Investigating environmental loopholes in the Amazon beef supply chain

By Stella Carneiro

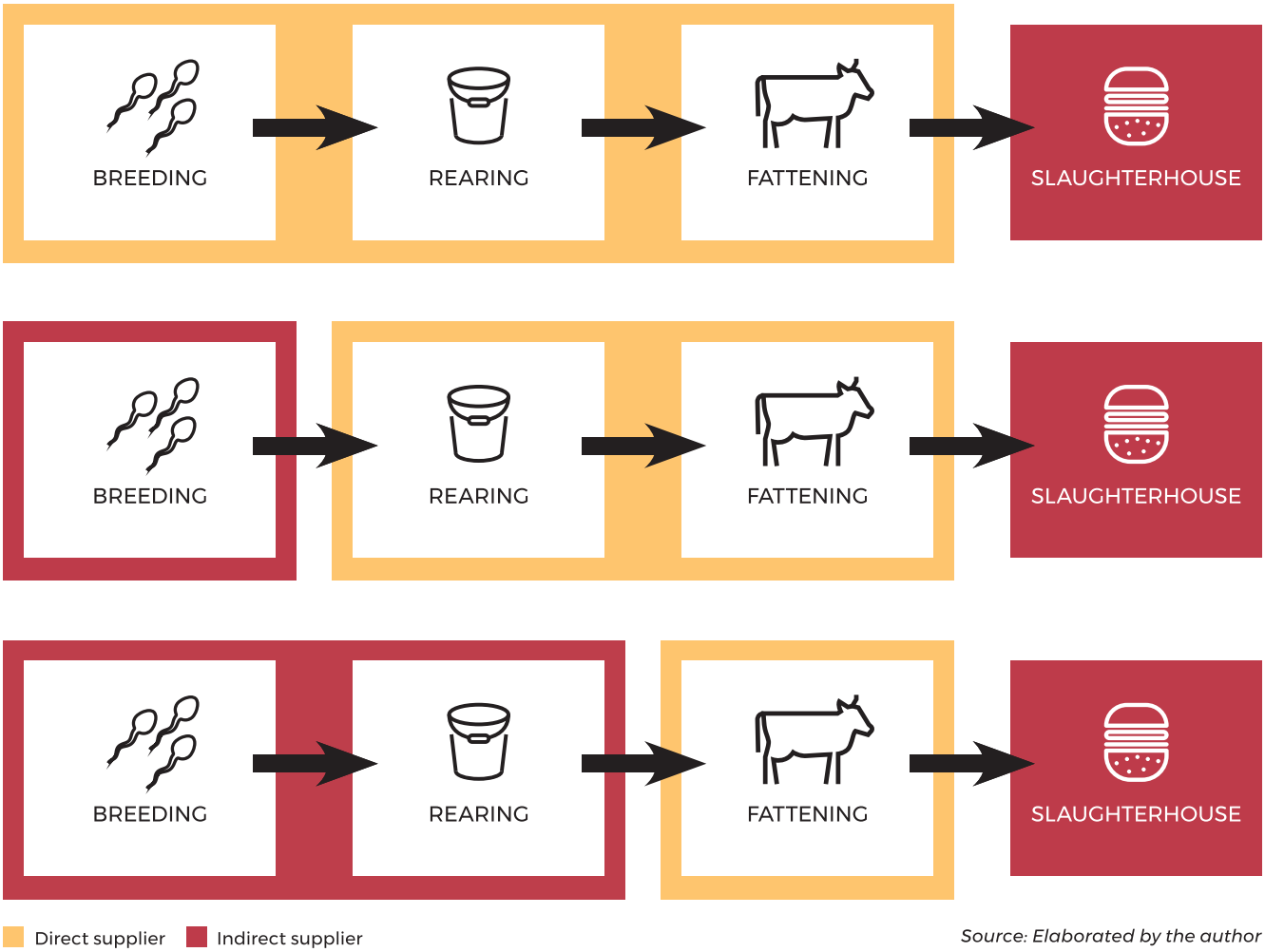
Cattle grazing is the number one activity in newly deforested areas, accounting for 45% of all tree-cover loss associated with agriculture between 2001 and 2015 (Goldman et al., 2020). Much of this deforestation occurred in Brazil (21.8 million hectares: 48% of the total), where pasture expansion into the Amazon's forests is made easy by the region's weak property rights and loose environmental law enforcement. Some argue these features helped Brazil consolidate its position as the largest beef exporter in the world, despite growing backlash from consumer groups and non-governmental organisations (Bowman et al., 2012).

