CHAPTER 5

FISCAL POLICY AS A COUNTERCYCLICAL TOOL

This chapter investigates whether fiscal policy should be used to combat business cycle fluctuations, especially downturns. Can discretionary fiscal policy successfully stimulate output? Or does it do more harm than good? New evidence presented here, from emerging as well as advanced economies, indicates that the effects of fiscal stimulus can be positive, albeit modest. But policymakers must be very careful about how stimulus packages are implemented, ensuring that they are timely and that they are not likely to become entrenched and raise concerns about debt sustainability. The chapter concludes with a discussion of how automatic stabilizers could be made more effective and how governance improvements could reduce "debt bias" concerns related to discretionary actions.

In recent months, as economies have been buffeted by falling asset prices, rising costs for raw materials and credit, and waning confidence, there have been renewed calls for governments to actively use fiscal policy to support efforts taken by central banks to prevent sharp declines in activity. Once again, there is a lively debate about the appropriate role of fiscal policy in managing the business cycle, especially during a downturn: Are discretionary fiscal actions helpful, or do they sometimes do more harm than good? When is a discretionary package most effective? When is it better simply to let automatic stabilizers do the job?

The debate over the appropriate role of fiscal policy in managing the business cycle has persisted for many years. One school of thought argues that taxes, transfers, and spending can be used judiciously to lean against fluctuations in economic activity, especially to the extent that economic fluctuations are mainly due to markets falling out of equilibrium instead of reacting to changes in fundamental factors such as productivity. Others contend that fiscal policy actions are generally either ineffective or make things worse, because the actions are ill timed or they create damaging distortions. This latter point of view has dominated the debate over the past two decades; consequently, fiscal policy has taken a backseat to monetary policy. But there also has been a recognition that there are times when monetary policy needs the support of fiscal stimulus, such as when nominal interest rates approach zero or the channels of monetary policy transmission are in some way impeded.

Against this background, this chapter takes a fresh look at the role of fiscal policy during economic downturns. The main objectives are to (1) analyze how fiscal policy has typically responded during downturns; (2) examine the effects on economic activity of fiscal stimulus during downturns; (3) identify the main factors that affect the outcomes of fiscal policy interventions; and (4) offer policy suggestions, in light of both empirical evidence and insights from theoretical work, on (a) whether and when to use discretionary fiscal policy, (b) the implications of using various fiscal policy instruments, and (c) the appropriate balance between automatic stabilizers and discretionary actions.

This chapter seeks to contribute to the considerable literature on fiscal policy as a countercyclical tool in three ways. First, it specifically evaluates whether discretionary fiscal policy responses to downturns have been timely and temporary. Second, whereas most previous studies have focused on the effects of policy in advanced economies, this chapter also looks at evidence for emerging economies. Finally, the chapter complements the empirical analysis with simulation analysis designed to assess how fiscal multipliers depend on the choice of

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fiscal instruments and the characteristics of the economy.

The policy record shows that discretionary fiscal policy has been more timely than some critiques suggest. But there are valid concerns about whether fiscal stimulus packages will be temporary and the implications for the path of government debt. Empirical evidence suggests that discretionary fiscal stimulus has a moderately positive effect on output growth in advanced economies. However, the effects appear to be constrained in emerging economies. This might be because of credibility issues, especially debt concerns. Simulation experiments show that fiscal multipliers can vary considerably, depending on the instrument used, the degree of monetary policy accommodation, and the type of economy. Consistent with the empirical evidence, increases in interest rate risk premiums as a result of debt concerns can render fiscal multipliers negative, suggesting that discretionary fiscal stimulus may do more harm than good.

Does this mean there is no role for countercyclical fiscal policy? In practice, the extent of automatic stabilizers has been related to the size of government, but more extensive government is generally associated with lower growth. Given this dichotomy, it is worth investigating further whether countercyclical fiscal rules and the fiscal policy framework can be designed to increase the ability of fiscal policy to smooth fluctuations in output and income over the course of business cycles—without increasing the size of government or placing debt stability at risk.

The chapter is organized as follows. The next section provides a brief review of the empirical and theoretical literature on the role of fiscal policy in stabilizing output. The following two sections present, first, the results of new empirical work that characterizes how fiscal policy has been used in both advanced and emerging economies and then an analysis of its effects. The subsequent section uses formal simulation-based analysis to examine the effectiveness of various stimulus options and the effects of various macroeconomic factors when the policy is implemented. The concluding section offers some policy suggestions.

Understanding the Fiscal Policy Debate

Fiscal policy can work in two general ways to stabilize the business cycle. One way is through automatic stabilizers, which arise from parts of the fiscal system that naturally vary with changes in economic activity—for example, as output falls, tax revenues also fall and unemployment payments rise.[1] Discretionary fiscal policy, on the other hand, involves active changes in policies that affect government expenditures, taxes, and transfers and are often undertaken for reasons other than stabilization.

By their nature, automatic stabilizers play an immediate role during downturns. But they are usually by-products of other fiscal policy objectives. As such, the size of automatic stabilizers tends to be associated with the size of government (see, for example, Fatás and Mihov, 2001), suggesting that an increase in the size of government can help dampen output volatility (see Galí, 1994). However, many argue that a larger government acts as a drag on growth over the longer term. Hence, there is a potential conflict between increasing stability and increasing economic efficiency. Moreover, the effectiveness of automatic stabilizers may be more a matter of proper design than size.

Because automatic stabilizers are often limited in scope—Box 5.1 reviews the extent of automatic stabilizers across economies—the active use of discretionary fiscal measures is often promoted as a countercyclical tool. Skeptics, however, question governments' ability to deliver well-timed measures as well as the macroeconomic effects of discretionary fiscal measures and the longer-term implications for fiscal sustainability.

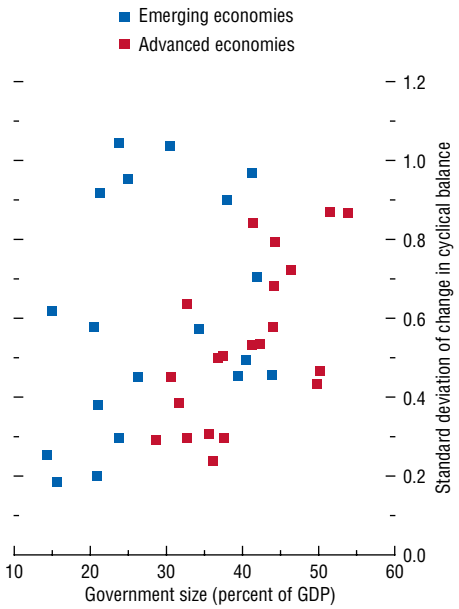
[1]Hence, the strength of automatic stabilizers depends on the size of transfers (such as the scope of unemployment insurance), the progressivity of the tax system, and the effects of taxes and transfers on labor participation and demand for workers and capital.

Box 5.1. Differences in the Extent of Automatic Stabilizers and Their Relationship with Discretionary Fiscal Policy

How important are automatic stabilizers? This box looks at their quantitative impact on the fiscal balance, especially in comparison with discretionary fiscal policy. First, the impact of automatic stabilizers on the primary balance varies across countries. The volatility in the primary balance is more a result of changes in discretionary policy than of automatic stabilizers. However, for many countries, changes in discretionary policy are not well synchronized with the business cycle, suggesting that automatic stabilizers are often a more important source of systematic countercyclical policy actions.

Automatic stabilizers are measured using the change in the cyclical balances estimated in the event analysis in the main text of this chapter.[1] The impact of automatic stabilizers on fiscal outcomes varies across countries and is positively related to both government size and output volatility. Government size is a good proxy for the size of automatic stabilizers, and provides the horizontal axis in the first figure.[2] Realized volatility in the cyclical balance—measured as the standard deviation of the change in the cyclical balance—is roughly equal to government size times the volatility in the output gap. The first figure shows that even though emerging economies have smaller governments, they tend to experience higher volatility in the cyclical balance than advanced economies. This is largely because emerging economies have more volatile output gaps. However, looking separately at emerging economies and advanced economies (to control for the higher output volatility in emerging economies), there is a positive relationship between government size and cyclical balance volatility—that is, countries with larger automatic stabilizers have more variation in the cyclical balance.[3]

Volatility in Cyclical Balance



Source: IMF staff calculations.

Changes in discretionary fiscal policy, however, account for more of the volatility of primary balances than automatic stabilizers. On average, the volatility of the cyclically adjusted balance is about three times greater than that of the cyclical balance. This is true for advanced economies and for emerging economies. But the extent to which these policy changes play a countercyclical role depends on how well they are synchronized with the business cycle. To examine this empirically, a measure of the cyclicality of fiscal policy discretion is compared with

The main author of this box is Steven Barnett.

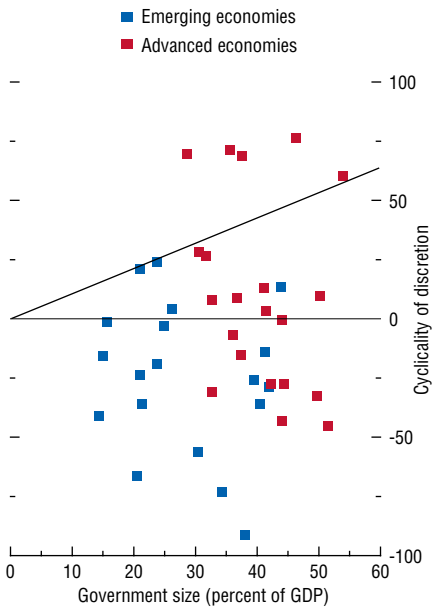
[1]The elasticity-based measure is used for the analysis in this box. The sample period is 1992–2007.

[2]Balassone and Kumar (2007), Box 4.2, explains why this holds. This general finding is robust to income elasticity assumptions.

[3]Government size, however, is often found to be negatively correlated with output volatility (for example, Andrés, Doménech, and Fatás, 2008), which would dampen the otherwise mechanical positive relationship between government size and cyclical balance volatility.

Box 5.1 *(concluded)*

Cyclicality of Structural Balance



Source: IMF staff calculations.

the size of automatic stabilizers.[4] The second figure shows that discretionary fiscal policy tends to be more countercyclical in advanced economies (when the countercyclicality of discretion is greater than zero), but is often procyclical in emerging economies (below zero). The units on the two axes are comparable and indicate the percentage point change in the respective balance (after dividing by 100) for a 1 percentage point increase in the output gap. If a country lies above the 45-degree line, it indicates that discretionary policy makes overall fiscal policy more countercyclical than automatic stabilizers do. As can be seen, this happens in only a few cases, including some of the Anglophone countries with smaller governments, as well as some of the Nordic ones with larger governments. However, there is little systematic evidence that countries with smaller governments compensate for weaker automatic stabilizers by using more discretion.

Together, these findings would suggest that (1) automatic stabilizers have, in general, played a more consistently countercyclical role than discretionary fiscal policy, and (2) changes in discretionary fiscal policy are either poorly timed or related to factors other than output stabilization. A caveat, however, is that fiscal policy discretion is measured by the cyclically adjusted balance, which, as discussed in the main text, is an imperfect proxy, because it may also capture factors unrelated to discretionary changes, notably asset price fluctuations.

Asset price movements directly affect financial transaction and capital gains taxes, but they also have broader, indirect revenue implications, notably through a wealth effect on consumption. To the extent that these movements do not fully track the business cycle (for example, amplified fluctuations relative to those of the output gap), the revenue effects will not be captured by conventional tax revenue elasticities and will be part of the cyclically adjusted component of revenue. In an unpublished study, the IMF staff prepared econometric estimates of the short-run sensitivity of cyclically adjusted tax revenue to house and equity price fluctuations in the G7 countries. The cyclically adjusted revenue data are computed using the conventional adjustment methods, ensuring consistency of the results. The estimates suggest that a 1 percent decline in both house and equity prices could reduce total tax revenue by up to almost 1 percent, with the house price decline accounting for most of the drop. The estimates also indicate that Canada, Japan, the United Kingdom, and the United States are more sensitive to house and equity price fluctuations than the continental European G7.

[4]Cyclicality of fiscal policy is measured by a regression, run in first differences, with the cyclically adjusted primary balance as the dependent variable and the output gap as the explanatory one. A positive coefficient indicates a more countercyclical policy. This regression, however, is potentially problematic in that it ignores the relationship (endogeneity) between fiscal policy and the output gap.

These skeptics argue that discretionary fiscal measures cannot be delivered quickly enough by legislatures, especially compared with the speed with which a central bank can change its policy rate. Hence, there is a risk that fiscal stimulus will arrive just as the economy recovers from a downturn. Moreover, argue the critics, fiscal stimulus measures are not likely to be well targeted, but are likely instead to be directed to wasteful and distortionary public spending and revenue measures more responsive to the pressures of interest groups than the needs of the economy. Furthermore, they are not likely to be withdrawn sufficiently quickly to preserve fiscal sustainability. For instance, there is widespread evidence that fiscal policy in emerging and less developed economies is procyclical rather than countercyclical, in part because of political incentives to run larger deficits in good times, when financing is available (Talvi and Végh, 2000).

Even if fiscal stimulus can be delivered quickly, does that justify the use of discretionary fiscal policy? There is still considerable debate and little theoretical consensus. A textbook Keynesian position is that private consumption and investment are driven by current income, with the implication that output is highly responsive to changes in fiscal policy. But fiscal policy can be much less effective in an open economy, depending on the degree of capital mobility and the exchange rate regime, because fiscal stimulus might simply "leak out." In addition to the standard crowding-out arguments, many neoclassical theorists emphasize the role of expectations about future income and taxes, arguing that fiscal multipliers are likely to be small because forward-looking households will figure out that temporary fiscal stimulus matters little to their lifetime income; multipliers may even be negative, if increased government expenditures lead to offsetting reductions in private consumption and investment.[2] By contrast, recent work using so-called New Keynesian models argues that an increase in government consumption still can have positive consumption and real wage effects, if there are nominal and real rigidities and liquidity constraints (see, for example, Galí, 2006). These models also suggest that not all temporary fiscal measures are ineffective: policies that affect the incentive to switch the timing of consumption—such as changes in consumption taxes—are likely to be most effective when they are understood to be temporary rather than permanent.

In recent years, four factors may have become increasingly relevant:

- *The extent of market rigidities:* Rigidities in goods and labor markets may have decreased over time, as a result of microeconomic reforms, and access to credit may have become more widely available, reducing fiscal multipliers.
- *The monetary policy framework:* The impact of fiscal policy can be expected to increase if it is accommodated by monetary policy, thus alleviating the crowding-out effect.
- *Globalization and openness:* To the extent that economies are more integrated—that is, an increasing share of domestic demand falls on imported goods—discretionary fiscal policy will be less effective today than previously.
- *Financial innovation:* Deregulation of financial markets and increased access to global capital may have eased credit constraints on households and firms, with the implication that consumption and investment are less constrained by current income and less responsive to discretionary fiscal policy measures. However, cross-border financial integration can also reduce the sensitivity of interest rates to government borrowing and ease crowding-out effects.

Unfortunately, empirical work has not settled the theoretical debates. Estimates of fiscal multi-

[2]For example, the well-known Ricardian equivalence critique of Barro (1974) argues that households and firms understand that deficits accompanied by future tax rises leave them no better off in net present value terms, and therefore they save rather than spend temporary (lump-sum) tax cuts. Neoclassical models often exhibit negative wealth effects following increases in government spending that are strong enough to reduce private consumption and investment.

Box 5.2. Why Is It So Hard to Determine the Effects of Fiscal Stimulus?

Perhaps surprisingly, the empirical literature on the effects of fiscal policy does not provide a clear answer to the simple question of whether discretionary fiscal policy can successfully stimulate the economy during downturns. Estimates of the effects of fiscal policy on many key macroeconomic variables can differ not merely in degree but in sign. This box aims to show why demonstrating conclusively what happens as a result of discretionary fiscal policy is, in fact, extremely difficult.

Any empirical work on this issue faces the following problems: (1) Every assessment of the impact of a policy change must take into account the economic circumstances when the policy was implemented. (2) A fiscal stimulus can be achieved by many different combinations of taxes, transfers, and spending, each of which can have different effects. (3) There will sometimes be a difference between the date on which a change in fiscal policy is measured from the data and the date on which the policy was common knowledge to households and firms. (4) Policy measures and economic activity are both endogenous—they depend on each other at the same time—and so it is not immediately clear what determines what just by looking at simple correlations. This last problem is arguably the most difficult to overcome. The researcher must somehow strip out those parts of changes in taxes, transfers, and spending that occur passively (such as from automatic stabilizers) from those that represent the true policy initiative, and use that measure of fiscal impulse to determine the effects on economic activity.

