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Policy Forum

What Do We Know About the Macroeconomic Effects of Fiscal Policy? A Brief Survey of the Literature on Fiscal Multipliers[1]

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Abstract

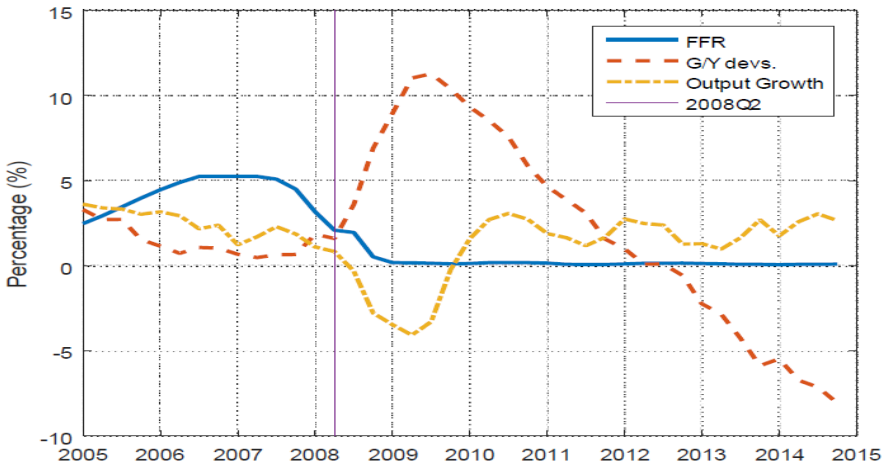
This article discusses recent research on the macroeconomic effects of fiscal policy—the theme of the 2018 edition of the Melbourne Institute Macroeconomic Policy Meeting. We review recent research findings on the effects of fiscal multipliers in normal times, during booms/busts, and in the presence of the zero lower bound. Studies on the effects of fiscal policy in open economy settings as well as contributions on the fiscal-monetary policy mix are also considered. We conclude by outlining a few research avenues that are particularly relevant from a policy standpoint.

1. Introduction

The global financial crisis (GFC) has had a long-lasting impact on policy rates in a number of countries. Figure 1 (sourced from Bilbiie et al. 2018) shows the evolution of the federal funds rate (the policy rate directly handled by the Federal Reserve) before, during and after the GFC in the United States. Noticeably, the Federal Reserve slashed interest rates down to zero in an attempt to manage the negative real effects of the financial crisis. At that point, hampered by the inability to use conventional monetary policy, it switched to adopting different forms of quantitative easing and forward guidance. In the meanwhile, fiscal policy also began to be increasingly adopted as a stabilization tool. Figure 1 also plots the deviation of the ratio of Government consumption (spending net of transfers) to GDP relative to its historical mean. The increase in government consumption occurred roughly in correspondence to the start of the recession—a fiscal move evidently intended to respond to a business cycle bust.

This monetary–fiscal policy mix was in place in other countries as well. In Australia, the cash rate was cut by 425 basis points going from 7.25 per cent in August 2008 to 3 per cent in April 2009. At the same time, Australia's Government surplus over GDP moved from 1.7 per cent in 2008 to a record low –4.2 per cent in 2012.[1]

Figure 1 US Real GDP Growth and Monetary and Fiscal Policy Indicators Before, During and After the Global Financial Crisis



Source: Bilbiie et al. (2018).

The fiscal spending policy implemented during the deepest phase of the financial crises led inevitably to concerns about fiscal credibility and debt service. Policies to repair the fiscal stance—the often called 'austerity plans'—became hotly debated from a political standpoint, and especially in economically fragile countries like Greece and Italy.[2]

These fiscal policy interventions have spurred fresh research on fiscal policy and its effects on the business cycle. Particular emphasis has been devoted to fiscal spending and tax multipliers in normal times, recessions, phases of high public and private debt, and during times of effective or actual zero lower bound. Recent research has also examined the role of anticipated fiscal moves, as well as the effects of fiscal plans.

This article summarises discussions around fiscal policy and its business-cycle effects drawing on the papers presented at the Melbourne Institute Macro Policy Meeting held on 4–5 October 2018.[3] The overall aim of the event was to provide a forum for academics and policymakers to discuss evidence and insights on the role of fiscal policy before, during and after the GFC. The Meeting featured 11 high quality scientific papers as well as a panel discussion facilitated by Bruce Preston (University of Melbourne) with panellists: Guy Debelle (Reserve Bank of Australia), Anella Munro (Reserve Bank of New Zealand) and Nigel Ray (Australian Treasury). This article discusses a few of the contributed papers and relates them to the extant literature and recent papers in the field.

