Simulations for MT and Brazilian Legal Amazon

September 2, 2025

Data

Variable	Notation	Date	Source	Completed
Productivity	A_n	2022	GAEZ soy productivity	×
Agribusiness	S_n	2002	MapBiomes Soy Coverage	×
Legal Status	L_n	2025	CNFP	×
Fixed Cost	F_n	-		
Deforestation	D_n	2002	MapBiomes (pasture+agriculture)	×
Wage	w_n			
Demand Transition	δ_n	-		
Transportation Costs	τ_n	-		
Loss of productivity	α	-		
Interest rate	β	-		
Probability	π	-		
Farmers' Bargaining Power	w_1	-		

New stuff

- Data resolution: 0.01 by 0.01, approx. 1km by 1km. Each cell has approx $1km^2$.

Table: Time are per period iteration in my computer (32Gb of Ram). Acropolis is less than 4 times faster.

Exercise	Time	N cells
MT	$\sim$ 9s	$\sim$ 1MM
Legal Amazon	$\sim$ 24s	$\sim$ 7MM

Sanity Check (1/3): does soy productivity predict soy coverage?

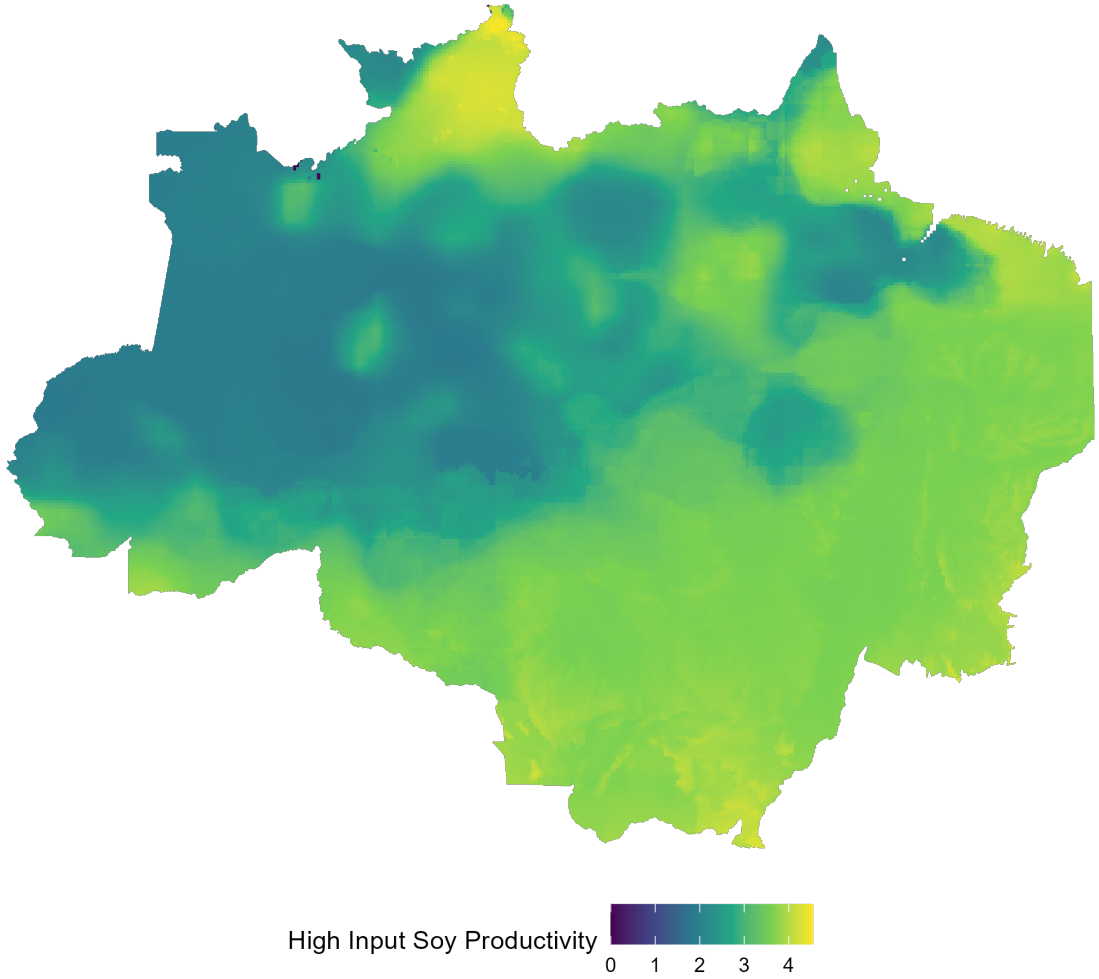


Figure: Soy productivity. Source: GAEZ

Sanity Check: does soy productivity predict soy coverage? (2/3)

