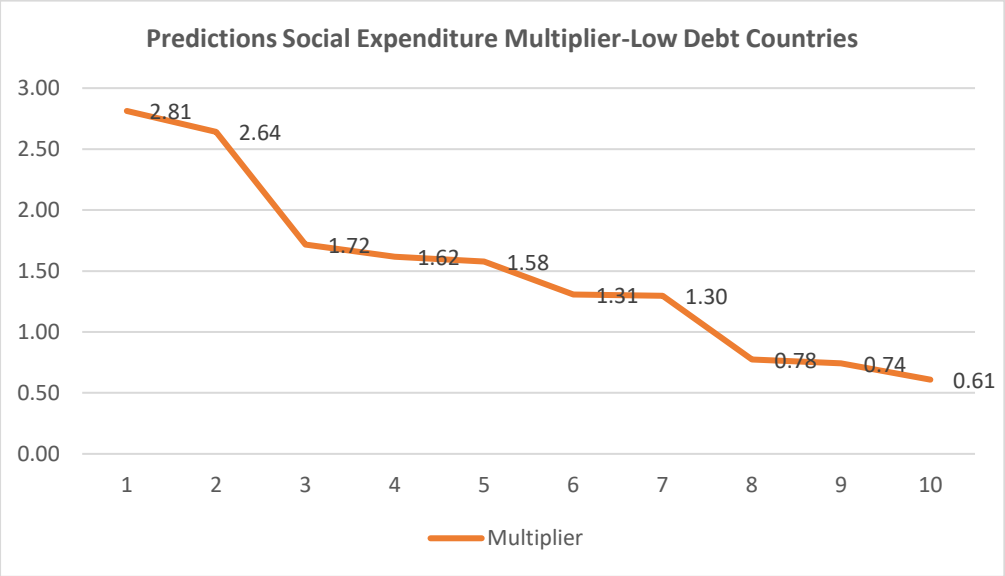


As seen from the above graph final consumption multiplier is high at the first year and steadily declines. The high impact of government's final consumption expenditures to output in low debt countries follows economic theory and intuition given that low debt countries have lower taxes and a small part of the total output is devoted to repaying the debt.

Figure 30 Impulse Response Function for Low Debt Countries Social Expenditures Model 2



Figures 31 Prediction Social Expenditure Multiplier for Low Debt Countries-Model-2



In low debt countries we see that final consumption multiplier is significantly higher than social expenditures multiplier. This could be explained because social benefits are targeted towards low-income households who save a bigger part of their income. Both Multipliers decreases constantly after first year.

Comparing low and high debt countries final consumption multiplier is much higher than multiplier in high debt countries, as expected. This is because in high debt countries government should devote resources for repaying debt. On the other hand, social expenditures multiplier is the same in the first year.

7.2.5 Summary

The table below summarises the above findings.

TABLE 24 Summary of the Findings

	Short-Run Fiscal Multipliers (Impact Multipliers) for the First Period after the fiscal shock											
	SIZE				**TRADE OPENESS**				**DEBT to GDP ratio**			
	Big Countries		*Small Countries*		*Open Countries*		*Less Open Countries*		*High Debt Countries*		*Low Debt Countries*	
	Impact	*Cumulative*	*Impact*	*Cumulative*	*Impact*	*Cumulative*	*Impact*	*Cumulative*	*Impact*	*Cumulative*	*Impact*	*Cumulative*
Final Consumption Multiplier	**0,36**	**0,1**	**5,45**	**-0,4**	**-0,78**	**-0,05**	**0,14**	**0,019**	**1,3**	**0,34**	**6,82**	**0,6**
Social Benefits Multiplier	**0,35**	**0,12**	**-0,47**	**-0,13**	**0,82**	**0,2**	**-0,004**	**-0,001**	**2,86**	**0,62**	**2,81**	**-0,4**

As the above table indicates final consumption multiplier is higher in small, less open and low debt countries. These findings are in accordance both with the relevant literature and the economic theory. Small economies are easier to mobilise factors of production, less open economies are characterised by smaller externalities of fiscal policy (i.e. less imports) and finally low debt countries have less expenses for servicing their debt.

As for the social benefits expenditures we see the opposite results that is, social benefits multipliers are higher in big, open, and high debt countries. Yet the differences among the countries are smaller. This could be explained on the ground that social benefits are targeted towards a specific group of households which have distinctive and peculiar characteristics. More precisely, these households are, possibly, excluded from financial sector and any money allowance from the government is saved rather than spend, having thus, minor, or even negative impact on economic activity. Further, these household spend their

limited income in services or in some primary goods that both are produced domestically. This kind of spendings have limited effects on imports.

In some cases, we report negative multiplier. As for the final consumption multiplier in open economies multiplier is negative. This is in accordance with economic theory given the high volume of imports. On the other hand, social benefit multiplier is negative in less open and small economies. A possible explanation for this is that in both groups of countries social benefits deprive resources from development. This crowding-out effect makes multipliers negative.

As for the size of multipliers findings showed, insignificant size of social benefits multiplier in big, small and less open economies. Moreover, in less open economies also final consumption multiplier is around zero. Yet in low debt countries both social expenditures and final consumption multipliers are high, while only final consumption multiplier is high in high debt and small countries.

These differences in the size of fiscal multipliers have some compelling effects on the structure of the economic governance. These policy implication are discussed in the next chapter.

