Discussion

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Overall impression and key findings

This paper investigates the impact of terms of trade movements on the stance of fiscal policy. This analysis is timely and important because the volatility of the terms of trade has increased in recent years, largely due to significant fluctuations in commodity prices. Moreover, the prominence of fiscal policy has increased as countries have adopted aggressive discretionary actions to combat the global recession. Although the paper includes a selected review of the related theoretical literature, its primary purpose is empirical: that is, to determine what can be learned about this relationship from the data.

Like much of Graciela Kaminsky's well-known research, this investigation uses a comprehensive and carefully collected dataset, consisting of observations on 74 countries over the period 1960 to 2008, and adopts a rigorous, yet robust, approach to analysing these data.[2] In particular, three fiscal variables – primary government balance, government expenditure and government revenue – as well as inflation, are regressed on the terms of trade, on the deviation of output from trend (to control for the business cycle), and on nonlinear interaction variables between the terms of trade and global capital flow bonanzas, terms of trade booms (to capture asymmetric effects), large terms of trade movements and the exchange rate regime. She also divides the sample of countries into four groups according to level of per capita income to control for differences in behaviour due to differences in level of development.

From this empirical exercise, Graciela obtains some useful inferences that highlight the key differences in the fiscal policy reactions to terms of trade movements across countries. In particular, she finds that developing countries typically run procyclical fiscal policies; that is, government expenditures rise, for example, with an increase in the terms of trade. She also finds that this procyclical effect is magnified by sizable capital flow bonanzas, which typically occur at the same time as the terms of trade increase. In contrast, she finds that OECD countries can effectively smooth the economic impact of transitory terms of trade movements by running countercyclical fiscal policies.

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2. Much of the data, including the terms of trade series, are filtered with a Hodrick-Prescott filter.

All terms of trade shocks are not created equal

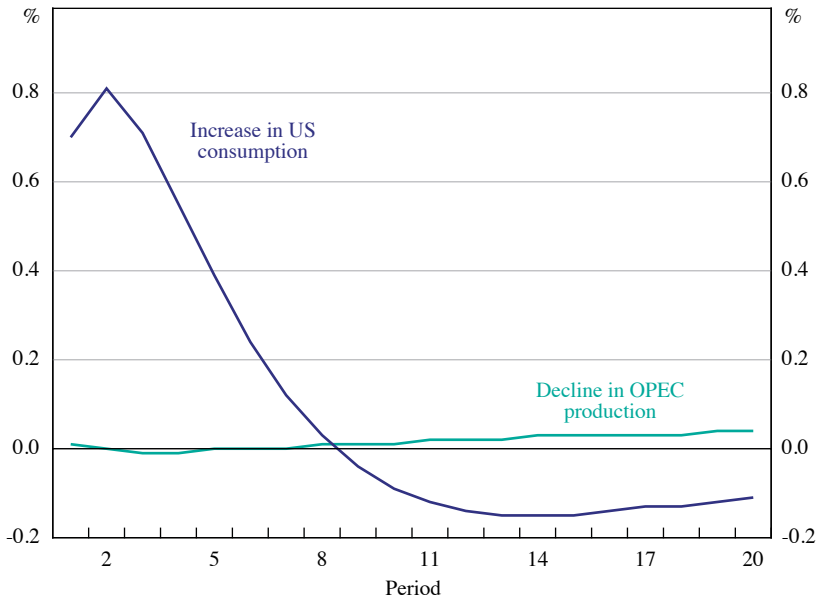
The regression analysis treats all terms of trade shocks as being equal and exogenous, although an effort is made to control for nonlinear effects of terms of trade shocks due to the magnitude (larger shocks could have a bigger impact) and to asymmetry (positive and negative shocks could have different effects). In theory and in practice, the underlying causes of the terms of trade shock matter. For example, a terms of trade improvement can occur because of an increase in export prices (due to a commodity price increase for a commodity exporter) or because of a reduction in import prices (due to increased imports from a lower-priced source country such as China). These two underlying changes are unlikely to have the same impact on the fiscal policy stance, despite the fact that they both cause a terms of trade increase, especially because the production and sale of commodities are taxed differently from that of other goods and services to ensure that a portion of the natural resource rents accrue to the government. To address this potential problem, the empirical analysis should focus on one source of terms of trade shocks, namely, commodity price variations, by dividing the sample of countries into commodity price exporters and importers and by constructing country-specific exporter or importer commodity price indices.

Even for commodity price movements, the macroeconomic impact of the movement depends on the underlying fundamental shock. For example, an oil price increase could be the result of a demand shock or a supply shock and the impact on output and the fiscal stance would be very different. Consider Figure 1: it shows the simulated impacts of a 10 per cent increase in oil prices on Canadian GDP generated by a temporary reduction in supply and by a temporary increase in US demand.[3] Despite the fact that the increase in oil prices is the same, the effects on Canadian GDP and thus the fiscal stance are radically different because stronger US demand is a large positive shock to the Canadian economy, whereas an oil supply shock has a much smaller impact because it slows down US economic activity. The empirical work in this paper does not control for the sources of the terms of trade movements nor is it able to take into account the general equilibrium effects. To address this issue would require a more structural estimation approach that can uncover the underlying fundamental shocks.

