Debt, Defaults and Dogma

Politics and the Dynamics of Sovereign Debt Markets

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Motivation

What accounts for high levels of **debt**, and high and volatile **interest rates** in EMEs?

- interest rates have a significant effect on **productivity** and on the **amplification** of shocks (eg. Mendoza-Yue 2012).
- the behavior of interest rates is an important factor accounting for differences between the **business cycles** of emerging and developed economies (eg. Uribe-Yue 2006, Nuemeyer-Perri 2005).
- high debt levels are of particular relevance in emerging economies because the high volatility of their borrowing cost makes them vulnerable to **crises**.

Motivation

- In addition to econ. vars., political factors are often consider to play a non-trivial role in fiscal decisions, debt markets and default decisions.
  - Brazil, Ecuador, Argentina and Greece's events are natural examples.

- EME have low political stability (i.e. high turnover).

- Hence, political fluctuations are a natural candidate to explain diff. in debt mkts and fiscal policy.

Motivation

"Argentine markets rallied as a decisive win for the ruling centre-right coalition in congressional elections on Sunday raised hopes for the reelection of [...] president Mauricio Macri. Argentina's [...] dollar bonds rose 1.8 per cent."

Financial Times on October 23, 2017.

"Greek stocks and government bonds fell, [...] after the anti-austerity party Syriza swept to victory in national elections [...] Yields on Greek 10-year government bonds rose to 8.7%."

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Headlines often suggest a link between political affiliations (L vs R) and sovereign interest rates through fiscal policy stance.

Motivation - what we do

Q: Is this a general phenomenon (across nations and time) or specific to a few “famous” nations with a default history?

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1. Build a database covering 40 *countries* and 23 years:
    - political affiliations/leanings (L or R) (*IDB's DPI*)
    - macro quantities and fiscal measures (*WDI*)
    - country spreads (EMBI)
2. Uncover (new) stylized facts regarding the influence of political affiliations (L vs R) on debt mkts and fiscal policy.
3. Propose a model of sov. default with endogenous political fluctuations (turnover) to rationalize the facts.

Empirical evidence

Empirical evidence – Political Affiliations

- Political data: party orientation wrt economic policy (based on own parties' descriptions).
  - Left: parties defined as communist, socialist, social democratic, or left-wing.
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- We think of L and R as **labels**.

- Do these labels align w/ our typical understanding of L vs. R?

Empirical evidence – Political labels matter

Our database shows that:

- L collects more taxes than R
- L has higher public spending than R
- R has higher debt-to-output than L

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- L collects more taxes than R
- L has higher public spending than R
- R has higher debt-to-output than L

- Consistent with 'common wisdom' about EME
- Also consistent with evidence from the US and OECD countries (see Müller, Storesletten and Zilibotti 2015)

(more)

Empirical evidence – Spreads and politics

Table 1: OLS estimation

Dep. variable: Spreads		
	(i)	(ii)
constant	507.5***	275.4
Political index	165.9**	149.5*
Debt/GDP	7.5***	9.6***
Y growth	−28.4***	−34.0***
Y growth × Political index	−46.2***	−46.5***
Year and region FE	no	yes
Adj. r^2	.27	.28
Sample size	276	276

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Fact 1: L govs. pay higher spreads than R govs.

Fact 2: L govs. face more counter-cyclical spreads than R govs.

Table 2: Spread volatility

	Left	Right
$\sigma(Spread)$ (in bps.)	594	481
$\sigma(Spread)^L/\sigma(Spread)^R$	1.23	

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Fact 3: L govs. face more volatile spreads than R govs.

Model

Model

- SOE w/ a continuum of households.
- Two political parties (L and R) which alternate in power.
- SOE trades bonds w/ competitive foreign lenders. Can't commit to repay.
- Time is discrete and goes on forever.

Model – Households

- Preferences: $$U(c, g) = \alpha u(c) + (1-\alpha)u(g) \quad (1)$$

$$u(x) = \frac{x^{1-\gamma} - 1}{1-\gamma}, \quad \text{for } x = \{c, g\}.$$

- Endowment y follows Markov process w/ trans. fun. $\mu(y'|y)$.