7.3 Policy Implication

The above findings have some interesting policy implications. After several years of state intervention, the Keynesian state reach its limits and appeared to compound the problem rather than offer a solution. Regardless, monetarists shift the focus of the economic policy to the concern of inflation that soared in the early 80s. The new economic orthodoxy that emerged from this turbulent period was undergirded by two major pillars; the adoption

of monetary policy solely as an anti-inflationary tool, and the effort states put into ensuring budget surpluses. It is out of this political and economic climate of the 80s that the Stability and Growth Pact emerged. The recent pandemic crisis and the subsequent political turmoil and return of inflation after several decades are demonstrative of the limits of the economic orthodoxy that has prevailed since 1980.

The Stability and Growth Pact has been suspended to stave off any unwanted economic consequences of the pandemic. Since then, the debt of the member states of EMU has soared and the fear of a new round of crisis, a debt crisis this time, has been invoked to justify the re-activation of fiscal rules. Recently, the European Central Bank decided to increase interest rates to combat inflation, which challenged states further in their efforts to finance their debt and work towards economic recovery. Thus, the core issue of the monetarist doctrine is that the appropriate economic policy dictates the independence of the Central Bank in order to maintain price stability, which appears to have reached its limit under the current circumstances.

The above discussion showed that the reactivation of the Stability and Growth Pact (the branch of the fiscal discipline of the monetarist doctrine) would be problematic given that certain countries ought to follow strict programmes of fiscal adjustments. In the face of these challenges, some argue in favour of institutional discretionality (Amato et al., 2022), while others believe that since individual states can no longer be solely responsible for their fiscal balance, the need for a new set of fiscal rules must be highlighted (Blanchard et al., 2021).

Yet, as this thesis attempted to show *the effectiveness and impact of fiscal policy depend on many factors* (Part I), *there are several flaws in the design of the framework of*

fiscal policy in the EMU (Part II) and *the fiscal multipliers that determine the potency of fiscal policy vary substantially across member-states* (Part III). This may cause the multi-speed fiscal adjustment Europe, given that some countries will succeed in restoring their fiscal position faster and more effectively than others. This thesis contributes to this discussion for the appropriate fiscal programmes that should be implemented in the EMU after the pandemic crisis.

Conclusion

Since the dawn of the 21st century, economies have faced two major downturns. In 2007-8, the financial and banking crisis hit developed economies forcefully. National governments attempted to revitalise economies and particularly the financial system by providing the necessary financial support. After many years of applying supply-side policies, it was (once again) the time to remember the Keynesian doctrine and the necessity of state intervention to restore economic activity. This was the first round of increasing the fiscal deficit. Some years later, the coronavirus pandemic broke out. Economies floundered again (in a very short time since the financial crisis) under severe stress. National and regional lockdowns shrunk economic activity, which was hit simultaneously by negative demand and supply shock. This economic downturn made the financial support of households and firms an imperative task, leading again to a substantial expansion of public spending and deficits. The crucial issue after the end of the pandemic crisis will be the elimination of excessive budgetary deficits. Fiscal policy has always been a central issue for economic theory and policy and often, a vigorous debate has raged over the appropriate fiscal policy. The issue of fiscal policy is more intriguing in the case of a monetary union, where the common currency

redefines the framework of fiscal policy. All these developments provided a source of inspiration for this thesis. The question we attempted to answer in this thesis is whether it is possible to apply the same fiscal rules in every economy of the monetary union and the analysis indicates that this is not a viable proposition.

The success of fiscal consolidation will depend on many other factors (such as the size of the crowding-out effect, the Ricardian or Non-Ricardian nature of households and governments, etc). These aspects of fiscal policy are extensively studied in the first part of this thesis, in which the core debate between fiscal and monetary policy, which started shortly after WWII, has been meticulously examined. The debate that has shaped the foundations of modern economic thinking ended in the early 1980s when the second round of fiscal debate commenced. The fiscal theory of the price level re-examined the role of fiscal policy and restored its status as an appropriate policy tool. This debate examined four fundamental aspects of the fiscal and monetary policies, namely, whether the government should behave as a Ricardian or non-Ricardian agent, the relationship of Central Banks and Governments in a game theoretic point of view, whether governments' budget should always be balanced and finally, whether government bonds are real wealth. The acceptance of one or the other of these assumptions plays a vital role in the effectiveness of the fiscal or monetary policy.

After reviewing the theoretical basis of fiscal policy, our focus, in the second part, is on monetary unions. We showed that three factors, viz., the level of debt, the size and openness of the country affect the capability of a country to tackle its fiscal burden. So, each country has an idiosyncratic behaviour and responds differently when policies of fiscal contraction are applied, which means that countries will react at a different speed, which will put pressure on the common currency, endangering its stability and that of the monetary

union. The understanding of the strengths and weaknesses of the fiscal rules of the European Monetary Union is pivotal for assessing its function. This is the task of the second part of this thesis, which starts with the historical evolution of the European Monetary Union, to understand the political, social, and economic framework in which it has been developed. It continues analysing and assessing the different types of fiscal monitoring, namely, numerical rules, institutional arrangement, and market mechanisms.

In the third and concluding part, the thesis examines the size of fiscal multipliers, trying to nail down the discussion on fiscal policy, presented in the previous parts, focussing on an issue at the heart of fiscal policy. So, the examination of the size of fiscal multipliers could provide us with an appropriate tool to assess the fiscal policy. This analysis helped us to answer the basic question of this thesis namely, the effectiveness of fiscal rules in the European Monetary Union. As shown, multipliers are affected by various factors such as the characteristics of the economy (e.g., marginal propensity to consume) and institutional characteristics (e.g., the role of Central Banks). The model we developed verified these results.

