Precaution Versus Mercantilism: Reserve Accumulation, Capital Controls, and the Real Exchange Rate

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Motivating Questions

How does a nation's current wealth affect its future RER & trade balances?

- Traditional answer is higher NFA $\Longrightarrow$ stronger RER, lower TB (Hume)
- Standard theory: neoclassical model of private sector, $TB_t = -r^* NFA_0$
- Standard evidence: seminal work by Lane and Milesi-Ferretti (2002/04)
- Logic: if you become wealthier you want to consume out of that wealth

Might this view be incomplete?

- New assumptions: role of government and its motives
- Some NFA wealth is not held by private sector (reserves)
- Government may have motives to prefer NFA $\uparrow$ (insurance/"precaution")
- Government may have motives to prefer TB $\uparrow$ (externality/"mercantilism")

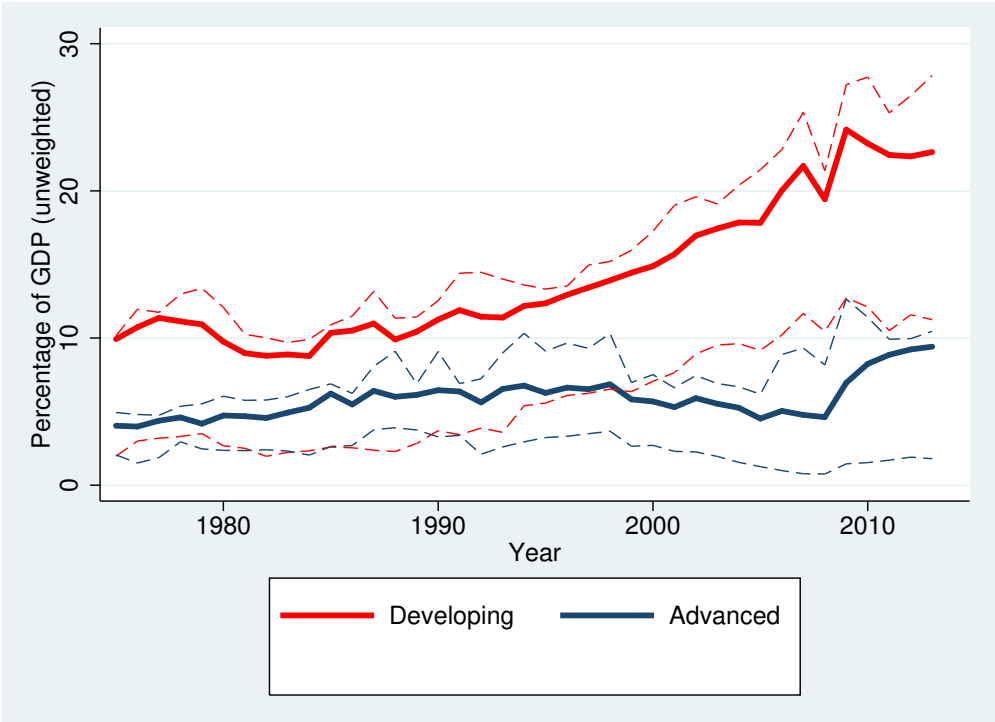
What does this paper do?

- Break the simple association between *NFA* and *TB*
- Revisit/extend the LMF results with evidence that *NFAxR* $\neq$ *RSRV*
- Optimal policy on 2 dimensions will require 2 instruments
- Present a theoretical model of capital controls and reserve accumulation

Reserve Accumulation: Facts

One of the most striking phenomena in global macro for last two decades.

- By 2011 global reserves exceeded $10 trillion (14% of World GDP).
- Large increase concentrated in developing countries.



Avg. Reserve Accumulation / GDP (Source : IMF IFS)

decomposition summary

Reserves Accumulations: Rationales

In theories of reserve accumulation, two motives are usually considered separately:

Mercantilist motive

- (Net) export in mfg. increases productivity (learning-by-doing externality).
- Amassing reserves devalues real exchange rate, boosts mfg. exports.
- Aizenman and Lee (2007), Jeanne (2013), Benigno and Fornaro (2012), Korinek and Servén (2016).