To illustrate, suppose overall fiscal policy, g, evolves according to

$$g = (\alpha + \beta)y + \eta, \qquad (1)$$

where y is the output gap. For simplicity, one can think of g as representing only government expenditures, so that a stimulus occurs when g is positive. There are two reactions of fiscal policy to the state of the economy: an automatic component, represented by α, and a systematic discretionary component, represented by β. Unexpected discretionary fiscal policy is denoted by η.

Now suppose that the output process is

$$y = \delta g + \varepsilon, \qquad (2)$$

where δ is the fiscal multiplier and ε represents shocks independent of policy. There are two significant problems presented by this system. First, we have a classic simultaneity problem—attempting to assess the effects of fiscal policy on output by estimating (1) will result in biased estimates. The second problem is a measurement problem—the difficulty of distinguishing systematic discretionary policy changes from automatic stabilizers. The elasticity-based fiscal impulse measure can be thought of as using OECD estimates of α and constructing

$$\tilde{f} = f - \alpha y.$$

Estimating the cyclicality of this measure is equivalent to estimating the parameter β.[1,2]

When examining the effectiveness of fiscal policy in the regression framework, a fiscal impulse measure that mistakenly includes cyclical changes generated by automatic stabilizers will lead to invalid inferences about the effects of discretionary fiscal policy. The second fiscal impulse measure therefore focuses entirely on η, the effects of unexpected fiscal policy shocks.[3]

Other approaches in the literature attempt to address the same issues. Structural vector autoregressions (SVARs) use statistical criteria to estimate shocks to fiscal policy and measure

The main author of this box is Alasdair Scott.

[1]See also Galí and Perotti (2003) for an application of the same method.

[2]When looking at the reaction of fiscal policy in emerging economies, it is necessary to make the "zero-one" assumption of income elasticities of expenditures and revenues, which is a cruder approach to measuring α but conceptually the same.

[3]For precise details on how the fiscal impulse measures are constructed, see Appendix 5.1.

Assessment of Impacts of Discretionary Fiscal Policy Stimulus by Empirical Method

	Output	Private Consumption	Private Investment in Durables	Private Capital Investment
VAR studies	Neutral to positive	Neutral to positive	Negative to positive	Negative to positive
Narrative studies	Positive	Negative	Negative	. . .
Case studies	Positive	Positive	. . .	. . .

Note: Studies placed in the vector autoregression (VAR) category include Fatás and Mihov (2001); Mountford and Uhlig (2002); Blanchard and Perotti (2002); and Galí, López-Salido, and Vallés (2007). Studies placed in the narrative category include Ramey and Shapiro (1998) and Edelberg, Eichenbaum, and Fisher (1999). Case studies include Johnson, Parker, and Souleles (2006).

how well those shocks can explain movements in output that are not accounted for by other economic shocks. Three problems are potentially relevant. As with reduced-form regressions, statistical assumptions need to be made to identify the fiscal shocks. Second, most VARs ignore the importance of debt dynamics in conditioning responses (whether or not a temporary rise in debt causes households and firms to expect future higher taxes is a key distinction between Keynesian and classical views on the effectiveness of discretionary fiscal policy).[4] Finally, as with reduced-form regressions, VARs might not reliably be able to resolve the timing issue.

By contrast, "narrative" approaches estimate policy-driven changes in fiscal stimulus by looking directly at the historical record of legislation and public statements. The advantage of this approach is that careful attention can be directed to picking the timing of the shocks by examining carefully when policy decisions were made and announced. But such studies are very resource intensive, making their application across countries almost impossible. Further, they are subjective, just as VARs and reduced-form analysis rely on identifying assumptions. In practice, analysis has centered around a small number of extraordinary episodes of military buildups, and there are questions as to how much can be learned from such episodes about discretionary fiscal policy during downturns.

A final approach examines specific "natural experiments," such as the effects of tax rebates. The advantage of this approach is that it can be directed at specific episodes for which it is relatively easy to identify the policy change and its intent. The corresponding disadvantage is that, by examining a specific case, it can be hard to draw broader lessons for policy.

This empirical work provides a mixed picture of the ability of government spending to stimulate private demand.[5] (There is less evidence about revenue-based measures.) Moreover, there appears to be a pattern between the method used and the qualitative results obtained. The table summarizes the results of a selection of prominent papers in the literature in terms of the signs of responses of key variables to discretionary increases in government spending.

In particular, SVAR-based studies in which fiscal interventions are identified by assuming that government spending is predetermined within the quarter (see Blanchard and Perotti, 2002) tend to find relatively strong positive effects, whereas narrative studies that rely on the reactions to episodes of extraordinary spending have tended to find much weaker, and even negative, relationships between episodes of fiscal stimulus and

[4]See Chung and Leeper (2007). Favero and Giavazzi (2007) do include debt stock.

[5]Results from case studies usually find positive effects, but the effects are generally not as strong as those generated by VAR studies. Studies of the 1975 tax rebates generally conclude that the effects were positive but modest (that is, short-run multipliers of about 0.2–0.5); see Modigliani and Steindel (1977) and Blinder (1981). Studies of the 2001 tax rebates have generated similar results; see Shapiro and Slemrod (2002).

Box 5.2 *(concluded)*

consumption.[6] Ramey (2008) suggests that this difference relates to the way that VARs treat timing—if discretionary fiscal policy measures are pre-announced, and households *decrease* their spending right away (as predicted by neoclassical theory), VARs that measure the effect based on actual changes to fiscal balances or components might record a *rise* in the growth rate of consumption on that date. This would support a Keynesian view of fiscal policy, but in fact the growth in consumption is driven by recovery from the previous fall. Narrative approaches, on the other hand, take into account the moment discretionary measures are announced.[7] Compared with these studies, the reduced-form approach employed in this chapter is conceptually closest to the SVAR approach of Blanchard and Perotti (2002); to the extent that the timing criticism applies to this paper and those like it, it also applies to our methodology. However, a comparative narrative study of all 41 economies in this study is beyond the scope of this chapter.

[6]Note, however, that narrative studies of the effects of tax changes find very large multipliers—see Romer and Romer (2007).

[7]But see also the rebuttal in Perotti (2007).

pliers cover a wide range, from positive through insignificant to negative.[3] One reason is that taking account of all the appropriate conditioning factors can be very difficult. Another reason is methodological. Put simply, separating out changes in discretionary fiscal policy from automatic stabilizers and evaluating their effects is very difficult—in particular, fiscal policy simultaneously both responds to and causes changes in economic activity. This "endogeneity problem" poses a major challenge for estimating the effects of fiscal policy, as discussed in Box 5.2.

How Has Discretionary Fiscal Policy Typically Responded?

The previous section identified two types of critique of fiscal policy: skepticism that discretionary fiscal policy can be delivered efficiently, owing to political constraints, and doubts that it can be effective, for economic reasons. These critiques frame the empirical analysis in this section, which examines how fiscal policy has typically responded to downturns.

Defining economic downturns and measuring fiscal stimulus are inevitably somewhat subjective exercises. In the analysis that follows, downturns are defined as periods during which either the growth rate is negative or the output gap is unusually negative, the precise threshold depending on whether quarterly or annual data are used. This definition is arguably more sensible than defining a downturn simply in terms of negative growth, because that would miss periods during which output is significantly below potential but still rising.

The measures of fiscal stimulus used in this chapter all start with the primary fiscal balance, the difference between total general government revenues and expenditure net of interest payments on consolidated general government liabilities. Changes in the primary balance can arise passively, as revenues and expenditures rise and fall with economic activity, or actively, as governments make choices about tax, transfer, and spending policies. What is needed, therefore, is a measure of the *cyclically adjusted* primary balance, the intuition being that changes in the cyclically adjusted primary balance should reflect changes in policy. The first part of this

[3]A typical range of expenditure multipliers would be from 0.5 (for example, Mountford and Uhlig, 2002) to about 1 (for example, Blanchard and Perotti, 2002). But Perotti (2007) has outliers as high as 4 and Krogstrup (2002) as low as –2.

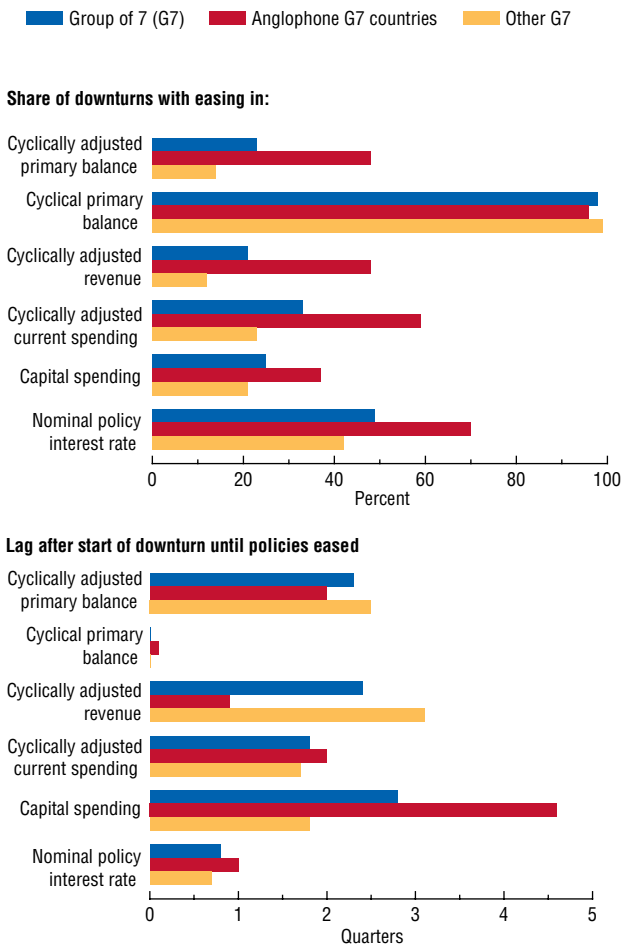
section looks at the responses of fiscal policy to changes in economic activity, identifying automatic stabilizers with changes in the cyclical component of the primary balance and discretionary fiscal policy with changes in the cyclically adjusted primary balance.[4] Constructing this measure requires two slightly different approaches, depending on the information available for the economies being analyzed.

Evidence on the Responsiveness of Fiscal Policy

The empirical investigation begins with analysis of advanced economies, for which long spans of fiscal data are available on a quarterly basis.[5] Discretionary fiscal actions are those that change the cyclically adjusted budget balance, using estimates of the output gap together with estimates of income elasticities of revenues and expenditures to extract the cyclical component from the budget.[6] Figure 5.1 presents a summary of policy responses in G7 economies over the past four decades. The numbers indicate that discretionary fiscal stimulus has been delivered in downturns, but it has been used much less frequently than automatic stabilizers and monetary policy. Discretionary fiscal stimulus has been used in about 23 percent of all downturn quarters—less than half as frequently as interest-rate easing—whereas automatic stabilizers are observed in well over 95 percent of downturns (upper panel).[7] Discretionary policy

Figure 5.1. How Often and Quickly Has Fiscal Stimulus Been Used in G7 Economies?[1]

Discretionary fiscal policy has been used less frequently than monetary policy and automatic stabilizers during downturns, and has taken longer to arrive.



Source: IMF staff calculations.
[1]G7 comprises Canada, France, Germany, Italy, Japan, United Kingdom, and United States.

[4]As defined in Box 5.1 and the event analysis, the cyclically adjusted balance is a residual and embodies all changes in the primary balance not removed by cyclical adjustment. This includes many factors not necessarily related to output stabilization, such as the impact of structural reform, one-off items, and other economic events (including asset price changes that are not cyclical in nature and could therefore be identified as "automatic" changes in the fiscal balance—see Jaeger and Schuknecht, 2007).

[5]For further details about the following analysis, see Leigh and Stehn (forthcoming).

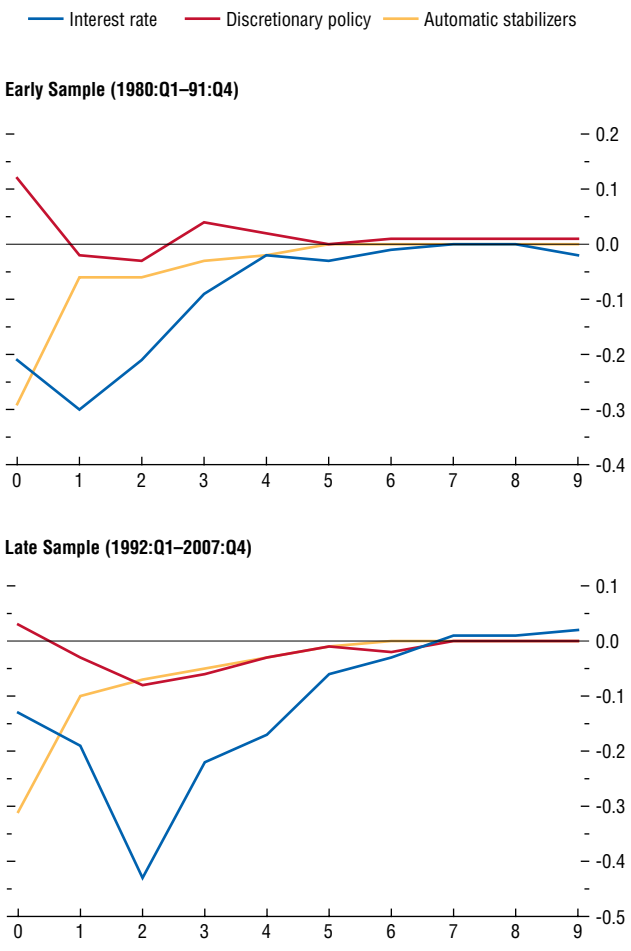
[6]These elasticities are taken from the OECD *Economic Outlook;* see Appendix 5.1 for details.

[7]Note that automatic stabilizers do not necessarily ease in all downturns, because the applied definition of a downturn does not rule out an increase in growth or the output gap (as long as the output gap is unusually negative).

Figure 5.2. How Strong Was the Fiscal Policy Response in G7 Economies?

(Percentage point deviation; quarters on x-axis; shock occurs in period zero)

Following an unexpected 1 percentage point fall in growth below potential, interest rates and the automatic component of the fiscal balance ease on impact; discretionary fiscal stimulus takes longer to arrive. In recent years, discretionary fiscal policy has become more countercyclical.



Source: IMF staff calculations.

also arrives later, on average about two and a half quarters after the onset of a downturn, and about one and a half quarters after interest-rate easing (lower panel). Capital spending is particularly slow, with an arrival lag of almost four quarters. By contrast, automatic fiscal easing, proxied by a fall in the cyclical primary balance, occurred in almost all downturns in the quarter of the downturn itself.

The size of discretionary fiscal easing is also much smaller on average than that of automatic stabilizers. Figure 5.2 shows average impulse responses of discretionary fiscal measures, automatic stabilizers, and interest rates for the G7 economies, drawing from vector autoregressions (VARs) estimated for two samples, an "early" sample covering 1980:Q1–1991:Q4 and a "late" sample covering 1992:Q1–2007:Q4.[8] In both samples, the discretionary fiscal easing is much smaller than the automatic stabilizers and is slower to arrive than both changes in interest rates and automatic stabilizers. However, a comparison of the two panels also suggests that the countercyclical response of discretionary fiscal policy has strengthened since the early 1990s.[9] The responses of spending and revenue components in the early sample reflect a combination of mildly procyclical revenue increases, small countercyclical current spending increases, and large procyclical capital spending cuts. The greater degree of fiscal policy countercyclicality observed since the early 1990s is the result of cuts in revenues, larger increases in current spending, and smaller procyclical cuts in capital spending. The response of automatic stabiliz-

[8]See Appendix 5.1 for more details. Note that, unlike much of the VAR literature, the analysis presented here does not evaluate the response of growth to fiscal policy shocks. Rather, the focus is on the response of fiscal policy variables to changes in growth.