In the last few decades, we have witnessed an increase in public debt. As the economies return to normality, there will be an urgent need for tackling this problem. Especially in the European Monetary Union, fiscal consolidation is imperative, given that the sound fiscal position of the countries guarantees the stability of the common currency. The effort to return to a viable fiscal position rests on the fiscal framework. Yet, common fiscal rules would not be suitable for all countries, given that *the effectiveness and impact of fiscal policy depend on several factors* (Part I), *there are different frameworks for fiscal monitoring and EMU's fiscal design has several drawbacks* (Part II) and *the fiscal multipliers that*

determine the potency of fiscal policy vary substantially across member-states (Part III). So, this was made clear in every part of this thesis.

The evidence presented in this thesis suggests that the fiscal institutional and legal framework of EMU has neither been designed nor been effective to deal with such an enormous increase in public debt. To apply identical fiscal rules to different countries could ultimately revive the old discussion of the two-speed Europe, this time in the sense of not development but fiscal adjustment (**the multi-speed fiscal adjustment Europe)**. If this comes true, then the European Union will face new 'exits' or a new round of fiscal austerity and perhaps severe recession in some countries. The only way out is a new economic paradigm with sustainable, fair, and equal development for all countries of the EMU.

Bibliography

- Afonso, A. (2002). Disturbing the Fiscal Theory of the Price Level: Can it fit the EU-15?. *ISEG-UTL Dept. of Economics Working Paper*, (1).
- Afonso, A., & Jalles, J. T. (2011). Appraising fiscal reaction functions. *ISEG-UTL Economics Working Paper*, (23) Available at SSRN: https://ssrn.com/abstract=1955177.
- Afonso, A., & Leal, F. S. (2019). Fiscal multipliers in the Eurozone: an SVAR analysis. *Applied Economics*, *51*(51), 5577-5593.
- Amato G., Bassanini F., Messori M., Tosato G. (2022), "The new European fiscal framework: how to harmonise rules and discretion", ASTRID Paper, n. 81.
- Ahmed, E., & Johannes, J. M. (1984). St. Louis equation restrictions and criticisms revisited: Note. *Journal of Money, Credit and Banking*, *16*(4), 514-520.
- Aiyagari, S. R., & Gertler, M. (1985). The backing of government bonds and monetarism. *Journal of Monetary Economics*, *16*(1), 19-44.
- Aizenman, J., Hutchison, M., & Jinjarak, Y. (2013). What is the risk of European sovereign debt defaults? Fiscal space, CDS spreads and market pricing of risk. *Journal of International Money and Finance*, *34*, 37-59.
- Aizenman, J., Hutchison, M., & Noy, I. (2011). Inflation targeting and real exchange rates in emerging markets. *World Development*, *39*(5), 712-724.
- Alcalá, F., & Ciccone, A. (2004). Trade and productivity. *The Quarterly journal of economics*, *119*(2), 613-646.
- Alesina, A., & Drazen, A. (1991). iWhy are Stabilizations Delayed? j. *American Economic Review 81, 1170–1188*
- Alesina, A., & Perotti, R. (1994). The political economy of growth: a critical survey of the recent literature. *The World Bank Economic Review*, *8*(3), 351-371.
- Alesina, A., & Perotti, R. (1994). *The welfare state and competitiveness* (No. w4810). National Bureau of Economic Research.
- Alesina, A., & Tabellini, G. (1990). A positive theory of fiscal deficits and government debt. *The Review of Economic Studies*, *57*(3), 403-414.

– Alesina, A., & Tabellini, G. (2005). *Why do politicians delegate?* (No. w11531). National Bureau of Economic Research.
– Alesina, A., Hausmann, R., Hommes, R., & Stein, E. (1999). Budget institutions and fiscal performance in Latin America. *Journal of development Economics*, *59*(2), 253-273.
– Andersen, L. C., & Carlson, K. M. (1970). *A monetarist model for economic stabilization* (p. 22). Federal Reserve Bank of St. Louis.
– Andersen, L. C., & Jordan, J. L. (1968). Monetary and fiscal actions: A test of their relative importance in economic stabilization. Federal Reserve Bank of St. Louis *Review*, November 1968, pp. 11-24. https://doi.org/10.20955/r.50.11-24.qox
– Ando, A., & Modigliani, F. (1965). The relative stability of monetary velocity and the investment multiplier. *The American Economic Review*, *55*(4), 693-728.
– Arce, O. J. (2005). *The fiscal theory of the price level: a narrow theory for non-fiat money* (No. 0501). Banco de España.
– Arestis, P., Şen, H., & Kaya, A. (2019). Fiscal and Monetary Policy Effectiveness in Turkey: A Comparative Analysis. *Panoeconomicus*, 1-24.
– Auerbach, A. J., & Gorodnichenko, Y. (2012). Fiscal multipliers in recession and expansion. *Fiscal policy after the financial crisis*, *63*, 98.
– Auerbach, A. J., & Gorodnichenko, Y. (2012). Measuring the output responses to fiscal policy. *American Economic Journal: Economic Policy*, *4*(2), 1-27.
– Bajo-Rubio, Ó., Díaz-Roldán, C., & Esteve, V. (2009). Deficit sustainability and inflation in EMU: An analysis from the Fiscal Theory of the Price Level. *European Journal of Political Economy*, *25*(4), 525-539.
– Baldwin, R. E., Di Nino, V., Fontagné, L., De Santis, R. A., & Taglioni, D. (2008). Study on the impact of the euro on trade and foreign direct investment. *European Economic and Monetary Union Working Paper*, (321).
– Barrell, R., Holland, D., & Hurst, I. (2012). Fiscal consolidation: Part 2. Fiscal multipliers and fiscal consolidations. OECD Economics Department Working Papers, No. 933, OECD Publishing, Paris, https://doi.org/10.1787/5k9fdf6bs78r-en.

