# BRAZIL'S ECONOMIC FOOTPRINT ON THE AMAZON RAINFOREST

DIPL 3800: Investigating International Relations

MARIANA DELACQUA
Seton Hall University

# ABSTRACT

Many scholars have explored the causes and consequences of the vast deforestation in the Amazon rainforest, while others have analyzed the fluctuation in the Brazilian economy. However, few give importance for the correlational relationship they have with each other. Through a case study approach, this research paper attempts to find the correlation between Brazil's economic development and the use of the Amazonian rainforest for it its resources. After identifying the relationship, it will be determined if the resource exploitation is worth the rainforest's destruction. In order to show the depth of this issue, the same factors are applied to a large agricultural area in the Southern region of Brazil. The impact of both these areas will be compared against one another as a means of identifying its impact on the Brazilian gross domestic product, the agricultural sectors and its long-term sustainability.

# TABLE OF CONTENTS

**Abstract** ..... **1**
**Table Of Contents** ..... **2**
**Introduction** ..... **3**
Background Of The Study ..... 3
Problem Statement ..... 3
Research Question ..... 4
Hypothesis ..... 4
Variables ..... 4
Significance Of The Study ..... 4
Objectives ..... 5
**Literature Review** ..... **6**
Gross Domestic Product ..... 6
Deforestation ..... 7
Ecological Goods And Services ..... 7
Sustainably In The Long Run ..... 8
**Methodology** ..... **8**
Research Design ..... 9
Target Population And Study Population ..... 9
Sampling Methods ..... 10
Frame Of Study ..... 11
Data Collection ..... 11
Data Analysis ..... **12**
**Limitations** ..... **13**
**Conclusion** ..... **14**
**References** ..... **15**

# INTRODUCTION

The purpose of this research paper is to understand the relationship between the fluctuation in Brazil's gross domestic product with the use of resources from the Amazon rainforest and identify if its exploitation is beneficial in the long-term.

## BACKGROUND OF THE STUDY

There is no question that the Amazon rainforest is a major powerhouse in South America. However, in the past few years its resources have been overly exploited for its economic potential and the consequences of it have been catastrophic. The deforestation that has occurred in the Amazon has been a large component of global environmental change, given the rapid expansion of various industries. Industrial sectors, such as agriculture, contribute largely to the yearly outcome of Brazil's gross domestic product. The purpose of this research paper is to understand the relationship between the fluctuation in Brazil's GDP with the use of resources from the Amazon rainforest and identify if its utilization is beneficial in the long-term. This will be done by comparing the agricultural sector in the Amazon rainforest to that of the southern region of Brazil.

## PROBLEM STATEMENT

Brazil has the largest concentration of forestland over any other nation in the world (Ewers, 2008). The rates of deforestation on Brazil's side of the Amazon have been attributed to the expansion of cattle ranching, soybean farming, infrastructure development, mining, and more (Foley, 2007). All these factors contribute to the growth of Brazil's gross domestic product. However, in the long run the country faces many issues. It has the task of rebuilding and replenishing the resources it has used as well as many other expectations from across the world due to backlash of the country's lack of care for the forest. This research paper will attempt to

find out how much the Brazilian GDP relies on its agricultural sector and if it is worth the destruction of the Amazon rainforest for economic benefits.

## RESEARCH QUESTION

What amount of Brazil's gross domestic product is dependent on the Amazon rainforest and is it worth the rainforest's destruction?

## HYPOTHESIS

The destruction of the Amazon forest for resource exploitation is more likely to have a negative long-term impact on Brazilian economy than are agricultural sectors in southern Brazil.

## VARIABLES

Independent Variable: The destructive resource exploitation of the Amazon

Dependent Variable: The impact on Brazil's gross domestic product

## SIGNIFICANCE OF THE STUDY

It is theoretically important to consider this question because of the impact the Amazon rainforest has on Brazil, the neighboring countries and the rest of the world. There is no doubt that the Amazon holds valuable resources, many of which are used by locals for their benefits. However, in the past years there has been a significant increase on the exploitation of the rainforest, that has caused an immense footprint. The use of the Amazon natural resources, or lack thereof due to deforestation, has shown to positively aid the Brazilian GPD but the costs of this action have proven to be negative (Andersen, 1998). In an analytical sense the extreme use of the Amazon does not help the Brazilian economy in the long-run.