[9]In the early sample, discretionary fiscal policy is procyclical on impact and provides a cumulative procyclical contraction of around 0.1 percentage point of potential GDP over four quarters. In the later sample, even though discretionary policy still produces no stimulus on impact, it leads to a cumulative stimulus of 0.2 percentage point over four quarters. This finding is consistent with, for example, Galí and Perotti (2003) and *World Economic Outlook* (September 2003).

ers remained unchanged in the second sample, while that of monetary policy strengthened. Figure 5.3 shows that there are noticeable cross-country differences across advanced economies. Discretionary fiscal policy and monetary policy have been more timely and more countercyclical in the United States, Canada, and the United Kingdom (the G7's three Anglophone countries) than in the rest of the G7. The other Organization for Economic Cooperation and Development (OECD) member countries display even weaker countercyclicality than the United States, Canada, and the United Kingdom in both monetary and discretionary fiscal policy.

Data Uncertainties and the Risk of Debt Bias

A concern that often arises regarding countercyclical fiscal activism is that policymakers may respond in an asymmetric manner, easing in downturns and not tightening sufficiently in upturns, implying a permanent increase in the public-debt-to-GDP ratio with potentially adverse consequences for long-run growth. To investigate whether fiscal policy in G7 countries has displayed such an asymmetric tendency, the VAR framework is adapted to allow for an asymmetric response to upturns and downturns (see Appendix 5.1). The results suggest that both fiscal policy and monetary policy are subject to an easing bias; that is, more easing during downturns than tightening during upturns (Figure 5.4). In contrast, automatic stabilizers respond in a symmetric way, with the easing observed in downturns almost exactly offset by tightening during upturns.

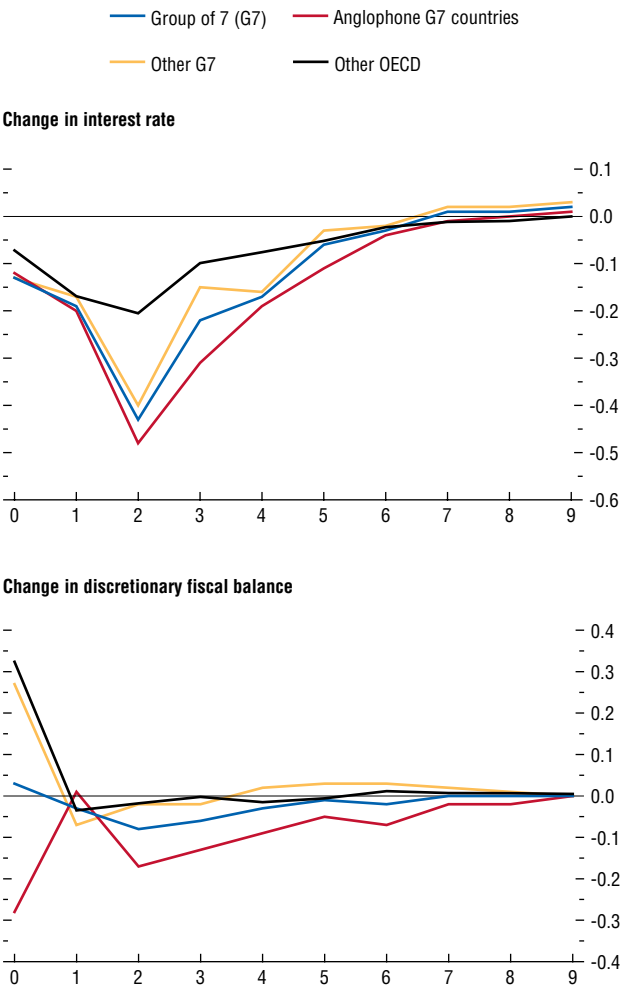
Hence, although discretionary fiscal policy has been actively used, there are valid concerns about debt bias. For illustration, a case study of tax-based stimulus legislation in the United States is provided in Box 5.3. The study finds that, although reasonably timely, 38 percent of cyclically motivated tax cuts were permanent.

An additional concern in the analysis of countercyclical fiscal activism is that policymakers face substantial uncertainties regarding the cyclical position and run the risk of destabilizing

Figure 5.3. How Have Fiscal Policy Responses Varied across Advanced Economies?

(Percentage point deviation; quarters on x-axis; shock occurs in period zero)

Following an unexpected 1 percentage point fall in growth below potential, Anglophone countries have provided both monetary and fiscal stimulus; the rest of the Organization for Economic Cooperation and Development (OECD) countries have provided a weaker monetary response and procyclical discretionary fiscal tightening. The figure displays policy responses for the late sample (1992:Q1–2007:Q4).

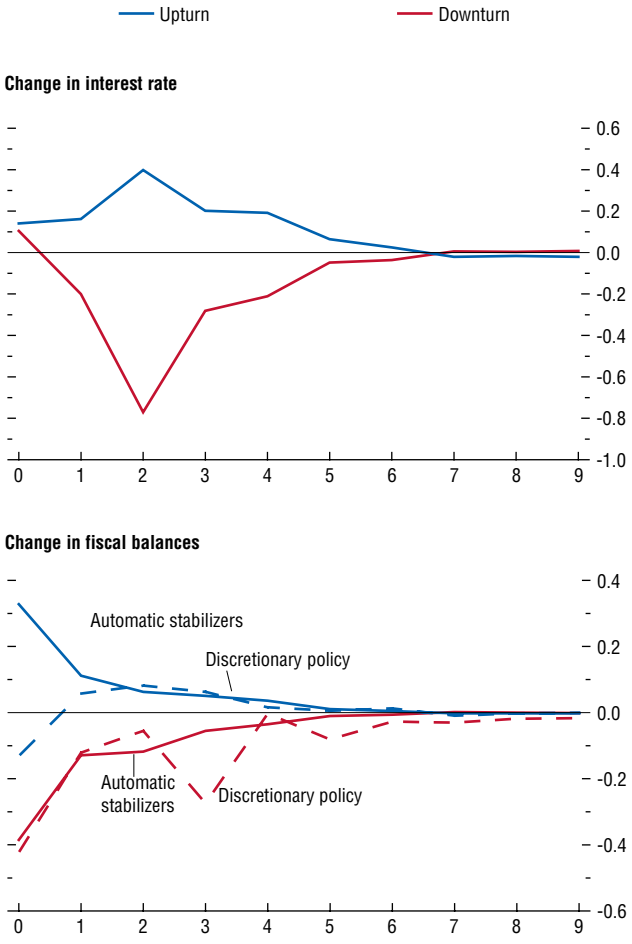


Source: IMF staff calculations.

Figure 5.4. Is There a Bias toward Easing during Downturns in G7 Economies?

(Percentage point deviation; quarters on x-axis; shock occurs in period zero)

Following a 1 percentage point shock to growth, both discretionary fiscal policy and monetary policy are subject to an easing bias, with more stimulus during downturns than tightening during upturns. In contrast, automatic stabilizers respond symmetrically to upturns and downturns. The figure displays policy responses for the late sample (1992:Q1–2007:Q4).



Source: IMF staff calculations.

the economy by responding to erroneously perceived downturns. This appears to be a serious problem, based on an assessment of the reliability of preliminary GDP estimates produced by national authorities.[10] There is a strong negative relationship between preliminary growth estimates and subsequent revisions. Forty percent of preliminary estimates indicating negative quarter-over-quarter growth were subsequently revised to positive growth.[11] Forecast efficiency tests find strong evidence of a bias toward pessimism in preliminary growth estimates.[12]

To investigate how fiscal policy in G7 countries has been affected by errors in growth estimates, the VAR framework is augmented with growth-estimation errors (see Appendix 5.1). The results reported in Figure 5.5 confirm that both fiscal and interest rate policy have been affected by errors in preliminary growth estimates, with a 1 percentage point fall in perceived growth relative to final revised growth associated with an easing in interest rates and the discretionary fiscal-balance-to-potential GDP ratio by about 0.2 percentage point. This finding suggests that concern over policy errors is well founded, especially as fiscal policy decisions appear to be less easily reversed than monetary policy decisions, and fiscal policy errors bear potentially long-lived consequences for debt.

Are Fiscal Policy Reactions Different in Emerging and Advanced Economies?

Some of the reservations about the application of discretionary fiscal policy may apply even more strongly in less advanced economies. Unfortunately, although the data in the previous section were available at quarterly frequency, consistent data for a broader set of econo-

[10]See Appendix 5.1. See also Cimadomo (2008) for further analysis of fiscal policy using real-time data.

[11]At the same time, 30 percent of quarters that, according to the final data actually had negative growth, showed positive growth in preliminary estimates.

[12]While remaining statistically significant, this bias appears to have declined in recent years, possibly reflecting the more stable and predictable growth environment.

mies are available only at annual frequency. In what follows, the analysis uses a sample of 21 advanced economies and 20 emerging economies, covering the period from 1970 to 2007.[13] The definition of "downturn" is conceptually the same as used previously with the quarterly data, but "unusually negative" is now defined as below –0.5 standard deviation of the output gap, on account of the use of annual data.[14] For advanced economies, OECD estimates of income elasticities of revenues and expenditures are used to calculate the cyclical balance. However, such estimates are not available for emerging economies, and so it is assumed that revenues move one-for-one with the business cycle, but expenditures do not—that is, the income elasticity of revenues is 1 and the income elasticity of expenditures is zero (see Appendix 5.1 for details). A fiscal expansion is then defined as a negative change in the cyclically adjusted primary balance of more than 0.25 percentage point and a fiscal contraction as a positive change of more than 0.25 percentage point. When the change in the cyclically adjusted primary balance is less than 0.25 percentage point (either positive or negative), fiscal policy is considered neutral. Hence, we have three states for the fiscal stance: stimulus (397 episodes), neutral (155 episodes), and tightening (437 episodes).

In addition to the assumptions necessarily imposed when choosing data sets and definitions, a number of caveats apply to analysis using these measures. In particular, the use of annual data limits the ability to accurately characterize fiscal interventions that begin and end within a year. Second, what is relevant is policymakers' perceptions of the state of the economy in real time, which might differ substantially from inferences made using revised data, but, in the

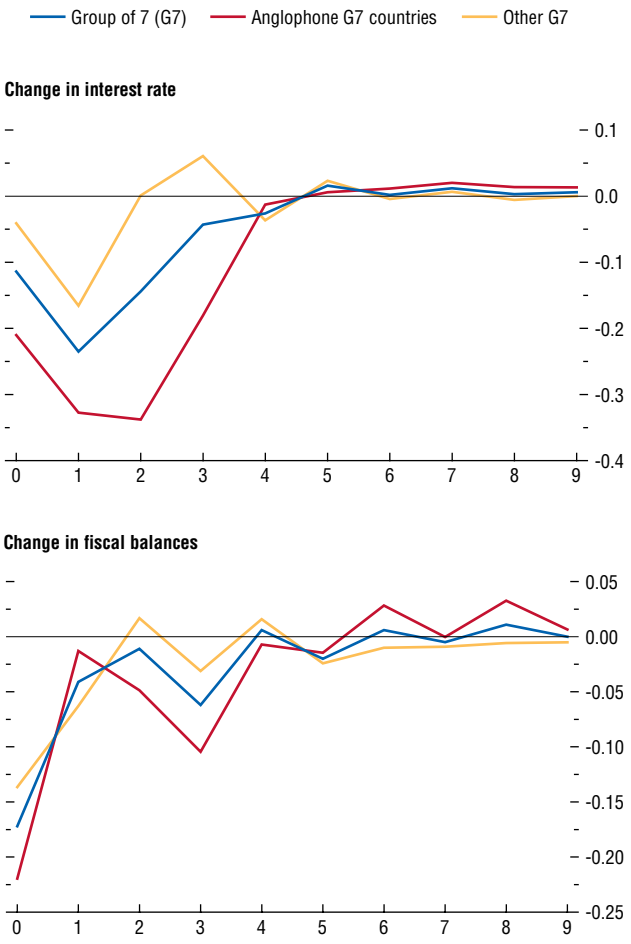
[13]See Appendix 5.1 for a list of economies and episodes of downturns.

[14]Correspondingly, upturns are defined as episodes during which the output gap is above 0.5 standard deviation. Potential output is measured using the Hodrick-Prescott filter, with λ set to 6.25, the value recommended in Ravn and Uhlig (2002).

Figure 5.5. Did G7 Economies Respond to Erroneously Perceived Downturns?

(Percentage point deviation; quarters on x-axis; shock occurs in period zero)

Following an erroneously perceived 1 percentage point fall in growth, both discretionary fiscal policy and monetary policy have eased, particularly in Anglophone countries. The figure displays policy responses for the late sample (1992:Q1–2007:Q4).



Source: IMF staff calculations.

Box 5.3. Have U.S. Tax Cuts Been "TTT"?

This box takes a closer look at whether fiscal interventions in the United States have been timely, temporary, and targeted (TTT). A recent data set compiled by Romer and Romer (2007) of all significant tax changes signed into law since 1945 permits a detailed analysis of this issue. By consulting official documents, Romer and Romer distinguish tax changes that were explicitly motivated by cyclical considerations from those motivated by other factors, including long-run growth support, debt reduction, and the financing of additional expenditures. Of all the 50 significant federal tax actions identified, 7 were assessed as cyclical, and, of these, 5 were tax cuts designed to stimulate short-run growth.

This box focuses on these five tax cuts, implemented between 1970 and 2002, as well as the Economic Stimulus Act, signed into law in February 2008. The box assesses how quickly after the onset of a downturn the tax cuts were legislated and implemented, how temporary they were, and how well targeted they were. In assessing how close to a downturn the tax cuts arrived, the analysis defines a downturn as in the main text. Growth data to assess the 2008: Q2 stimulus are not yet available.

The main results are as follows:

- *Timeliness:* Four out of the five cyclically motivated tax cuts occurred within one quarter of a downturn (see table). In the case of 2002, the stimulus arrived three quarters after the downturn. The average implementation lag of tax cuts; that is, the delay between the signing of the legislation into law and its impact on revenue, was one quarter.
- *Temporariness:* Although only one of the six cyclically motivated tax cuts was permanent, the remainder contained a permanent component (see table). In particular, about 79 percent of the tax cuts were designed to be temporary, with an average planned duration of two quarters. Some of the tax cuts were subsequently extended, so that a smaller proportion—62 percent—actually ended up

The main authors of this box are Daniel Leigh and Sven Jari Stehn.

How Timely, Temporary, and Targeted Were the Tax Cuts?

Legislated Tax Cut			Timeliness		Temporariness[1]				Targeting
					Proportion temporary		Duration of temporary portion (quarters)		
Date stimulus arrived	Name of act	Size of stimulus (percent of GDP)	Date of nearest downturn[2]	Inside lag (quarters)[3]	Planned	Actual	Planned	Actual	Bang-for-the-buck score[4]
1970:Q1	Tax Reform	1.2	1970:Q1	1	0	0	permanent		1.0
1975:Q2	Tax Reduction	3.6	1975:Q1	1	97	78	2.3	1.0	2.5
1977:Q3	Tax Reduction and Simplification	1.0	1977:Q4	1	77	67	1.3	1.0	1.9
2001:Q3	Economic Growth and Tax Relief Reconciliation	1.7	2001:Q3	1	100	100	1.3	1.3	2.4
2002:Q2	Job Creation and Worker Assistance	1.7	2001:Q3	1	100	67	3.7	4.0	1.3
2008:Q2	Economic Stimulus	1.1	. . .	1	100	. . .	1.6	. . .	2.7
Mean		1.6	. . .	1	79	62	2.0	1.8	2.0

[1]Temporary stimulus is defined as a stimulus that expires. Actual duration may exceed planned duration because of legislated extensions.

[2]Downturn is defined as a quarter with negative or below-trend growth and an output gap more than one standard deviation below zero.

[3]Inside lag denotes the period between the date the stimulus was signed into law and the date it was implemented (quarter in which tax liabilities actually changed).

[4]Bang-for-the-buck score (3 = high, 2 = medium, 1 = low) indicates the degree of cost-effectiveness according to CBO (2008) classification.

Box 5.3 *(concluded)*

being temporary, and 38 percent became permanent.

- *Targeting:* The targeting efficiency of each tax cut package is assessed using the cost-effectiveness classification scheme of the Congressional Budget Office (CBO, 2008), which indicates the likely bang-for-the-buck impact on aggregate demand of a range of possible fiscal stimulus tools. Based on this classification scheme, three out of the six cyclically motivated tax cuts are classified as cost-effective. More than half of the content of these three tax packages consisted of personal direct transfers and personal lump-sum rebates—two fiscal tools assessed as being the most cost-effective by the CBO. The most recent, 2008, stimulus scored highest on this account, followed by 1975 and 2001. The least cost-effective stimulus measures were the 1970 and 2002 tax reductions, the bulk of which consisted of corporate lump-sum rebates and personal and corporate tax-rate reductions.

