What do we know about the effects of austerity?

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Abstract

This paper summarizes the results of a large recent literature on multi year fiscal plans for deficit reduction (austerity). The key results are that deficit reduction policies based upon spending cuts are much less costly in terms of short run output losses than tax based adjustments. . On average fiscal adjustment based upon spending cuts have very samll otput costs and in come cases they are expansionary. We then discuss which possible models can explain these findings and discuss how the evidence can disentangle them.

1 Introduction

The literature on fiscal multipliers is far from having reached an agreed upon conclusion about their size (sometimes even their sign) and how they might be state contingent.[1] There is so much debate about this issue, that Eric Leeper defined this literature as "alchemy". One result, however, seems very robust: in OECD economies fiscal consolidations (austerity) based upon expenditure cuts are much less costly than those performed on the tax side.

This result was originally shown by an early literature which studied episodes of austerity before the financial crisis and the Great Recession. Alesina and Ardagna (2010) summarized and extended these results, which were then confirmed in IMF (2010) and Guajardo et (2014) using

[1]For reviews of the literature on fiscal multipliers see Ramey (2016) and Alesina, Favero and Giavazzi (forthcoming) chapt. 4.

a methodology based upon the narrative method pioneered by Romer and Romer (2010).[2]

The purpose of this paper is twofold. First we review more recent evidence based upon an extension of the narrative method which considers multi-year fiscal plans rather than year-by-year shifts in fiscal variables, like in Romer and Romer (2010) and Guajardo et al.(2014). We shall argue that analyzing multi-year plans is a better way of studying the effects of fiscal policy because in the real world governments typically adopt, and legislatures vote, multi-year budget laws which have little resemblance to isolated fiscal "shocks". We will also document cases of "expansionary austerity", namely episodes in which even large reductions of government spending were associated on impact with increases in GDP growth[3] – a possibility first recorded by Giavazzi and Pagano (1990). Second, we illustrate alternative theoretical explanations for our findings about spending- versus tax-based consolidations and we discuss which ones seem more appropriate in different cases.

2 Austerity: recent evidence

2.1 Estimating the Macroeconomic Effects of Austerity

When legislatures decide to launch a consolidation program, it rarely consists of a budget lasting only one year. It is instead, typically, a multi-year policy package designed to reduce the budget deficit by a certain amount. The first decision is by how much the deficit should be reduced [4]; then, and often after much discussion, which taxes to increase and which expenditure items to cut. This means that if the goal is to reduce the deficit by a certain amount, spending cuts and tax increases are not independent of each other since they must add up to a defined total. In addition, some measures are announced long before they are carried out, while other are implemented immediately. Thus the standard approach to evaluating fiscal policy — which consists of assessing the effects of year-by-year "isolated" shifts in taxes or spending — overlooks two important points. One is the multi-year nature of fiscal adjustments which affects the planning of consumers and investors to the

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[2]Alesina and Ardagna (2013) show how the results by Guajardo et al (2014) are in fact very similar to those by Alesina and Ardagna (2010).

[3]Note however, that, the 90 per cent confidence intervals on the responses of GDP growth to a fiscal correction lie in the negative quadrant. Impulse responses measure the difference between the paths leading the economy to its steady state in presence and in absence of the fiscal correction.

[4]In the case of EU countries this decision needs to be reviewed by the European Commission before being submitted to Parliament.

extent that their expectations matter. The other is the interdependence of the decisions about how much to cut spending and how much to raise taxes which cannot be assumed to be independent of one another and thus cannot be studied in isolation. Finally, in order to measure the macroeconomic consequences of a fiscal adjustment plan one must use an empirical model which can track the effects of the various measures (distinguishing between Expenditure Based (EB) and Taxed Based (TB) plans) on macroeconomic variables.