- Barro, R. J. (1989). The Ricardian approach to budget deficits. *Journal of Economic perspectives, 3*(*2*)*, 37-54.A113*
- Barro, R. J. (1974). Are government bonds net wealth?. *Journal of political economy*, *82*(6), 1095-1117.
- Baskaran, T., & Feld, L. P. (2013). Fiscal decentralization and economic growth in OECD countries: is there a relationship?. *Public finance review*, *41*(4), 421-445.
- Bassetto, M. (2002). A game–theoretic view of the fiscal theory of the price level. *Econometrica*, *70*(6), 2167-2195.
- Bassetto, M., & Cui, W. (2018). The fiscal theory of the price level in a world of low interest rates. *Journal of Economic Dynamics and Control*, *89*, 5-22.
- Batini, N., Callegari, G., & Melina, G. (2012). Successful austerity in the United States, Europe and Japan. IMF Working Papers, 2012(190), A001. Retrieved Feb 16, 2022, from https://www.elibrary.imf.org/view/journals/001/2012/190/article-A001-en.xml
- Batten, D. S., & Thornton, D. L. (1986). The monetary-fiscal policy debate and the Andersen-Jordan equation. *Federal Reserve Bank of St. Louis Review*, *68*(8), 9-17.
- Baum, A., & Koester, G. (2011). The impact of fiscal policy on economic activity over the business cycle-evidence from a threshold VAR analysis. Bundesbank Series 1 Discussion Paper No. 2011,03, Available at SSRN: https://ssrn.com/abstract=2785397
- Beetsma, R. (1995). Fiscal externalities and the optimal degree of independence of a European Central Bank.
- Beetsma, R. M., & Bovenberg, A. L. (1998). Monetary union without fiscal coordination may discipline policymakers. *Journal of international economics*, *45*(2), 239-258.
- Beetsma, R. M., & Bovenberg, A. L. (1999). Does monetary unification lead to excessive debt accumulation?. *Journal of Public Economics*, *74*(3), 299-325.
- Beetsma, R. M., & Bovenberg, A. L. (1995). *Designing fiscal and monetary institutions for a European Monetary Union*. Centre for Economic Policy Research.

– Bergin, P. R. (2000). Fiscal solvency and price level determination in a monetary union. *Journal of Monetary Economics*, *45*(1), 37-53.

– Bergman, M., Hutchison, M. M., & Jensen, S. E. H. (2013). *Do sound public finances require fiscal rules or is market pressure enough?*. European Commission, Directorate-General for Economic and Financial Affairs.

– Bernoth, K., Von Hagen, J., & Schuknecht, L. (2012). Sovereign risk premiums in the European government bond market. *Journal of International Money and Finance*, *31*(5), 975-995.

– Bias, P. V. (2014). A chronological survey of the Friedman-Meiselman/Andersen-Jordan single equation debate. *Research in Business and Economics Journal*, *10*(1).

– Blanchard, O., Leandro, A., Zettelmeyer, J. (2021), "Redesigning EU fiscal rules: from rules to standards«, Economic Policy, April, 195–236.

– Blanchard, O. J., & Leigh, D. (2013). Growth forecast errors and fiscal multipliers. *American Economic Review*, *103*(3), 117-20.

– Blanchard, O. J., & Leigh, D. (2014). Learning about fiscal multipliers from growth forecast errors. *IMF Economic Review*, *62*(2), 179-212.

– Blanchard, O. J., Cottarelli, C., Spilimbergo, A., & Symansky, S. (2009). Fiscal policy for the crisis. Available at SSRN: https://ssrn.com/abstract=1339442 or http://dx.doi.org/10.2139/ssrn.1339442

– Blanchard, O., & Perotti, R. (1999). An empirical characterization of the dynamic effects of changes in government spending on output. *NBER Working Paper*, *7296*, 101-106.

– Blanchard, O., & Perotti, R. (2002). An empirical characterization of the dynamic effects of changes in government spending and taxes on output. *the Quarterly Journal of economics*, *117*(4), 1329-1368.

– Blinder, A. S. (1982). *Issues in the coordination of monetary and fiscal policy* (No. w0982). National Bureau of Economic Research.

– Blinder, A. S. (1983). On the monetization of deficits. In *The Economic Consequences of Government Deficits* (pp. 39-73). Springer, Dordrecht.

– Bohn, H. (1998). The behavior of US public debt and deficits. *the Quarterly Journal of economics*, *113*(3), 949-963.

– Bordo, M. D., & Jonung, L. (1999). *The future of EMU: what does the history of monetary unions tell us?* (No. w7365). National bureau of economic research.
– Born, B., Juessen, F., & Müller, G. J. (2013). Exchange rate regimes and fiscal multipliers. *Journal of Economic Dynamics and Control*, *37*(2), 446-465.
– Bovenberg, A. L., Kremers, J. J., & Masson, P. R. (1991). Economic and monetary union in Europe and constraints on national budgetary policies. *Staff Papers*, *38*(2), 374-398.
– Bryant, J., & Wallace, N. (1980). A suggestion for further simplifying the theory of money (No. 62). Federal Reserve Bank of Minneapolis.
– Buchanan, J. M., & Wagner, R. E. (1977). Democracy in deficit: The political legacy of Lord Keynes.
– Buiter, W. H. (1982). *Comment on TJ Sargent and N. Wallace:" Some Unpleasant Monetarist Arithmetic*" (No. w0867). National Bureau of Economic Research.
– Buiter, W. H. (1983). The theory of optimum deficits and debt. The Economics of Large Government Deficits. Federal Reserve Bank of Boston Conference Series Number 27.
– Buiter, W. H. (1998). The young person's guide to neutrality, price level indeterminacy, interest rate pegs, and fiscal theories of the price level. *NBER working paper*, (w6396).
– Buiter, W. H. (2001). The fallacy of the fiscal theory of the price level, again. Bank Of England Working Paper No. 141, Available at SSRN: https://ssrn.com/abstract=282189 or http://dx.doi.org/10.2139/ssrn.282189
– Buiter, W. H. (2002). The fiscal theory of the price level: A critique. *The Economic Journal*, *112*(481), 459-480.
– Buiter, W. H. (2003). Ten Commandments for a Fiscal Rule in the E (M) U. *Oxford Review of economic policy*, *19*(1), 84-99.
– Buiter, W. H. (2017). The Fallacy of the Fiscal Theory of the Price Level-Once More. CEPR Discussion Paper No. DP11941, Available at SSRN: https://ssrn.com/abstract=2945356
– Buti, M., & Giudice, G. (2002). Maastricht's fiscal rules at ten: an assessment. *JCMS: Journal of Common Market Studies*, *40*(5), 823-848.

