Journal of Development Economics 106 (2014) 92–106

Contents lists available at ScienceDirect

Journal of Development Economics

journal homepage: www.elsevier.com/locate/devec

# Was this time different?: Fiscal policy in commodity republics ☆

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ARTICLE INFO

*Article history:*
Received 31 December 2011
Received in revised form 20 February 2013
Accepted 25 July 2013

*Keywords:*
Commodity prices
Optimal fiscal policy
Fiscal behavior
Institutions

ABSTRACT

We revisit the issue of fiscal procyclicality in commodity-rich nations–commodity republics in the nomenclature of this paper. Since commodity prices are plausibly a main driver of fiscal policy outcomes in these countries, we focus on the behavior of fiscal variables across the commodity cycle, in contrast to behavior across the output cycle, which has been the main focus of earlier research on fiscal procyclicality. We present evidence of reduced fiscal policy procyclicality in a number of countries. Our empirical results suggest that improvements in institutional quality have led to a more countercyclical fiscal policy stance in a number of countries. The presence of fiscal rules also seems to have made a difference: countries that use them displayed a larger shift toward fiscal counter-cyclicality between the two episodes.



## 1. Introduction

According to standard economic theory, fiscal policy should be countercyclical. In the neoclassical smoothing model of Barro (1979), a government should optimally run surpluses in good times and deficits in bad times.[1] A government should do the same, though for different reasons, in the standard Keynesian or neo-Keynesian framework.

Yet in practice governments often seem to follow a procyclical fiscal policy. Cuddington (1989), Talvi and Vegh (2005) and Sinnott (2009), among others, document that governments save little or even disave in booms. Procyclicality is most evident in Latin America (Gavin et al., 1996; Gavin and Perotti, 1997; Stein et al., 1999) but is also present in OECD countries (Arreaza et al., 1999; Lane, 1998, 2003; Talvi and Vegh, 2005). Using quarterly data and a set of econometric models to correct for the potential reverse causality from fiscal policy to business cycle, Ilzetski and Vegh (2008) provide evidence that confirms the idea that fiscal policy in developing countries is procyclical.

The problem of procyclicality seems to be especially acute for commodity-rich nations–*commodity republics* in the nomenclature of this paper. In those countries, commodity-linked revenues (taxes, royalties, profits) can be a large portion of government revenue (see Sinnott, 2009). And by any measure, commodity price volatility is large.[2] As a result, overall revenues are quite volatile — and so can be spending and the fiscal balance. If expenditures react more than proportionally to revenue increases, then the fiscal balance can move with the cycle.

In this paper we revisit the issue of fiscal procyclicality in commodity republics. Since commodity prices are plausibly a main driver of fiscal policy outcomes in these countries, we focus on the behavior of fiscal variables across the commodity cycle, in contrast to behavior across the output cycle, which has been the main focus of earlier research on fiscal procyclicality.

The paper has two goals. First, to document over a long period of time the behavior of fiscal policy for a large number of commodity-producing countries. Second, to see whether the behavior of fiscal policy in such countries has changed over time. In particular, we wish to test the hypothesis that "this time was different": given that commodity-producing nations improved the rules and institutions that govern their fiscal policies, did fiscal policy behave less procyclically – and perhaps even countercyclicallyv – in the recent commodity boom episode?

We construct a commodity price index for a group of 48 economies, incorporating information on the importance of each commodity in the total commodity output of the country for the period 1960–2010. Using that index we identify commodity boom episodes: periods of significant increases in commodity prices in the period 1900–2010 for the 32

☆ We are grateful to Yan Carriere, Juan Matamala and Sergio Salgado for excellent research assistantship and to Cristian Muñoz for data collection. We are also grateful to Luis Catao for sharing his data with us. We thank Guillermo Calvo, Choongsoo Kim, Harald Uhlig and three anonymous referees for very useful comments and suggestions.

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[1] If, of course, the fluctuations are expected to be temporary, not permanent. We return to this point below.

[2] Mendoza (1995) estimates that close to one-half of the variation in aggregate output for a group of 30 developed and developing economies can be attributed to terms of trade shocks. Kose (2002) using a similar framework finds that terms of trade shocks can explain almost all of the variance in output in small open developing economies.

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http://dx.doi.org/10.1016/j.jdeveco.2013.07.012

countries that given the high importance of commodity production in total production may be considered commodity republics. We define a commodity boom episode as a period in which our domestic production-weighted commodity price index surpasses its historical trend by a certain threshold margin. For most of the countries under study we identify two boom episodes: one taking place in the 1970s and early 1980s, and another in the years immediately prior to 2008.

Next we study the behavior of key fiscal variables surrounding these commodity boom episodes. We analyze how real government expenditures, real government revenues and the fiscal balance behave over the commodity price cycle. Then we study how procyclical or countercyclical fiscal policy was during these episodes. To that end, and using two different specifications, we estimate coefficients that capture, country by country, the response of fiscal variables to movements in commodity prices.

