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

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.
  - **Right:** parties defined as conservative, Christian democratic, or right-wing.
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- We think of $L$ and $R$ as labels.
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- We think of $L$ and $R$ as labels.

- Do these labels align w/ our typical understanding of $L$ vs. $R$?
Our database shows that:

- \( L \) collects more taxes than \( R \)
- \( L \) has higher public spending than \( R \)
- \( R \) has higher debt-to-output than \( L \)
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 $L$

- Consistent with ‘common wisdom’ about EME
- Also consistent with evidence from the US and OECD countries (see Müller, Storesletten and Zilibotti 2015)
Empirical evidence – Spreads and politics

Table 1: OLS estimation

<table>
<thead>
<tr>
<th>Dep. variable: Spreads</th>
<th>(i)</th>
<th>(ii)</th>
</tr>
</thead>
<tbody>
<tr>
<td>constant</td>
<td>507.5***</td>
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| 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

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<td>$\sigma(\text{Spread})$ (in bps.)</td>
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## Empirical evidence – Spreads and politics

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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: \[ U(c, g) = \alpha u(c) + (1 - \alpha) u(g) \]  \hspace{1cm} (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:

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

where \( y_a \leq y \, \forall y \).
Model – Political turnover

- An election may occur in every period with prob $\pi$.
  - Similar to Chatterjee and Eyigungor (2017) and Scholl (2017).

- If an election occurs, the incumbent may be replaced.
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If an election occurs, the incumbent may be replaced.

The re-election probability $P$ depends on

- Gov’t spending: $\uparrow g \implies \uparrow P$
- Taxation: $\uparrow \tau \implies \downarrow P$
Evidence on taxes:

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


Evidence on gov't spending:

- $\uparrow g \implies \uparrow P$

Model – Political turnover

Evidence on taxes:

• $\uparrow \tau \Rightarrow \downarrow P$

• $R$ parties are more strongly affected by $\uparrow \tau$.
  - Tillman and Park (2009).
Evidence on taxes:

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Evidence on taxes:

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  Tillman and Park (2009).

Evidence on gov’t spending:

- $\uparrow g \implies \uparrow P$
  

- $L$ parties receive more political support from $\uparrow g$
  
  Shin (2016)
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 $\uparrow g$
In case of repayment:

\[ g + b = \tau y + b'q(b', y) \]  \hspace{1cm} (3)
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In case of default:

\[ g = \tau y_a \]  \hspace{1cm} (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 ($\tau$) and new borrowing ($b'$, if not excluded) are chosen.

4. w/ prob $\pi$ there is an election. w/ prob $P(\tau, g)$ incumbent wins.

- end of period $t$
Model – Government’s Problem

\[ V_i(b, y) = \max \left\{ V_i^R(b, y), V_i^D(y) \right\} \]
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\[ V_i^R(b, y) = \max_{g, \tau, b'} \left\{ U(c, g) + \beta(1 - \pi) \int_{y'} V_i(b', y') \mu(y', y) dy' + \beta \pi \left[ P_i(\tau, g) \int_{y'} V_i(b', y') \mu(y', y) dy' + (1 - P_i(\tau, g)) \int_{y'} \bar{V}_i(b', y') \mu(y', y) dy' \right] \right\} \]
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\]

subject to

\[
c = (1 - \tau) y,
\]
\[
g = \tau y + q_i(b', y)b' - b.
\]
Model – Government’s Problem

\[ V^D_i(y) = \max_{g, \tau} \left\{ U(c, g) + \right. \]
\[ \beta (1 - \pi) \left( \theta \int_{y'} V_i(0, y') \mu(y', y) \ dy' + (1 - \theta) \int_{y'} V^D_i(y') \mu(y', y) \ dy' \right) + \]
\[ \beta \pi \left[ P_i(\tau, g) \left( \theta \int_{y'} V_i(0, y') \mu(y', y) \ dy' + (1 - \theta) \int_{y'} V^D_i(y') \mu(y', y) \ dy' \right) + \right. \]
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\[ \beta \pi \left[ P_i(\tau, g) \left( \theta \int_{y'} V_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} V_i^D(y') \mu(y', y) dy' \right) + \right. \]