To construct fiscal consolidation plans [5] we started from detailed information on the consolidations implemented by 16 OECD countries between 1978 and 2014. We address the potential endogeneity of shifts in fiscal variables using the Romer and Romer (2010) "narrative" approach later applied to the countries in our sample by Devries et al. (2011) and extended by Alesina et al. (2015). The fiscal consolidation measures in the Devries et al. dataset (both tax increases and spending cuts) are selected reading the records available in official documents to identify the size, timing and principal motivation for each fiscal action. They are "exogenous" because their adoption was not motivated by the state of the economic cycle but rather were geared towards reducing an inherited budget deficit or were meant to correct its long run trend, *e.g.* an increase in pension outlays induced by population aging. We have extended the Devries et al. dataset adding the consolidation measures implemented between 2010 and 2014. In order to construct fiscal plans we have analyzed and identified the legislative source of about 3500 different fiscal measures adopted in these countries over our sample. This was necessary in order to use these measures to reconstruct fiscal plans, for instance discriminating between measures announced and measures immediately implemented. This disaggregation was not in the original Devries at al. dataset. While doing this, we double checked their classifications. For example we exclude the Netherlands, which is included in the D&al. sample, because the data were not exogenous to the cycle by our definition.

We distinguish between several categories of fiscal measures. For the analysis in this paper, however, we group measures in just two broad categories: spending, g, and taxes, τ. We classify as spending all measures related to government spending and investment: current expenditure for goods and services, public sector salaries, education, health care, government investment, among other. We include transfers in g because, theoretically, we expect a cut in transfers to be less distortionary than an increase in taxes – for instance transfers do not affect the marginal rate of substitution between consumption and leisure. Our choice is supported

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[5]Our database on fiscal plans is available at www.igier.unibocconi.it/fiscalplans

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by the findings in Alesina et al. 2017b who use a three-level disaggregation: tax-based plans, spending-based plans and transfers-based plans. We classify as taxes changes in direct taxes – *e.g.* income, profits, capital gains and property taxes – and indirect taxes – *e.g.* VAT, sales taxes, excise duties on goods, and stamp duties. We include both changes in tax rates and measures designed to broaden the tax base.

Fiscal plans consist of a sequence of actions decided upon when a budget law is adopted, but some implemented immediately, other to be implemented in following periods. Plans are also a mix of measures, some affecting government expenditures, other affecting revenues. Typically legislatures start debating the overall size of an adjustment and then discuss its composition: by how much to cut spending (and which programs) and by how much to raise taxes (and which ones). The design of plans thus generates inter-temporal and intra-temporal correlations among fiscal variables. The inter-temporal correlation is the one between the announced (future) and the unanticipated (current) components of a plan. The intra-temporal correlation is the one between the changes in revenues and in spending that determine the composition of a plan, given its size.

The exogenous fiscal measures selected in our narrative analysis are thus classified in three categories: measures that were immediately implemented ("unexpected" measures), measures that were written in the legislation but whose implementation was deferred ("announcements") and measures that were implemented in a given year but had been previously announced. We distinguish fiscal plans between those that are expenditure based (EB) and those that are tax based (TB) by first summing all fiscal measures (unanticipated, implemented but previously announced and announcements) and then labelling a plan TB if the largest component of the fiscal correction (measured as a fraction of GDP the year before the budget law is introduced) is an increase in taxes. Similarly for EB plans.

To be able to simulate over time the effect of a plan we need to construct "artificial" announcements. We do so estimating the in-sample correlation between announcements and unexpected measures. Note that EB and TB plans are mutually exclusive and this gets around the problem posed by the intra-temporal correlation of individual changes in g and in t. Measuring the macroeconomic impact of a plan requires modelling the relationship between plans and macroeconomic variables. This can be done either through Moving Average projections of macroeconomic variables on the different components of a plan, or by specifying a multivariate model, tpically a VAR, which includes both macroeconomic and fiscal variables (see Favero and Giavazzi, 2012). The Moving Aver-

age approach has the advantage of being parsimonious; the VAR compensates the need for more degrees of freedom with several advantages. First using a VAR which includes changes in revenues and spending (as a fraction of GDP) and tracks the impact of the narratively identified shifts in fiscal variables on total revenues and total spending allows us to check the strength of our narratively identified instruments – for instance it allows us to verify if, following a positive shift in taxes, revenues indeed increase. Second, in a VAR the estimated coefficients on the narratively-identified shifts in fiscal variables measure the effect on output growth of the component of such adjustments that is orthogonal to lagged included variables: thus the estimated multipliers are not affected by the possible predictability of plans on the basis of the lagged information included in the VAR. Finally, a VAR allows to compute multipliers in two different ways: with respect to an initial fiscal impulse and with respect to the cumulated change in fiscal variables.