In the past few years policymakers have begun to be more environmentally conscious, especially with the rapid acceleration of global warming. In contrast, Brazilian policy makers have not, in the past years, been in unison in their environmental decisions (Abranches). Some believe in the use of the natural resources for economic benefits while others lean more towards the protection of the land. It is important to show the correlation of GDP and use of natural resources in order to establish if it is worth it or not to damage the land for economic growth. As a developing country, Brazilian leaders tend to focus on the most efficient way to grow, expand, and advance with other world powers. This impulse typically results in harmful long-term consequences.

## OBJECTIVES

Although there have been various journals on the study of the Brazilian economy and gross domestic product, few have attempted to show the consequences that resource exploitation has on the long-run. Due to this, this research paper will attempt to:

- Establish a relationship between economic growth and resource exploitation
- Find how dependent the Brazilian GDP is on its agricultural sector
- Show the ecological consequences that the Amazon rainforest is facing
- Compare the use of agriculture resources in the Amazon versus Southern regions of Brazil
- Prove that this means of economic development is not sustainable in the long run
- Determine more appropriate measures, as noted in different geological agricultural areas

# LITERATURE REVIEW

In order to successfully answer this research question, we must first understand some key terms and concepts that relate to the topic. Ideas to consider include:

## GROSS DOMESTIC PRODUCT

Gross Domestic Product (GDP) is a powerful number that essentially defines a country's economic power, it measures the monetary value of final goods and services produced in a country in a given period of time. Across multiple nations, GDP has been a driving force for governmental policies, making economic growth a priority for many leaders across the world. Since the development to the concept, "GDP has been the key to success. Its underlying economic principles have contributed to splitting the planet into two worlds: the 'developed' and the 'developing' countries. Through the adoption of policies to sustain GDP, a country would not only reap alleged economic benefits, but it would also see its geopolitical status increase" (Fioramonti, 2013). It is widely assumed that this number can determine the well-being of a country's social and economic status. However, when taking multiple factors into consideration, GDP does not hold a large amount of influence on a country's identity. Nevertheless, the will to boost economic growth has, at times, given the concept of GPD a negative connotation. Leaders begin to sacrifice almost anything in order to see an increase in their GPD, raising important questions like: "Does our quality of life really improve when our economy grows 2 or 3 per cent? Can we continue to sacrifice the environment to safeguard a vision of the world based on the illusion of infinite economic growth?" (Fioramonti, 2013). Eventually, this paper will answer these questions through analyzing the long-term effects of using the Amazon as a boost in the Brazilian GDP.

## DEFORESTATION

For many decades, the Amazon has been seen as a corporation or a basin of production rather than one of the world's most important ecological systems. Research shows that, "Brazil is home to a larger expanse of tropical forest than any other nation, and parts of the Brazilian Amazon are experiencing the highest absolute rates of forest clearance of anywhere in the world" (Ewers, 2008). In this process, there has been an increase in deforestation of the rain forest through the clearing of land in order to increase production of ecological goods and services for the benefit of the economy. Deforestation not only impacts the local community, but it also has a large impact on global change across the world. In Brazil, the rate of deforestation has varied over the years but are mainly due to "to a wide range of factors such as the expansion of cattle ranching and soybean farming, infrastructural expansion and the proliferation of paved and unpaved roads, macroeconomic shocks to the Brazilian economy and international exchange rates" (Abranches, 2008).

