Imperfect Financial Markets and the Cyclicality of Social Spending

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Overview

- Financial markets & fiscal policy over the business cycle
  - Government expenditure
  - Taxes
  - External debt with endogenous risk
  - Inequality

- Why is this interesting?
  - Countercyclical fiscal policies in advanced economies
  - Procyclical fiscal policies in emerging markets
  - Cross-country differences driven by *social transfers*

Research Question

Can sovereign risk explain the observed cross-country differences in the cyclicality of fiscal policy (and its components)?

Literature

Empirical Literature: Fiscal Policy differences

Gavin & Perotti (1997), Kaminsky, Reinhart & Végh (2005), Végh & Vuletin (2012), Michaud & Rothert (2018)

Default Risk and Fiscal Policy

Eaton & Gersovitz (1981), Cuadra, Sanchez & Sapriza (2010), Ferriere (2015), Camous & Gimber (2018), Bianchi, Ottonello & Presno (2021)

Political Economy and Fiscal Policy

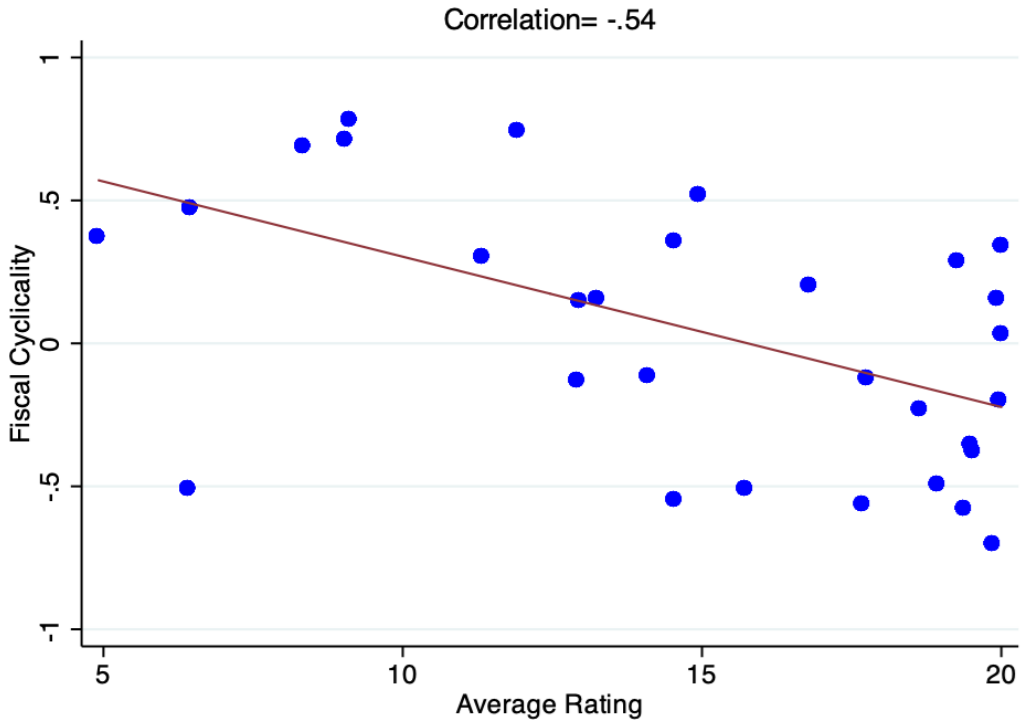
Andreasen, Sandleris and van der Ghote (2019), Talvi & Végh (2005), Ilzetzki (2011)

Redistribution with Uniform Transfers

Alonso-Ortiz & Rogerson (2010), Bhandari, Evans, Golosov & Sargent (2013)

