

The effectiveness of environmental policies on reducing deforestation in the Brazilian Amazon

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Annex E. Summary of the Thesis

Deforestation has declined dramatically in the Brazilian Amazon over the past decade. The objective of this research was to better understand why it declined so fast. Specifically, the main research question was “What are the factors that explain the rapid annual decline in deforestation in the Brazilian Amazon since 2004?”

Four sub-questions were used to answer that question: (1) How does formalizing of land rights and monitoring support lead to improvements in indigenous peoples’ livelihoods and survival in demarcated indigenous territories? (2) What has been the effect of demarcating indigenous territories on forest reservation? (3) How do environmental policies compare with each other in terms of their effect sizes? (4) To what extent can environmental policies be associated with a decrease in deforestation in the Brazilian Amazon?

Research question 1 – How does formalizing of land rights and monitoring support lead to improvements in indigenous peoples’ livelihoods and survival in demarcated indigenous territories?

The research for this question aimed to get a local perception of four indigenous communities that were demarcated under the Indigenous Lands Project, jointly funded by the World Bank and KfW Development Bank.

The research was based on a field visit to four indigenous communities in the Brazilian state of Amazonas and used a qualitative case study methodology. The objective of the research was to better understand livelihood opportunities and survival strategies of indigenous peoples living in indigenous territories.

Using qualitative research methods, I found that providing indigenous peoples with rights to their lands not only improves their cultural autonomy but also supports their survival by creating livelihood opportunities. Even though poverty persists in the remote areas of indigenous territories, living conditions have improved dramatically over the past two decades. For example, at the time of my field visit the indigenous territories had access to modern amenities, such as schools, health centers, electricity, and improved sources of water. It was difficult to disentangle the effects of land demarcation from the provision of pensions,

schooling, health services, and conditional cash transfer programs (such as *Bolsa Escola* followed by *Bolsa Família*). However, the entire policy mix seemed to have had a positive effect on population growth, poverty alleviation, and education and health indicators – although a quantitative analysis of this policy mix is still needed.

Research question 2 - What has been the effect of demarcating indigenous territories on forest preservation?

To answer question 2, I wanted to find out whether demarcating indigenous territories had an impact on forest preservation. There is debate in the literature about whether parks with people or parks without people preserve forests best. My research weighs in on the side of parks with people and tests whether providing indigenous peoples with the right to their lands makes a difference in forest preservation.

I used a time series of satellite-based forest cover data covering three decades as well as matched samples of treated and comparison indigenous territories. The comparison revealed that there is no statistically significant effect of demarcating indigenous territories on forest preservation.

The analysis does not show an effect because most of the indigenous communities demarcated under the Indigenous Lands Project are not yet threatened by deforestation. Thus, demarcating indigenous territories may be an investment that does not show immediate results. With respect to my main research question of why deforestation declined dramatically over the past decade, this chapter does not yield an answer. Therefore, more research is needed to understand the decline.

Research question 3 - How do environmental policies compare with each other in terms of their effect sizes?

The objective of research question 3 was to compare the results from other authors in the peer-reviewed literature. I compared six articles that had used some form of statistical matching analysis. I wanted to understand how the effect sizes of five environmental policies compared. For three additional environmental policies I did not find any article that used statistical matching analysis.

To answer this sub-question, I relied on the methodology developed by Samii et al. 2014 for making the effect sizes comparable. The six papers covered the following environmental policies: (1) strictly protected areas, (2) sustainable use areas, (3) indigenous territories, (4) enforcement missions, and (5) public disclosure. All these policies apply to the Brazilian Amazon region.

The results of this research show that the average effect size was relatively small and comparable for all five environmental policies. It also shows that no single environmental policy was more effective than the others. Hence, I conclude that environmental policies tend to have a relatively small annual effect on deforestation. In terms of my main research question as to why deforestation declined dramatically over the last few decades, this research explains a small part of the observed decline.

Research question 4 - Have environmental policies become significant (negative) drivers of deforestation in the Brazilian Amazon?

Under research question 4, I identified a gap in the literature with respect to the marginal effect of environmental policies on deforestation. To answer the question, I used a model that combined proxies for eight environmental policies. The research shows that all the things we cannot measure precisely explain an important part of the decline in deforestation. These factors include macro-scale policy effects that my treatment indicators do not pick up. This also means that the research community should not ignore policies in econometric models of deforestation, which is an important statement given that few previous models have included policy variables.

This finding is a step in the direction of understanding the sudden decline in deforestation. It includes more detailed variables that model environmental policies than, for example, Assunção et al. (2015), who include land scarcity as a proxy for the effect of environmental policies on deforestation. However, the fact that my model only explains a small part of the variation in deforestation between the municipalities in the Brazilian Amazon shows that the research community is only beginning to understand the marginal effects of environmental policies. All the factors that cannot be explained vary between states and over time and therefore explain the large variation in the dependent variable of deforestation. More work is therefore required.

When I look at my overarching research question and the sudden decline, I see that more research is needed to understand the decline. I also notice that my modeling approach only gets me so far. Either researchers need to devise new ways of modeling deforestation and environmental policies, or they need to drill down to the local level and gain a qualitative understanding of why deforestation decreased in specific locations. Testing global models against experience on the ground could help me better understand the deforestation decline. Combining qualitative and quantitative methods has the potential to solve some of the riddles that one method alone cannot solve.

In sum, this research filled an important research gap. Chapters 2 and 3 assessed the impact of the Indigenous Lands Project on community survival, livelihood opportunities, and forest preservation. It found that demarcating indigenous territories does not have a statistically significant effect on forest preservation. It also found that land titling is beneficial for the well-being of indigenous communities in that it creates conditions for a sustainable livelihood, security, and improved health conditions, as well as supporting circular migration, or living in between rural and urban spaces. In chapters 5 and 6, this research assessed eight environmental policies in the Brazilian Amazon and their effects on forest preservation. It confirmed the small effect size in forest conservation projects in the research conducted by other authors and assessed the cumulative effectiveness of the different environmental policies.