- Flow budget constraint:

$$c = \begin{cases} (1-\tau)y, & \text{if gov't repays} \\ (1-\tau)y_a, & \text{if gov't defaults} \end{cases} \quad (2)$$

where $y_a \leq y \; \forall y$.

Model – Political turnover

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- If an election occurs, the incumbent may be replaced.
- The re-election probability P depends on

$$\text{Gov't spending:} \quad \uparrow g \implies \uparrow P$$
$$\text{Taxation:} \quad \uparrow \tau \implies \downarrow P$$

Model – Political turnover

Evidence on taxes:

- $\uparrow \tau \implies \downarrow P$

  Tillman and Park (2009), Beasley and Case (1995), Bosch and Sole-Olle (2004), Happy (1992), Landon and Ryan (1997), Vermeir and Heyndels (2006).

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Evidence on gov't spending:

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- L parties receive more political support from $\uparrow g$

  Shin (2016)

Model – Political turnover

Based on the previous evidence, we guarantee that $P_i(\tau, g)$ satisfies four properties:

P1. $\uparrow \tau \implies \downarrow P$,

P2. R parties are more strongly affected by $\uparrow \tau$,

P3. $\uparrow g \implies \uparrow P$, and

P4. L parties receive more political support from $\uparrow g$

(more on P)

Model – Fiscal Policy

In case of repayment:

$$g + b = \tau y + b' q(b', y) \tag{3}$$

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In case of default:

$$g = \tau y_a \tag{4}$$

Model – Timing

- Incumbent enters period t in good credit standing and w/ b debt
    1. y is realized.
    2. Default decision is made.
    3. Consumption (c, g), taxation (τ) and new borrowing (b', if not excluded) are chosen.
    4. w/ prob π there is an election. w/ prob $P(\tau, g)$ incumbent wins.
- end of period t

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$$\left.\beta\pi\Bigg[P_i(\tau,g)\int_{y'} V_i(b',y')\mu(y',y)dy' + (1-P_i(\tau,g))\int_{y'} \bar{V}_i(b',y')\mu(y',y)dy'\Bigg]\right\}$$

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subject to

$$\begin{aligned} c &= (1-\tau)y, \\ g &= \tau y + q_i(b',y)b' - b. \end{aligned}$$

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$$
\begin{aligned}
V_i^D(y) = \max_{g,\tau} \Bigg\{ & U(c,g) + \\
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subject to

$$c = (1-\tau)y_a,$$

$$g = \tau y_a,$$

with

$$y_a = \begin{cases} y & \text{if } y \leq \psi\bar{y}, \\ \psi\bar{y} & \text{otherwise,} \end{cases}$$

Model – party i not in power

- $\bar{V}_i(b, y)$ depends on the opponent's $(-i)$ decision
- $\bar{V}_i^R(b, y)$: value when the incumbent repays.
- $\bar{V}_i^D(y)$: value when the incumbent defaults.
- The value of **not being in power** is just the discounted expected probability of being **back in power**.

▸ value functions

Model – Default decision

The default policy of incumbent i is characterized by:

$$d_i(b, y) = \begin{cases} 0 & \text{if } V_i^R(b, y) \geq V_i^D(y) \\ 1 & \text{otherwise.} \end{cases} \tag{5}$$

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Default probability:

$$\lambda_i(b', y) = \int_{\mathcal{D}_i(b')} \mu(y', y) dy'$$

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- Risk neutral, deep-pocketed agents
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Calibration

Calibration (i/ii)

- 1 model period $\equiv$ 1 year.
- $\log(y') = \rho \log(y) + \epsilon'$ with $E[\epsilon] = 0$ and $E[\epsilon^2] = \sigma^2$.

Table 3: Parameter values set independently.