Precautionary motive

- Precautionary stockpiling as an insurance against BOP/financial crisis.
- Amassing reserves creates buffer for using in a sudden stop/flight.
- Obstfeld, Shambaugh and Taylor (2010), Jeanne and Ranciére (2011), Bianchi, Hatchondo, and Martinez (2016).

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We construct a simple integrated theoretical framework to account for real exchange rate determination incorporating **BOTH** views in one model.

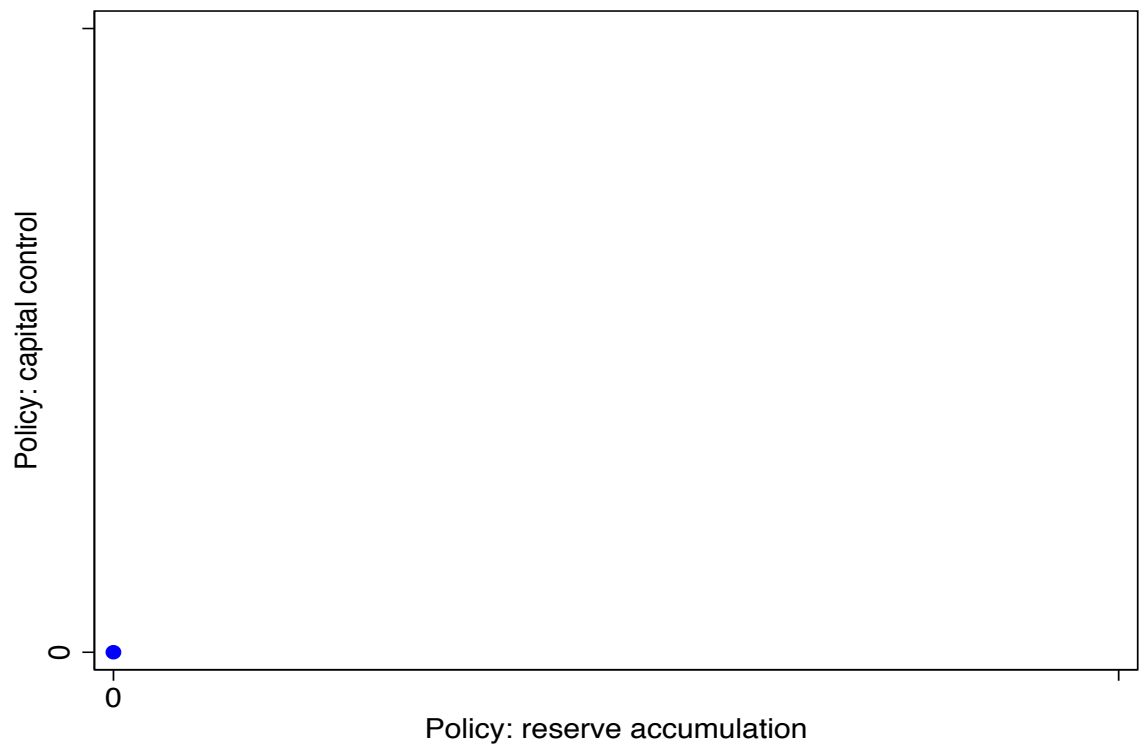
We compare the predictions of the model to our data driven empirical findings.

Preview: Model Intuition

Two distortions: financial crisis cost (ξ) and LBD externality (ν).
Two policy instruments: reserves (*rsrv*) and capital controls (tax indexed by κ).

Start from baseline: no financial crisis ($\xi = 0$), no LBD externality ($\nu = 0$).