– Buti, M., & Van den Noord, P. (2004). *Fiscal policy in EMU: Rules, discretion and political incentives* (No. 206). Directorate General Economic and Financial Affairs (DG ECFIN), European Commission.

– Buti, M., Giudice, G., & Leandro, J. (2020). *Strengthening the Institutional Architecture of the Economic and Monetary Union*. Centre for Economic Policy Research.

– Canzoneri, M. B., Cumby, R. E., & Diba, B. T. (2001). Is the price level determined by the needs of fiscal solvency?. *American Economic Review*, *91*(5), 1221-1238.

– Carlson, K. M. (1978). Does the St. Louis equation now believe in fiscal policy?. *rn*, *1*(4), 4.

– Chian Koh, W. (2017). Fiscal multipliers: new evidence from a large panel of countries. *Oxford Economic Papers*, *69*(3), 569-590.

– Christiano, L. J., & Fitzgerald, T. J. (2000). *Understanding the fiscal theory of the price level* (No. w7668). National bureau of economic research.

- Christiano, L., Eichenbaum, M., & Rebelo, S. (2011). When is the government spending multiplier large?. *Journal of Political Economy*, *119*(1), 78-121.

– Cochrane, J. H. (1998). A frictionless view of US inflation. *NBER macroeconomics annual*, *13*, 323-384.

– Cochrane, J. H. (2001). Long-term debt and optimal policy in the fiscal theory of the price level. *Econometrica*, *69*(1), 69-116.

– Cochrane, J. H. (2005). Money as stock. *Journal of Monetary Economics*, *52*(3), 501-528.

– Coenen, G., Erceg, C. J., Freedman, C., Furceri, D., Kumhof, M., Lalonde, R., ... & Trabandt, M. (2012). Effects of fiscal stimulus in structural models. *American Economic Journal: Macroeconomics*, *4*(1), 22-68.

– Cohen, D., & Wyplosz, C. (1989). The European monetary union: an agnostic evaluation. *Macroeconomic policies in an interdependent world*, 311-37.

– Cooper, R. W., & Kempf, H. (2000). *Designing stabilization policy in a monetary union* (No. w7607). National Bureau of Economic Research.

– Corsetti, G., & Müller, G. J. (2013). Multilateral economic cooperation and the international transmission of fiscal policy. In *Globalization in an Age of Crisis:*

Multilateral Economic Cooperation in the Twenty-First Century (pp. 257-297). University of Chicago Press.

- Corsetti, G., Meier, A., & Müller, G. J. (2012). What determines government spending multipliers?. *Economic Policy*, *27*(72), 521-565.
- Creel, J., & Sterdyniak, H. (2002). The fiscal theory of the price level and sluggish inflation: how important shall the wealth effect be?. *Document de travail*, 2002-01.
- Cwik, T., & Wieland, V. (2011). Keynesian government spending multipliers and spillovers in the euro area. *Economic Policy*, *26*(67), 493-549.
- Daniel, B. C. (2001). A fiscal theory of currency crises. *International Economic Review*, *42*(4), 969-988.
- Davig, T., & Leeper, E. M. (2011). Monetary–fiscal policy interactions and fiscal stimulus. *European Economic Review*, *55*(2), 211-227.
- De Grauwe, P., & Ji, Y. (2012). Mispricing of sovereign risk and macroeconomic stability in the Eurozone. *JCMS: Journal of Common Market Studies*, *50*(6), 866-880.
- De Grauwe, P., & Ji, Y. (2013). Self-fulfilling crises in the Eurozone: An empirical test. *Journal of International Money and finance*, *34*, 15-36.
- Della Posta, P., & Tamborini, R. (2021). *The existential trilemma of EMU in a model of fiscal target zone* (No. 66). EconPol Working Paper. ifo Institute - Leibniz Institute for Economic Research at the University of Munich, https://EconPapers.repec.org/RePEc:ces:econwp:_66.
- Delors, J. (1989). *Report on economic and monetary union in the European Community. Collection of papers submitted to the Committee for the Study of Economic and Monetary Union (1989)[preparatory paper for Delors Report]. By Committee for the Study of Economic and Monetary Union*.
- DePrano, M., & Mayer, T. (1965). Tests of the relative importance of autonomous expenditures and money. *The American Economic Review*, 729-752.
- Devereux, M. B., & Engel, C. (1998). *Fixed vs. floating exchange rates: How price setting affects the optimal choice of exchange-rate regime* (No. w6867). National Bureau of Economic Research.

