Impact of monetary policy in income distribution: Evidence from Brazil.

YSI Latin America Convening

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Online repository: `https://github.com/aishameriane/YSI2018`

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Impact of monetary policy in income distribution

Outline

- **Introduction:** monetary policy x income distribution/inequality
  - Results from other studies
- Data from Brazil
- **Empirical model:** Bayesian time varying parameter autoregressive vector model with stochastic volatility (TVP-VAR with SV)
  - **Objective:** to verify if the interest rate shocks (from conventional monetary policy) affect income distribution in Brazil.
- Results and Discussion

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- Inequality as minor side effect of monetary policy changes, apart from the aggregate stabilization;
- The role of the representative agent in models evaluating monetary policy;
  - *What could go wrong?*

*"Aggregation would not matter if we could be sure that the **marginal propensities to spend** from wealth **were the same** for creditors and debtors. (...) There are indeed reasons for expecting or at least for suspecting, just that. **The population is not distributed between debtors and creditors randomly**. Debtors have borrowed for good reasons, most of which indicate a high marginal propensity to spend from wealth of from current income or from any liquid resources they can command."*
[Tobin, 1982]

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Relation between monetary policy and inequality

- Theoretical channels throughout monetary policy could impact inequality have been proposed in the literature:
  - **Inflation tax**;
  - **Savings redistribution**;
  - **Unhedged interest exposure** [Auclert, 2017];
  - **Earnings heterogeneity**;
  - **Income composition**.
- The overall effect of monetary policy changes, even when considering these channels separately, remains uncertain [Amaral, 2017].

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Relation between monetary policy and inequality

- Empirically, authors use mostly data from national surveys to construct Gini Index for income (and, sometimes, for consumption and other variables).
  - [Mumtaz and Theophilopoulou, 2017] - Gini indexes for consumption, wages and income for UK (1969-2012). BVAR and TVP-VAR models (conventional and unconventional monetary policy). ***Rise in interest rates leads to rise in Gini indexes and the quantitative easing policy amplified this effect during the Great Recession.***
  - [Davtyan, 2017] - Data from top one percent of income distribution and a vector autocorrection model. ***Contractionary monetary policy decreases income inequality.***
  - **Other studies:** [Bivens, 2015], [Coibion et al., 2017] - FED expansionary policy tends to diminish inequality; for the Italian economy, [Casiraghi et al., 2017] found a negligible effect of monetary policy over inequality whilst [Guerello, 2017], using data from the Euro area, encountered a negative association between inequality and interest rates.

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Data from Brazil

- Inequality data from Brazil is scarce and the existing series only have annual data.
- The Brazil's IRS has monthly series for the Capital Income and the Labor Income.
  - We can compute a distribution measure dividing this two series to obtain the **capital-labor ratio**.

Objective

To investigate if conventional monetary policy shocks affect income distribution in Brazil, using macroeconomic data from the inflation-target period (2000-2018) in a Bayesian TVP-VAR with SV model.

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Empirical model

- **Data series**: Capital-labor ratio (K/L), per capita GDP (annual var.); IPCA (inflation index, % in 12 months); effective exchange rate (monthly var.) and 3-month treasury bill rate (interest rate, %).
- **Period**: Monthly series, from January 1996 to February, 2018. First 48 observations were used to calculate prior hyperparameters.
- **Identification of the structural shocks**: K/L has a structural behavior and is not contemporaneously affected by other shocks; inflation and GDP affect interest rate that affect exchange rate (impossible trinity).
- **Estimation scheme**: Multi-stage gibbs sampler from [Del Negro and Primiceri, 2015].
- **Impulse response calculation**: For each period, a different IRF is calculated, using the corresponding estimated coefficients and volatilities.

