CHARLES UNIVERSITY
FACULTY OF SOCIAL SCIENCES
Institute of Economic Studies

Expansionary Fiscal Consolidation Revisited: Evidence from the Over-Indebted Europe

Master's thesis

Author: Jaroslav Máca
Study program: Economics and Finance
Supervisor: PhDr. Jaromír Baxa, Ph.D.
Year of defense: 2024

Declaration of Authorship

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Prague, April 29, 2024

Jaroslav Máca

Abstract

This thesis studies macroeconomic effects of fiscal consolidation on a sample of EU-28 countries for a period from 2004 to 2019 sticking primarily to the state-of-the-art narrative approach. For this purpose, we collect additional 2037 new fiscal measures to update publicly available dataset used in some previous papers. This is of interest as we demonstrate that cyclically adjusted primary balance in case of conventional approach can disregard a number of relevant findings. We do find moderate indications that fiscal consolidation can turn out to be expansionary in terms of enhancing GDP growth. In line with the existing literature, private investment is shown to react more strongly than private consumption. Nevertheless, success in terms of reducing public debt-to-GDP ratio is limited due to the low persistence of austerity measures. However, currency appreciation in countries with floating exchange rate regime can inhibit full materialization of growth-enhancing potential of fiscal consolidation. In the end, central bank is shown to cut interest rates to offset recessionary pressures. Further research shall revisit the role of composition. In fact, we reveal that tax-based austerity measures are typically chosen as "adjustment of the last resort" and successfully reverse course of history, while spending-based ones are rather self-defeating. This is in sharp contrast to conventional wisdom that has been built up for years. Last but not least, this paper can serve policy makers as a reminder that undertaking painful austerity measures pays off though there are risks they need to be aware of – notably that unemployment rate continues to increase for additional two years before it successfully reverts and plunges which could jeopardize the government's re-election prospects.

JEL Classification	E62, E60, E20, E12, F45, H30, H61
Keywords	Fiscal consolidation, European Union, Local projections, Narrative approach, Non-Keynesian effects
Title	Expansionary Fiscal Consolidation Revisited: Evidence from the Over-Indebted Europe

Author's e-mail	`jaramaca@seznam.cz`
Supervisor's e-mail	`jaromir.baxa@fsv.cuni.cz`

Abstrakt

Tato závěrečná práce se zabývá makroekonomickými dopady fiskální konsolidace na vzorku 28 zemí EU v období 2004 až 2019, přičemž se drží především nejmodernějšího narativního přístupu. Za tímto účelem shromažďujeme dalších 2037 nových fiskálních opatření, abychom aktualizovali veřejně dostupný soubor dat použitý v některých předchozích publikacích. To je významné, neboť ukazujeme, že cyklicky očištěné primární saldo v případě konvenčního přístupu může řadu relevantních zjištění přehlížet. Nacházíme mírné náznaky toho, že fiskální konsolidace se může ukázat jako expanzivní ve smyslu posílení růstu HDP. V souladu s existující literaturou se ukazuje, že soukromé investice reagují silněji než osobní spotřeba. Nicméně úspěch, pokud jde o snížení poměru veřejného dluhu k HDP, je omezený vzhledem k nízké vytrvalosti úsporných opatření. Zhodnocení měny v zemích s režimem plovoucího směnného kurzu však může bránit plnému zhmotnění prorůstového potenciálu fiskální konsolidace. Nakonec se ukazuje, že centrální banka snižuje úrokové sazby, aby kompenzovala tlaky vyvolávající recesi. Další výzkum by se měl znovu zabývat otázkou významu složení. Odhalujeme totiž, že úsporná opatření založená na daních jsou obvykle volena jako „korekce poslední instance" a úspěšně obracejí běh dějin, zatímco opatření na výdajové straně jsou spíše sebepoškozující. To je v příkrém rozporu s léta budovanou všeobecnou představou. V neposlední řadě může tento článek sloužit politickým činitelům jako připomínka, že podstupovat bolestivá úsporná opatření se vyplatí, i když jsou zde rizika, kterých si musí být vědomi - zejména, že míra nezaměstnanosti poroste ještě další dva roky, než se podaří zvrátit její vývoj a dojde k prudkému poklesu, což by mohlo ohrozit vyhlídky vlády na znovuzvolení.

Klasifikace JEL	E62, E60, E20, E12, F45, H30, H61
Klíčová slova	Fiskalní konsolidace, Evropská unie, lokální projekce, narativní přístup, nekeynesiánské vlivy
Název práce	Prorůstová fiskální konsolidace znovu na scéně: analýza předlužené Evropy
E-mail autora	jaramaca@seznam.cz
E-mail vedoucího práce	jaromir.baxa@fsv.cuni.cz

Acknowledgments

I would like to thank PhDr. Jaromír Baxa, Ph.D. for supervising this thesis.

Typeset in LaTeX using the IES Thesis Template.

Bibliographic Record

Máca, Jaroslav: *Expansionary Fiscal Consolidation Revisited: Evidence from the Over-Indebted Europe.* Master's thesis. Charles University, Faculty of Social Sciences, Institute of Economic Studies, Prague. 2024, pages 100. Advisor: PhDr. Jaromír Baxa, Ph.D.

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Acronyms

CAPB Cyclically adjusted primary balance

CEE Central and Eastern Europe

COVID-19 Coronavirus disease 2019

ECB European Central Bank

GFC Global financial crisis

IRFs Impulse response functions

LPs Local projections

SGP Stability and Growth Pact

VARs Vector autoregressions

Master's Thesis Proposal

Author	Jaroslav Máca
Supervisor	PhDr. Jaromír Baxa, Ph.D.
Proposed topic	Expansionary Fiscal Consolidation Revisited: Evidence from the Over-Indebted Europe

Motivation Public sector traditionally plays an important role in Europe. Moreover, in reaction to the wave of unexpected shocks such as COVID-19 pandemic and Russian invasion of Ukraine with related energy crisis, virtually all governments boosted their economies taking advantage of the suspended Stability and Growth Pact until 2024. While it remains questionable how much governments spending aimed at offsetting "black swans" and to what extent the underlying motivation was purely political, there is no doubt it leads to hardly sustainable debt levels for multiple countries in the European Union (The Economist, 2023a). Indeed, Italy and Spain among others reported debt-to-GDP ratio exceeding 100%! Moreover, the situation is complicated as ECB and other monetary authorities must raise interest rates to combat inflation "monster" which makes debt service burden strikingly expensive (Arnold, 2023).

As a consequence, recent developments resemble the set up in the 2010s when European sovereign debt crisis took place threatening pure existence of second-largest reserve currency. "Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough," declared Mario Draghi, then ECB President, to calm down financial markets and return trust in the euro area (European Central Bank, 2012). Nowadays, widening government bond yield spreads are once again calling for fiscal consolidation (Vladkov and Arnold, 2023).

Fortunately, Alesina and Perotti (1995) point out that austerity measures do not have to automatically cause a decline of output or a prolonged recession with huge unemployment. In fact, in case of heavily indebted countries, it is assumed the so-called non-Keynesian effects are more likely to occur. The principle is as follows: households and firms are aware of debt burden, including possible risk of bankruptcy, and thus sophistically hold extra savings to be prepared for bad times. Under these

circumstances, if governments go for austerity in a credible way, economic agents may feel free to consume and invest more given lowered risk premium (Giavazzi and Pagano, 1995). Therefore, fiscal consolidation can turn out to be expansionary in the end.

Hypotheses To ground a fiscal fantasyland (The Economist, 2023b), following hypotheses will be tested:

#1 There are signs of expansionary fiscal consolidation (incl. post-European sovereign debt crisis era)

#2 The composition of fiscal consolidation plays a significant role

#3 The exchange rate regime significantly impacts fiscal consolidation

Expected Contribution The expansionary fiscal consolidation firstly attracted attention when Ireland and Denmark have undergone austerity in the 1980s. Giavazzi and Pagano (1990) find that GDP growth can be maintained despite budget cuts/tax increases as in case of Denmark/Ireland, respectively. The topic then became well established in the literature within the framework of the political economy as Alesina takes a lead and revises it on a regular basis, rather confirming that expansionary fiscal consolidation can hold (e.g., Alesina and Perotti, 1995; Alesina and Perotti, 1996; Alesina and Ardagna, 2010; Alesina et al., 2015; Alesina et al., 2017).

However, several recently published papers have delivered contrasting results indicating that debate is not yet over, and that further evidence is needed (e.g., Guajardo et al., 2014; Attinasi and Metelli, 2017; Georgantas et al., 2023). In other words, we are interested in whether expansionary fiscal consolidation identified in papers by Alesina et al. is robust to a variety of approaches, or whether the results are mainly driven by the choice of empirical methodology.

As it is already a couple of years since the last comprehensive studies were published, it is essential to provide additional evidence on how the results have shaken out in light of the European sovereign debt crisis or the recent excessive fiscal stimulus. Moreover, we would like to document whether composition matters as suggested by Alesina and Perotti (1996).

Furthermore, researchers usually focus on OECD countries though history of sovereign debt crises in Europe can be traced back to the early 19th century (Reinhart et al., 2012). Indeed, Europe is significantly more egalitarian compared to other OECD countries, not to talk about the rest of the world. Therefore, this thesis makes a great deal by enriching much smaller literature on expansionary fiscal consolidation in the Old Continent.

Last but not least, we offer a fine alternative to the latest papers such as the one by Georgantas et al. (2023) sticking primarily to the narrative approach which is considered state-of-the-art methodology free of potential endogeneity. The same applies to focus on EU and time range as already mentioned.

Methodology As our baseline empirical methodology, we stick to the narrative approach first proposed by Romer and Romer (2010). Under this framework, fiscal announcements and measures are collected by a researcher who organizes them into the so-called fiscal "plans" which can be regarded as typically multi-year austerity measures. As governments do not always fully announce them in advance, thus they carry both expected and unexpected parts (Alesina et al., 2017). The main advantage of this method is that it is assumed to contain no potential endogeneity. Nonetheless, we certainly consider alternative approaches, particularly the one based on cyclically-adjusted primary balance presented mostly in pioneering studies, to assess the robustness of our results (Giavazzi and Pagano, 1995; Alesina and Ardagna, 1998; Georgantas et al., 2023). After setting fiscal episodes, impulse response functions are estimated using vector autoregressive models or other methods with regards to literature review (Alesina et al., 2017; Beetsma et al., 2021).

Our sample consists of the current EU-27 member states and the United Kingdom, a former EU member state until 2020. Following Alesina et al. (2017), our baseline time span starts in 1981 and ends in 2019. This gives us a representative dataset with a sufficient number of countries known for fiscal consolidation in recent years and sufficient diversity in terms of exchange rate regimes (hard peg vs. free float).

Regarding "exogenous" fiscal adjustment plans, we benefit from data sources publicly available on the Bocconi IGIER website. Additionally, macroeconomic variables will be taken mainly from Eurostat Database and Refinitiv Datastream.

Outline The master's thesis would be divided into following parts:

1. Introduction
2. Literature Review
3. Methodology
4. Data
5. Results and Discussion
6. Further issues
7. Conclusion

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Author

Supervisor

Chapter 1

Introduction

> *“Within our mandate, the ECB is ready to do whatever it takes to preserve the euro. And believe me, it will be enough.”*
>
> – Mario Draghi, *European Central Bank*[1]

Public sector traditionally plays an important role in the European Union – the origin of welfare with fruitful social security systems (The EU is trying to become a welfare superstate 2021). Meanwhile, governments' budget deficits continue to spiral which has been further exacerbated by “black swans” such as COVID-19 pandemic and the Russian invasion of Ukraine with related energy crisis. Consequently, the EU public debt drastically increased to barely sustainable levels. Indeed, Italy, France, Spain among other countries reported debt-to-GDP ratio over 100%!

Furthermore, after a decade or so, inflation took off and flew at the level of 10%. Hence, ECB and other monetary authorities in the region had a little choice than to sharply raise interest rates to combat inflation “monster” (Arnold 2023). While the remarkable progress in restoring price stability has been already made, there is the other side of the coin full of fury and panic from overly indebted countries facing high borrowing costs (Kowalcze *et al.* 2023). In financial markets, government bond yields have risen and spreads widened (Rising bond yields are exposing fiscal fantasy in Europe 2023).

The current situation resembles the setup which took place during the European sovereign debt crisis, a local spin-off of the GFC, mostly in the 2010s. It demonstrated how precarious can common currency be for a variety of structurally different and asynchronous economies (Lane 2012). In the end, Greece

[1] For the verbatim of the remarks made by the “Super Mario” see Global Investment Conference 2012

and other troubled countries received life-saving bailouts under a condition of undertaking painful austerity measures.

Fortunately, Giavazzi & Pagano (1990) point out that fiscal consolidation does not have to lead to neither a sharp decline of output nor dramatic increase of unemployment thanks to the prevalence of the so called non-Keynesian effects. In fact, non-Keynesian effects are more associated with over-indebted countries.

The principle is relatively straightforward though assumes some degree of sophistication among economic agents. They are said to be aware of the debt burden and thus consider a risk of default into their decision-making (Giavazzi & Pagano 1995; Alesina & Perotti 1997). In other words, households hold extra savings instead of spending to be prepared for potential economic catastrophe. Analogically, businesses are resistant to invest into new risky project and rather stay in cash. In both cases, economic activity is frozen once concerns are triggered (Bertola & Drazen 1993; Sutherland 1997).

However, if government decides to go for austerity in a credible way and the size of the fiscal consolidation plan is sufficient to calm down financial markets, then economic agents can again feel free to consume and invest more. Therefore, fiscal consolidation can turn out to be expansionary in the end (Alesina *et al.* 1998a). Recently, several published papers delivered mixed or explicitly contrasting results suggesting that the debate is not over yet (Afonso *et al.* 2022; Guajardo *et al.* 2014; Yang *et al.* 2015). Moreover, that is not the worst scenario as fiscal consolidation can be even self-defeating (Attinasi & Metelli 2017; Georgantas *et al.* 2023).

Additionally, macroeconomic effects can be even more nuanced with regards to composition of austerity measures. The conventional wisdom that has been built up for years associates spending cuts with enhancing GDP growth while it typically sees recessionary pressures related to tax-based fiscal consolidation (Alesina & Ardagna 2010). In the last few years, some researchers, though, find exact opposite – namely that spending-based consolidations in advanced economies are rather self-defeating (Afonso *et al.* 2022; Georgantas *et al.* 2023).

Regarding empirical methods, we stick to the so-called narrative approach as our baseline methodology because it is assumed to be free of any potential endogeneity in the relation of interest (Romer & Romer 2010). For this purpose, we extend publicly available dataset originally used in Alesina *et al.* (2017) covering period 2015-2019 as it was already outdated (Georgantas *et al.* 2023).

Nevertheless, we also consider the alternative measure based on cyclically-

adjusted primary balance for robustness checks (Georgantas *et al.* 2023). Indeed, this methodological discrepancy needs special attention because the results might be driven by the choice of empirical methods (Guajardo *et al.* 2014). Last but not least, correct model specification is of interest, too (Jordà & Taylor 2016).

To ground a fiscal fantasyland in an over-indebted Europe (Governments are living in a fiscal fantasyland 2023), following hypotheses will be tested:

#1 There are signs of expansionary fiscal consolidation (incl. post-European sovereign debt crisis era)

#2 The composition of fiscal consolidation plays a significant role

#3 The exchange rate regime significantly impacts fiscal consolidation

The rest of the thesis is structured as follows: Chapter 2 provides an overview of the relevant literature. Chapter 3 explains the application of empirical methods. Chapter 4 describes the data. Chapter 5 presents and discusses the results. Chapter 6 concludes the thesis.

Chapter 2

Literature Review

2.1 Clash of opposing schools of economic thought

First economic thoughts can be traced back to the ancient era when Indian polymath and emperors' advisor Chanakya engraved Arthashastra manuscript to the wooden plate and when Greek philosophers Xenophon and Aristotle gave name to the "oeconomicus" while debating in the Lyceum (Waldauer *et al.* 1996; Xenophon 1968).

Nevertheless, the history becomes more relevant once we move forward to the 18th century when the Western Enlightenment laid foundations of modern economics. Until then, international trade was dominated by mercantilism, according to which countries should focus on export of goods to acquire as much gold as possible (Heckscher 1936). Indeed, a theory based more on protectionism implicitly assumed a zero-sum game.

On the contrary, Smith (1776) proposes a totally different approach based on free markets. Their underlying mechanism enables to bring one's consumption beyond one's production capacities. This is achieved by firms specialising in goods in which they have a comparative advantage over other producers. Although economic agents behave in pure self-interest, "invisible hand" ensures overall societal prosperity similarly to the beehive laws (Mandeville & Wood 1772).

Mainly, the so-called classicists oppose government intervention in most areas of the economy due to its lower efficiency (Barro 1991). Indeed, countries with higher share of government consumption in the aggregate demand are shown to exhibit lower growth (Barro 1979; 1991). Nevertheless, classicists acknowledge that governments are irreplaceable when it comes to public goods

and services such as defence and education. Teachings of the classical school of economic thought determined constants of economic business for roughly 150 years.

However, the Great Depression that hit the USA and the rest of the world in the late 1920s revealed drawbacks of the "laissez-faire" approach. It was a deadly cocktail of structural changes in real economy which moved towards durables with longer economic cycle, establishment of inflexible gold standard but, admittedly, also tragic misconduct of monetary policy (Bernanke 1995; Eichengreen 1992). Federal Reserve was worried of bubble in stock market so tightened monetary conditions. As a consequence, deflationary pressures arguably lead to mounting unemployment with regards to imperfect clearing in labour markets. The credit crunch and the meltdown in the banking system then grew into the biggest crisis in history (Bernanke 1983). Moving to the Europe, it was paradoxically government sector among few who "profited" during the contraction as the search for a new viable and more "secure" paradigm took place in cities from Berlin via Paris to London. The gauntlet has been thrown and it was Keynes (1936) who pick it up while giving rise to the new school of economic thought – Keynesianism. According to the paradigm, prices are not perfectly elastic but exhibit some degree of stickiness which holds also for wages, especially with regards to the so-called downward nominal wage rigidity. As a consequence, economy tends to deviate from the steady state which may under adverse conditions escalate into the crises similar to the Great Depression. Therefore, it is suggested that governments and central banks have an important role to play in stabilising the economy as fiscal and monetary policies have the potential to affect real variables in the short run (Keynes 1936; Fischer 1977). In case of weak private consumption and investment, government spending can thus stimulate aggregate demand and maintain economic growth balanced over the business cycle (Keynes 1936; Feldstein 1982).

Nonetheless, Keynesian economics somewhat disregards supply side of the economy which has proved to be a major weakness facing oil shocks in the 1970s (Barsky & Kilian 2004; Blanchard & Gali 2007). The disruptions of oil supplies from turbulent Middle-East to developed countries resulted in a very high inflation and mounting unemployment. Even more importantly, though the idea of balancing and offsetting business cycle sounds great, in practice governments show little motivation to run fiscal surpluses when economy is overheating.

Furthermore, neo-classicists rushed to deliver a witty rebuttal building on

the knowledge of Smith while adding new features. Noteworthy, Ricardian equivalence states that economic agents exhibit sophisticate insight into the inter-temporal nature of taxation. If governments do not raise taxes today – there must be a trade-off which will inevitably lead to higher taxes tomorrow (Barro 1974). Given households preference for consumption smoothing with regards to the permanent income hypothesis, this can have immediate effect on today's consumption (Friedman 1957). Indeed, very high levels of public debt connected with a risk of default should be implicitly considered in the current decision making of economic agents. However, there are counter-arguments that there is no such a "blind" fiscal stimulus that would not stimulate aggregate demand (Feldstein 1982; 1997).

More importantly, the more comprehensive theory block has been synthesized in the 1980s taking the "right" pieces from both competing schools of economic though while disregarding problematic points (Goodfriend & King 1997). It proposes that in the short-run, one can stick to the Keynesian economics, meanwhile, neo-classicists can be more trusted in the long-run. That means monetary and fiscal policy are said to have an impact on real variables in the short-run. However, in the long-run the nominal price and wage rigidity is no longer an issue and only technological changes shifting productivity can systematically increase output. A peaceful merger of economic thought into mainstream—"orthodox"—economic thought successfully prevailed so far (Blanchard 2000).

Nowadays, while central bankers around the world lament about how little we know about inflation, we will focus on the clash of opposing schools of economic thought within the framework of macroeconomic effects of fiscal policy in the following sections.

2.2 Idea of growing through austerity

The underlying mechanism behind the fiscal consolidations which turn out to be expansionary is the prevalence of the so-called non-Keynesian effects (Giavazzi & Pagano 1995; Alesina & Perotti 1997). As the name indicates, these contradicts the Keynesian framework and are rather in harmony with classical theories.

First of all, non-Keynesian effects are thought to be more associated with highly and overly indebted countries (Alesina *et al.* 1998a; Perotti 1996; Giavazzi & Pagano 1995). There are multiple plausible explanations why budget

balance tends to be "biased" to deficits that are accumulated into sizeable public debt. Contrary to the popular belief, the fluctuations over the business cycle cannot be held responsible as average length of "highly indebted period" is more than ten years (Rogoff & Sibert 1988; Reinhart *et al.* 2012; Persson & Svensson 1989; Alesina & Passalacqua 2016). Focusing on the political factors, fiscal illusion when voters do not fully understand the debt consequences can be taken into consideration (Alesina & Perotti 1995). Furthermore, given the nature of politics, it is shown that polarity between parties' interests and uncertainty about re-election provides incentives for those in office to push their programme priorities. Moreover, debt can be regarded as a strategic variable: the more subsequent coalition has to handle the debt burden, the less it can promote their own ideological interests (Alesina & Perotti 1995).

Last but not least, even institutional framework can play an important role. Majoritarian electoral system—generating usually strong governments with greater durability of the executives in office—is shown to result in lower deficit and debt levels (Alesina & Passalacqua 2016; Alesina & Paradisi 2017; Alesina & Perotti 1995). Noteworthy, temperate countries such as Italy tend to run fiscal consolidations in the spirit of "stop-and-go" policy which threatens the credibility of such announcements compared to Canada and other stable countries (Tarrow 1977; Alesina & Paradisi 2017).

Of course, setting thresholds on which levels of debt are moderate, potentially risky or are openly calling for debt restructuring seems to be purely arbitrary. However, one can argue that debt burden begins to be rather unsustainable at the moment when it is directly transmitted to the worsened macroeconomic performance. Reinhart & Rogoff (2010) show countries with public debt-to-GDP ratio above 90% exhibit lower GDP growth by more than 1% compared to their more fiscally responsible peers (Reinhart *et al.* 2012). Besides, 60% threshold set by SGP can also be regarded as a relevant benchmark.

In any case, this corresponds to the multiple large European economies; for instance Italy, France, and Spain which all reported public debt-to-GDP ratio over 100% in recent years. The public debt burden as recent as of 2023 is well illustrated in Figure A.1. Moreover, Europe will get under additional pressure induced by higher defence and "green" spending. The situation is further complicated by private debt loaded in European societies even though this is not of primary interest in this thesis. The same applies to the fact that the share of debt that is owned by foreign creditors increases which can be

regarded as additional risk factor (Reinhart *et al.* 2012).

The reason why debt matters is derived from wealth effects, demand side of the economy. In fact, it is argued that traditionally assumed linear relation between government expenditures and private consumption/output lacks clear microeconomic foundations when debt is hardly sustainable. Households and firms then must consider a risk premium that default is likely to occur within their lifetime which is normally assumed to happen in distant future (Alesina & Perotti 1995; 1997; Bertola & Drazen 1993; Sutherland 1997). In other words, as debt is financed by issuance of bonds, the situation seems to be sustainable as long as investors consider bonds to be part of net wealth with respect to expected tax liabilities in the future (Barro 1974; 1979).