Hence, for the most part, fiscal interventions in the United States have been timely, but not always temporary or well targeted.

absence of consistent real-time vintages of data, it is difficult to adjust for this difference.

Bearing these caveats in mind, the analysis identified the following stylized facts:

- Emerging economies respond during downturns with fiscal stimulus only half as frequently as advanced economies: 22 percent versus 41 percent (Figure 5.6, top panel). When emerging economies do implement fiscal stimulus, the response is slightly higher, as measured by changes in the cyclically adjusted primary balance as a percent of potential GDP (Figure 5.6, middle panel, first and third bars). But this is because downturns are larger (Figure 5.6, middle panel, second and fourth bars).
- In just over one-third of episodes, fiscal stimulus involved a mixture of revenue and expenditure changes. Of those that relied mainly on one kind of stimulus, expenditure measures dominate for both advanced and emerging economies (Figure 5.6, bottom panel).
- In emerging economies, changes in the overall primary balance are usually procyclical, despite countercyclical effects from automatic stabilizers (Figure 5.7, top panel).[15] And they are more procyclical in downturns when advanced economies are simultaneously experiencing downturns, consistent with rises in external financing premiums (Figure 5.7, bottom panel). In advanced economies, changes in the primary fiscal balance are, on average, countercyclical, mostly because of automatic stabilizers, as measured by changes in the cyclical balance.

The Macroeconomic Effects of Discretionary Fiscal Policy

Having defined downturns and episodes of fiscal stimulus, this section turns to the central question: What are the macroeconomic effects of discretionary fiscal policy, especially during downturns? An event analysis identifies some of the basic patterns, using the same elasticity-based fiscal impulse measure as in the previous section, and then regressions provide a more systematic assessment of cause and effect.

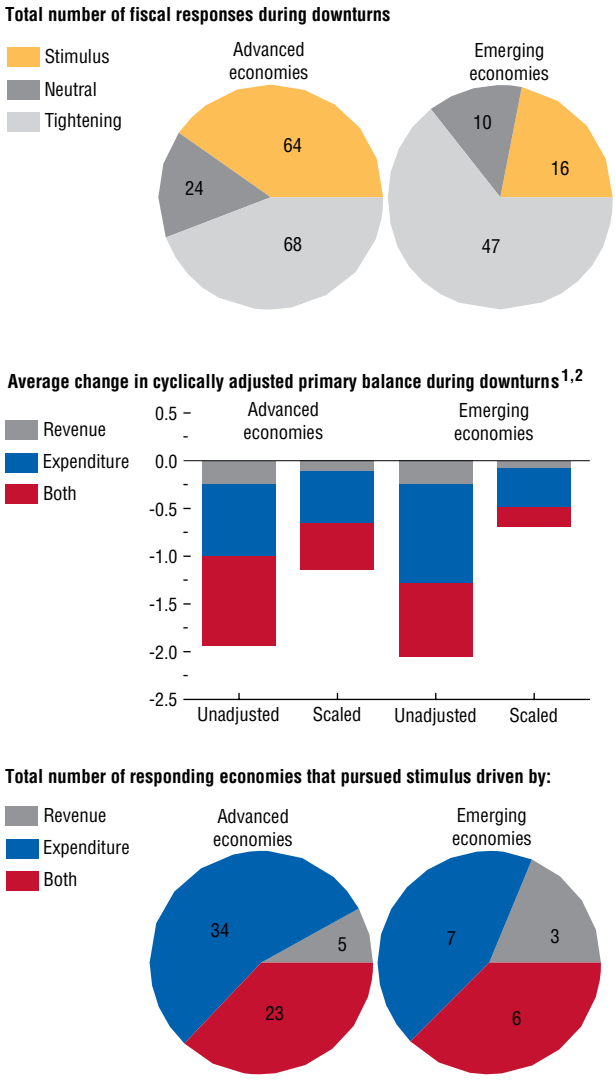
An Event Analysis of Episodes of Downturns and Fiscal Stimulus

The event analysis shows the dynamics of key macroeconomic variables—real GDP growth, the

[15]This finding is consistent with Kaminsky, Reinhart, and Végh (2004) and a number of other studies. It holds across both fixed and floating exchange rate regimes at the time of the episode.

Figure 5.6. Composition of Fiscal Stimulus during Downturns for Advanced and Emerging Economies

The pie charts at the top show the types of fiscal policy response—stimulus, neutral, or tightening—during episodes of downturns for advanced economies and emerging economies. The bar chart indicates the average size of fiscal stimulus. Areas indicate the average proportion of the total sample stimulus from changes in revenues only, changes in expenditures, or both. The pie charts at the bottom indicate the frequency of using revenue only, changes in expenditures, or both for advanced economies and emerging economies.



Source: IMF staff calculations.

[1]Average change in cyclically adjusted primary balance associated with various types of fiscal stimulus weighted by the share of fiscal stimulus cases of a particular type among countries that responded with fiscal stimulus during downturns.

[2]For each group of economies the left-hand column is the change in cyclically adjusted primary balance in percent of GDP. The right-hand column is the change in cyclically adjusted primary balance in percent of GDP scaled by the standard deviations of changes in output gap.

debt-to-GDP ratio, inflation, exchange rates, the current account, and money growth—around episodes of downturns. Table 5.1 and Figure 5.8 show how macroeconomic variables move together with fiscal stimulus before, during, and after downturns. As expected, the debt-to-GDP ratio increases following a fiscal stimulus and improves when it tightens, while current account balances improve in the downturn year when there is tightening and deteriorate when there is stimulus. But for other variables, the results are generally ambiguous. In particular, growth rates are larger in episodes without fiscal stimulus, but the change in growth rates from the downturn year to the first year after the downturn is somewhat larger when there is fiscal stimulus. These observations are common across advanced and emerging economies.

Table 5.2 shows median values of real GDP growth across all economies during episodes of downturns and fiscal stimulus for a number of variables that theory suggests could have important effects: public debt, current account balances, trade openness, and the exchange rate regime.[16] Figure 5.9 shows the difference between growth rates in the year of the downturn and the year following. Looking across these conditioning factors, there is little discernible difference in the impact of fiscal policy from variations in the current account balance, openness to trade, and the exchange rate regime, despite what theory suggests. However, the level of public debt does appear to be associated with consistent differences in growth outcomes—economies that implement fiscal stimulus and have high public debt going into a downturn typically experience lower growth rates before and after the downturn year and

[16]For the first three of these variables, the results are divided into "high" and "low" cases, based on the average for that variable three years before the recession episode. The thresholds for high and low are the median values of the overall sample, except debt, for which the threshold for high debt is 75 percent for advanced economies and 25 percent for emerging economies. Exchange rate regimes are categorized according to whether the exchange rate was fixed or floating in the first year of the downturn.

less of a pickup in growth in the year following fiscal stimulus, whereas high-debt economies that implement fiscal tightening experience stronger gains in growth.

Turning to the ways fiscal policy was implemented, economies that employed a combination of revenue and expenditure stimulus experienced less-severe downturns compared with those that relied on revenue or expenditure measures alone, although revenue-based policies were associated with faster recoveries and higher growth in the years following (Table 5.3).[17] Conversely, expenditure-based fiscal tightening was associated with higher growth in years following the downturn.

In summary, the event analysis indicates that taking into account debt and the composition of fiscal stimulus could be important to understanding the effects of fiscal policy. Conversely, it is difficult to see clear patterns with other variables that theory indicates could be important.

Regression Analysis

Event analysis records only associations between fiscal stance and the dynamics of the macroeconomic variable in question, but indicates nothing about causation between the variables.[18] Further, by characterizing variables according to simple categories and considering them one by one in isolation from one another might hide important information about the size of and interaction between variables. A regression framework is used to address this.

The conceptual framework for these regressions is an examination of the effects of discretionary fiscal policy on real GDP growth, while controlling for the potential effects from monetary policy and other sources of demand

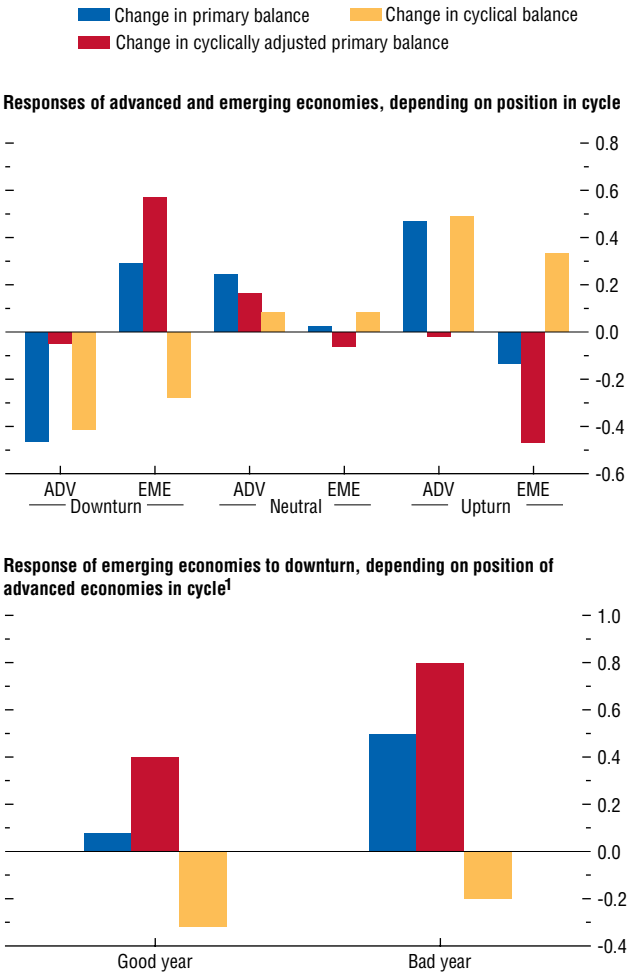
[17]The small sample size of episodes involving revenue impulse, however, warrants caution in interpreting these results.

[18]Growth associations are a prime example: If there are lower growth rates in downturns when fiscal policy was very aggressive, is the appropriate conclusion that fiscal policy is not effective or that fiscal policy had to be very aggressive because the downturn was very severe?

Figure 5.7. Fiscal Policy Responses in Downturns and Upturns

(Average change, percent of GDP)

The upper bar chart shows average fiscal policy responses for advanced (ADV) and emerging (EME) economies in (left to right) GDP downturn episodes, neutral episodes, and upturn episodes. A negative number indicates fiscal stimulus. Discretionary fiscal policy is associated with the cyclically adjusted primary balance. The lower bar chart shows average fiscal policy responses in emerging economies when advanced economies are in upturns and downturns. In both charts, the average change in the balance is scaled by the standard deviations of changes in the output gap.



Source: IMF staff calculations.

[1]Average change in the balance scaled by the standard deviations of changes in output gap. A good year is defined as a year in which the GDP-weighted average gap of advanced economies is below the median GDP-weighted average gap of advanced economies across all years.

Table 5.1. Macroeconomic Indicators around Downturns, with and without a Fiscal Impulse: All Economies[1]

Median	Number of Observations in Downturn	Three-Year Average before Downturn	One Year before Downturn	Year of Downturn	One Year after Downturn	Four-Year Average after Downturn
Real GDP growth						
Fiscal stimulus	51	3.1	2.2	–0.1	3.6	3.2
Fiscal tightening	83	2.5	2.8	0.7	4.2	3.6
Change in debt-to-GDP ratio						
Fiscal stimulus	43	–1.4	–0.5	2.2	1.1	0.8
Fiscal tightening	61	1.4	1.5	1.2	–0.9	–1.2
Change in cyclically adjusted primary balance						
Fiscal stimulus	51	0.0	–0.2	–1.1	0.0	0.2
Fiscal tightening	83	0.0	0.1	1.6	–0.2	0.2
Inflation						
Fiscal stimulus	48	5.6	5.5	4.7	3.0	2.7
Fiscal tightening	78	7.1	6.2	5.2	5.0	5.1
Change in nominal exchange rate[2]						
Fiscal stimulus	41	–0.6	0.0	2.9	–0.5	0.1
Fiscal tightening	72	4.6	3.3	7.9	3.5	2.3
Current account surplus						
Fiscal stimulus	51	–2.4	–2.9	–0.8	–0.9	–1.2
Fiscal tightening	81	–0.9	–0.8	0.0	0.2	–0.1
Real money growth						
Fiscal stimulus	32	5.0	2.6	1.7	4.2	4.8
Fiscal tightening	54	4.6	4.3	3.3	4.9	5.0

Note: For each variable, the median is recorded for the three categories of fiscal stance during the first year of the downturn: stimulus, neutral policy, and tightening. In each case, values are recorded for the average of the median three years before the downturn, one year before the downturn, the first year of the downturn itself, one year after the whole downturn episode, and the average for the four years after the downturn episode. Note that some downturns last for more than one year. In a multiyear downturn, the year after the downturn is the first year after the last downturn year.

[1]Fiscal impulse identified during the first year of a downturn as a decline in the cyclically adjusted primary balance to GDP below 0.25 percentage point of GDP.

[2]Exchange rate is given as local currency/U.S. dollars (+ sign denotes a depreciation).

stimulus, and taking into account factors that might affect the transmission of fiscal stimulus.

The main regressor of interest is the fiscal impulse measure.[19] Ideally, the fiscal impulse measure would pick up all discretionary changes in fiscal stance, whether from systematic reactions to the state of the economy or nonsystematic (that is, unexpected) discretionary actions. The systematic component of the fiscal impulse measure is, however, endogenous, which leads to problems with statistical inference. Moreover, as discussed in Box 5.2, it is very difficult to distinguish systematic changes in fiscal policy from automatic stabilizers. In principle, the elasticity-based fiscal impulse measure used in the previous section should achieve this, but unless the elasticities are perfectly accurate for each period—and potential output is measured correctly—this type of fiscal impulse measure will likely suffer from additional, measurement-error-related endogeneity, undermining the validity of the regressions.

To reduce these endogeneity problems and check for robustness, a second fiscal impulse measure is used that focuses exclusively on the nonsystematic component of discretionary fiscal policy (as is also the case in the fiscal literature that uses structural vector autoregression (SVAR) and "narrative" approaches; see Box 5.2). This measure aims to identify unexpected changes in fiscal stance, based for each country on separate regressions of revenues and expenditures on output growth and a time trend—see Appendix 5.1 for details. (In what follows, this measure will be referred to as the

[19]Note that all the variables are now continuous and no longer use the categories of the event analysis.

regression-based fiscal impulse measure, to distinguish it from the elasticity-based measure.)

Other regressors include two lags of real GDP growth, to control for endogenous inertia in the economy; real money growth (contemporaneous and two lags), as a measure of monetary policy; changes in foreign demand (contemporaneous and two lags); and government size. These were found to be significant at the 10 percent level and were retained in all regression specifications that follow.

