International Equity and Debt Flows to Emerging Market Economies: Composition, Crises, and Controls

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Motivation

Capital flows to emerging markets are very volatile

- contributing to BOP/debt crises and volatile consumption
- creating an incentive for countries to impose capital controls

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  - Sunspot multiple equilibrium (Schmitt-Grohe and Uribe 2020)
- Demand externality
  - Farhi and Werning (2012 and 2016); Schmitt-Grohe and Uribe (2019)

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Our point of departure

- However, debt is not the only form of international capital flows
- Equity provides much better risk-sharing

Motivation (Cont.)

- Institutional quality matters for the composition of external liability

Our objectives and main results

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- Rationalize salient features of the data
- Work out endogenous composition of capital flows (equity versus debt)
  - Quality of domestic institutions will play a key role
- To work out optimal capital controls

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Main findings

- Capital structure and financial stability depend on institutional quality
  - Improving institutions and relaxing financial constraints are not the same thing
- Optimal capital controls policy depends on institutional quality
  - Improving institutional quality is better than imposing capital controls
  - Capital controls policy is useful only when institutional quality is poor enough
    - ⋆ Tax rate on debt $>$ Tax rate on equity > 0

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Additional work: with improvement in institutional quality,

- FDI relative to passive equity financing tends to decline
- Local currency debt relative to foreign currency debt tends to increase
- Long term versus short term debt tends to increase

Some data patterns

We use data from 159 countries between 1996 and 2015 to show that

1. The share of equity financing in total external liability tends to rise with the strength of a country's institutional quality. This relationship still holds after we control from income, trade openness, and (domestic) financial development.

2. Financial crises is less frequent in countries with a higher share of equity financing in total external liability.

3. Countries with a lower quality of institutions tend to have more restrictions on both cross border equity flows and debt flows.

External capital structure and institutional quality

	Panel A: Panel Regression: 1996-2015			Panel B: Cross Section: 1996-2015	
	Equity share (% in total liability)			$\Delta_{1997-2015}$ Equity share (% in total liability)	
	(1)	(2)	(3)		(4)
Quality $(t-1)$	1.99*	6.90**	9.21***	$\Delta_{1996-2014}$ Quality	10.16*
	(1.10)	(3.38)	(3.47)		(5.54)
Log GDP per capita $(t-1)$			-6.67	$\Delta_{1996-2014}$ Log GDP per capita	-2.77
			(4.26)		(4.90)
Private Credit $(t-1)$			-0.12***	$\Delta_{1996-2014}$ Private Credit	-0.07
			(0.05)		(0.06)
Trade $(t-1)$			0.01	$\Delta_{1996-2014}$ Trade	0.06
			(0.03)		(0.05)
Observations	2697	2697	2697	Observations	144
Random Effects	Y	N	N		
Year FE	N	Y	Y		
Country FE	N	Y	Y		
Cluster at Country-level	N	Y	Y		
R^2	0.0145	0.411	0.436	R^2	0.015

Probability of crises and external capital structure

	Sudden Stop Crises				Systemic Banking Crises			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Equity Share ($t-1$)	-0.03***	-0.05***	-0.03***	-0.05**	-0.04***	-0.06***	-0.04***	-0.04***
	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Log GDP per capita ($t-1$)			-0.22	0.87			-0.28	-2.18*
			(0.26)	(1.59)			(0.46)	(1.22)
Private Credit ($t-1$)			0.00	0.00			0.04***	0.06***
			(0.00)	(0.01)			(0.01)	(0.01)
Trade ($t-1$)			0.00	-0.00			0.01*	0.02**
			(0.00)	(0.01)			(0.00)	(0.01)
Random-effects	Yes	No	Yes	No	Yes	No	Yes	No
Country FE	No	Yes	No	Yes	No	Yes	No	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	928	736	892	708	2016	1083	1910	999