Activating trigger points, households and firms prefer to hold excess cash and limit their non-necessary consumption and investment. If government decides to go for austerity in this setup, a risk of default decreases which calms down both investors in financial markets and domestic economic agents. First, the success of fiscal consolidation in terms of reducing debt-to-GDP ratio is given mainly by the persistence and size of the measures (Alesina & Perotti 1997). Second, the composition of such consolidation can crucially enhance its credibility and promote economic growth, i.e. what we call to be an expansionary fiscal consolidation. It is not only about whether the consolidation is tax- or spending- based. At least investors in financial markets ask themselves way more nuanced questions: Does government "only" postpone inevitable public infrastructure maintenance, or does it have position strong enough to introduce permanent and painful measures such as raising retirement age? If the latter holds, creditors might find consolidation plan more credible (Giavazzi & Pagano 1995; Alesina & Perotti 1997). To sum up, undertaking painful austerity today can imply lower taxes tomorrow which translates via expectation channel into higher private sector wealth. Given consumption smoothing over the course of a lifetime, households can stimulate overall demand immediately (Sutherland 1997; Alesina & Perotti 1995; 1997; Friedman 1957).

Moving to the supply side of the economy, changes in government wage expenditures in public sector can have some effect on the labour market supply but this is rather negligible at the aggregate level (Alesina & Perotti 1995). What is far more important, it is the labour market structure and a degree of unionization. In countries with sufficiently influential centralized unions, that is unions strong enough to negotiate adequate wage increases as a trade-off for approving fiscal effort, labour market can contribute to the overall wealth of the

employees and encourage spending. In fact, vast majority of EU member states would fit into this group in sharp contrast to fully competitive labour markets in the USA (Calmfors & Driffill 1988; Nickell 1997; Nickell & Layard 1988). Moreover, Alesina & Perotti (1995) calculate that 1% GDP worth austerity measures can result in higher wages by 2% GDP in unionized countries as they are able to coordinate. Nevertheless, if unions are dominant, this may result in loss of competitiveness due to surging unit labour costs.

To complete our theoretical overview, the non-Keynesian effects are symmetric, i.e. contractionary fiscal expansion—a reverse phenomenon to the expansionary fiscal consolidation—can materialize, too. In literature, Swedish experience of early 1990s is discussed as a good candidate (Giavazzi & Pagano 1995). In fact, public finance roller-coaster firstly reduced debt-to-GDP ratio from 47% to only 25% thanks to the austerity but it, then, dramatically climbed to 68% during fiscal expansion of the early 1990s. In addition, output contracted as Sweden experienced sharpest recession in its history, with traditionally strong manufacturing sector being hit extremely hard. As a consequence, thousands of firms went bankrupt and half a million of workers lost their jobs (Giavazzi & Pagano 1995).

Last but not least, fiscal consolidation can turn out be self-defeating, i.e. austerity measures aiming to reduce public debt end up with higher indebtedness than in the beginning which serves as a reminder that prevalence of non-Keynesian effects cannot be guaranteed (Attinasi & Metelli 2017; Georgantas *et al.* 2023).

2.3 What research has shown us so far

Expansionary fiscal consolidation firstly attracted attention when Denmark and Ireland undertook drastic austerity measures in the 1980s following period when many European countries accumulated high public debts due to high interest rate environment given consequences of oil shocks (Giavazzi & Pagano 1990; Barsky & Kilian 2004).

In Denmark, the government ran large fiscal deficits to boost economy due to looming recession fears. Nevertheless, the result was not as expected, unemployment and economy continued to worsen, while public debt-to-GDP ratio skyrocketed to 65% in the end of 1982 from just 29% in the beginning of 1980. Given real interest rate around 12%, debt sustainability began to be questioned, while one of the rating agencies suddenly added “credit watch” label

to its AAA rating (Giavazzi & Pagano 1990). At that time, new conservative coalition government has been formed that immediately announced significant austerity measures. Within four years, the economic conditions surprisingly resulted in higher economic growth: And even debt-to-GDP ratio started to decline. Besides, the cabinet run structural reforms in the direction of bigger market liberalisation. What is worth highlighting, the GDP grew 3.6% per annum during period 1983-1986 in spite of fiscal consolidation (Giavazzi & Pagano 1990).

Moving to the Ireland, we make clear what we refer to. In fact, the first stabilization policy actions—based mainly on tax hikes—taken in early 1980s did not succeed at lowering the public debt burden. The important role here might have played stock market and real asset prices which plunged and further induced deflationary and recessionary pressures. However, what is commonly considered "tale" in this case, it is the second Irish stabilization which began in 1987 when "the toughest austerity program the country had witnessed" was launched (Giavazzi & Pagano 1990). At that time, the composition of fiscal consolidation was based rather on cuts in public consumption and public investments. In the end, fiscal consolidation succeeded and turned out to be expansionary. Moreover, the public debt-to-GDP reverted and started to decline after a more than a decade (Giavazzi & Pagano 1990).

Researchers afterwards switched their attention to statistical analysis of larger samples, namely slightly varying sample of mostly rich countries (Alesina & Perotti 1995; Alesina *et al.* 1998a). Examining 19 OECD countries from 1960 to 1995, Alesina *et al.* (1998b) reveal only minor changes between ideologically left-wing and right-wing coalitions. Indeed, socialists may run loose fiscal policy more frequently but are also shown to rather stick to austerity measures when needed.

Noteworthy, it was warned that then highly indebted countries such as Belgium and Italy would need to run large fiscal surpluses—cca worth 6% of GDP—for circa a decade to comply with SGP on the eve of entry into EMU (Alesina *et al.* 1998b). In fact, currency union with a dozen of structurally various economies and fiscal policies kept in the hands of sovereigns was generally regarded as potentially fragile construct (Lane & Perotti 1996; 2003; Feldstein 1997).

Questions such as whether composition—tax hikes vs. spending cuts—, size and persistence of austerity measures play significant role arise (Alesina & Perotti 1997). Alesina & Ardagna (2010) studying panel of OECD countries from

1970 to 2007 point out that while size and persistence of austerity measures is crucial for success in terms of reducing public debt burden, it is the composition which may play a critical role whether the fiscal consolidation turns out to be expansionary in terms of enhancing output growth. Furthermore, nor have political factors—government prospects for re-election—been overlooked (Alesina *et al.* 1998b).

Furthermore, Romer & Romer (2010) introduce into the realm of fiscal policy the so-called narrative approach, which has previously been used to study the effects of monetary policy (Romer & Romer 2004; Bernanke *et al.* 2005). Romer & Romer (2010) return to in-depth analysis of few selected countries. Indeed, in this case, we're seeing more of a longitudinal study of the USA. Authors browse official legislative documents such as Presidential speeches and Congressional reports to collect narrative-based "exogeneous" tax changes from 1945 to 2007. They point out that previous methodology tends to underestimate negative effects of tax-based consolidation on growth. It is found that—in reaction to the exogeneous tax increase of 1%—output significantly declines and reaches a trough sized -3% GDP after 10 quarters/2.5 years (Romer & Romer 2010).

At the same time, a related stream of literature examines the effects of fiscal shocks using various identifications on a sample of European countries and delve into the realm of fiscal multipliers. While Caldara & Kamps (2008) deliver inconclusive findings regarding tax shocks, Auerbach & Gorodnichenko (2012) show that tax-based measures can have higher multiplier and therefore induce recessionary pressures more than expenditure-based austerities.

Next, Alesina & Ardagna (2013) focus on rather multi-year fiscal plans inspired to some extent by Mountford & Uhlig (2009) who allowed fiscal shocks to be correlated. It is argued that fiscal consolidation is usually multi-year process and suggests to allow for slight adjustment in given year if it is part of substantial long-term improvement. Nevertheless, the cyclical adjustment of primary balance is considered imperfect and to some extent arbitrary which serves as a motivation to construct a narrative dataset of more than 3500 fiscal measures for OECD countries (Alesina & Ardagna 2013; Alesina *et al.* 2015a).

Studying sample of 16 OECD countries from 1978-2014, Alesina *et al.* (2015a) find that tax-driven austerity significantly reduces GDP growth and is rather recessionary. On the contrary, expenditure-driven consolidations can turn out to be expansionary with reponse of business investment being key factor. The division into consumption&investment-based and transfer-based

austerities is shown to be rather an unnecessary exercise revealing only cosmetic changes in the response of private consumption while leaving aggregate response practically unchanged.

Recently, several papers have delivered contrasting findings. Georgantas *et al.* (2023) run analysis on a sample of 24 OECD countries from 1990 to 2019 and conclude that fiscal consolidation is contractionary delaying the reduction of the debt ratio with the exception of loose monetary conditions when there are signs of expansionary fiscal consolidation. More importantly, a couple of papers which focused on studying EU-15 member states has come to the inconclusive findings. While Afonso (2010) point out there might be some evidence in favour of expansionary fiscal consolidation, Attinasi & Metelli (2017) reveal that fiscal consolidation can be even self-defeating, i.e. leading to higher public debt-to-GDP ratio. The self-defeating thesis also applies to spending-based adjustments in recessions in OECD countries (Georgantas *et al.* 2023).

One of the very few studies which considered otherwise under-researched CEE countries find that expenditure driven consolidations tend to be more successful than tax-driven ones (Afonso *et al.* 2006). Moreover, it is suggested that already high levels of income taxation made it practically impossible to further increase tax burden in CEE countries (Afonso *et al.* 2006). Indeed, the nature and underlying mechanism in CEE and other not so highly developed countries may be totally different than in OECD, a club of mostly rich countries.

Fortunately, large sample analysis focusing on developing countries emerged in the last years. Woldu & Szakálné Kanó (2023) study 40 sub-Saharan African countries from 2000 to 2019 and find that fiscal consolidation reduces GDP growth and private demand. Next, real exchange rate reacts negatively to fiscal consolidation shock. Authors also reveal asymmetries with respect to the economic cycle and thus recommend to go for an expenditure-based consolidation during boom periods (Woldu & Szakálné Kanó 2023). Finally, Afonso *et al.* (2022) examined large sample of 174—from which 37 are advanced and 137 developing—economies from 1970 to 2018. They find that that tax increases in advanced economies can lead to occurrence of non-Keynesian effects which opposes most of the earlier implications (Alesina & Ardagna 2013; Alesina *et al.* 2017). On the contrary, higher government expenditures are associated with Keynesian effects – thus stimulating overall demand (Afonso *et al.* 2022). Crowding in effect on investment is documented, too (Afonso *et al.* 2022).

2.4 Questions that (still) need to be answered

As already mentioned, vast majority of papers focus on just slightly varying sub-samples of OECD countries. Of course, it is good to benefit from publicly available data as much as possible with respect to the narrative dataset of fiscal measures (Alesina *et al.* 2017). However, we need to be aware of structural differences among these mostly rich countries. Notably, Japan with its ageing population and extremely low inflation/interest rates for decades or the USA with their focus on market forces compared to their European peers may exhibit completely different patterns in terms of fiscal policy. Moreover, in Europe, mostly Western European countries are typically studied while CEE states are under-researched as pointed out by Cizkowicz *et al.* (2023). Indeed, the findings proposed by Afonso *et al.* (2006) illustrate remarkable differences between CEE and EU-15 countries.

Furthermore, the unique narrative dataset of more than 3500 fiscal measures used in Alesina *et al.* (2017) is already considered outdated as it ends in 2014 (Afonso *et al.* 2022; Georgantas *et al.* 2023). Additionally, it disregards Greece and some "smaller" EU member states. Logically, this is reflected in the limited ability to comprehensively study the effects of the European sovereign debt crisis that has shaken the "Old Continent" in the last decade. Admittedly, Alesina *et al.* (2015a) focuses on the specifics *how* the European sovereign debt crisis propagated rather than its macroeconomic effects. Besides, the Great Recession brought a change in terms of slower growth similarly to oil shocks in the 1970s (Alesina & Perotti 1997).

Next, most papers find tax-based consolidation to be more drastic – maybe more successful in reducing debt-to-GDP ratio but often offset by recessionary implications compared to spending-based consolidation (Alesina & Ardagna 2010; Alesina & Perotti 1997). However, this is worth of further examination particularly with regards to less developed countries as Woldu & Szakálné Kanó (2023) find exact opposite in Africa.

Mainly, the impacts of monetary policy—with emphasis on exchange rate regime—are not yet sufficiently covered. It is relatively well documented that loose monetary conditions in terms of low interest rate can enhance economic growth during fiscal belt-tightening (Georgantas *et al.* 2023). In fact, change in interest rate is said to be one of the vital mechanisms throw which fiscal consolidation—or debt in general—can affect decision-making of various economic agents. However, this can happen just if the monetary policy is kept

in the hands of the given country where currency devaluation is frequently shown to accompany credible austerity measures (Lambertini & Tavares 2005; Mundell 1960; 1961; Obstfeld 1981). Although Obstfeld (1981) associates floating exchange rate regime and currency devaluation with boosting export competitiveness in painful times of austerity, Alesina & Ardagna (2013) find no evidence for it. Totally different is situation under pegged currency: and the euro area here is a perfect example as it has to match the needs of such a diverse region – region where are—among others—Italy, Germany and Estonia. For example, it was discussed that euro may be too strong currency for some countries (Lane 2012; Lane & Perotti 2003; Lambertini & Tavares 2005; Mati & Thornton 2008). Noteworthy, Greece would definitely benefit from currency devaluation if that was easily achievable.

And even more importantly, majority of studies make use of conventional approach given the time-demanding narrative approach in terms of methodology. The cyclically adjusted primary balance is, however, an imperfect measure suffering from both measurement error and endogeneity. On the contrary, it is argued that narrative approach is more accurate as it is assumed to be free of any potential endogeneity in the examined relation (Alesina *et al.* 2017; 2019; 2015a; Romer & Romer 2010). However, proponents of CAPB say that it is commonly and widely used, sufficient or that even "exogeneous" plans can be expected by rational and sophisticate economic agents in advance (Jordà & Taylor 2016; Georgantas *et al.* 2023). Based on some comparisons, Guajardo *et al.* (2014) show that narrative approach and conventional measures tend to overlap in most cases but may differ dramatically in others with narrative being usually more accurate. Further, rebuttal by Yang *et al.* (2015) try to control primary balance for asset prices fluctuations which makes conventional approach more competitive in the field.

Last but not least, the econometric modelling evolves in time, too. As can be seen from the table below, many papers in the past relied on VARs models introduced by Sims (1980) which can be also applied to panel data (Holtz-Eakin *et al.* 1988). However, Jordà (2005) proposes alternative econometric modelling framework which has become gaining momentum recently (Jordà & Taylor 2016; Georgantas *et al.* 2023; Woldu & Szakálné Kanó 2023). Although differences between the methods themselves should not be a key driver of the results, the importance of correct model specification must be kept in mind. In fact, Jordà & Taylor (2016) reveal that early findings suggesting expansionary character of fiscal consolidation can be caused by lack of control variables in

the model.

We present a condensed summary of selected renowned papers in Table 2.1 ranked from the most cited study.

Table 2.1: Overview of selected renowned papers

Paper	**Approach**	**Definition**	**Countries**	**Period**	**Estimation**	**Finding(s)**
Blanchard & Perotti (2002)	structural	shock	USA	1947-1997	VARs	recessionary (-)
Romer & Romer (2010)	narrative	exogeneous	USA	1945-2007	VARs	recessionary (-)
Giavazzi & Pagano (1990)	case study	observed	Denmark & Ireland	1980s	descriptive	expansionary (+)
Alesina & Ardagna (2010)	conventional	1.5% of GDP	OECD, 21	1970-2007	comparative	mixed (±)
Alesina & Perotti (1997)	conventional	1.5% of GDP or 1.25% for two years	OECD, 20	1960-1994	comparative	mixed (±)
Alesina *et al.* (1998a)	conventional	2% of GDP or 1.5% for two years	OECD, 20	1960-1994	comparative	mixed (±)
Giavazzi & Pagano (1995)	conventional	3% of GDP or 2-3% for two-four years	OECD, 19	1970-1992	OLS	expansionary (+)
Alesina *et al.* (2015b)	narrative	exogeneous	OECD, 17	1978-2009	SUR	mixed (±)
Jordà & Taylor (2016)	conventional	1.5% of GDP	OECD, 21	1970-2007	LPs	mixed (±)
Guajardo *et al.* (2014)	conventional narrative	1.5% of GDP exogeneous	OECD, 17	1978-2009	OLS	mixed (±)
Alesina & Ardagna (2013)	conventional	2% of GDP in two or 3% in three years	OECD, 21	1970-2010	OLS	expansionary (+)
Ardagna (2004)	conventional	no threshold specified	OECD, 17	1975-2002	OLS	expansionary (+)
Afonso (2010)	conventional	1 or 1.5 st.d. of entire sample	EU, 15	1970-2005	OLS	expansionary (+)
Alesina *et al.* (2017)	narrative	exogeneous	OECD, 16	1978-2014	SUR	recessionary (-)
Yang *et al.* (2015)	conventional narrative	various criteria exogeneous	OECD, 20	1970-2009	OLS	recessionary (-)
Afonso *et al.* (2006)	conventional	average+2/3 st.d. of entire sample	EU, 25	1991-2003	logit	mixed (±)
Attinasi & Metelli (2017)	structural	shock	EA, 11	2000-2012	VARs	recessionary (-)
Beetsma *et al.* (2021)	narrative	announcements	EU, 13	1978-2013	VARs	recessionary (-)
Afonso *et al.* (2022)	conventional	0.5% of GDP for two years	37 advanced & 137 developing	1970-2018	OLS	recessionary (-)
Georgantas *et al.* (2023)	conventional	instrument	OECD, 24	1990-2019	LPs	recessionary (-)
Woldu & Szakálné Kanó (2023)	conventional	1.5% of GDP	Africa, 40	2000-2019	LPs	recessionary (-)

Chapter 3

Methodology

3.1 Conventional approach

To study macroeconomic effects of fiscal policy, it is crucial to first derive "fiscal impulse" variable. The so-called conventional approach based on changes in cyclically-adjusted primary balance (ΔCAPB) is commonly used measure in literature (Afonso 2010; Alesina & Perotti 1997; Georgantas *et al.* 2023).

The principle is as follows: fiscal policy could be trivially expressed in terms of budget balance. However, interests paid on debt accumulated in the past cannot be influenced by government in given year which motivates us to rather consider primary expenditures/balance which is net of paid interests as our starting point.

Next, changes in both general government revenues and general government primary expenditures are driven by two different factors: it may be caused by exogeneous policy decisions or automatic stabilizers such as progressive taxation and some social security perks. The former is given by purposeful actions of active fiscal policy which is of our interest in this thesis. However, we have to be aware that this is contaminated by the latter due to economic cycle.

Hence, we will cyclically adjust both general government primary expenditures and general government revenues to derive cyclically adjusted primary balance. In the literature, there are multiple ways how to do cyclical adjustment but, in most cases, the procedure relies on estimation of output gap which is far from straightforward as this variable cannot be observed. Following the elegant approach proposed by Blanchard (1990), we can consider unemployment rate as a proxy variable for output gap.

Therefore, cyclically adjusted primary expenditures can be derive as follows:

run regression of primary expenditures on time trend and unemployment rate as follows:

$$G_t = \alpha_0 + \alpha_1 Trend + \alpha_2 U_t + e_t \tag{3.1}$$

And then calculate what would be primary expenditures if the unemployment rate remained the same as in the previous year:

$$G_t^*(U_{t-1}) = \hat{\alpha_0} + \hat{\alpha_1} Trend + \hat{\alpha_2} U_{t-1} \tag{3.2}$$

The literally same procedure could be devoted to cyclical adjustment of general government revenues but it is argued that, moreover, capital gains taxes should be controlled for (Yang *et al.* 2015). Due to data availability, stock market index is usually considered as a proxy sufficiently representative of other assets in the economy including real estate.

Thus, we firstly regress revenues on time trend, unemployment rate and stock market returns as follows:

$$R_t = \alpha_0 + \alpha_1 Trend + \alpha_2 U_t + \alpha_3 AssetPrice_t + e_t \tag{3.3}$$

And in the next step, we calculate what would be revenues if the unemployment rate and stock market index returns remained the same as in the previous year:

$$R_t^*(U_{t-1}, AssetPrice_{t-1}) = \hat{\alpha_0} + \hat{\alpha_1} Trend + \hat{\alpha_2} U_{t-1} + \hat{\alpha_3} AssetPrice_{t-1} \tag{3.4}$$

Alternatively, following Alesina *et al.* (1998b) we consider two time trends as the Great Recession may constitute a structural break/shift with regards to lower growth as one of the robustness checks. In that case, two time trends instead of just one time trend are added into equations but the principle remains the same. One time trend is from 2004 to 2009, the second is from 2010 to 2019.

$$G_t = \alpha_0 + \alpha_1 Trend_{04-09} + \alpha_2 Trend_{10-19} + \alpha_3 U_t + e_t \tag{3.5}$$

$$G_t^*(U_{t-1}) = \hat{\alpha_0} + \hat{\alpha_1} Trend_{04-09} + \hat{\alpha_2} Trend_{10-19} + \alpha_3 U_{t-1} \tag{3.6}$$

$$R_t = \alpha_0 + \alpha_1 Trend_{04-09} + \alpha_2 Trend_{10-19} + \alpha_3 U_t + \alpha_4 AssetPrice_t + e_t \quad (3.7)$$

$$R_t^*(U_{t-1}, AssetPrice_{t-1}) = \hat{\alpha_0} + \hat{\alpha_1} Trend_{04-09} + \hat{\alpha_2} Trend_{10-19} + \hat{\alpha_3} U_{t-1} + \hat{\alpha_4} AssetPrice_{t-1} \quad (3.8)$$

Finally, in both cases, the change in the cyclical adjusted primary balance (ΔCAPB) can be derived by subtracting the actual revenue and expenditure in the previous year from the adjusted measure for a given year as follows:

$$\Delta CAPB = (R_t^* - R_{t-1}) - (G_t^* - G_{t-1}) \quad (3.9)$$

Next, fiscal consolidation periods are defined using some reasonable criteria. In this thesis, we consider two definitions:

1) Following Alesina & Ardagna (2013), the fiscal consolidation dummy is equal one if and only if: cumulative change in CAPB is at least 2% in two years and improving both year or at least 3% in three or more years with improvement in each year

2) Following Afonso *et al.* (2006), the fiscal consolidation dummy takes value one if and only if: change in CAPB is bigger than average + 2/3 standard deviation of all discretionary changes in the budget balance in the entire sample

Specifically, Afonso threshold is equal 3.92% with regards to one time trend; is equal 4.26% with regards to two time trends adjustment in our case.

These two types of thresholds are rather complementary for multiple reasons. Firstly, Afonso (2010) allows one year budget adjustment conversely to Alesina & Ardagna (2013) who emphasise multi-year austerity measures. However, the relative definition suggested by Afonso (2010) is more flexible in comparison to absolute terms set by Alesina & Ardagna (2013). Last but not least, Alesina & Ardagna (2013) thresholds were originally used to examine EU-15 countries while Afonso (2010) ones were chosen for analysing CEE-10 countries.

Mainly, "fiscal impulse" as derived by this approach is then the cyclically adjusted primary balance multiplied by consolidation dummy. Specifically, in

our case, we obtain in the end following four modifications: Alesina with 2 time trends, Alesina with 1 time trend, Afonso with 2 time trends, and Afonso with 1 time trend.

