The effect of Indonesia's moratorium on deforestation clusters

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Introduction

Tropical deforestation accounts for roughly 10% of annual carbon emissions, more than the combined emissions from road, rail, air, and marine transportation, worldwide. Any viable effort to mitigate climate change will have to address tropical deforestation. The external costs of deforestation are not incorporated into the private decision to convert forests for agriculture, suggesting that public intervention might be necessary to curb the rate of clearing. An array of alternatives have been specified to reduce new clearing activity, ranging from portecting selected areas to a full moratorium on new clearing activity. To date, however, the efficacy of these measures has been minimal.
Deforestation in Indonesia was responsible for 25% of total emissions from tropical deforestation between 2000 and 2005. The proportion is projected to be higher for 2005 through 2010. The
Any viable response to climate change must address the deforestation rate, which is almost certainly above the social optimum. Carbon sequestration is just one of many environmental services provided by standing forests that are not incorporated into the private cost of clearing. Other environmental services include nurturing biodiversity and habitats for ranging mammals. These services are functions of the spatial distribution of forests, rather than just the level.

Background

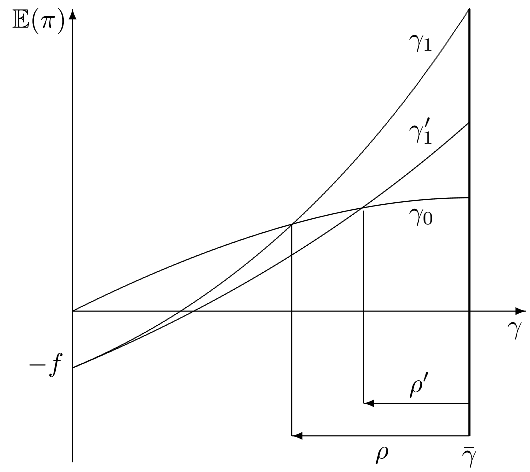
In May 2010, Indonesia announced a moratorium on new deforestation, with an array of caveats. Industry has used the uncertainty in land use maps to find loopholes in the moratorium and the rate of deforestation has fallen only slightly [insert citation, time series graph]. Norway offered US$1 billion in aid contingent on a demonstrated reduction in the deforestation rate.

Model

Let $R_t = R_{1t} + R_{2t}$ be the amount of total amount of land available to a single agent, split between equal-sized plots $i \in \{1, 2\}$.

Figure (1) illustrates the effect of reducing the expected returns of new clusters on the composition of incremental deforestation. The value $\bar{\gamma}$ is a fixed level of production targeted by the firm. The expected profit from land that is close to previously cleared land is given by γ_0. The marginal profit is diminishing, perhaps because of increasing marginal costs or decreasing marginal returns for (marginal profit should be zero at $\hat{\gamma}$?).

Figure 1: Illustration



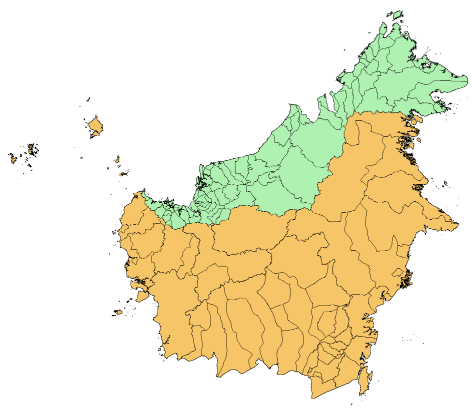


Figure 2: Sample area, Malaysia in green and Indonesia in orange. Borders indicate subprovinces.

Empirical strategy

Results

Discussion

Policy acts on people with incentives, not on inanimate objects. You cannot simply legislate a reduction of deforestation. The paper indicates that there is some *leakage* associated with local (not just in space like a protected area, but in scope of policy) conservation policy. This paper suggests that measures should be taken to dampen the incentives of both plots, reduce the incentive to clear at all. Maybe that would push people to the black market, though, just as deforestation was pushed to new areas in this study. The scope is not wide enough. This also offers an argument for an overhead and comprehensive monitoring system.