Capital controls and institutional quality I

Panel A: Fixed Effects Model										
	OLS		Probit Model		Logit Model		Ordered Probit Model		Ordered Logit Model	
	Equity (1)	Debt (2)	Equity (3)	Debt (4)	Equity (5)	Debt (6)	Equity (7)	Debt (8)	Equity (9)	Debt (10)
Quality	-0.25*	-0.22	-1.18**	-1.83***	-1.99**	-3.05***	-1.29**	-1.49**	-2.46***	-2.45*
	(0.14)	(0.16)	(0.49)	(0.52)	(0.86)	(0.90)	(0.50)	(0.73)	(0.91)	(1.43)
Log GDP per capita	-0.22*	-0.03	-2.18***	-0.26	-4.17***	-0.65	-1.31*	-0.10	-2.06	-0.43
	(0.13)	(0.14)	(0.73)	(0.73)	(1.34)	(1.28)	(0.74)	(0.80)	(1.43)	(1.49)
Private Credit	-0.00	0.00	-0.01**	0.01*	-0.02**	0.01**	-0.01**	-0.00	-0.01**	-0.01
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Trade	0.00	0.00	0.01*	0.01**	0.01*	0.02**	0.00	0.01	0.01	0.01
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1680	1653	705	646	705	646	1680	1653	1680	1653

Capital controls and institutional quality II

Panel B: Random Effects Model										
	OLS		Probit Model		Logit Model		Ordered Probit Model		Ordered Logit Model	
	(11) Equity	(12) Debt	(13) Equity	(14) Debt	(15) Equity	(16) Debt	(17) Equity	(18) Debt	(19) Equity	(20) Debt
Quality	-0.25**	-0.19*	-1.63**	-1.71*	-2.88*	-2.94*	-1.31***	-1.28**	-2.46***	-2.16**
	(0.12)	(0.11)	(0.82)	(0.99)	(1.68)	(1.73)	(0.43)	(0.53)	(0.77)	(1.03)
Log GDP per capita	-0.10	-0.04	-0.94	-0.38	-2.15	-0.76	-0.77	-0.31	-1.22	-0.70
	(0.09)	(0.08)	(0.97)	(0.77)	(2.50)	(1.28)	(0.57)	(0.52)	(1.06)	(0.96)
Private Credit	-0.00	0.00	-0.01	0.01	-0.01	0.01	-0.01*	-0.00	-0.01*	-0.01
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Trade	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.01
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1680	1653	1680	1653	1680	1653	1680	1653	1680	1653

Environment: A small open economy

- Three-period model: $t = 1, 2, 3$
- Two goods: tradable and non-tradable
- Preference is given by

$$\omega_T \log C_{T1} + \beta E_1 [\omega_T \log C_{T2} + \omega_N \log C_{N2} + \beta \omega_T \log C_{T3}] \tag{1}$$

- Notation
  - C_{Tt}: tradable consumption at $t = 1, 2, 3$
  - C_{N2}: non-tradable consumption at time 2
  - ω_T: share of tradable consumption in total consumption
  - β: discount rate
- Income stream: $\{y_2, y_{N2}, y_3\}$, where $y_2 \sim U[\underline{y}, \bar{y}]$ and $\underline{y} \equiv 0$.

Environment: Financial contracts

- Debt contract
  - One period debt, denoted in units of tradable good (as in the literature)
  - In extensions, we will consider (a) long dated debt, and (b) local currency debt
- Equity contract
  - Sold at $t = 1$ with a claim on income stream $\{y_2, y_3\}$
  - In an extension, we will distinguish between FDI and passive (portfolio) equity
- Financial frictions in the debt market (Bianchi, 2011; and Korinek, 2018)

$$\frac{d'}{1+r} \leq \phi(py_{N2} + (1-s)y_2) \tag{2}$$

  - ϕ: the degree of financial friction
  - p: the price of non-tradable good to tradable good.
  - s: share of equity sold to int'l investors

Role of institutional quality

Possible manipulation of payoffs by CEO of the domestic firm

- Equity payoff with true payoffs $\{y_2, y_3\}$
  - CEO may steal $\kappa\{y_2, y_3\}$ with $\kappa \in [0,1]$ from equity investors
  - q: the probability that the CEO can get away from stealing (e.g., international investors lose a legal case in the local court)
  - $1-q$: the probability that the CEO fails and has to pay a fine of $\chi\{y_2, y_3\}$ with $\chi \in (\kappa, 1]$