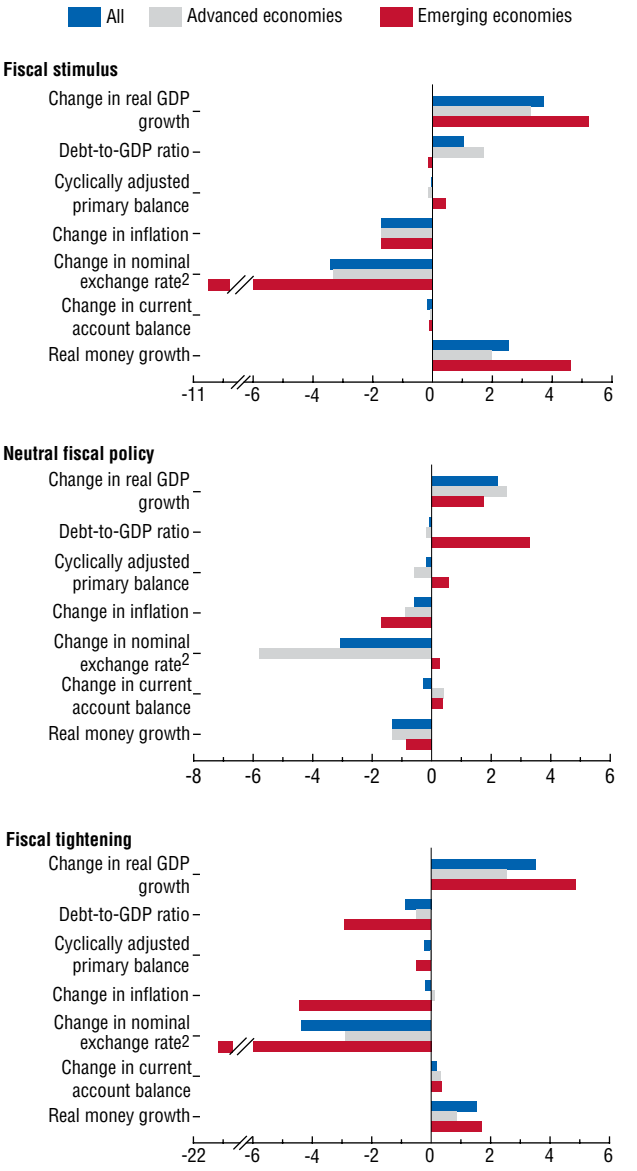
Table 5.4 presents the key results in terms of responses of real GDP to a 1 percent fiscal impulse, using both the elasticity-based and regression-based fiscal impulse measures.[20] The values show the output effects in the year of the fiscal intervention and three years later, with a positive number indicating that positive fiscal stimulus raises output.[21] The results for the baseline specification are presented in the first row. For both fiscal impulse measures, the estimated effect of fiscal stimulus on output growth in the baseline specification is weak—closer to zero than the Keynesian assumption of 1 or more—and turns negative after three years. However, as can be seen in the second and third rows of the table, this conceals important differences across countries. In advanced economies, the multipliers are statistically significant and moderately positive—a 1 percentage point fiscal stimulus leads to an increase in real GDP growth of about 0.1 percent on impact, and up to 0.5 percent above its level in year 0 after three years. This is broadly comparable with the effects found from previous SVAR studies and case studies. By contrast, although emerging economies see impact effects similar to those of advanced economies, the effects on output in the medium term are consistently negative across both fiscal impulse measures—for these economies, discretionary

[20]See Appendix 5.1 for tables of coefficient estimates and regression diagnostics.

[21]Note, however, that the regressions underlying the first nine rows do not distinguish between fiscal stimulus and fiscal tightening—a negative effect on output from fiscal tightening is therefore assumed to be consistent with a positive effect from fiscal stimulus.

Figure 5.8. Macroeconomic Indicators after Downturns, with and without a Fiscal Stimulus[1]

The bar charts indicate changes in macroeconomic indicators from the year of downturn to the first year after downturn.



Source: IMF staff calculations.

[1]Fiscal stimulus during the first year of a downturn is defined as a decline in the cyclically adjusted primary balance to GDP below 0.25 percentage point of GDP.

[2]Exchange rate is given as local currency/U.S. dollar (+ sign denotes a depreciation). Value for emerging economies with fiscal stimulus is –10.5; with fiscal tightening, –21.2.

Table 5.2. Real GDP Growth and Fiscal Impulse under Various Initial Conditions: All Economies[1,2]

Conditioning Variables[3]	Number of Observations in Downturn	Three-Year Average before Downturn	One Year before Downturn	Year of Downturn Real GDP Growth	One Year after Downturn	Four-Year Average after Downturn
Public debt						
High	13	2.1	1.5	–0.1	2.7	2.0
Low	30	3.1	2.4	–0.3	3.6	3.2
Current account balance[4]						
High	22	2.7	2.4	0.3	2.6	2.4
Low	27	3.2	2.0	–0.7	3.9	3.4
Openness to trade						
High	24	3.0	2.6	–0.1	2.7	3.1
Low	25	3.4	1.6	–0.3	3.9	3.4
Exchange rate						
Fixed	20	2.8	2.0	–0.3	3.1	3.0
Floating	26	3.1	1.9	0.2	3.7	3.3

[1]Fiscal impulse is identified during the first year of a downturn as a decline in the cyclically adjusted primary-balance-to-GDP ratio below 0.25 percentage point of GDP.
[2]Initial conditions for variables are defined as a three-year average before the year of a downturn.
[3]The threshold for high debt is 75 percent for advanced economies and 25 percent for emerging economies. All other variable thresholds are the median of the variable across the sample.
[4]A positive value for the current account balance indicates a surplus; a negative value indicates a deficit.

fiscal policy does indeed appear to do more harm than good.

The output responses shown in the next six rows of the table indicate that, overall, revenue-based stimulus measures seem to be more effective in boosting real GDP than expenditure-based measures, particularly in the medium term and in advanced economies. Expenditure-based impulses are found to have consistently negative effects in emerging economies after three years, perhaps reflecting concerns that, once implemented, increased expenditures are difficult to remove.

A key question is whether discretionary fiscal policy can successfully stimulate the economy during downturns. This is addressed in the final four rows of the table. When controlling for downturns, the general effects of fiscal interventions appear to be positive and, if anything, show slightly stronger effects than the baseline specification. However, it is possible that the results for these multipliers are driven by strong negative effects from fiscal tightening and do not reflect significantly positive effects from fiscal stimulus. When controlling specifically for the effects of fiscal stimulus, the effects are in fact consistently negative across the two fiscal impulse measures (although there is some improvement in output growth in the years that follow, such that the level of output is less negative than initially).

What could be driving such a different result? One concern is that the fiscal impulse measures are not adequately dealing with the endogeneity problem, especially the elasticity-based measure, which could lead to biased results.[22] If it is not a measurement problem, the effects could depend on private sector expectations of the debt implications of the fiscal stimulus. The final two rows show how the effects depend on the level of public debt at the time of the intervention. In low-debt economies, the initial effect of a fiscal stimulus is negative, but there is a positive effect on growth in the years that follow, such that the net effect after three years is relatively negative when using the elasticity-based measure, and positive when using the regression-based measure. By contrast, in high-debt economies

[22]For example, during downturns both fiscal revenues and output fall. To the extent that the regressions do not correct for the response of automatic stabilizers, an automatic response might be picked up as a fiscal stimulus, which, unsurprisingly, is identified as "ineffective" in the regressions. This is more likely in the elasticity-based approach—the assumption of unit-revenue elasticities for emerging economies, for example, may well be too low. This would tend to bias results, especially for the short run.

the effect is consistently large and persistently negative. This suggests that concerns about fiscal sustainability may be dominating spending decisions, even if current fiscal policy would traditionally be thought of as stimulatory.[23]

Additional regressions were run that included interaction terms of the fiscal impulse measure and dummies indicating (1) high or low openness to trade; (2) high or low levels of financial development, as a measure of liquidity constraints; (3) fixed versus floating exchange rate regimes; and (4) high or low current account surpluses, as a measure of external sustainability. Higher levels of trade openness and financial development yield higher multipliers, and multipliers are higher under floating exchange rate regimes. These results run contrary to economic theory, suggesting that debt concerns might dominate the effectiveness of fiscal policy. Indeed, higher-than-average current account balances (generally surpluses) tend to be associated with larger multipliers.[24] Finally, running the baseline regression using two different time subsamples yields a cautionary note: multipliers have apparently been weaker in recent years.[25]

The evidence from this analysis indicates that discretionary fiscal policy can successfully stimulate output growth, especially if it is revenue-based. But there are reasons for caution in employing stimulus packages during downturns, with evidence suggesting that, if it is to work at all, it will do so only when underlying fiscal positions are sound. This indicates that governments need to improve balances during upturns and make credible commitments that stimulus packages will not threaten debt sustainability.

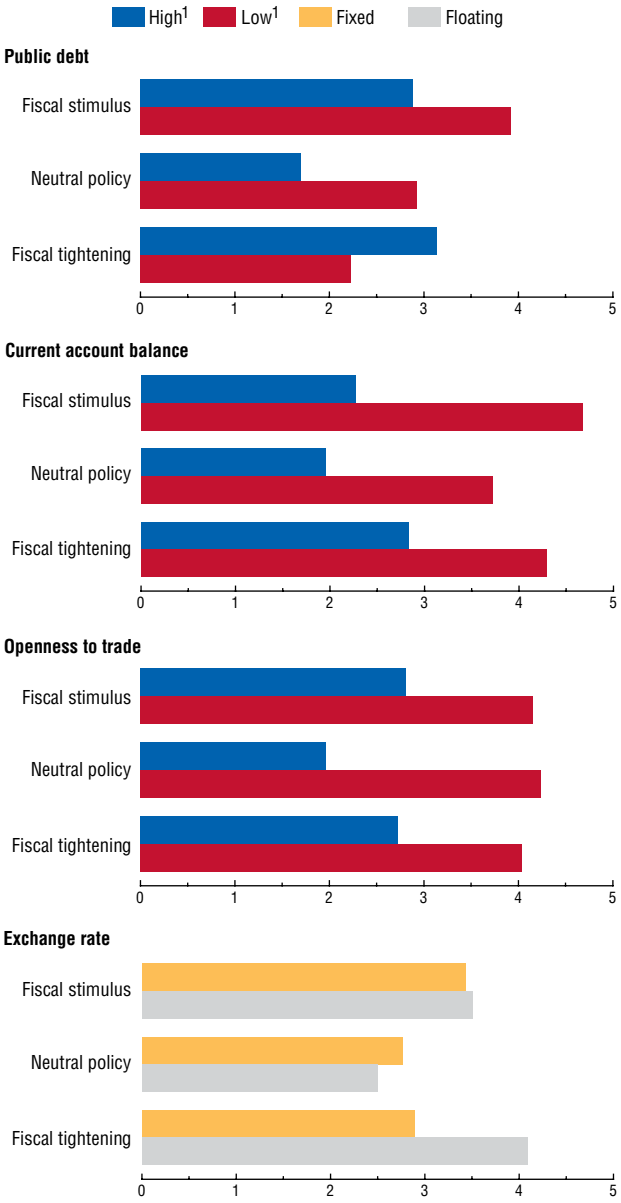
[23]The effects of both fiscal stimulus and fiscal tightening are much worse when controlling for severe downturns. See Appendix 5.1 for more details.

[24]In the medium term, the multipliers are positive when using the regression-based fiscal impulse measure but still negative when using the elasticity-based fiscal impulse measure.

[25]This is particularly true for advanced economies. One potential explanation, consistent with both the empirical evidence and the simulations presented later, is that monetary policy has become less accommodative in those economies.

Figure 5.9. Changes in Real GDP Growth and Fiscal Policies under Various Initial Conditions

The bar charts indicate changes in real GDP growth from year of downturn to first year after downturn, differentiated by macroeconomic conditions three years before the downturn (debt, current account, openness to trade, and money growth) and by the exchange rate regime and composition of fiscal impulse in the year of downturn.



Source: IMF staff calculations.

[1]The threshold for high debt is 75 percent for advanced economies and 25 percent for emerging economies. The thresholds for current account balance and trade openness are the median of the variable across the sample.

Table 5.3. Real GDP Growth and Fiscal Impulse by Composition: All Economies[1,2]

Conditioning Variables	Number of Observations in Downturn	Three-Year Average before Downturn	One Year before Downturn	Year of Downturn Real GDP Growth	One Year after Downturn	Four-Year Average after Downturn
Fiscal stimulus						
Revenue-based impulse	5	4.4	2.8	–0.7	3.6	4.1
Expenditure-based impulse	31	3.1	2.0	–0.4	2.9	3.0
Both expenditure and revenue impulses	15	3.0	1.6	0.6	4.1	3.5
Fiscal tightening						
Revenue-based impulse	31	2.4	2.3	–0.2	3.3	3.1
Expenditure-based impulse	17	2.8	3.2	1.2	5.0	4.3
Both expenditure and revenue impulses	35	2.7	3.3	1.1	4.3	4.2

[1]Fiscal impulse is identified during the first year of a downturn as a decline in the cyclically adjusted primary balance to GDP below 0.25 percentage point of GDP.
[2]Initial conditions for variables are defined as a three-year average before the year of a downturn.

A Simulation-Based Perspective on Fiscal Stimulus

The previous section finds some evidence for moderately positive multipliers, but with important caveats about the type of economy, the composition of the fiscal impulse, and the level of debt. Clearly, there is a large number of potentially important factors that policymakers need to take into account when designing a discretionary fiscal policy action. The objective of this section is to examine, in a controlled setting, how the effects of fiscal stimulus depend on the structure of the economy in question.

The model used is an annual version of the Global Integrated Monetary and Fiscal Model (GIMF). GIMF is a multicountry dynamic stochastic general equilibrium model that includes a number of useful features relative to existing monetary business cycle models (such as both myopic and liquidity-constrained consumers and potential long-term productivity benefits from government investment) and a wide range of fiscal instruments affecting household and business intertemporal choices (government investment, labor taxes, consumption taxes, and transfers to households).[26]

[26]The country blocs are the United States, the euro area, Japan, emerging Asia, and the remaining economies. For a more detailed description of the model, see Kumhof and Laxton (2008).

The first exercise compares outcomes for key macroeconomic variables using various fiscal policy instruments for a large economy, calibrated to match the United States. The results are presented in Figure 5.10. The shock is a temporary fiscal expansion, calibrated to deliver a primary deficit that is 1 percent above baseline in year 1 and 0.5 percent above baseline in year 2. Thereafter, a fiscal reaction function ensures that debt is brought back to its initial level by raising lump-sum taxes. The fiscal stimulus is completely unanticipated in the first year, but its time profile, including the further stimulus in year 2 and the longer-term implications for taxes, is fully understood once initiated. Each row of Figure 5.10 shows the reactions of, from left to right, GDP (in percentage deviations from the baseline), inflation and nominal interest rates (in percentage point deviations from baseline), and real interest rates (in percentage point deviations from baseline). Going down the figure, successive rows show the impact of various fiscal instruments: government investment, consumption taxes, labor income taxes, and transfers to households. In each panel, two responses are shown: one in which nominal interest rates are assumed to react to expected deviations of inflation from target, and one in which nominal interest rates are held constant for the initial two years, thereby accommodating the fiscal stimulus.

Table 5.4. Responses of Real GDP to Discretionary Fiscal Policy Changes

	Real GDP Response			
	Elasticity-based fiscal impulse measure		Regression-based fiscal impulse measure	
Effect in:	Year zero	Year three	Year zero	Year three
	(with respect to positive fiscal impulse by 1 percentage point of GDP)			
Baseline specification	0.15	–0.16	0.08	–0.02
Country differences				
Advanced economies only	0.12	0.13	0.11	0.51
Emerging economies only	0.21	–0.03	0.10	–0.09
Composition				
Revenue-based policy changes	0.21	0.12	0.10	0.14
Expenditure-based policy changes	0.13	–0.21	0.06	–0.06
Composition: advanced economies only				
Revenue-based policy changes	0.35	0.59	0.01	0.40
Expenditure-based policy changes	–0.09	–0.26	0.15	0.52
Composition: emerging economies only				
Revenue-based policy changes	0.23	0.23	0.13	0.17
Expenditure-based policy changes	0.20	–0.18	0.08	–0.23
Downturns	0.29	0.00	0.10	0.04
Fiscal stimulus only	–1.30	–0.88	–0.87	–0.29
Fiscal stimulus only, high initial debt	–1.75	–2.05	–1.05	–0.80
Fiscal stimulus only, low initial debt	–0.96	–0.36	–0.65	0.13

In each case, there are no long-run changes in potential output; eventually, each of the variables will return to zero.[27] Hence, the experiment focuses on the differences in the short-run impact of the policy measures. The results show the following:

- For the same increase in deficit, there are large differences in the size of short-run multipliers across instruments. On the assumption that it can be implemented immediately and efficiently, government investment has a larger effect than other measures.[28] This is because it has a direct effect on aggregate demand, whereas the effects of taxes and transfers depend on propensities to consume. Investment also has the largest effect on inflation and real interest rates.
- The monetary policy regime plays a key role in the effectiveness of fiscal stimulus—with accommodation, the output multipliers are up to twice as large, and the effects are more persistent.[29] Concomitantly, inflation is higher. The difference is least for labor taxes, because lowering labor taxes increases incentives for work as well as consumption. As a result, a supply response mutes the inflationary impact. It can also be shown that without monetary accommodation, multipliers are smaller when prices are more flexible.[30] This is because inflation increases more strongly following the stimulus, thereby necessitating a more aggressive hike in interest rates that reduces the output response. With monetary accommodation, greater price flexibility has the opposite effect, because higher inflation implies a larger drop in real interest rates.
- Cuts in the consumption tax and temporarily higher household transfers have a clear

[27]This is also true for government investment, but in this case the effect on output is much more long lived, because government infrastructure capital has productive benefits that depreciate only slowly over time.

[28]This is in contrast to the empirical results, which showed more positive effects from revenue-based stimulus. In these simulations, private agents understand that debt will be maintained at initial levels. In practice, it could be that expenditure-based packages are more likely to be made permanent and therefore raise concerns about debt sustainability.