Parameter	Symbol	Value	Source
Income autocorr. coeff.	ρ	0.78	Estimation
Std. dev. of income innovations	σ	0.034	Estimation
Borrower's risk aversion	γ	2	Prior literature
Risk-free rate	r^*	0.04	Prior literature
Duration of defaults	θ	0.154	Prior literature
Probability of elections	π	0.25	Prior literature

Calibration (ii/ii)

- $P_i(\tau, g) = \left(\frac{c(\tau)}{y} - \kappa_i\right)^{\phi} + \left(\frac{g}{y}\right)^{\omega_i}$ with $i = \{L, R\}$.

Table 4: Parameter values set jointly via calibration.

Parameter	Symbol	Value	Target	Data	Model
Discount factor	β	0.65	Mean spread	495	504
Income cost of default	ψ	0.89	Mean b/y	10%	10%
Utility weight on g	α	0.03	Mean g/y	15%	16%
Political parameter	ϕ	0.75	Mean T/Y	17%	17%
Political parameter	κ_L	0.55	Mean T_L/Y	18%	18%
Political parameter	κ_R	0.59	Mean T_R/Y	15%	15%
Political parameter	ω_L	0.56	Mean $P(\cdot)$	66%	66%

Results

Results – Road-map

1. Main results
2. Business cycle statistics
3. Endogenous vs. exogenous turnover
4. Fiscal policy over the cycle

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Our model replicates **Fact 1** and **Fact 2**.

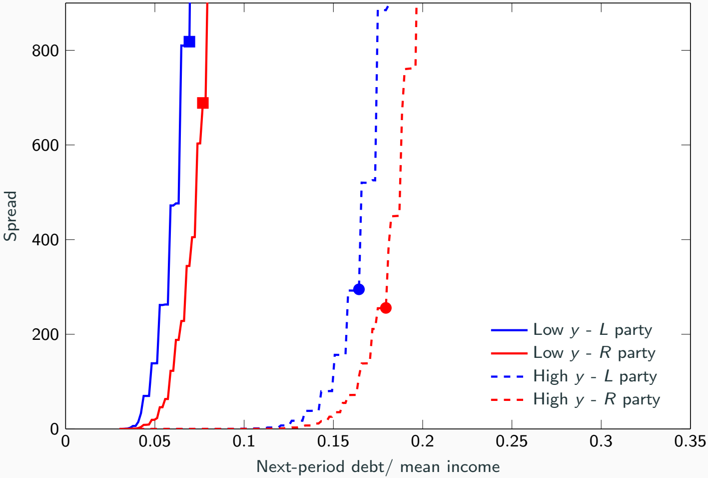

Figure 1: Spread-debt menus.

Results – Main results

- **Main takeaways:**
    1. L always faces worst spread-debt menus, and pays **higher** spreads in eq. (Fact 1).
    2. As income increases, L decreases spreads by **more** than R (Fact 2).

- **Mechanism:**
    (i) The default region is **larger** for L
    (ii) The optimal mix of τ, g and b' differs across parties.

$(i) - (ii)$ are determined simultaneously.

Results – Main results

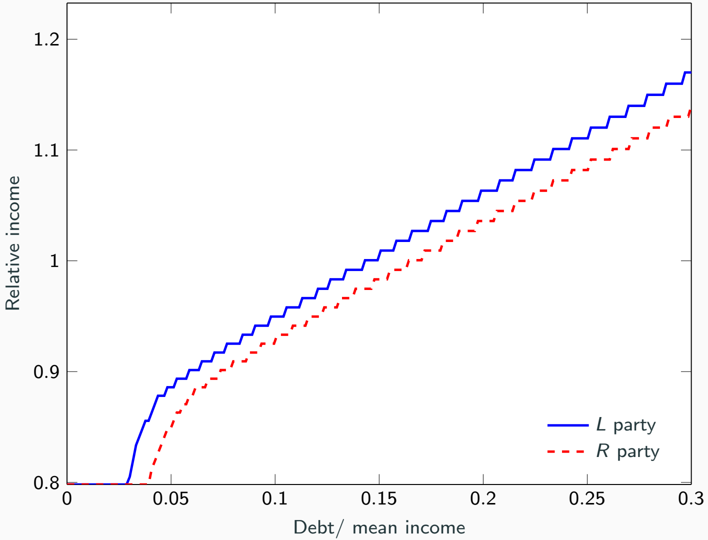

Figure 2: Default sets for L and R.