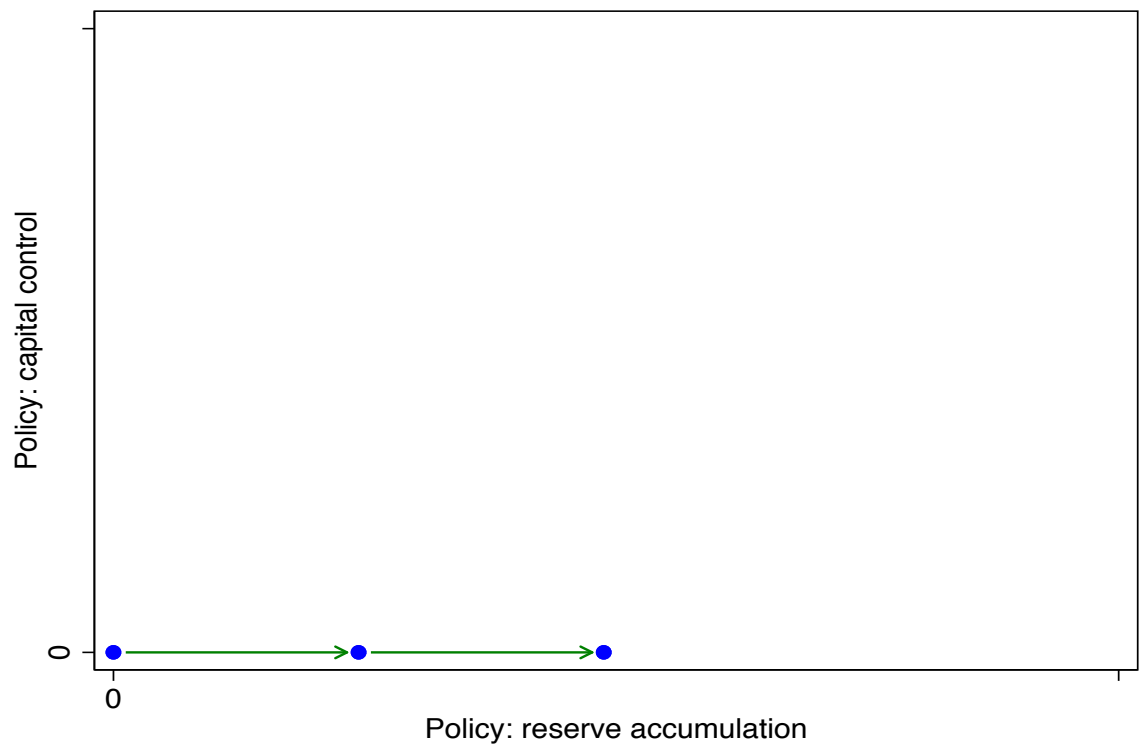
Laissez faire. Government chooses no reserves ($rsrv = 0$) and no capital controls ($\kappa = 0$), and so the laissez faire equilibrium (0,0) below is socially optimal.



Preview: Model Intuition

Deviate from baseline: increase crisis cost ($\xi \uparrow$), no LBD externality ($\nu = 0$).

Pure precautionary motive. Government increases reserves (*rsrv* $\uparrow$) but uses no capital controls ($\kappa = 0$), and the socially optimal equilibrium moves to the right.