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Empirical model

$$y_t = Z_t \alpha_t + R_t^{1/2} \xi_t \tag{1}$$

$$\alpha_t = \alpha_{t-1} + u_t \qquad u_t \sim \mathcal{N}_p(0_p, Q) \tag{2}$$

where ξ_t follows a standard normal distribution and $R_t = B^{-1} H_t B^{-1'}$ with:

$$B_t = \begin{bmatrix} 1 & 0 & \cdots & 0 \\ \beta_{21,t} & 1 & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ \beta_{k1,t} & \beta_{k2,t} & \cdots & 1 \end{bmatrix} \quad \text{and} \quad H_t = \begin{bmatrix} h_{1t} & 0 & \cdots & 0 \\ 0 & h_{2t} & \cdots & 0 \\ \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & \cdots & h_{kt} \end{bmatrix}$$

$$\text{where} \quad ln(h_{it}) = ln(h_{it-1}) + \sigma_i \eta_{it}, \quad \eta_{it} \sim \mathcal{N}(0,1)$$

$$\text{and} \quad \beta_t = \beta_{t-1} + \upsilon_t, \quad \upsilon_t \sim \mathcal{N}(0,1)$$

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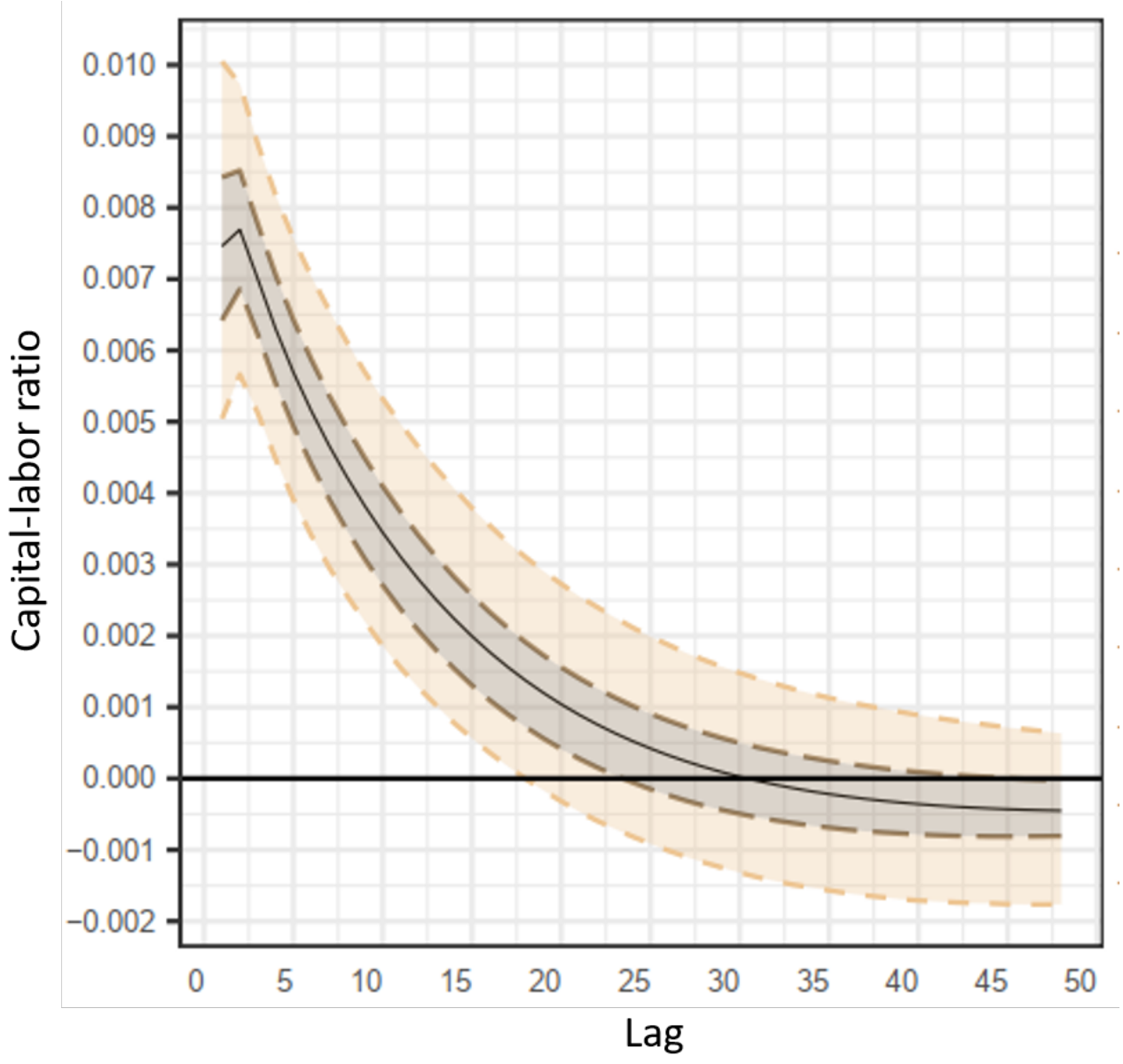
Main results