Ramey's (2018) survey paper is the polar star of our short review. Her contribution, presented at the Meeting, offers a comprehensive and insightful survey of the literature on fiscal multipliers. As she puts it, such literature has experienced a renaissance over the past decade or so. In particular, Ramey (2018) notices that substantial progress has been made over three different but interconnected fronts to increase our understanding of the size of the fiscal multipliers. We briefly describe these fronts below.

First, the realism and credibility of models for policy analysis have substantially increased. Examples of new developments include allowing for nominal frictions (for both prices and

wages), introducing hand-to-mouth consumers, imposing lower bounds on policy interest rates, recognising currency unions and various financing methods, distinguishing between the effects of anticipated/unanticipated fiscal policy.

Second, the quantification of fiscal multipliers has benefited from natural experiments, the adoption of narrative methods, the use of proxy SVAR/external instrument methods and the use of local projection methods. Moreover, a better understanding on how to compute fiscal multipliers has led to the standardisation of the methods used to assess them. The consideration of state-dependent multipliers has also become the norm.

Third, there have also been improvements in the types of data analysed. These improvements include the use of novel country-specific historical and cross-sectional datasets, the application of narrative instruments for panels of countries, and the exploitation of rich new data created by the variety of policymakers' fiscal responses to the crisis.

Our survey focuses on recent empirical analysis aimed at quantifying the size of fiscal spending and tax multipliers. We cover studies investigating the role of unexpected as well as anticipated fiscal shocks; contributions that allow for counter-cyclical and, more generally, state-dependent multipliers; investigations that deal with fiscal and monetary policy interactions, with a focus on fiscal spending when the policy rate is at the zero lower bound; and papers dealing with fiscal plans.[4] Our survey complements Ramey's (2018) contribution as well as the excellent reviews of the literature by Parker (2011), Ramey (2011a), Favero and Karamysheva (2015) and Leeper and Leith (2016).

The structure of the paper is as follows. Section 2 surveys the recent literature on fiscal multipliers, with a focus on papers dealing with linear VAR analysis. Section 3 moves away from the assumption of linearity and covers recent contributions on counter-cyclical fiscal multipliers. Section 4 offers a review on other forms of state-dependence. Section 5 concludes by pointing out a few avenues for future research.

2. How Large are the Fiscal Spending and Tax Multipliers?

Ramey's (2011a) survey of the literature points to fiscal spending multipliers likely to be in the 0.5 to 2 range. Ramey (2018) refines this estimate and proposes a narrower 0.6–1 range. The refinement is partly due to a better understanding of how to compute fiscal spending multipliers. In fact, the computation of such multipliers has been the object of an intense debate involving several prominent researchers. To illustrate how different definitions of the multiplier can lead to strikingly different estimates, Ramey (2018) carries out an interesting exercise using a standard dataset of the US economy comprising log real total government spending per capita, log real GDP per capita, log real federal tax receipts per capita, 3-month Treasury bill interest rates, and the inflation rate over the period 1939Q1–

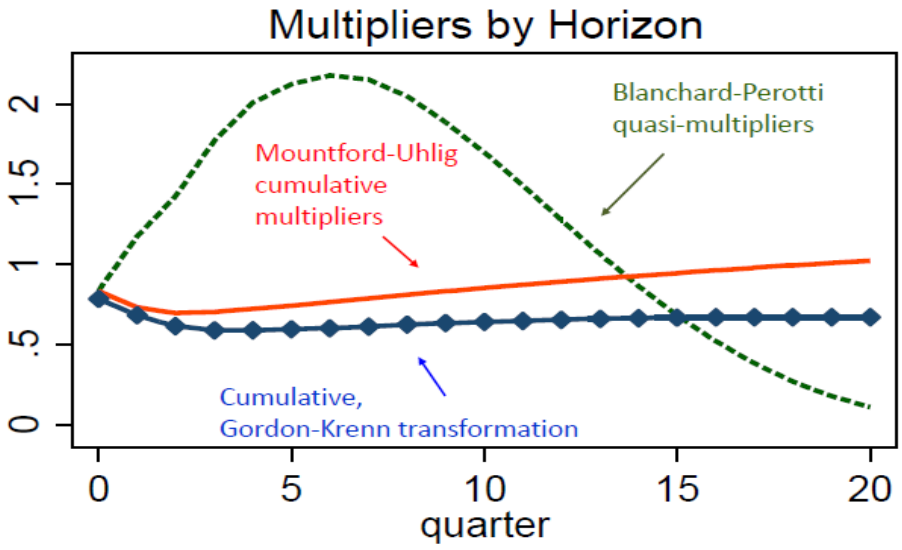
2015Q4. She then computes the effects of fiscal spending shocks, identified recursively as in one of the exercises conducted by Blanchard and Perotti (2002), with three different methods.