This first set of results suggests that the fiscal policy of many commodity republics was indeed quite procyclical in the earlier boom episode. For instance, in several cases we identify a negative relationship between the fiscal balance (as a percentage of GDP) and the behavior of commodity prices. That is, the fiscal balance deteriorates as commodity prices increase, in exactly the opposite fashion to what theory would suggest.

To test the established wisdom that "this time was different" with regard to the conduct of fiscal policy in commodity-rich nations, we look for systematic differences between the most recent episode of increases in commodity prices and the previous episode. The results are encouraging: there is evidence of reduced procyclicality in a number of countries. The number of negative relationships between the fiscal balances and commodity prices drops significantly, showing that there are fewer countries whose fiscal policy seems to have been overtly procyclical in the recent episode. Behind this change stands an improvement in the cyclical behavior of revenues. Regarding the behavior of expenditure, our evidence points towards a reduction in its procyclicality.

The paper is organized as follows. In the next section we briefly summarize recent related literature on the cyclicality of fiscal policy in commodity-rich nations or with respect to terms of trade shocks. Then we review what the theoretical literature has to say about the cyclical behavior of fiscal policy in commodity rich countries. Later we specify the commodity price index and the precise definition of a boom. Having identified the boom episodes, in the following section we describe the behavior of fiscal and macro variables during times of high prices. Then, in Section 6, we carry out the econometric estimation of the elasticities of fiscal variables with respect to the commodity price index. In that section we tackle the question of whether fiscal behavior was different in a statistically significant way across boom episodes. Section 7 then analyzes the role of a few institutional and political variables in trying to explain the changed pattern of fiscal behavior. Section 8 concludes.

## 2. Related literature

As mentioned in the Introduction, the empirical literature tends to support the view that governments in developing countries often follow a procyclical fiscal policy. Some recent studies have concentrated their analysis on commodity-rich nations or have concentrated in the impact of terms of trade shocks on fiscal outcomes. We briefly summarize here the conclusions of some of the main papers on this issue.

Villafuerte and Lopez-Murphy (2010) evaluate the behavior of fiscal policy in oil-producing countries during the recent oil price cycle (2003–2008). Their dataset includes 31 countries in which oil revenue was at least 25% of total fiscal revenue. They show that the overall fiscal balance for those countries improved significantly during the recent oil price cycle. Nonetheless, the non-oil primary fiscal balance worsened significantly as a result of increased primary spending. They also provide evidence of procyclical fiscal policy behavior in oil producing countries. Interestingly, they find that higher degrees of fiscal procyclicality are negatively correlated with the income level of countries.

Centered also on oil producing countries, Erbil (2011) studies fiscal cyclicality in 28 developing countries for the period 1990–2009. He estimates the elasticity of different fiscal measures – such as government expenditure and public investment – to output, controlling for the terms of trade and also taking into account potential reverse causality. He provides evidence supporting the existence of procyclical fiscal policy in low and middle-income countries. Some evidence suggests that higher political quality and better institution factors – as well as less binding financial constraints – are associated with lower cyclicality of fiscal policy.

Kaminsky (2010) studies the links between the fiscal stance and terms of trade cycles for a sample of 74 countries. She finds that fiscal policy is countercyclical in OECD countries and procyclical in developing countries vis a vis GDP. Regarding terms of trade cycles, she provides evidence that fiscal policy in OECD and low-income countries is acyclical. For upper-middle-income countries fiscal policy is countercyclical with respect to the terms of trade while the response of fiscal policy in lower-middle-income countries is procyclical. Nonetheless, for both upper-middle income and lower-middle income countries, fiscal policy tends to be more procyclical during terms of trade booms relative to normal times.

So, fiscal policy in developing economies, including commodity–rich nations, tends to be procyclical. In the next section we provide a framework that shows that deviations of fiscal policy from what the standard economic theory predicts can be explained by political economy factors. Then we provide evidence that relates changes in fiscal policy cyclicality with changes in political and institutional factors.

## 3. What theory predicts

In this section we review what the response of fiscal expenditure and the fiscal balance should be to shock the government income — as captured, for instance, by the increase in price of a natural resource owned by the government. We begin by studying the optimal response of a single benevolent policymaker. We then study the case of several policy makers that interact strategically, giving rise to the "voracity" effect. This voracity effect has been presented as an explanation for the procyclicality of fiscal policy documented in the empirical literature.

### 3.1. The case of a single policymaker

#### 3.1.1. The government budget constraint

Consider a government that spends a real flow $g_t$, financed either by collecting revenue $\tau_t$, enjoying the benefits of a positive income shock $\varepsilon_t$, or decumulating assets whose stock is denominated by $b_t$ and which pays a fixed rate of interest rate $r$.

The corresponding government budget constraint is

$$\dot{b}_t = rb_t + \tau_t + \varepsilon_t - g_t, \tag{1}$$

where $\dot{b}_t$ can be interpreted as the fiscal surplus or deficit at time $t$. Any such government must also impose the standard no Ponzi game condition that the discounted value of government assets be zero at infinity:

$$\lim_{t\to\infty} b_t e^{-rt} = 0. \tag{2}$$