- Debt with promised payoff 1
  - The CEO may steal $\kappa'(0 < \kappa' < 1)$ from debt investors by falsely declaring a bankruptcy and suffering a bankruptcy cost of B
  - q: the probability that the CEO can get away from stealing (i.e., international investors lose a legal case in the local court)
  - $1-q$: the probability that the CEO fails and has to pay a fine of χ' with $\chi' \in (\kappa', 1]$

Effect of institutional quality on financing costs

Proposition

The incentive for domestic agents to manipulate payoffs depends on parameter values. Specifically,

- *CEO's payoff from cheating equity investors are given by* $[q\kappa - (1-q)\chi]y_1$. *She does not manipulate equity payoffs when* $q < \frac{\chi}{\kappa+\chi}$ *but does so when* $q \geq \frac{\chi}{\kappa+\chi}$.
- *CEO's payoff from cheating debt investors are given by* $q\kappa' - (1-q)\chi' - B$. *She does not manipulate debt payoffs when* $q < \frac{\chi'+B}{\chi'+\kappa'}$ *but does so when* $q \geq \frac{\chi'+B}{\chi'+\kappa'}$.

- Note: if B is big enough ($B < \kappa'$), CEO never cheats on debt
- Holmstrom (2016): debt is less "information sensitive" than equity

Interpretation of θ

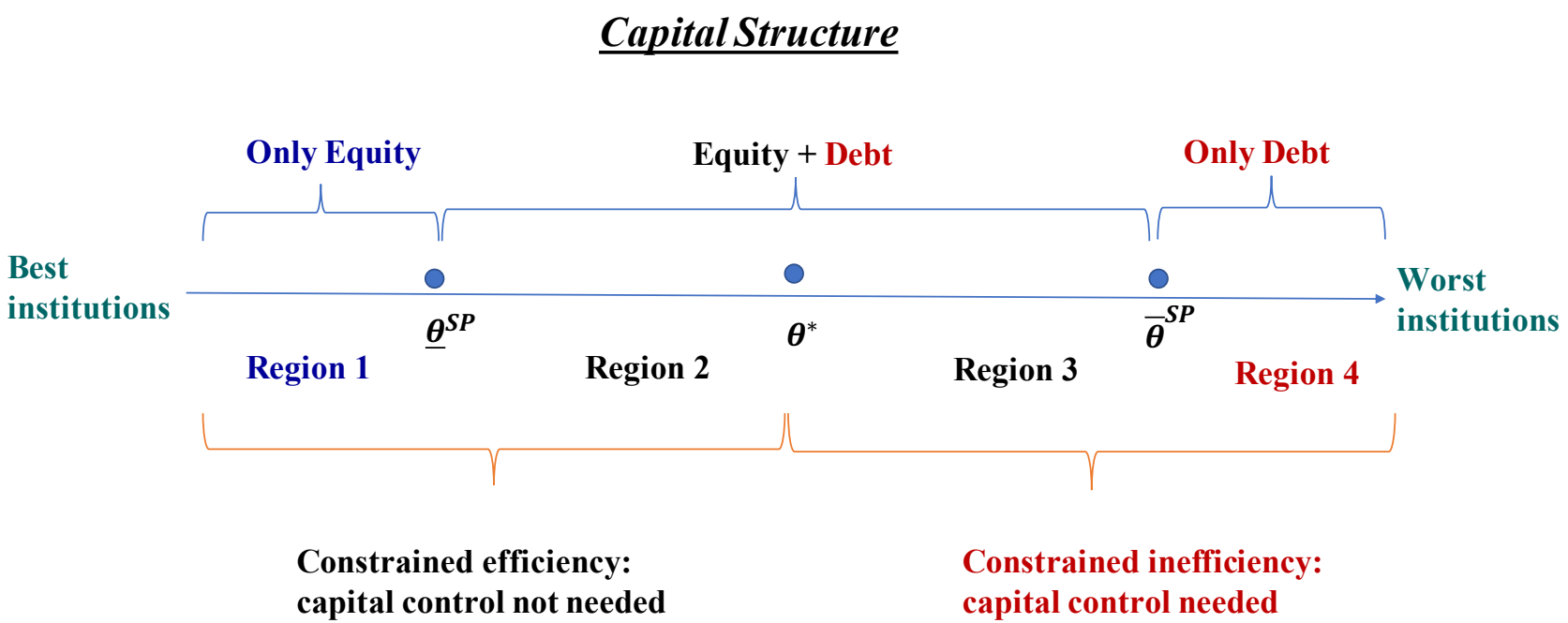
- $\theta = \max\{0, q\kappa - (1-q)\chi\}$
  - q: probability of investor being expropriated (i.e., losing legal case in the local court)
  - κ: fraction of income loss in manipulation
  - χ: fraction of income that is paid to investors as fine
- θ: expected % reduction in payoff to foreign equity investors
- Alternative explanations for θ
  - Expropriation risk due to corruption or deviations from rule of law
  - Risk to foreign equity investors due to governments moral hazard
    - ★ future government more tempted to raise tax on dividends to foreign investors when investment size goes up