## ECOLOGICAL GOODS AND SERVICES

The idea of goods and services is a widely recognized term that describe tangible products (goods) and activities provides by other individuals (services). However, adding the term "ecological" to the concept of goods and services gives it a different meaning, it refers to idea of:

> The supply of valuable products and materials (including agricultural, forest, mineral, and pharmaceutical commodities), the support and regulation of environmental conditions (through processes like pollination, flood control, and water purification), and the provision of cultural and aesthetic benefits (including ecotourism, heritage, and sense of place) by ecosystems. (Foley, 2007)

There is the idea that the use of natural resources as a means of production on the local scale can benefit the local community greatly, However, in recent years there has been an acceleration in rate of production in order to help the nation as a whole, influencing a growth in domestic product. Despite the abundance of resources found in the land and its possible positive effects, if it continues this way there will no sustainability in the future.

### SUSTAINABLY IN THE LONG RUN

The Amazon is the largest rainforest in the world and home to a verity of diverse ecosystems that are key to the rest of the world. However, with the current and increasing rates of deforestation, there has been a destruction in multiple aspects of its biodiversity. In the short run, using the rainforest as a resource for the demanding cattle and agricultural products may be tolerable, in the years to come it will not be. As more of the land is use, less sustainable it becomes due to human actions, "by the year 2000, nearly 15% of the forests in the basin had already been cleared. Recent rates of deforestation continue to be very high; between 2002 and 2004, the highest rate of forest clearing for any 3-year period to date was recorded. This trend is likely to continue as more roads are built through the core of the forest and growing international markets for free-range beef and soybeans drive increasing demand for agricultural products" (Foley, 2007). The use of the Amazon as driving force to boost Brazil GDP does not prove to be sustainable, if it continues at this rate.

## METHODOLOGY

Due to the number of different factors to consider in this topic, this paper will rely on the research found in accredited secondary sources. Studies that consider the impacts of

deforestation tend to focus on two or more specific variables to its cause, rather than considering all the causes of deforestation at once. In the area of agriculture, in specific, we can use qualitative and quantitative methods to find a pattern in the agricultural intensification in the two different sample areas.

## RESEARCH DESIGN

Extensive analysis will be done on scholarly journals and articles to establish patters between the independent and dependent variables in order to prove a relationship between them. Data will be gathered from sources such as the International Monetary Fund (IMF), World Bank and Consumer Index. Additionally, arguments will be drawn from various patterns seen throughout academic journals. By the end of the analysis the research done by using secondary sources to prove the hypothesis to be correct or incorrect. As no primary research will be done, the scholarly articles will be fact-checked with one another.

## TARGET POPULATION AND STUDY POPULATION

The goal of research is not only to be accurate and reliable, but also applicable. Therefore, before the study can be conducted, a target population must be identified. The purpose of the target population is to describe, as a whole, what the researcher is analyzing through creating a specific criterion to determine which groups are included and not included in the researcher's study. From there, a sample size can be selected for research purposes which will, at the end, be a representation of the target population. It is important that this sample size is well chosen so that it can be applicable to other parts of the same study population.

This study will focus on the deforestation of two specific sectors within Brazil and their impact on gross domestic product of the country. As the purpose of this research paper is to

identify the relationship between deforestation and gross domestic product, the study population can be defined as the forests that have undergone deforestation for economic purposes. That is, any forest land that is a resource for agriculture, mining, industrial or urban use. Deforestation is determined as gross clearing of flora, recognized as areas of forest and non-forest. The target population is thus the Amazon rainforest and subsidiary Southern regions of Brazil that have undergone deforestation for agricultural purposes. Of all other forests in the world, the Amazon is by far the largest and greatly explored for its economic abilities.

## SAMPLING METHODS

The purpose of sampling methods is to explain the systemic procedure from which samples were drawn from. This research will be conducted through the use of a non-probability sample, "samples for which each element in the population has an unknown probability of inclusion in the sample" (Johnson, pg. 228). This method is used to collect data when the researcher is not able to use probability techniques, it is however, less representative of the study population. Additionally, a large portion of the research will be done through judgmental samples, such as case studies, in order to gain information from various topics with a limited amount of observation. Sample size is important for the purpose of research as it defines the number of subjects are included within a sample in for it to have a statistically significant result. Additionally, the sampling method and sample size determine the reliability and validity of the study, by evaluating the quality of research. Reliability is about the consistency of a measure while validity is about its accuracy.