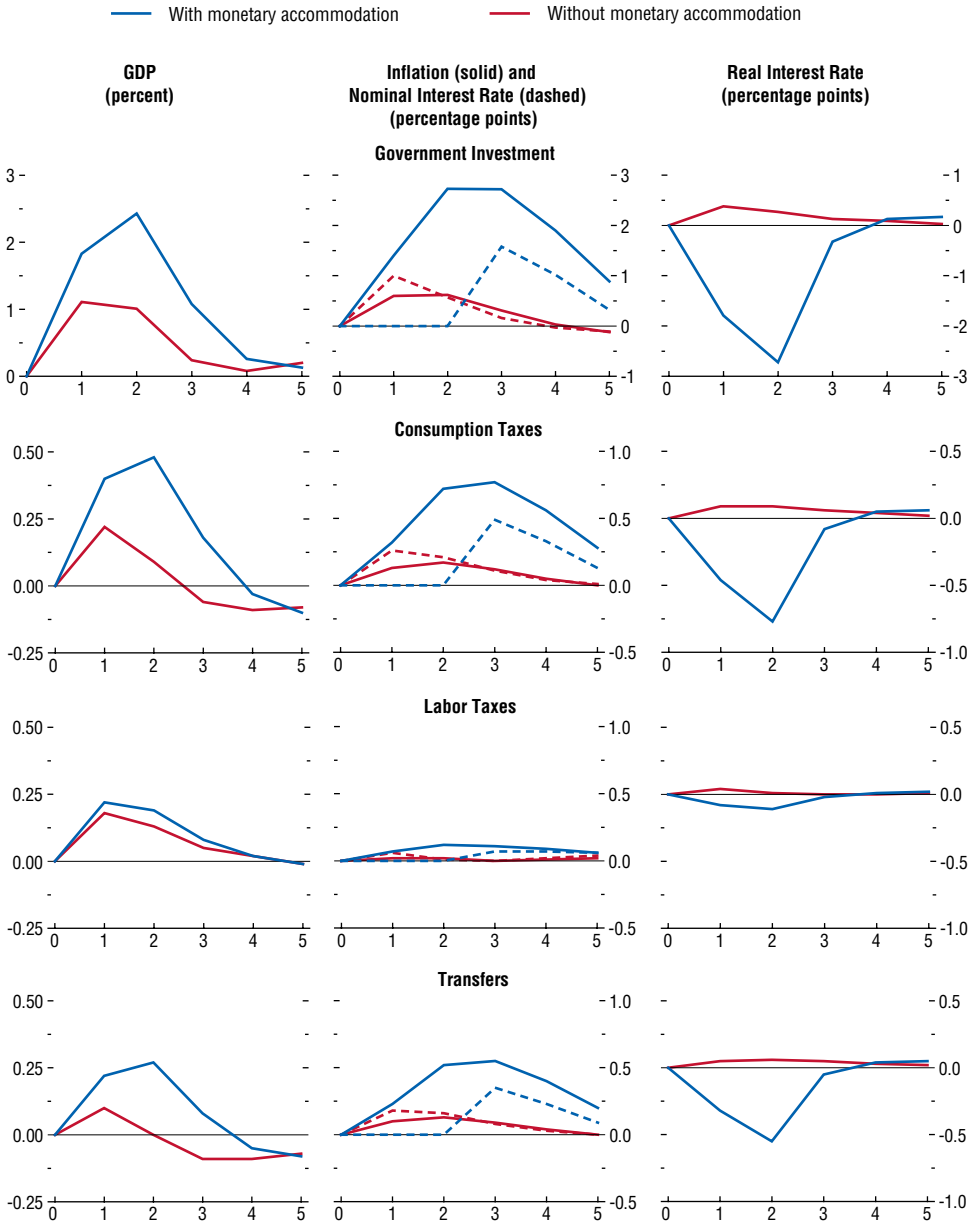
[29]This is consistent with the view that fiscal policy could be most effective when monetary policy is least effective, such as when nominal interest rates are close to zero or the monetary harmonization mechanism is imparied.

[30]Simulations for different degrees of price flexibility are not shown in Figure 5.7.

Figure 5.10. Effect of Fiscal Expansion in a Large Economy

(Deviation from baseline; years on x-axis; shock occurs in year 0)

Impulse responses to 1 percent increase in deficit in year 1 and 0.5 percent increase in deficit in year 2.



Source: IMF staff calculations.

"tilting" effect on output (output is above, then below baseline), because they provide incentives to bring forward consumption and investment.[31] Cuts in labor taxes, on the other hand, generate a more consistently positive supply response.

If policy measures are made permanent and financed by an increase in debt, then long-run supply and debt effects become much more important. For all fiscal instruments, higher debt tends to crowd out private output because it leads to higher real interest rates.[32] When there is a permanent increase in transfers, regardless of short-run monetary accommodation, the real interest rate rises in the long run, which reduces output or, at best, leaves it unchanged. Lower tax rates, on the other hand, reduce supply distortions, and therefore generate permanent increases in output, more so when labor taxes are lowered than when consumption taxes are lowered. Making lower tax rates permanent could *raise* the short-term impact, depending on the balance between the positive supply-side effect and negative interest rate effects. The effects from permanently higher government investment depend on whether the spending can generate a higher rate of return than if the resources were available to private investors.

How do the multipliers differ according to the characteristics of the economy? Additional simulations show the following:

- For any given size of fiscal stimulus, multipliers are lower in smaller and more open economies—see Figure 5.11—although those for labor taxes fall by less.[33]
- A higher share of liquidity-constrained consumers, as might be expected in most emerging economies, results in significantly larger multipliers.
- At the same time, fiscal stimulus may lead, in high-debt emerging economies, to an increase in real interest rates as market participants demand a higher interest rate risk premium. This reduces output multipliers, especially for revenue-based measures, as shown in Figure 5.12. If the increase in interest rate risk premiums is large enough, the multipliers are negative. It is possible that this is the mechanism driving the negative results of fiscal stimulus seen from the empirical work in Table 5.4.

These results indicate that the effects of fiscal stimulus are likely to vary considerably, depending on how the stimulus is implemented and on the type of economy. The results support the idea that the degree of monetary policy accommodation is important, which may have played a role in the smaller estimates of fiscal multipliers in recent years. This is not to say that fiscal policy cannot work; rather, it is likely to be most effective when monetary policy is constrained and ineffective (see also Blinder, 2006). The results also illustrate a potentially important mechanism by which concerns about public debt sustainability could lower fiscal multipliers to a point at which discretionary fiscal policy would do more harm than good.

Conclusions and Policy Considerations

This chapter addresses a simple question: What are the effects of fiscal policy during downturns? The analysis indicates that the answer is complicated and highly dependent on an economy's characteristics.

One obvious appeal of discretionary fiscal policy is that governments can potentially have a quick effect on spending power, whereas the effects of monetary policy are subject to long and sometimes uncertain lags. And in practice, the policy record in advanced economies shows that discretionary fiscal policy has been used

[31]This is an example of a temporary fiscal policy change that is effective because of forward-looking expectations, showing that the "permanent income" criticism of temporary policy measures does not always hold.

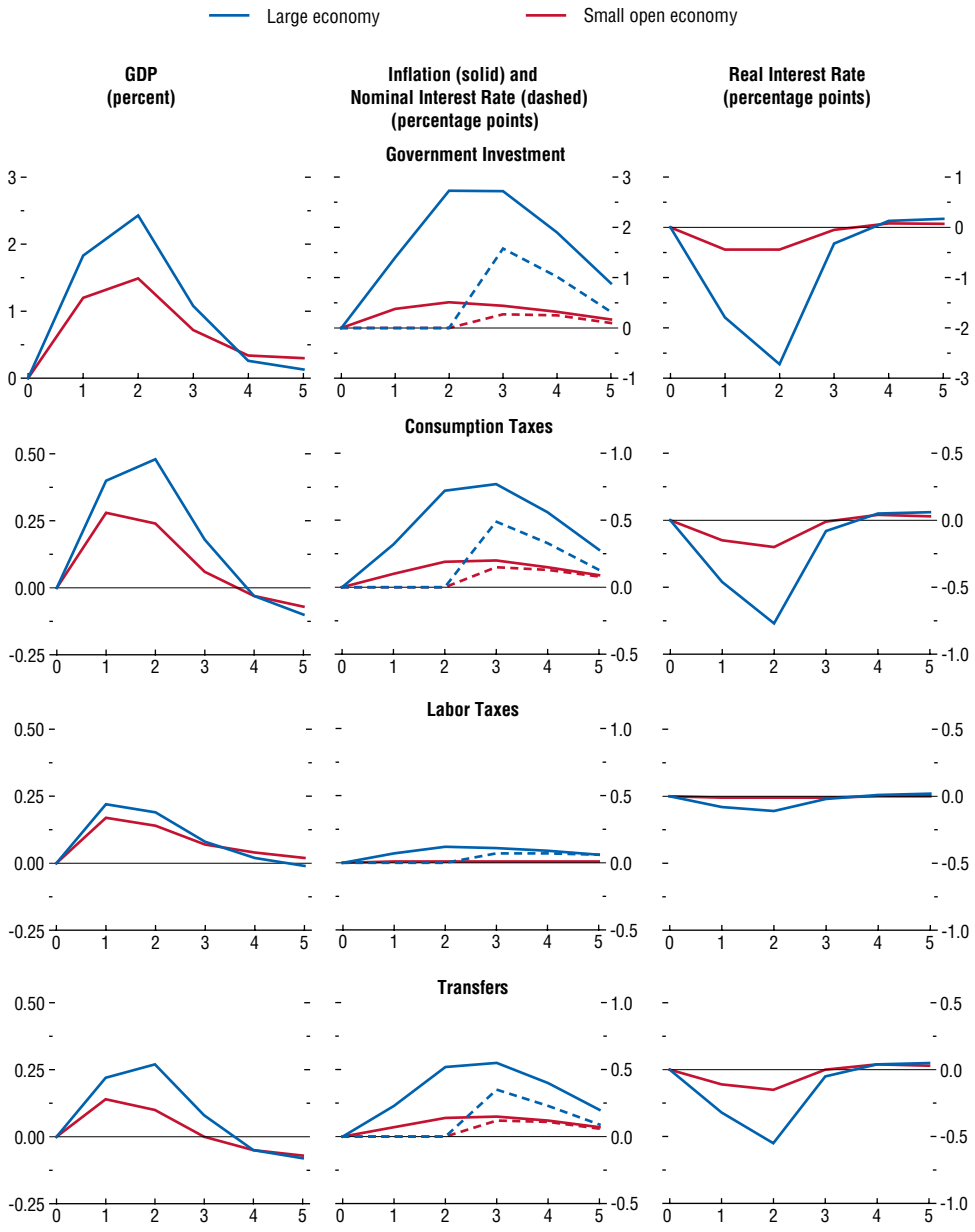
[32]In small countries—that is, small enough that interest rates are exogenous—this is still likely to happen. The degree depends on changes in interest rate risk premiums.

[33]The empirical results in the previous section point to the opposite result: multipliers are higher in smaller and more open economies. This suggests that the measure of openness used in the regressions is picking up other effects not accounted for in these simulations.

Figure 5.11. Fiscal Expansion in a Large Economy Compared with a Small Open Economy with Monetary Accommodation

(Deviation from baseline; years on x-axis; shock occurs in year 0)

Impulse responses to 1 percent increase in deficit in year 1 and 0.5 percent increase in deficit in year 2.

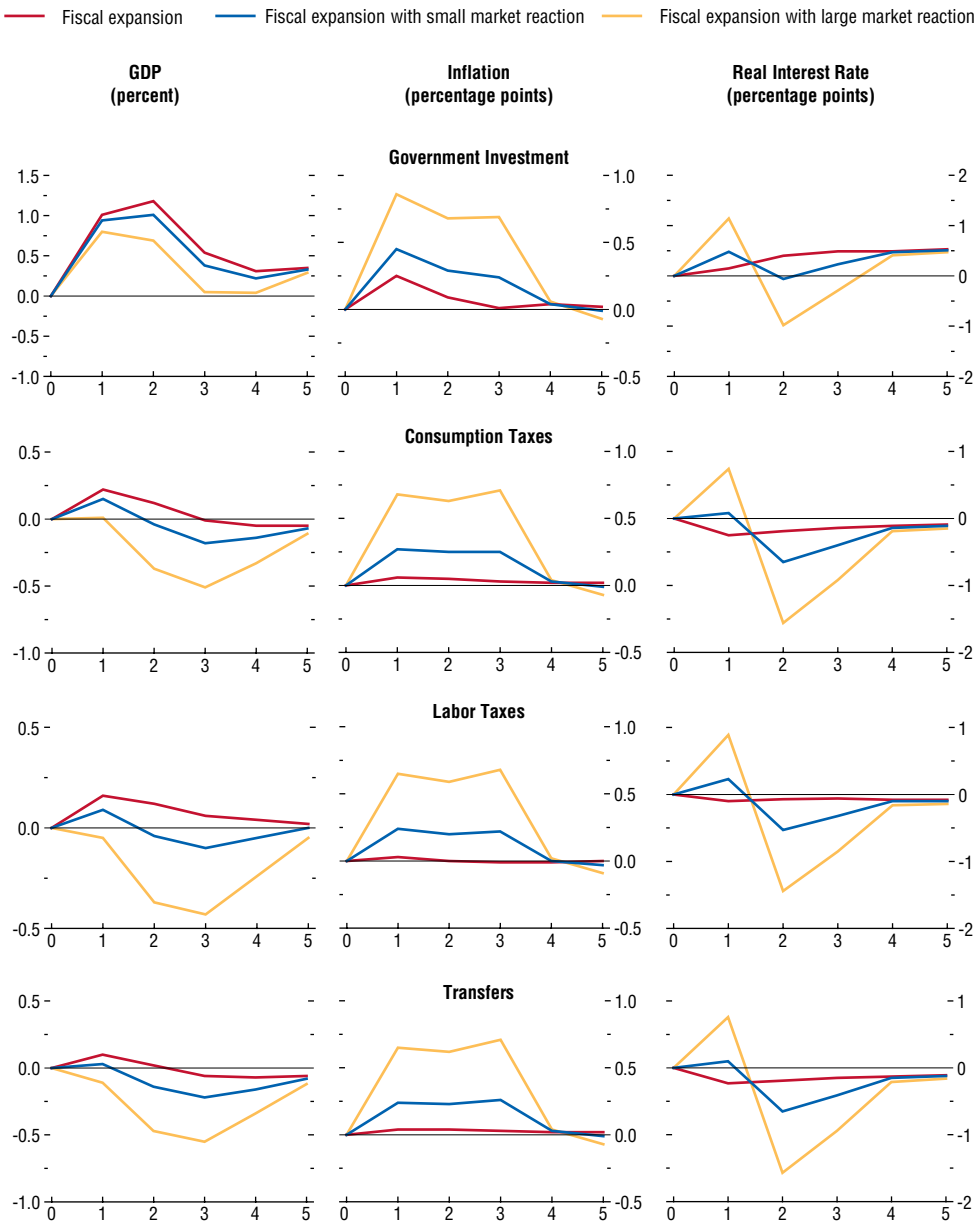


Source: IMF staff calculations.

Figure 5.12. Effect of Fiscal Expansion in a Small Economy with Market-Risk-Premium Reaction

(Deviation from baseline; years on x-axis; shock occurs in year 0)

Impulse responses to 1 percent increase in deficit in year 1 and 0.5 percent increase in year 2.



Source: IMF staff calculations.

actively, although not nearly as much as automatic stabilizers or monetary policy. However, discretionary measures have typically been implemented later than automatic stabilizers and changes in monetary stance; they are more often a response to downturns than upturns, sometimes more than necessary; and stimulus measures have often been made permanent, which has had adverse implications for fiscal sustainability.

An examination of the average effects of discretionary fiscal policy across a combined sample of advanced and emerging economies does not provide strong evidence of countercyclical effects on activity. However, a closer analysis suggests that the effects are moderately countercyclical in advanced economies. By contrast, there is only weak evidence for countercylical effects in emerging economies, and only initially, with indications that effects turn negative in subsequent years. Revenue-based stimulus measures seem to be more effective at boosting output than expenditure-based measures, especially in emerging economies, perhaps reflecting concerns that, once implemented, increased expenditures are difficult to remove.