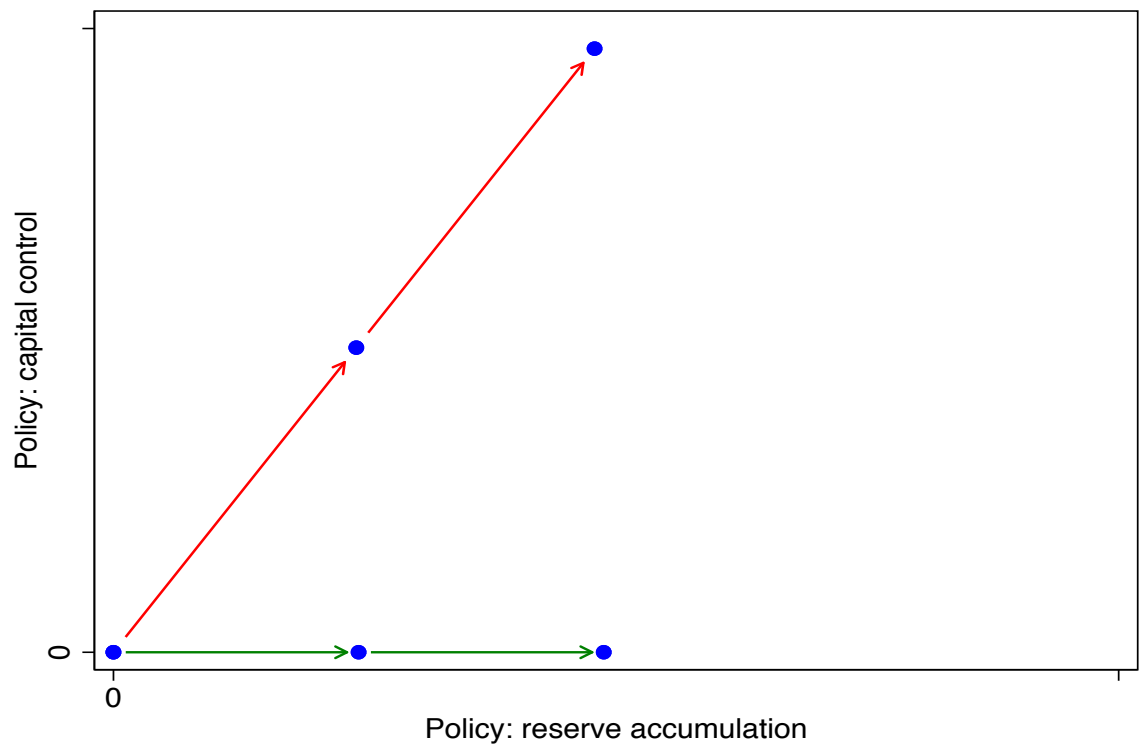


Preview: Model Intuition

Deviate from baseline: no financial crisis ($\xi = 0$), increase LBD externality ($\nu \uparrow$).

Pure mercantilist motive. Government increases reserves (*rsrv* $\uparrow$) and uses capital controls ($\kappa \uparrow$), and the socially optimal equilibrium moves up and right.

(Why? Ricardian equivalence, so controls are needed to ensure offsetting effects of private capital flows are only partial, then externality kicks in via *TB* $\uparrow$ and *RER* deval.)

