

Impacts of introducing financial mechanisms complementary to climate policies to attract low-carbon investments and long-term economic effects in Brazil

Stock Flow

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Introduction

The Paris Agreement and the average temperature below 2°C

Brazilian NDC - net zero GHG emissions from 2050

HOW?

With command-and-control policies and market instruments that increase the financial flow towards low-carbon investments

The problem

Carbon pricing is necessary, but insufficient economic and political limitations

The question

Can innovative financial mechanisms (IFM) be



Preliminary simulations in excel to estimate the potential



of different IFM to leverage investments

III Method Calibration Better representation of State of the art and limitations of carbon pricing the finance sector and Modeling plan introduction of IFM Consistent approach Literature SVMA and innovative financial mechanisms¹²³ review **IMACLIM-BR** model simulations Risks to low-carbon investments in developing countries

III.1 The models

KLEM-BR and IMACLIM-BR are a hybrid computable general equilibrium model

KLEM-BR^a

- General equilibrium recursive growth model [6].
- Two sectors: energy and composite (all other economic activities)

IMACLIM-BR^a

- General equilibrium recursive growth model [6]
- Economy-wide multisectoral model

III.2 Better representing the financial flow

IMACLIN-BR and KLEM-BR ignore capital markets, implicitly proposing a perfect market that allocates available capital, resulting from the accumulation of savings, in such a way as to equalise the profitability of investments in each production sector.

	Households	Productive sectors	Commercial Banks	Government	Central Bank	Rest of the World	Total
Deposits	+D		¬D				0
Loans		−Li	+L				0
Advances			¬A		+A		0
Government bonds	+Bh			−B	+Bcb	+Bw	0
Equities	+E	¬Ei					0
Capital		+Ki					+K

The calibration of KLEM BR and IMACLIM BR relies on inputoutput tables (IOTs) representing the annual economic flows of an economy and ensuring a balance between the uses and resources of that economy.

IV. Results



Net worth	+Vh	+Vi	+Vb	−B	+Vcb	+Vw	+K	
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Table 1:Balance sheet matrix4

The Stock Flow Consistent methodology has been introduced as a way to avoid the incompleteness that characterizes most standard models in terms of financial flows and stocks.

Elasticity sensibility in 2050

Macroeconomic Variables	Low σ_s	Hihg σ_{s}	Low σ_{WU}	Hihg σ_{WU}	Low σ_{KL}	High σ_{KL}	Low σ_{KLE}	High σ_{KLE}	Low $\sigma_{\rm Y}$	High σ_{Y}	Low σ_X	High σ_{χ}
Real GDP	2%	-1%	0%	0%	0%	0%	-6%	2%	0%	0%	1%	-1%
Unemployment rate (Pts)	-0,13	0,05	-0,04	0,02	-0,04	0,02	0,25	-0,09	0,00	0,00	-0,09	0,04

Table 2: Elasticity sensibility

V. Next steps

Attach the SFC matrix in the KLEM-BR

Estimate the impact of the IFM to attract investiment

Run the model with and without climate policy and analyse and compare the results

—Energy output	Non-energy consumption	—Energy consumption
	—Volume of investment	—Capital stock
-Capital stock (perpetual inventory)	-Labour productivity in non-E sector	—REER index
—Purchasing power of wage	—Non-E GDP index	-Non-E GDP share

Figure 1: Macroeconomic Variables

- GHG emissions trajectory compatible with zero net emissions in 2050 \succ Radical reduction of deforestation from 2025
- Carbon Pricing, on part of GHG emissions, starting in 2021

Analyse the impacts of macroeconomic indicators

Do all the same procedure in the IMACLIM-BR

VI. Expected results

To understand the extent to which the IFM facilitate the promotion of a set of investments needed to place the Brazilian economy on a low-carbon trajectory in line with the objectives updated by the new Brazilian NDC.

Notes: ^b IMACLIM and KLEM are developed by the CIRED.

References:

[3] La Rovere, E., et al., 2018. [1] Stern, N, Stiglitz, JE., 2017. Report Overcoming the financial barrier to a low High-Level Commission on emission development strategy in Brazil Carbon Pricing Prices. Carbon E.L. International Economics 155 (2018) Leadership Coalition [2] Hourcade, J.C., Pottier, A., Espagne, 61–68 E., 2018. Social value of mitigation [4] Couix, Q (2022) Modeling the activities and forms of carbon pricing. Financial Sector in Imaclim International Economics on ScienceDirect" International Economics 155 (2018) 8-18





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