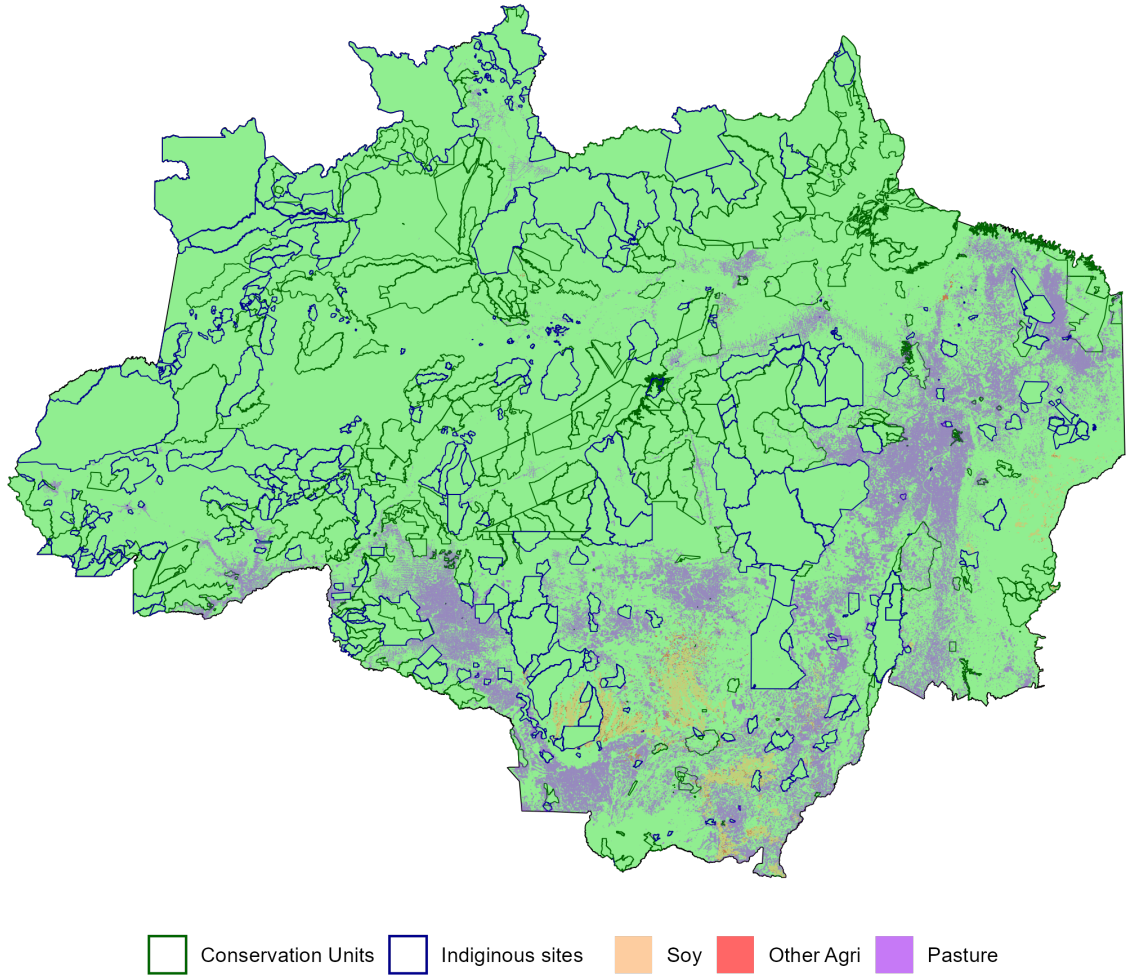


Figure: Land use. Source: MapBiomes. Look how soy tends to concentrate in high productivity areas.

Sanity Check (3/3): does soy productivity predict soy coverage?