Last but not least, for the sake of testing hypothesis #2, we divide identified fiscal impulse into two sub-samples: tax- and expenditure- driven changes based on the dominant component.

$$(R_t^* - R_{t-1}) \lesseqgtr (G_t^* - G_{t-1}) \tag{3.10}$$

Hypothetically, in the case of a tie, such an observation would be included in both groups, but this situation did not occur in our sample.

Since the cyclically adjusted primary balance is an imperfect measure, we proceed to our preferred empirical method.

3.2 Narrative approach

The state-of-the-art methodology how to derive fiscal impulse variable is the so-called narrative approach introduced firstly by Romer & Romer (2010) as it is thought to be free of any potential endogeneity in the examined relation.

It is based on the researcher's effort to delve into the official government documents and other legislative sources to collect all the fiscal measures which have effect on budget balance. Specifically, we consider tax and expenditure innovations with projected impact on up to five year horizon. By that, we can create the so-called exogeneous fiscal plans which usually take form of multi-year fiscal consolidation (Alesina *et al.* 2015a; 2017).

Exogenous fiscal "plans" can be decomposed into three parts. Firstly, unexpected fiscal changes that materialize in the same year when they are announced. Secondly, fiscal changes announced in the past—no more than five years ago—of which impact realize in current year. Lastly, we cannot disregard fiscal changes that are announced in given year but will be implemented in subsequent years up to our maximum horizon of five years. Noteworthy, the underlying mechanism can be rigorously expressed as follows:

$$e_{i,t} = e_{i,t}^u + e_{i,t,0}^a + \sum_{j=1}^{horiz} e_{i,t,j}^a \tag{3.11}$$

$$e_{i,t,0}^a = e_{i,t-1,1}^a \tag{3.12}$$

Of course, the dataset structure makes it fully possible to sort the fiscal measures changes into adequate tax/expenditure categories such as consumption, investment, various types of transfers; or direct and indirect taxes.

$$e^u_{i,t} = \tau^u_{i,t} + g^u_{i,t} \tag{3.13}$$

$$e^a_{i,t,j} = \tau^a_{i,t,j} + g^a_{i,t,j} \tag{3.14}$$

$$\tau^a_{i,t,0} = \tau^a_{i,t-1,1} \tag{3.15}$$

$$g^a_{i,t,0} = g^a_{i,t-1,1} \tag{3.16}$$

Nonetheless, for the sake of testing hypothesis #2, we will distinguish only between tax- and expenditure- driven plans as follows:

$$\tau^u_t + \tau^u_{t,0} + \sum_{j=1}^{horiz} \tau^a_{t,j} \lesseqgtr g^u_t + g^u_{t,0} + \sum_{j=1}^{horiz} g^a_{t,j} \tag{3.17}$$

To recap, if the tax component is larger than the expenditure component in a given year, then the entire fiscal impulse is classified as tax-based plan and vice versa. In the case of equality, such an observation is included in both categories, which happens in the Netherlands in 2016.

Last but not least, the principle of constructing exogeneous fiscal plans is well illustrated in the following diagram using the example of Greek bailout trilogy in 2010-2015.

Table 3.1: Construction of exogeneous fiscal "plans"

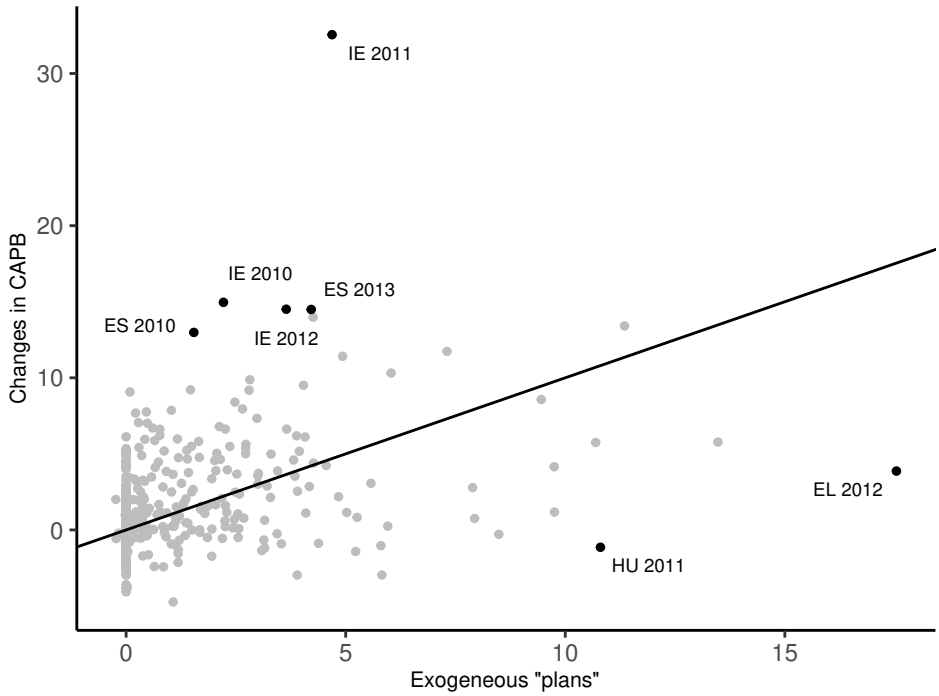
Year	e^u_t	$e^a_{t-1,t}$	$e^a_{t,t+1}$	$e^a_{t,t+2}$	$e^a_{t,t+3}$	$e^a_{t,t+4}$	$e^a_{t,t+5}$
2010	2.82	0	0	0	0	0	0
2011	0	0	2.67	2.67	2.67	2.67	0
2012	1.39	2.67	5.77	5.04	2.67	0	0
2013	0	5.77	5.04	2.67	0	0	0
2014	-0.40	5.04	2.67	0	0	0	0
2015	0.60	2.67	1.10	-0.10	-0.10	0	0

In the waves of stormy Mediterranean Sea during the EU sovereign debt crisis Greece "unexpectedly" started austerity measures in 2010 by a plan worth 2.82% GDP as stated in Table 3.1. As this proved to be grossly insufficient,

the government announced a package of austerity measures to be implemented in period 2012-2015 without giving more detailed information. Therefore, in line with Alesina *et al.* (2015b), we divide total load equally among all four years. In 2012, further measures worth in total 1.39% GDP were unexpectedly realized in the same year. Moreover, measures announced in 2011 for upcoming years were carry over to year 2012 with adequate part being materialized. Additionally, new measures to be implemented in 2013 and 2014 were announced in 2012 sized 3.1% GDP and 2.37% GDP, respectively. In 2013, we see that measures were just carried over from previous year with corresponding plan of 5.77% GDP to be implemented that year. The "carry over" principle continued in 2014 with the notable exception that year was even space for a cosmetic tax cuts worth -0.4% GDP that were unexpectedly materialized and thus somewhat compensated already announced measures worth 5.04% GDP from 2013. Finally, in 2015 some measures worth 0.6% GDP realized unexpectedly, others were carried over from 2014 and some were announced to be implemented in 2016. As the exceptional fiscal efforts began to pay off, the Sun rose over the Mediterranean Sea in harmony with the announced soft fiscal stimulus scheduled for years 2017 and 2018.

Graphical comparison of discussed approaches how to derive fiscal impulse variable is portraited in Figure 3.1. The corresponding scatter with regards to the composition is available in Figure A.2. We elaborate on extreme cases where the methodological discrepancy exceeds 10% as it is already a difference worth mentioning. As we have already described, Greece made a huge fiscal effort to stabilize public finances in period 2010-2015. However, in 2012 there were still no quantifiable signs that the situation is improving. The Hungarian case is to some extent similar as the country was notoriously known for large fiscal deficits in the 2000s. The problem further escalated during the GFC with budget balance recovering slowly despite government's creativity, including "voluntary proposal" to participate in de facto nationalisation of pension funds. Ireland—driven by financial sector—is arguably a complementary observation to the setup that took place in 2009 as nicely explained by Guajardo *et al.* (2014). In fact, it reveals that adjustment for stock market as suggested by Yang *et al.* (2015) cannot sufficiently control for really extreme movements in stock market. Last but not least, boom and bust in Spanish stock market is another indication for that. To sum up, we find evidence rather in favour of narrative approach based on exogeneous fiscal "plans" in most, if not all, commented examples.

Figure 3.1: Comparison of conventional and narrative approaches



Note: This figure compares size of fiscal impulse as derived by exogeneous fiscal "plans" and by conventional approach. Cyclical adjustment of primary balance is done with regards to one time trend for the simplicity reasons. The diagonal line represents ideal scenario in which both measures are equal. Highlighted are cases in which methodological discrepancy exceeds 10% GDP.

To be fair, even narrative approach faces criticism as at least some "exogeneous" fiscal plans can be expected by sophisticate economic agents in advance (Jordà & Taylor 2016; Guajardo *et al.* 2014). Nevertheless, for the sake of this thesis, we stick to the narrative approach as our primary approach.

3.3 Econometric modelling

Once we derive fiscal impulse variable, regardless of the chosen method, we can proceed to studying its effects on set of macroeconomic and financial variables.

To do so, we stick to the LPs introduced by (Jordà 2005) for the purpose of econometric modelling. In fact, macroeconometric modelling used to be dominated by VARs, which was widely used procedure for a long time (Sims 1980; Holtz-Eakin *et al.* 1988). However, LPs gain momentum in the last decade as documented in Table 2.1 as they are said to exhibit numerous advantages (Jordà 2005; Jordà & Taylor 2016; Georgantas *et al.* 2023). Noteworthy, this kind of direct forecasting modelling technique is less prone to model misspecification. Moreover, within the single equation framework, they can be easily applied to our panel data. On the contrary, VARs rely on iterative approach

while running sequence of forecasts which may accumulate error in case of model misspecification. Nevertheless, it is believed that under correct specification VARs may be more efficient than LPs, similarly as OLS vs IV. Some point out that both approaches actually estimate the same impulse response functions if we relax the assumptions related to lag structures in the VARs (Plagborg-Møller & Wolf 2021).

Following Jordà (2005), the impulse response functions can be defined as the difference between scenario with intervention and scenario without intervention, similarly to the difference-in-differences setup in cross-sectional data.

$$IR(t, s, \mathbf{d_i}) = E(\mathbf{y_{t+s}}|\mathbf{v_t} = \mathbf{d_i}; \mathbf{X_t}) - E(\mathbf{y_{t+s}}|\mathbf{v_t} = \mathbf{0}; \mathbf{X_t}) \tag{3.18}$$

where $E(.|.)$ denotes the best, mean squared error predictor; $\mathbf{y_t}$ is an $n \times 1$ random vector; $\mathbf{X_t} \equiv (\mathbf{y_{t-1}} + \mathbf{y_{t-2}} + ...)'$; $\mathbf{0}$ is of dimension $n \times 1$; $\mathbf{v_t}$ is the $n \times 1$ vector of reduced-form disturbances; and $\mathbf{D}$ is an $n \times n$ matrix, whose columns $\mathbf{d_i}$ contain the relevant experimental shocks (Jordà 2005). Specifically, in our case, these are fiscal consolidations shocks.

To calculate the state of the y_t variable in a given year, we project it on the vector of matrices contained in $\mathbf{X_t}$ repeating for each forecast horizon to obtain a collection of local projections in line with direct forecasting models (Jordà 2005).

$$\mathbf{y_{t+s}} = \alpha^{\mathbf{s}} + \mathbf{B_1^{s+1}}\mathbf{y_{t-1}} + \mathbf{B_2^{s+1}}\mathbf{y_{t-2}} + ... + \mathbf{B_p^{s+1}}\mathbf{y_{t-p}} + \mathbf{u_{t+s}^s} \tag{3.19}$$

$s = 0, 1, 2, ..., h$

where $\alpha^{\mathbf{s}}$ is an $n \times 1$ vector of constants, and the $\mathbf{B_i^{s+1}}$ are matrices of coefficients for each lag i and horizon $s + 1$.

Finally, we gather impulse response functions following Equation 3.18 & Equation 3.19 given the projections where the intervention did took or did not took place (Jordà 2005).

$$\hat{IR}(t, s, \mathbf{d_i}) = \hat{\mathbf{B_1^s}}\mathbf{d_i} \tag{3.20}$$

$s = 0, 1, 2, ..., h$

with the normalization $\mathbf{B_1^0} = \mathbb{I}$.

Moreover, we will include a vector of regressors to control for the natural development in the economy which cannot be ascribed to the purposeful fiscal

policy decisions. Specifically, we consider one lag of these variables: GDP growth, inflation, short-term interest rate and public debt-to-GDP ratio. The only exception here are some responses for inflation which are retrieved while omitting its lagged version in the regression. Last but not least, we will display responses with a 68% confidence band of one standard deviation in the following sections.

Chapter 4

Data

4.1 Dataset

In this thesis, we study EU-28 countries from 2004 to 2019 using annual data. That means we include also country-years when Romania, Bulgaria, and Croatia were just on the way to the European Union, the same holds for United Kingdom after the Brexit referendum.

We have two types of data – first of which can be named as the narrative dataset where we collect individual fiscal measures and project their effects on the countries in given years; the second set is made up of various macroeconomic and financial variables.

Our narrative dataset, indeed, consists of three separate though compatible datasets of narrative fiscal measures that we merge into one final dataset for the sake of this thesis. Firstly, we consider a publicly available dataset which was originally used in Alesina *et al.* (2017) to study 16 OECD countries from 1978 to 2014. Nonetheless, we actively use 2192 out of 3434 fiscal measures thanks to the solid overlap with our country-years.

Secondly, we consider publicly available dataset from Cizkowicz *et al.* (2023) which focus on under-researched CEE countries and collect fiscal measures for 11 new EU member states. The authors declare consistency with the dataset by Alesina *et al.* (2017) in terms of methodology. Hence, we make use of all 1915 gathered fiscal measures.

Mainly, we update the already outdated dataset of Alesina *et al.* (2017) by additional 2037 new fiscal measures for period 2015-2019. Indeed, we also cover Greece and bunch of "smaller" EU countries which were disregarded so far to

complete our narrative dataset. Noteworthy, we allow fiscal measures collected by Alesina *et al.* (2017) to spill over into years starting 2015.

The construction of such a narrative dataset can be briefly described as follows. The fiscal measures are INPUTTED in billion of national currency. For euro area countries, previous nation-specific currencies are considered when needed. Next, we RESCALE projected effects by gross domestic product of previous year. After that, the measures are STRUCTURED into country-years and multiplied by consolidation dummy in the FINAL step.

Admittedly, there are some missing fiscal data. In the Cizkowicz *et al.* (2023) dataset, Romania and Bulgaria data are not gathered until 2007 when these countries joined European Union. In addition, we have not been able to retrieve the 2016 Stability Programme for Germany or the Netherlands on the European Commission's website or on the websites of the national ministries. Besides, fiscal measures with no estimated budget impact had to be disregarded. When the overall impact was not specified, we distribute it proportionally into given years.

Furthermore, while we and Cizkowicz *et al.* (2023) rely exclusively on these Convergence and Stability Programmes, Alesina *et al.* (2017) consider various legislative document sources which induces a degree of inconsistency. Last but not least, it would be naïve to assume that we have collected all fiscal measures so our narrative dataset suffers from—hopefully small—measurement error.

As we can see in Table 4.1, all EU-28 countries have pursued fiscal consolidation for at least three years since EU enlargement in 2004. The leaders are Southern European countries such as Greece, Italy, Spain with more than ten years of fiscal adjustments. Moreover, Ireland and Cyprus also undertook remarkable austerities even though here it was more connected to the developments in the banking and financial sector.

However, Hungary with its average size of measures worth 6.1% nicely demonstrates the consequences of snow-ball effect: Persistently high deficits were, suddenly, flared up by GFC in 2009 and it required a really significant adjustment to stabilise the situation. In any case, they are different strategies how to run fiscal consolidation which is well reported in Table 4.2. While Germany, France, and Luxembourg usually rely on spending cuts and even tend to cosmetically decrease taxation to boost growth, Estonia does the exact opposite. Noteworthy, Italy leans towards tax hikes as well. Standard length of the fiscal adjustment is roughly 3-4 years.

The corresponding descriptive statistics by year are available in the Ta-

Table 4.1: Size and length (horizon) of exogeneous fiscal "plans" by country

Country	**Number of exogeneous "plans"**	**Average annual size of all measures**	**Average annual size – tax component**	**Average annual size – spending component**	**Average horizon (years) of fiscal consolidation**
Belgium	7	1.38	0.49	0.89	7.00
Bulgaria	6	1.01	0.77	0.24	6.00
Czechia	4	0.72	0.37	0.34	1.00
Denmark	7	1.30	0.58	0.71	3.50
Germany	7	0.52	-0.01	0.52	3.50
Estonia	7	2.32	2.51	-0.18	3.50
Ireland	7	3.29	1.30	1.98	7.00
Greece	13	5.43	2.48	2.94	6.50
Spain	11	1.94	0.96	0.98	11.00
France	8	2.11	-0.13	2.25	8.00
Croatia	7	1.51	0.61	0.89	3.50
Italy	13	1.69	1.14	0.55	4.33
Cyprus	12	3.39	2.29	1.10	3.00
Latvia	6	1.87	0.84	1.02	3.00
Lithuania	3	0.71	0.33	0.38	3.00
Luxembourg	7	1.53	-0.26	1.79	3.50
Hungary	7	6.10	1.09	5.01	3.50
Malta	12	0.85	0.51	0.33	4.00
Netherlands	8	1.48	0.62	0.86	4.00
Austria	7	1.29	0.29	1.00	3.50
Poland	10	2.48	0.96	1.51	2.50
Portugal	10	3.84	1.49	2.34	3.33
Romania	7	1.17	0.67	0.50	3.50
Slovenia	10	2.78	0.30	2.48	3.33
Slovakia	8	0.88	0.28	0.60	2.66
Finland	9	1.13	0.66	0.47	9.00
Sweden	3	0.10	0.84	-0.73	3.00
United Kingdom	9	1.87	0.69	1.18	9.00

Table 4.2: Composition of exogeneous fiscal "plans" by country

Country	**Tax-based**	**Spending-based**	**Equal**	**Total**
Belgium	3	4	0	7
Bulgaria	5	1	0	6
Czechia	3	1	0	4
Denmark	4	3	0	7
Germany	1	6	0	7
Estonia	7	0	0	7
Ireland	1	6	0	7
Greece	8	5	0	13
Spain	6	5	0	11
France	1	7	0	8
Croatia	2	5	0	7
Italy	9	4	0	13
Cyprus	7	5	0	12
Latvia	3	3	0	6
Lithuania	2	1	0	3
Luxembourg	0	7	0	7
Hungary	2	5	0	7
Malta	6	6	0	12
Netherlands	1	6	1	8
Austria	1	6	0	7
Poland	5	5	0	10
Portugal	3	7	0	10
Romania	4	3	0	7
Slovenia	1	9	0	10
Slovakia	4	4	0	8
Finland	7	2	0	9
Sweden	3	0	0	3
United Kingdom	2	7	0	9

ble A.2 & Table A.3. Fiscal consolidation reaches first peak in the period 2005-2007 with regards to structural and convergence changes. This was achieved typically sticking to the spending cuts, particularly in new EU member states. Mainly, GFC resulted in a wave of austerities literally around the whole region. In 2011-2012, more than twenty countries undertook painful fiscal adjustments with average size of measures above 3% GDP in both years. Noteworthy, we observe that the composition changes in time as more adjustments rely on tax hikes after 2010.

Moving to the set of macroeconomic variables, these are taken mainly from Eurostat which is the official data source of the European Union. Due to data availability issues, we consult Office for National Statistics, U.K. statistical bureau, for some British observations.

The yield on Estonia's ten-year bond is missing because the government issued it in June 2020. Moreover, we do not gather bond yield for both Romania and Croatia in year 2004. The short-term interest rate is actually compiled from a number of tables published in Eurostat with missing observations for Bulgaria 2018-2019.

In addition, we collect general government revenues, expenditures and interests paid as a percentage of GDP for the procedure described in detail in Section 3.1. Last but not least, benchmark stock market indices used for cyclical adjustment of primary balance are then retrieved from Eikon Refinitiv. Their overview can be found in Table A.1.

4.2 Data processing

Macroeconomic and financial variables are processed/transformed as follows:

1. Real GDP growth is defined as

$$dy_{i,t} = 100log(\frac{y_{i,t}}{y_{i,t-1}}) \tag{4.1}$$

where $y_{i,t}$ is the real GDP at time t

2. Consumption growth is defined as

$$dcons_{i,t} = 100log(\frac{cons_{i,t}}{cons_{i,t-1}}) \tag{4.2}$$

where $cons_{i,t}$ is the private consumption at time t

3. Investment growth is defined as

$$dgcf_{i,t} = 100log(\frac{gcf_{i,t}}{gcf_{i,t-1}}) \tag{4.3}$$

where $gfc_{i,t}$ is the gross fixed capital formation at time t

4. Short-term interest rate (three-month) is kept in levels % as it is

5. Unemployment rate among 15-74 years old as a share of the labour force is kept in levels % as it is

6. Inflation is defined as

$$dhicp_{i,t} = 100log(\frac{hicp_{i,t}}{hicp_{i,t-1}}) \tag{4.4}$$

where $hicp_{i,t}$ is the EU-harmonised index of consumer prices at time t

7. General government debt ratio is kept in levels as a share of GDP

8. Government bond yield (ten-year) is kept in levels % as it is

9. Export growth is defined as

$$dexp_{i,t} = 100log(\frac{exp_{i,t}}{exp_{i,t-1}}) \tag{4.5}$$

where $exp_{i,t}$ is the export at time t

10. Import growth is defined as:

$$dimp_{i,t} = 100log(\frac{imp_{i,t}}{imp_{i,t-1}}) \tag{4.6}$$

where $imp_{i,t}$ is the import at time t

11. Government consumption growth is defined as:

$$dgc_{i,t} = 100log(\frac{gc_{i,t}}{gc_{i,t-1}}) \tag{4.7}$$

where $gc_{i,t}$ is the government consumption at time t

12. Change in nominal effective exchange rate is defined as

$$dneer_{i,t} = 100log(\frac{neer_{i,t}}{neer_{i,t-1}}) \tag{4.8}$$

where $neer_{i,t}$ is the nominal effective exchange rate at time t

Noteworthy, descriptive statistics of macroeconomic and financial variables is provided in Table 4.3. We briefly mention some important findings. Note-

worthy, EU-28 from 2004-2019 exhibit solid equally-weighted GDP growth of 4.46%. Investment is shown to have bigger standard deviation/volatility compared to private consumption and remaining output components.

Table 4.3: Descriptive statistics of macroeconomic and financial variables

Variable	**Mean**	**Std. d.**	**Med.**	**Min**	**Max**	**ADF test**
Output growth	4.46	5.23	4.13	-25.53	29.86	494.77***
Consumption growth	4.01	4.67	3.68	-20.75	26.71	602.08***
Investment growth	4.19	12.51	4.67	-61.55	73.24	357.47***
Interest rate	2.04	2.55	1.22	-0.50	19.14	0.99
Unemployment rate	8.61	4.26	7.60	2.0	27.50	195.65***
Inflation rate	2.10	1.97	1.91	-1.72	14.19	197.27***
Public debt ratio	59.94	34.88	54.00	3.80	186.40	140.18***
Bond yield	3.62	2.40	3.78	-0.25	22.50	—
Export growth	6.80	8.55	6.747	-30.08	40.18	1180.5***
Import growth	6.26	10.01	7.080	-45.09	36.49	1560.2***
Gov. cons. growth	4.28	5.24	3.936	-28.98	30.06	212.98***
Nom. eff. exch. rate	-0.11	2.71	0.00	-20.84	11.90	1522.7***

Note: ADF test is the inverse chi-squared test proposed by Maddala and Wu (1999).