2.2   Empirical results

Alesina Favero and Giavazzi (forthcoming) uncover many strong regularities.[6]

1) There is a large and statistically significant difference between the effects on output of EB and TB austerity. EB fiscal consolidations have, on average, been associated with a very small downturn in output growth: a spending based plan worth one percent of GDP implies a loss of about half of a percentage point relative to the average GDP growth of the country, which lasts less than two year. Moreover, if an EB austerity plan is launched when the economy is not in a recession, the output costs are zero on average. This average small downturns are the result of cases of EB plans that were more recessionary and others that were associated with almost immediate surges in output growth, that is "expansionary austerity".

Cases in which austerity was accompanied by growth in GDP higher than the average of other countries before the financial crisis include, amongst other, Austria, Ireland, Belgium and Denmark in the eighties, Spain and Canada in the nineties. On the other hand TB plans are associated with large and long lasting recessions. A TB plan worth one per cent of GDP is followed, on average, by a two percent fall in GDP relative to its pre-austerity path. This large recessionary effect lasts several years. We report in Figure 1 the responses of output growth to an EB and TB plan worth one per cent of GDP as shown in Alesina et al. (2017a) within a plan-augmented multi-country panel VAR specification

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[6]See also several papers by the same authors with co-authors Alesina et al (2015, 2016, 2107).

for three variables: output growth, the change of tax revenues as a fraction of GDP and that of primary government spending, also as a fraction of GDP.
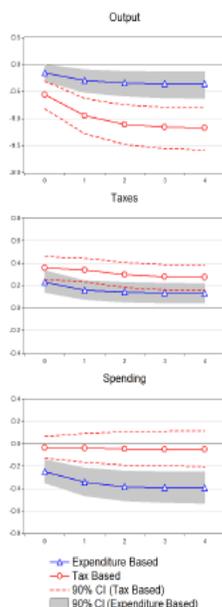

Figure 1: The effect of fiscal consolidation plans (source Alesina et al. (2017a)

2) The effects of reductions in entitlement programs and other government transfers are very different from those of tax increases. They are accompanied by mild and short lived downturns, probably because these cuts are perceived as permanent, leading to a lower expected tax burden. Thus the evidence suggests that transfers are not akin to negative taxes.

3) Amongst the components of private demand, investment growth responds very differently following the introduction of the two types of austerity plans. It responds positively to EB plans and negatively to TB plans. Business confidence behaves consistently with private investment. Consumption, though, and also net exports, on average do not differ during the two types of adjustments.

4) The recent episodes of austerity which occurred after the financial crisis, and started during a recession, were not significantly different from previous cases. The sheer size of some of these austerity plans was exceptional, not only in Greece but also in Spain, Portugal, Ireland, and to a lesser extent Italy and the UK. These episodes confirm the major asymmetry in the effects of the two types of plans. Countries that chose TB austerity suffered deeper recessions compared to those that decided to adopt EB plans. Amongst the latter are Ireland, despite

a massive bank bailout program [7] and the UK, which posted a much more successful economic performance than the IMF had predicted when the country announced its spending based plan in 2010 (eventually the IMF apologized for having severely criticized the UK government).

5) Whether or not fiscal consolidations, on both the tax side and the spending side, are more costly when started during an economic downturn is a difficult point to discern. The answer depends on a variety of issues regarding the measurement of the dynamic pattern of the economy before and during the adjustment (see Auerbach and Gorodnichenko 2012, Ramey and Zubairy 2014). However, the asymmetry between EB and TB based austerity is robust to the adoption of a model that allows for different effects of fiscal adjustment in an expansion and a downturn (Alesina et al. 2017a). Table 1 illustrate the point by showing the fiscal multipliers of an EB and TB permanent fiscal plan of one percent of GDP derived by simulating a Smooth Transition AutoRegressive (STAR) model with two states, recession and expansion, and a non-linearity associated with the composition of a fiscal plan. That is we allow multipliers to differ depending on whether the fiscal consolidation plan is tax-based or expenditure-based and the economy in in expansion or recession. The variables included in this panel VAR are the growth rate of per capita output , the change of tax revenues as a fraction of GDP and that of primary government spending, also as a fraction of GDP. Multipliers are computed following two definitions: we show a cumulated multiplier and a multiplier defined as the sum of the output response over the simulation horizon, divided by the sum of the primary surplus response. The latter is based on the definition suggested by Woodford 2011 and used by Auerbach and Gorodnichenko 2012 and has the advantage of taking into account the response of taxes and spending to the fiscal plan, as well as considering the persistence of fiscal shocks. Note that since our simulated plans contain both spending and tax measures — and both expenditure and receipts react to EB an TB plans — what we compute here is a primary surplus multiplier.