3. This simulation was conducted by Stephen Snudden using the Bank of Canada's global DSGE model, BoC-GEM. For more details on BoC-GEM, consult Lalonde and Muir (2007).

Figure 1: Canada's GDP Response to a Positive 10 Per Cent Oil Price Shock

Per cent deviation from control



Source: Bank of Canada

The econometric approach also assumes that all terms of trade movements are exogenous. Although this is a useful first approximation, it is not generally true. There are many examples in which the economic activity of the home economy has affected its terms of trade. In particular, the US high-tech boom of the 1990s drove down the relative price of information technology and communications equipment through rapid technology improvements and supply increases. Other things being equal, this had the effect of reducing the US terms of trade. A similar story can be told for China regarding its production and export of semi-durables and durables after it joined the World Trade Organization in 2002. Consequently, the estimation techniques should also include instrumental variables estimation to control for the potential endogeneity of the terms of trade.

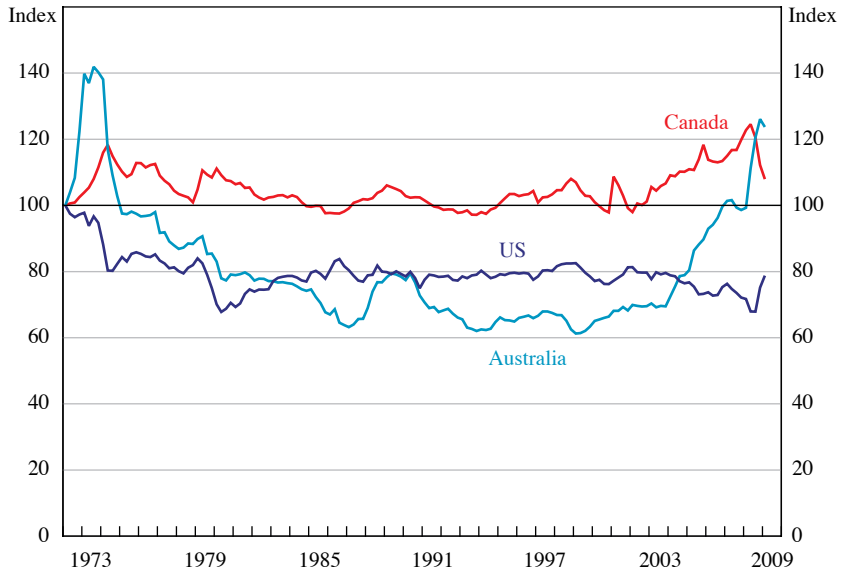
Although the advantage of using the terms of trade is that this data series is available for each country, the terms of trade variable is subject to measurement problems that represent important caveats to the empirical results.[4] Central bankers, especially those that are inflation targeters, spend a lot of time worrying about measurement issues surrounding the consumer price index (CPI) and also how to measure the 'underlying' rate of inflation.[5] Since the terms of trade represents the ratio of two

4. Silver (2007) provides a useful recent discussion of the measurement problems surrounding import and export price indices which are used to construct the terms of trade.

5. The paper by Francesco Ravazzolo and Shaun Vahey in this volume addresses the issue of measuring the underlying rate of inflation.

baskets of goods, as opposed to one in the case of the CPI, the potential measurement issues are compounded. Figure 2 shows the terms of trade measures for Canada, the United States and Australia. I am most familiar with the first two measures and what I find most striking about them is how smooth they are, despite the significant movements in the structure of global trade and in relative prices witnessed over the past 25 years. Indeed, I question how meaningful the variation would be in these two series after applying a Hodrick-Prescott filter to them. Figure 3 compares the Canadian terms of trade to the Bank of Canada's commodity price index. The difference between the two series is striking, especially since commodity-based products represent roughly 40 per cent of Canadian exports. Therefore, given the potential measurement errors with the terms of trade, using an index of commodity prices, as suggested earlier, may generate more efficient and more economically meaningful results.

Figure 2: Terms of Trade
March quarter 1972 = 100



Source: IMF

Figure 3: Terms of Trade and Commodity Price Index – Canada
March quarter 1972 = 100

Sources: Bank of Canada; IMF

Political economy considerations

The paper's main finding that the response of fiscal positions to terms of trade movements differs greatly between developing and developed economies raises the question of why this may be true. Although the paper does raise some political economy issues, it does not explore them fully in the regression analysis. Two popular explanations of the different fiscal responses in developing and developed countries that are worth considering more carefully are known as the 'resource curse' and the 'Dutch disease'.

The resource curse argues that when there is a natural resource revenue windfall either because of a discovery or a rapid rise in prices, this serves to undermine a country's governance structure. Politicians have the incentive to use the windfall to maintain power by effectively buying votes or empowering their supporters so that they can eventually divert some of the windfall to themselves.[6] Hence, rather than smooth the consumption of this windfall by saving a portion of it, their incentive is to spend it immediately upon receipt. Consequently, fiscal expenditures would be procyclical in developing countries without appropriate governance controls.