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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**.
The default policy of incumbent $i$ is characterized by:

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

(5)
Model – Default decision

The default policy of incumbent $i$ is characterized by:

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(5)

Default set:

$$\mathcal{D}_i(b) = \{y \in \mathcal{Y} : d_i(b, y) = 1\}$$
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Default probability:

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

- Risk neutral, deep-pocketed agents
- $r^*$ is the international risk-free interest rate
- Bonds are priced in a competitive market
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$$q_i(b', y) = (1 - \pi) \left( \frac{1 - \lambda_i(b', y)}{1 + r^*} \right) +$$
$$\pi \left[ P_i(\tau, g) \left( \frac{1 - \lambda_i(b', y)}{1 + r^*} \right) + (1 - P_i(\tau, g)) \left( \frac{1 - \lambda_{-i}(b', y)}{1 + r^*} \right) \right]$$
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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.

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<th>Value</th>
<th>Source</th>
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<td>Income autocorr. coeff.</td>
<td>$\rho$</td>
<td>0.78</td>
<td>Estimation</td>
</tr>
<tr>
<td>Std. dev. of income innovations</td>
<td>$\sigma$</td>
<td>0.034</td>
<td>Estimation</td>
</tr>
<tr>
<td>Borrower’s risk aversion</td>
<td>$\gamma$</td>
<td>2</td>
<td>Prior literature</td>
</tr>
<tr>
<td>Risk-free rate</td>
<td>$r^*$</td>
<td>0.04</td>
<td>Prior literature</td>
</tr>
<tr>
<td>Duration of defaults</td>
<td>$\theta$</td>
<td>0.154</td>
<td>Prior literature</td>
</tr>
<tr>
<td>Probability of elections</td>
<td>$\pi$</td>
<td>0.25</td>
<td>Prior literature</td>
</tr>
</tbody>
</table>
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.

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<tr>
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<th>Value</th>
<th>Target</th>
<th>Data</th>
<th>Model</th>
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<tr>
<td>Discount factor</td>
<td>( \beta )</td>
<td>0.65</td>
<td>Mean spread</td>
<td>495</td>
<td>504</td>
</tr>
<tr>
<td>Income cost of default</td>
<td>( \psi )</td>
<td>0.89</td>
<td>Mean ( b/y )</td>
<td>10%</td>
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<tr>
<td>Utility weight on ( g )</td>
<td>( \alpha )</td>
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<tr>
<td>Political parameter</td>
<td>( \kappa_L )</td>
<td>0.55</td>
<td>Mean ( T_L/Y )</td>
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<tr>
<td>Political parameter</td>
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<tr>
<td>Political parameter</td>
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<td>0.56</td>
<td>Mean ( P(\cdot) )</td>
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</table>
Results
Results – Road-map

1. Main results
2. Business cycle statistics
3. Endogenous vs. exogenous turnover
4. Fiscal policy over the cycle
Table 5: OLS estimation

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<td>–12.2***</td>
</tr>
<tr>
<td>Year and region FE</td>
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</tr>
<tr>
<td>Adj. $r^2$</td>
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### Results – Main results

#### Table 5: OLS estimation

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Our model replicates **Fact 1** and **Fact 2**.
Results – Main results

Figure 1: Spread-debt menus.
• 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 $\tau$, $g$ and $b'$ differs across parties.

(i) – (ii) are determined simultaneously.
Figure 2: Default sets for $L$ and $R$. 
Why is $L$’s default region larger?

1. As income decreases, both parties decrease gov’t spending.
Why is $L$’s default region larger?

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2. $L$ looses more from $\downarrow g$ (in reelection terms).
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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’.
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1. As income decreases, both parties decrease gov’t spending.

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.
Results – Main results

Figure 3: Changes in $g$ and $P$. 

