

How big are fiscal multipliers?

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As fiscal stimulus packages were hastily put together around the world last spring, one could not have been blamed for thinking that there must be some broad agreement in the profession regarding the size of the fiscal multipliers. Far from it. In a January 2009 *Wall Street Journal* op-ed piece, Robert Barro argued that peacetime fiscal multipliers are essentially zero. At the other extreme, Christina Romer, Chair of President Obama's Council of Economic Advisers, used multipliers as high as 1.6 in estimating the job gains that will be generated by the \$787 billion stimulus package approved by Congress last February. The difference between Romer's and Barro's views of the world amounts to a staggering 3.7 million jobs by the end of 2010.

If anything, the uncertainty regarding the size of fiscal multipliers in developing and emerging markets is even higher. Data is scarcer and often of dubious quality. A history of fiscal profligacy and spotty debt repayments calls into question the sustainability of any fiscal expansion. How does this financial fragility affect the size of fiscal multipliers? Does the exchange regime matter? What about the degree of openness? These are all critical policy questions that remain largely unanswered.

New research based on new data

A big hurdle in obtaining precise estimates of fiscal multipliers has been data availability. Most studies have relied on annual data, which makes it difficult to obtain precise estimates. To address this shortcoming, we have put together a novel quarterly dataset for 45 countries (20 high-income and 25 developing/emerging nations). The coverage, which varies across countries, spans from as early as 1960:1 to as late as 2007:4. We have gone to great lengths to ensure that only data originally collected on a quarterly basis is included (as opposed to interpolating based on annual data).

This *Policy Insight* summarises the main findings we obtained when estimating fiscal multipliers for different groups of countries in our sample.

The main results of our study – presented in greater detail below – can be summarised as follows:

- In developing countries, the response of output to increases in government spending is smaller on impact and considerably less persistent than in high income countries.
- The degree of exchange rate flexibility is a critical determinant of the size of fiscal multipliers. Economies operating under predetermined exchange rate regimes have long-run multipliers of around 1.5, but economies with flexible exchange rate regimes have essentially zero multipliers.
- The degree of openness to trade (measured as exports plus imports as a proportion of GDP) is another critical determinant.¹ Relatively closed economies have long-run multipliers of around 1.6, but relatively open economies have very small or zero multipliers.
- In highly-indebted countries, the output response to increases in government spending is short-lived and much less persistent than in countries with a low debt to GDP ratio.
- The multipliers for the US in the post-1980 period are rather small (in the range 0.3-0.4) both in the short and long-run. On the other hand, multipliers for government investment are large (around 2).

High income versus developing countries

As a first cut at the data, we divided the sample into high income and developing countries. We estimated a vector autogression model using the cyclical components of GDP and government consumption and then computed the impulse response of GDP to a change in government consumption. Our identifying assumption, following Blanchard and Perotti (2002), is that discretionary government consumption can only respond to output with a one quarter lag.

¹ We should note that this definition of openness, based on actual trade activity, would not necessarily coincide with a definition based on the degree to which a country allows for free international trade (i.e., the size of tariff and non-tariff barriers). A case in point is the US, a relatively closed economy based on actual trade activity, but highly open based on actual restrictions to trade.