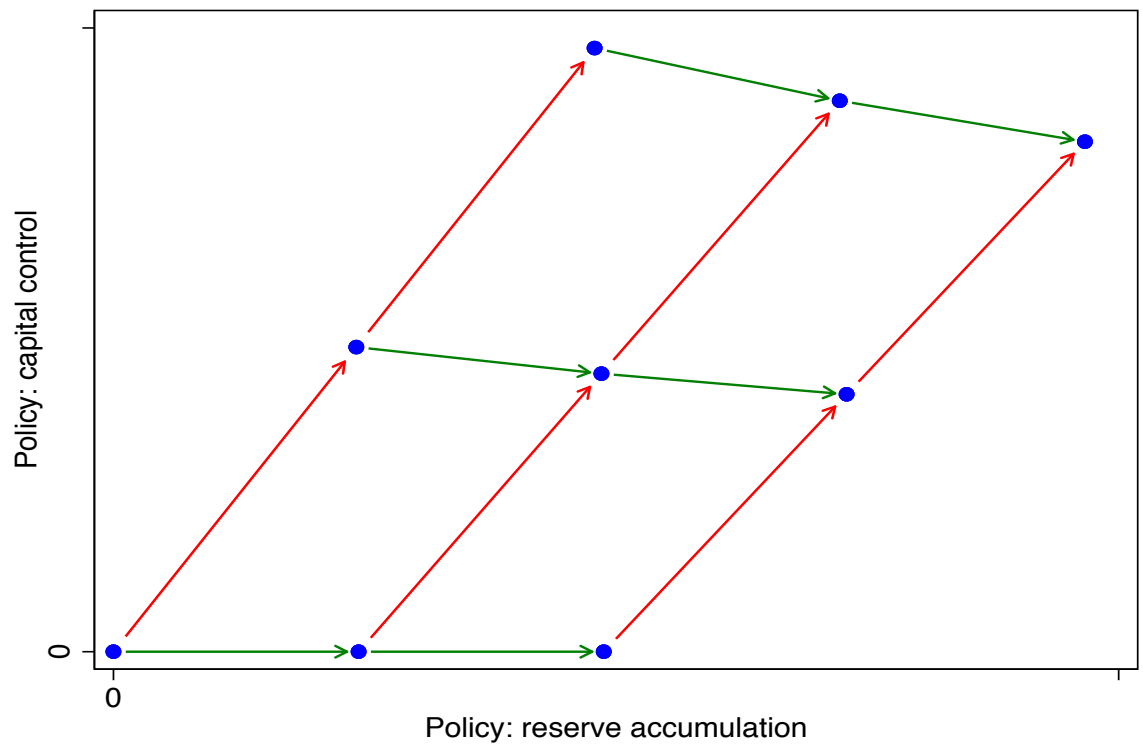


Preview: Model Intuition

Deviate more: when 2 distortions are present ($\xi \uparrow, \nu \uparrow$).

Policy tradeoff. Like before, but both policies are costly so there is a tradeoff when we are away from the extreme cases when only 0 or 1 distortions are present.

(Clearest for precautionary motive: when this rises, all else equal, the policymaker susbtitutes and the mercantilist motive is dialed back: reserves rise on net, but capital controls are relaxed)



Our Goal

Empirics: real exchange rate determination

- Relation between external assets (NFA=NFAxR+RSRV) and RER;
  - positive association between NFAxR and RER (confirms previous findings)
  - negative association between RSRV and RER (new stylized fact)
- Role of capital controls (new stylized fact).

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Theory: closed form solutions for model with 2 motives and 2 policy instruments

- Capital account policies – reserve accumulations and capital controls.
- Mercantilist motive (export-driven growth, LBD externality).
- Precautionary motive (insurance against crisis).
- Also, a model of gross asset positions.

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- Also, a model of gross asset positions.

Additional empirics: trade balance v. growth relationship consistent with theory

- association between capital account policies and trade surplus.
- association between capital account policies and growth of GDP / TFP.

Empirics: Data

- 22 advanced countries and 53 developing countries, covering 1975 to 2007 (2011).

- Data Source : IFS-IMF, DOTS-IMF, External Wealth of Nations Mark II from Lane and Milesi-Ferretti (2007), Penn World Table (7,9), World Bank, OECD, and BIS Statistics, Barro and Lee (2013), Chinn and Ito (2008), Edwards (2007), Fernández, Klein, Rebucci, Schindler, and Uribe(2015), Quinn and Toyota (2008).

- We split the sample into subperiods (as in LMF):

1975–1985	:	Period 1
1986–1996	:	Period 2
1997–2007	:	Period 3
2008–2011	:	Period 4

Empirics: Dependent Variable and Controls

$$REER_{it} = \Pi_{j \neq i} \left[\frac{P_i}{P_j} \right]^{W_{ij}} \text{ ,where } W_{ij} = \text{ex+im trade share of j with i}$$

$$NFAxR_{it} = \text{NFA net of Reserves}_{it} \ / \ \text{GDP}_{it}$$

$$RSRV_{it} = \text{Reserves}_{it} \ / \ \text{GDP}_{it}$$

$$TT_{it} = P^{ex} / P^{im}$$

$$YD_{it} = \Pi_{j \neq i} \left[\frac{Y_i}{Y_j} \right]^{W_{ij}}$$

$$KAControl_{it} = -KAOPEN_{it} \quad \text{(Chinn-Ito measure)}$$

$$KAClosed_{iT} = \text{Binary indicator based on } KAControl_{it} \text{ (g.t./l.t. median)}$$