- Deskar Škrbić, M., & Šimović, H. (2015). The size and determinants of fiscal multipliers in Western Balkans: comparing Croatia, Slovenia and Serbia. *EFZG working paper series*, (10), 1-21.
- Dixit, A., & Lambertini, L. (2003). Interactions of commitment and discretion in monetary and fiscal policies. *American economic review*, *93*(5), 1522-1542.
- Dixit, A., & Lambertini, L. (2003). Symbiosis of monetary and fiscal policies in a monetary union. *Journal of International Economics*, *60*(2), 235-247.
- Eggertson, G., & Krugman, P. (2012). Debt, Deleveraging, and The Liquidity Trap: A Fisher-Minsky-Koo Approach *Quarterly Journal of Economics*,27(3) 1469-1513.
- Eggertsson, G. B. (2011). What fiscal policy is effective at zero interest rates?. *NBER Macroeconomics Annual*, *25*(1), 59-112.
- Elliott, J. W. (1975). The influence of Monetary and Fiscal actions on total spending: The St. Louis total spending equation revisited. *Journal of Money, Credit and Banking*, *7*(2), 181-192.
- Evans, G. W., & Honkapohja, S. (2007). Policy interaction, learning, and the fiscal theory of prices. *Macroeconomic dynamics*, *11*(5), 665-690.
- Favero, C. A., & Monacelli, T. (2005). Fiscal policy rules and regime (in) stability: evidence from the US.
- Feld, L. P., Kalb, A., Moessinger, M. D., & Osterloh, S. (2013). Sovereign bond market reactions to fiscal rules and no-bailout clauses–the Swiss experience, IEB Working Paper N. 2013/028, Available at SSRN: https://ssrn.com/abstract=2340513 or http://dx.doi.org/10.2139/ssrn.2340513
- Foad, H. (2007). Export-oriented FDI, the Euro, and EU enlargement. *San Diego State University manuscript*.
- Frankel, J. A., & Rose, A. K. (1998). The endogenity of the optimum currency area criteria. *The Economic Journal*, *108*(449), 1009-1025.
- Friedman, B. M. (1977). Even the St. Louis Model Now Believes in Fiscal Policy: Note. *Journal of Money, Credit and Banking*, *9*(2), 365-367.
- Friedman, M. (1948). A Monetary and Fiscal Framework for Economic Stability. *The American Economic Review, 38*(3), 245-264.

– Friedman, M., & Meiselman, D. (1963). *The relative stability of monetary velocity and the investment multiplier in the United States, 1897-1958*.

– Friedman, M., & Meiselman, D. (1965). Reply to Ando and Modigliani and to DePrano and Mayer. *The American Economic Review*, 753-785.

– Furceri, D. and A. Mourougane (2010), "The Effects of Fiscal Policy on Output: A DSGE Analysis", OECD Economics Department Working Papers, No. 770, OECD Publishing, Paris, https://doi.org/10.1787/5kmfp4z3njg0-en.

– Galí, J., López-Salido, J. D., & Vallés, J. (2007). Understanding the effects of government spending on consumption. *Journal of the european economic association*, *5*(1), 227-270.

– Giavazzi, F., & Pagano, M. (1990). Can severe fiscal contractions be expansionary? Tales of two small European countries. *NBER macroeconomics annual*, *5*, 75-111.

– Goldfeld, S. M., Blinder, A. S., Kareken, J., & Poole, W. (1972). Some implications of endogenous stabilization policy. *Brookings Papers on Economic Activity*, *1972*(3), 585-644.

– Gordon, D. B., & Leeper, E. M. (2006). The price level, the quantity theory of money, and the fiscal theory of the price level. *Scottish Journal of Political Economy*, *53*(1), 4-27.

– Gramlich, E. M. (1971). The usefulness of monetary and fiscal policy as discretionary stabilization tools. *Journal of Money, Credit and Banking*, *3*(2), 506-532.

– Haas, J. S., D'Erman, V. J., Schulz, D. F., & Verdun, A. (2020). Economic and fiscal policy coordination after the crisis: is the European Semester promoting more or less state intervention?. *Journal of European Integration*, *42*(3), 327-344.

– Hall, R. E. (2009). *By how much does GDP rise if the government buys more output?* (No. w15496). National Bureau of Economic Research.

– Hodson, D. (2020). EMU and political union revisited: what we learnt from the euro's second decade. *Journal of European Integration*, *42*(3), 295-310.

– Hory, M. P. (2016). Fiscal multipliers in Emerging Market Economies: can we learn something from Advanced Economies?. *International Economics*, *146*, 59-84.

– Howarth, D., & Quaglia, L. (2021). Failing forward in Economic and Monetary Union: explaining weak Eurozone financial support mechanisms. *Journal of European Public Policy*, *28*(10), 1555-1572.
– Howarth, D., & Verdun, A. (2020). Economic and Monetary Union at twenty: a stocktaking of a tumultuous second decade: introduction. *Journal of European integration*, *42*(3), 287-293.
– Ilzetzki, E., Mendoza, E. G., & Végh, C. A. (2013). How big (small?) are fiscal multipliers?. *Journal of monetary economics*, *60*(2), 239-254.
– Inman, R. P. (1996). *Do balanced budget rules work? US experience and possible lessons for the EMU* (No. w5838). National Bureau of Economic Research.
– John, S. K. S. (2021). *Education and solidarity in the European Union: Europe's lost spirit*. Springer Nature.
– Jordan, J. L. (1986). *The Andersen-Jordan approach after nearly 20 years*. Federal Bank.
– Kiewiet, D. R., & Szakaty, K. (1996). Constitutional limitations on borrowing: An analysis of state bonded indebtedness. *The Journal of Law, Economics, and Organization*, *12*(1), 62-97.
– Kirchner, M., Cimadomo, J., & Hauptmeier, S. (2010). Transmission of government spending shocks in the euro area: Time variation and driving forces. ECB Working Paper No. 1219, Available at SSRN: https://ssrn.com/abstract=1626267
– Kirsanova, T., Satchi, M., Vines, D., & Wren-Lewis, S. (2007). Optimal fiscal policy rules in a monetary union. *Journal of Money, credit and Banking*, *39*(7), 1759-1784.
– Kocherlakota, N., & Phelan, C. (1999). Explaining the fiscal theory of the price level. *Federal Reserve Bank of Minneapolis Quarterly Review*, *23*(4), 14-23.
– Kraay, A. (2012). How large is the government spending multiplier? Evidence from World Bank lending. *The Quarterly Journal of Economics*, *127*(2), 829-887.
– Lamfalussy, A. (1989). Macro-coordination of fiscal policies in an economic and monetary union in Europe. *Paper annexed to the Report on Economic and Monetary Union in the European Community (commonly called the Delors Report). Committee for the Study of Economic and Monetary Union*.
– Lane, T. D. (1993). Market discipline. *Staff Papers*, *40*(1), 53-88.