Capital structure, pecuniary externality and capital controls

Pecuniary externality

- Price of non-tradable goods is a function of tradable goods consumption
- The social planner knows this, but private agents fail to realize this

Capital structure and capital controls: Role of θ



Policy implementation

- Pigovian taxation

$$C_{T1} = (1-\tau^s)\, s(1-\theta)y_1 + \left(1-\tau^d\right)\frac{d}{1+r} + T \tag{3}$$

where $T = \tau^s s(1-\theta)y_1 + \tau^d \frac{d}{1+r}$.

Proposition

Optimal capital controls tax implementation
The social planner's allocation can be implemented by a capital control tax $\{\tau^s, \tau^d\}$ *on total external equity and debt, where taxes are given by*

$$\tau^d = \frac{\beta(1+r)E\left[\phi\mu\frac{\omega_N}{\omega_T}\right]}{\frac{\omega_T}{C_{T1}}} > 0 \tag{4}$$

$$\tau^s = \frac{\beta E\left[\phi\mu\frac{\omega_N}{\omega_T}y_2\right]}{\frac{\omega_T}{C_{T1}}(1-\theta)y_1} > 0 \tag{5}$$

Furthermore, $\tau^d > \tau^s$.

Institutional quality θ versus financial development ϕ

Relative to emerging market economies, advanced economies typically have

- better institutional quality (i.e. low θ)
- high level of financial development (i.e. high ϕ)

Comparative statistics by varying θ or ϕ: Illustration using a numerical example

Similarity

- both imply a lower probability of crises

Differences

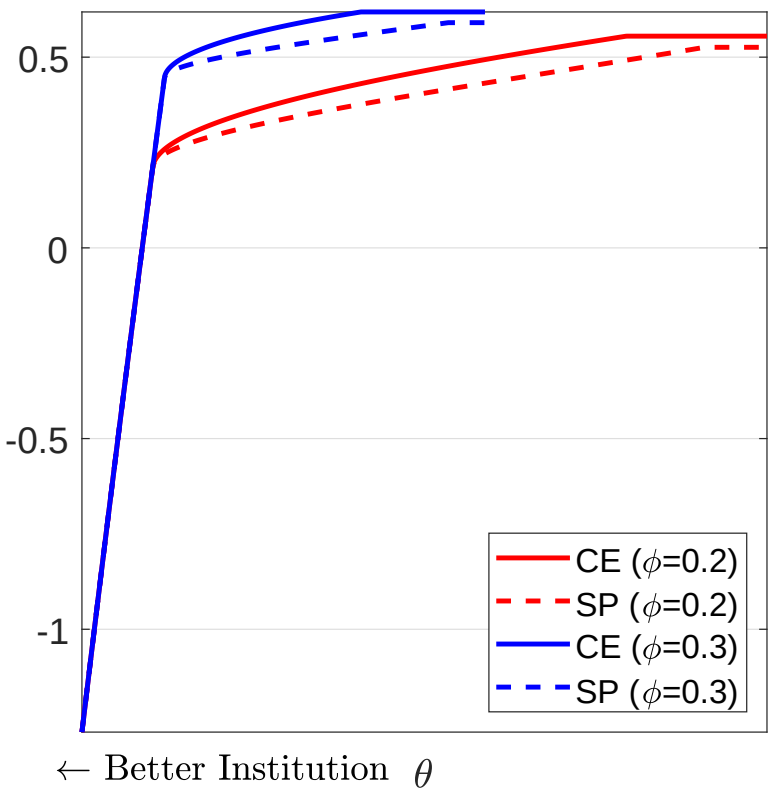
- share of equity financing
- intensity of capital controls policy