Due to the dynamic landscape and versatility of the Amazon, it is not possible to select probability samples for this study. Therefore, the research will be done through non-probability samples which will be done through an accumulation of scholarly article, case studies and

academic journals. The authors of these pieces tend to base their research through experimental and observational methods directly from within the Amazon. Then, that research is combine with previous studies in order to check the validity and reliability of their findings. In the study, validity and reliability will be confirmed if my findings are consistent with those of previous researchers. As the Amazon is a large rainforest, with various features, the sample size of the study will be big enough to study the different aspects of the research question.

## FRAME OF STUDY

In addition to the techniques in obtaining a target and sample population, researchers must also narrow done the scope of study through a sampling frame. A sampling frame is defined as, "the particular population from which a sample is actually drawn from" and it serves the purpose of better identifying the goals the research. It is important that this frame is selective of the study population for it to be representative of the target population.

In this case, the sampling frame will be the Brazilian side of the Amazon rainforest, in specific, the section which is used for agricultural production. In order to determine the economic power and ecological footprint of this land, it will be compared with a southern region in brazil, known as Mato Grosso, where land use for agriculture is also very common. It is important to draw both these samples from the same country due to the fact that the study will be taking into consideration Brazil's gross domestic product.

## DATA COLLECTION

In order to be able to successfully answer the research question, a series of measures must be taken. First, it is important to note Brazil's currently GDP and the percentage the agricultural sector contributes to that number. The CIA Factbook and the World Bank estimated Brazil's GDP to be around 2.055 trillion USD in 2017, with a slight decrease over the last year. Out of

that number, the country's agricultural sector made up 6.6 percent (The World Factbook). To get an accurate representation of the change over the years, the research must consider how GDP has changed over the last 20 years and how the growing agricultural sector has influenced that growth. The rate of deforestation has to be analyzed over the last 2 years as well. Establishing the same timeline is important so that the economic factors can be compared with the environmental ones.

Lastly, to answer the last part of the research question on whether the exploration of the Amazon is worth its destruction, research must be conducted on the diminishing rate of the rainforest resources. Its ecological factors will be a good indicator on whether or not the current economic process is sustainable or unsustainable. The same agricultural process will be compared against another major agricultural area found in the Southern regions of Brazil, a location that is reserved for agriculture and shows to be much more sustainable. Through these measures, this research will attempt to prove that utilizing the natural resources for economic purpose is not beneficial in the long-term.

## DATA ANALYSIS

It is important to consider that although the data will be obtained and analyzed from scholarly articles and credible sources, their statistics are valid but not always reliable, due to the inconsistency found in the studies' numeral statistics. This is because agriculture, the economy and deforestation are all constantly changing factors. Due to this, the statistics will regularly be fluctuating. Therefore, the best way to ensure the that data is the most accurate is to always keep it up to date. It will be predicted that the destruction of the Amazon forest for resource exploitation is more likely to have a negative long-term impact on Brazilian economy than are other agricultural sectors in southern Brazil, assuming the hypothesis to be correct.

# LIMITATIONS

Given the complexity of this topic, this issue was researched through a case study approach, in order to find an in-depth understanding of this issue in its real-life context. Due to this methodology, the research in this paper is only as accurate and reliable as the sources they come from. Some key limitations include the manner in which researchers identify and describe the key terms where at times they vary from one another.