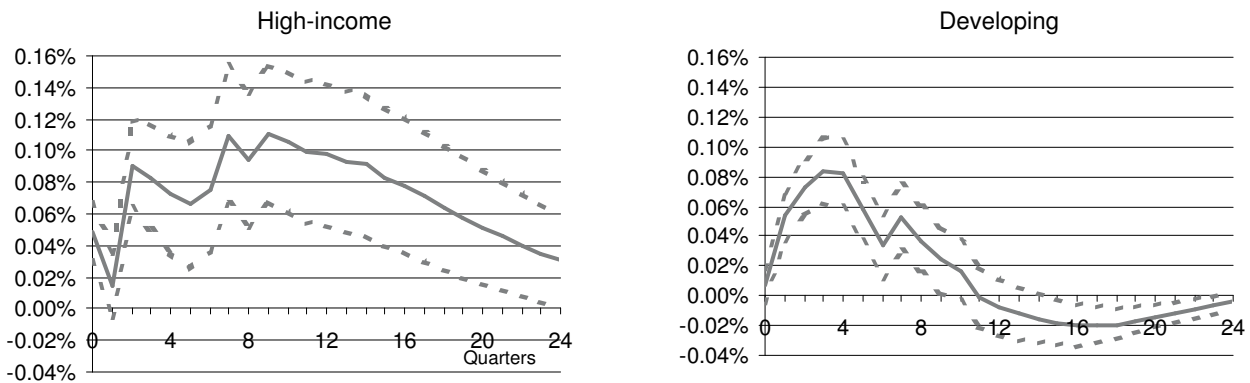
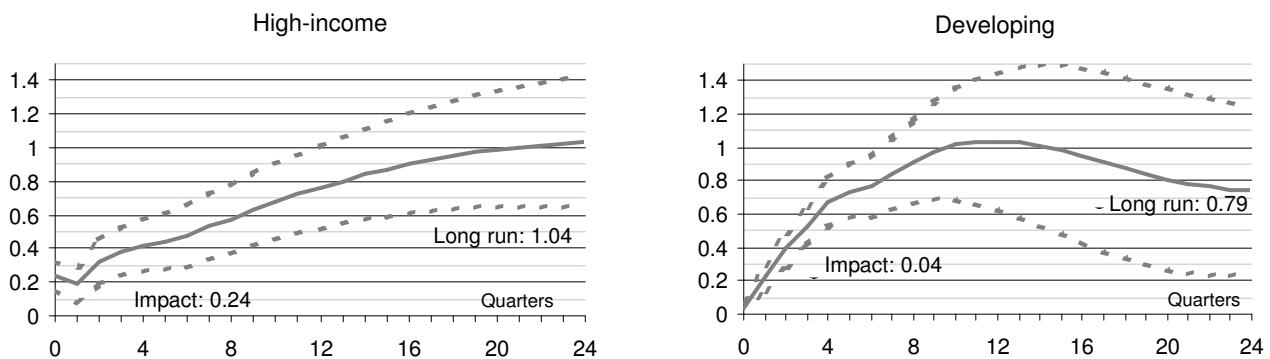
Figure 1 Output response to a 1% shock to government consumption**Figure 2** Cumulative multiplier in response to a shock to government consumption

Figure 1 shows the impulse response of GDP to a 1% shock to government consumption at time 0; the dotted lines indicate the one-standard deviation significance band. While the impact response is higher in high income countries (0.05%) than in developing countries (0.01%), the most striking difference is how much less persistent the output response is for developing countries. Indeed, while the output response for high income countries remains significantly positive for the 24 quarters covered in the plot, it becomes zero (statistically speaking) after about only 10 quarters for developing countries.

For high-income countries, even after the full impact of a fiscal expansion is accounted for, output has essentially risen in the long-run by the same amount as government consumption.

For developing countries, on the other hand, an additional dollar of government consumption crowds out some other component of GDP by 21 cents in the long-run.

Based on the impulse response depicted in Figure 1, we can compute the corresponding fiscal multipliers. Specifically, to get the impact multiplier for, say, high income countries, we simply divide the impact effect in Figure 1 (0.05%) by the ratio of government consumption to GDP (0.21) to get 0.24.

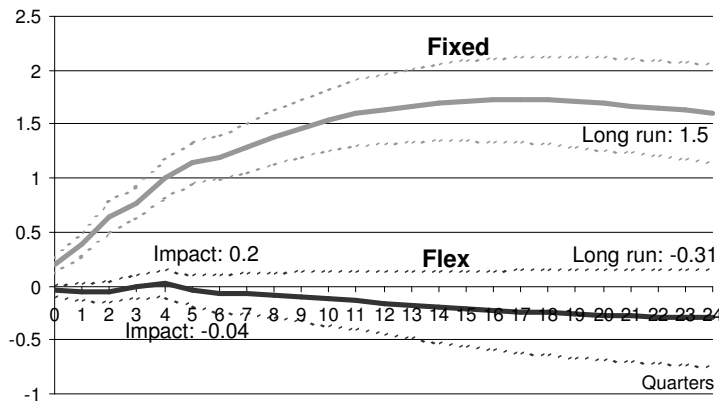
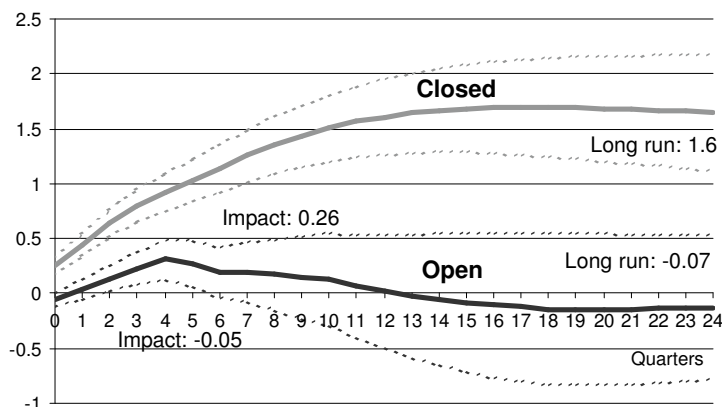
The impact multiplier for high income countries is 0.24. In other words, an additional dollar in government

