



THE ECONOMICS OF CATTLE RANCHING IN THE AMAZON

LAND GRABBING OR PUSHING THE AGRICULTURAL FRONTIER?



CLIMATE
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Brazil is the largest beef exporter in the world, accounting for nearly one-fifth of total global beef exports. With more than 230 million head of cattle, it has the second largest cattle herd in the world and its production is largely based on grass. Nearly 40% of the country's herd is in the nine states that form the Brazilian Amazon.¹

Numerous studies on the dynamics of deforestation document that a large part of the deforested areas in the Amazon are transformed into pastures.^{2,3} Estimates show that about 70% of deforested land in the Amazon is used for cattle ranching. As such, changing the dynamics of cattle ranching has become a critical component in the efforts to combat deforestation in the region. Donors have invested millions of dollars to develop deforestation-free meat production and in broader efforts to increase transparency in the supply chain.⁴

One key feature of the Amazon that might influence the dynamics of cattle ranching and deforestation is the distribution of land rights in the region. While within the Amazon about 60% of its land is classified as public land, this number drops to 12% in the rest of the country. These public lands have been the target of intense deforestation and part of this area has already been illegally registered as “private property” in the Rural Environmental Registry (*Cadastro Ambiental Rural* - CAR), making it clear that these lands are vulnerable to land grabbing and speculation.^{5,6} **Understanding the role of the distribution of land rights in the dynamics of cattle ranching in the Amazon is tantamount to help design policies effective in decoupling beef production and deforestation in the region, a key element to combat deforestation in the Amazon and promote the growth of the region's rural economy.**⁷

In this report, researchers from Climate Policy Initiative/Pontifical Catholic University of Rio de Janeiro (CPI/PUC-Rio) dig deeper into the link between cattle ranching and deforestation in the Amazon to investigate the economic dynamics behind it. They use relatively unexplored

1 Eisenhammer, Stephen. *One Brazilian farmer tried - and failed - to ranch more responsibly in the Amazon*. Reuters, 2020. reut.rs/3zIBWqa.

2 Barona, Elizabeth, Navin Ramankutty, Glenn Hyman, and Oliver Coomes. “The role of pasture and soybean in deforestation of the Brazilian Amazon”. *Environmental Research Letters* 5, no. 2 (2010). bit.ly/3kEbcmy.

3 Tyukavina, Alexandra, et al. “Types and rates of forest disturbance in Brazilian Legal Amazon”. *Science advances* 3, n° 4 (2017): 2000-2013. bit.ly/2XHFGuS.

4 Donors have invested over US\$ 163 million in Brazil in strategies directed at Upstream Markets & Value Chains, New Finance Mechanisms, and Commercial Agriculture (see bit.ly/3IZqmSG).

5 Alencar, Ane, Paulo Moutinho, Vera Arruda, and Divino Silvério. *Amazônia em chamas: o fogo e o desmatamento em 2019 e o que vem em 2020*. IPAM, 2020. bit.ly/3mdQn11.

6 Azevedo-Ramos, Claudia, et. al. “Lawless land in no man's land: The undesignated public forests in the Brazilian Amazon”. *Land Use Policy* 99 (2020). bit.ly/3zAeoDP.

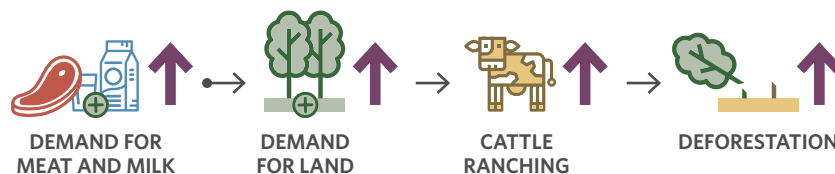
7 Barreto, Paulo and Daniel Silva da Silva. *Como desenvolver a economia rural sem desmatar a Amazônia?* Imazon, 2013. bit.ly/3okbl1P.

data on land prices to understand if the relationship between cattle ranching and deforestation in the Amazon is driven mainly by increases in the demand for food or from increases in the supply of land caused by land grabbing. **Ultimately, this work sets the stage for policymakers to better analyze and understand if the current set of policies in place address the root causes of deforestation associated with cattle ranching.**

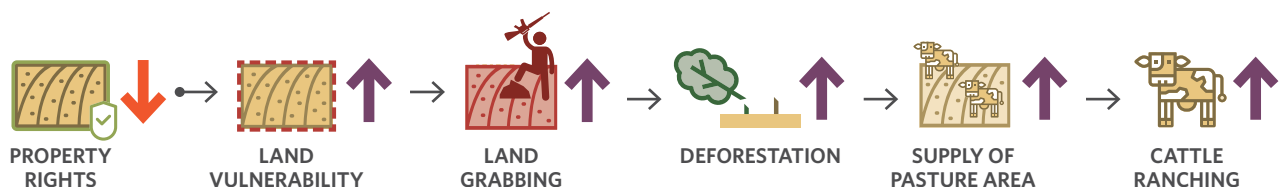
DYNAMICS BETWEEN DEFORESTATION, CATTLE, AND THE LAND MARKET

Understanding the economic process behind the relationship between cattle ranching and deforestation is fundamental to understanding the economy of cattle ranching and designing effective public policies to dissociate these processes in the Amazon. For example, if this relationship is primarily driven by the expansion of the demand for meat, public policies focused on increasing the productivity of cattle ranching may be sufficient to reduce the pressure that it exerts on deforestation. However, if this relationship is predominantly derived from land grabbing, these policies alone would be insufficient and policies to improve land security will be essential to break the connection between cattle ranching and deforestation.

