

# Exchange Rate Flexibility, Financial Market Openness, and Economic Growth

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- Exchange rate flexibility plays an insignificant role in growth.
- Financial market openness matters in determining how the exchange rate flexibility should be if the objective is to maximize long-run economic growth.

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- EMs in the open financial market:
  - Hard to obtain monetary policy independence regardless of exchange rate flexibility.
  - Rey (2015, 2016), Passari and Rey (2015), Hofman and Takáts (2015), Rose (2014).

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- Impact of exchange rate flexibility on economic growth varies with the degree of financial openness.
  - Dynamic Panel Model (Aghion et al., 2009)
    - 87 countries, [▶ Country List](#)
    - Sample period: 1966 ~ 2010 (5-year intervals)
  - Classify countries into ADs and EMs based on their level of financial market openness.
  - Investigate whether the effect of exchange rate flexibility on economic growth differs between ADs and EMs.

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- Classification based on financial development:
  - Financial development measure = Private Credit / GDP
  - Measures market size, but does not capture the multi-dimensional aspects of financial development (Svirydzenka, 2016).
  - Less relevant for cross-border activities.
- We classify countries into ADs and EMs based on financial market openness and convertibility.
  - Financial market integration: allowing residents and domestic institutions to participate in the transactions of international financial markets (Yu, 2014).
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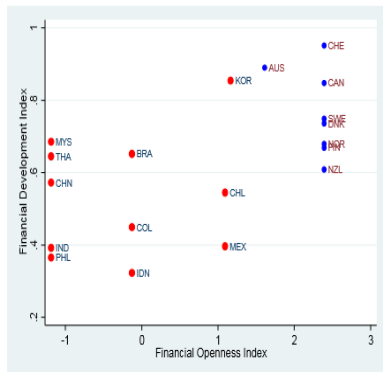
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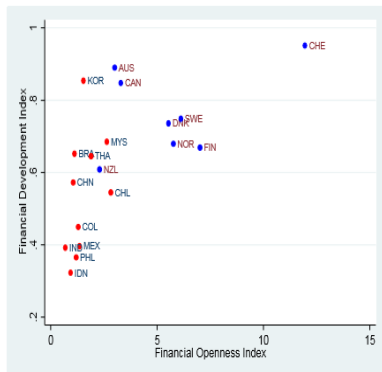
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## Financial Development and Financial Openness

(a) Chinn-Ito index



(b) Lane & Milesi-Ferretti



Note: Blue points denote countries that use a freely convertible currency, and red points denote countries that do not use a freely convertible currency. Data on the currency convertibility is available at <http://www.financialfreedomindex.com/currency-convertibility.html>

## Empirical Model Specification

- Dynamic Panel Model (Arellano and Bond, 1991; Arellano and Bover, 1995; Blundell and Bond, 1998; Windmeijer, 2005)

$$y_{i,t} - y_{i,t-1} = (\alpha - 1)y_{i,t-1} + \beta_1 ER_{i,t} + \beta_2 ER_{i,t} \cdot KA_{i,t} + \beta_3 KA_{i,t} + \delta' Z_{i,t} + \mu_t + \eta_i + \varepsilon_{i,t}$$

where

$y_{i,t}$ : log of output per capita,  $ER_{i,t}$ : exchange rate flexibility

$KA_{i,t}$ : financial market openness,  $Z_{i,t}$ : a set of control variables

$\mu_t$ : time fixed effect,  $\eta_i$ : country fixed effect,  $\varepsilon_{i,t}$ : error

- Hypothesis:  $\beta_1 < 0$  and  $\beta_2 > 0$
- the impact of exchange rate flexibility  $\beta_1 ER_{i,t} + \beta_2 ER_{i,t} \cdot KA_{i,t}$  is more negative at low levels of financial market openness.

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## Data and Variables

- Following Aghion et al. (2009), exchange rate flexibility ( $ER_{i,t}$ ) is calculated using the exchange rate regime classified by Reinhart and Rogoff (2004):

$$ER_{i,t,t+5} = \frac{1}{5} \sum_{l=1}^5 ERR_{i,t+l}$$

where

$$ERR_{i,t} \in \{1, 2, 3, 4\} = \{\text{fix, peg, managed float, float}\}$$

- Financial Market Openness ( $KA_{i,t}$ ): Chinn-Ito Index (de-jure)
- A set of control variables ( $Z_{i,t}$ ): [Data Source](#)
  - education: average years of secondary schooling
  - trade openness: imports and exports as proportion of GDP
  - government burden: government spending as proportion of GDP
  - lack of price stability: inflation
  - crisis dummies: the frequency of a currency crisis and external debt crisis within each 5-year interval (Reinhart and Rogoff, 2011)