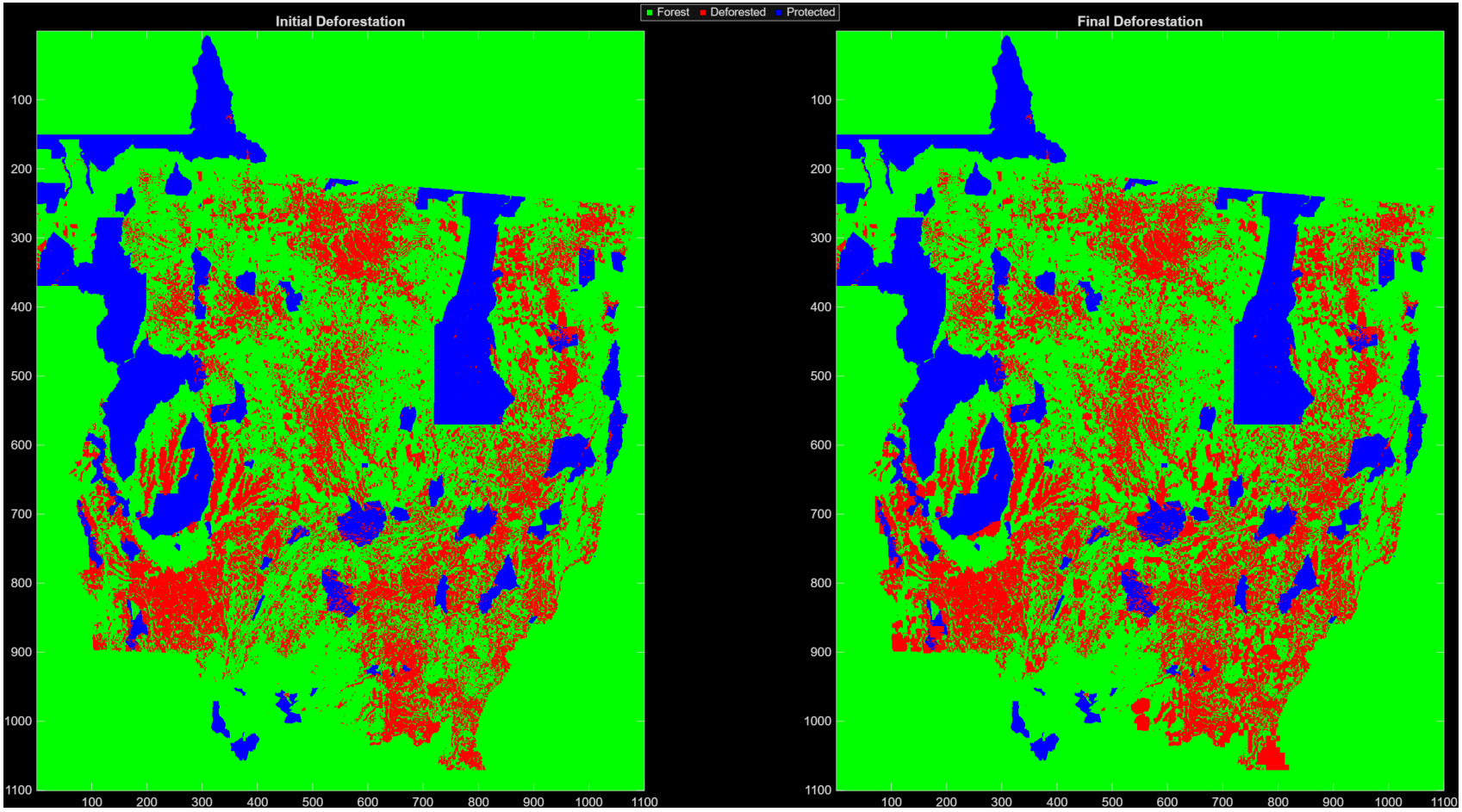
$$\text{soy\_coverage}_i = \beta_0 + \beta_1 \text{soy\_productivity}_i$$

i is a cell, coverage $\in [0, 100](\%)$, productivity $\in [0, 4]$.