Although the legal limits of deforestation on private properties have been defined since 1965, the tightening of legislation for environmental crimes is relatively recent. Only in 2008 were embargoes of illegally deforested areas made mandatory and fines for whoever acquires animal or vegetable products from embargoed properties established. But some have suggested this regulation has loopholes that can curb its effectiveness (Alix-Garcia and Gibbs, 2017; Gibbs et al., 2016). I investigate this further using a dataset of over 700,000 animal transit permits from the Amazon state of Pará, which lists cattle transactions made between 2014 and 2020.

The cattle supply chain can include multiple intermediaries throughout the stages of animal raising and fattening. When meatpackers purchase cattle from a ranch, they background check only its direct supplier, ignoring if the direct supplier bought cattle from other ranches — so-called 'indirect suppliers' — as described in Figure 1. Animals are bought and sold between multiple ranches in remote areas during their life span before slaughter. The size and complexity of this indirect market hinder law enforcement efforts at this stage in the supply chain.

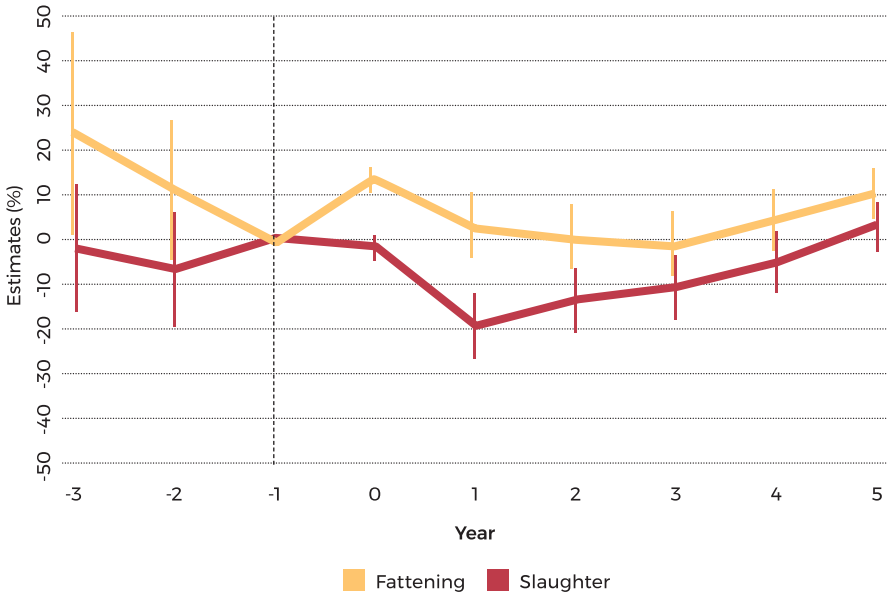
This setup allows the 'washing' of animals grazed in embargoed areas, shifting them from illegal pasture to legal pasture before they are sold to slaughterhouses. Even though anyone who purchases deforestation-linked products is subject to fines, the largest meat processing companies are under greater scrutiny because they control most of the slaughtering capacity in the state. The four largest meat producers in the state buy an average of 30% of the total livestock produced there over the course of a year, according to the data I collected.

Figure 1: Stages of the cattle supply chain: animal raising to slaughtering



Source: Elaborated by the author

Figure 2: Effect of the deforestation trade ban on the sales of cattle for fattening and slaughter in embargoed areas



Source: Animal transit permits from Adepará; embargoed property lists from IBAMA and Semas/PA. Notes: The vertical axis plots the estimated coefficients and their 95% confidence intervals of yearly dummies from an event study regression. The dependent variable is the number of animals sold by ranch.

Matching the animal transit data with the embargoed areas list in a differences-in-differences setting, I find that ranches in embargoed areas continue with their activities during the embargo period (which lasts five years), but switch their roles as direct suppliers to indirect ones. Figure 2 illustrates the effect of the embargoes during their term. Controlling for the buyer–seller travelled distance and seller fixed effect, the impact of the ban is the highest during the first year — when an embargoed ranch sells on average 20% fewer animals for slaughter than in the year before the ban. The trend is reversed in the following years until it becomes positive again in the fifth year, when the embargo expires.

My database consists of a sample of 40,436 ranches, 3,637 of which are in embargoed areas, illegally trading cattle in Pará. But this number corresponds to only a fraction of the deforestation taking place in the state. Although it can be punished, past forestation is hard to detect because once an area has been cleared it becomes a small part of the vast expanse of illegally cleared land in Brazil (Assunção, Gandour and Rocha, 2013).

My results confirm that loopholes in environmental policy have enabled beef farmers and producers to continue to profit from the use of deforested land. They highlight the need to restructure existing policy to increase transparency along the beef supply chain. Policies that tackle only the edges of this complex network end up ignoring the greater share of the market that continues to benefit from the conversion of forest to pasture area. The transition to a sustainable beef industry in the Amazon requires animal-tracing technology, integrated farming and better use of pastures for more intensified ranching that will rely less on continuous area expansion to meet future livestock demand. ◀

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About the author

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