Inflation hovers around 2% target in the long-term though there are relatively high differences between countries and in time. What is interesting, EU equally-weighted meets its public debt threshold of 60% GDP even though this finding is contaminated by extreme observations such as Estonia with minimum in 2007 of 3.8% GDP or notoriously known case of Greece with maximum in 2018 sized of tremendous 186.4% GDP.

For the sake of testing the hypothesis #3, we need to divide observations into two sub-samples based on exchange rate regime. This seems like an easy task but, as Reinhart & Rogoff (2004) point out, de iure classification frequently differ from de facto behaviour. In the end, we classify Czechia 2004-2019, Croatia 2004-2019, Poland 2004-2019, United Kingdom 2004-2019, Sweden 2004-2019, Romania 2004-2019, Slovakia 2004, and Hungary 2009-2019 as floating exchange rate regime. Further, Slovakia 2005, Hungary 2008, and Slovenia 2004 are included in both groups as the exchange rate regime switched in that year. The rest of the observations is then classified as pegged exchange rate regime.

Of course, the Croatian kuna was heavily managed and Czechia ran exchange rate floor for several years. The Bulgarian lev, on the other hand, was

pegged to the euro without being officially included in ERM II, and the Maltese lira, for example, was pegged to a currency basket.

Chapter 5

Results and Discussion

5.1 Over-indebted Europe

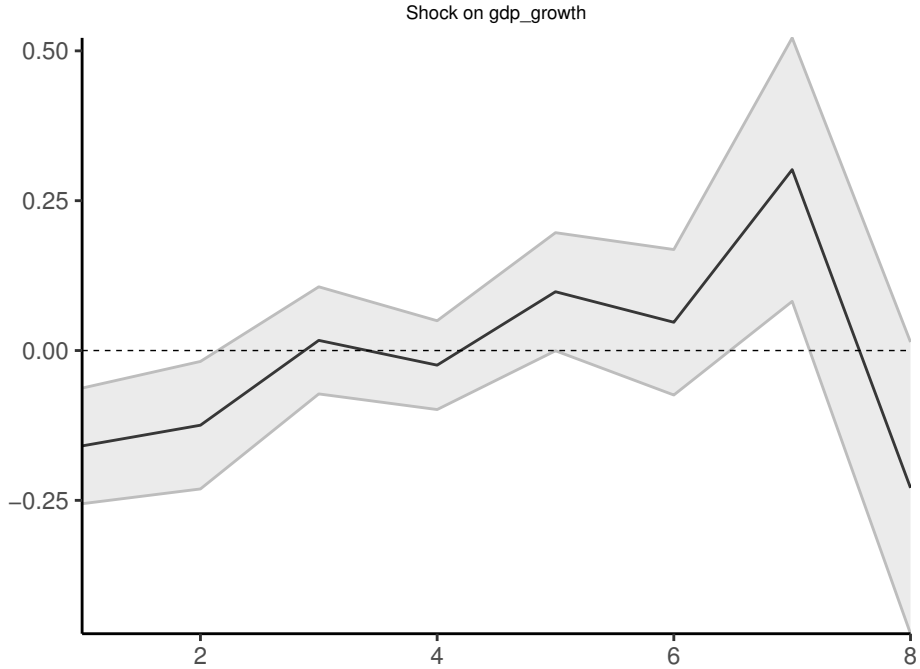
Moving to the results, we firstly examine whether there are signs of expansionary fiscal consolidation in our sample of EU-28 countries from 2004 to 2019 using annual data. Therefore, we also show if pioneering findings on the topic hold including post-European sovereign debt crisis era. As we present first set of results, we will comment on the most important features related to impulse response functions on the first chart.

Response of output and its components

In Figure 5.1, we can see the impulse response function of GDP growth to fiscal consolidations shock as derived by narrative approach.

On x-axis, there is an eight-year long horizon with the convention proposed by Jordà (2005) that first year/horizon on x-axis is the year of shock. In any case, it is roughly a length of business cycle. On y-axis, there is a cumulative change in the given macroeconomic variable caused by the shock, i.e. what is the difference between scenario with initial shock and scenario without such shock. The shock is sized to be 1% GDP. Specifically, GDP growth is shown to moderately decline in the year of shock which is in line with the ongoing turmoil in the economy. After that, GDP growth slightly but persistently climbs to reach peak after seven years when the cumulative effect is expansionary worth 0.3% compared to scenario without fiscal consolidations shock. The plunge in the last year of our eight-year horizon can be explained rather by the data issues than that would be authentic behaviour in reaction to fiscal consolidations shock. Indeed, we argue that consolidations which begin early in our dataset,

Figure 5.1: Over-indebted Europe: Impulse response function of GDP growth, narrative approach, with control variables



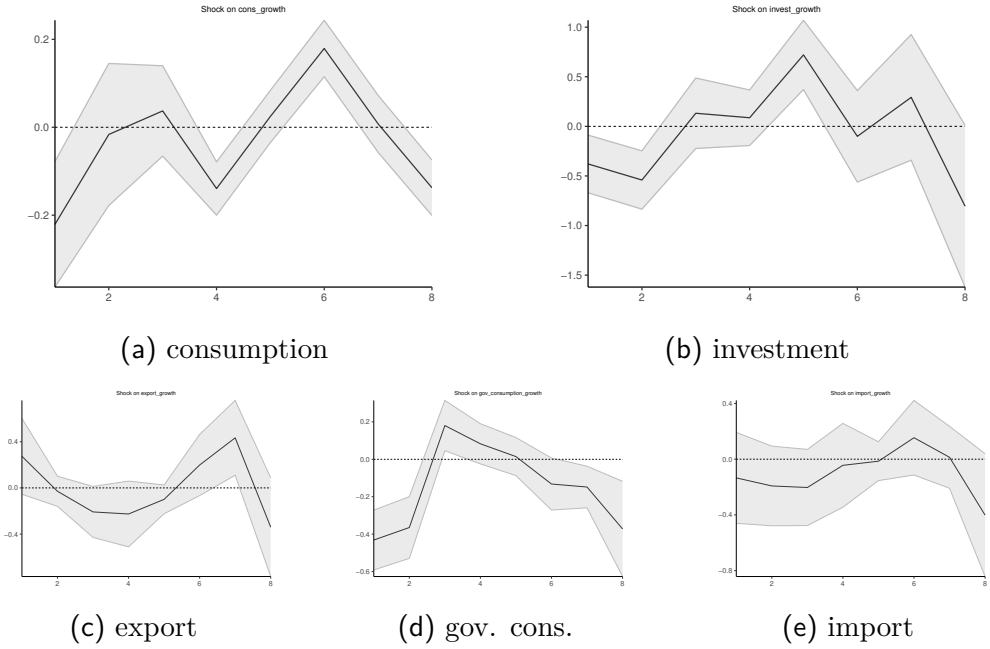
Note: The figure depicts the cumulative impulse response function to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Horizons are years with the convention the shock occurs in year 1.

roughly between 2004-2006, are then contaminated by the austerities that took place during the GFC. Alternatively, the responses from consolidations in 2013 are then simply prematurely ended in 2019 after only seven years. In fact, these crucial issues underline the importance of correct interpretation of derived results. Once we understand the basic principles behind the IRFs, we can proceed to the overall findings.

As already mentioned, there is some evidence that fiscal consolidation turns out to be expansionary in the end. Additionally, these findings are relatively supported by conventional approach even though they would not rule out neutral response at the end of our horizon. Noteworthy, not all components of the aggregate follow the same path. In fact, we find that private investment is remarkably more volatile component and reacts more strongly to the shock than private consumption. While cumulative change in consumption peaks sixth year at a level of 0.2% GDP, private investment attacks 0.7% GDP in the fifth year. Noteworthy, conventional approach sees private investment to collapse after that.

However, our results would be very different if we would not included con-

Figure 5.2: Over-indebted Europe: Responses of output components, narrative approach, with control variables



(a) consumption (b) investment

(c) export (d) gov. cons. (e) import

Note: The figure depicts the cumulative responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Horizons are years with the convention the shock occurs in year 1.

trol variables into our model specification. In that case, the fiscal consolidation would be suggested to enhance output growth by solid 0.75% GDP with, again, investment reacting more strongly with its 2% GDP. The conventional approach with no control variables would overshoot even more to derive growth worth 1.5% GDP. Indeed, this motivates us to comment more on the importance of correct model specification. While Alesina & Ardagna (2013) provide compelling evidence for expansionary hypothesis, Guajardo *et al.* (2014) find no such signs controlling for natural development in the economy. In fact, Jordà & Taylor (2016) nicely document that previous findings by Alesina & Ardagna (2013) can be caused by model misspecification and omitting control variables.

The IRFs for narrative approach without control variables can be found in Figure A.3. The conventional approach with controls is provided in Figure A.4 & Figure A.5; specification without controls is then presented in Figure A.6 & Figure A.7.

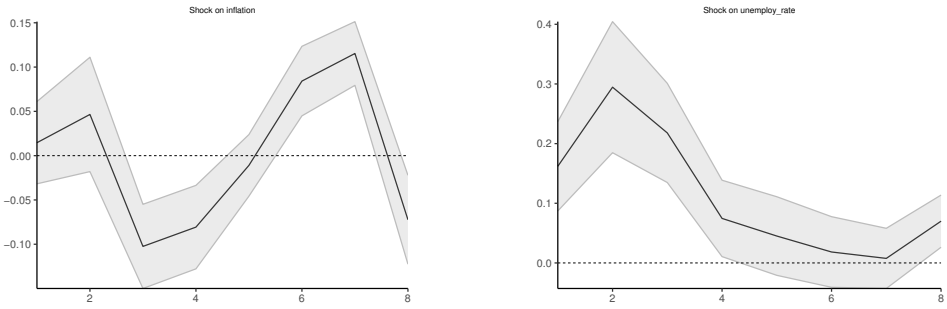
Responses of inflation and unemployment rates

Moving to the inflation, it exhibits characteristic pattern during the course of our horizon. Initially, as the fiscal stimulus is not further provided, there are

minor deflationary pressures. Later, as the economic agents begin to spend and invest more, inflation rebounds which is driven exactly by a stronger demand and at least modest manifestation of non-Keynesian effects. After seven years, we observe inflation higher by 0.1% compared to no-shock scenario.

Furthermore, it is shown that unemployment rate continues to surge for another circa two years after the beginning of fiscal consolidation but, afterwards, it reverts and hopefully plunges. Narrative approach sees muted cumulative change at the end of the horizon. Nevertheless, conventional approach reveal that the cumulative change at the end of horizon can be even actual decrease worth roughly -0.2%. If we would not included control variables, the findings would be again even more favourable as the unemployment rate would be shown to decline after it reverts to -0.6% lower compared to no-shock scenario; conventional would arguably overestimate the decline with -1%.

Figure 5.3: Over-indebted Europe: Responses of inflation and unemployment, narrative approach, with control variables



(a) inflation (b) unemployment

Note: The figure depicts the cumulative responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Horizons are years with the convention the shock occurs in year 1.

In any case, this is a very important observation that points to a possible reason why governments are postponing austerity measures. It is crucial to bear in mind that after a couple of really challenging years, the reward—sharp decline in unemployment rate—will probably follow. Hence, it is the role of policy makers to inform and explain these consequences to the public which may then find the austerity measures more reliable and credible without deteriorating government's re-election prospects.

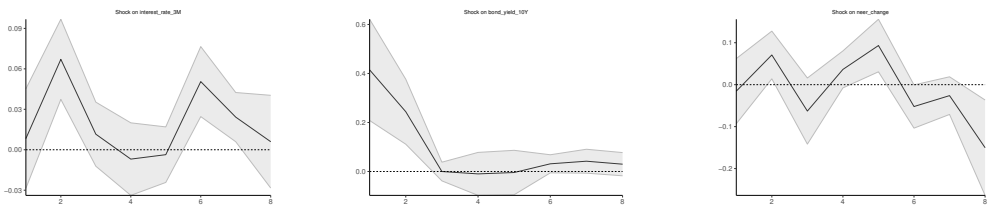
Responses of interest and exchange rates

Short-term interest rate continues to raise for the first two years of fiscal consolidation. This is not surprising as adjustments are usually applied in crisis

when the credibility is earned gradually in time. Mainly, we observe decline after these initial two years which can help turn fiscal consolidation to be expansionary. Nevertheless, after five or six years, we observe interest rate raises which maybe caused by inflationary pressures which occurs at the same time. Regarding conventional approach, it sees short-term interest rate to slightly but confidently decrease along our whole horizon. It is worth up to -0.05%. Not including control variables would, however, suggest raise of 0.2% after immediate small decrease which follows in reaction to fiscal consolidation announcement.

Higher bond yield in the year of shock highlights how complicated and utterly adverse the recent developments may be in some cases of fiscal adjustment. In any case, the potential debt burden relief directly translates into bond market. Once the creditors find the fiscal consolidation credible, government bond yield remarkably plummets for three years after the announcement. This effect is, moreover, highly persistent for the rest of our horizon. However, our models provide mixed evidence if that means actual decrease compared to no-shock scenario or if it is just a tie. Anyway, the conventional approach would vote for a actual decrease sized less than -0.1%. Besides, there is a stream of literature which examines immediate effects of announcement on bond market (David *et al.* 2022). Hence, we point out it is not only about the credibility of the announcement itself but mainly about how the fiscal consolidation is really done throughout the years.

Figure 5.4: Over-indebted Europe: Responses of interest and exchange rates, narrative approach, with control variables



(a) interest rate (b) bond yield (c) exchange rate

Note: The figure depicts the cumulative responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Horizons are years with the convention the shock occurs in year 1.

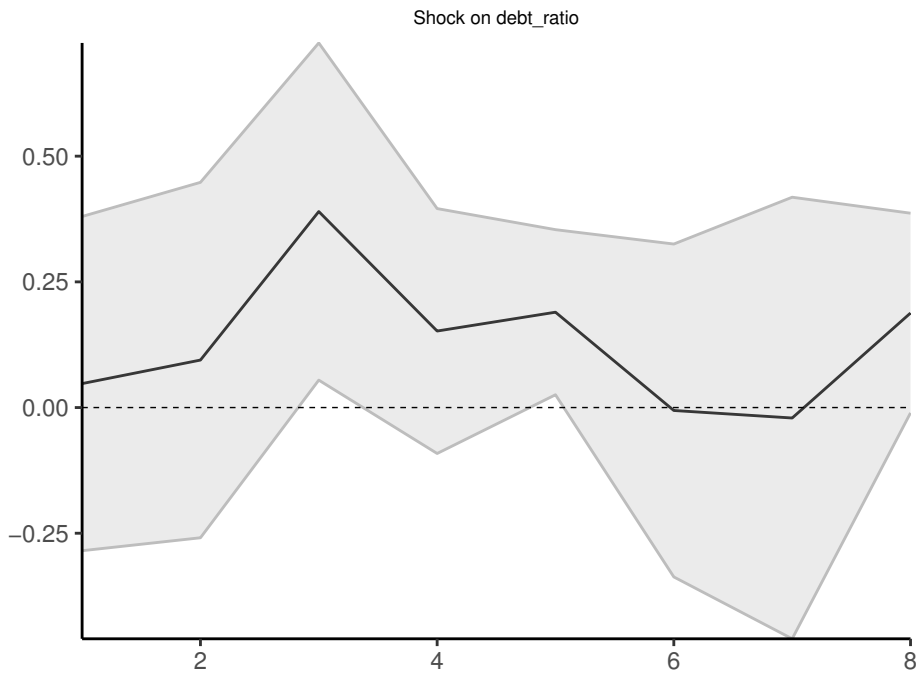
The response of nominal effective exchange rate is virtually muted which is not surprising given that majority of observations is in euro area or with other forms of pegged exchange rate regime. In detail, we show that fiscal consolidation is accompanied by currency appreciation shortly after it begins but limited success/expansionary character could be held accountable for the

weakening currency after that. Moreover, model without control variables sees currency depreciation along the horizon which is in harmony with over-indebted countries and related lower growth prospects.

Response of public debt ratio

Mainly, our findings concerning success of fiscal consolidation in terms of reducing public debt-to-GDP ratio are rather mixed. The public debt burden continues to increase in the year of fiscal consolidations shock in line with the adverse development. Moreover, due to low persistence of austerity measures as the government consumption makes an effort to recover prematurely, the debt surges in the third year. However, the expansionary nature of fiscal consolidation then erases most of the losses. In the end, the debt ratio remains practically unchanged. Nevertheless, with regards to the relatively wide confidence bands/uncertainty, we cannot rule out some success in reducing debt burden.

Figure 5.5: Over-indebted Europe: Impulse response function of public debt ratio, narrative approach, with control variables



Note: The figure depicts the cumulative impulse response function to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Horizons are years with the convention the shock occurs in year 1.

In fact, conventional approach reveals that fiscal consolidation turns out to be expansionary if we account for the deficit in the year of shock. Noteworthy,

model without controls would suggest that the fiscal consolidation is not clearly self-defeating as the debt-to-GDP is significantly reduced by almost 3% GDP which resembles Alesina & Ardagna (2013) conclusions.

Let us recall that the IRFs for narrative approach without control variables can be found in Figure A.3. The conventional approach with controls is provided in Figure A.4 & Figure A.5; specification without controls is then presented in Figure A.6 & Figure A.7.

Discussion #1

First of all, we document that fiscal consolidation can turn out to be expansionary on a sample of EU-28 from 2004 to 2019. Moreover, we agree that conventional approach can be considered as an alternative to a narrative approach. However, in line with Guajardo *et al.* (2014) we point out that some key phenomena can be detected only sticking to the state-of-the-art narrative approach. The correct model specification seems to be even more important (Jordà & Taylor 2016). Not including control variables, particularly when choosing conventional approach, leads to disproportionately expansionary findings.

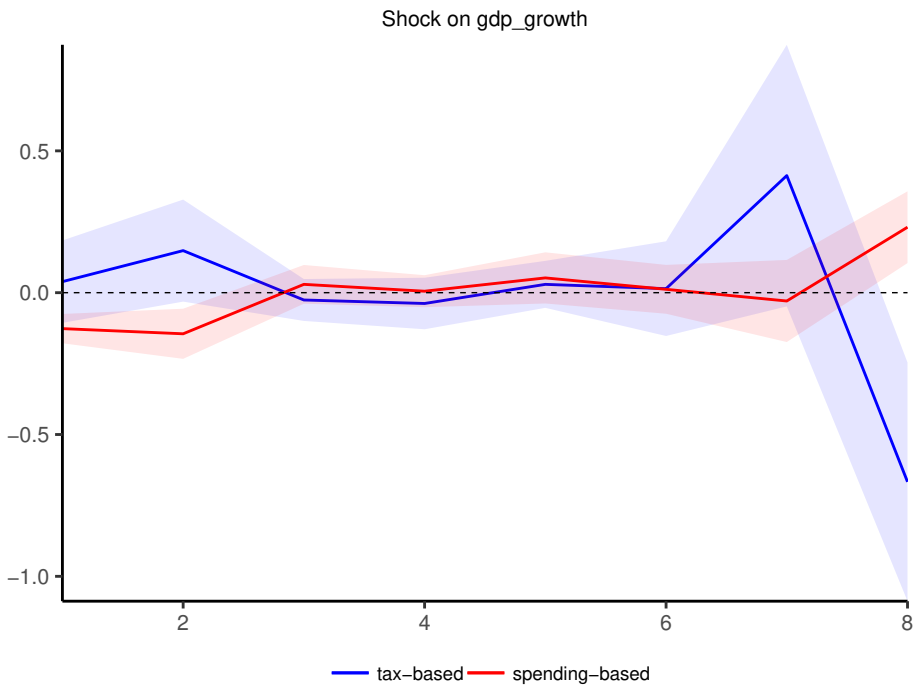
5.2 Role of fiscal policy

Moving to the testing hypothesis #2, we are interested in whether the composition of fiscal consolidation plays a significant role. To do so, we divide the sample into two categories: tax- and spending-based consolidations following procedure described in Equation 3.17. Composition together with the size and persistence of the measures is one of the parameters that the government can decide on. Moreover, it is in the roots of ideological discrepancy between right-wing and left-wing governments.

Response of output and its components

Our baseline results addressing output, however, provide very little insight. We see that in both cases, GDP growth hovers around zero and maybe reaches peak at somewhere around 0.3% GDP after seven or eight years. Conventional approach would arguably overestimate expansionary response of output, notably in case of tax-based consolidation.

Figure 5.6: Role of fiscal policy: Impulse response function of GDP growth, narrative approach, with control variables

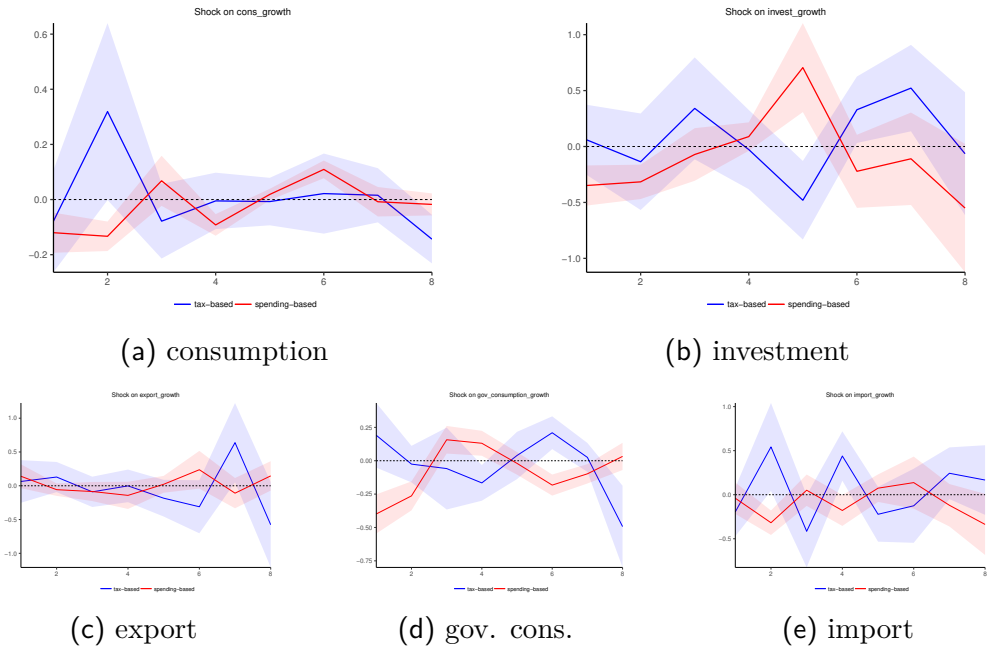


Note: The figure depicts the cumulative impulse response function to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Composition is specified in Section 3.2, too. Horizons are years with the convention the shock occurs in year 1.

Interestingly, one can observe a remarkable "zigzac" in private consumption during tax-based consolidations. This gives us an indication for a well-known phenomenon in periphery countries. Some households are simply stressed out and spend all their savings because they cannot imagine any reasonable economic future. Ironically, we would not call this non-Keynesian effects, it is rather a country-specific issue. Besides, conventional approach sees investment to collapse at the end of horizon in spending-based consolidation which supports recent findings (Afonso *et al.* 2022; Georgantas *et al.* 2023). Again, if we would not include control variables, the expansionary hypothesis would be supported more strongly by adding cca 0.5% GDP but differences between tax- and spending-based consolidation would remain limited, if any at all. Noteworthy, the "zigzac" in private consumption is robust to model without controls but is absolutely ignored by conventional approach.