In the case of the Dutch disease, the political effect is often felt more in developed economies with relatively diversified economies because a resource windfall will

6. See Sachs and Warner (2001) and Mehlum, Moene and Torvik (2006) for a more detailed explanation of the 'resource curse'.

typically cause inter-sectoral resource reallocation that entrenched interests will attempt to resist.[7] In particular, because the windfall will accrue to the private sector as well as the public sector, there will be an increased demand for non-traded goods (chiefly housing and government services) as well as for resources. To accommodate this demand the remaining export-oriented/import-competing traded goods sector will have to contract. Because this sector often consists of manufacturing firms and their associated unions, they represent a potent political interest group and will pressure governments to prevent or mitigate the real appreciation (higher non-traded goods prices) and resultant resource reallocation. The only effective government response to limit the sectoral impact is to implement a countercyclical fiscal policy that taxes the windfall and reduces spending. The consequent increase in government savings not only reduces the domestic demand for non-traded goods and restrains resource reallocation, but it also has the effect of smoothing the consumption impact of the resource windfall across generations.

It would be useful to consider these potential explanations in the theoretical section of the paper, as well as to include institutional and political economy variables that capture the quality of governance and the impact of entrenched interest groups in the pooled regressions, to better understand the differential responses of the fiscal position to terms of trade (commodity price) movements across countries.

The limits of pooling

Although there are potentially sizable efficiency gains from pooling the large number of observations available in panel datasets, the resultant coefficient estimates are sensitive to the econometric approach to controlling for cross-sectional parameter heterogeneity and for time-series parameter instability. The approach used in the paper imposes restrictions on parameter homogeneity and stability that are not adequately tested. To better understand the robustness of the empirical results, these restrictions should be tested, and if rejected, more flexible forms of parameter estimation should be considered.[8]

Another important consideration in panel data estimation is which variation in the sample should be used to identify the parameter of interest for the hypothesis being examined: cross-section or time series. In practice, many counterfactual 'what if' economic questions are best addressed with parameter estimates based on time series or 'within' variation. These key policy or impact parameters can be best estimated by controlling for the 'across' variation with fixed-country or group effects or by dividing the sample, if tests reject the assumption of homogeneous coefficients. In this paper, the coefficients of interest measure the impact of a terms of trade movement on the fiscal stance over time. Hence, the econometric technique should place more weight on the 'within' rather than the 'across' variation. One way

7. See Corden (1984) for a survey of the Dutch disease, which is also known as the 'booming sector' phenomenon.

8. Wooldridge (2002) provides a recent survey of such techniques.

this could be accomplished is by dividing the sample into commodity importers and exporters as well as by income.

Concluding remarks

The paper successfully highlights some key stylised facts present in the data on the relation between the stance of fiscal policy and terms of trade movements. The next steps in the research program will be to drill down to better understand the sources of the terms of trade fluctuations and the broader factors that influence the fiscal policy response across countries.

References

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2. General Discussion

The discussion of Graciela Kaminsky's paper first focused on the institutionalised fiscal policies adopted by some countries. One participant referred to the experience of Chile, where a countercyclical rule required the government to target a structural fiscal surplus after adjusting for the position of the economy relative to its trend path and the deviation of the copper price from a longer-term forecast (made by an independent panel of experts). Also, in Germany a constitutional amendment was recently implemented to enshrine countercyclical fiscal policy. Another participant referenced the experience of Norway, for which the intergenerational fiscal framework plays a key role in sequestering tax revenues from the energy sector. Graciela Kaminsky replied by welcoming interest in the question of why some countries adopt fiscal rules and others do not, but she stressed that this was beyond the scope of the analysis in her paper.

In subsequent discussion, a participant said that they thought that Graciela Kaminsky's paper was predicated on the idea of there being a deterministic or, at least, a frequent cycle in the terms of trade. However, the question of interest

in Australia and elsewhere over recent years has been about the extent to which movements in commodity prices and the terms of trade are permanent. This was important since the optimal response of fiscal policy depended on the persistence of shocks, with a permanent increase in the terms of trade consistent with permanently higher revenue and expenditure. Adding to this point, another participant suggested that China's recent integration into the world economy implied a persistent, if not permanent, change in Australia's terms of trade, whereas previous shocks to the terms of trade tended to be driven by the global business cycle.

A participant asked how we could be sure whether a shock was permanent or transitory. One participant replied by arguing that the only thing to do was to wait; in the meantime policy should respond cautiously by acting as if there is some chance that the shock is temporary. Consistent with this, another participant noted that the Chilean fiscal rule implicitly treats shocks to copper prices as if they were transitory in the first instance, but if the shock persists, it will eventually be reflected in forecasts of the longer-term price of copper.

There followed a series of comments about the possibility of empirically decomposing the terms of trade shocks into transitory and permanent shocks. In response, Graciela agreed that this would be relevant to public policy, but she suggested that carrying out that analysis requires a more focused approach based on a more limited sample of countries and a richer dataset.