Stylized facts

Fiscal Expenditure

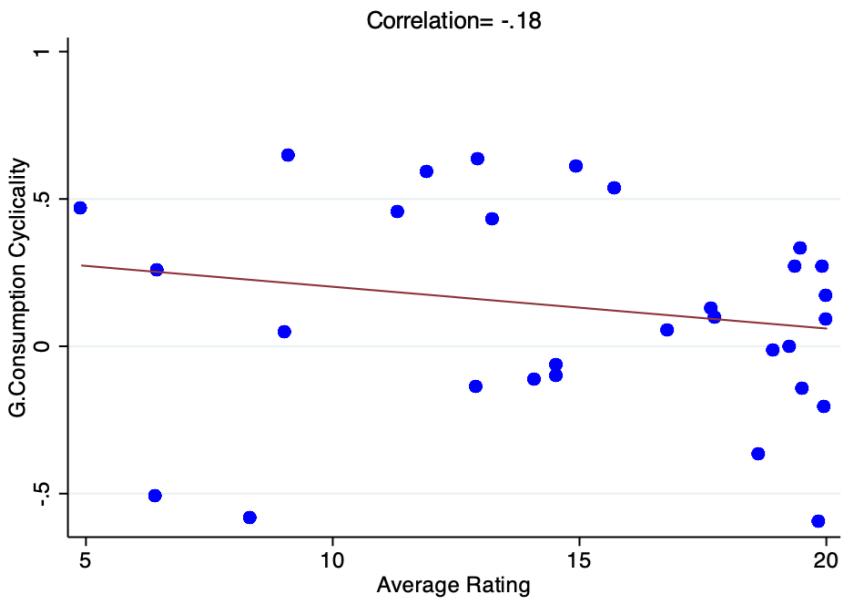


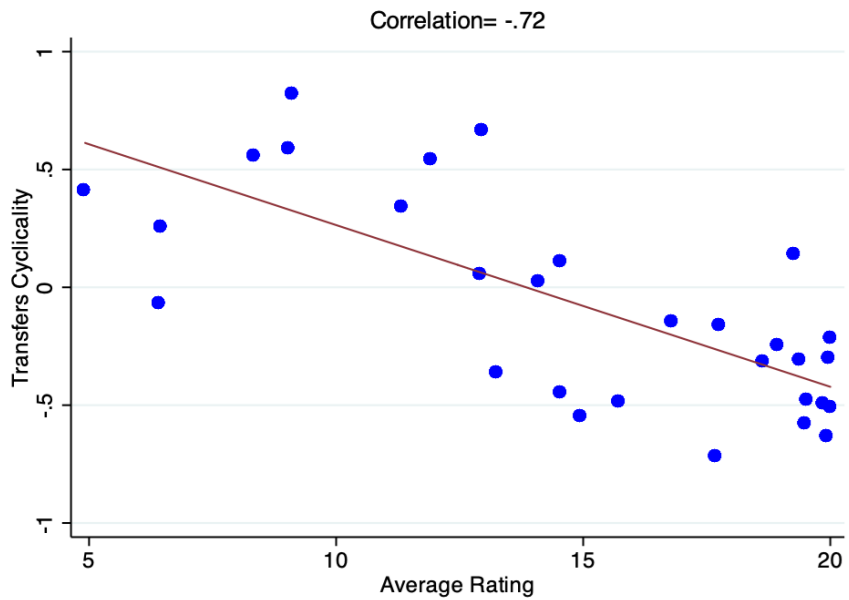
- Correlations of cyclical components of GDP w. cyclical comp. of fiscal expenditure
- 30 countries, 1990-2015
- On average 40% of GDP (std. 11p.p.)

Data Descr.

Expenditure Components

Government consumption (left) and transfers (right)





- Total expenditure = Transfers + Goods & Services + Employment Exp. + Interest + Other
- Transfers and Goods&Serv. cover on average 50% of total fiscal expenditures

More Data

Model

Environment: Households

- Time is discrete, $t = 0, 1, 2, \ldots$
- Households differ in labor productivity: $e^i \in [0, 1]$
- Constant population of size 1, share σ^i have e^i.
- Aggregate, persistent TFP shock A_t

$$\max_{c_t^i, h_t^i} [\kappa u(c_t^i, h_t^i) + (1 - \kappa)\nu(g_t^P)],$$

$$\text{s.t.:} \quad (1 + \tau_t)c_t^i = A_t e^i h_t^i + g_t^T. \tag{1}$$

- Total output: $Y_t = A_t \sum_i \sigma^i e^i h_t^i$

Environment: Government (I)

State of economy is $S = (A, b)$. Every period government decides whether to default:

$$V^0(S) = \max_{d \in \{0,1\}} \left(dV^d(S) + (1-d)V^{nd}(S) \right), \tag{2}$$

where after repayment it solves:

$$V^{nd}(S) = \max_{\{\tau, g^T, g^P, b'\}} [\kappa \sum_i \sigma^i u(c^{*i}, h^{*i}) + (1-\kappa)\nu(g^P)] + \beta \mathbb{E}[V^0(S')|S] \tag{3}$$

where c^{*i}, h^{*i} solve HHs problem, subject to gov't budget constraint:

$$g^P + g^T + b = \tau C^* + qb', \quad \text{where } C^* = \sum^i \sigma^i c^{*i}. \tag{4}$$

and risk-neutral pricing of debt by foreign investors:

$$q(b', A) = \frac{\mathbb{E}(1 - d(b', A))}{1 + r}. \tag{5}$$

Environment: Government (II)

After default gov't solves:

$$V^d(S) = \max_{\{\tau_d, g_d^T g_d^P\}} [\kappa \sum_i \sigma^i u(c^{*i}, h^{*i}) + (1-\kappa)\nu(g_d^P)] + \beta \mathbb{E}[\mu V^0(S') + (1-\mu)V^d(S')|S], \tag{6}$$

subject to HHs constrains (4)-(5) and gov't budget constraint:

$$g_d^P + g_d^T = \tau_d C^*. \tag{7}$$

After default economy incurs asymmetric proportional productivity loss.

Calibration

Calibration to Brazilian economy

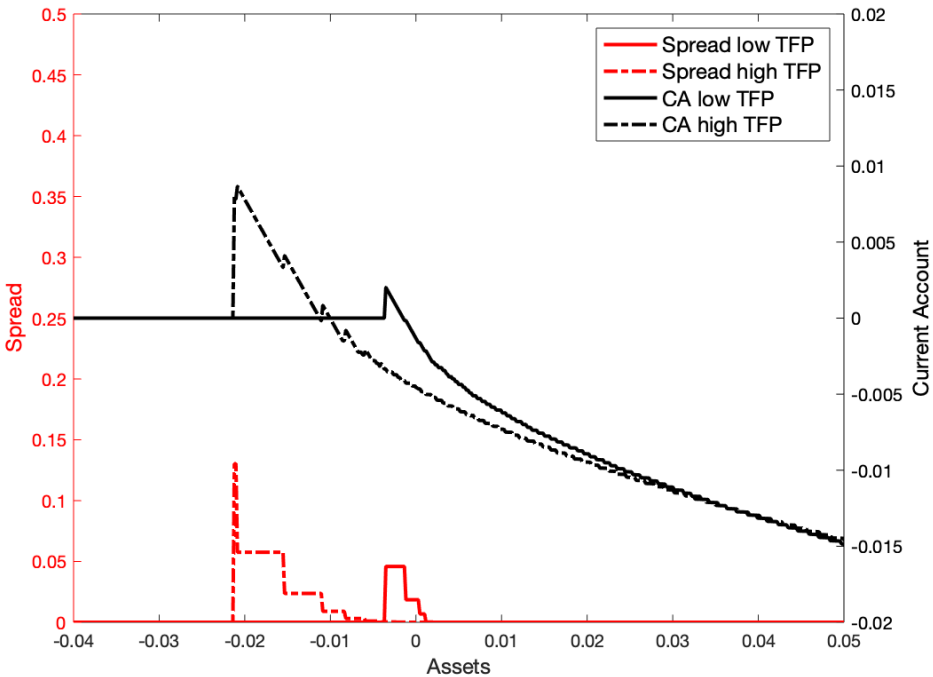
Parameter	Value	Target/Source
	Set Parameters	
Interet rate r	1%	3 month T-Bill
Risk aversion γ	2	CSS (2010)
Frisch elasticity ψ	0.6	M&R (2018)
	Calibration	
Labor disutility χ	0.82	1/3 time worked
Consumption weight κ	0.839	Share of social spending
TFP persistence ρ_A	0.919	GDP pers. 0.885
TFP volatility σ_ϵ	0.00418	GDP vol. 2.65%
Exclusion μ	0.2	Market exclusion 5qrts
Discounting β	0.94 (0.99)	Def. feq. 2.8%
Penatly θ	0.989 (0.01)	Debt service 2.1% GDP
Productivities e^i	$\{0.2685, 0.4370,$ $0.4909, 0.557, 1\}$	Pre-tax income quintiles: $\{0.03,0.11,0.15,0.21,1\}$