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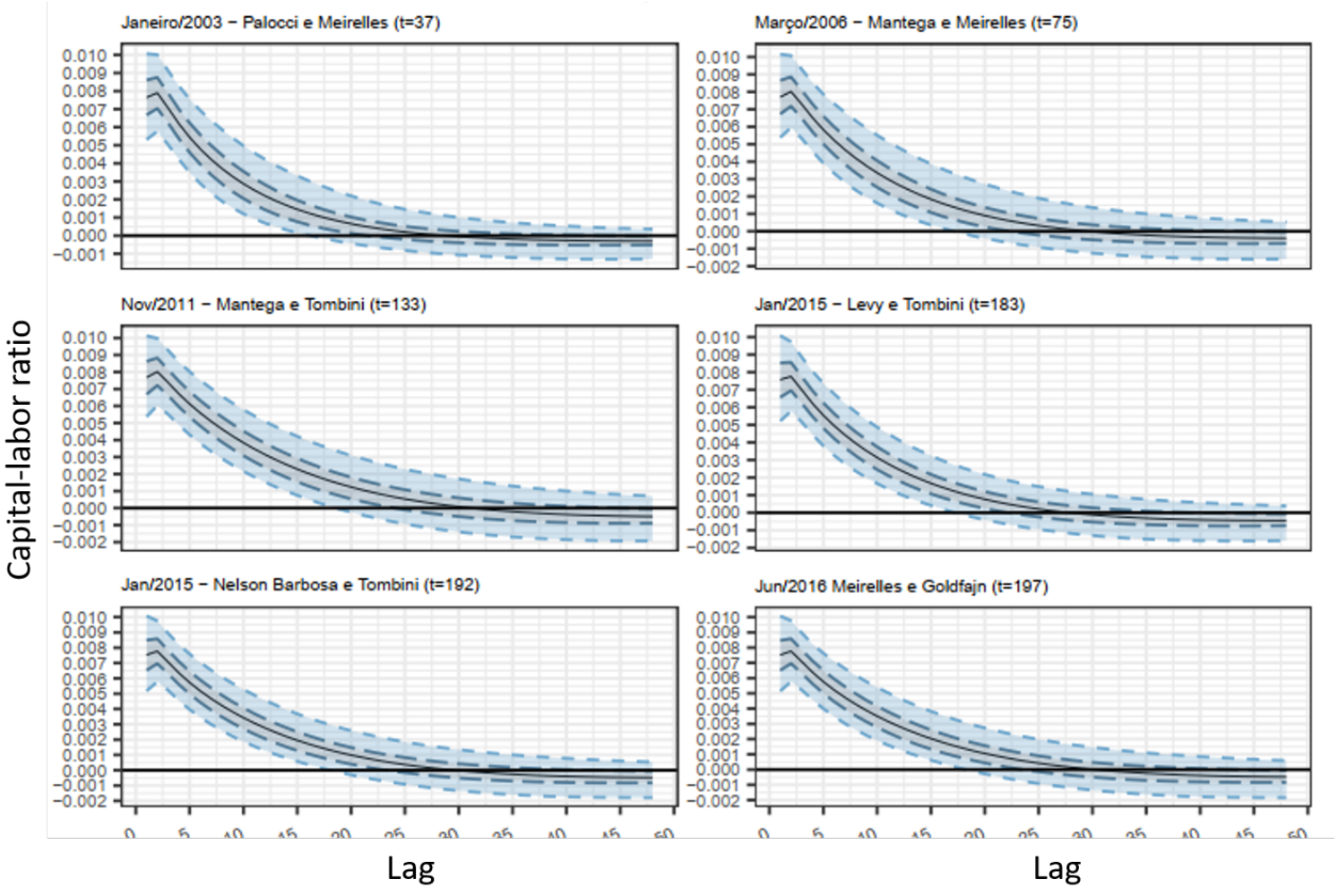

