

Extended Abstract
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Paper Title	Commodity Booms and The Environment
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**Abstract prepared for presentation at the 93rd Annual Conference of the
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16 – 18 April 2018

Abstract	200 words max
<p>This paper studies how production responses from agricultural commodity booms affect greenhouse gas emissions, the primary cause of climate change. Brazilian localities more exposed to booms substantially increase deforestation and agricultural fires, leading to higher emissions. The effects are significantly larger in Brazil's Amazon than in other biomes. Commodity booms also induce production responses toward lower emissions, such as higher output per area. Taking into account higher- and lower-emission production responses, high-exposed localities present an increase in net emissions. Moreover, our findings highlight that positive economic shocks may have unintended consequences, as high-exposed localities present lower compliance with an emission curbing policy.</p>	
Keywords	commodities; environment; climate mitigation policies; agriculture.
JEL Code	Q50, Q02, O13, H81 see: www.aeaweb.org/jel/guide/jel.php?class=Q)
Introduction	100 – 250 words
<p>Understanding how the interplay between market forces and institutions can shape environmental outcomes lies at the core of contemporary policy debates. Over the past centuries, periods of economic prosperity have commonly happened to the detriment of the environment. Deforestation, intentional fires, and pollution are reoccurring examples of how human activities impact the environment.</p> <p>Despite being a pressing global challenge, systematic evidence on the pathways through which economic growth affects GHG emissions or compliance with climate-mitigation policies is rather scarce. This paper aims at filling these gaps by making two contributions. First, we provide an in-depth analysis of GHG emissions during a period of economic boom. Second, we study the interplay between market forces and institutions by assessing how economic booms affect compliance with climate mitigation policies.</p>	
Methodology	100 – 250 words
<p>To assess the relationship between growth and emissions, we study the effects of a strong shift in commodity prices in the 2000s and 2010s on Brazil's agricultural sector — a suitable setting to study our research question. Using a shift-share design, we construct a commodity exposure index for each municipality in Brazil. The exposure index uses time-series variation of international commodity prices and the spatial variation in agricultural suitability. We then use panel data and a two-way fixed effects regression to answer our research questions, by checking the effects of commodity exposure on several environmental and economic variables (GDP, agricultural area, deforestation, number of fires, GHG emissions, agricultural productivity, land usage, among others).</p> <p>Our data set contains municipality-level yearly data. We collect information from the Brazilian Bureau of Statistics' (IBGE) on the quantity produced and area employed for crops and livestock. In addition, we use satellite data on soil cover and land usage from MapBiomass. Brazilian official data on deforestation from Terrabrasil and PRODES and the number of fires from Brazil's Agency for Space Research (INPE) are also included. Satellite and field collected data on GHG emissions and removals ("sinks") sourced by SEEG from Brazil's Climate Observatory are also collected for our panel. Likewise, we gather Brazilian Agricultural Census data on areas employed as temporary and permanent crops, pastureland, no-till areas, natural forests, commercial forests, and other agricultural land usages. We also collect data on a climate mitigation credit policy from Matriz de Dados de Crédito Rural from Brazil's Central Bank. FAO-GAEZ on agro-climatic potential yield is also collected and cross-referenced with Brazil's municipalities. Finally, IBGE provides data on local economic growth, migration, population estimates, unemployment, illiteracy, and other socioeconomic variables which may be relevant for our analysis.</p>	
Results	100 – 250 words
<p>We start by showing that localities more exposed to the commodity boom increase production and land demand, as measured by increases in agriculture Gross Domestic Product (GDP) and total production area. Using satellite data, we find that greater commodity exposure generates measurable impacts on deforestation and fires. To further understand the role of carbonizing and decarbonizing factors, we assess the impacts on production intensity, land-use conversion, and crop mix. Decarbonizing factors play a chief role: we find greater intensity in crop production and land allocation toward a lower-emission crop mix. By contrast, we also find an increase in land allocation toward cattle raising, an important carbonizing factor. Taken together, these different margins of adjustment indicate an ambiguous effect on GHG emissions. Finally, we also test whether market factors can affect compliance with climate-mitigation policies, and we find that high-exposed-commodity localities present lower compliance with an emission-curbing policy.</p>	
Discussion and Conclusion	100 – 250 words
<p>We study how commodity booms affect the primary driver of climate change: greenhouse gas emissions. Commodity booms are associated with carbonizing factors (as measured by deforestation and fires) as well as decarbonizing factors (for instance, allocation of land toward lower-emission crop mix and higher crop productivity). It is, thus, ex-ante unclear whether commodity booms generate an increase in net GHG emissions. Taking into consideration carbonizing and decarbonizing factors, we show that Brazilian localities more exposed to commodity booms present an increase in net GHG emissions. Our findings highlight that market forces can promote GHG mitigation ("market-driven mitigation"), but one needs to consider several pathways to assess how economic growth affects net emissions.</p>	