TFP follows AR(1) process, preferences are as in GHH (1988)

$$u(c,h) = \frac{\left[c - \chi \frac{h^{1+\psi}}{1+\psi}\right]^{1-\gamma}}{1-\gamma} \tag{8}$$

Results

Results: Current Account



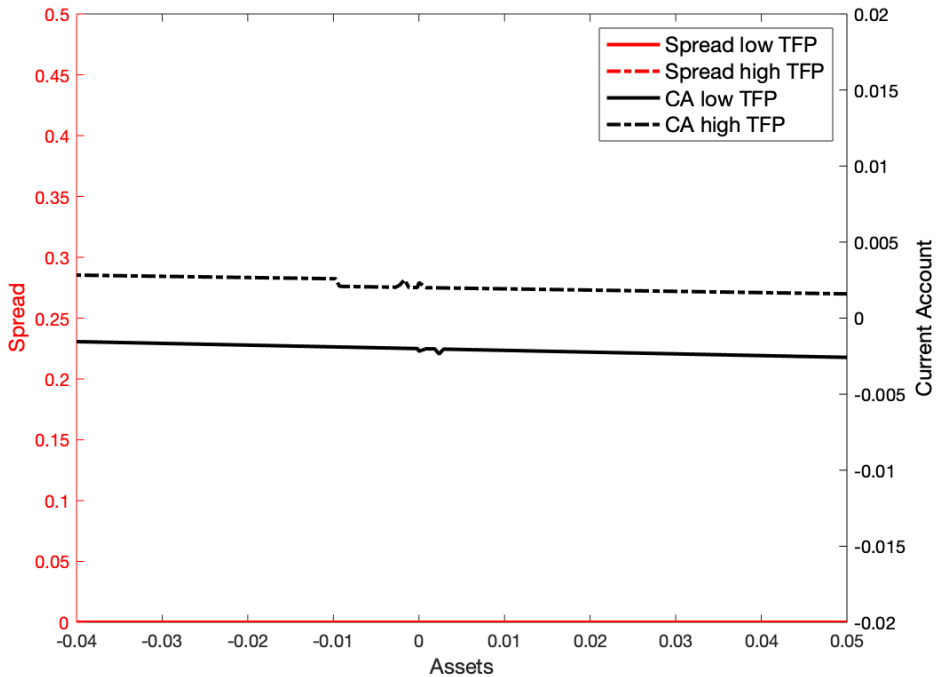
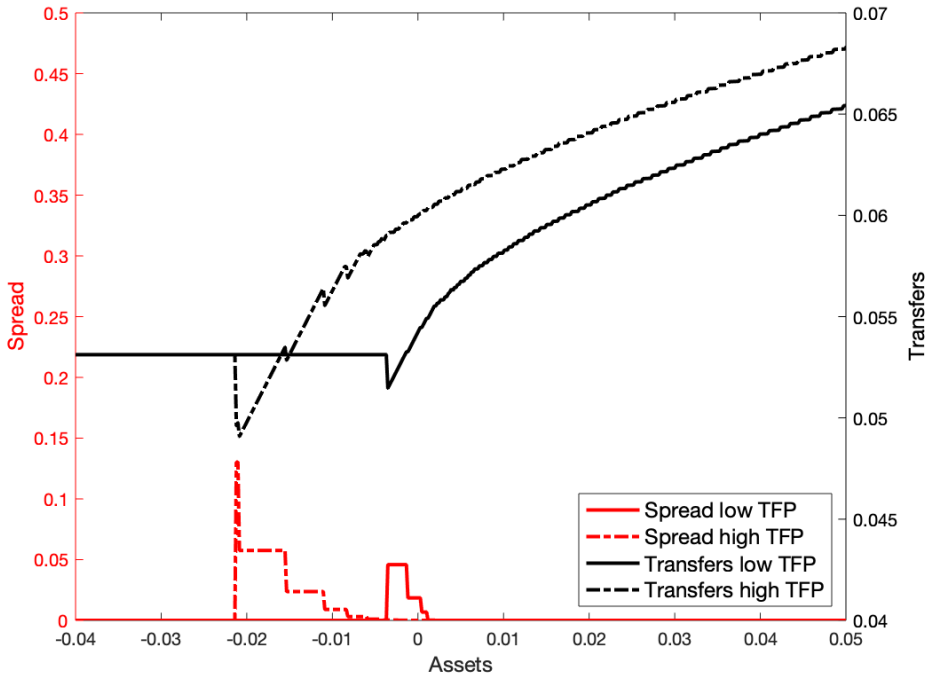


Figure: Current Account in risky (left) and safe economy (right)