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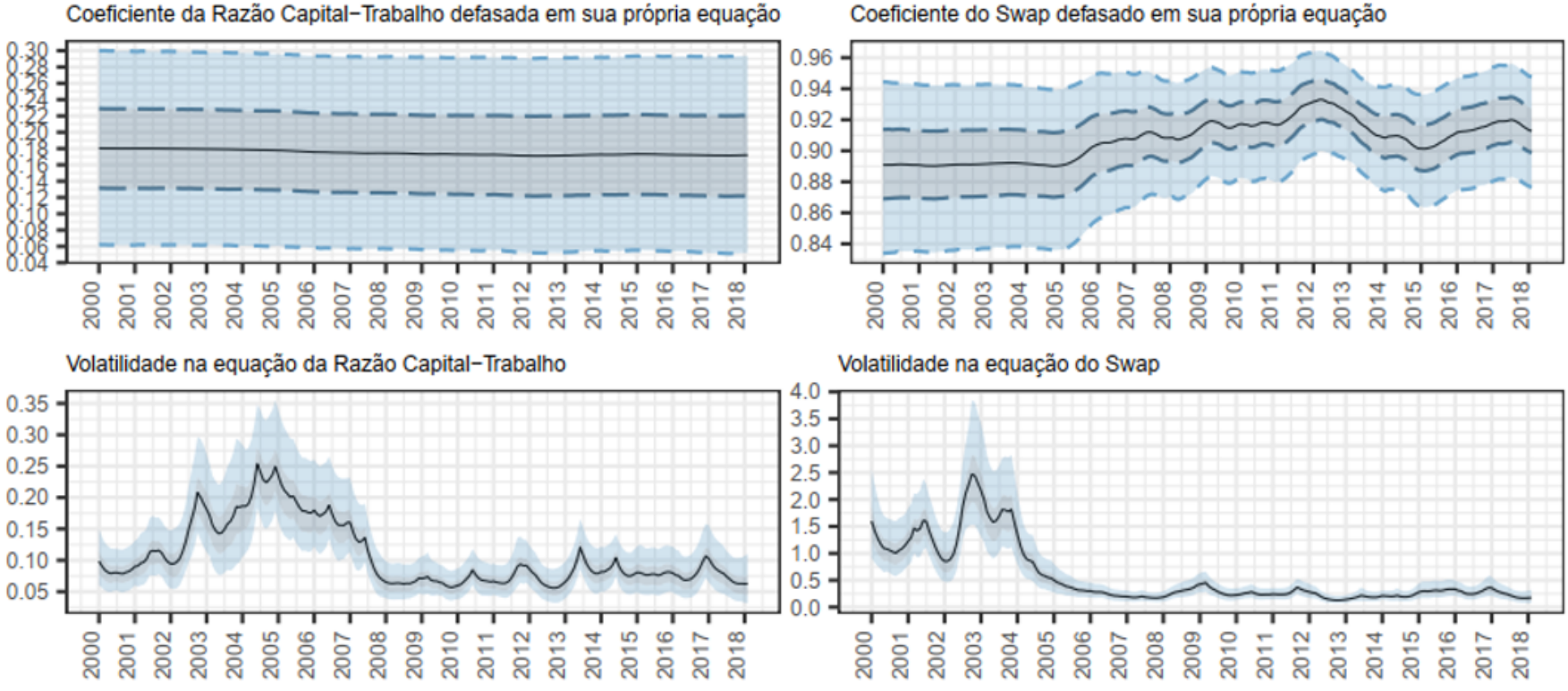

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Main results and future developments

- Monetary policy shocks increases the capital labor ratio;
  - This relationship is stable over time, considering different periods.
- Econometric future developments: change to Wishart innovations, shrinkage prior (coefficients).
- Economic developments: refine the discussion between inequality and/or distribution, investigate other variables and explore the link between capital labor ratio with other distribution measures.

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