– Laxton, D., & Pesenti, P. (2003). Monetary rules for small, open, emerging economies. *Journal of Monetary Economics*, *50*(5), 1109-1146.

– Leeper, E. M. (1991). Equilibria under 'active'and 'passive'monetary and fiscal policies. *Journal of monetary Economics*, *27*(1), 129-147.

– Leeper, E. M., Walker, T. B., & Yang, S. C. S. (2008). *Fiscal foresight: analytics and econometrics* (No. w14028). National Bureau of Economic Research.

- Leigh, D., Devries, P., Freedman, C., Guajardo, J., Laxton, D., & Pescatori, A. (2010). Will it hurt? Macroeconomic effects of fiscal consolidation. *World Economic Outlook*, *93*, 124.

– Li, K., Morck, R., Yang, F., & Yeung, B. (2004). Firm-specific variation and openness in emerging markets. *Review of Economics and Statistics*, *86*(3), 658-669.

– McCallum, B. T. (1984). Are bond-financed deficits inflationary? A Ricardian analysis. *Journal of political economy*, *92*(1), 123-135.

– McCallum, B. T. (2001). Indeterminacy, bubbles, and the fiscal theory of price level determination. *Journal of Monetary Economics*, *47*(1), 19-30.

– McCallum, B. T. (2003). *Is the fiscal theory of the price level learnable?* (No. w9961). National Bureau of Economic Research.

– McCallum, B. T., & Nelson, E. (2005). Monetary and fiscal theories of the price level: the irreconcilable differences. *Oxford Review of Economic Policy*, *21*(4), 565-583.

– Modigliani, F. (1961). Long-run implications of alternative fiscal policies and the burden of the national debt. The Economic Journal, 71(284), 730-755.

– Mochtar, F. (2004). Fiscal and monetary policy interaction: Evidences and implication for inflation targeting in Indonesia. *Buletin Ekonomi Moneter dan Perbankan*, *7*(3), 359-386.

– Modigliani, F. (1995). The monetarist controversy, or, should we forsake stabilization policies?. In *Essential Readings in Economics* (pp. 383-408). Palgrave, London.

– Mundell, R. A., & Mundell, R. A. (1971). *The dollar and the policy mix: 1971*. International Finance Section, Princeton University.

– Neto, O. A., & Borsani, H. (2004). Presidents and cabinets: the political determinants of fiscal behavior in Latin America. *Studies in Comparative International Development*, *39*(1), 3-27.

– Niepelt, D. (2004). The fiscal myth of the price level. *The Quarterly Journal of Economics*, *119*(1), 277-300.

– Persson, M., Persson, T., & Svensson, L. E. (2006). Time consistency of fiscal and monetary policy: a solution. *Econometrica*, *74*(1), 193-212.

– Persson, T., & Svensson, L. E. (1989). Why a stubborn conservative would run a deficit: Policy with time-inconsistent preferences. *The Quarterly Journal of Economics*, *104*(2), 325-345.

- Petroulas, P. (2007). The effect of the euro on foreign direct investment. *European Economic Review*, *51*(6), 1468-1491.

– Kocherlakota, N., & Phelan, C. (1999). Explaining the fiscal theory of the price level. *Federal Reserve Bank of Minneapolis Quarterly Review*, *23*(4), 14-23.

– Poole, W., & Kornblith, E. B. (1973). The Friedman-Meiselman CMC paper: New evidence on an old controversy. *The American Economic Review*, 908-917.

– Poterba, J. M., & Von Hagen, J. (1999). Introduction to" Fiscal Institutions and Fiscal Performance". In *Fiscal institutions and fiscal performance* (pp. 1-12). University of Chicago Press.

– Ramey, V. A., & Zubairy, S. (2018). Government spending multipliers in good times and in bad: evidence from US historical data. *Journal of Political Economy*, *126*(2), 850-901.

– Ratto, M., Roeger, W., & in't Veld, J. (2009). QUEST III: An estimated open-economy DSGE model of the euro area with fiscal and monetary policy. *economic Modelling*, *26*(1), 222-233.

– Reinhart, C. M., & Rogoff, K. S. (2010). Growth in a Time of Debt. *American economic review*, *100*(2), 573-78.

– Riera-Crichton, D., Vegh, C. A., & Vuletin, G. (2015). Procyclical and countercyclical fiscal multipliers: Evidence from OECD countries. *Journal of International Money and Finance*, *52*, 15-31.