Complete Markets vs Autarky

Results: Transfers



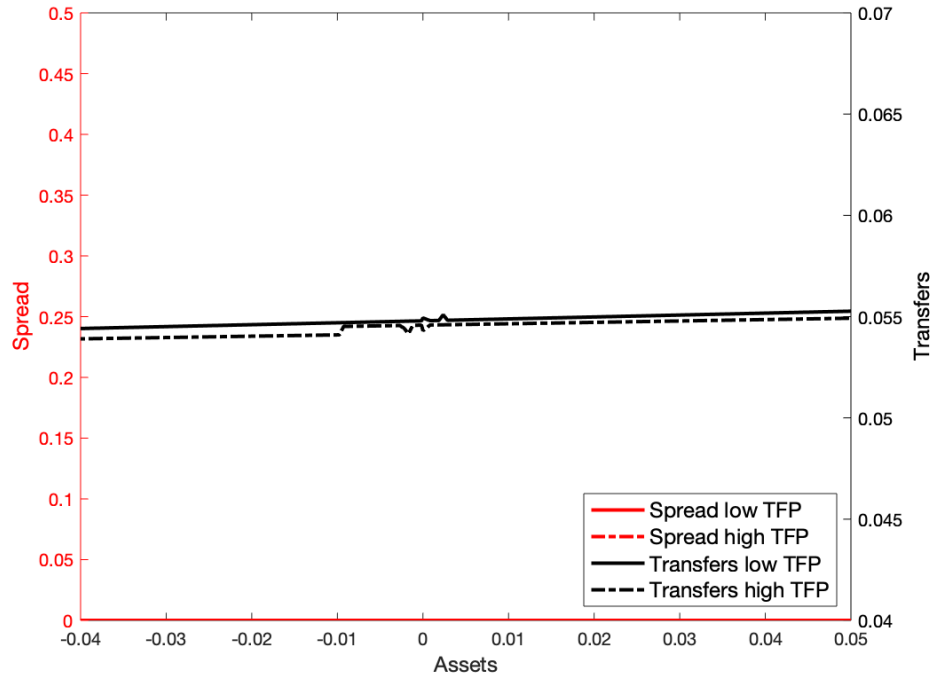
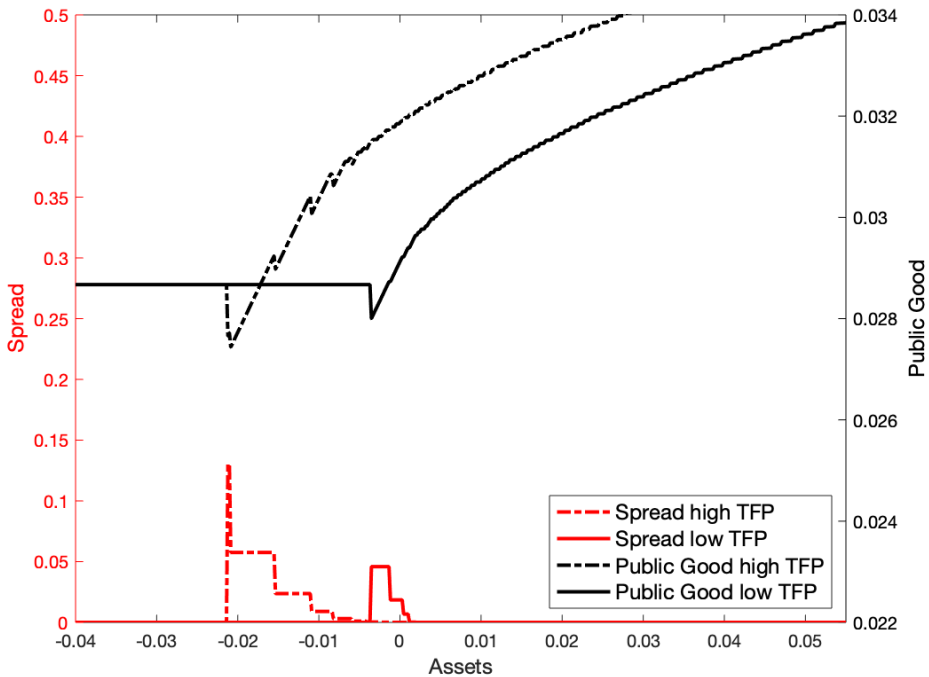


Figure: Transfers in risky (left) and safe (right) economy

Results: Public Good



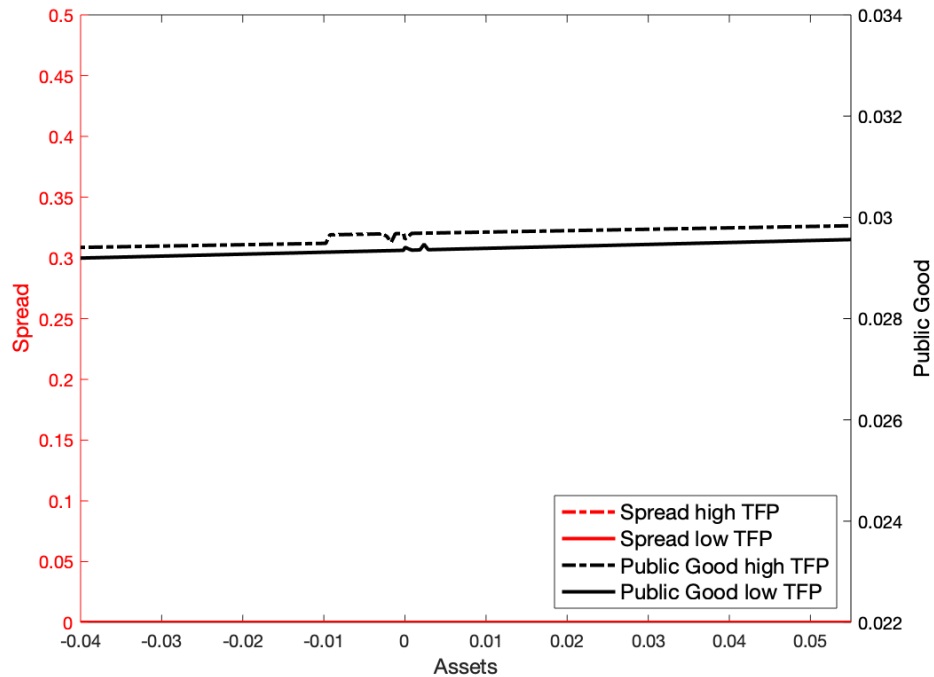
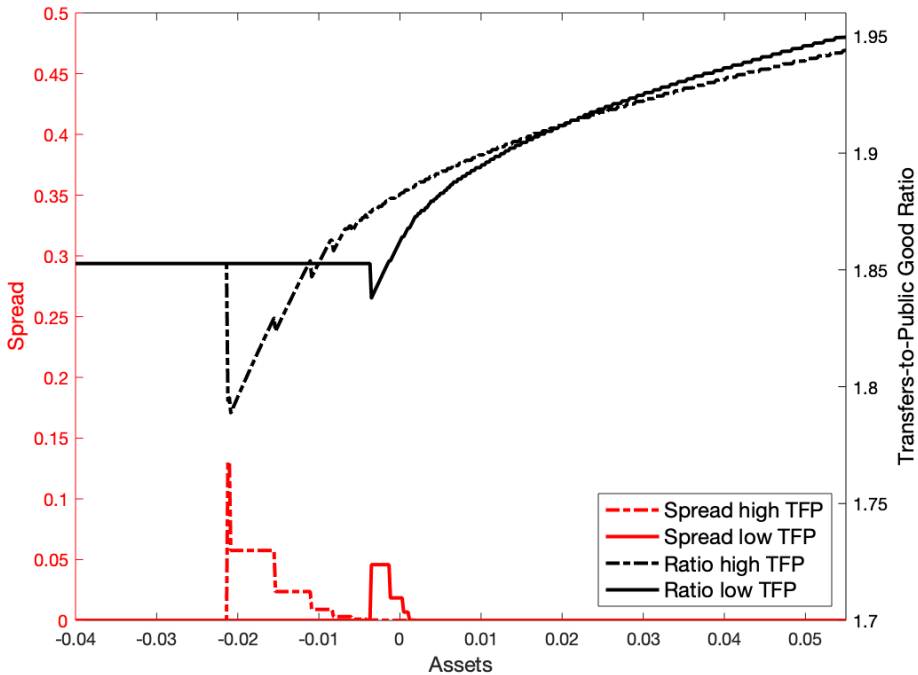