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   $\Longrightarrow$ L defaults 'before'.

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2. L looses more from $\downarrow g$ (in reelection terms).
3. It comes a point where L prefers to default instead of continuing w/ austerity.
   $\implies L$ defaults 'before'.
4. Hence, we get different default regions $\implies$ different spread menus.

τ & g

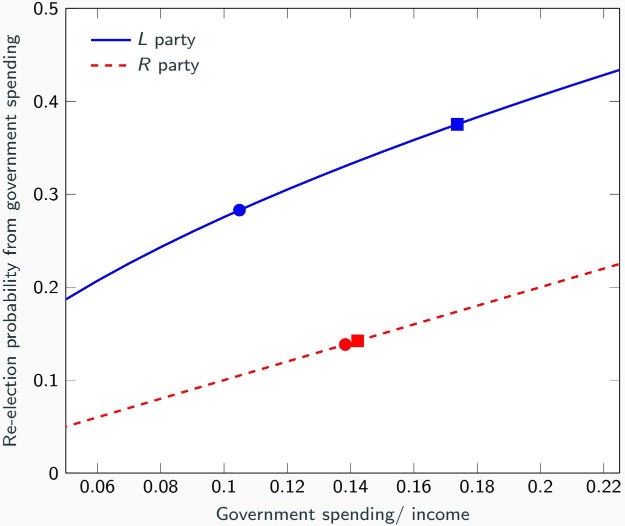

Figure 3: Changes in g and P.

Results – Business cycle statistics

Table 6: Non-targetted moments.

	Panel Data (1993-2015)	Model
s_L (in bps.)	518	542
s_R (in bps.)	463	439
$\sigma(s_L)$ (in bps.)	594	188
$\sigma(s_R)$ (in bps.)	481	129
$\sigma(s_L)/\sigma(s_R)$	1.23	1.46
$\sigma(C)/\sigma(GDP)$	1.53	1.45
$\sigma(T)/\sigma(GDP)$	3.66	3.29
$\sigma(G)/\sigma(GDP)$	2.34	2.60
$\rho(GDP, G)$	0.40	0.63
$\rho(GDP, \tau)$	-0.24	-0.32
$\rho(GDP, s)$	-0.35	-0.49
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Robustness – Endogenous vs. exogenous turnover (I)

Exercise: keep P_L and P_R unchanged, but make both exogenous.

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Table 7: OLS estimation

Dep. variable: Spreads			
	Data	**Benchmark**	**Exo. Turnover**
constant	507.5^{***}	431.8^{***}	657.0^{***}
Political index	165.9^{***}	116.1^{***}	-90.5^{***}
Debt/GDP	7.5^{***}	12.4^{***}	16.3^{***}
Y growth	-28.4^{***}	-21.2^{***}	-71.5^{***}
Y growth $\times$ Political index	-46.2^{***}	-12.2^{***}	6.7^{***}

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Results flip: now **L** pays lower spreads, and its spreads are less countercyclical than those of **R**.

Robustness – Endogenous vs. exogenous turnover (I)

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Results flip: now **L** pays lower spreads, and its spreads are less countercyclical than those of **R**.

Why?

Robustness – Endogenous vs. exogenous turnover (I)

Exercise: keep P_L and P_R unchanged, but make both exogenous.

Results flip: now **L** pays lower spreads, and its spreads are less countercyclical than those of **R**.

Why?

- Data (and benchmark calibration) feature: $P_L > P_R$.
- If P is exogenous, then L is more patient than R *no matter what*.
- Expected result: more impatient party faces worse credit conditions.

  (consistent w/ Cuadra and Sapriza, 2008 and Hatchondo et al., 2009)

Robustness – Endogenous vs. exogenous turnover (II)

Another exercise: make P exo, constant and equal across parties.