Lowering θ implies 1) higher equity share; 2) less use of capital controls policy

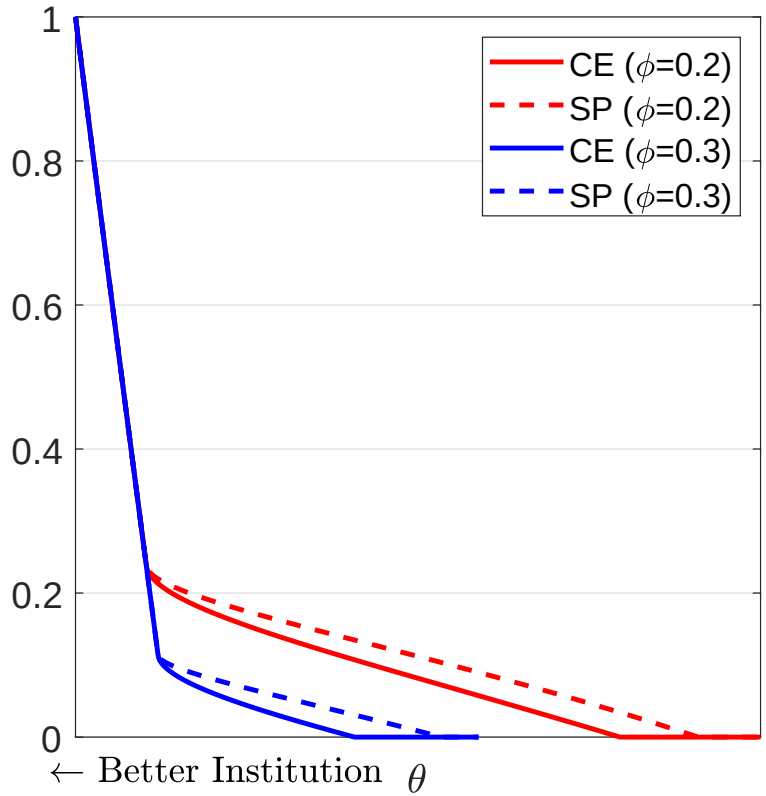
But increasing ϕ implies the opposite pattern

Variation in θ and ϕ

Panel A: Debt financing (d)

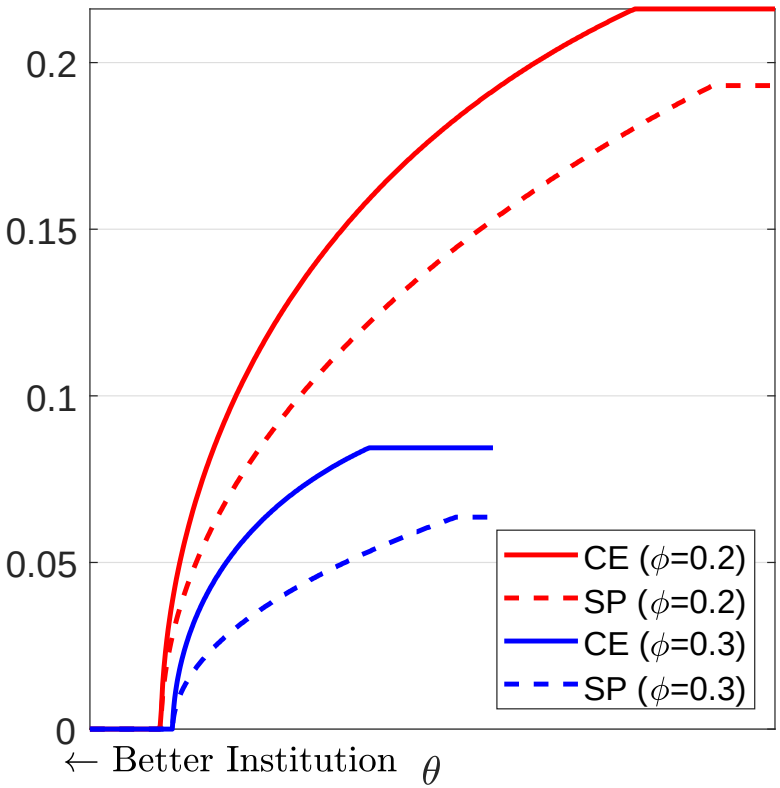


Panel B: Equity financing (s)