The first one follows Blanchard and Perotti (2002) and focuses on the ratio between the peak of the response of output and the impact response of fiscal spending. This method, according to Ramey (2018), leads to a 'quasi-multiplier' because it overlooks the role played by fiscal spending persistence. However, such persistence is something policymakers take into account when assessing how much bang they can get out of a buck (which, in fact would not be one buck only if the fiscal spending process is persistent, but indeed a sequence of bucks). Mountford and Uhlig (2009) propose computing cumulative fiscal multipliers by i) taking the persistence of fiscal spending into account, and ii) discounting the future realisations of output and fiscal spending as predicted by the VAR impulse responses. This way of computing the multipliers is more informative for policymakers to assess the costs and benefits of the implementation of fiscal policy interventions.

A common element in Blanchard and Perotti's (2002) and Mountford and Uhlig's (2009) investigations is the use of the scaling factor Y/G (i.e., the ratio of output over public spending) to convert the estimated elasticities to dollar terms (again, to address the question: 'How much does GDP rise when government spending rises by $1?'). The use of this conversion factor is problematic for two reasons. First, the Y/G ratio is unstable over long sample periods, which is undesirable if one wants to have a 'stable' indication of the size of the multiplier. Second, as noted by Sims and Wolff (2018), G is acyclical while Y is procyclical. Hence, the Y/G ratio is procyclical too, which implies that the use of a constant ratio Y/G overestimates the spending multiplier in recessions (and underestimates it in expansions). Hall (2010) and Barro and Redlick (2011) avoid the use of the Y/G conversion ratio by transforming the variables employed in the analysis to the same units *before* the estimation of the econometric model. This is achieved by dividing them either by past real GDP or by past real potential GDP.

Ramey (2018) shows that these three different ways of computing the multipliers can lead to dramatically different estimates. Figure 2 (borrowed from Ramey 2018) shows that the computation of multipliers à la Blanchard and Perotti (2002) can substantially induce an upward bias in the figures related to this spending multiplier. Once the persistence of spending is taken into account, the multiplier is lower than one. Getting rid of the conversion factor reduces even further the multiplier, at least conditional on the dataset employed by Ramey (2018).

Figure 2 Effect of Different Methods to Compute the Fiscal Spending Multiplier



Source: Ramey (2018).

Does this Figure represent the ultimate word on the strength of fiscal policy as a business cycle stabiliser? This is unlikely. Interested readers may want to read the Ramey and Zubairy-Gorodnichenko exchanges on the strength of the fiscal spending multiplier published, with admirable intellectual honesty, on Ramey's webpage.[5] In short, the view that the fiscal multiplier is larger than one in periods of slack is indeed supported by part of the literature (more on this point in Section 3). Moreover, as stressed by Ramey (2018) herself, the size of fiscal spending multipliers may also depend on the type of spending under scrutiny. For instance, Iltzeki et al. (2013) find public investment multipliers to be in the 1.5–1.6 range.

Turning to tax multipliers, Ramey's (2018) survey points to values between –2.5 and –3. While this range covers a number of contributions in the literature, it does not include all relevant ones. For instance, a recent paper by Caldara and Kamps (2017) shows that changes in the values of the fiscal spending and tax elasticities can lead to dramatically different fiscal multipliers, a point that underlines the relevance of a serious econometric analysis on such elasticities. Using a clever identification strategy based on instruments that are not related to fiscal objects, but that are used to estimate VAR-consistent fiscal policy rules, Caldara and Kamps (2017) find that spending increases provide more stimulus than tax cuts, and that the one-year median tax multiplier ranges between –0.5 and –0.7, while the spending multiplier ranges between 1 and 1.3.

2.1 Fiscal Foresight

In discussing the results above, we have not devoted much attention to distinguishing between unanticipated and anticipated fiscal policy moves. Modeling a standard set of US variables with a medium-scale structural model that allows for foresight up to eight quarters, Schmitt-Grohe and Uribe (2012) find that about 60 per cent of the variance of government spending is due to anticipated shocks. Unfortunately, in the presence of fiscal foresight, standard VARs—which rely on current and past shocks to interpret the dynamics of the modeled variables—are typically 'non-fundamental', in that they do not embed the information related to 'news shocks', that is, future shocks anticipated by rational agents. This leads to an issue when it comes to econometric analysis, in particular VAR analysis, because it is obviously true that a VAR lacking proxies on expected fiscal spending would not embed enough information for an econometrician to correctly identify the effects of this type of news shocks. Leeper et al. (2013) derive the econometric biases that may arise in this case.