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[7]In chooing a EB plan the Irish government mentioned the fidings about the relative cost of tax hikes and expenditure cut: *"In framing Budget 2010, the Government focused on curbing spending to adjust expenditure needs to the revenue base which has been reduced as a result of the overall contraction of the economy and the loss of certain income streams. In addition, in formulating policy the Government took on board evidence from international organizations, such as the EU Commission, the OECD and the IMF, as well as the relevant economic literature which indicates that consolidation driven by cuts in expenditure is more successful in reducing deficits than consolidation based on tax increases. Past Irish experience also supports this view and suggests that confidence is more quickly restored when adjustment is achieved by cutting expenditure rather than by tax increases."* (*Ireland Stability Programme Update*, December 2009, p. 15).

Regardless of the definition, the multipliers of EB plans are much lower (in absolute value) than those of TB plans, both in expansion and in recession. In expansion, a tax-based fiscal consolidation plan of one precent of GDP has a cumulative multiplier of -1.5, while the cumulative multiplier of a spending-based plan of the same size is -0.46. Similarly, the primary surplus multiplier of a TB plan is -3.70, while that of a EB plan is -0.75. Multipliers in recessions are slightly lower (in absolute value) than in expansions, and exhibit a similar heterogeneity between TB and EB plans.

Table 1: Output Multipliers

		$\sum_{t=0}^{4} \Delta y_t$	$\frac{\sum_{t=0}^{4} \Delta y_t}{\sum_{t=0}^{4}(\Delta \tau_t - \Delta g_t)}$
Expansion	EB	-0.46	-0.75
		$(-0.94;-0.06)$	$(-1.55;-0.31)$
	TB	-1.50	-3.70
		$(-2.29;-0.84)$	$(-8.79;-1.87)$
Recession	EB	-0.28	-0.58
		$(-0.59;0.01)$	$(-1.13;-0.18)$
	TB	-0.96	-2.31
		$(-1.58;-0.44)$	$(-4.39;-1.26)$

Note. The table reports the cumulated and cumulated as fraction of cumulated primary surplus multipliers obtained from the Transition AutoRegressive (STAR) model with two states, recession and expansion, and a nonlinearity associated with the composition of a fiscal plan (Alesina et al. (2017a). 90 percent bootstrapped (1000 repetitions) confidence intervals for the first column and one standard deviation for the second in parentheses.

The only exception to the results reported in Table 1 is observed when the Zero Lower Bound for monetary policy rate is also considered, although data from periods at the ZLB are still too few to draw clear conclusions.

3 What could explain these findings ?

How can we explain these results which are empirically quite striking? We can think of at least four arguments which we now review in turn.

3.1 Accompanying policies.

One "theory" is that the difference between TB and EB plans is simply due to a systematic difference in accompanying policies. The most obvious candidate is monetary policy. In fact Guajardo et al. (2014) argue that indeed differences in the response of monetary policy are substantially responsible for these findings. Alesina, Favero and Giavazzi (forthcoming) instead show that only a small fraction of the heterogeneous effects of EB and TB adjustments is related to monetary policy.

They do so by running a counterfactual simulation: they augment the baseline model including in the specification a monetary policy indicator, the change in the short-term rate. They then compare the response of output growth to EB and TB plans in a baseline scenario, where monetary policy rates are allowed to respond to fiscal policy, and in a counterfactual scenario where interest rates are constrained not to respond to shifts in fiscal variables. The counterfactual simulation shows that the heterogeneous effect of TB and EB plans on output is mitigated somewhat by the absence of a monetary policy response, but it remains highly significant.