References

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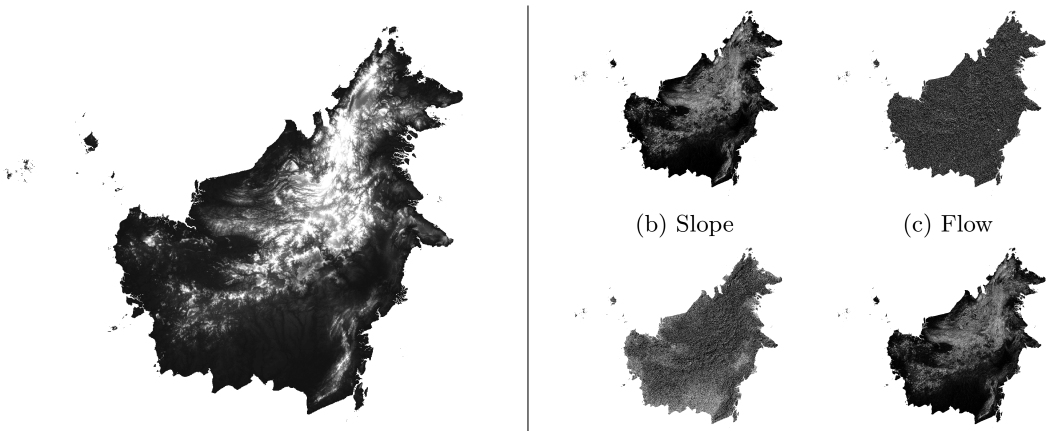
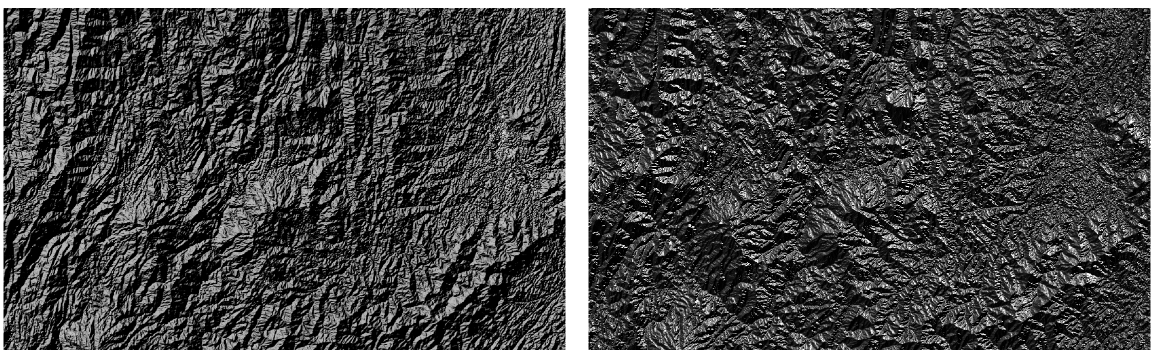


(a) Elevation (b) Slope (c) Flow (d) Aspect (e) Drop

Figure 3: Map of the digital elevation model (left) with derived data sets (right) indicating slope, hydrology, and terrain roughness, 90m resolution.



(a) Hillshade (b) Flow direction

Figure 4: Detailed images of two derived data sets for the same area.

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Table 1: Proportion of deforestation from new clusters

	(1)	(2)	(3)
(Intercept)	0.04552***	0.06408***	0.06506***
	(0.00192)	(0.00536)	(0.00746)
cntry	0.03790***	0.03790***	0.02947***
	(0.00271)	(0.00263)	(0.01055)
post	−0.01117***	0.00047	−0.01334
	(0.00346)	(0.00460)	(0.04075)
cntry:post	−0.04021***	−0.04021***	0.11524**
	(0.00489)	(0.00475)	(0.05763)
pd		−0.00530***	−0.00558***
		(0.00144)	(0.00207)
pd:cntry			0.00241
			(0.00292)
pd:post			0.00253
			(0.00732)
pd:cntry:post			−0.02822***
			(0.01035)
R^2	0.64452	0.66756	0.68762
Adj. R^2	0.63913	0.66081	0.67635
Num. obs.	202	202	202

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$

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(a) New cluster deforestation

(b) Alerts of deforestation

Figure 5: Detailed images of two derived data sets for the same area.