Understanding how to tackle news shocks in VAR analysis is important. News shocks can generate fundamentally different responses with respect to those triggered by unexpected movements in fiscal spending and taxes. House and Shapiro (2006) and Mertens and Ravn (2012) show the importance of distinguishing between unexpected versus expected tax changes. The reason is simple: while unexpected tax changes tend to stimulate output, expected ones can be associated with decreases in output due to firms' and consumers' decisions to postpone investment and consumption until taxes are actually lower. Related papers are Mertens and Ravn (2010, 2012) and Leeper et. al (2012).

Using a proxy for fiscal policy shocks constructed with a narrative approach, Ramey (2011b) documents that most variations in fiscal spending in the United States are anticipated. The timing of this type of news shocks is that once news on changes in fiscal spending have been released, output moves, and even if fiscal spending does not at this point in time, it will soon follow. This is indeed what a model with rational agents would predict, because agents would anticipate future spending even without observing it at time *t* and would start adjusting their consumption decisions even before the increase in spending actually occurs. Using her novel measure of fiscal news shock, Ramey (2011b) finds the fiscal spending multiplier to be lower than one.

Another way of tackling the fiscal foresight issue is to add measures of expectations to the VAR, as in Auerbach and Gorodnichenko (2012). Forni and Gambetti (2016) show that the sum of revisions of expectations over future fiscal spending is a powerful instrument for fiscal spending news, and it can then be added to an otherwise standard fiscal VAR to identify fiscal spending news shocks and compute the impulse response of fiscal spending and real GDP to such shocks. Caggiano et al. (2015) employ Forni and Gambetti's (2016) measure to show that fiscal spending news shocks are very expansionary in deep recessions, while Ong (2018) finds spillovers effects on the Canadian term structure of interest rate due to fiscal spending news shocks originating in the United States. Other papers dealing with

fiscal foresight, using a variety of different strategies, are Yang (2005), Fisher and Peters (2010), Mertens and Ravn (2011), Ramey (2011b), Favero and Giavazzi (2012), Kriwoluzky (2012), Leeper et al. (2013), Ellahie and Ricco (2017), Ben Zeev and Pappa (2017) and Lee et al. (2018). A survey of the literature concerned with news shocks in general (not only related to fiscal policy) is provided by Beaudry and Portier (2014). Finally, related to this literature, it is important to remember that 'non-fundamentalness' is an empirical issue and that, most times, small scale VARs (possibly augmented with variables capturing agents' confidence) can perform well (Canova and Hamidi Sahneh 2017).

2.2 Fiscal Plans

A recent twist to the literature is the one triggered by a paper by DeVries et al. (2011). They construct a new dataset of fiscal consolidations for 17 OECD economies during the period 1978–2009. They focus on discretionary changes in taxes and government spending having the goal of reducing the budget deficit, that is, not due to the evolution of the business cycle. To identify the motives behind fiscal plans, they examine policy documents such as budgets, budgets speeches, central bank reports and convergence and stability programs submitted by the authorities to the European Commission, and IMF and OECD reports. This narrative approach, which is inspired by an earlier effort by Romer and Romer (2010), is employed by Guajardo et al. (2014) to estimate the effects of fiscal consolidations, which are found to lead to contractionary private demand and GDP. Beetsma et al. (2015) investigate the relationship between spending and tax-based plans and confidence. Their results suggest that consumer confidence falls around announcements of consolidation measures, an effect likely driven by revenue-based measures.

Alesina et al. (2015) point out that the correct experiment to quantify the impact of a fiscal adjustment requires simulating the effects of multi-year fiscal plans (as opposed to individual fiscal shocks). This because i) fiscal plans usually involve inter-temporal adjustments in spending and taxes, and ii) in the presence of a plan targeted at reducing the deficit (or debt) to GDP ratio, spending and tax adjustments are naturally correlated. They simulate fiscal plans adopted by 16 OECD countries over a 30-year period and compare the effects of fiscal adjustments mainly based on cuts in expenditures (EB) with those related to adjustments mainly based on increases in taxes (TB). EB adjustments are found to have little output cost compared to those based on taxes. This message is reiterated in follow up papers (Alesina et al. 2017; Alesina et al. 2015).