A second and related possibility could be that the difference is explained by the behavior of the exchange rate. Note that exchange rate movements *during* a fiscal plan are clearly endogenous to it; but a devaluation prior to the introduction of a plan may not be [8] and thus might explain the lower output cost of EB plans. Alesina Favero and Giavazzi (forthcoming) show that this is not the case. On average there is no systematic difference in the behavior of the exchange rate before fiscal adjustments based upon tax increases or spending cuts. The authors exclude from their sample all episodes of fiscal consolidation that are preceded by a devaluation of at least three percent to at least 10 percent over the previous three years (which is approximately the 10th percentile of the distribution of the three-year cumulative change in the exchange rate). The results were unchanged. In addition if the exchange rate had been an important explanation of the difference between TB and EB plans, the difference between the two cases in terms of GDP growth, should be associated to a different behavior of net exports. This is not the case. As we discussed above, the driving force is domestic private investment.

Finally, large fiscal adjustments are often periods of "deep" structural reforms which may include products and/or labor market liberalization. The latter may stimulate growth and if they were systematically occurring at the time of spending cuts, they may explain the finding. The answer is no: these reforms do not occur systematically during periods of spending cuts. Note that this result is not inconsistent with the evidence and the case studies reported in Perotti (2013) and Alesina and Ardagna (1998, 2013). What these papers show is that amongst all fiscal adjustments, the least costly were those accompanied by supply side reforms and by wage moderation. Our robustness check is different: we check whether the adoption of EB and TB adjustments can be explained

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[8]Whether devaluations stimulate growth, or not, remains a debated subject. Krugman and Taylor (1978) argue against the conventional wisdom that devaluations unambiguously increase growth.

by supply side reforms, and we find that it cannot.

3.2 Confidence

With this (admittedly vague) term we identify situations in which a fiscal consolidation removes uncertainty and stimulates demand by making consumers and especially investors more optimistic about the future. Imagine a situation – for instance as described in Alesina and Drazen (1991) — in which an economy is on an unsustainable path with an exploding public debt. Sooner or later a fiscal stabilization has to occur. The longer one waits, the higher the taxes that will need to be raised (or spending to be cut) in the future When the stabilization occurs it removes the uncertainty about further delays which would have increased even more the costs of the stabilization.[9] Blanchard (1990) provides a simple model which illustrate this point. A stabilization which eliminates the uncertainty about higher fiscal costs in the future stimulates demand today — especially, we may add, demand from investors, who are more sensitive to uncertainty about the future given the long run nature of their plans.

In their models Blanchard (1990) and Alesina and Drazen (1991) do not distinguish between stabilizations occurring on the tax or spending side. However it is quite likely that the beneficial effects associated with the removal of uncertainty are more likely to occur in the presence of EB rather than TB consolidation plans: a TB plan which does not address the automatic growth of entitlements and other spending programs which grow over time if much less like likely to produce a long lasting effect on the budget. If the automatic increase of spending is not addressed, taxes will have to be continually increased to cover the increase in outlays. Thus the confidence effect is likely to be much smaller for TB plans, as expectations of future taxes will continue to rise. EB plans produce the opposite effects. [10]

Alesina and Ardagna (2010) and several papers reviewed therein, present evidence on the dynamics of government budgets consistent with this interpretation: spending based adjustments lead to more long lasting debt stabilization. Alesina, Favero and Giavazzi (forthcoming) present results on business confidence which support this view. They show that, at least in their sample of OECD countries, business confi-

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[9]Alesina and Drazen (1991) explain delays of the unavoidable stabilization as a result of a war of attrition, a political game amongst competing groups trying to avoid taxation.

[10]These models do not incorporate the possibility of default. But if the latter is expected to have major adverse effects, a fiscal stabilization which removes the risk of default will have similar implications.

dence increases immediately at the start of an EB consolidation plan, much more so that at the beginning of a TB plan. Croce et al. (2012) examine the effects of corporate taxation on firms' decisions, and hence on asset prices. Shocks to government expenditure generate tax risk for firms, and the extent of this uncertainty depends on the government's financing policy and on its ability to pin down long-run tax dynamics.

3.3 The supply side: labor supply

Thus far we have not considered the supply side of the economy, but clearly tax hikes and spending cuts – beyond other effects – have different effects on labor supply.