Figure: Public Good Spending in risky (left) and safe (right) economy

Results: Spending Composition



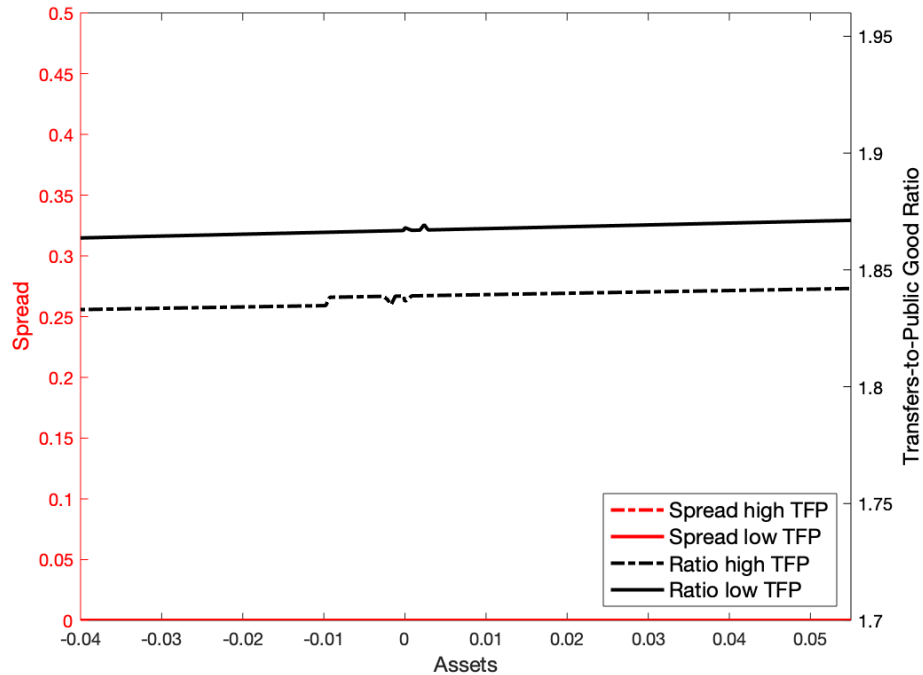


Figure: Transfers-to-Public Good in risky (left) and safe economy (right)

Empirical Check

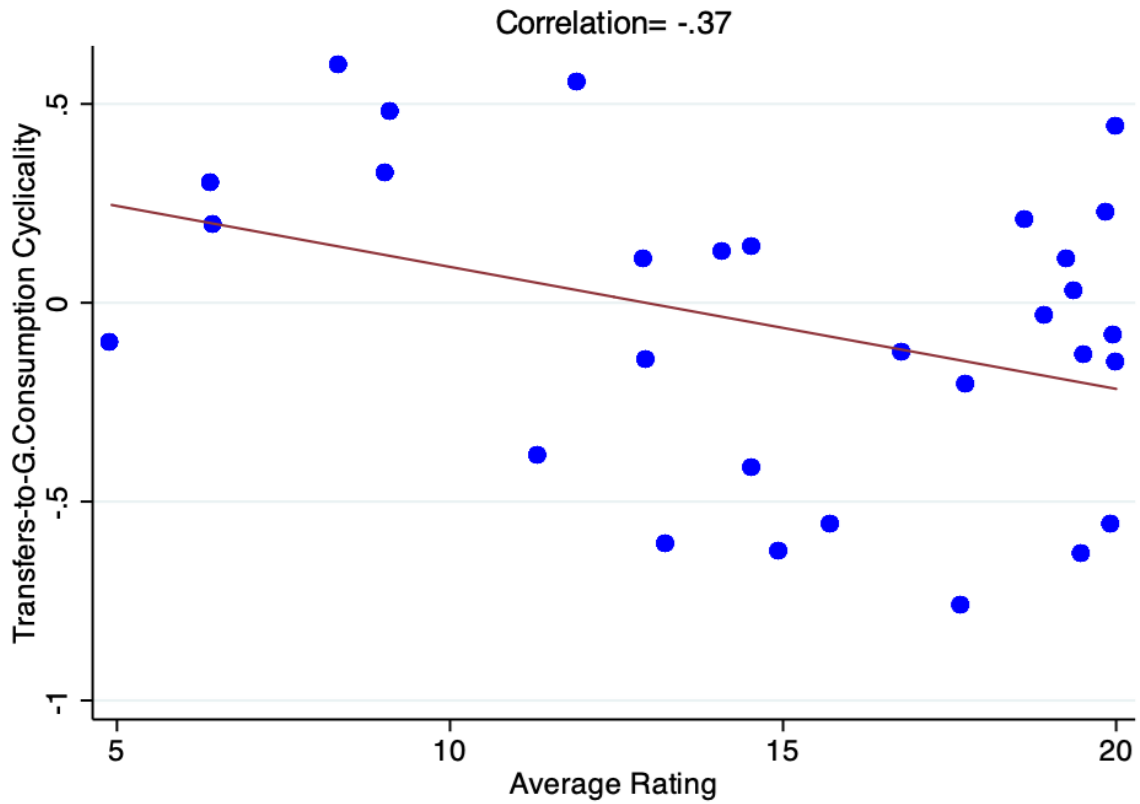


Figure: Cyclicality of the ratio of transfers to government consumption vs average rating