What is the driver of the differences in EB and TB plans? Contrary to some results in the literature, the difference between these two types of adjustments is not found to be driven by accompanying policies (e.g., monetary policy). Instead, it is found to be correlated with the different responses of business confidence and private investment. A recap of the possible different channels behind the different responses in EB and TB plans is provided by Alesina et al. (2018).

Moving to the supply side, an interesting connection between Alesina et al.'s (2018) findings and supply side effects is represented by network effects. Acemoglu et al. (2016) investigate the role of networks and how shocks propagate across such networks. It turns out that supply-side shocks propagate downstream more powerfully than upstream, that is, consumer industries of sectors hit by the supply shock are affected more strongly than suppliers of those sectors. This happens because supply shocks change the prices faced by consumer industries, while demand shocks have limited effects on prices, and therefore propagate more strongly upstream. Why does this matter for our discourse on fiscal policy shocks? It matters because fiscal adjustments based on TB plans have a distinct supply side component, while EB adjustments have a stronger demand side one. To understand what macro consequences these two different types of plans can have, one needs to work with an econometric model that can quantity the 'input-output' type of links going from industry *j* to its suppliers and consumers. Such a model could then be used to simulate the direct and network effects of the implementation of EB and TB fiscal plans on each sector $j = 1,...,J$ (with J equal to the overall number of sectors). Briganti et al. (2018) model the US economy as an industry network with a Spatial Vector Autoregression model and show that tax-based plans propagate through the network with an average output multiplier of close to –2, while the propagation of expenditure-based plans does not lead to any statistically significant effect on growth.

3. Fiscal Multipliers in Booms and Busts

The counter-cyclicality of fiscal spending multipliers (see, for example, Parker 2011) is a hotly-debated topic. Fiscal spending multipliers may be larger during periods of slack because crowding out of private consumption and investment is weaker. This could be due to less responsive prices during phases of economic slack and the constrained reaction of nominal interest rates due to the zero-lower bound. Papers dealing with the zero lower bound and its consequences are Eggertsson and Woodford (2003), Krugman (2008), Eggertsson 2010, Christiano et al. (2011), Woodford (2011), Fernandez-Villaverde et al. (2015) and Leeper et al. (2017). It has also been suggested that there are higher returns from public spending due to counter-cyclical financial frictions and credit constraints (Canzoneri et al. 2016) and there is evidence of procyclical crowding out determined by state-dependent labor market tightness (Michaillat 2014; Roulleau-Pasdeloup 2014). Empirical evidence in favor of state-dependent fiscal multipliers is provided by, among others, Tagkalakis (2008), Auerbach and Gorodnichenko (2012, 2013, 2017), Bachmann and Sims (2012), Mittnik and Semmler (2012), Batini et al. (2012), Fazzari et al. (2015) and Figueres (2017).

These analyses are mainly conducted using nonlinear VARs, with shocks often identified by a Blanchard-Perotti (2002) type of recursive strategy without taking external information on tax elasticities into account. Differently, Owyang et al. (2013) and Ramey and Zubairy (2018)

employ local projections à la Jordà (2005) and exploit fiscal spending news shocks identified with a narrative approach to compute asymmetric multipliers in expansions and in recessions. They find no evidence in favour of larger multipliers in bad times for the United States. This evidence, however, is found for Canada.

How do we reconcile the different estimates provided by, say, Auerbach and Gorodnichenko (2012) and Ramey and Zubairy (2018)? An interesting exercise is performed by Caggiano et al. (2015). By relaxing the assumption of absorbing states entertained by Auerbach and Gorodnichenko (2012), Caggiano et al. (2015) show that an expansionary fiscal spending shock occurring during an economic downturn can accelerate the exit from the bust phase, which is then much shorter than the one assumed by Auerbach and Gorodnichenko (2012). As a consequence, the discounted returns of fiscal spending in recessions are lower and are found to be statistically equivalent (although numerically higher) than the ones in expansions. This result is similar to the one in Ramey and Zubairy (2018) on the acyclicality of fiscal spending multipliers. However, when extreme events (in particular, the GFC) are considered, the smooth-transition VAR used by Caggiano et al. (2015) points to a large fiscal spending multiplier (about 2.5) which is much higher than the one normally associated with sustained booms. The message here is clear: not all recessions are alike, and during deeper ones, higher returns may result from the extra buck spent on public investment or consumption.

It is important to note that, while most of the literature has focused on the effects of a positive fiscal spending shocks in booms and busts, recent evidence points to significant differences between the effects of positive and negative changes in fiscal spending. Barnichon and Matthes (2018) show that, regardless of whether we identify government spending shocks from a narrative approach or zero restrictions, the contractionary multiplier—the multiplier associated with a negative shock to government spending—is above 1, and it is even larger in times of economic slack. In contrast, the expansionary multiplier—the multiplier associated with a positive shock—is substantially below 1 regardless of the state of the business cycle.