Consider the effects of TB and EB plans in the context of a basic neo-Keynesian model with tax distortions. EB plans are the least recessionary the longer lived is the reduction in government spending. Symmetrically, TB plans are more recessionary the longer lasting is the increase in the tax burden and thus in distortions. Consider a simple demand and supply framework. Assume that the government budget is always balanced through compensating changes in non-distortionary transfers.[11] A cut in government expenditure has two effects. The demand curve shifts inward, due to the direct effect of lower demand from the government. The supply curve also shifts inward: following a cut in government spending consumers feel richer because they expect higher transfers in the future. This lowers labor supply, which in turn leads to an increase in firms' marginal costs. The shifts in aggregate demand and supply are functions of the persistence of fiscal adjustments: higher persistence implies both higher demand and higher supply elasticities, because the long-term nature of fiscal shocks makes consumers more sensitive to changes in prices and firms more aggressive in their price settings. On the other hand, the present value of transfers increases with the persistence of spending cuts. The result is that aggregate demand reacts less, but labor supply falls more because of the wealth effect. When persistence increases, the demand shift due to a cut in government expenditure starts to be dominated by the supply shift due to lower labor supply. The demand effect falls faster than the supply effect, so that the government spending multiplier decreases with persistence. Symmetrically, in the case of an increase in labor taxes, the multiplier increases with persistence. An increase in labor taxes has only a direct effect on aggregate supply. This is because labor taxes create a wedge in the labor market but do not distort demand directly. As in the case of reductions in government consumption, higher persistence raises the elasticities of

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[11]This is assumed for simplicity or exposition but the intuition can be extended to the case of budget deficits and to an open economy (see Alesina et al 2017b)

both supply and demand. Now, however, the shift in supply dominates: as persistence rises, this shift amplifies. To put it simply, a persistent increase in labor taxes makes the static substitution effect between labor and leisure more permanent and this increases the wage tax multiplier. To the extent that fiscal adjustments are perceived to be permanent, and are on the supply side, a standard neokeynesian model thus implies that spending cuts are (much) less recessionary than tax hikes.

3.4 The supply side: network effects

Following a different line of thought Acemoglu et al. (2015 and 2016) study the role of networks linking different sectors in the economy and the propagation of shocks across such networks. Network based analysis of the transmission of macroeconomic shocks starts from the observation that input-ouptut linkages can neutralize the law of large numbers. Studying the propagation of adjustments through input-output linkages Acemoglu et al. (2016) show that supply-side shocks propagate downstream more powerfully than upstream: downstream customers of sectors that are hit by a supply shock are affected more strongly than upstream suppliers. The converse is true for demand shocks: they propagate more powerfully upstream. The reason for this asymmetric pattern lies in the fact that supply side shocks change the prices faced by customer industries, while demand side shocks have much smaller effects on prices and propagate upstream.[12]

How are these results related to the evidence illustrated in the previous paragraph? Fiscal adjustments based on increasing taxation have a strong supply-side component, while EB adjustments are one of the benchmark cases of demand-side adjustments. Because their propagation is totally different, the size of the final effect on output of the two different types of fiscal adjustments depend on different elements of the input-output matrix. EB adjustments, being mainly demand shocks, have a network effect that goes through the connection of industry i with its customers. Symmetrically, TB adjustments, being mainly supply shocks, have a network effect that goes through the connection of industry i with its suppliers. The empirical model for the measurement of the effect of a fiscal adjustment on value added growth is thus a global VAR model in which the effect of EB and TB adjustments are the sum

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[12]In the simplified benchmark model studied in much of the literature (Long and Plosser 1983, and Acemoglu, Carvalho, Ozdaglar and Tahbaz-Salehi 2012), where both production functions and consumer preferences are Cobb-Douglas (so that income and substitution effects cancel out), the asymmetry in the propagation of demand and supply shocks becomes extreme. There is no upstream effect from supply-side shocks and no downstream effect from demand-side shocks.

of a direct effect and an indirect effect driven by a sector and an adjustment specific global variable, *i.e.* a weighted average of added value growth in all the other sectors with weights that are specific to each sector and to the nature of the adjustment. Briganti et al. (2017) show that the simulation of such a model produces output effects of TB and EB adjustments that reproduce the asymmetry documented in the previous paragraph.