– Rogoff K. (1990). Political Budget Cycle. American Economic Review, pp.1-16

– Sala, L. (2004). The fiscal theory of the price level: identifying restrictions and empirical evidence. IGIER Working Paper No. 257, Available at SSRN: https://ssrn.com/abstract=538802 or http://dx.doi.org/10.2139/ssrn.538802
– Sargent, T. J., & Wallace, N. (1984). Some unpleasant monetarist arithmetic. In Griffiths B., Wood G.E. (eds) *Monetarism in the United Kingdom* (pp. 15-41). Palgrave Macmillan, London.
– Sargent, T. J. (1982). The ends of four big inflations. In *Inflation: Causes and effects* (pp. 41-98). University of Chicago Press.
– Savage, J. D., & Verdun, A. (2016). Strengthening the European Commission's budgetary and economic surveillance capacity since Greece and the euro area crisis: a study of five Directorates-General. *Journal of European Public Policy*, *23*(1), 101-118.
– Silber, W. L. (1971). The St. Louis Equation:" Democratic" and" Republican" Versions and Other Experiments. *The Review of Economics and Statistics*, 362-367.
– Silva, R., Carvalho, V. M., & Ribeiro, A. P. (2013). How large are fiscal multipliers? A panel-data VAR approach for the Euro area. *FEP Working Papers no. 500, August, Porto, Portugal: Faculty of Economics University of Porto,*
– Sims, C. A. (1994). A simple model for study of the determination of the price level and the interaction of monetary and fiscal policy. *Economic theory*, *4*(3), 381-399.
– Sims, C. A. (1997). Fiscal foundations of price stability in open economies. *Available at* SSRN: https://ssrn.com/abstract=75357 or http://dx.doi.org/10.2139/ssrn.75357
– Sims, C. A. (1999). The precarious fiscal foundations of EMU. *De Economist*, *147*(4), 415-436.
– Sims, C. A. (1999, November). Domestic currency denominated government debt as equity in the primary surplus. In *Latin American meetings of the Econometric Society, Cancun, Mexico. August* (Vol. 19).
– Smets, F., & Wouters, R. (2003). An estimated dynamic stochastic general equilibrium model of the euro area. *Journal of the European economic association*, *1*(5), 1123-1175.

– Smets, F., & Wouters, R. (2004). Forecasting with a Bayesian DSGE model: an application to the euro area. *JCMS: Journal of Common Market Studies*, *42*(4), 841-867.

– Smith, G. (1982). Monetarism, Bondism, and Inflation. *Journal of Money, Credit and Banking*, *14*(2), 278–286. https://doi.org/10.2307/1991644

– Smithies, A. (1948). The multiplier. *The American Economic Review*, *38*(2), 299-305.

– Squalli, J., & Wilson, K. (2011). A new measure of trade openness. *The World Economy*, *34*(10), 1745-1770.

– Stein, S. H. (1980). Autonomous expenditures, interest rate stabilization, and the St. Louis equation. *The Review of Economics and Statistics*, 357-363.

– Stone, R., & Stone, W. M. (1938). The marginal propensity to consume and the multiplier: a statistical investigation. *The Review of Economic Studies*, *6*(1), 1-24.

– Tang, K. K. (2011). Correcting the size bias in trade openness and globalization measures. *Global Economy Journal*, *11*(3), 1850235.

- Thams, A. (2007). The Relevance of the fiscal Theory of the Price Level revisited. *Available at SSRN 960750*.

– Thompson, E. A. (1967). Debt instruments in both macroeconomic theory and capital theory. The American Economic Review, 57(5), 1196-1210.

– Tobin, J. (1952). Asset holdings and spending decisions. *The American Economic Review*, *42*(2), 109-123.

– Turrini, A., Röger, W., & Székely, I. P. (2012). Banking crises, output loss, and fiscal policy. *CESifo Economic Studies*, *58*(1), 181-219.

– Velasco, A. (2000). Debts and deficits with fragmented fiscal policymaking. *Journal of Public Economics*, *76*(1), 105-125.

– Verdun, A. (1996). An “asymmetrical” economic and monetary union in the EU: perceptions of monetary authorities and social partners. *Journal of European Integration*, *20*(1), 59-81.

– Von Hagen, J. (1991). A note on the empirical effectiveness of formal fiscal restraints. *Journal of Public Economics*, *44*(2), 199-210.

– Von Hagen, J. (2002). Fiscal rules, fiscal institutions, and fiscal performance. *Vol. XX, No. XX, Issue, Year*.

– Von Hagen, J., & Eichengreen, B. (1996). Federalism, fiscal restraints, and European monetary union. *The American Economic Review*, *86*(2), 134-138.

– Weber, A. A. (1990). *European Economic and Monetary Union and Asymmetries and adjustment problems in the European Monetary System: Some empirical evidence* (No. 9-90). Volkswirtschaftliche Diskussionsbeiträge.

– Weingast, B. R. (1981). Regulation, reregulation, and deregulation: The political foundations of agency clientele relationships. *Law & Contemp. Probs.*, *44*, 147.

– Woodford M. (1998) Control of the Public Debt: A Requirement for Price Stability?. In: Calvo G., King M. (eds) The Debt Burden and its Consequences for Monetary Policy. International Economic Association Series. Palgrave Macmillan, London. https://doi.org/10.1007/978-1-349-26077-5_5

– Woodford, M. (1994). Monetary policy and price level determinacy in a cash-in-advance economy. *Economic theory*, *4*(3), 345-380.

– Woodford, M. (1995, December). Price-level determinacy without control of a monetary aggregate. In *Carnegie-Rochester conference series on public policy* (Vol. 43, pp. 1-46). North-Holland.

– Woodford, M. (1998). *Public debt and the price level* (Vol. 38). mimeo.

– Woodford, M. (2001). *Fiscal requirements for price stability* (No. w8072). National Bureau of Economic Research.

– Woodford, M. (2003). Comment on: Multiple-solution indeterminacies in monetary policy analysis. *Journal of Monetary Economics*, *50*(5), 1177-1177.