4. Other Forms of State-Dependence

This section focuses on the relevance of systematic monetary policy and the particular form of it—the zero lower bound—for the fiscal multiplier. It then covers other forms of state-dependence, including nonlinearities related to financial frictions, public and private debt, and exposure to external aggregate pressures.

4.1 Zero Lower Bound

Fiscal policy at the zero lower bound has been the subject of intense scrutiny since the GFC. The reason is simple. Given the inability of most central banks to implement conventional

policy easings (a costly inability, as empirically proven by, for example, Caggiano et al. 2017; Kulish et al. 2017; Liu et al. 2017), policymakers have experimented with expansionary policies such as unconventional monetary policy interventions or fiscal plans to stimulate their economies out of recession. Christiano et al. (2011) study the effects of a binding zero lower bound on the fiscal spending multiplier in a medium-scale New Keynesian framework (for other references, see Eggertsson and Woodford 2003; Eggertsson 2010). They show that the multiplier can be much larger than one. The reason is the following. An increase in spending leads to an increase in output, marginal cost and expected inflation. The increase in expected inflation, given the zero level of the policy rate, drives the real ex-ante interest rate down, which then boosts the multiplier. The value of the multiplier depends on many factors. Interestingly, the larger the output cost an economy experiences due to the presence of the zero lower bound (which limits the central bank's ability to tackle recessionary shocks in the first place), the larger the value of the multiplier.

4.2 Monetary–Fiscal Policy Mix

While fiscal policy has often been studied in isolation, it is important to stress that its interaction with monetary policy is crucial for the determination of the size of the fiscal multipliers. Leeper (1991) is a classic reference to show the relevance of the interactions between monetary and fiscal policy for the determination of the equilibrium values of inflation and output. Leeper and Leigh (2016) provide a comprehensive survey.

Bianchi and Melosi (2017) model the interaction between monetary and fiscal policy with a micro-founded regime-switching DSGE framework featuring different possible monetary–fiscal policy mixes. They use this framework to study the missing deflation in the United States during the zero lower bound period, and find the uncertainty surrounding debt stabilisation as a possible factor behind the missing deflation during the great recession. The uncertainty is about the type of policy mix that would occur after the Federal Reserve decide to leave the zero lower bound and increase the policy rate. Rational agents could have expected a passive monetary/active fiscal policy mix to be in place after the lifting of the policy rate. Passive monetary policy would have allowed inflation and real activity to adjust to stabilise debt, therefore accommodating active fiscal policy. This combination of expected future policies would then have sustained inflation during and after the 2007–2009 recession in spite of the dramatic drop in real activity recorded in 2009.

An interesting spinoff of the above paper is Bianchi and Melosi (2018) (one of the papers presented at the Melbourne Institute Macroeconomics Policy Meeting this year). They study a scenario in which fiscal policymakers may be perceived as unwilling to take action to stabilise high levels of debt (like those cumulated by several countries after the GFC), while the central bank is committed to fighting inflation. In this situation, inflation expectations will tend to rise because agents would expect inflation to eventually stabilise the real value of debt. However, given the central bank's commitment to stabilise inflation, interest rates will rise. The output contraction following the monetary policy tightening may lead to a

further increase in the debt/GDP ratio and to a vicious spiral featuring further increases in inflation expectations, interest rates and public debt. Bianchi and Melosi (2018) show that a coordinated commitment to inflate away part of the debt can lead to welfare improvements and lower uncertainty because it separates the issue of long-run debt sustainability from the need for a short-run fiscal stimulus.

A relevant paper on the policy mix is the one by Eusepi and Preston (2018a). They propose a theory of the fiscal foundations of inflation based on imperfect knowledge and learning and show that the Great Moderation in the United States would not have been great if the public debt-over-GDP ratio had been characterised by the same level and composition observed in a number of European countries since the advent of the GFC. Their reasoning is as follows. Typically, rational expectation-DSGE models of inflation assign a dominant role to monetary policy and confine fiscal policy to the background. In the language of Leeper (1991), fiscal policy is 'passive', that is, it just determines the value of debt. Differently, monetary policy is active (that is, it is aggressively used to control inflation). Hence, these models point to a switch from bad to good monetary policy when it comes to explaining the dramatic reduction of macroeconomic volatilities (inflation, output growth) experienced by the United States since the mid-1980s and before the GFC.