Last but not least, we show tax hikes can be immediately compensated by slightly higher government consumption which makes perfectly sense with regards to targeted social help/transfers to the people in need or some public investments. This corresponds namely to Estonia and Sweden in our sample. Low

Figure 5.7: Role of fiscal policy: Responses of output components, narrative approach, with control variables



(a) consumption (b) investment

(c) export (d) gov. cons. (e) import

Note: The figure depicts the cumulative responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Composition is specified in Section 3.2, too. Horizons are years with the convention the shock occurs in year 1.

persistence of spending-based consolidation—surging government consumption in the third year—is supported making use of conventional approach, too.

The IRFs for narrative approach without control variables can be found in Figure A.8. The conventional approach with controls is provided in Figure A.9 & Figure A.10; specification without controls is then presented in Figure A.11 & Figure A.12.

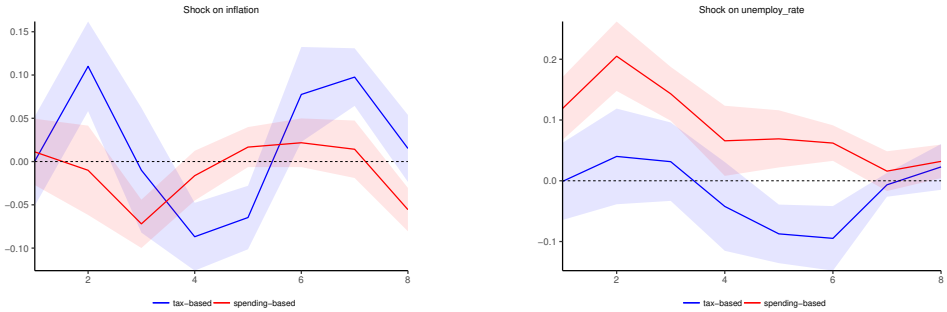
Response of inflation and unemployment rates

Inflation exhibits already described pattern in both types of adjustments but as it is more pronounced in tax-based austerities, one may raise a point whether that is a sign of more dominant/powerful type of adjustment. Noteworthy, omitting control variables shows significantly lower inflation during tax-based adjustment which is robust even if we stick to conventional approach.

Unemployment rate delivers a prominent insight. In our baseline model specification with control variables; the tax-based consolidation is slightly more efficient in reducing it compared to spending-based. However, the model without control variables would suggest clearly opposing findings. In fact, this can serve as an indication that it is not only one-way mechanism that composition

would affect economy. The initial state—recent developments in the economy—can be actually determinant of composition in the end! We document that tax-based consolidations are typically chosen under especially adverse conditions. Therefore, it is an arguably misspecified model that sees recessionary pressures in case of tax-based austerities.

Figure 5.8: Role of fiscal policy: Responses of inflation and unemployment, narrative approach, with control variables



(a) inflation (b) unemployment

Note: The figure depicts the cumulative responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Composition is specified in Section 3.2, too. Horizons are years with the convention the shock occurs in year 1.

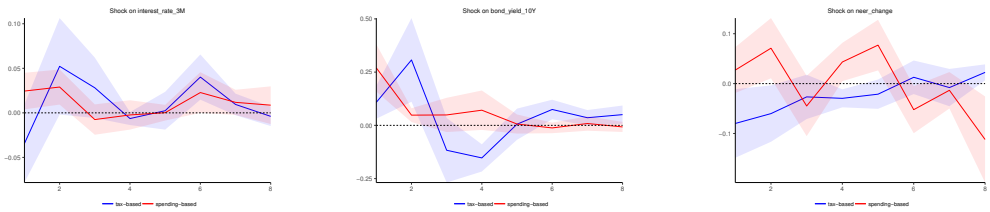
Mainly, it is really crucial for policy makers to communicate that tax hikes are functioning even though citizens/voters indeed observe in everyday life that unemployment rate continues to increase. Nonetheless, our results are robust in the sense that it takes two-three years before the unemployment rate culminates, reverts and hopefully plunges. The plunge is strongly supported especially by conventional approach which, however, tends to overshoot.

Response of interest and exchange rates

According to the conventional approach with controls, interest rate cosmetically decreases in both types of adjustment; not including controls sees increase of interest rate up to 1.5% in tax-based consolidation which is another example of overshooting again. On the contrary, correctly specified narrative approach sees immediate drop of interest rate in tax-based consolidations. This could happen if economic agents consider tax-based austerities more credible than spending-based ones. In fact, it is fully in harmony with our thesis of "adjustment of the last resort"! Noteworthy, in any case, the decline in interest rate is limited which in the end translates to only modest evidence of expansionary fiscal consolidation.

Long-term government bond yield sharply increases in the year of shock which indicates the urgency with which the fiscal consolidation usually is run. We can see that bond yield plummets below a no-shock scenario roughly three years after tax hikes when the adjustment already have gained a sufficient credibility. A likely explanation of rather moderate decrease of bond yield in case of spending cuts is their low persistence as the government consumption rebounds in the third year. Indeed, that's exactly the moment when the bond yield settles and stops falling.

Figure 5.9: Role of fiscal policy: Responses of interest and exchange rates, narrative approach, with control variables



(a) interest rate (b) bond yield (c) exchange rate

Note: The figure depicts the cumulative responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Composition is specified in Section 3.2, too. Horizons are years with the convention the shock occurs in year 1.

However, these findings are not supported making use of conventional approach which sees little differences between these two types of fiscal consolidation. And if there are any differences, then rather leaning towards the success of spending cuts. Yet, again, we need to be aware that not controlling for natural development in the economy would shift our findings - the bond yield would be shown to decrease in spending-based consolidation and not in tax-based. In the end, all these findings are leading us in the direction that tax-based adjustment is chosen under more adverse conditions and need more years to deliver actual improvement – which is does, maybe contrary to the spending cuts.

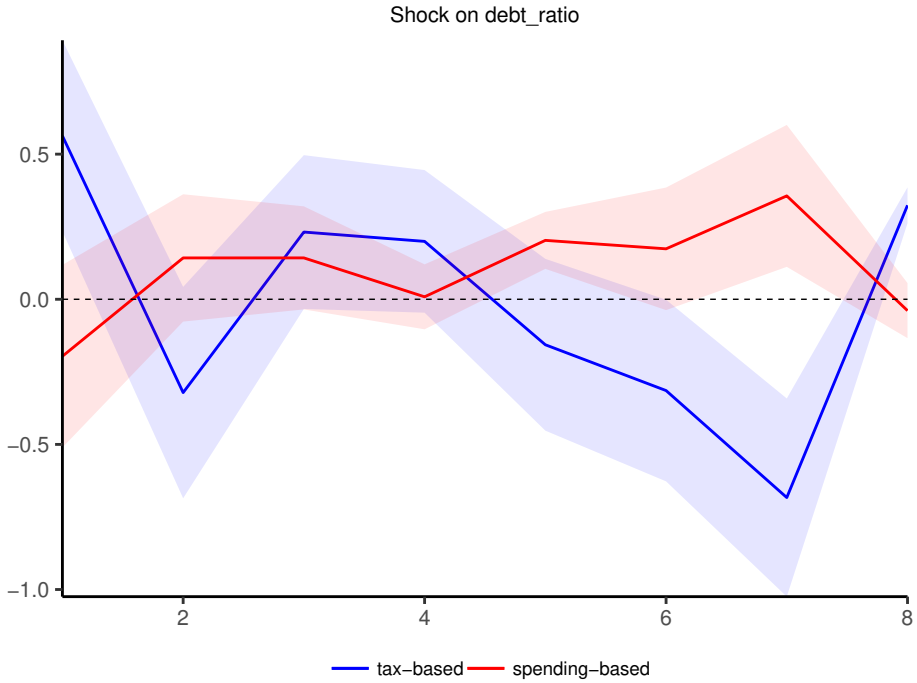
Additionally, currency confidently appreciates in response to tax-based consolidations while the opposite is true for spending-based ones once the initial panic disappears. Admittedly, the response is tiny as it hovers within $\pm 0.1\%$ range compared to no-shock scenario though conventional approach would overshoot it as usual.

Response of public debt ratio

Moreover, the higher efficiency of tax-based consolidation would be supported by success concerning development of debt burden up to six years. We show

that public debt ratio increases in the turbulent year of tax-based adjustment while spending cuts decreases it immediately. However, tax-based consolidation then successfully squeezes juice out of taxpayers to reduce debt burden by 1.2% GDP in six years including the effect in year of fiscal consolidations shock. On the contrary, strikingly low persistence of spending-based austerity measures—as indicated by skyrocketing government consumption—makes this type of adjustment rather self-defeating by 0.4% GDP.

Figure 5.10: Role of fiscal policy: Impulse response function of public debt ratio, narrative approach, with control variables



Note: The figure depicts the cumulative impulse response function to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Composition is specified in Section 3.2, too. Horizons are years with the convention the shock occurs in year 1.

Let us recall that the IRFs for narrative approach without control variables can be found in Figure A.8. The conventional approach with controls is provided in Figure A.9 & Figure A.10; specification without controls is then presented in Figure A.11 & Figure A.12.

Discussion #2

The composition of fiscal consolidation would deserve further examination. If any, the differences in our models point out success and expansionary character of tax-based consolidation in line with Afonso *et al.* (2022) contrary to the popular belief/conventional wisdom that has been built up for years (Alesina

et al. 1998b; Alesina & Ardagna 2010; Alesina *et al.* 2015b). It seems that such a draconian way of improving the state of public finances can gain momentum because it is likely more credible type, which can be seen as a plus in times of general distrust in institutional framework. In fact, we show that tax-based consolidations are often considered as "adjustment of last resort".

5.3 Impact of monetary policy

Moving to the testing of our last hypothesis #3, we are interested in studying the impact of the exchange rate regime. This serves as a more or less robust prerequisite to the ability to set independently interest rate. The wealth effects based on lower interest rate are then one of the main channels through which fiscal consolidation can turn out to be expansionary in the end (Mundell 1961; Obstfeld 1981; Sutherland 1997; Alesina & Perotti 1995; 1997). As described in Section 4.2, we divide our observations into two groups - with somehow pegged currency (e.g., euro, ERM II) and the one with more or less managed floating currency (e.g., krona, koruna) with respect to the country-year of fiscal consolidations shock.

Response of output and its components

There are literally no differences between the two groups after seven years. However, we will elaborate on how the output response evolves during this time period and try to motivate suggestions that are provided later on. In peg countries, output is shown to cosmetically decrease in the year of shock but it harmonically increases along the entire horizon. The collapse in the eighth year mimics our findings for whole sample. This is, indeed, logical with regards to the fact that most observations are taken from euro area.

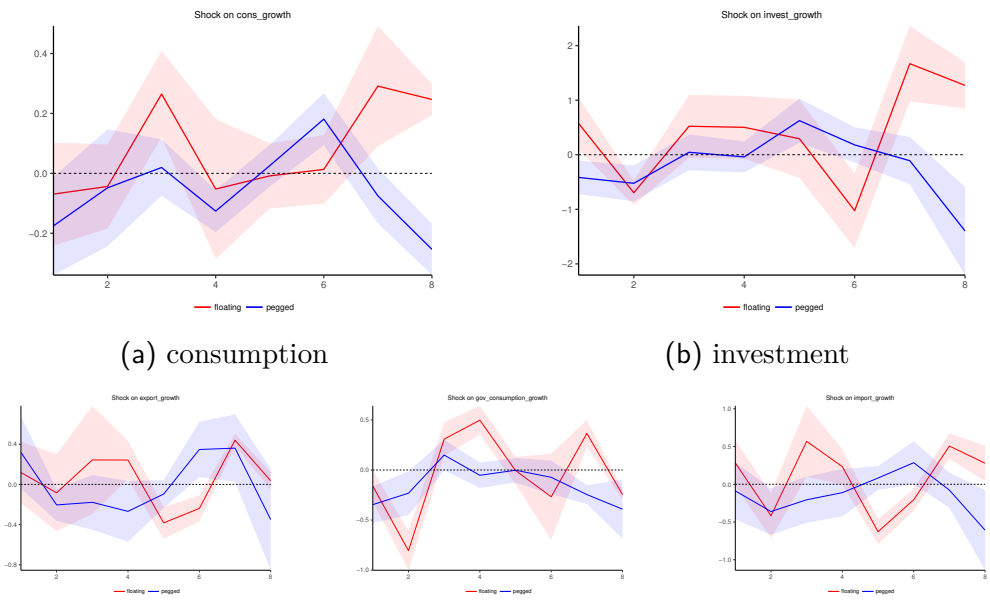
In float countries, the response is more dynamic and energetic with a jump from second to third year worth almost 0.6% GDP, i.e. more than is cumulative effect after eight-year horizon which is only 0.25% GDP. This jump is, moreover, supported by conventional approach! It does not, though, see its expansionary finish unless we omit control variables which results in an overshoot worth an unlikely 4% GDP.

Nevertheless, the differences between the groups are hard to interpret concerning the uncertainty and overall volatility in general. Noteworthy, export

Figure 5.11: Impact of monetary policy: Impulse response function of GDP growth, narrative approach, with control variables

Note: The figure depicts the cumulative impulse response function to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Exchange rate regime is grouped based on the treatment indicated in Section 4.2. Horizons are years with the convention the shock occurs in year 1.

Figure 5.12: Impact of monetary policy: Responses of output components, narrative approach, with control variables



(a) consumption (b) investment

(c) export (d) gov. cons. (e) import

Note: The figure depicts the cumulative responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Exchange rate regime is grouped based on the treatment indicated in Section 4.2. Horizons are years with the convention the shock occurs in year 1.

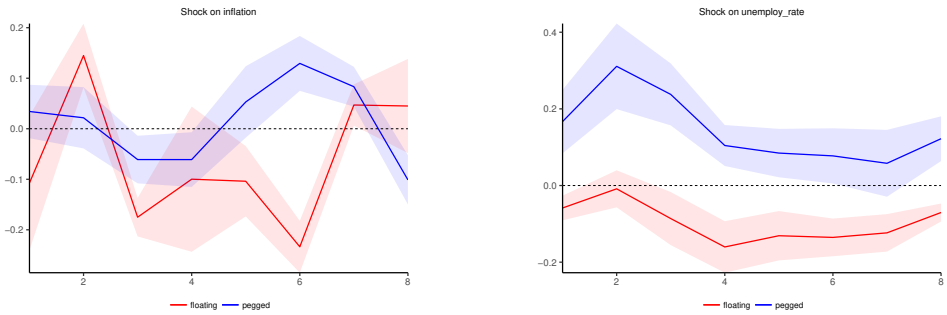
seems to get boosted in the third year and, additionally, import does not rise in float countries as harmonically as in countries with pegged currencies.

The IRFs for narrative approach without control variables can be found in Figure A.13. The conventional approach with controls is provided in Figure A.14 & Figure A.15; specification without controls is then presented in Figure A.16 & Figure A.17.

Response of inflation and unemployment rates

Inflation does exhibit our familiar pattern in peg countries. On the other hand, in float countries, it is hovering around zero which could be caused by some external factors. One of such possibilities—talking about nominal variable par excellence—are of course actions of monetary authority. Noteworthy, in the age of central banks, there is no purely floating exchange rate regime as all floats can and to some extent are objectives of monetary policy. Admittedly, we observe tiny deflationary pressures in float but it is legitimate to ask whether these are so pronounced that would deserve rate cuts. Not including control variables does not change this.

Figure 5.13: Impact of monetary policy: Responses of inflation and unemployment, narrative approach, with control variables



(a) inflation (b) unemployment

Note: The figure depicts the cumulative responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Exchange rate regime is grouped based on the treatment indicated in Section 4.2. Horizons are years with the convention the shock occurs in year 1.

Unemployment rate is way more problematic issue with pegged currency. Although it reverts and plunges, in the end, the cumulative effect is none considering the deterioration in the year of shock. On the contrary, in float countries we observe a relatively fresh decline. Moreover, one may argue that the overall effect is driven by a sharp drop taking place from second to fourth year. Yet, to be fair, this pattern occurs also in peg countries. These findings remain

robust to not including control variables in narrative approach. Admittedly, the conventional approach would be traditionally more favourable in terms of actual reduction of unemployment, particularly if excluding control variables.

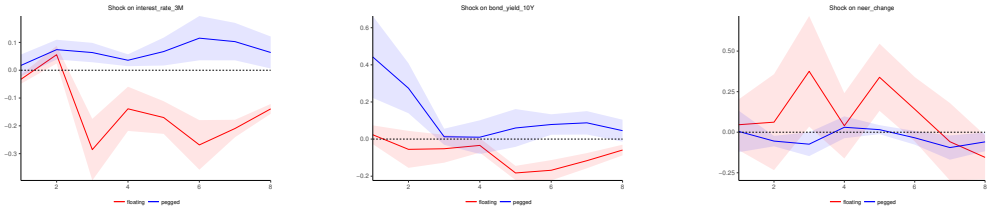
Response of interest and exchange rates

In fact, until now, we have just provided and commented on some stylised facts related to the impacts of monetary policy and how the actions of central bank can affect macroeconomic variables. Mainly, the central bank in float countries—the independent monetary authority—is cutting interest rates by exactly 25bps in the third year of fiscal consolidation to mitigate negative consequences of strong national currency with the aim to maintain growth prospects. As we have already commented on, it is unlikely that such a monetary loosening would be associated with deflationary pressures, even though some drop in inflation is well noticeable. What is crucial, conventional approach with controls sees the decline sized of 25bps, too. However, as it dilutes this drop into three-year long period, it leaves the possibility of central bank rate cut off the table! Not including control variables in case of conventional approach does not help at all. On the contrary, short-term interest rate continues to climb under pegged currencies which can be associated to the overall setup when the fiscal consolidation is applied. As the most macroeconomic variables tend to worsen in the fiscal consolidations shock year, it is a clear indication that the ongoing turmoil makes any austerity non-credible at the beginning. In this case, though, even some expansionary signs do not bring a lower risk premium. Nevertheless, conventional approach sees some slight decline in interest rate even in pegged countries which may be an indication of prevalence of the so-called non-Keynesian effects.

Furthermore, the consolidation in pegged countries comes very late as the bond yield is skyrocketing in the year of fiscal consolidations shock. Noteworthy, austerity succeeds in its stabilization. A significant drop in float countries situated in the fourth and fifth year of consolidation plan — is not at all surprising given the monetary easing we described above. Conventional approach fails to detect bond yield moderation in float.

As expected, the exchange rate is literally muted in peg countries with only minor initial appreciation noticeable in conventional approach without controls. Regarding floating observations, fiscal consolidation is linked to a currency appreciation of 0.4% once economic agents and investors find austerity

Figure 5.14: Impact of monetary policy: Responses of interest and exchange rates, narrative approach, with control variables



(a) interest rate (b) bond yield (c) exchange rate

Note: The figure depicts the cumulative responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Exchange rate regime is grouped based on the treatment indicated in Section 4.2. Horizons are years with the convention the shock occurs in year 1.

credible. Such a strong currency may, however, be a concern with regards to economic growth, as export becomes less competitive. Moreover, as we have already mentioned, interest rate is shown to be cut by independent monetary authority, national central bank, in the third year of the fiscal consolidation. As a consequence, exchange rate returns part of the profits, and remains only moderately stronger compared to a no-shock scenario for couple of years.

More importantly, disregarding control variable would shift our findings. It holds that this channel is logically muted under pegged currencies. However, a persistent depreciation worth a whopping 1% hits float countries in the year of the fiscal consolidation shock. It nicely documents the background when the fiscal consolidation usually takes place – in an over-indebted country which suffers from a list of problems; one of them being a weak currency or even capital flights (Krugman 1999).

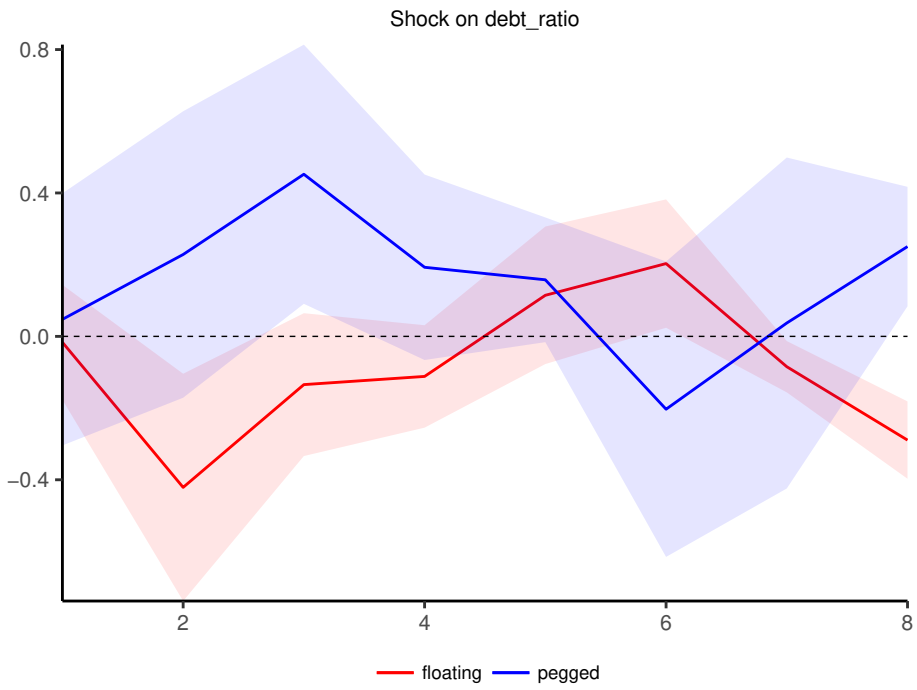
In addition, conventional approach for float is too noisy to be able detect the central bank rate cut though depreciation/devaluation is generally noticeable after initial strengthening of the currency.

Response of public debt ratio

Last but not least, the public debt ratio provides a very nice illustration, as the impact of the exchange rate regime is easily detectable. After initial moderation, debt is again becoming an issue as a too strong currency makes it difficult to maintain economic growth. Next, once the central bank cuts interest rate—creating pressure on the currency—the debt ratio resumes to decline with cumulative statistically significant effect sized of -0.3% GDP after eight years.

On the contrary, fiscal consolidation is rather self-defeating by the same

Figure 5.15: Impact of monetary policy: Impulse response function of public debt ratio, narrative approach, with control variables



Note: The figure depicts the cumulative impulse response function to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Horizons are years with the convention the shock occurs in year 1.

magnitude under pegged currency, even though there are some debt-reducing shakes along the horizon.

Nonetheless, conventional approach sees at least some success at the end of our horizon in peg. Not including control variables would change our argumentation even more dramatically. Under pegged currency, debt ratio would be shown to decrease by 3% GDP, whereas under float we would observe only modest success worth 1% GDP. Conventional approach without controls exhibits unreliable overshooting.

Let us recall that the IRFs for narrative approach without control variables can be found in Figure A.13. The conventional approach with controls is provided in Figure A.14 & Figure A.15; specification without controls is then presented in Figure A.16 & Figure A.17.

Discussion #3

We show that monetary policy matters as the fiscal consolidation is accompanied by currency appreciation in countries with floating exchange rate regime (Fischer 1977; Obstfeld 1981). This threatens the full realization of growth-enhancing potential of austerity measures. We do argue that national central bank is shown to cut interest rate to maintain growth prospects, which ultimately benefits the fiscal adjustment. However, it would be a nice idea for further research to browse through official documents whether actual developments support our views.