Model:	(Whole Legal Amazon)	(In the 3dg Buffer)
Variables		
Constant	-0.8751***	-2.2876***
	(0.0088)	(0.0288)
soy_productivity	0.4977***	0.9892***
	(0.0028)	(0.0083)
Fit statistics		
Observations	6,556,492	3,345,730
R^2	0.005	0.004
Adjusted R^2	0.005	0.004

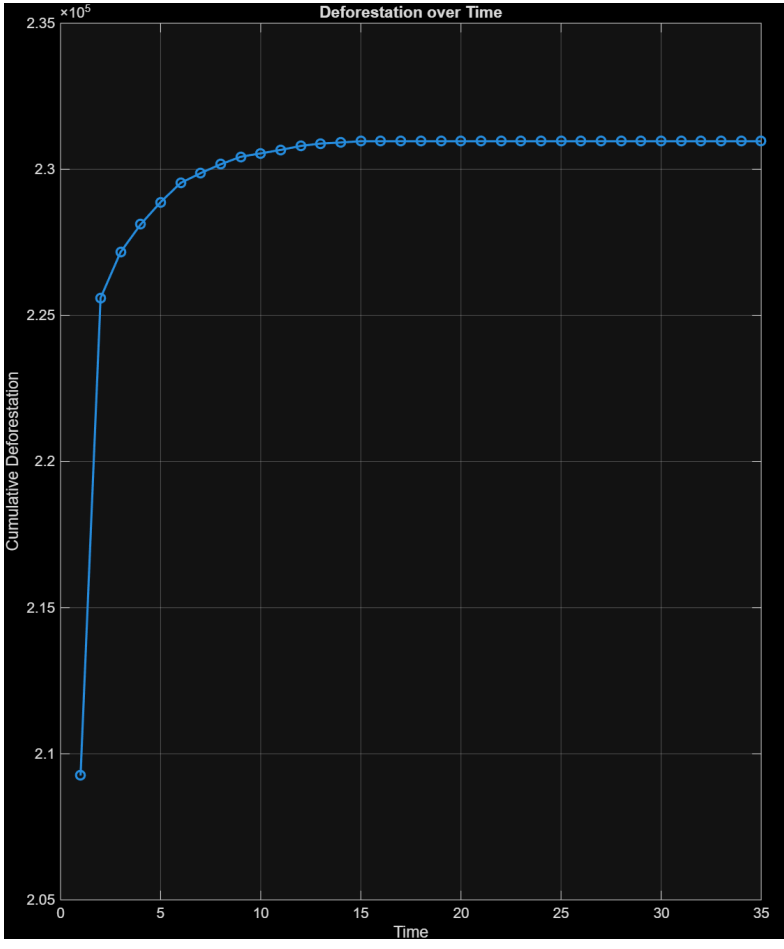
IID standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

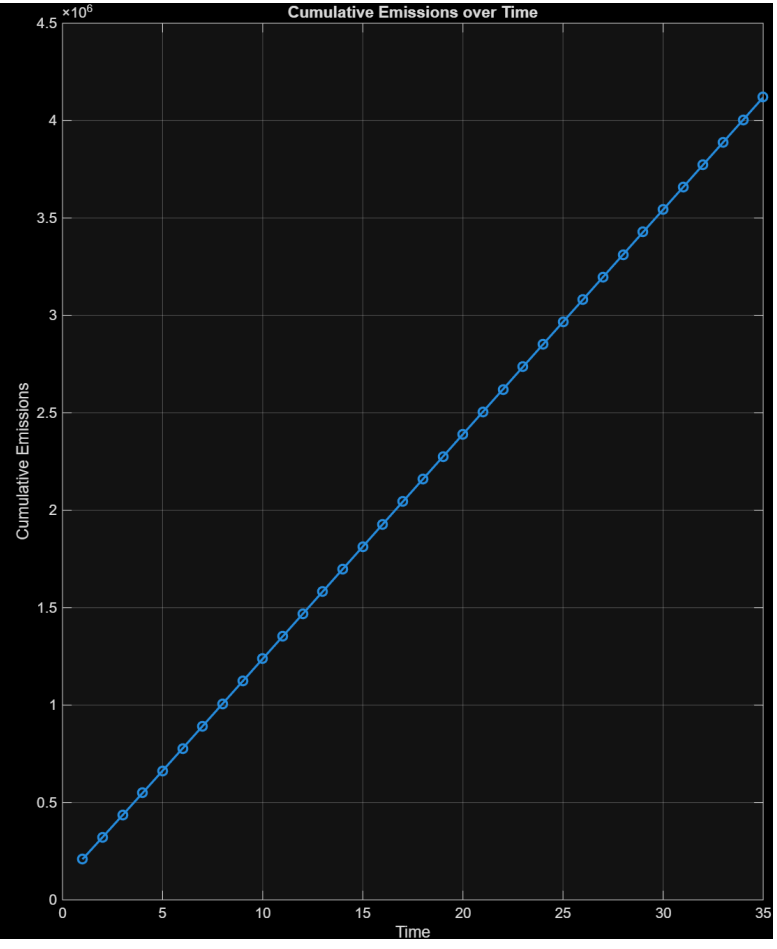
Exercise MT (1/2)