These empirical findings are broadly consistent with simulations from a multiperiod general equilibrium model. The simulations show how the fiscal multiplier can vary from Keynesian (1 or greater) to negative, depending on the instrument used and the type of economy. In particular, the multiplier is lower when monetary reaction does not accommodate the fiscal stimulus and when there is a strong increase in risk premiums following fiscal stimulus (such as when concerns about servicing debt obligations are high). Increased government spending can be the most direct means of increasing output, if it can be implemented quickly. On the other hand, it is the most inflationary. Tax changes that provide greater rewards for work effort or incentives for bringing consumption forward might be nearly as effective in supporting economic activity, with less risk of inflation.

Given both the interest in fiscal policy as a countercyclical tool and the evidence that discretionary fiscal stimulus can have adverse effects, should governments rely more on automatic stabilizers? Or is it possible to design alternative countercyclical fiscal policy mechanisms that would respond symmetrically and more quickly to changes in the state of economy?[34]

There are two broad possibilities, each with its advantages and disadvantages.

Increasing the responsiveness of automatic stabilizers: The extent of passive automatic stabilizers could be augmented, for example, by increasing the progressivity of the revenue system. Such mechanisms would work automatically and would not necessarily increase the size of government. A related approach would be to change certain tax, transfer, or spending programs to introduce links to the state of the economy following simple rules, akin to the Taylor rule for setting interest rates. This could be done by implementing pre-approved temporary spending programs or raising unemployment insurance benefits once the unemployment rate reaches a certain threshold. An advantage of such an approach would be its transparency.

However, such schemes could also bring unintended consequences that would need to be weighed against possible stabilization benefits. A system of temporary consumption tax changes could lead to self-fulfilling falls in current consumption if tax cuts were anticipated. Proposals that call for automatic triggers in response to cyclical developments are also problematic because there are no completely reliable real-time measures of the state of the economy. Responses based on previous periods' outcomes—such as an automatic tax rebate—could be more accurate and less distortionary but might not be as well targeted as those that

[34]This idea goes back at least to Musgrave (1959, p. 512), who coined the phrase "formula flexibility" to describe a system in which changes in taxes and/or expenditures would be legislated in advance to respond to changes in income. More recently, versions have been advocated in Seidman (2003).

are based on current income. It might also be difficult to develop predetermined state-contingent spending programs that are a well-targeted and efficient use of public money (Solow, 2005). Furthermore, all of the above could introduce distortions: schemes to increase tax progressivity or tie unemployment insurance generosity to the state of the economy would likely alter work incentives, and might prove politically difficult to adhere to during upturns. Thus, they would have to flanked with measures to improve the targeting of support during downturns. Better targeting, however, is likely to pose administrative challenges that could prove expensive to address.

Changes in fiscal policy governance: Broader reforms could bolster the credibility of discretionary policy actions, in particular, to reduce the risk of debt bias. This might involve establishing an independent, nonpartisan government agency, such as already exist in many countries—a sort of "fiscal watchdog"—charged with identifying changes in the cyclical state of the economy, assessing the extent to which fiscal policy is consistent with medium-term objectives, and providing advice on various policy measures.[35] This would minimize partisan judgment in the evaluation of economic information and would avoid relying solely on statistical measures of the state of the economy, which can be imprecise. In addition, this arrangement could increase the timeliness and temporariness of the fiscal impulse. Such agencies could also be entrusted with giving advice on which tax and expenditure parameters to vary, as they indeed already do in a number of countries.[36]

Clearly, a careful examination of the potential costs and risks of such systems would be required before implementing any such approaches. In addition to the choice of fiscal instruments and the administrative complexities of changing tax rates or expenditure plans, the system would have to be coordinated with monetary policy goals (see Taylor, 2000). Nonetheless, given the limitations of automatic stabilizers as currently implemented and the risks associated with discretionary fiscal policy, the idea deserves further examination.

Appendix 5.1. Data and Empirical Methods

Evidence on the Responsiveness of Fiscal Policy

Quarterly data on the output gap and real GDP growth are taken from the OECD *Economic Outlook,* and are seasonally adjusted. Downturns are defined as quarters in which growth is either negative or below potential, with the output gap more than one standard deviation below zero. Changes in monetary policy are proxied by the quarterly change in the nominal short-term interest rate taken from the IMF's International Financial Statistics database. All changes are quarter-over-quarter and unannualized. The analysis focuses on "large" changes in discretionary fiscal variables, defined as those that exceed 0.25 percent of GDP a quarter. Similarly, discretionary changes in nominal short-term interest rates are defined as those that exceed 0.25 percent in one quarter.

The vector autoregression (VAR) is estimated for each country using quarterly data. The variables included in the VARs, and their ordering, are as follows: actual real GDP growth minus potential real GDP growth, inflation (based

[35]For example, the objective of the Swedish Fiscal Policy Council is to provide an independent evaluation of the Swedish government's fiscal policy, including whether fiscal policy is consistent with the state of the economy in the business cycle.

[36]Some have even proposed that governments delegate limited fiscal responsibility to these nonpartisan agencies, for exclusive use in macroeconomic stabilization (see Ball, 1997, and Calmfors, 2003). Under existing proposals, such agencies could vary certain tax or expenditure parameters, within certain limits set out by the legislative branch and on the basis of a narrow stabilization mandate supplemented by strict accountability requirements. A weakness of such proposals is they present a challenge regarding the role of government and they make it difficult to establish a dividing line between the agency and government in terms of countercyclical fiscal policy (see Debrun, Hauner, and Kumar, 2008, for a detailed survey).

on the GDP deflator), changes in the nominal interest rate, changes in the primary cyclically adjusted fiscal balance, and changes in the automatic (cyclical) fiscal balance. This ordering implies that although policy variables can respond to growth and inflation shocks within one quarter, the transmission lag from policy variables to growth and inflation is at least one quarter. Two lags of each variable are included in the VAR.

Data Uncertainties and the Risk of Debt Bias

For the purposes of testing for asymmetric responses, each VAR now includes the following variables: growth when the economy is in a downturn and zero otherwise; growth when the economy is in an upturn and zero otherwise; and the previously included variables, that is, inflation, changes in nominal interest rates, and changes in fiscal balances. As before, downturns are defined as quarters in which growth is either negative or below potential, with the output gap more than one standard deviation below zero. The results are robust to changing the ordering of the two halves of growth (downturns and upturns) in the VAR, to alternative ordering for the fiscal and monetary policy variables, and to including a time trend in each equation. Because the VAR is specified in first differences, any trend in fiscal balances over the sample period affects the constant term in the fiscal balance equation.

For the purposes of testing the reliability of preliminary GDP estimates, the analysis updates the estimates of Faust, Rogers, and Wright (2005), which used data ending in 1997. Revisions are defined as the difference between the data as they stood in the most recent OECD *Monthly Economic Indicators* (June 2008) and the data when they were first published in the *Monthly Economic Indicators*. For the United States, the United Kingdom, and Canada, preliminary data are available beginning in 1965:Q1. For Japan, the starting date is 1970:Q1; for Italy and Germany, 1979:Q4; and for France, 1987:Q4.

For the purposes of evaluating the effect of growth estimation errors, each VAR now includes the preliminary estimation errors in addition to the previously included variables. The estimation errors are ordered in the VARs after growth and inflation but before the policy variables. The results are robust to alternative ordering among the errors and policy variables.

Policy Reactions in Emerging and Advanced Economies

The analysis uses a sample of 21 advanced economies and 20 emerging economies from the IMF's World Economic Outlook (WEO) database, covering the period from 1970 to 2007.[37] The sample includes annual data for general government revenues and expenditures (net of interest payments). Other macroeconomic data (for example, for external balances and inflation) are sourced from the World Bank's World Development Indicators database, the WEO database, and other public sources. The list of economies and episodes of downturn is in Table 5.5 (with years of fiscal stimulus in bold).

In addition to the WEO data, an examination was made using the IMF's *Government Finance Statistics Manual* (GFS) data. One advantage of this data set is that it offers greater disaggregation—revenues can be broken down into personal, corporate, consumption, and trade. Taxes and expenditures can be broken down into household, nonprofit institution, and corporate transfers (subsidies); interest; government employee wages; and other expenditures as well as capital spending. More-disaggregated data potentially allow for finer distinctions regarding the income elasticities of taxes and spending and therefore a more accurate measure of automatic versus cyclical adjustments in revenues and expenditures. Extensive comparisons were made between

[37]Owing to data limitations, India was dropped from the sample used for regressions.

Table 5.5. List of Countries and Downturn Episodes

Country	Years in Downturn
Argentina	1975, 1976, 1978, 1981, 1982, 1985, 1988, 1989, 1990, 1995, **1999,** 2000, **2001,** 2002
Australia	**1972,** 1978, 1982, **1983, 1991, 1992**
Austria	1975, **1978,** 1981, 1988, 1997
Belgium	1975, 1977, 1987, 1993, **2003**
Brazil	1970, 1981, 1983, 1990, 1992
Canada	**1975, 1982, 1991, 1992**
Chile	1972, 1973, 1975, 1982, 1983, **1999**
China	1976, 1990, 1991
Colombia	1976, 1977, 1983, 1985, 1991, **1992,** 1999
Czech Republic	1990, 1991, 1992, **1997,** 1998
Denmark	**1974, 1975,** 1980, **1981,** 1983, **1988,** 1993, 2003
Egypt	1973, 1974, 1981
Finland	**1977, 1978, 1991, 1992, 1993**
France	**1975, 1986,** 1987, **1993,** 1997
Germany	1975, 1982, 1989, **1990,** 1993, 2003
Greece	1974, 1981, 1982, 1983, 1987, 1993
Hungary	1985, 1988, 1990, **1991**
Iceland	1975, 1976, **1983, 1985,** 1988, 1991, 1992, 2003
India	1972, 1974, 1979, 1980, 1987, 2002
Indonesia	1998
Ireland	1975, 1976, 1983, 1993, 1994
Italy	1972, 1975, 1980, 1983, 1993, **2003**
Japan	1974, **1975,** 1987, **1994, 1998, 1999**
Malaysia	1971, 1975, 1985, 1986, 1987, **1998**
Mexico	1977, 1982, 1983, 1986, 1988, 1995, 2001
Netherlands	1975, 1980, 1981, 1982, 1993, **2003,** 2005
New Zealand	1972, 1976, 1977, 1979, 1983, **1991,** 1992, 1998
Pakistan	1970, 1972, 2002, 2003
Poland	1980, 1981, 1982, 1984, 1990, **1991**
Portugal	1975, 1984, 1985, **1986, 1993,** 2003
Romania	1975, **1985**, 1988, 1989, **1990,** 1991, **1992,** 1997, 1998, 1999
Slovak Republic	1990, 1991, 1992, 1993
Slovenia	1976, 1983, 1987, 1988, 1990, 1991, 1992
South Africa	1977, 1978, **1982,** 1983, 1985, 1986, 1990, **1991, 1992**
Spain	1971, 1981, 1985, 1986, **1993**
Sweden	1977, 1981, 1983, **1991, 1992, 1993,** 2003
Switzerland	1975, 1976, 1978, 1982, 1983, **1991,** 1993, 2003
Turkey	1973, 1979, 1980, 1989, 1994, 1999, 2001
Ukraine	1987, 1990, 1991, 1992, 1993, 1994, 1996, **1997,** 1998, 1999
United Kingdom	1971, 1974, 1975, 1980, 1981, **1991, 1992**
United States	**1970,** 1974, **1975, 1980, 1982,** 1991

[1]Years in bold correspond to use of a fiscal stimulus in a downturn, with fiscal stimulus defined as a decline in the cyclically adjusted primary balance to GDP below 0.25 percentage point of GDP.

WEO and GFS data for the same selection of countries. Two major problems arose. First, to create a sufficiently long time series, various GFS vintages needed to be spliced together, leading to situations in which the components listed above jumped at the splice points, apparently simply because of reclassifications. This led to spurious measures of fiscal impulses, taking away the theoretical advantage of using these data. Second, long time series of GFS data are available only for central government. This can present a deceptive picture of changes in fiscal policy. For example, estimates of fiscal impulses at the central level of government were found to be countercyclical (with the output cycle) for all countries. This finding deserves more investigation, but is outside the scope of this study.

Fiscal Impulse Measures

The elasticity-based fiscal impulse measure used for the stylized facts, event analysis, and regressions is a cyclically adjusted primary balance, calculated as

$$capb_t = r_t - e_t^P \frac{Y_t^{real}}{Y_t^{tr-real}},$$

where r_t is the revenue-to-GDP ratio in period t, e_t^P is the primary expenditure-to-GDP ratio in period t, and $Y_t^{real}/Y_t^{tr-real}$ is real output divided by potential (trend) output in period t. These estimates of the cyclically adjusted balance rely on output gap estimates derived using a time-series filter, which may not work well when supply shocks are frequent and large, as for many emerging economies. Applying the same elasticities across economies (as assumed for emerging economies), where one has a low elasticity of taxes to output and another has a high elasticity of taxes to output could lead to results implying that the former uses discretionary fiscal policy more actively than the latter, whereas in fact the cause is stronger automatic stabilizers.

The regression-based fiscal impulse measure used for the regressions is constructed as the

difference between a hypothetical primary deficit in period t assuming no changes in the economic environment and the actual primary deficit in period t–1. As a first step, note that the actual primary balance in period t can be expressed as a function of the discretionary policies, P_t, and the economic environment prevailing in that period, E_t:

$$B_t = B(P_t, E_t).$$

The change in the primary balance *with respect to the previous year* can then be decomposed as follows:

$$\begin{aligned}\Delta B_t &= B(P_t, E_t) - B(P_{t-1}, E_{t-1}) \\ &= [B(P_t, E_t) - B(P_t, E_{t-1})] + [B(P_t, E_{t-1}) \\ &\quad - B(P_{t-1}, E_{t-1})] \\ &= \Delta B_t^E + \Delta B_t^P.\end{aligned}$$

The term $B(P_t, E_{t-1})$ captures what the primary balance would have been under the period t policies, assuming the economic environment was the same as in period t–1. It is then possible to break the change in the balance into two elements. The first element, ΔB_t^E, represents the fiscal effects of changes in the economic environment from E_{t-1} to E_t. The second element, ΔB_t^P, captures the change in the balance as a result of changes in discretionary policies.

In practice, the initial step for calculating the regression-based measure of fiscal impulse is to estimate the following equations, assuming real GDP growth is a good proxy for the economic environment:

$$R_t = \alpha_R + \beta_R \cdot growth_t + \gamma_R \cdot trend_t + u_t$$

$$G_t = \alpha_E + \beta_E \cdot growth_t + \gamma_E \cdot trend_t + e_t,$$

where R is general government revenue in percent of GDP, G is general government primary expenditure in percent of GDP, *growth* is real GDP growth, *trend* is a time trend, and u and e are residuals. The growth-adjusted revenue, which indicates what the revenue *would* have been in period t if the growth rate remained unchanged from the previous period, is computed as $R_t(growth_{t-1}) = \hat{\alpha}_R + \hat{\beta}_R \cdot growth_{t-1} + \hat{\gamma}_R \cdot trend_t + \hat{u}_t$. The growth-adjusted primary expenditure is computed in the same way, as $G_t(growth_{t-1}) = \hat{\alpha}_E + \hat{\beta}_E \cdot growth_{t-1} + \hat{\gamma}_E \cdot trend_t + \hat{e}_t$. The measure for the primary balance that would have prevailed in period t if the growth rate had been equal to that in period $t-1$, $B(P_t, E_{t-1})$, can then be calculated as $R_t(\text{growth}_{t-1}) - E_t(growth_{t-1})$. The actual primary balance in the previous period, $B(P_{t-1}, E_{t-1})$, is simply $R_{t-1} - G_{t-1}$. The final step in the construction of the fiscal impulse measure is to take the difference between the growth-adjusted measure for the primary balance in period t and the primary balance in the previous period:

$$\begin{aligned}Fiscal\ impulse_t &= [R_t(growth_{t-1}) - G_t(growth_{t-1})] \\ &\quad - [R_{t-1} - G_{t-1}] \\ &= (\hat{\gamma}_R - \hat{\gamma}_E) + (\hat{u}_t - \hat{u}_{t-1}) \\ &\quad - (\hat{e}_t - \hat{e}_{t-1}).\end{aligned}$$

Note that although $\hat{u}_t$ and $\hat{e}_t$ can be expected to be uncorrelated with y_t, $\hat{u}_{t-1}$ and $\hat{e}_{t-1}$ are correlated with y_t.