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## Main Result

	RR Coarse Classification			
	(1)	(2)	(3)	(4)
Exchange Rate Flexibility (ER)	-1.920** (0.752)	-1.669** (0.680)	-1.419** (0.638)	-0.793 (2.463)
Financial Market Openness (KA)	-7.424*** (2.803)	-6.637** (2.544)	-5.210** (2.014)	-6.005* (3.296)
Financial Development (FD)			0.398 (0.410)	0.828 (1.652)
Initial GDP per capita	-0.377 (0.634)	-0.482 (0.625)	-1.308** (0.583)	-1.265** (0.589)
Flexibility × Financial Market Openness (ER × KA)	3.731*** (1.257)	3.407*** (1.135)	3.021*** (1.076)	3.435** (1.616)
Flexibility × Financial Development (ER × FD)				-0.224 (0.815)
Education	1.551 (1.081)	1.748* (1.024)	2.647*** (0.772)	2.559*** (0.797)
Trade Openness	1.767*** (0.593)	1.761*** (0.560)	1.507*** (0.499)	1.485*** (0.566)
Government Burden	-1.506 (1.018)	-1.549 (1.049)	-0.866 (0.903)	-0.868 (0.952)
Lack of Price Stability	1.608 (2.581)	3.647 (2.796)	3.233 (4.478)	2.982 (4.735)
Currency Crisis		-0.265 (0.186)	-0.254 (0.193)	-0.223 (0.215)
External Debt Crisis		-0.375*** (0.132)	-0.444*** (0.133)	-0.448*** (0.137)
No. countries/observations	87/536	87/536	87/534	87/534

Note: The estimation methodology is two-step system GMM with small sample robust correction. Time-fixed effects are included in all regressions. Standard errors are in the parentheses. \*, \*\*, and \*\*\* indicate significance at the 10, 5, and 1-percent levels, respectively. Dependent variable is growth rate of GDP per capita. A constant term is included, but not reported.

## Empirical Result

- Exchange rate flexibility has a negative effect on economic growth.
- Effect of exchange rate flexibility on economic growth differs between ADs and EMs. ▶▶ Threshold
  - Countries with low financial market openness (EMs) benefit from maintaining a low level of exchange rate flexibility.
- Robust to alternative exchange rate flexibility measures. ▶▶ Robustness Check
  - Finer classification from Reinhart and Rogoff (2004).
  - Aghion et al. (2009):

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## Policy Implications for EMs

- Policy coordination between ADs and EMs.
- All possible policy instruments that work for EMs given a restricted set of policy measures.
  - (i) Choose interest rate or exchange rate or both as policy instruments.
  - (ii) Introduce capital flow measures and/or macro-prudential measures with the idea of containing build-up risks and bubbles in specific markets and asset types.
  - (iii) Maintain adequate level of international reserves as insurance, taking into account global and regional safety nets.
    - Reduce the exchange rate flexibility for EMs.

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## Conclusion

- Financial openness influences the effect of exchange rate flexibility on economic growth.
  - Exchange rate flexibility has a negative effect on economic growth.
  - Countries with low financial market openness (EMs) benefit from maintaining a low level of exchange rate flexibility.
- Policy Implications for EMs:
  - Policy coordination and all possible policy instruments that work for EMs given a restricted set of policy measures.
  - Exchange rate policy to reduce the exchange rate volatility for EMs with high exchange rate flexibility.

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## Country List

Algeria	Guatemala	Nigeria
Australia*	Honduras	Norway*
Austria*	Hungary	Pakistan
Bangladesh	Iceland*	Panama
Belgium*	India	Papua New Guinea
Bolivia	Indonesia	Paraguay
Botswana	Iran, Islamic Rep.	Peru
Bulgaria	Ireland*	Philippines
Burkina Faso	Israel*	Poland
Canada*	Italy*	Portugal*
Chile	Jamaica	Senegal
Colombia	Japan*	Slovak Republic*
Congo, Rep.	Jordan	Slovenia*
Costa Rica	Kenya	South Africa
Cote d'Ivoire	Korea, Rep.*	Spain*
Cyprus*	Latvia*	Sri Lanka
Czech Republic*	Lithuania*	Sweden*
Denmark*	Madagascar	Switzerland*
Dominica	Malawi	Syrian Arab Republic
Dominican Republic	Malaysia	Thailand
Ecuador	Malta*	Togo
Egypt, Arab Rep.	Mexico	Trinidad and Tobago
El Salvador	Mongolia	Tunisia
Finland*	Morocco	Turkey
France*	Nepal	Uganda
Gambia, The	Netherlands*	United Kingdom*
Germany*	New Zealand*	United States*
Ghana	Nicaragua	Uruguay
Greece*	Niger	Venezuela, RB