Simulation

Statistic	Data	Model-R	Model-S
Targeted Moments			
Pre-tax Gini	0.53	0.54	0.54
Output Persistence	0.885	0.883	0.904
Output Standard Deviation	2.65%	2.69%	2.41%
Debt service-to-GDP	2.1%	2.1%	13.4%
Default Frequency	2.8%	2.8%	0%
Transfers-to-Public Good	1.80	1.80	1.80
Untargeted Moments			
Post-tax Gini	0.51	0.45	0.45
Transfers-to-GDP	6.5%	21.9%	21.8%
corr(Transfers,GDP)	0.43	0.85	-0.12
corr(Public Good, GDP)	-0.52	0.91	0.45
corr(Trade Balance, GDP)	-0.13	-0.23	0.83
corr(Spread, GDP)	-0.40	-0.17	NaN

Robustness

1. Pro-rich government $\alpha_i = \lambda^i / \sum_i \lambda^i, \lambda = 2.5$
2. Low inequality: $Gini = 0.18$, $T/Y = +0$.

Table: Robustness Analysis

Moment	Benchmark	Pro-rich gov.	Low inequality
T/Y	21.9%	6.5%	0.1%
$Prob(Def)$	2.8%	2.9%	0.15%
B/Y	2.1%	2.1%	0.4%
$mean(spread)$	0.029	0.030	0.001
Pre-tax Gini	0.54	0.54	0.18
Post-tax Gini	0.45	0.51	0.18
$corr(CA, Y)$	-0.24	-0.32	-0.11
$corr(T, Y)$	0.85	0.78	0.20
$corr(\tau, Y)$	-0.23	-0.31	-0.11
$corr(G, Y)$	0.91	0.93	0.99

Summary

- Procyclical transfer policy can be rationalized by countercyclical borrowing constraints.
- While redistribution still possible, policy achieves opposite of consumption smoothing during periods of distress.
- Save economy crisis: saving on public good.
  Risky-economy crisis: saving on transfers.
- Procyclical bias.
- Role of IMF: Can IFI alleviate procyclicality?

The End

Thank you

Data

- Fiscal expenditure from Michaud & Rothert (2018)
  - Harmonized GFS (IMF)
  - 30 countries between 1990-2015
  - Total expenditure = transfers + goods & services + employment exp. + interest + other
  - Cyclicality: remove linear-quadratic trend and correlate with GDP
- Sovereign debt ratings from S&P, Fitch and Moody's
  - Encode on 0 to 20 scale
  - Time average (of yearly average) for each country

Back

Cyclicality Data

	Rating	Total Expenditure		Transfers		Public Goods	
		% of GDP	*corr* w. GDP	% of GDP	*corr* w. GDP	% of GDP	*corr* w. GDP
Argentina	4.92	21.17	0.37	6.13	0.41	1.68	0.47
Austria	18.94	50.72	-0.50	22.19	-0.25	5.87	-0.02
Belgium	18.65	51.67	-0.23	22.39	-0.32	3.98	-0.37
Bolivia	6.42	21.27	-0.51	3.74	-0.07	4.26	-0.51
Brazil	8.33	26.23	0.69	8.33	0.56	2.44	-0.58
Canada	19.47	42.46	-0.36	9.56	-0.58	8.35	0.33
Chile	14.53	21.11	-0.55	4.81	-0.45	2.66	-0.07
Czech Republic	14.53	36.72	0.36	16.32	0.11	3.59	-0.10
Denmark	19.52	54.60	-0.38	18.40	-0.48	8.31	-0.15
Dominican Republic	6.45	12.24	0.47	0.74	0.25	2.00	0.25
Estonia	14.69	34.79	.	11.62	.	7.14	.
Finland	19.38	50.51	-0.58	19.36	-0.31	8.95	0.27
France	19.85	51.83	-0.70	23.32	-0.49	5.10	-0.60
Germany	20.00	46.81	0.03	24.53	-0.21	3.87	0.09
Greece	11.32	46.85	0.30	17.01	0.34	5.64	0.46
Hungary	11.91	50.80	0.74	16.73	0.54	7.69	0.59
Iceland	14.94	40.56	0.52	6.25	-0.54	10.46	0.61
Ireland	17.68	36.69	-0.56	12.42	-0.72	5.07	0.13
Israel	14.09	43.58	-0.11	12.26	0.02	9.39	-0.12
Italy	16.79	48.72	0.20	19.64	-0.14	4.88	0.06
Luxembourg	20.00	37.48	0.34	19.44	-0.51	3.38	0.17
Netherlands	19.97	44.81	-0.20	19.59	-0.30	6.18	-0.21
Poland	13.25	43.44	0.16	17.30	-0.36	6.48	0.43
Portugal	15.73	43.93	-0.51	15.75	-0.48	4.74	0.53
Romania	9.02	33.85	0.72	10.83	0.59	6.62	0.05
Slovak Republic	12.96	43.20	0.15	17.05	0.66	6.02	0.64
Slovenia	15.51	43.58	.	17.72	.	6.39	.
Spain	17.76	39.61	-0.12	15.57	-0.16	4.57	0.09
Sweden	19.27	52.08	0.28	17.55	0.14	7.42	-0.01
Thailand	12.91	17.09	-0.13	1.74	0.06	5.33	-0.14
United Kingdom	19.92	41.09	0.16	13.31	-0.63	9.77	0.27
Uruguay	9.11	26.82	0.78	12.82	0.82	3.72	0.65
Total	15.19	40.17	0.03	14.44	-0.08	5.84	0.13