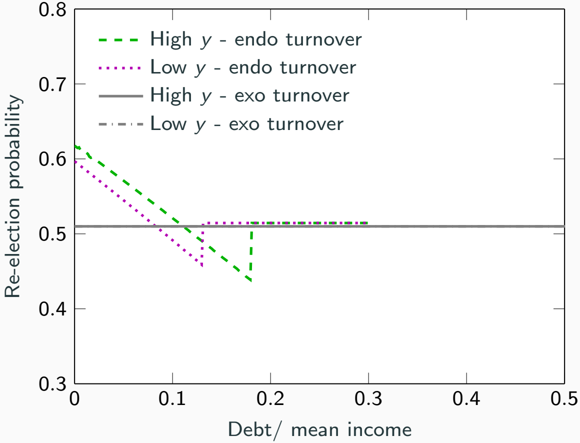


Figure 4: Endo. vs. exo. political turnover: $P(\tau, g)$ and b/y.

Robustness – Endogenous vs. exogenous turnover (II)

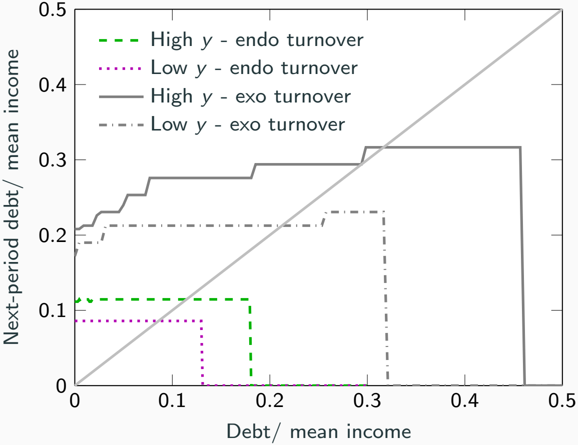


Figure 5: Endo. vs. exo. political turnover: borrowing policy functions.

Robustness – Endogenous vs. exogenous turnover (II)

- Endogenizing turnover has big implications for debt capacity.
- Incumbent's re-election is decreasing in debt, conditional on not defaulting.
- However, defaulting can increase re-election prob (frees up resources to $\uparrow g$ and/or $\downarrow \tau$).
- Lenders anticipate this and restrict lending in the "endog. turnover economy."

Robustness – Exogenous turnover vs. No-turnover

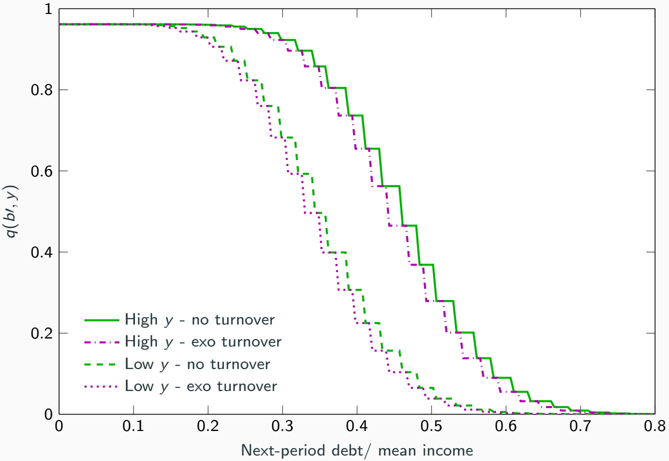


Figure 6: Price schedules for "exo-turnover" and "no-turnover" economies.

Robustness – Exogenous turnover vs. No-turnover

- "No-turnover economy" $\rightarrow P_i(\tau, g) = \bar{P} = 1 \quad \forall i$
- Introducing (exo) turnover leads to a decrease in prices.
- Gov't becomes de-facto more short-sighted.
- Results consistent w/ Cuadra and Sapriza (2008) and Hatchondo et al. (2009).