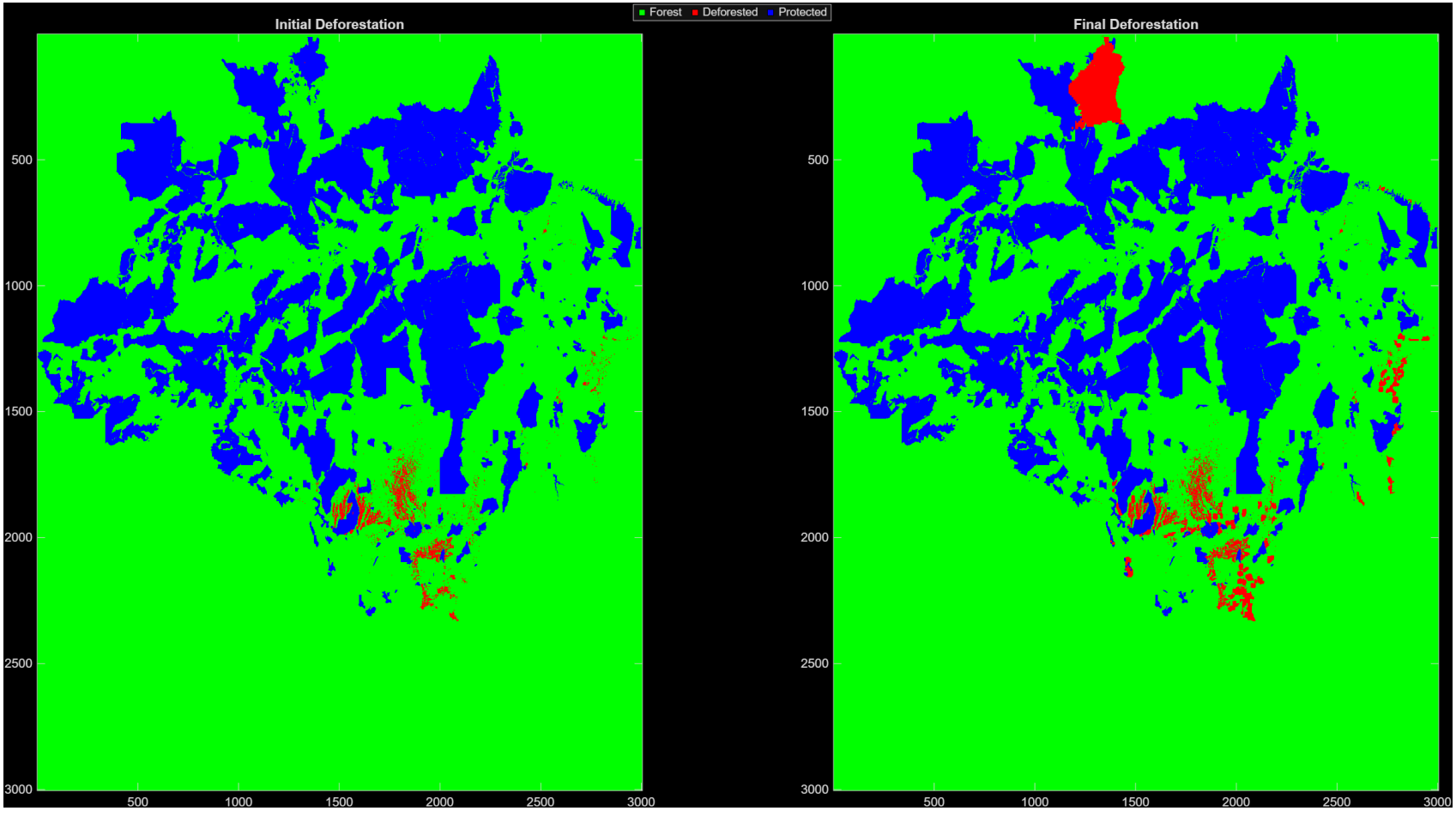
- Agribusiness here is agri and pasture on MapBiomes (needs to be changed).

Exercise MT (2/2)





Exercise Legal Amazon (1/2)



Exercise Legal Amazon (2/2)