

Brazil's rate of deforestation went down dramatically over the last ten years. It's not completely clear why that's happened. The trend now seems to be reversing (or at least encountering an upward blip). But it's not clear why that's happening either. I wish I had a clear explanation to give you. A big part of the story seems to involve national policy shifts, but there are some complications that don't seem to have obvious explanations.

These developments are hugely important. The Amazon, most of which is in Brazil, is one of the world's great centers of biodiversity. There are places where you can as many kinds of butterflies in a day as live in all of the eastern United States. And the Amazon is only an enormous repository of carbon. The destruction of the Amazon is bad news for the whole planet.

Let's start with the good news part of the story, the decade-long decrease in deforestation. What was behind that? One possible reason, advanced by ecologist Philip Fearnside in an [interview on Yale 360](#), is economic. Commodity prices went down, and so did the value of Brazilian currency, making food exports unprofitable. So people stopped cutting down rain forest. There could be something to that, but there is also reason to be skeptical. That's because Brazil was an exception to the trend, both in other Amazonian countries and globally, which was in the opposite direction of increasing deforestation. (See [here](#) and [here](#) for the evidence.) Both economic circumstances and the drivers of deforestation vary from place to place, but it's not obvious why the Brazil - living in the same world economy as Peru, Bolivia, and other countries with tropical forest - should have responded to global economic changes with a big dip in deforestation while the deforestation in the other countries grew sharply. Also, deforestation decreases in [different Brazilian states](#) weren't lockstep, which also suggests the possibility that uniform national forces applying to the whole country may not be the complete explanation. Finally, Brazilian beef and soybean production were rising during much of the same time when deforestation was falling. (See Figure 3 [here](#))

The other plausible cause involves Brazil's forest policy. Brazil adopted a number of anti-deforestation measures, including increased enforcement. In a particularly interesting move, the government used its controls of state banks to deter agriculture and logging use of forests. These policies are being carefully studied in other countries with deforestation problems. It's frustrating that we don't have better empirical analysis of the role of policy versus economics in driving the declining trend. Whatever the reasons, however, the downward trend was very good news.

Unfortunately, as Dr. Fearnside points out, there are indications that the trend is reversing. Satellite evidence suggests that deforestation has doubled in the past year. The government

has [confirmed](#) this shift. The reasons for this change are also unclear. Fearnside attributes some of the change to a shift in exchange rates favoring exporters. (I'm not sure about that as a cause - Brazilian beef exports are actually [down](#) this year, and so are [soy exports](#).) But Fearnside also lays considerable blame on policy changes by the current government that have weakened forest protections - in particular an amnesty that gives violators reasons to hope that there will be future episodes of forgiveness of their current sins. There have been other changes that have also lowered protections. An additional reason may be that the Brazilian economy as a whole has been [faltering](#), which may have made profits from deforestation more appealing compared to the alternatives.

There's an oddity about where deforestation is increasing. In 2013, deforestation in Pará was about as great as in Rondônia and Mato Grosso combined. (see [this chart](#)). But in 2014, each of those states had more deforestation than Pará. (see [here](#)) There seem to be two possible explanations. One is that the drivers of deforestation in those states are much different, so countrywide economic or legal changes have very different effects in each state. Mato Grosso, for example, is a far bigger [soybean producer](#) than the other two states. The other is that there are differences in policy or enforcement (either by the states themselves or by the local federal authorities) that are driving the outcomes. There are [some indications](#) that state governments and independent prosecutors made a difference, along with national policy, in the earlier decrease in deforestation, so maybe changes at those levels are part of the current increase.

The most obvious explanation for the overall trends is the change in national policy - first to sharply restrict deforestation, then to loosen the restrictions a bit. It seems very likely that this obvious explanation is a big part of the story. But the story is complicated by the economic changes that were happening in the background and by the differences in the way the trends have played out at the state level. So there are some empirical puzzles waiting to be resolved.

Whatever the causes for this year's reversal in trends, we can only hope that Brazil gets back on track in its efforts to control deforestation.

