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Re-election incentives and deforestation cycles in the Brazilian Amazon☆

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ABSTRACT

Despite expansive research on Amazonian deforestation and its drivers, the role of local politics is not well understood. Using a panel data set that combines municipal-level deforestation and election data from 2002 to 2012, I estimate the effect of an incumbent mayor running for re-election on deforestation rates in election periods. I find that deforestation rates increase 8–10% in election years when an incumbent mayor runs for re-election, an amount equivalent to four percent of the total forest lost since the 2004 elections. Electoral deforestation cycles do not appear to be driven by changes in agricultural policy implementation and activity, but are linked to corruption and campaign finance, suggesting that weak institutional constraints facilitate electoral manipulation of forest resources. This phenomenon is not likely limited to Amazonian forests; re-election incentives could very well lead to misallocation of other natural resources in alternate geographies.

1. Introduction

The Amazon Basin is the largest rainforest in the world, is a globally important source of biodiversity and ecosystem services, and plays a critical role in international climate agreements (Foley et al., 2007). Since 1990, nearly 370,000 km^2 of the Brazilian Amazon, an area larger than Germany, has been deforested (INPE, 2014). Despite expansive research on the drivers and deterrents of Amazonian deforestation, there are few applications of formal economic models that explore how political incentives influence forest resource allocation. The political economy of deforestation in the Brazilian Amazon has thus received little attention in the economics literature. Accordingly, I explore how local politics influence deforestation in the Brazilian Amazon, specifically focusing on the extent to which re-election incentives induce deforestation in election years.

In election periods, politicians manipulate public spending and policy to boost popularity and secure votes. Election cycles have been observed in monetary and fiscal policy, as well as public goods provision (Nordhaus, 1975; Rogoff, 1990; Khemani, 2004). Only recently were election cycles documented in natural resources; Burgess et al. (2011) show a substantial increase in illegal logging prior to local elections in Indonesia. Anecdotal evidence suggests that Amazonian forests may be similarly

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plagued; the Brazilian Minister of the Environment attributed a spike in deforestation to mayors ignoring illegal logging to garner votes for the 2008 mayoral elections (Balakrishnan, 2008).

Combining satellite-derived deforestation data with municipal election data from 2002 to 2012, I compare annual deforestation in municipalities where an incumbent mayor runs for re-election with municipalities absent an incumbent mayoral candidate. I include municipality and state-year fixed effects to control for factors that simultaneously influence electoral cycles and deforestation rates. Since Amazonian deforestation is primarily driven by agriculture, I examine whether electoral deforestation cycles are driven by agricultural policy implementation, agricultural constituency composition and interest group presence. I also consider the role of political connections, corruption and campaign finance in electoral deforestation cycles.

In election periods, deforestation rates are 8–10% higher in municipalities when an incumbent runs for re-election compared with municipalities without an incumbent running for re-election. This translates to 3545 km^2, or 4% of the total forest lost since the 2004 elections. Although agriculture is the biggest driver of deforestation, electoral deforestation cycles do not appear to be driven by agricultural activity or interests. Political affiliation between re-election eligible mayors and national-level politicians reduces the effect of elections on deforestation.

Corruption and campaign finance are strongly linked to electoral deforestation cycles. Municipalities with highly corrupt mayors running for re-election have approximately 50% more deforestation in election periods compared with municipalities without an incumbent running for re-election. This “corruption effect” accounts for all of the increase in deforestation when incumbent mayors run for re-election. Campaign contributions also play an important role in the electoral deforestation cycle. Self-funded campaign contributions are significantly positively related to election year deforestation; surprisingly, corporate and individual contributions are not. For each 1% increase in self-funded campaign contributions, there is a 0.017% increase in deforestation.

Brazil's political climate is notoriously corrupt, with dubious campaign finance dynamics (Gingerich, 2014). This, coupled with re-election incentives and the ability to clandestinely gain from forest resources, creates perfect conditions for electoral deforestation cycles. Because corrupt politicians receive greater private benefits from holding office, they have more incentives to remain in office and misallocate resources to assure re-election, leading to larger resource distortions (Shi and Svensson, 2006). Mayors may specifically exploit forest resources in election periods because they can gain valuable campaign funding without the voting population detecting resource misallocation, since an increase in deforestation above the norm is not easily observed.

Prior work on the political economy of forest resource use focuses primarily on decentralization, and the characteristics of participants and institutional arrangements (Andersson et al., 2006; Ribot et al., 2006; Agrawal, 2007; Andersson and Gibson, 2007). Some of this work demonstrates that decisions made by local politicians determine the effectiveness of decentralized forest management, and that decentralization leads to sustainable forest management only when local politicians have the political or financial incentives, ultimately suggesting that local politicians manipulate forest resources for political advancement (Gibson and Lehoucq, 2003; Andersson et al., 2004).

Local politics undoubtedly influence forest management. Here I apply an economic framework to understand how local political processes create incentives to manipulate forest resources, and show that local electoral processes lead to increased deforestation in the Brazilian Amazon. This phenomenon is not likely limited to Brazil given that deforestation cycles have been observed elsewhere (Burgess et al., 2011). Compared with Brazil, many forest-rich countries have weaker institutions and lesser capacity to prevent electoral deforestation cycles. Election cycles are also not likely limited to forest resources, re-election incentives could instigate misallocation of other natural resources such as minerals or oil.

2. Background

2.1. Deforestation in the Brazilian Amazon

Brazil has been characterized a “world leader” in deforestation (Nepstad et al., 2009). Deforestation contributes to climate change, biodiversity loss and reduced rainfall (Shukla et al., 1990; Skole and Tucker, 1993; Foley et al., 2007; Nepstad et al., 2009), and recent literature points to the adverse public health effects of deforestation, such as increased malaria incidents (Pattanayak and Pfaff, 2009; Garg, 2014). Historic drivers of Amazonian deforestation are diverse. Central government policies in the 1960s promoted large infrastructure projects and settlement in the Amazon region, initiating a surge of deforestation through the 1980s (Binswanger, 1991; Alston et al., 2000; Araujo et al., 2009). Since the 1980s, agricultural credit and subsidies, coupled with globalizing markets and improved transportation systems, encouraged further economic development activities that accelerated deforestation (Hargrave and Kis-Katos, 2012). Currently, industrial scale agriculture, primarily cattle ranching, is the biggest driver of deforestation in the Amazon (Fearnside, 2005; Nepstad et al., 2009; Hargrave and Kis-Katos, 2012). Most of Brazil's deforestation over the past decade has been attributed to illegal activity; as much as 90% of deforestation from 2000 to 2012 was illegal (Lawson et al., 2014).

Economic development remains one of Brazil's top priorities, however given the Amazon's critical role in carbon sequestration and biodiversity preservation, protecting Amazonian forests is also of utmost importance. After record-breaking deforestation in the 1990s and early 2000s, Brazil implemented a number of policies designed to protect its forests (Arima et al., 2014). Protected areas were widely established and the 1965 forest code was modified, increasing the proportion of forest cover landholders were required to maintain on their property (Nolte et al., 2013). In 2004, the