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Original article

# Fueling development? Assessing the impact of oil and soybean wealth on municipalities in Brazil

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### ABSTRACT

The commodity boom of the 2000s, which now came to an end, represented a windfall to resource-rich countries. However, the benefits – or potential curse – likely had heterogeneous effects at the local level, with the potential to increase regional or income inequalities within countries. This paper examines the impact of the international commodity boom during the first decade of the 2000s on different parts of Brazil. Using a range of quantitative techniques, it estimates the changes in development and inequality indicators between 2000 and 2010 among oil rich, soybean rich, and resource poor control municipalities. Our results indicate both that there is a “catch-up” effect benefitting less developed, resource poor municipalities, and that oil rich municipalities may be experiencing some of the dynamics associated with a resource curse. These findings are broadly in line with existing empirical research on the effect of oil wealth on local development in Brazil. We argue that national-level institutions and social programs that redistribute the windfall and constrain how local governments spend their resources likely constitute part of the reason for why regional inequalities have not been exacerbated as a result of the boom and local resources curses are at most incipient.

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## 1. Introduction

The sharp fall of commodity prices in the past few years has put an end to Latin America's “Golden Decade”. Average growth has slowed from 3.2 percent in 2012 to 1.3 percent in 2014 and the region now finds itself in recession (IMF 2016). Several of Latin America's largest economies, including Brazil, have been plunged into crisis. But, although the commodity boom has ended, key questions about its implications for the region's economic and social development are still unanswered. For instance, while the positive aggregate, national-level impact on a range of economic and social indicators is widely recognized, variation *within* countries remains understudied (World Bank, 2011; Hunter, 2011). Yet, there exist substantial regional differences both in the extent and kind of resource wealth within several Latin American countries. Such variation may have a range of consequences. It might, for instance, either produce or exacerbate regional inequalities as resource-rich areas benefited more from the boom, or it may have created local instances of a “resource curse” as commodity rich local governments were swamped by rents they were unable to manage, or used

for wasteful spending aimed at political gains (Robinson et al., 2006). Within-country variation in degree and kind of resource wealth also provides a valuable opportunity to examine the impact of different commodities, which often affect local economies and government finances in different ways.

This paper aims at improving our understanding of the commodity boom's impact on different parts of Brazil. It examines the effect of two of Brazil's most important commodities, oil and soybeans, on final development outcomes – the Human Development Index (HDI), the Municipal Development Index (IFDM) from the Federation of Industries of the State of Rio de Janeiro, and the Gini coefficient – among Brazil's more than 5000 municipalities during the first ten years of the 2000s. It takes advantage of variation both in terms of the geographic distribution of oil and soybean wealth and in the channel through which they impact local economies. Oil revenues find their way straight into municipal budgets as royalties paid by oil companies operating in Brazil, most notably Petrobras, and primarily benefit municipalities along the coast. Soybeans, in contrast, provide no direct rents to municipal budgets, making their impact only via local GDP and the indirect effect on tax revenue, and soybean producing municipalities are mainly found in the Brazilian heartland. The analysis is carried out in three steps. We first estimate the change in the HDI, Gini, and IFDM, between 2000 and 2010 among

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resource-rich – in either oil or soybeans – and resource-poor municipalities by simply taking the difference in means and examining the statistical significance. We then focus more closely on the effect of oil and soybean wealth, replicating the estimation using regression analysis and genetic matching. Finally, to complement the analysis we estimate the change in local government budgets between 2000 and 2010, again taking the difference in means.

The analysis generates three main findings. First, in the simple difference in means estimation there is a “catch-up” effect. While all municipalities made improvements in their HDI and IFDM, less developed, resource-poor municipalities made greater improvements than ones more developed and rich in soybeans or oil. Second, the estimation based on matching suggests that while soybean wealth has a positive effect on development outcomes, the effect of oil wealth is negative. Moreover, the estimation of changes in government budgets shows that oil rich municipalities have seen budget increases larger than both soybean rich and resource poor municipalities. This suggests that oil rich municipalities, where governments receive rents straight into their budgets, may be experiencing some of the dynamics associated with a resource curse. But the magnitudes are small and the effect not consistently statistically significant at conventional confidence levels. We suggest this may be the case because of the relatively brief timeframe and because Brazilian national-level institutions and policies governing public goods provisions have contained the local resource curses that rents may generate. Third, the estimation based on matching also shows that both oil and soybean wealth have a positive effect on the Gini coefficient and that they are therefore exacerbating within-municipality inequality. Given that wealth in oil, unlike that in soybeans, only impacts local economies via the municipal budget we suggest that it in oil rich municipalities is a political rather than a market logic that drives the increase in inequality and that this is an indication of corruption that adds suggestive evidence for the presence of local resource curses. As with the suggestion that the short timeframe and national-level institutions may have contained such incipient local resource curses, the point about how oil wealth drives inequality should be treated as a reasonable hypothesis based on the fiscal rules of the country and previous findings from the literature.