Results – Equilibrium reelections

- $P(\tau, g)$. τ and g are endogenous
- We find that $P(\tau, g)$ is increasing in income growth.
- Consistent w/ empirical evidence (Brender and Drazen, 2008).

- Intuition: as income grows, borrowing is cheaper, can afford both: $\tau \downarrow$ and $g \uparrow$.

Results – Equilibrium reelections

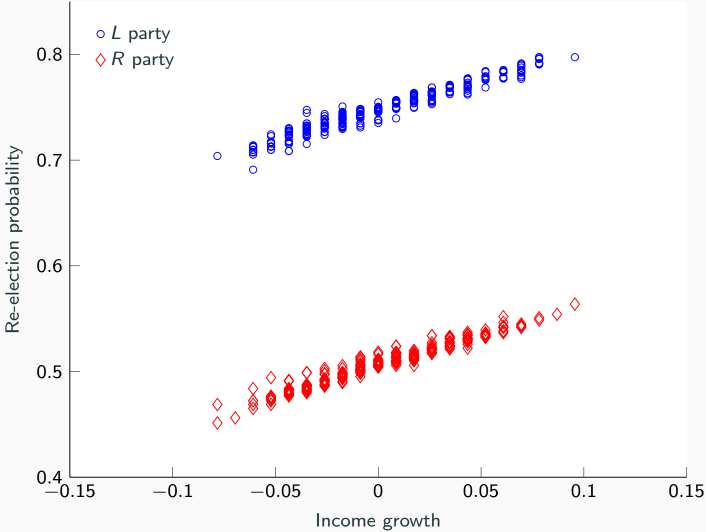


Figure 7: Re-election probability and income growth.

Results – Fiscal policy over the cycle

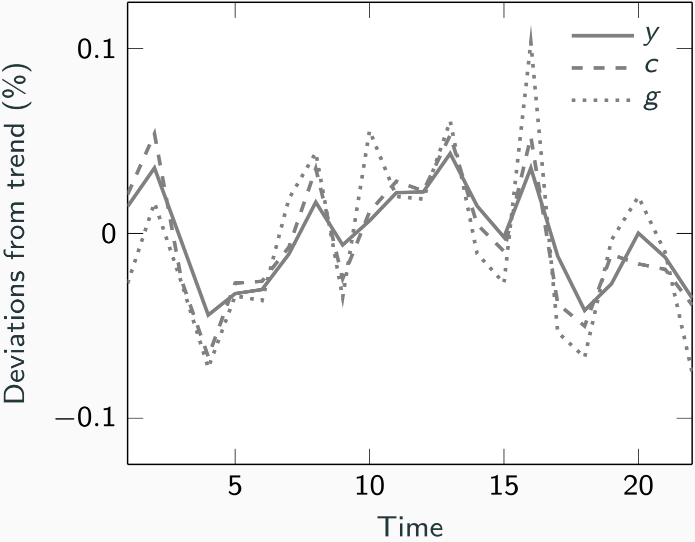


Figure 8: Cyclical behavior of c and g.

Results – Fiscal policy over the cycle

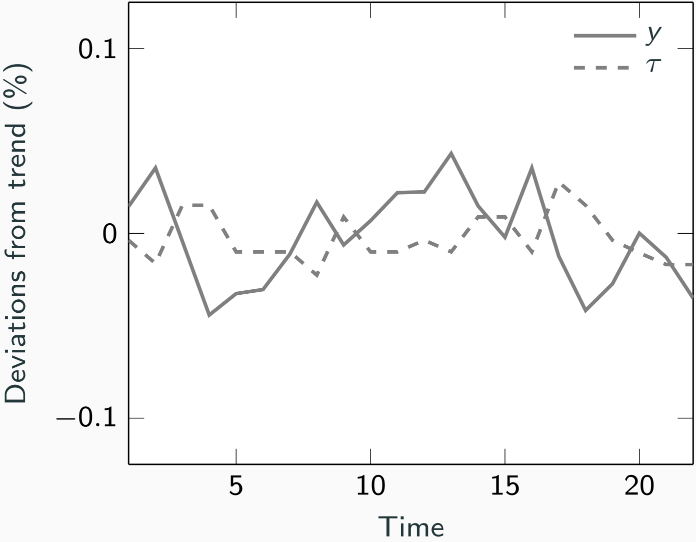


Figure 9: Cyclical behavior of τ.