In the past few years, researchers have recognized deforestation areas through identifying areas of forest and non-forest from satellites images. However, the Amazon rainforest has a more dynamic landscape than those two options suggest. The Amazonian landscape experiences cycles of clearing, cultivation, grazing, and secondary forest regrowth, resulting in a complex mosaic of intact rainforest, lands under varying management regimes, and recovering secondary forests (Foley, 2007). Therefore, the choice between forest and non-forest are not adequate descriptions of the land, making it hard for researchers to identify the areas that are considered to have undergone deforestation. At the moment, scholars have not yet operationalized the concept of deforestation in the Amazon rainforest, due to the difficulty in quantifying the different various factors previously listed. The landscape of the Amazon basin must be explained in a manner that reflects the different rates of gross deforestation, such as land clearing for crops, the management regimes of farmlands, the abandonment of fields, and the regrowth of secondary forest. Unfortunately, because these measurements are not exact, this research paper will use the most approximate estimate of the net deforestation area, that of which considers gross clearing minus regrowth of forestland in the Amazon basin from the past 20 years.

# CONCLUSION

The goal of this research project is to determine what amount of Brazil's gross domestic product is dependent on the Amazon rainforest and if it is worth the rainforest's destruction. The hypothesis predicted that the destruction of the Amazon forest for resource exploitation is more likely to have a negative long-term impact on Brazilian economy than are agricultural sectors in southern Brazil. In order to find out the relationship between both factors the independent variable, the destructive resource exploitation of the Amazon, and the dependent variable, the impact on Brazil's gross domestic product, were analyzed against each other. Through a case study analysis, it will be determined if the destruction of the Amazon forest for resource exploitation is more likely to have a negative long-term impact on Brazilian economy than are other agricultural sectors in southern Brazil, as an attempt to prove the hypothesis to be correct. Future research should be done to find the accuracy of the various statistics.

# REFERENCES


Abranches, Sérgio. “The Political Economy of Frontier Expansion and Deforestation in the Amazon.” *The Economics of Deforestation in the Amazon*, doi:10.4337/9781845425517.00008.

Andersen, Lykke Eg. “Modelling the Relationship between Government Policy, Economic Growth, and Deforestation in the Brazilian Amazon.” *SSRN Electronic Journal*, 1998, doi:10.2139/ssrn.54986.

Bajpai, Prableen. “Emerging Markets: Analyzing Brazil's GDP.” *Investopedia*, Investopedia, 12 Mar. 2019, www.investopedia.com/articles/investing/102615/emerging-markets-analyzing-brazils-gdp.asp.

“Brazil Data.” *The World Bank* , The World Bank Group, 2019, data.worldbank.org/country/brazil.

Ewers, Robert M., et al. “Temporal Fluctuations in Amazonian Deforestation Rates.” *Environmental Conservation*, vol. 35, no. 04, 2008, p. 303., doi:10.1017/s0376892908005122.

Fioramonti, Lorenzo. Gross Domestic Problem : The Politics Behind the World’s Most Powerful Number. Zed Books, 2013. EBSCOhost, search.ebscohost.com/login.aspx?direct=true&AuthType=sso&db=e000xna&AN=529451&site=eds-live.

Foley, Jonathan A., et al. “Amazonia Revealed: Forest Degradation and Loss of Ecosystem Goods and Services in the Amazon Basin.” *Frontiers in Ecology and the Environment*, vol. 5, no. 1, 2007, pp. 25–32., doi:10.1890/1540-9295(2007)5[25:arfdal]2.0.co;2.

Garrett, R. D., et al. “Intensification in Agriculture-Forest Frontiers: Land Use Responses to Development and Conservation Policies in Brazil.” Global Environmental Change, vol. 53, Nov. 2018, pp. 233–243. EBSCOhost, doi:10.1016/j.gloenvcha.2018.09.011.

“Gross Domestic Product: An Economy’s All.” *International Monetary Fund*, 18 Dec. 2018, www.imf.org/external/pubs/ft/fandd/basics/gdp.htm

Johnson, Janet Buttolph, Henry T. Reynolds, and Jason D. Mycoff. Political science research methods. Cq Press, 2015, pp. 212-240.

“The World Factbook: Brazil.” *Central Intelligence Agency*, Central Intelligence Agency, 1 Feb. 2018, www.cia.gov/library/publications/the-world-factbook/geos/br.html#field-anchor-economy-industries