The remainder of the paper is divided into four sections. Section 2 explains in greater detail why we should think that the commodity boom – and particularly price boom for oil and soybeans – might have had a different impact on different parts of Brazil, and what these differences might be. Section 3 contains our empirical analysis. It first describes our data and then proceeds through the three steps of analysis briefly described above. Section 4 discusses our findings and Section 5 concludes by summarizing our findings and, briefly, linking them to broader debates about the impact of the commodity boom on Latin America’s political economy.

## 2. The case and theory

This section is divided into two parts. First, it gives a brief overview of the Brazilian boom in oil and soybeans and explains why it might have had a different impact on development outcomes in different parts of the country. Second, it provides a brief review of the literature on natural resources and development and of the small empirical literature on oil wealth and local development in Brazil. On that basis it explains *what* we might expect the different impact on development outcomes in different parts of the country to be.

### 2.1. The Brazilian boom in oil and soybeans

Brazil’s boom in oil and soybeans during the first decade of the 2000s was rooted in the combination of international price spikes and large domestic production increases (see Fig. 1). While oil production has a long history in Brazil – onshore oil was first discovered in small quantities in 1939 and the national oil company Petrobras was founded in 1953–it is only since the discovery of offshore reserves in the 1980s that Brazil has become a major oil producer (Freire, 2013; Guan, 2010). Over the course of the first decade of the 2000s, oil production more than doubled from about 900,000 to 1,900,000 barrels per day. Although Brazil only became virtually self-sufficient in oil in the late 2000s, the domestic oil industry has become an important part of the economy, making up approximately 12% of GDP (CNI, 2012). Discoveries of the Tupi, Jupiter, and Carioca fields, in the pre-salt oil

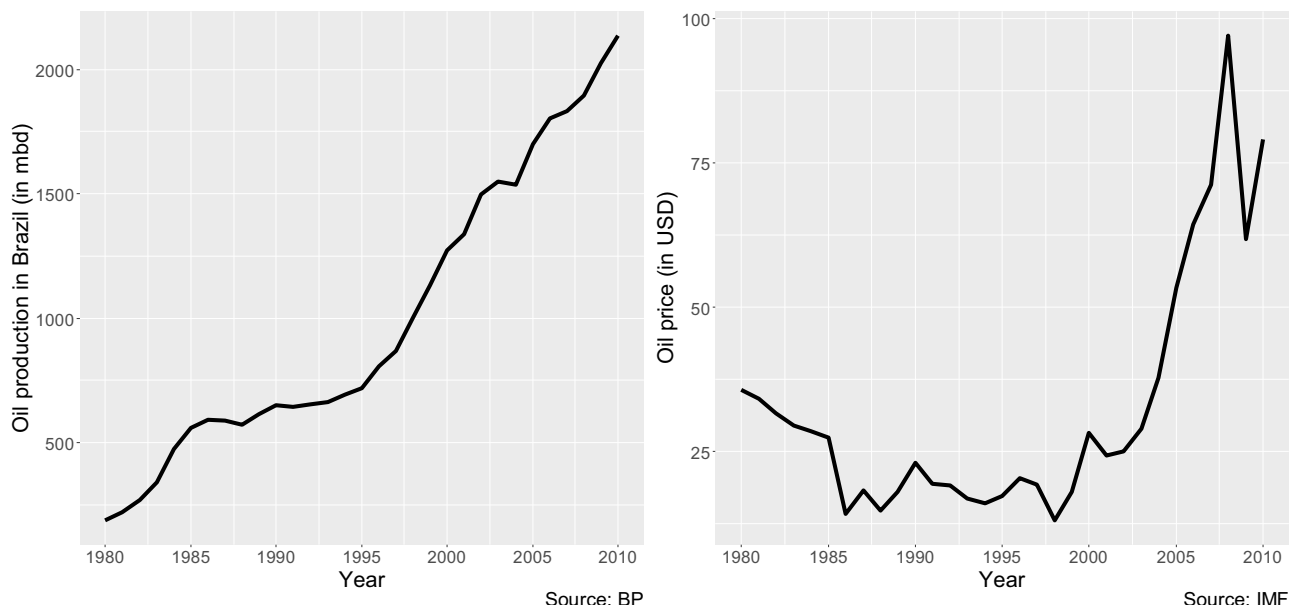


Fig. 1. Oil production in Brazil and international oil price (1980–2010).

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