What Eusepi and Preston (2018a) show is that this result falls apart when imperfect knowledge and learning are introduced. Imperfect knowledge makes agents uncertain about current and future policy regimes and therefore the long-term equilibrium levels of inflation and taxes. Agents will then try to learn these equilibrium levels by estimating econometric models to learn about them. Interestingly, Eusepi and Preston find that stability—defined as the set of policies that ensures agents correctly learn the long-run objectives of policy—is threatened when debt is elevated and of moderate maturity (between 2 and 7 years), which is indeed the maturity for most European countries. This is a crucial policy message because most European countries (with the notable exception of the United Kingdom) feature high debt levels and average debt maturities falling within this range. Eusepi and Preston show that, even under an aggressive monetary policy, debt levels and maturities comparable to the European ones would have prevented the US economy enjoying the Great Moderation. As an aside, we note that learning is a factor that would force researchers to re-evaluate the stabilising power of monetary policy even in models in which fiscal policy is secondary (Eusepi and Preston 2018b).

Turning to the VAR empirical side, Rossi and Zubairy (2011) and Canova and Pappa (2011) show that fiscal multipliers tend to be larger when positive spending shocks are accompanied by a decline in the real interest rate.

4.3 Uncertainty

An intriguing but little explored research avenue relates to the dependence of the effects of fiscal interventions on uncertainty. Baker et al. (2016) find political uncertainty to be

pervasive in many industrialised countries. Interestingly, the bulk of this uncertainty, at least in the United States, is associated with fiscal policy decisions. Such uncertainty suggests an optimal delay in investment and hiring by firms (Bloom 2009; Bloom et al. 2018). Standard models of precautionary savings also point to a reduction in consumption driven by unclear fiscal plans. But is there any empirical evidence for this? Ricco et al. (2016) employ nonlinear empirical frameworks and find that fiscal policy shocks are less effective when uncertainty is high. Alloza (2018) shows that this is true even in a complex framework that jointly models uncertainty states (high uncertainty, tranquil times) and business cycle states (recessions, expansions). Possibly, this finding offers a rationale for a direct policy response to measures of uncertainty (Fernandez-Villaverde et al. 2015; Evans et al. 2015; Caggiano et al. 2018).

There are now a number of findings about the effect of uncertainty lowering the effectiveness of monetary policy shocks (see Pellegrino, 2017, 2018; Aastveit et al. 2017; Eickmeier 2016).[6] The weaker response of growth and inflation to macroeconomic policies, in the presence of high uncertainty, can be rationalised by a 'wait-and-see' type of optimal behavior by households and firms as economic analysis suggests a postponement of purchases of durable consumption and productive capital to a time when uncertainty is lower. Castelnuovo and Pellegrino (2018) find evidence of a steeper new-Keynesian Phillips curve (i.e., of more flexible prices) in times of high uncertainty, something which may offer a price setting-related rationale to the milder real effects of monetary policy shocks in such a state of the world. This result, which is obtained with a full-system estimation of a medium-scale DSGE model, echoes the one in Vavra (2014), who focuses on a single equation estimation of a battery of new-Keynesian Phillips curves and also finds that the slope of the supply curve, which is influenced by the Calvo parameter, depends on the level of uncertainty in the economic system. A clear policy implication, for monetary policy as well as fiscal policy, is that strong interventions by monetary and fiscal policymakers are needed, during periods of high uncertainty, for these policies to have an impact on real activity.

4.4 Yet Other Forms of State-Dependence

Corsetti et al. (2012) investigate the sensitivity of government spending multipliers to different economic scenarios. They find fiscal multipliers to be particularly high during times of financial crisis. Perotti (1999) shows that fiscal multipliers may depend on the size of the debt-to-GDP ratio, which is in place when fiscal shocks occur. A DSGE-based quantification of fiscal multipliers in the presence of normal vs. abnormal debt-to-GDP ratios is offered by Cantore et al. (2017). Bernardini and Peersman (2018) use state-dependent local projections and historical US data and find that fiscal spending multipliers are particularly high during periods of private debt overhang thanks to crowding in. Looking at open economies, Broner et al. (2018) (a paper presented at the Meeting) study the role played by foreign holdings of public debt for the domestic fiscal multipliers. While an expansion of public spending in close economies typically crowds out private investment, for open economies, since foreign investors are allowed to buy domestic debt, the negative crowding out effect on domestic investment is mitigated. Broner et al. (2018) test this hypothesis with a panel data approach

involving 17 advanced economies from the 1980s to the present. In line with the predictions of their theoretical model, they find that the size of fiscal multipliers increases with increasing share of public debt held by foreigners. For a paper documenting fiscal spillovers via trade in the European Union, see Beetsma et al. (2006).