5.4 Evaluation of research hypotheses

[#1] There are signs of expansionary fiscal consolidation (incl. post-European sovereign debt crisis era)

Partially supported *Indeed, austerity measures that took place during the GFC are arguably growth-enhancing ones but the evidence in general is rather weak.*

[#2] The composition of fiscal consolidation plays a significant role

Cannot say *This is definitely not a one-way street. Mainly, tax-based consolidation is often used as an "adjustment of the last resort" and thrives as such.*

[#3] The exchange rate regime significantly impacts fiscal consolidation

Generally supported *Expansionary character of fiscal consolidation is inhibited due to the currency appreciation. Fortunately, central bank cuts interest rate to maintain growth prospects.*

Chapter 6

Conclusion

This thesis studies the expansionary fiscal consolidation on a sample of EU-28 countries from 2004 to 2019. This opens the door to full-scale examination of austerities which took place during the European sovereign debt crisis, a local spin-off of GFC. Moreover, it is a crucial topic as a recent fiscal stimulus will be arguably echoed by another round of fiscal consolidations.

To provide such an evidence, we stick primarily to the state-of-the-art narrative approach as it is thought to be free of any potential endogeneity (Romer & Romer 2010; Guajardo *et al.* 2014). Hence, to do so, we update already outdated dataset used in Alesina *et al.* (2017) by additional more than 2030 new fiscal measures covering period 2015-2019. In fact, we collect fiscal measures also for Greece and several "smaller" member states—which have so far been marginalised despite some remarkable austerities—for the whole period. Nevertheless, we also consider a conventional approach as kind of robustness check. In terms of econometric modelling, we apply LPs onto our panel (Jordà 2005).

We do find some evidence that fiscal consolidation can turn out to be expansionary as it enhances GDP growth by moderate 0.3% at peak after seven years. In line with the existing literature, it is shown that private investment is significantly more volatile component of output compared to private consumption (Alesina *et al.* 2015b). In most models, there are minor deflationary pressures at the beginning as fiscal stimulus is no longer provided; however, inflation rebounds thanks to stronger demand and hot economy at the end of our projected horizon.

Furthermore, it appears that austerity measures have an extremely low persistence, as government consumption surge in only two years after the beginning

of fiscal consolidation. As this is clearly premature, significant correction follows in subsequent years. Nonetheless, it does not enable fiscal consolidation to succeed in terms of reducing public debt-to-GDP ratio. In fact, we find some signs fiscal consolidation to be rather self-defeating (Attinasi & Metelli 2017).

Although unemployment can drop on our horizon, it usually continues to soar for additional two or three years after the beginning of fiscal consolidation until it reverses and hopefully plummets. It may be therefore one of the reasons why are austerity measures so unpopular among policy makers – as a reward may be delayed, it is difficult for government to motivate undertaking painful austerity measures among their voters.

The findings are, in general, robust to the set of results derived making use of conventional approach. However, we illustrate that cyclically adjusted primary balance tends to disregard some important phenomena such as interest rate cut by national central bank or "overshoot" in other cases (Guajardo *et al.* 2014). Moreover, misspecified models with no included control variables are even more dangerous as they would provide overly expansionary/successful evidence (Jordà & Taylor 2016).

Next, we study the impacts of monetary policy with respect to the exchange rate regime on fiscal consolidation dividing observations into those with pegged currencies and those with more or less managed floating currencies. We reveal that the currency appreciation—which accompanies fiscal consolidation in countries with float—can be held responsible for not letting fully develop its growth-enhancing potential, compared to the euro area member states and other countries with pegged currencies (Obstfeld 1981). As already mentioned, we document that central bank then cuts interest rates with the aim to offset negative consequences of strong currency and catch-up with their pegged peers.

Further research shall revisit the conventional wisdom related to the role of composition of fiscal consolidation that has been built up for years (Alesina & Ardagna 2010). Indeed, we point out that tax-based consolidation is more expansionary in terms of enhancing GDP growth/successful in reducing public debt ratio—and unemployment—compared to its spending-based counterpart. However, being typically chosen under especially adverse conditions as an "adjustment of the last resort", we demonstrate that model misspecification can lead to findings in favour of spending-based consolidation.

Finally, this thesis can serve policy makers as a guidance and reminder that the fiscal consolidation does not have to end up by a huge decline of output and soaring unemployment – and that undertaking painful austerity measures can

indeed turn out to be expansionary in the end (Giavazzi & Pagano 1990). At the present time, Italy is troubled by lower growth prospects while considering to run mounting fiscal deficits until at least 2026 (Migliaccio 2024). We suggest to rather calibrate public budget with respect to breath-taking austerity that Greece has undertaken in the last decade to recover into a success story (The Economist's country of the year for 2023 2023). It is arguably the only thing that would calm down concerns of investors who put on the debt burden of Italian boot (Arnold & Kazmin 2023).

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Appendix A

Appended Tables and Figures

Appended tables

Table A.1: Overview of stock market indices

Country	**Stock index**	**Country**	**Stock index**
Belgium	BEL 20	Lithuania	OMX Vilnius
Bulgaria	SOFIX	Luxembourg	LuxX
Czechia	PX	Hungary	BUX
Denmark	OMX Copenhagen 20	Malta	MSE
Germany	DAX	Netherlands	AEX
Estonia	OMX Talinn	Austria	ATX
Ireland	ISEQ All-Share	Poland	WIG20
Greece	ATG	Portugal	PSI 20
Spain	IBEX 35	Romania	BET 20
France	CAC 40	Slovenia	SBI TOP
Croatia	CROBEX	Slovakia	SAX
Italy	FTSE MIB	Finland	OMX Helsinki 25
Cyprus	CYMNPRL	Sweden	OMX Stockholm 30
Latvia	OMX Riga	United Kingdom	FTSE 100

Note: Closing values on the last trading days of the year are retrieved from Eikon Refinitiv.

Table A.2: Size and length (horizon) of exogeneous fiscal "plans" by year

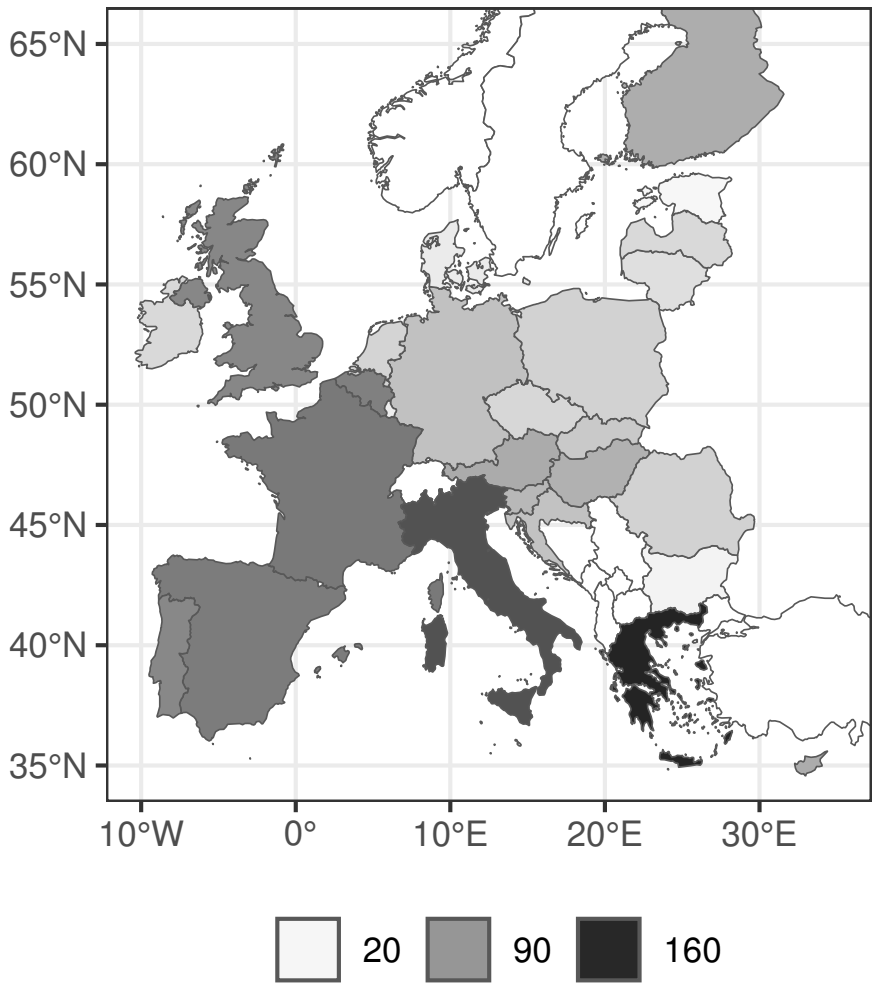
Year	**Number of exogeneous "plans"**	**Average country size of all measures**	**Average country size – tax component**	**Average country size – spending component**	**Average horizon (years) of fiscal consolidation**
2004	8	1.79	0.83	0.96	3.57
2005	10	2.46	1.23	1.22	3.00
2006	10	2.93	1.05	1.87	6.00
2007	8	2.81	1.15	1.65	5.00
2008	6	1.52	0.25	1.26	4.00
2009	9	1.83	1.04	0.78	4.66
2010	19	2.21	0.88	1.32	5.45
2011	23	3.25	1.33	1.91	5.16
2012	23	3.20	1.24	1.96	3.33
2013	21	2.82	1.42	1.39	1.00
2014	18	2.49	0.60	1.89	2.00
2015	19	1.49	0.57	0.91	2.66
2016	17	1.32	0.56	0.76	2.50
2017	15	0.85	0.51	0.33	2.25
2018	13	0.49	0.35	0.13	2.00
2019	6	0.63	0.58	0.04	1.00

Table A.3: Composition of exogeneous fiscal "plans" by year

Year	**Tax-based**	**Spending-based**	**Equal**	**Total**
2004	3	5	0	8
2005	4	6	0	10
2006	3	7	0	10
2007	4	4	0	8
2008	2	4	0	6
2009	6	3	0	9
2010	8	11	0	19
2011	12	11	0	23
2012	8	15	0	23
2013	11	10	0	21
2014	4	14	0	18
2015	9	10	0	19
2016	8	8	1	17
2017	8	7	0	15
2018	7	6	0	13
2019	4	2	0	6

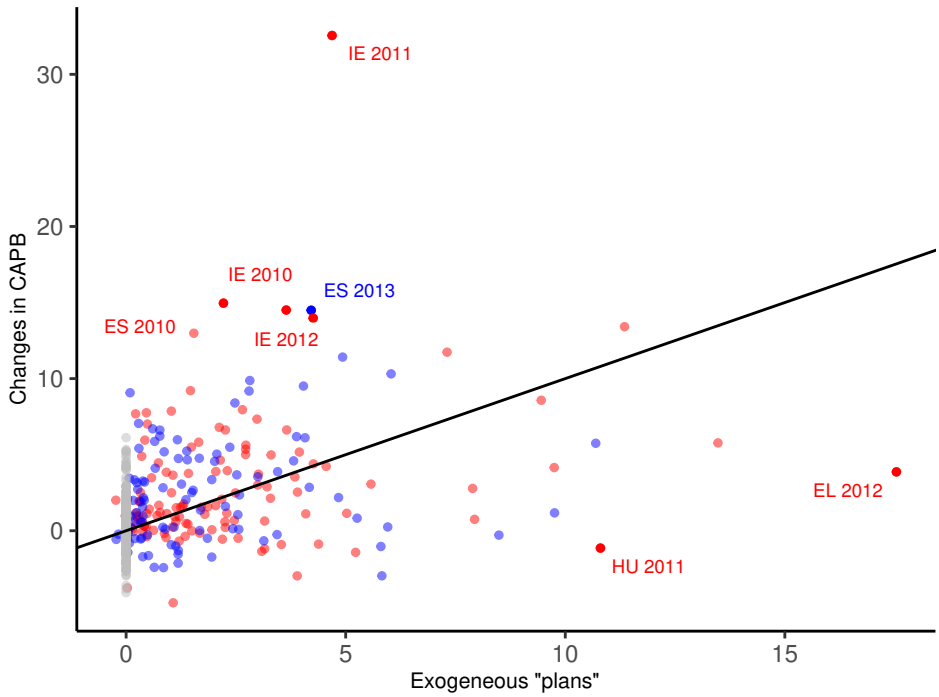
Appended figures

Figure A.1: ECB Governing Council: Gross general government debt, share of GDP (%)



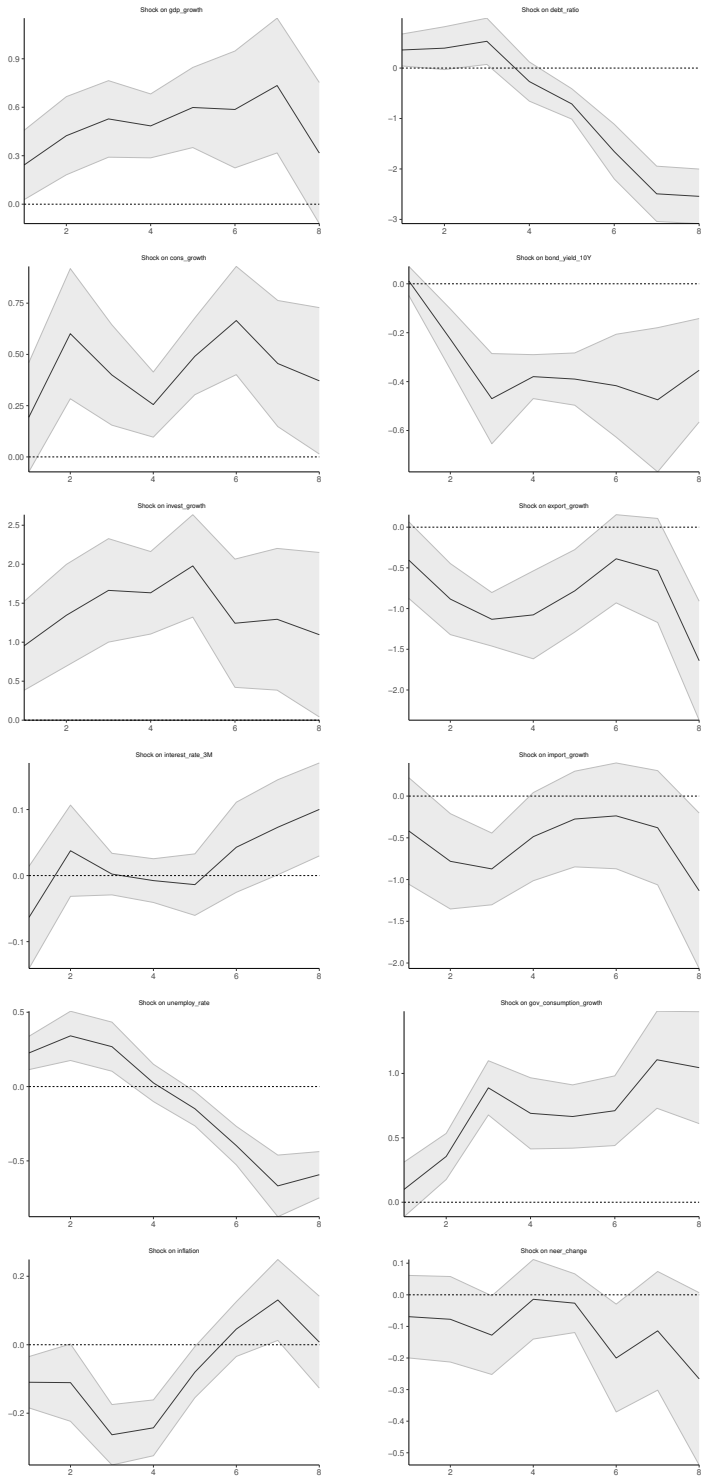
Note: The shade of grey indicates the level of indebtedness. Levels above 90% are associated with notably lower growth outcomes by Reinhart & Rogoff (2010). For EU-27, data are as of Q4 2023. Datum for UK is as of Q3 2023.

Figure A.2: Comparison of conventional and narrative approaches, based on composition



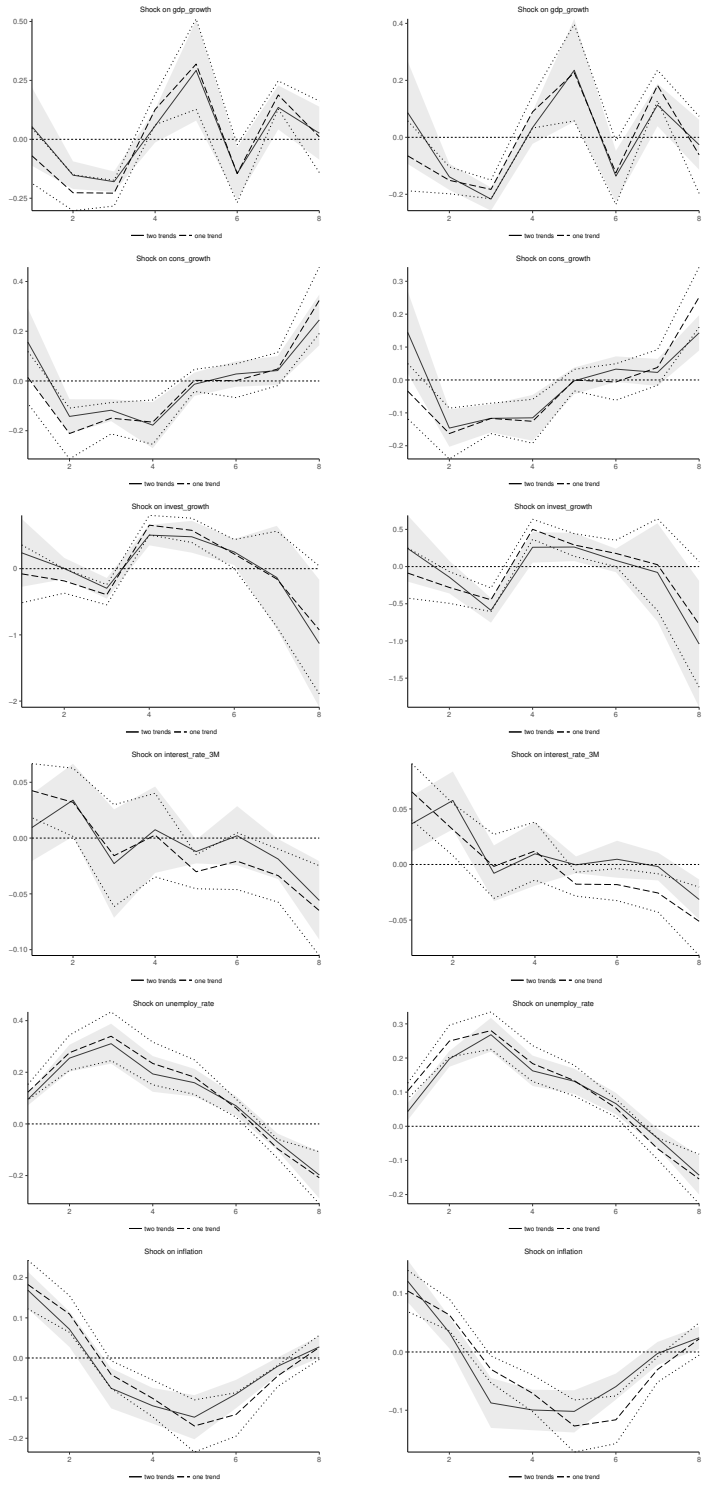
Note: **blue-** denotes tax-based fiscal consolidations, **red-** denotes spending-based fiscal consolidations as suggested by narrative approach. Grey dots represent muted exogeneous "plans". Cyclical adjustment of primary balance is done with regards to one time trend for the simplicity reasons. The diagonal line represents ideal scenario in which both measures are equal. Highlighted are cases in which methodological discrepancy exceeds 10% GDP.

Figure A.3: Over-indebted Europe: Responses of macroeconomic variables to fiscal consolidations shock, narrative approach, without control variables



Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Horizons are years with the convention the shock occurs in year 1.

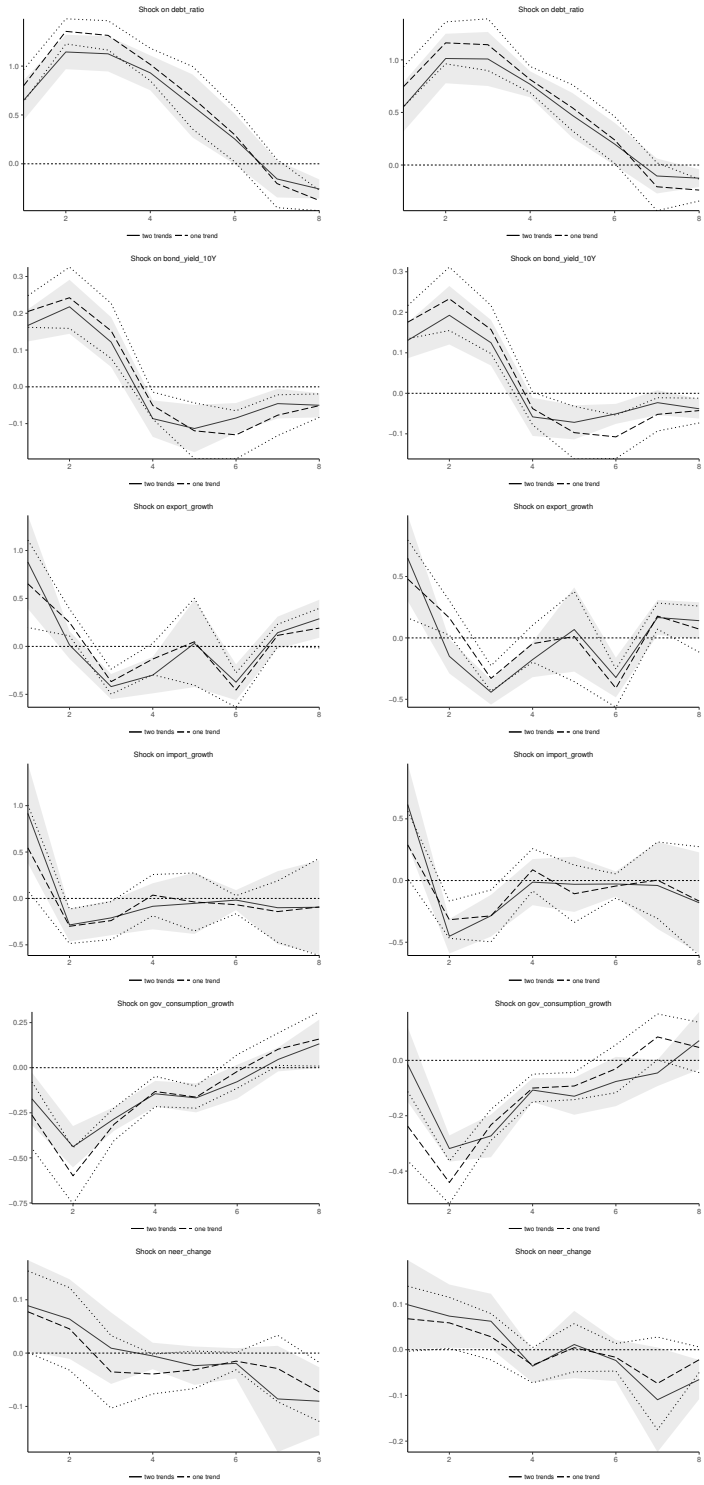
Figure A.4: Over-indebted Europe: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, with control variables



(a) Alesina thresholds (b) Afonso threshold

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Horizons are years with the convention the shock occurs in year 1.