spending will deliver only 24 cents of additional output in the quarter in which it is implemented. For developing countries, the impact multiplier is close to zero.

Focusing on the impact multiplier, however, may be misleading because fiscal stimulus packages can only be implemented over time and there may be lags in the economy's response. To account for these factors, Figure 2 shows the *cumulative* multipliers for both high income and developing countries, defined as the cumulative change in GDP divided by the cumulative change in government consumption (as a percentage of GDP). For example, a value of 0.5 in quarter 3 would indicate that, after 3 quarters, the cumulative increase in output, in dollar terms, is half the size of the cumulative increase in government consumption.

The plots also include the value of the long-run cumulative multiplier where this is the value that the cumulative multiplier takes once the responses of both GDP and government consumption have died down (according to the VAR estimates). Notice that this may not coincide with the value of the cumulative multiplier after 24 quarters, when our plots end.

We can see that the cumulative multiplier for high income countries rises from an initial value of 0.24 (the impact effect) to a long-run value of 1.04. Hence, even after the full impact of a fiscal expansion is accounted for, output has essentially risen by the same amount as government consumption. On the other hand, the cumulative long-run multiplier for developing countries is just 0.79. In other words, in the long run, an additional dollar of government consumption crowds out some other component of GDP (investment, consumption, or net exports) by 21 cents.

Figure 3 Cumulative multiplier: predetermined and flexible exchange rate regimes**Figure 4** Cumulative multiplier: open and closed economies

Predetermined versus flexible exchange rate regimes

As a second cut at the data, we divided our sample of 45 countries into those with predetermined exchange rates and those with more flexible exchange rate regimes.² The cumulative impulse responses, shown in Figure 3, suggest that the exchange rate regime matters a great deal. Under predetermined exchange rates, the impact multiplier is 0.2 (and significantly different from zero) and rises all the way to 1.5 in the long-run. Under flexible exchange rate regimes, however, the multiplier is indistinguishable from zero both on impact and in the long-run.

The cumulative responses suggest that the exchange rate regime and degree of openness matter a great deal.

These results are, in principle, consistent with the Mundell-Fleming model, one of the workhorses of modern open economy macroeconomics, which would predict that fiscal policy is more effective in stimulating output under predetermined exchange rates than under flexible exchange rates. In this model, the initial effect of a fiscal expansion is to increase output and raise