On the one hand, the increased demand for meat and milk stimulates the expansion of cattle ranching and culminates in an increase in the demand for land for these activities stimulating deforestation (Figure 1a):

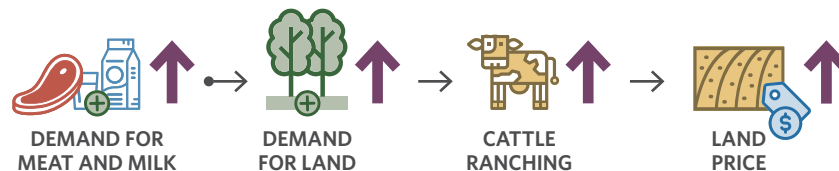


On the other hand, in a context of fragile property rights, forests are deforested for illegal occupation in a process that increases the supply of pasture areas and stimulates extensive cattle ranching (Figure 1b):

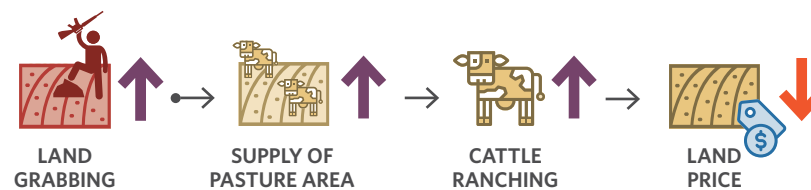


Disentangling the relationship between cattle ranching and the dynamics of land prices allows us to identify the predominant economic process behind the association between cattle ranching and deforestation. This work seeks to identify the different causal links between deforestation and cattle ranching and how those links imply different dynamics for the land market.

If land prices increase along with the growth of cattle, then deforestation is driven by a greater demand for cattle (Figure 2a):



If land prices decrease with the growth of cattle, then deforestation is the result of land grabbing (Figure 2b):



Using data on land prices, researchers examine the interactions both in and outside the Amazon.⁸ Inside the Amazon, an increase in cattle ranching is associated with a reduction in land prices (as exemplified in Figure 2b). Outside of the Amazon, an opposite relation occurs – regions where land prices increased also experienced increased cattle production (Figure 2a). In the Amazon, 10% increase in cattle herd is associated with a similar reduction of around 10% in land prices; while outside the Amazon, a 10% increase in cattle herd is associated with a 5% increase in land prices.

Previous studies from CPI/PUC-Rio estimated a low potential for productivity gains for cattle ranchers in the Amazon using existing technologies and practices, reflecting the predominance of an extensive cattle business model characterized by raising animals in large areas and grazing, with low use of inputs and low productivity throughout the region.⁹ This result is reinforced by estimating the relationship between cattle and pasture degradation levels. Within the Amazon, the expansion of cattle herd is associated with increasing levels of degradation of pastures, reflecting a business model with low levels of investment stimulated by land grabbing and land speculation. Meanwhile, outside the Amazon, the expansion of cattle ranching is not associated with increased levels of pasture degradation.

⁸ Researchers use land use data from MapBiomas, pasture quality data from Lapig/MapBiomas, cattle herd from PPM/IBGE, and land prices data from IHS Markit.

⁹ Lima Filho, Francisco Luis, Arthur Bragança, and Juliano Assunção. *Increasing Cattle Productivity in the Amazon Requires New Technologies*. Rio de Janeiro: Climate Policy Initiative, 2021. bit.ly/3iyYOQR.

These results suggest that the causes of deforestation within the Amazon appear to be different from the rest of Brazil. The relationship between cattle ranching and land prices suggests that, outside the Amazon, cattle growth primarily reflects an increase in demand for meat and milk. This increases the demand for land, which also increases land prices. In the Amazon, however, the expansion of cattle ranching seems to be strongly related to land grabbing. This land grabbing process increases the supply of land, which reduces its price, as well as destines its use for extensive cattle ranching.

CONCLUSION

This study provides evidence that land grabbing explains a substantial part of the relationship between cattle ranching and deforestation in the Amazon. In this sense, designing public policies that address land grabbing is an important action for stopping deforestation and fostering a more sustainable business model for cattle ranching in the region. Reducing the likelihood that land grabbers obtain land rights over invaded lands is critical to ensuring a greater effectiveness of policies to combat deforestation in the Amazon.

NOTES

This study estimated the correlations between the evolution of land prices, deforestation, and cattle ranching, comparing inside and outside the Amazon biome. For this purpose, data on land use (MapBiomas), cattle production (Municipal Livestock Survey/IBGE), pasture quality data (Lapig) and information on land purchase and sale prices obtained from IHS Markit were used. Deforestation was measured as a percentage of the deforested region. Herd evolution was calculated as the evolution of the number of head of cattle per area in the region. Evolution of degraded pasture was calculated as the evolution of the percentage of pasture that showed some level of degradation. Land prices were calculated in log.

The regressions also had additional controls to eliminate possible biases, including: proportion of the rural population in each region from the 2000 Population Census; soil productivity for alternative crops (soybean and corn), data from FAO/GAEZ; and, human development index, from IPEA data.

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