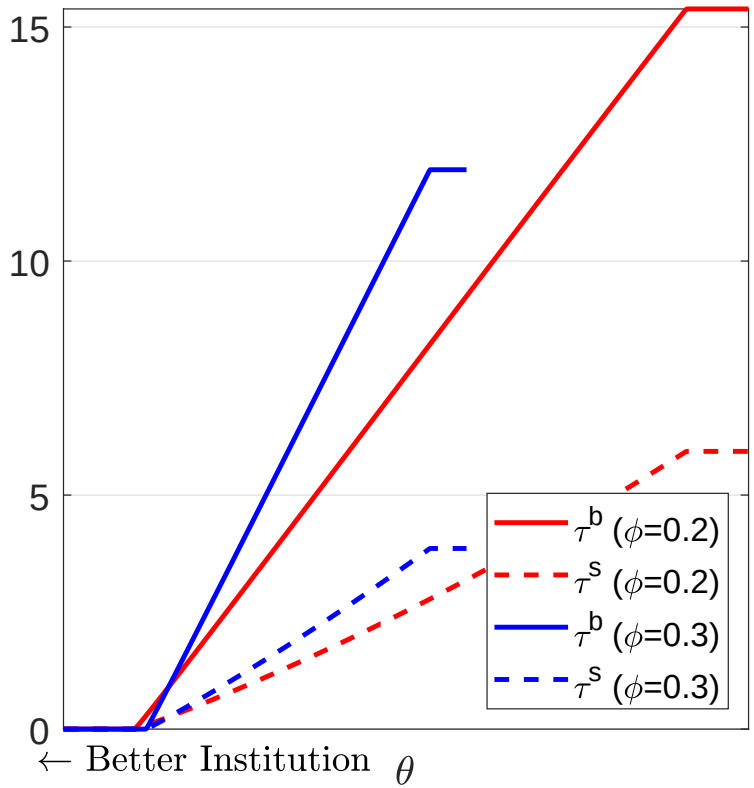


Variation in θ and ϕ (Cont.)

Panel C: Probability of crises



Panel D: Capital control taxes (%)



Conclusions

- We provide a model of composition of capital flows that embeds a central role for institutional quality
- Institutional quality determines capital structure and financial stability
- Better institutions and more relaxed financial constraint are different
- Optimal tax on capital flows depends on the institutional quality
  - When domestic institutional quality is high, no need for capital controls
  - When domestic quality is low, controls on both equity and debt

Dataset

Dataset

- Capital Structure: External Wealth of Nations from Lane and Milesi-Ferretti (2007)
- Worldwide Governance Indicators (WGI) dataset from World Bank Institute
- Sudden stop episodes from Korinek and Mendoza (2014)
- Capital controls data from Fernàndez et al (2016)

Coverage

- 58 countries annual data from 1996-2011

Institutional quality measure

- Control of Corruption (CC)
- Government Effectiveness (GE)
- Political Stability and Absence of Violence/Terrorism (PS)
- Rule of Law (PL)
- Regulatory Quality (RQ)
- Voice and Accountability (VA)

Dataset

- We use capital controls measure from Fernàndez et al. (2016)
- Based on IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER)
- 10 asset categories
  - equity (EQ), bonds with an original maturity of more than one year (BO), money market Instruments (MM), collective investment securities such as mutual funds and investment trusts (CI), derivatives (DE), commercial credits (CC), financial credits (FC), guarantees, sureties and financial back-up facilities (GS), direct investment (DI), and real estate transactions (RE).
- Look at the restrictions on foreign purchases by non-residents (MM, BO, EQ, CI, DE and RE)
  - measures with respect to "purchase locally by non-residents"
- For the remaining
  - measure on inflow restrictions