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Complete Markets vs Autarky

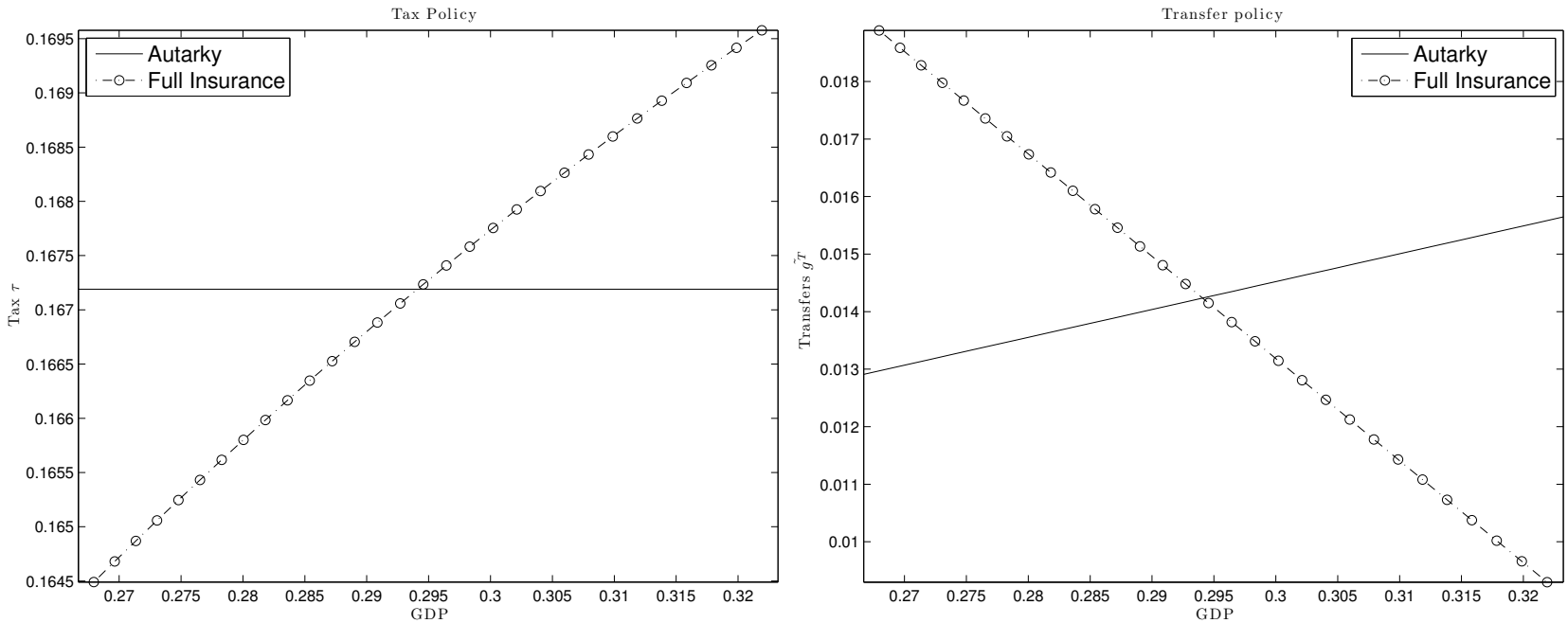
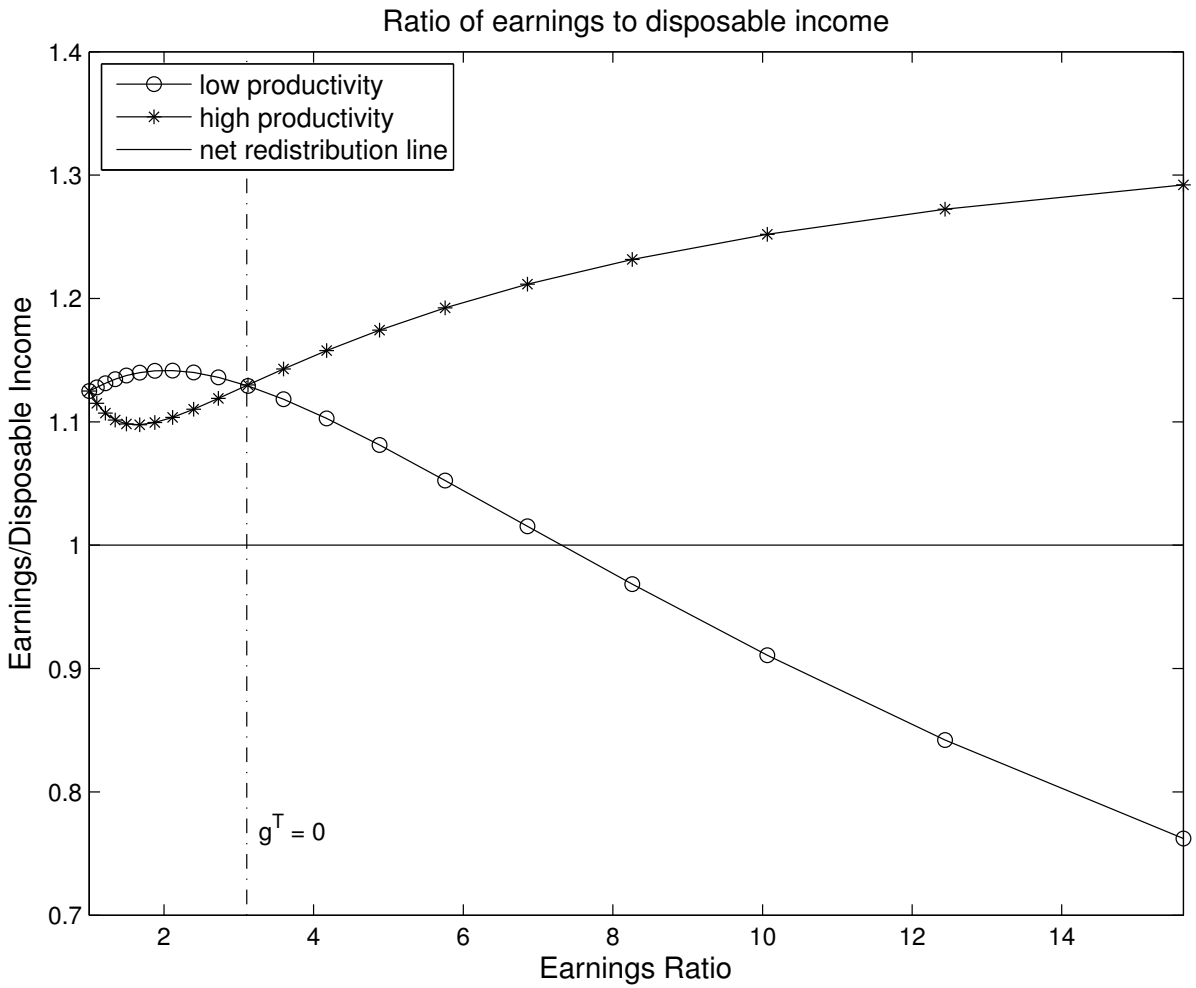


Figure: Optimal taxes (left) and transfers (right) as a function of GDP in complete markets and autarky

Optimal Static Redistribution

Static Redistribution

Figure: Redistribution with constant marginal tax rates and uniform transfers: Ratio of disposable income and earnings.