4   References

Acemoglu D., V. Carvalho, A. Ozdaglar, and A. Tahbaz-Salehi (2012), "The Network Origins of Aggregate Fluctuations", *Econometrica*, 80(5), 1977-2016

Acemoglu D., A. Ozdaglar, and A. Tahbaz-Salehi (2015), "Systemic Risk and Stability in Financial Networks ", *American Economic Review* , 105(2), 564-608

Acemoglu D., U. Akcigit and W. Kerr (2016), "Networks and the Macroeconomy: An Empirical Exploration", *NBER Macroeconomics Annual*, 30(1), 273-335

Alesina A. and S. Ardagna (1998), "Tales of Fiscal Adjustment", *Economic Policy*, 13(27), 489-585

Alesina A. and S. Ardagna (2010), "Large Changes in Fiscal Policy: Taxes versus Spending", *Tax Policy and the Economy*, 24, 35-68, edited by J.R. Brown

Alesina A. and S. Ardagna (2013), "The Design of Fiscal Adjustments", *Tax Policy and the Economy*, 27(1), 19-68

Alesina A. and A. Drazen (1991), "Why Are Stabilizations Delayed?", *American Economic Review*, 81(5), 1170-1188

Alesina, A., C. Favero, and F. Giavazzi (2015), "The Output Effect of Fiscal Consolidation Plans", *Journal of International Economics*, 96, S19-S42

Alesina A., G. Azzalini, C. Favero, F. Giavazzi and A. Miano (2017a), "Is it the "How" or the "When" that Matters in Fiscal Adjustments" , NBER WP 22863, forthcoming in *IMF Economic Review*

Alesina A., O. Barbiero, C. Favero, F. Giavazzi, and M. Paradisi (2017b), "The Effects of Fiscal Consolidations: Theory and Evidence ", NBER WP 23385

Alesina A., C. Favero, and F. Giavazzi (forthcoming), "Austerity", Princeton University Press

Auerbach A. and Y. Gorodnichenko (2012), "Measuring the Output Responses to Fiscal Policy", *American Economic Journal: Economic Policy*, 4(2), 1-27

Blanchard O. (1990), "Comments on Giavazzi and Pagano", NBER Chapters in *NBER Macroeconomics Annual 1990*, vol. 5, 75-122

Briganti E., C. Favero and M. Karamysheva (2017), "The Network Effects of Fiscal Adjustments ", mimeo IGIER, Bocconi University

Croce, M. M., H. Kung, T. T. Nguyen, and L. Schmid (2012), "Fiscal Policy and Asset Prices", *Review of Financial Studies*, 25(9), 2635-2672

DeVries P., J. Guajardo, D. Leigh and A. Pescatori (2011), "A New Action-based Dataset of Fiscal Consolidation", IMF Working Paper No. 11/128, International Monetary Fund

Favero, C. and F. Giavazzi (2012), "Measuring Tax Multipliers: The Narrative Method in Fiscal VARs", *American Economic Journal: Economic Policy*, 4 (2), 69-94

Giavazzi F. and M. Pagano (1990), "Can Severe Fiscal Contractions Be Expansionary? Tales of Two Small European Countries ", NBER Chapters in *NBER Macroeconomics Annual 1990*, vol. 5, 75-122

Guajardo, J., D. Leigh, and A. Pescatori (2014), "Expansionary Austerity? International evidence ", *Journal of the European Economic Association*, 12(4), 949-968

IMF (2010), "Will it Hurt? Macroeconomic Effects of Fiscal Consolidations", Chapter 3, October

Krugman P. and L. Taylor (1978), "Contractionary Effects of Devaluation", *Journal of International Economics*, 8(3), 445-456

Leeper E. M. (2010), "Monetary Science, Fiscal Alchemy", NBER WP 16510

Long J.B. and C. Plosser (1983), "Real Business Cycles ", *Journal of Political Economy*, 91(1), 39-69

Perotti R. (2013), "The Austerity Myth: Gain without Pain?" in *Fiscal Policy After the Great Recession*, eds. Alberto Alesina and Francesco Giavazzi, University of Chicago Press and NBER, 307-354

Ramey, V. A. (2016), "Macroeconomic Shocks and Their Propagation" in *Handbook of Macroeconomics*, eds. John B. Taylor and Harald Uhlig, Amsterdam: Elsevier, Vol. 2, 71-1628

Ramey, V. A. and S. Zubairy (2014), "Government Spending Multipliers in Good Times and in Bad: Evidence from U.S. Historical Data ", NBER WP 20719, forthcoming in *Journal of Political Economy*

Romer C. and D. H. Romer (2010), "The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks", *American Economic Review*, 100(3), 763-801