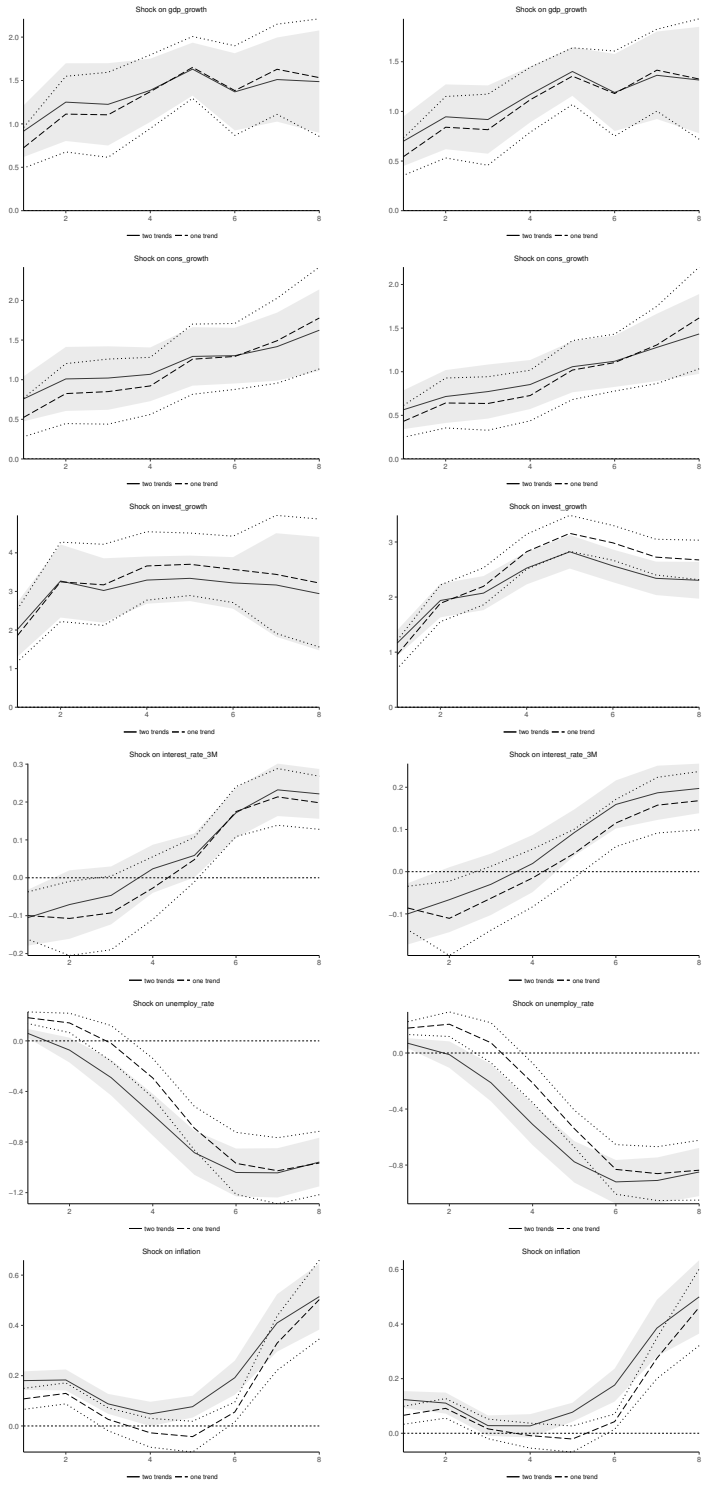
Figure A.5: Over-indebted Europe: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, with control variables - cont'd



(a) Alesina thresholds (b) Afonso threshold

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Horizons are years with the convention the shock occurs in year 1.

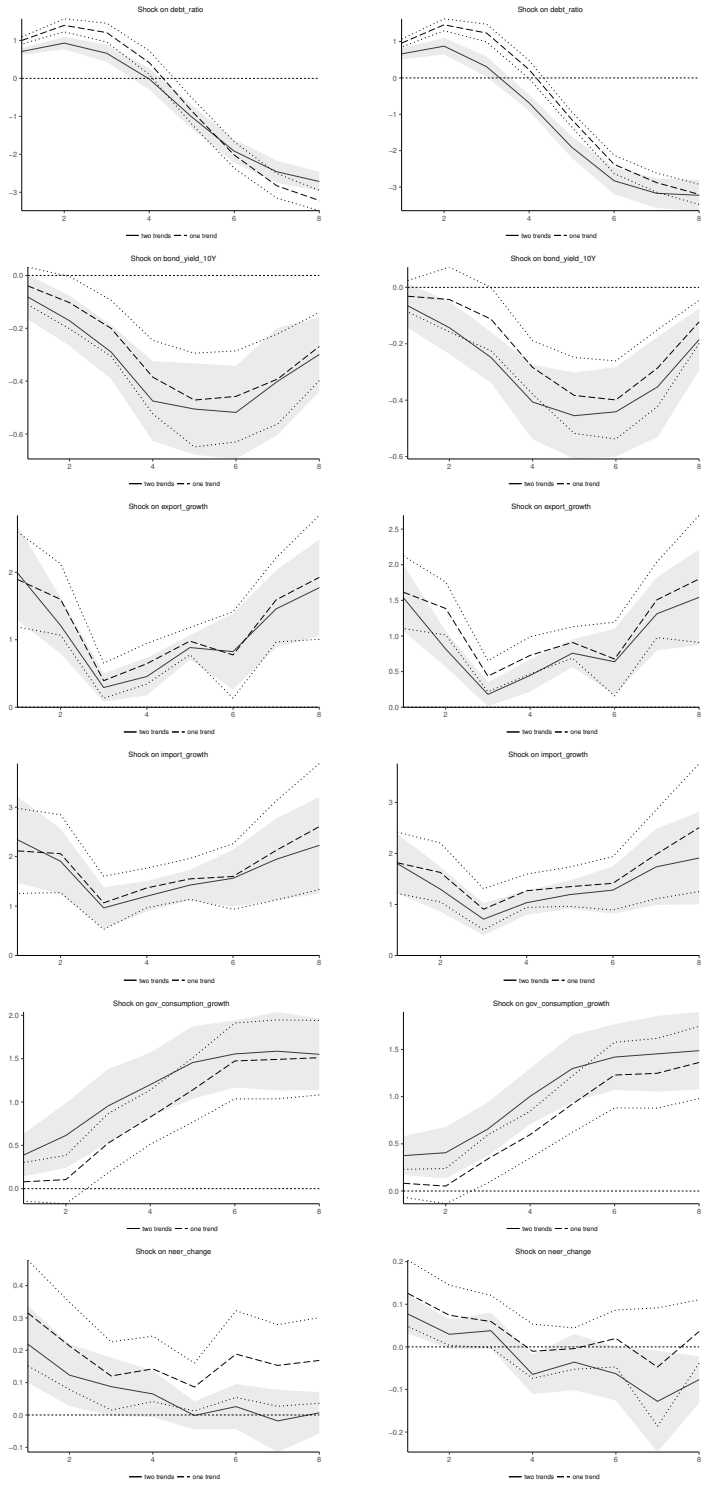
Figure A.6: Over-indebted Europe: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, without control variables



(a) Alesina thresholds (b) Afonso threshold

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Horizons are years with the convention the shock occurs in year 1.

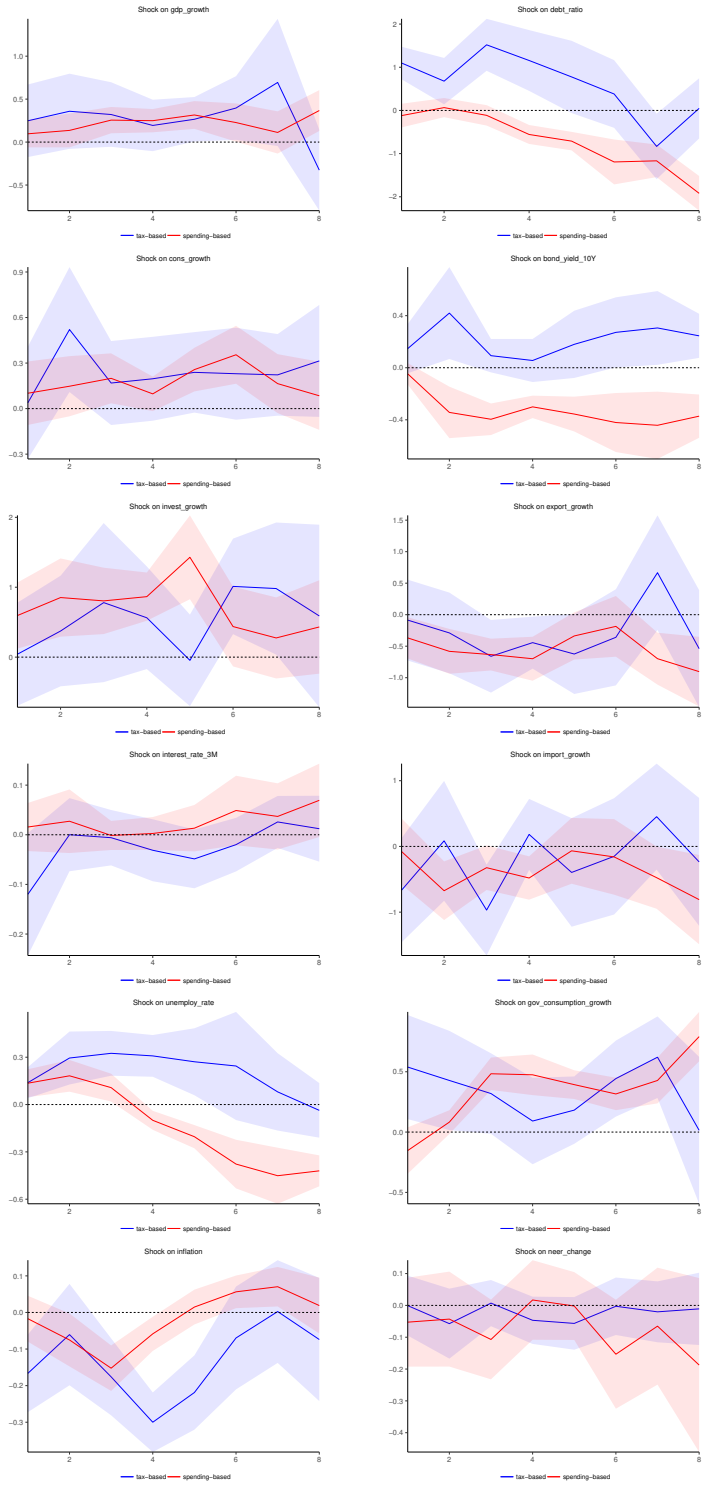
Figure A.7: Over-indebted Europe: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, without control variables - cont'd



(a) Alesina thresholds (b) Afonso threshold

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Horizons are years with the convention the shock occurs in year 1.

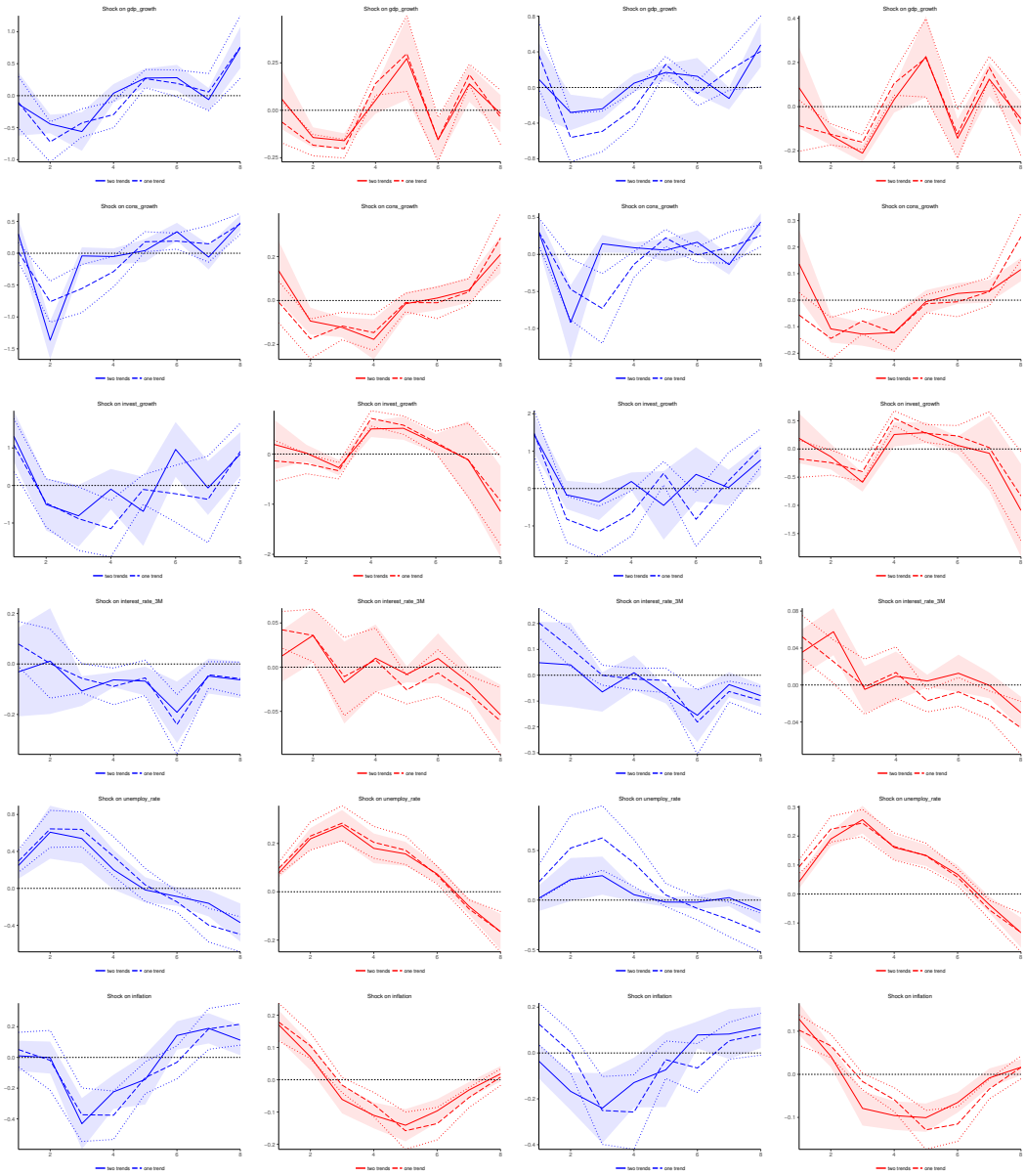
Figure A.8: Role of fiscal policy: Responses of macroeconomic variables to fiscal consolidations shock, narrative approach, without control variables



Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.2. Composition is specified in Section 3.2, too. Horizons are years with the convention the shock occurs in year 1.

Figure A.9: Role of fiscal policy: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, with control variables

(a) Alesina thresholds (b) Afonso threshold

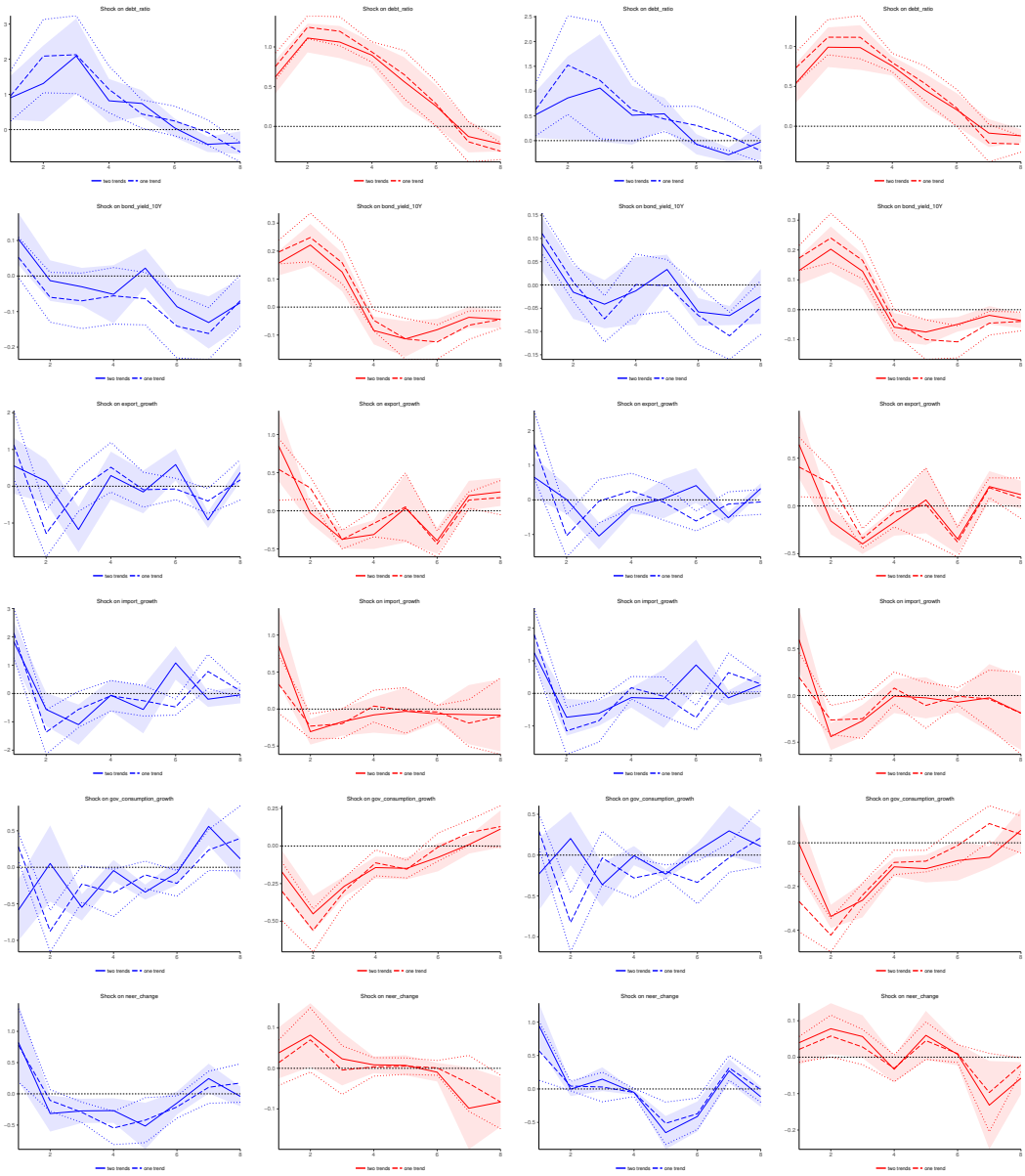


i. tax-based ii. spending-based i. tax-based ii. spending-based

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Composition is specified in Section 3.1, too. Horizons are years with the convention the shock occurs in year 1.

Figure A.10: Role of fiscal policy: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, with control variables - cont'd

(a) Alesina thresholds (b) Afonso threshold

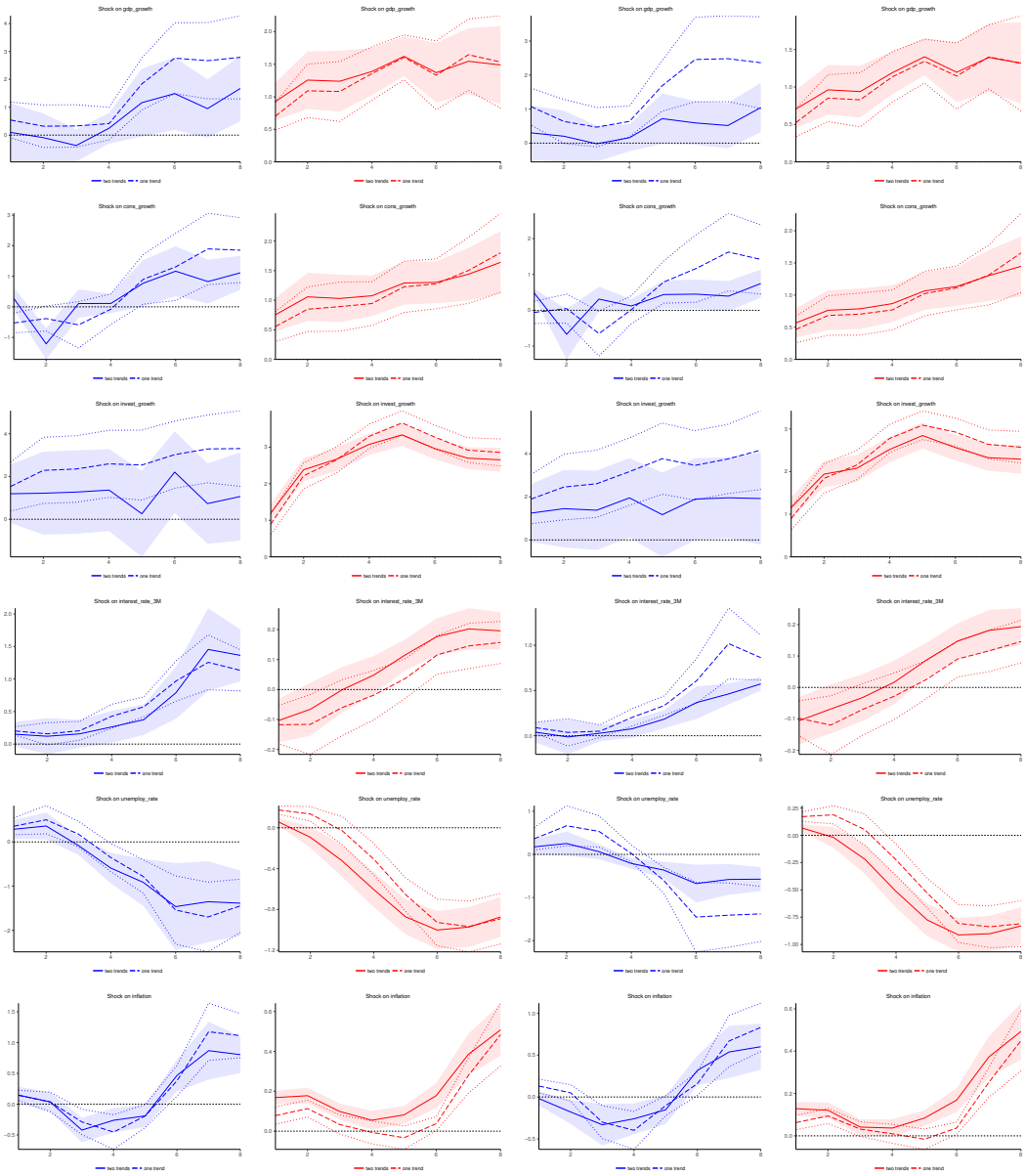


i. tax-based ii. spending-based i. tax-based ii. spending-based

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Composition is specified in Section 3.1, too. Horizons are years with the convention the shock occurs in year 1.