[Graph showing the relationship between government spending/income and re-election probability for L and R party]
## Results – Business cycle statistics

### Table 6: Non-targetted moments.

<table>
<thead>
<tr>
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<tbody>
<tr>
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Exercise: keep $P_L$ and $P_R$ unchanged, but make both exogenous.
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Table 7: OLS estimation

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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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**Results flip:** now $L$ pays lower spreads, and its spreads are less countercyclical than those of $R$. 
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?**
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)
Another exercise: make $P$ exo, constant and equal across parties.

Figure 4: Endo. vs. exo. political turnover: $P(\tau, g)$ and $b/y$. 
Figure 5: Endo. vs. exo. political turnover: borrowing policy functions.
• 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” $\rightarrow P_i(\tau, g) = \bar{P} = 1 \; \forall i$

- 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 reelecions

- \( P(\tau, g) \). \( \tau \) 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 re-elections

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 $\tau$. 

Deviations from trend (%) vs. Time
Results – Fiscal policy over the cycle

- \( \text{corr}(\tau, y) < 0 \Rightarrow \text{Procyclical fiscal policy} \)
  - good times: borrowing is cheap, so gov’t relies less on \( \tau \)
  - bad times: borrowing is expensive, so more reliant on \( \tau \)
  - during defaults: no borrowing, so even more procyclicality.

- Both \( c \) and \( g \) are procyclical. 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 !
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.
• **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.
<table>
<thead>
<tr>
<th>Angola</th>
<th>Croatia</th>
<th>Kazakhstan</th>
<th>Poland</th>
</tr>
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<tbody>
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<td>Senegal</td>
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# Fiscal policy and political colors

## Table 8: Politics and Fiscal Policy

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<tbody>
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<td>$E(T/Y)$</td>
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$P(\tau, g)$ details

\[ P_i(\tau, g) = \left( \frac{c(\tau)}{y} - \kappa \right)^{\phi_i} + \left( \frac{g}{y} \right)^{\omega_i} \]  \hspace{1cm} (6)

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

**P1.** $\uparrow \tau \implies \downarrow P$: \[ \frac{\partial P_i}{\partial \tau} < 0 \ \forall \ i \]

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

**P3.** $\uparrow g \implies \uparrow P$: \[ \frac{\partial P_i}{\partial g} > 0 \ \forall \ i \]

**P4.** $L$ parties receive more support from $\uparrow g$: \[ \left| \frac{\partial P_L}{\partial g} \right| > \left| \frac{\partial P_R}{\partial g} \right| \]
Figure 10: Components of $P(\tau, g)$: taxes (←) and gov. spending (→).
\[ \bar{V}^R_i(b, y) = \beta(1 - \pi) \int_{y'} \bar{V}_i(b'_{-i}, y') \mu(y', y) dy' + \beta \pi \left[ (1 - P_{-i}(\tau_{-i}, g_{-i})) \int_{y'} V_i(b'_{-i}, y') \mu(y', y) dy' + P_{-i}(\tau_{-i}, g_{-i}) \int_{y'} \bar{V}_i(b'_{-i}, y') \mu(y', y) dy' \right] \]

\[ \bar{V}^D_i(y) = \beta(1 - \pi) \left( \theta \int_{y'} \bar{V}_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} \bar{V}^D_i(y') \mu(y', y) dy' \right) + \beta \pi \left[ (1 - P_{-i}(\tau_{-i}, g_{-i})) \left( \theta \int_{y'} V_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} V_i^D(y') \mu(y', y) dy' \right) + P_{-i}(\tau_{-i}, g_{-i}) \left( \theta \int_{y'} \bar{V}_i(0, y') \mu(y', y) dy' + (1 - \theta) \int_{y'} \bar{V}^D_i(y') \mu(y', y) dy' \right) \right] \]

\[ \bar{V}_i(b_{-i}, y) = \begin{cases} \bar{V}^R_i(b_{-i}, y) & \text{if } d_{-i}(b_{-i}, y) = 0 \\ \bar{V}^D_i(y) & \text{if } d_{-i}(b_{-i}, y) = 1 \end{cases} \]
Figure 11: Taxes and Gov’t spending.
Figure 12: Relative movements in $\tau$ and $g$. 