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Optimality Conditions

- Risk sharing condition:

$$\kappa \sum_i \sigma^i u_c^i(c_t^i, h_t^i) = (1-\kappa) v'(G_t^P) = \text{MU of resources} \tag{9}$$

- Distribution of tax distortion:

$$\underbrace{\sum_i \left[\kappa u_c^i(c_t^i, h_t^i) - (1-\kappa) v'(G_t^P)\right] \sigma^i c_t^i}_{\text{weighted sum of rs wedges}} = \underbrace{(1-\kappa) v'(G_t^P) w_t \sum_i \sigma^i \epsilon^i h_t^i \xi_{h,\tau}}_{\text{weighted sum of output wedges}} \tag{10}$$

$$\xi_{h,\tau} = \frac{\partial h}{\partial \tau} \frac{\tau}{h} = -\frac{1}{\phi} \frac{\tau}{1-\tau} \tag{11}$$

Equilibrium

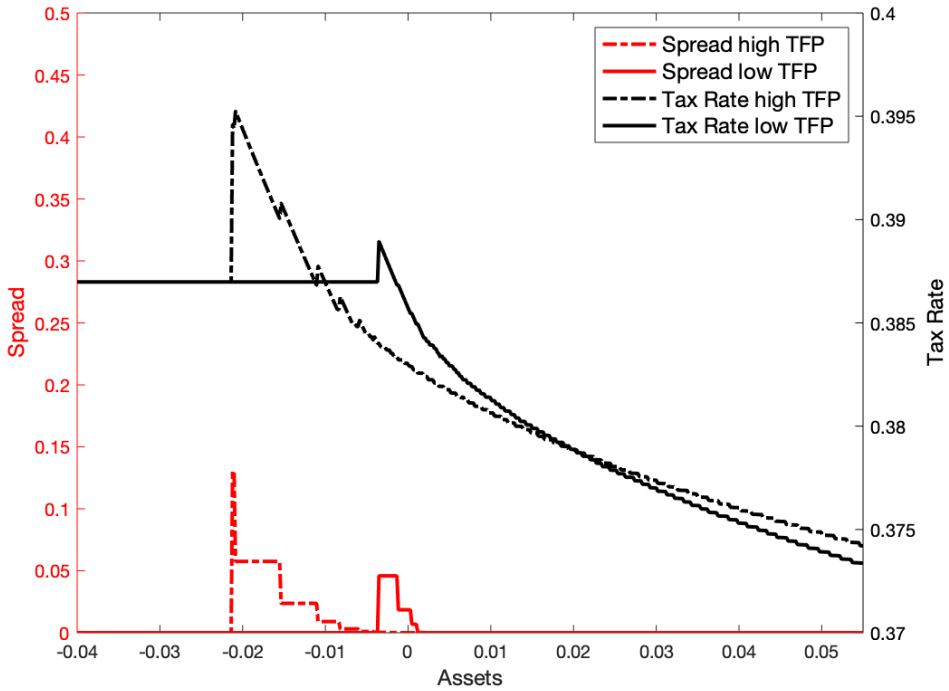
A stochastic dynamic recursive equilibrium in this economy is a set of households decisions $\{c^i(S), h^i(S), c^i_d(S), h^i_d(S)\}$ government default policy $d(S)$, government policies $\{g^T(S), g^P(S), b'(S), \tau(S), g^T_d(S), g^P_d(S), \tau_d(S)\}$, and a bond price policy function $q(S)$ such that:

(a) Given bond prices and government policies, the household decisions solve the households' maximization problem.

(b) Given bond prices and household decisions, the government policies solve the government's maximization problem.

(c) Lenders' beliefs are consistent with default probabilities and the resulting bond prices satisfy the zero profit condition.

Summary: Taxes



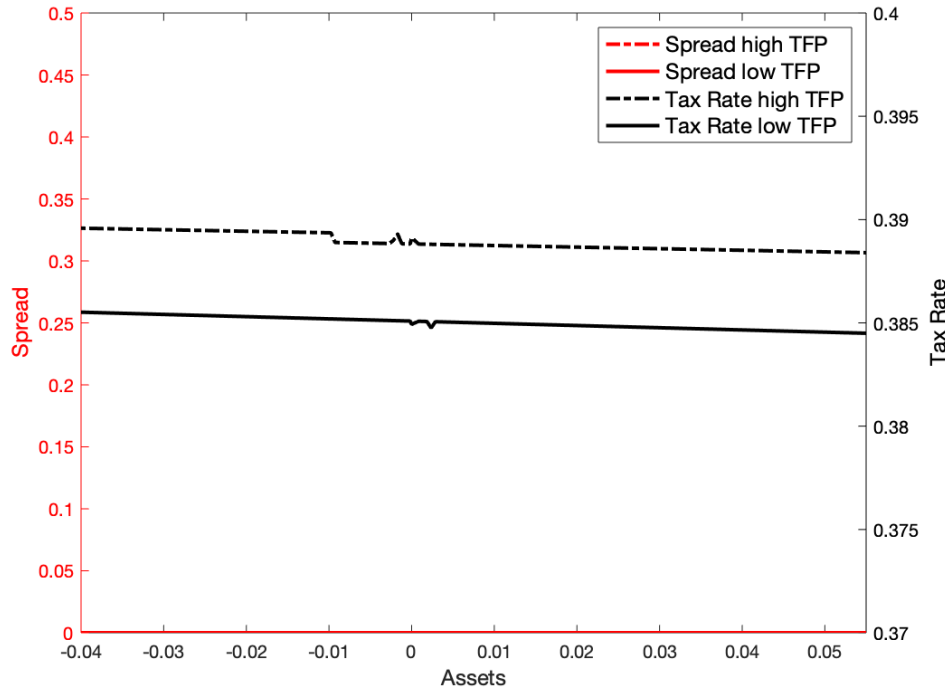


Figure: Taxes in risky (left) and safe (right) economy