Results – Fiscal policy over the cycle

- $corr(\tau, y) < 0 \Rightarrow$ Procyclical fiscal policy
  - good times: borrowing is cheap, so gov't relies less on τ
  - bad times: borrowing is expensive, so more reliant on τ
  - during defaults: no borrowing, so even more procyclicality.
- Both c and g are procylical. Usual explanation.

Conclusion

Conclusion

- Politics, bond markets and fiscal policy interact in a meaningful way.
- Established some (new) stylized facts.
- Propose a model which delivered the following features, all consistent with the data:
  - higher, more volatile and more counter-cyclical spreads for L governments,
  - endogeneous procyclical fiscal policy,
  - political stability is (endogenously) increasing in output and decreasing in debt,

Conclusion

- Linking back to the motivation.
- There are evidence and theories suggesting that:
  "**level** and **volatility** of spreads matter for EME."
- We've shown that **political differences** matter for both:
  level and **volatility** of spreads.

THANKS !

Database of Political Institutions

Party orientation with respect to economic policy, coded based on the description of the party in the sources:

- Right: for parties that are defined as conservative, Christian democratic, or right-wing.
- Left: for parties that are defined as communist, socialist, social democratic, or left-wing.
- 0: for all those cases which do not fit into the above categories (i.e. party's platform does not focus on economic issues, or there are competing wings), or no information.

back

World Bank's WDI

- **Taxes:** Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue.

- **Government Spending:** General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are capital formation.

back

List of countries

Angola	Croatia	Kazakhstan	Poland
Argentina	Dom. Rep.	Lebanon	Senegal
Belize	Ecuador	Mexico	South Africa
Bolivia	El Salvador	Mozambique	Tanzania
Brazil	Ghana	Namibia	Thailand
Bulgaria	Guatemala	Nigeria	Trinidad & Tobago
Chile	Honduras	Pakistan	Tunisia
Colombia	Hungary	Panama	Turkey
Costa Rica	India	Paraguay	Uruguay
Cote d' Ivore	Jamaica	Peru	Vietnam

back

Fiscal policy and political colors

Table 8: Politics and Fiscal Policy

	Left	Right
$E(T/Y)$	18.1	15.4
$E(G/Y)$	15.3	13.8
$E(Debt/Y)$	9.2	11.3

back

$P(\tau, g)$ details

$$P_i(\tau, g) = \left(\frac{c(\tau)}{y} - \kappa\right)^{\phi_i} + \left(\frac{g}{y}\right)^{\omega_i} \tag{6}$$

where $i = \{L, R\}$

P1. $\uparrow \tau \implies \downarrow P$: $\quad \frac{\partial P_i}{\partial \tau} < 0 \, \forall \, i$

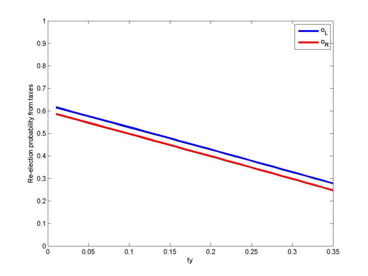
P2. R parties are more strongly affected by $\uparrow \tau$: $\quad \left|\frac{\partial P_L}{\partial \tau}\right| < \left|\frac{\partial P_R}{\partial \tau}\right|$

P3. $\uparrow g \implies \uparrow P$: $\quad \frac{\partial P_i}{\partial g} > 0 \, \forall \, i$

P4. L parties receive more support from $\uparrow g$: $\quad \left|\frac{\partial P_L}{\partial g}\right| > \left|\frac{\partial P_R}{\partial g}\right|$