Note: \* denotes advanced economy defined by World Economic Outlook (IMF, 2015)

## GDP Growth Rate Correlation

Emerging Markets	Global Financial Crisis (2007-2009)		after GFC (2010-2015)	
	HP filtered GDP Growth	Actual - Avg	HP filtered GDP Growth	Actual - Avg
Brazil	0.76	0.79	0.25	-0.18
Chile	0.99	0.99	0.09	-0.31
Colombia	0.97	0.98	-0.59	-0.76
Mexico	0.97	0.97	0.72	0.37
India	0.17	0.22	0.59	0.56
Indonesia	0.97	0.96	0.18	-0.28
Malaysia	0.96	0.96	0.84	0.62
Philippines	1.00	1.00	0.47	0.40
Thailand	0.99	0.99	0.66	0.48
China, P.R.: Mainland	0.84	0.87	0.42	-0.02

## Data Source

Variable	Definition	Source
<b>Dependent Variable</b>		
GDP per capita ( $Y_{i,t}$ )	gross domestic product divided by midyear population	World Bank
<b>Explanatory Variables</b>		
Exchange Rate Flexibility ( $ER_{i,t}$ )	de facto exchange rate regime classification (coarse and fine)	Reinhart and Rogoff (2004)
	real effective exchange rate	IMF IFS
Financial market openness ( $KA_{i,t}$ )	de jure financial market openness	Chinn and Ito (2006)
<b>Other Control Variables</b>		
Education	secondary school enrollment	World Bank
Trade Openness	(import + export)/GDP	World Bank
Government Burden	(Government final consumption expenditure)/GDP	World Bank
Lack of Price Stability	log(100-inflation)	IMF IFS
Financial Development	(private credit)/GDP	World Bank
Currency Crisis	an annual depreciation versus the US dollar of 15 percent or more.	Reinhart and Rogoff (2011)
External Debt Crisis	failure to meet a principal or interest payment on the due date.	Reinhart and Rogoff (2011)

## Threshold

Given financial market openness,

$$\frac{\partial(y_{i,t} - y_{i,t-1})}{\partial ER_{i,t}} = \beta_1 + \beta_2 \widetilde{KA} \geq 0$$

$$\widetilde{KA} = -\frac{\beta_1}{\beta_2} \approx 0.5$$

- # of countries of which  $KA > 0.5$ : 54 out of 82 (66%, 2006~2010)

▶ Back

## Threshold (Continued)

Given Exchange rate flexibility,

$$\frac{\partial(y_{i,t} - y_{i,t-1})}{\partial KA_{i,t}} = \beta_3 + \beta_2 \widetilde{ER} \geq 0$$

$$\widetilde{ER} = -\frac{\beta_3}{\beta_2} \approx 2$$

- # of countries of which  $ER > 2$ : 46 out of 82 (56%, 2006~2010)

▶ Back

## Robustness Check

	RR Fine Classification		Exchange Rate Volatility	
	(1)	(2)	(3)	(4)
Exchange Rate Flexibility (ER)	-0.561*** (0.202)	-0.499** (0.192)	-14.95** (5.699)	-11.73* (6.148)
Financial Market Openness (KA)	-7.509*** (2.773)	-6.716** (2.645)	-1.216* (0.722)	-1.003 (0.792)
Initial GDP per capita	-0.112 (0.625)	-0.203 (0.608)	-1.246** (0.524)	-0.877 (0.531)
Flexibility × Financial Market Openness (ER × KA)	1.069*** (0.341)	0.984*** (0.314)	33.10** (14.58)	30.62* (16.77)
Education	1.316 (1.124)	1.482 (1.046)	2.885** (1.206)	2.114* (1.159)
Trade Openness	1.838*** (0.571)	1.824*** (0.538)	0.815** (0.377)	0.999** (0.381)
Government Burden	-2.011* (1.015)	-2.029** (1.017)	-1.371 (1.191)	-1.706** (0.825)
Lack of Price Stability	1.555 (2.320)	3.712 (2.585)	-5.460 (4.683)	0.276 (4.734)
Currency Crisis		-0.272 (0.168)		-0.612*** (0.209)
External Debt Crisis		-0.325** (0.141)		-0.181 (0.165)
No. countries/observations	87/536	87/536	48/294	48/294

Note: The estimation methodology is two-step system GMM with small sample robust correction. Time-fixed effects are included in all regressions. Standard errors are in the parentheses. \*, \*\*, and \*\*\* indicate significance at the 10, 5, and 1-percent levels, respectively. Dependent variable is growth rate of GDP per capita. A constant term is included, but not reported.