Figure A.11: Role of fiscal policy: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, without control variables

(a) Alesina thresholds (b) Afonso threshold

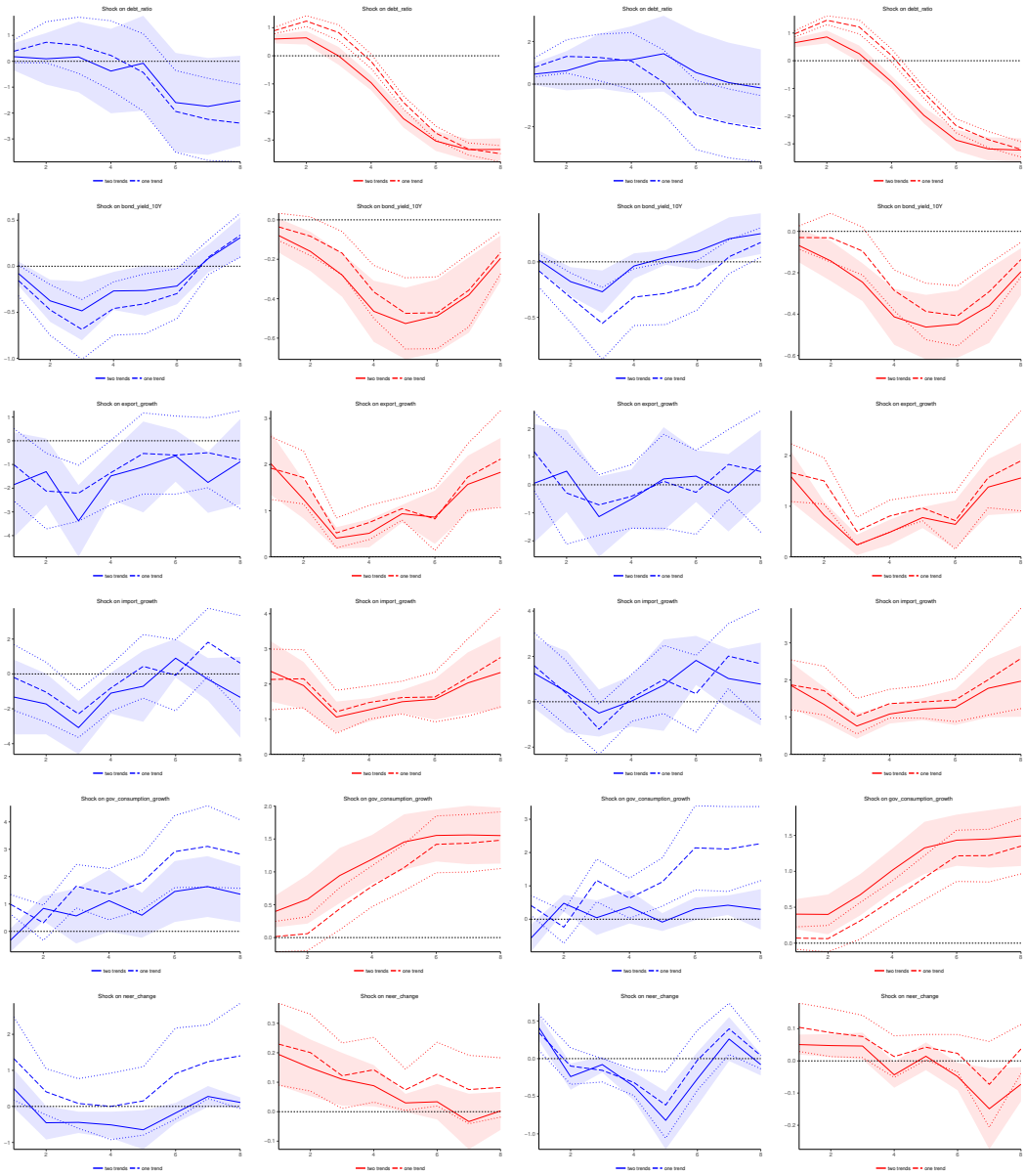


i. tax-based ii. spending-based i. tax-based ii. spending-based

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Composition is specified in Section 3.1, too. Horizons are years with the convention the shock occurs in year 1.

Figure A.12: Role of fiscal policy: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, without control variables - cont'd

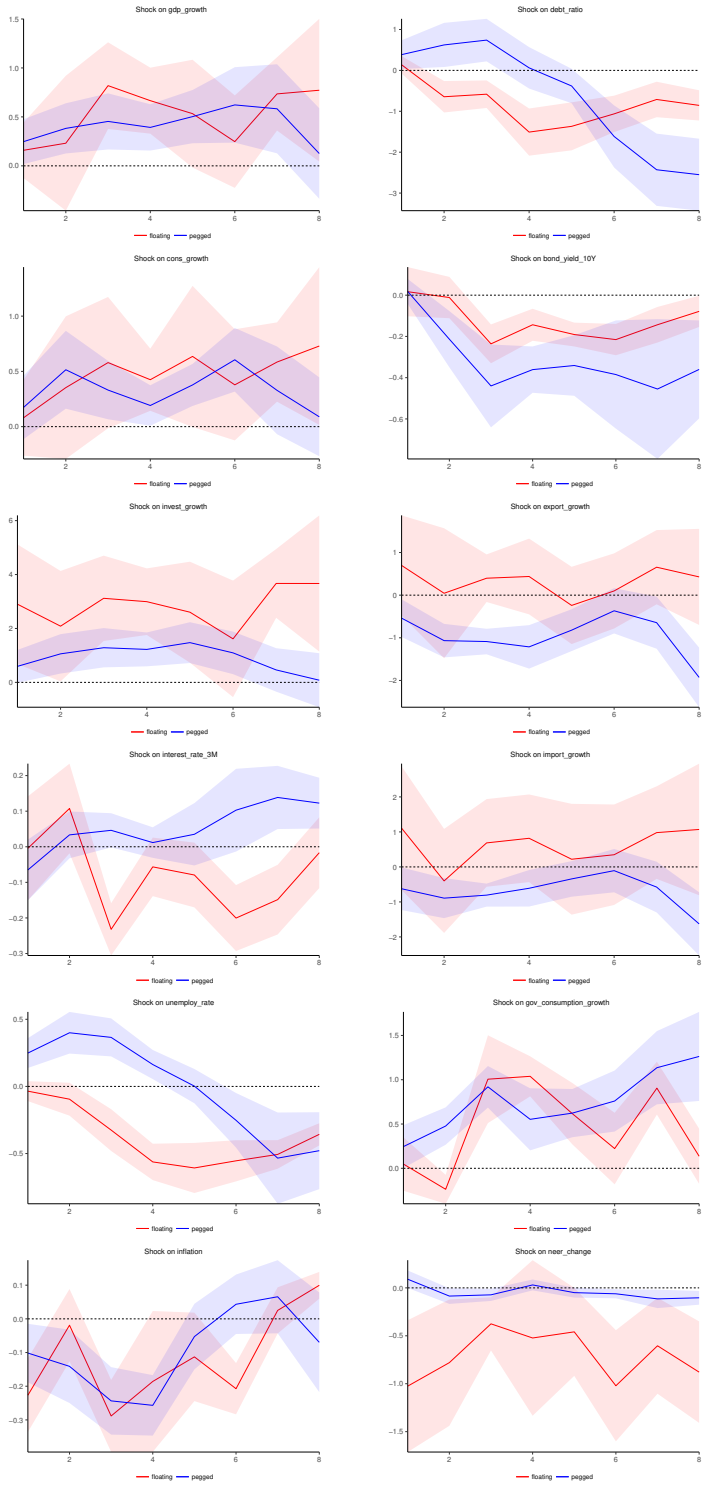
(a) Alesina thresholds (b) Afonso threshold



i. tax-based ii. spending-based i. tax-based ii. spending-based

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Composition is specified in Section 3.1, too. Horizons are years with the convention the shock occurs in year 1.

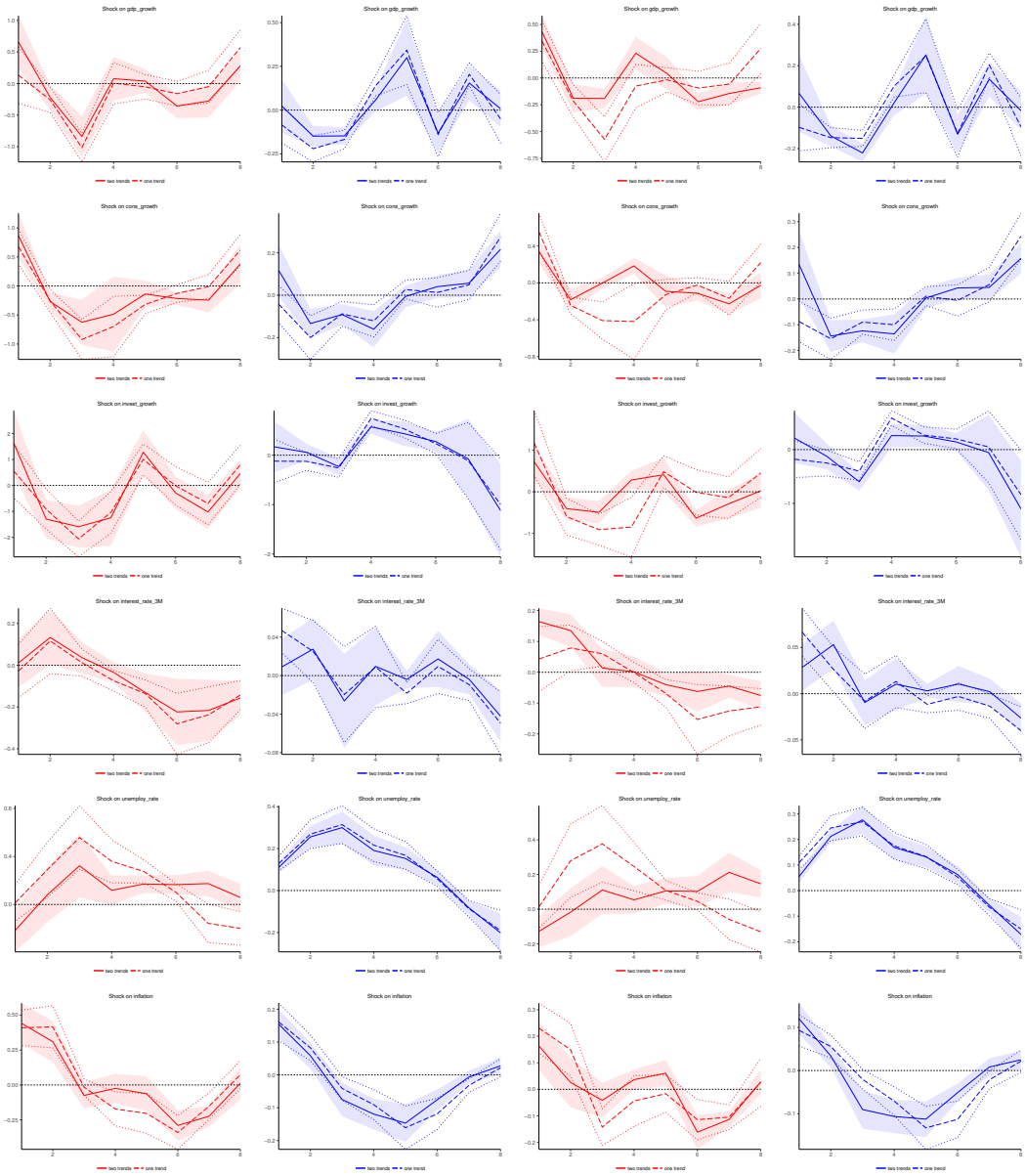
Figure A.13: Impact of monetary policy: Responses of macroeconomic variables to fiscal consolidations shock, narrative approach, without control variables



Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Exchange rate regime is grouped based on the treatment indicated in Section 4.2. Horizons are years with the convention the shock occurs in year 1.

Figure A.14: Impact of monetary policy: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, with control variables

(a) Alesina thresholds (b) Afonso threshold

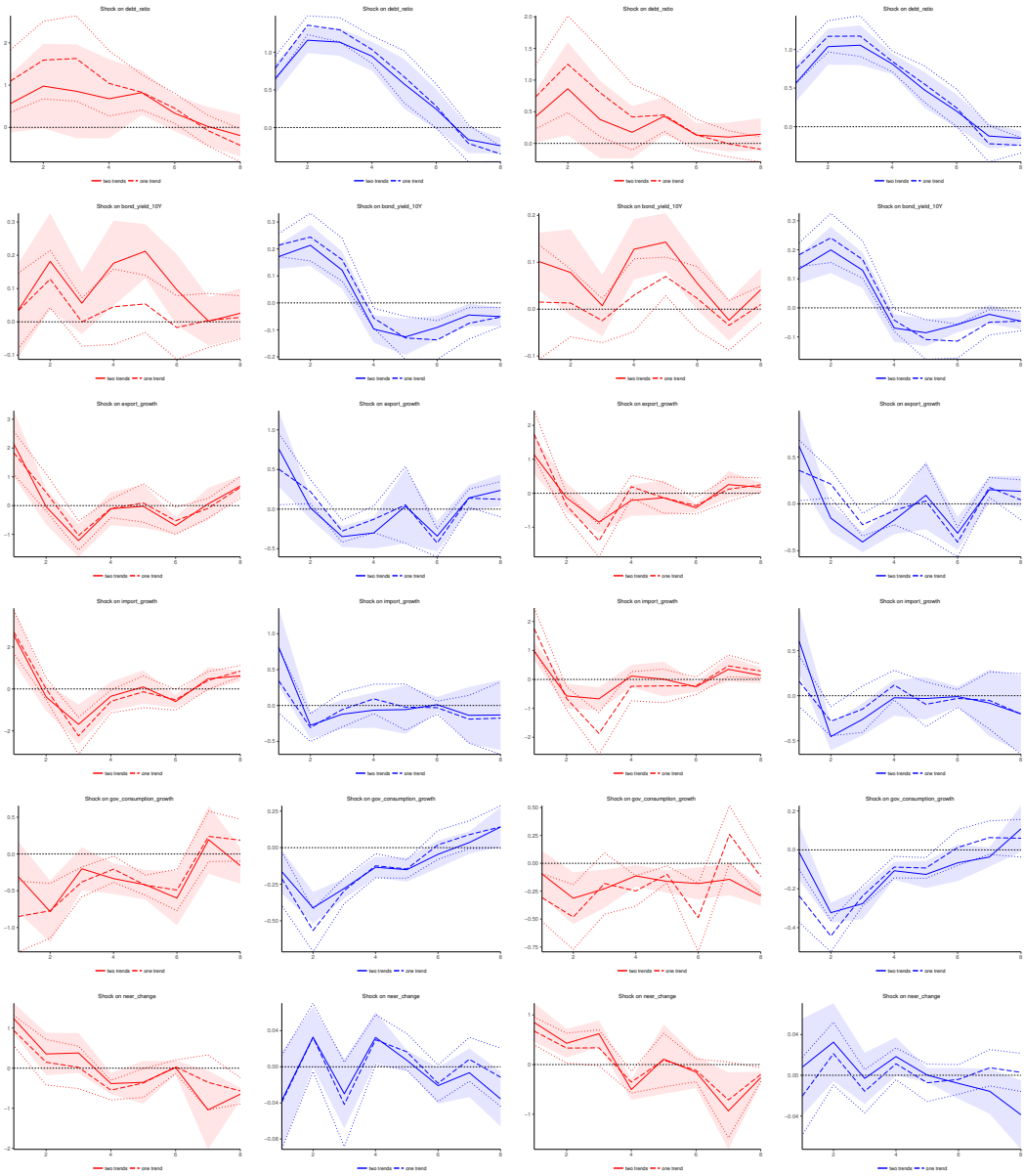


i. floating ii. pegged i. floating ii. pegged

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Exchange rate regime is grouped based on the treatment indicated in Section 4.2. Horizons are years with the convention the shock occurs in year 1.

Figure A.15: Impact of monetary policy: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, with control variables - cont'd

(a) Alesina thresholds (b) Afonso threshold

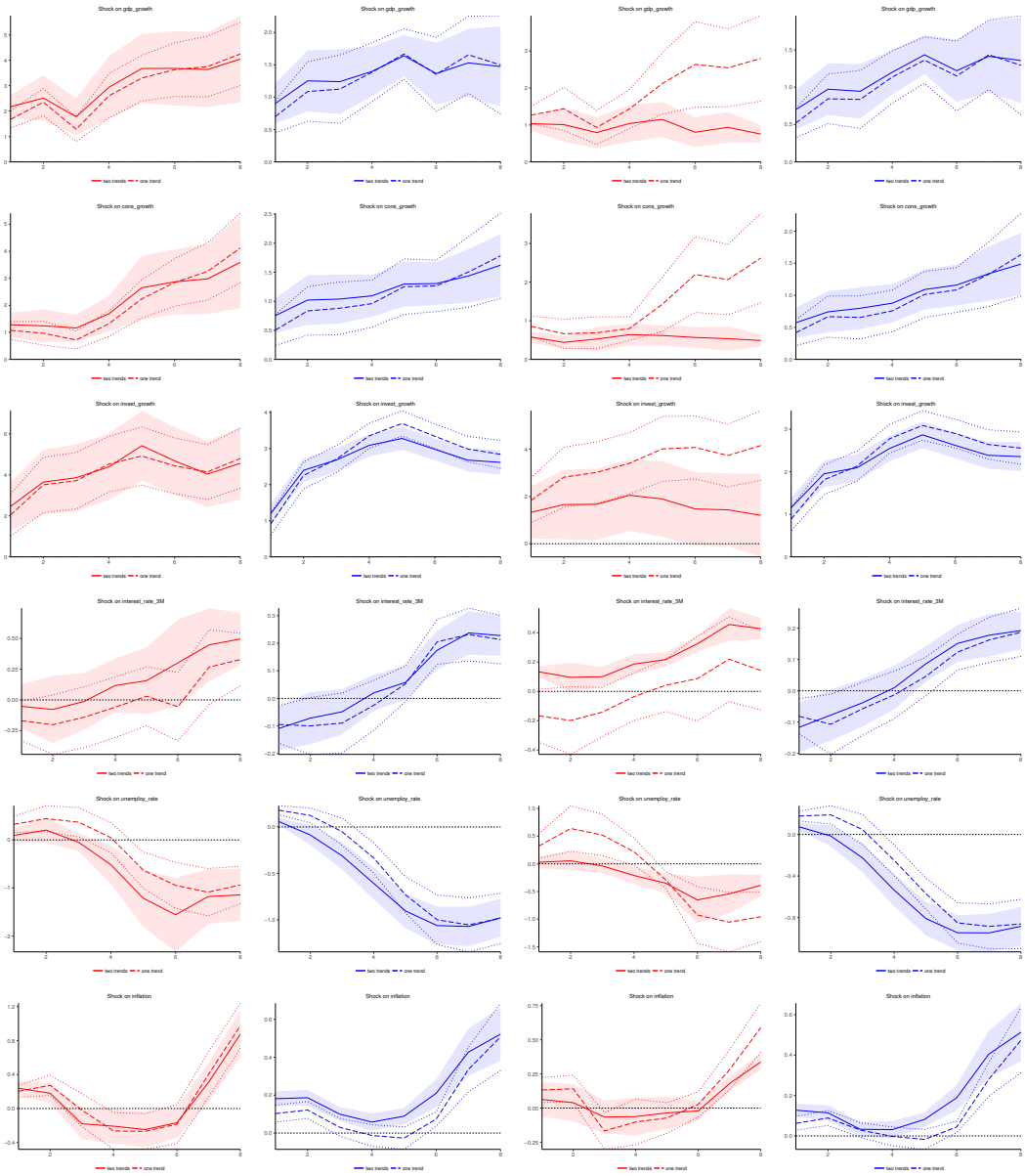


i. floating ii. pegged i. floating ii. pegged

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Exchange rate regime is grouped based on the treatment indicated in Section 4.2. Horizons are years with the convention the shock occurs in year 1.

Figure A.16: Impact of monetary policy: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, without control variables

(a) Alesina thresholds (b) Afonso threshold

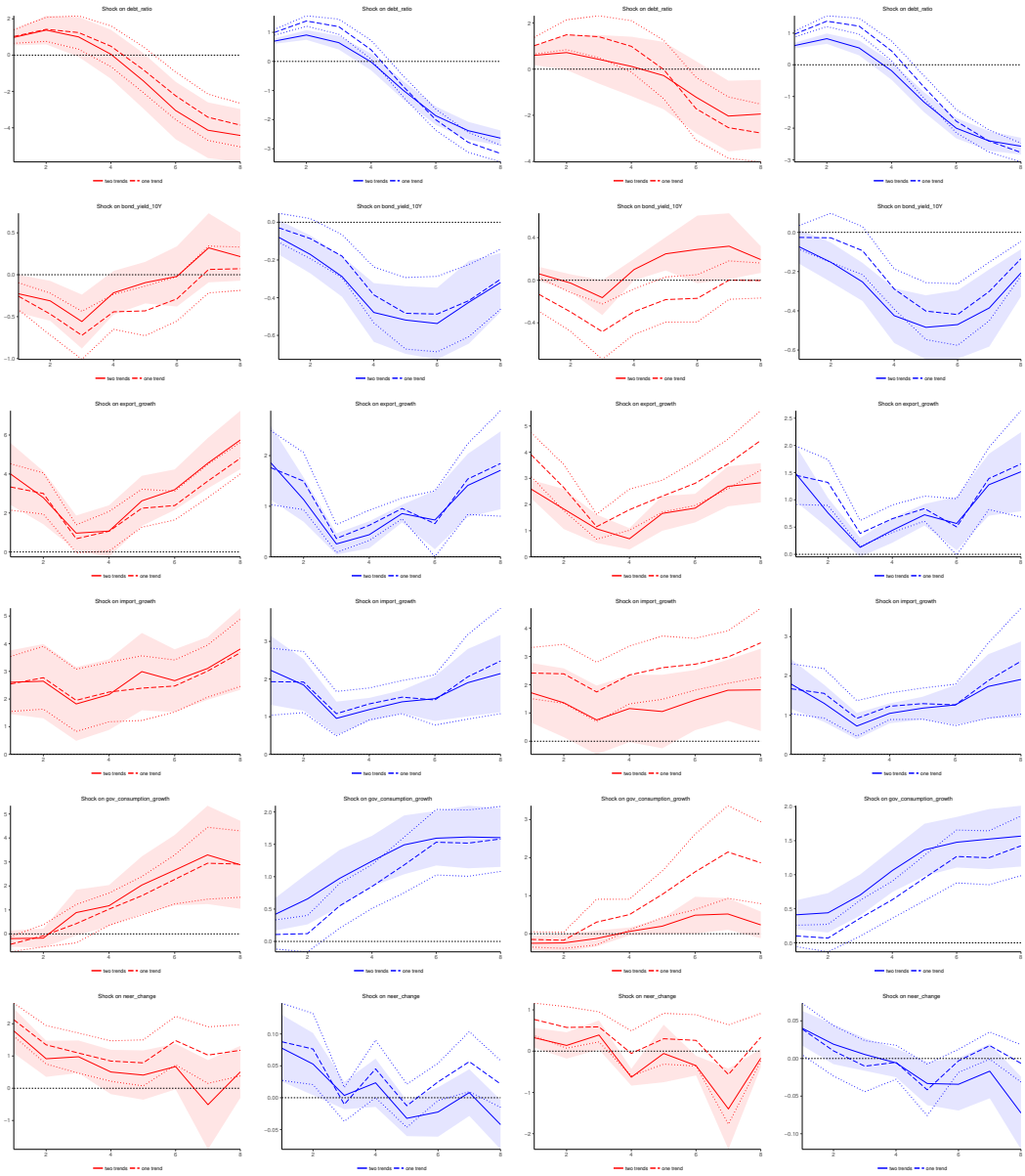


i. floating ii. pegged i. floating ii. pegged

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Exchange rate regime is grouped based on the treatment indicated in Section 4.2. Horizons are years with the convention the shock occurs in year 1.

Figure A.17: Impact of monetary policy: Responses of macroeconomic variables to fiscal consolidations shock, conventional approach, without control variables - cont'd

(a) Alesina thresholds (b) Afonso threshold



i. floating ii. pegged i. floating ii. pegged

Note: The figure depicts the responses to a unit shock with 68% confidence bands. Shock is a fiscal consolidations dummy derived by following procedure described in detail in Section 3.1. Exchange rate regime is grouped based on the treatment indicated in Section 4.2. Horizons are years with the convention the shock occurs in year 1.