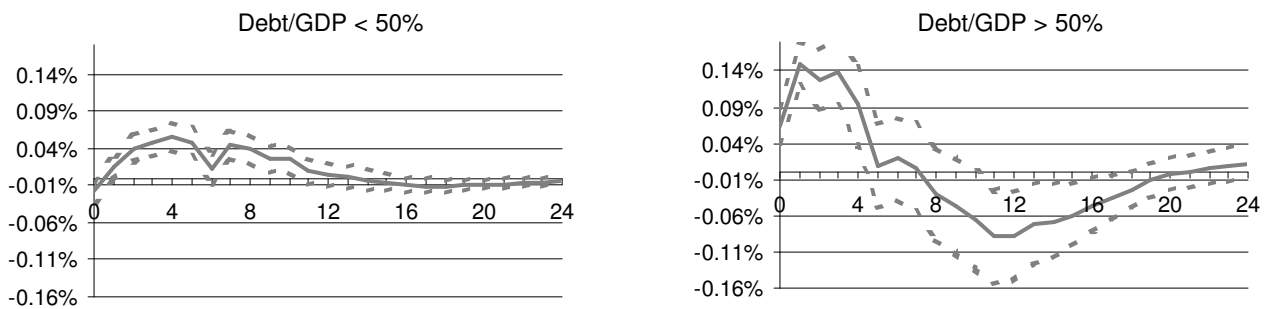
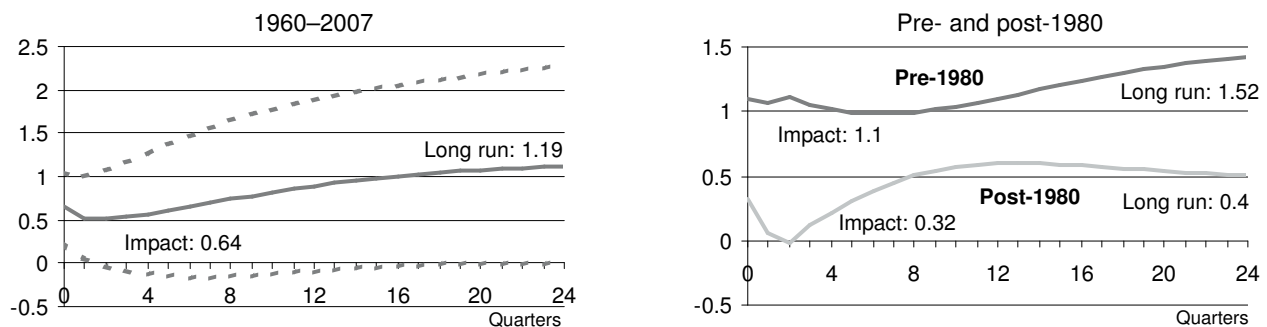
interest rates, which tends to appreciate the domestic currency. Under predetermined exchange rates, the monetary authority must expand the money supply to prevent this appreciation. Such monetary policy accommodation provides an additional boost to output. Under flexible exchange rates, however, the monetary authority keeps a lid on the money supply, which cuts short any further output expansion. The model, however, would find it difficult to explain no change in output under flexible exchange rates, as our findings suggest.

Open versus closed economies

As a third cut at the data, we divided our sample of 45 countries into 'open' and 'closed' economies. For our purposes, we defined as 'open' a country whose foreign trade (imports plus exports) exceeds 60% of GDP. If foreign trade is less than 60% of GDP, we defined the country as closed. (Minor variations of this definition did not significantly affect our results.) Using this criterion, 29 countries are classified as open and the remaining 16 are classified as closed. The cumulative responses, shown in Figure 4, indicate that the degree of openness is a critical determinant of the size of the fiscal multiplier. For the closed economies, the impact response is 0.26 and reaches 1.6 in the long run. For the open economies, on the other hand, both the impact and the long-run response are not significantly different from zero.

These results are, in principle, consistent with a standard Keynesian view of the world in which the multipli-

² We followed the updated Reinhart-Rogoff classification in Ilzetzki, Reinhart, and Rogoff (2009).

Figure 5 Output response to a 1% shock to government consumption (developing countries)**Figure 6** Cumulative multiplier: United States

er is lower in a more open economy as a larger fraction of the fiscal expansion is diverted to the rest of the world through higher imports.

Financial fragility

Our final cut at the data was to divide developing countries into highly-indebted countries (countries with an external debt to GDP ratio above 50%; 11 countries in total) and countries with low debt (less than 50%; 14 countries in total). Figure 5 shows the impulse response of GDP to a 1% shock to government consumption at time 0. While the short-term response is larger for highly-indebted countries than for low-debt countries, the most striking feature is how short-lived is the GDP response in the case of highly indebted countries. In fact, the GDP response becomes zero (statistically speaking) after just 4 quarters and significantly negative after 10 quarters.

This finding is consistent with the idea that, in highly-indebted countries, the sustainability of any rise in government spending will be quickly called into question by markets participants. The resulting increase in financing costs will not only make it more difficult to keep up the fiscal expansion but also dampen the output effects of current government spending.

What about the US?

Given the current debate in the US regarding the effectiveness of President's Obama fiscal stimulus package – captured by the debate between Barro and Romer in the introductory paragraph – it is certainly relevant to inquire about the size of fiscal multipliers for the US.