5. Conclusions and Directions for Future Research

This paper has reviewed a few contributions presented at the 2018 Melbourne Institute Macroeconomics Policy Meeting and placed them in the context of the lively debate on the effects of fiscal policy and the size of the fiscal multipliers, which is enjoying a renaissance since the advent of the GFC. We have covered discussions on the technicalities related to the computation of the multipliers (data transformation, the role of fiscal spending and tax persistence, and that of discounting), the use of nonlinear frameworks to capture state-dependent effects and the distinction between different types and timing of fiscal shocks (unexpected vs. expected, one-off vs. multi-year). In summary, we note:

i. multipliers computed with unit normalisation and by discounting future realisations of fiscal spending (or taxes) and output point to lower numbers than previously documented in the literature;
ii. state-dependent effects are difficult to reject; while large multipliers can be found in recessions, there are other forms of state-dependence such as financial frictions, high public or private debt, foreign bond holdings and the monetary policy zero lower bound; and
iii. increasing attention has been devoted to fiscal anticipation, multi-year intervention, and their effects, in particular, analysis on fiscal plans tend to suggest that expenditure-based adjustment are less costly than tax-based interventions.

We see many different but interconnected avenues for future research.

From a theoretical standpoint, microfounded models able to predict state-dependent multipliers may guide econometricians attempting to quantify fiscal multipliers at different phases of the business cycle, financial cycle, or for different levels of public or private debt. On top of positive analysis, normative analysis should also be carried out to understand the conditions when optimal policy interventions can be beneficial for society. An example would be for economies in the presence of frictions or constraints that make the economy nonlinear, a prominent example being the zero lower bound. See for example, Bilbiie et al. (2018) and Matveev (2018, a paper presented at the Meeting).

More work is needed before we have a consensus about the size of fiscal policy multipliers. Following Ramey and Zubairy's (2018) example, the construction of long historical datasets appears to be a promising avenue to sharpen econometric estimates of the fiscal multipliers (such as the inclusion of informative historical periods, for example, the pre-World War Two period in the United States). The same reasoning applies to the use of data of countries that

have experienced potentially informative economic phases, for example, the long zero lower bound span in Japan.

A related issue is that of identification. Identifying fiscal shocks is hard. The narrative approach à la Romer and Romer (2010) and Ramey (2011b) is clearly an interesting approach (although it can be questionable given the subjective nature of readings of historical documents). Owyang et al. (2013) show that conclusions on the size of the fiscal multiplier for one country (the United States) are not necessarily applicable to other countries (Canada). Caldara and Kamp's (2017) clever identification of fiscal spending shocks with non-fiscal instruments is another approach worth pursuing with data related to different countries.

Finally, the response of a broad set of variables should be studied to have a deeper understanding of the transmission mechanism(s) driving the output effects of fiscal spending. Observables such as consumption, investment, prices, wages, interest rates and employment should be carefully studied. Furthermore, for open economies like, for example, Australia, the response of net exports and the exchange rate should also be scrutinised.

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[1] Source <https://www.rba.gov.au/statistics/cash-rate/>

[2] Fiscal retrenchment was also implemented in Australia, which recorded a deficit equal to –1.2 per cent in 2013, it worsened to –3 per cent in 2014, before settling at –1.9 per cent in 2017. Source: <https://tradingeconomics.com/australia/government-budget>

[3] The workshop program is available at <https://sites.google.com/site/efremcastelnuovo/home/melbourne-institute-macroeconomic-policy-meetings>

[4] There is also a growing literature dealing with heterogeneous agents models such as HANK (Kaplan and Violante 2018) and TANK (Galì et al. 2007; Debortoli and Galì 2018). See Gross's (2018) presentation at the workshop for an example. Differently, this survey is mostly concerned with papers directly dealing with aggregate data. Also, we do not focus on the role of automatic stabilizers. For a recent paper on such a role, see McKay and Reis (2016).

[5] See <http://econweb.ucsd.edu/~vramey/research/Gorodnichenko_slides.pdf>, <http://econweb.ucsd.edu/~vramey/research/EFG_Followup.pdf>, and <https://eml.berkeley.edu/~ygorodni/Gorodnichenko_Comments_on_RZ_note.pdf>

[6] For related research, see also Bloom (2014, 2017), Caggiano et al. (2014), Caggiano, Castelnuovo and Pellegrino (2017), Caggiano et al. (2017a ,b), Castelnuovo and Tran (2017) and Castelnuovo et al. (2017).