▸ back

$P(\tau, g)$ details



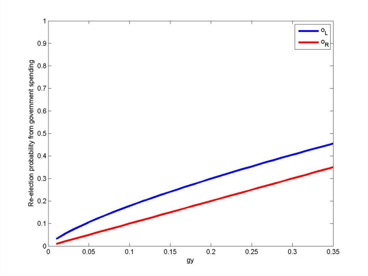


Figure 10: Components of $P(\tau, g)$: taxes ($\leftarrow$) and gov. spending ($\rightarrow$).

back

Value functions while not in power ▸ (back)

$$\bar{V}_i^R(b,y) = \beta(1-\pi)\int_{y'} \bar{V}_i(b'_{-i},y')\mu(y',y)dy' +$$

$$\beta\pi\Bigg[(1-P_{-i}(\tau_{-i},g_{-i}))\int_{y'} V_i(b'_{-i},y')\mu(y',y)dy' +$$

$$P_{-i}(\tau_{-i},g_{-i}))\int_{y'} \bar{V}_i(b'_{-i},y')\mu(y',y)dy'\Bigg]$$

$$\bar{V}_i^D(y) = \beta(1-\pi)\left(\theta\int_{y'} \bar{V}_i(0,y')\mu(y',y)dy' + (1-\theta)\int_{y'} \bar{V}_i^D(y')\mu(y',y)dy'\right)$$

$$+\beta\pi\Bigg[(1-P_{-i}(\tau_{-i},g_{-i}))\left(\theta\int_{y'} V_i(0,y')\mu(y',y)dy' + (1-\theta)\int_{y'} V_i^D(y')\mu(y',y)dy'\right)$$

$$+P_{-i}(\tau_{-i},g_{-i})\left(\theta\int_{y'} \bar{V}_i(0,y')\mu(y',y)dy' + (1-\theta)\int_{y'} \bar{V}_i^D(y')\mu(y',y)dy'\right)\Bigg]$$

$$\bar{V}_i(b_{-i},y) = \begin{cases} \bar{V}_i^R(b_{-i},y) & \text{if } d_{-i}(b_{-i},y) = 0 \\ \bar{V}_i^D(y) & \text{if } d_{-i}(b_{-i},y) = 1 \end{cases}$$

Taxes and gov't spending (level)

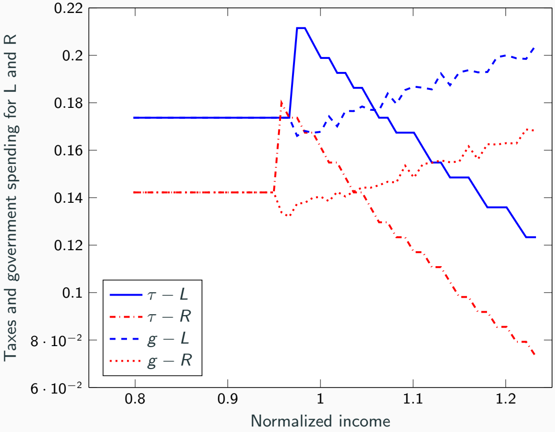


Figure 11: Taxes and Gov't spending.

back

Taxes and gov't spending (relative)

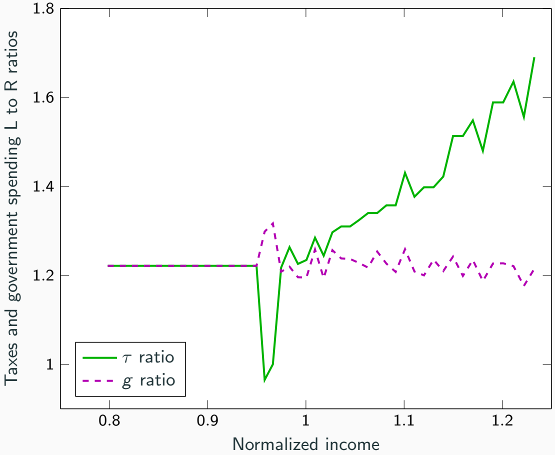


Figure 12: Relative movements in τ and g.

back