The left-hand side panel in Figure 6 shows the cumulative multiplier for the US for our whole sample (from 1960 to 2007). The impact multiplier is 0.64 and the long-run cumulative multiplier is 1.19. While these esti-

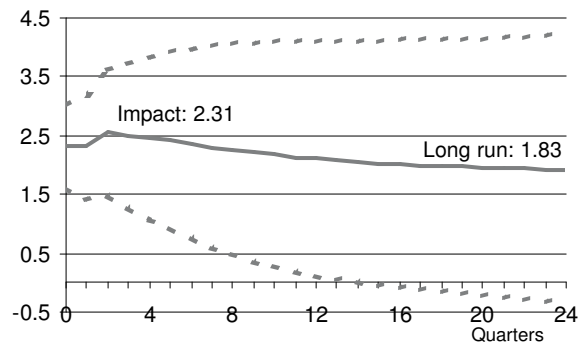
mates are certainly closer to Romer's than to Barro's, they mask some important structural changes over the sample period. To see this, consider the right-hand side panel in Figure 6 which breaks the sample into pre-1980 and post-1980. To avoid cluttering, we have omitted the significance bands in the right-hand side panel of Figure 6. They would show that the pre-1980 multipliers are significantly different from zero only for the first five quarters and that the post-1980 estimates are never significant. We should caution, however, that the sample for the US is about eight times smaller than that for high income countries as a whole.

The difference between the two US sub-samples is quite striking. We can see that the pre-1980 multipliers are considerably larger than the post-1980 multipliers.

The difference between the two sub-samples is quite striking. We can see that the pre-1980 multipliers are considerably larger than the post-1980 multipliers. The post-1980 multipliers are just 0.32 on impact and 0.4 in the long-run. This is certainly a far cry from the impact multiplier (1.05) and long-run multiplier (1.55) used in the Romer report,³ although our findings for the US are consistent with Perotti (2004).

While the reasons for the dramatic change in fiscal multipliers for the US from the pre- to the post-1980 period deserve a more careful analysis, we conjecture that, in line with our previous findings, two factors have played an important role. First, while for most of the pre-1980 period the US operated under the Bretton

2 We should also caution that the multipliers reported by Romer and Bernstein refer to a *permanent* increase in government spending, rather than a temporary (though persistent) increase as is typical of VARs.

Figure 7 Cumulative multiplier on government investment: United States (1980-2007)

Woods system whereby the value of the dollar was officially fixed to gold, during the post-1980 period the US has operated under a fairly flexible exchange rate regime. Higher exchange rate flexibility has allowed a greater emphasis on controlling inflation since the Volcker disinflation in the early 1980's to the more recent *de facto* inflation targeting pursued by the Federal Reserve. The focus on price stability has left little scope for monetary accommodation during fiscal expansions. Second, the US has become a much more open economy, as evidenced by the fact that its ratio of exports plus imports (as a proportion of GDP) has increased from 12% in the earlier sub-sample to 22% in the later.

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In practice, a sizable component of President Obama's package consists of government investment, as opposed to government consumption. Figure 7 shows the cumulative multiplier for government investment in the US for the post-1980 period. The multipliers are 2.31 on impact and 1.83 in the long run. While the precision of the estimates falls as the horizon lengthens, we can see that the cumulative multiplier is significantly different from zero for around 14 quarters. In sharp contrast – and as already noted – the post-1980 multipliers for government consumption are not significantly different from zero at any horizon. Differentiating between government consumption and investment is thus a critical consideration.

Policy implications

All in all, our findings suggest that drawing sweeping generalisations on the size of the fiscal multipliers is probably an exercise in futility. Some of our most robust results point to the fact that the size of the fiscal multipliers critically depends on key characteristics of the

economy (closed versus open, predetermined versus flexible exchange rate regimes, high versus low debt) or on the type of aggregate being considered (government consumption versus government investment).

In particular, we have found that, in economies open to trade and operating under flexible exchange rates, a fiscal expansion leads to no significant output gains. Further, any gains will be, at best, short-lived in highly-indebted countries. Since, over the last decades, many emerging countries have become more open to trade and moved towards greater exchange rate flexibility (typically in the context of inflation targeting regimes), our results suggest that seeking the holy grail of fiscal stimulus is likely to be counterproductive, with little benefit in terms of output and potential long-run costs due to larger stocks of public debt.

On the other hand, emerging countries – particularly large economies with some degree of 'fear of floating' – would be well served if they stopped pursuing procyclical fiscal policies. Indeed, emerging countries have typically increased government consumption in good times and reduced it in bad times, thus amplifying the underlying business cycle – what Kaminsky, Reinhart, and Vegh (2004) have dubbed the 'when it rains, it pours' phenomenon. The inability to save in good times greatly increases the probability that bad times will turn into a full-fledged fiscal crisis. Given this less-than-stellar record in fiscal policy, even an a-cyclical fiscal policy – whereby government consumption and tax rates do not respond to the business cycle – would represent a major improvement in macroeconomic policy. While occasional rain may be unavoidable for emerging countries, significant downpours would be relegated to the past.

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