Regression Analysis

Dynamic panel regressions were run using the Arellano-Bond estimator.[38]

The multipliers presented in Table 5.4 are derived from regression results shown in Table 5.6 (using the elasticity-based fiscal impulse measure) and Table 5.7 (using the regression-based fiscal impulse measure). Note that, because it is based on the primary balance, a negative change in the regression-based measure represents fiscal stimulus, so that a negative coefficient indicates that fiscal stimulus typically has a positive effect on real GDP growth. A positive coefficient on the expenditures-only fiscal impulse or a negative coefficient on the revenue-only fiscal impulse indicate positive effects on growth.

[38]Experiments were also run with single-equation regressions for individual economies. In most cases, the results were insignificant, indicating that there was insufficient variation in the short time samples to adequately differentiate the effects of fiscal stimulus on output growth.

Table 5.6. Discretionary Fiscal Policy and Growth: Regression Results with Arellano-Bond Dynamic Panel Estimator Using Elasticity-Based Fiscal Impulse Measure[1]

Right-Hand-Side Variables	Baseline Specification	Country Differences, Advanced Economies	Country Differences, Emerging Economies	Downturns	Components	Components, Advanced Economies	Components, Emerging Economies
Real GDP growth							
Lag1	0.36	0.53	0.33	0.42	0.37	0.53	0.31
	(4.18)	(8.11)	(3.11)	(7.21)	(4.08)	(8.52)	(2.87)
Lag2	–0.01	–0.04	0.06	0.11	0.02	–0.04	0.08
	(–0.15)	(–0.85)	(1.11)	(2.83)	(0.49)	(–0.67)	(1.47)
Changes in cyclically adjusted primary balance (dCAPB)	–0.15	–0.12	–0.21	. . .	. . .	. . .	. . .
	(–1.93)	(–1.89)	(–2.51)	. . .	. . .	. . .	. . .
Lag1	0.14	0.01	0.13	. . .	. . .	. . .	. . .
	(3.03)	(0.28)	(2.01)	. . .	. . .	. . .	. . .
Lag2	0.13	0.05	0.12	. . .	. . .	. . .	. . .
	(3.78)	(0.90)	(3.44)	. . .	. . .	. . .	. . .
Changes in cyclically adjusted primary expenditure	. . .	. . .	. . .	. . .	0.13	–0.09	0.20
	. . .	. . .	. . .	. . .	(1.34)	(–0.83)	(1.59)
Lag1	. . .	. . .	. . .	. . .	–0.16	0.00	–0.21
	. . .	. . .	. . .	. . .	(–2.66)	(0.13)	(–2.39)
Changes in revenue	. . .	. . .	. . .	. . .	–0.21	–0.35	–0.23
	. . .	. . .	. . .	. . .	(–3.42)	(–3.97)	(–3.35)
Lag1	. . .	. . .	. . .	. . .	0.05	0.02	0.03
	. . .	. . .	. . .	. . .	(1.10)	(0.29)	(0.49)
Lag2	. . .	. . .	. . .	. . .	0.10	0.02	0.06
	. . .	. . .	. . .	. . .	(2.23)	(0.32)	(1.31)
Neutral dummy x positive fiscal impulse x dCAPB	. . .	. . .	. . .	–0.35	. . .	. . .	. . .
	. . .	. . .	. . .	(–2.84)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	–0.15	. . .	. . .	. . .
	. . .	. . .	. . .	(–1.45)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.10	. . .	. . .	. . .
	. . .	. . .	. . .	(1.13)	. . .	. . .	. . .
Neutral dummy x negative fiscal impulse x dCAPB	. . .	. . .	. . .	–0.06	. . .	. . .	. . .
	. . .	. . .	. . .	(–0.71)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	0.19	. . .	. . .	. . .
	. . .	. . .	. . .	(1.82)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.13	. . .	. . .	. . .
	. . .	. . .	. . .	(1.74)	. . .	. . .	. . .
Downturn dummy x positive fiscal impulse x high-debt dummy x dCAPB	. . .	. . .	. . .	1.75	. . .	. . .	. . .
	. . .	. . .	. . .	(2.36)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	–0.30	. . .	. . .	. . .
	. . .	. . .	. . .	(–0.54)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	–0.51	. . .	. . .	. . .
	. . .	. . .	. . .	(–0.98)	. . .	. . .	. . .
Downturn dummy x positive fiscal impulse x low-debt dummy x dCAPB	. . .	. . .	. . .	0.96	. . .	. . .	. . .
	. . .	. . .	. . .	(3.59)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	–0.50	. . .	. . .	. . .
	. . .	. . .	. . .	(–3.60)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	–0.42	. . .	. . .	. . .
	. . .	. . .	. . .	(–2.19)	. . .	. . .	. . .
Downturn dummy x negative fiscal impulse x high-debt dummy x dCAPB	. . .	. . .	. . .	–0.44	. . .	. . .	. . .
				(–2.05)			
Lag1				0.44			
				(1.98)			
Lag2				0.15			
				(1.59)			

Table 5.6 *(continued)*

Right-Hand-Side Variables	Baseline Specification	Country Differences, Advanced Economies	Country Differences, Emerging Economies	Downturns	Components	Components, Advanced Economies	Components, Emerging Economies
Downturn dummy x negative fiscal impulse x low-debt dummy x dCAPB	. . .	. . .	. . .	–0.52	. . .	. . .	. . .
	. . .	. . .	. . .	(–3.75)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	0.50	. . .	. . .	. . .
	. . .	. . .	. . .	(2.39)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.21	. . .	. . .	. . .
	. . .	. . .	. . .	(1.65)	. . .	. . .	. . .
Deep downturn dummy x positive fiscal impulse x dCAPB	. . .	. . .	. . .	0.00	. . .	. . .	. . .
	. . .	. . .	. . .	(0.00)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	–0.80	. . .	. . .	. . .
	. . .	. . .	. . .	(–4.76)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.84	. . .	. . .	. . .
	. . .	. . .	. . .	(4.00)	. . .	. . .	. . .
Deep downturn dummy x negative fiscal impulse x dCAPB	. . .	. . .	. . .	0.28	. . .	. . .	. . .
	. . .	. . .	. . .	(1.53)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	0.00	. . .	. . .	. . .
	. . .	. . .	. . .	(0.00)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.57	. . .	. . .	. . .
	. . .	. . .	. . .	(3.63)	. . .	. . .	. . .
Upturn dummy x positive fiscal impulse x dCAPB	. . .	. . .	. . .	–0.80	. . .	. . .	. . .
	. . .	. . .	. . .	(–4.76)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	0.84	. . .	. . .	. . .
	. . .	. . .	. . .	(4.00)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.28	. . .	. . .	. . .
	. . .	. . .	. . .	(1.53)	. . .	. . .	. . .
Upturn dummy x negative fiscal impulse x dCAPB	. . .	. . .	. . .	0.57	. . .	. . .	. . .
	. . .	. . .	. . .	(3.63)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	–0.86	. . .	. . .	. . .
	. . .	. . .	. . .	(–3.95)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	–0.57	. . .	. . .	. . .
	. . .	. . .	. . .	(–3.10)	. . .	. . .	. . .
Real money growth	0.04	0.02	0.07	0.05	0.05	0.02	0.07
	(1.67)	(0.95)	(2.16)	(1.94)	(1.96)	(1.13)	(2.16)
Lag1	0.02	0.01	0.03	–0.01	0.02	0.01	0.03
	(0.91)	(0.46)	(1.02)	(–0.46)	(0.90)	(1.35)	(1.17)
Lag2	–0.02	0.00	–0.02	–0.02	–0.02	0.00	–0.02
	(–1.30)	(0.22)	(–1.05)	(–1.02)	(–1.17)	(–0.23)	(–1.18)
Government size	–0.03	–0.01	–0.04	–0.02	–0.03	–0.02	–0.04
	(–1.97)	(–0.99)	(–1.56)	(–2.16)	(–1.88)	(–1.55)	(–1.45)
Trade-weighted growth of trading partners	0.35	0.10	0.42	0.17	0.33	–0.01	0.44
	(2.06)	(0.71)	(1.81)	(1.37)	(1.96)	(–0.06)	(1.77)
EMU dummy[2]	–0.80	–0.13	. . .	–0.67	–0.78	–0.12	. . .
	(–2.35)	(–0.50)	. . .	(–2.50)	(–2.58)	(–0.47)	. . .
Number of observations	796	487	309	650	796	487	309
Number of countries	40	21	19	40	40	21	19
p-value for Sargan test of overidentifying restrictions	0.000	0.000	0.003	0.000	0.000	0.011	0.002
p-value for Hansen test of overidentifying restrictions	1.000	1.000	1.000	1.000	1.000	1.000	1.000
p-value for the test of no-second-order serial correlation	0.811	0.270	0.868	0.010	0.606	0.242	0.845

[1]Dependent variable is real GDP growth. All regressions also included a set of time dummies.
[2]EMU = European Monetary Union.

Table 5.7. Discretionary Fiscal Policy and Growth: Regression Results with Arellano-Bond Dynamic Panel Estimator Using Regression-Based Fiscal Impulse Measure[1]

Right-Hand-Side Variables	Baseline	Country Differences, Advanced Economies	Country Differences, Emerging Economies	Downturns	Components	Components, Advanced Economies	Components, Emerging Economies
Real GDP growth							
Lag1	0.37	0.54	0.30	0.43	0.38	0.56	0.29
	(3.86)	(8.09)	(2.67)	(7.10)	(3.73)	(7.58)	(2.51)
Lag2	–0.03	–0.01	0.04	0.12	–0.03	–0.01	0.05
	(–0.71)	(–0.18)	(0.83)	(3.04)	(–0.68)	(–0.25)	(0.86)
Changes in cyclically adjusted primary balance (dCAPB)	–0.08	–0.11	–0.10	. . .	. . .	. . .	. . .
	(–1.18)	(–1.81)	(–1.50)	. . .	. . .	. . .	. . .
Lag1	0.04	–0.14	0.08	. . .	. . .	. . .	. . .
	(0.79)	(–3.18)	(1.25)	. . .	. . .	. . .	. . .
Lag2	0.06	–0.02	0.10	. . .	. . .	. . .	. . .
	(1.89)	(–0.33)	(2.00)	. . .	. . .	. . .	. . .
Changes in cyclically adjusted primary expenditure	. . .	. . .	. . .	. . .	0.06	0.15	0.08
	. . .	. . .	. . .	. . .	(0.84)	(2.27)	(0.87)
Lag1	. . .	. . .	. . .	. . .	–0.05	0.13	–0.14
	. . .	. . .	. . .	. . .	(–1.13)	(2.89)	(–1.78)
Lag2	. . .	. . .	. . .	. . .	–0.06	–0.01	–0.12
	. . .	. . .	. . .	. . .	(–1.62)	(–0.20)	(–1.77)
Changes in revenue	. . .	. . .	. . .	. . .	–0.10	–0.01	–0.13
	. . .	. . .	. . .	. . .	(–1.87)	(–0.17)	(–1.90)
Lag1	. . .	. . .	. . .	. . .	–0.02	–0.13	–0.01
	. . .	. . .	. . .	. . .	(–0.36)	(–1.85)	(–0.18)
Lag2	. . .	. . .	. . .	. . .	0.03	–0.08	0.03
	. . .	. . .	. . .	. . .	(0.97)	(–1.29)	(0.53)
Neutral dummy x positive fiscal impulse x dCAPB	. . .	. . .	. . .	–0.39	. . .	. . .	. . .
	. . .	. . .	. . .	(–3.15)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	–0.17	. . .	. . .	. . .
	. . .	. . .	. . .	(–2.43)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.08	. . .	. . .	. . .
	. . .	. . .	. . .	(0.79)	. . .	. . .	. . .
Neutral dummy x negative fiscal impulse x dCAPB	. . .	. . .	. . .	0.07	. . .	. . .	. . .
	. . .	. . .	. . .	(0.51)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	0.03	. . .	. . .	. . .
	. . .	. . .	. . .	(0.31)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.19	. . .	. . .	. . .
	. . .	. . .	. . .	(2.28)	. . .	. . .	. . .
Downturn dummy x positive fiscal impulse x high debt dummy x dCAPB	. . .	. . .	. . .	1.05	. . .	. . .	. . .
	. . .	. . .	. . .	(2.58)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	–0.37	. . .	. . .	. . .
	. . .	. . .	. . .	(–1.12)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	–0.38	. . .	. . .	. . .
	. . .	. . .	. . .	(–1.54)	. . .	. . .	. . .
Downturn dummy x positive fiscal impulse x low debt dummy x dCAPB	. . .	. . .	. . .	0.65	. . .	. . .	. . .
	. . .	. . .	. . .	(4.87)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	–0.53	. . .	. . .	. . .
	. . .	. . .	. . .	(–5.50)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	–0.33	. . .	. . .	. . .
	. . .	. . .	. . .	(–2.52)	. . .	. . .	. . .

Table 5.7 *(concluded)*

Right-Hand-Side Variables	Baseline	Country Differences, Advanced Economies	Country Differences, Emerging Economies	Downturns	Components	Components, Advanced Economies	Components, Emerging Economies
Downturn dummy x negative fiscal impulse x high debt dummy x dCAPB	. . .	. . .	. . .	–0.40	. . .	. . .	. . .
	. . .	. . .	. . .	(–1.93)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	0.34	. . .	. . .	. . .
	. . .	. . .	. . .	(1.87)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.14	. . .	. . .	. . .
	. . .	. . .	. . .	(1.29)	. . .	. . .	. . .
Downturn dummy x negative fiscal impulse x low debt dummy x dCAPB	. . .	. . .	. . .	–0.46	. . .	. . .	. . .
	. . .	. . .	. . .	(–3.24)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	0.30	. . .	. . .	. . .
	. . .	. . .	. . .	(1.29)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.21	. . .	. . .	. . .
	. . .	. . .	. . .	(1.69)	. . .	. . .	. . .
Upturn dummy x positive fiscal impulse x dCAPB	. . .	. . .	. . .	–0.91	. . .	. . .	. . .
	. . .	. . .	. . .	(–4.59)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	0.86	. . .	. . .	. . .
	. . .	. . .	. . .	(3.67)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	0.19	. . .	. . .	. . .
	. . .	. . .	. . .	(0.84)	. . .	. . .	. . .
Upturn dummy x negative fiscal impulse x dCAPB	. . .	. . .	. . .	0.57	. . .	. . .	. . .
	. . .	. . .	. . .	(4.27)	. . .	. . .	. . .
Lag1	. . .	. . .	. . .	–0.91	. . .	. . .	. . .
	. . .	. . .	. . .	(–5.62)	. . .	. . .	. . .
Lag2	. . .	. . .	. . .	–0.37	. . .	. . .	. . .
	. . .	. . .	. . .	(–2.04)	. . .	. . .	. . .
Real money growth	0.05	0.02	0.07	0.05	0.06	0.02	0.08
	(1.92)	(1.06)	(2.41)	(1.92)	(2.19)	(1.11)	(2.65)
Lag1	0.01	0.01	0.03	–0.01	0.01	0.01	0.03
	(0.83)	(0.50)	(1.03)	(–0.43)	(0.85)	(0.50)	(0.99)
Lag2	–0.02	0.00	–0.02	–0.02	–0.02	0.00	–0.02
	(–1.37)	(0.15)	(–0.97)	(–1.03)	(–1.34)	(0.27)	(–0.94)
Government size	–0.04	–0.01	–0.04	–0.02	–0.04	–0.01	–0.04
	(–2.44)	(–1.00)	(–1.62)	(–2.26)	(–2.17)	(–0.97)	(–1.36)
Trade-weighted growth of trading partners	0.34	0.08	0.40	0.16	0.35	0.08	0.43
	(1.93)	(0.60)	(1.77)	(1.29)	(1.93)	(0.54)	(1.69)
EMU dummy	–0.79	–0.19		–0.71	–0.82	–0.19	. . .
	(–2.28)	(–0.80)		(–2.61)	(–2.50)	(–0.83)	. . .
Number of observations	796	487	309	650	796	487	309
Number of countries	40	21	19	40	40	21	19
p-value for Sargan test of overidentifying restrictions	0.000	0.000	0.001	0.000	0	0.004	0.003
p-value for Hansen test of overidentifying restrictions	1.000	1.000	1.000	1.000	1.000	1.000	1.000
p-value for the test of no second order serial correlation	0.790	0.254	0.758	0.019	0.739	0.428	0.641

[1]Dependent variable is real GDP growth. All regressions also included a set of time dummies.

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