link

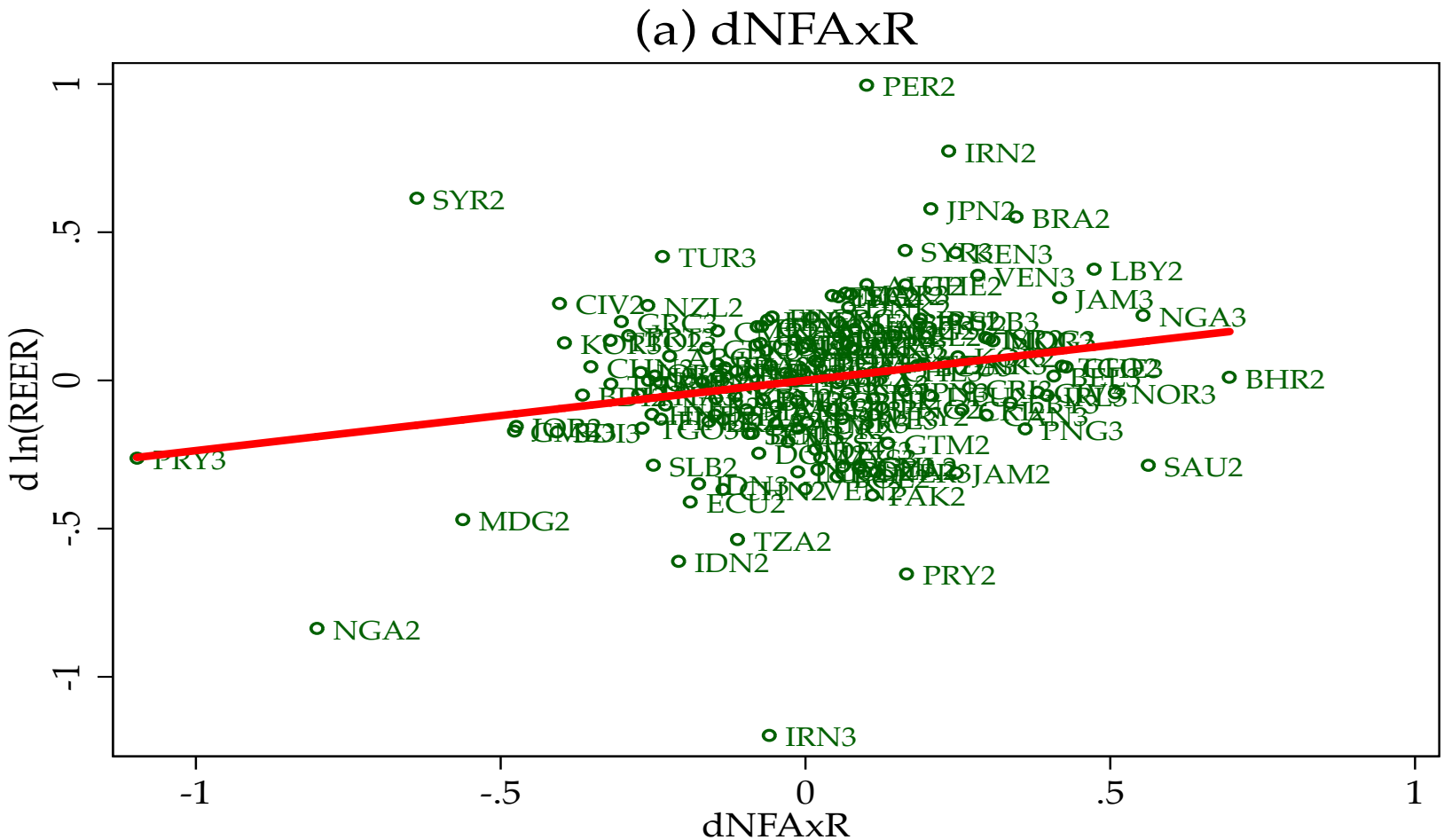
Empirics: REER / X-Sections / Period 123

Table 3: Determinants of the Real Effective Exchange Rate: Cross-Sectional Analysis

Dependent variable: Δ log(REER)	Periods 12 (Average 86–96 minus Average 75–85) & 23 (Average 97–07 minus Average 86–96), Pooled Sample					
	Full Sample		Advanced Countries		Developing Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
Δ NFAxR	0.19*	0.24**	-0.12	NA	0.20	0.25**
	(1.84)	(2.40)	(-1.43)		(1.66)	(2.17)
Δ RSRV	**-0.89*** **	**0.12**	-0.01		**-0.97****	**-0.05**
	(-2.68)	**(0.35)**	(-0.02)		**(-2.49)**	**(-0.11)**
Δ RSRV × KAClosed		**-1.77*** **				**-1.52*** **
		(-3.77)				**(-2.81)**
Δ ln YD	0.11	0.10	0.04		0.03	0.02
	(0.98)	(0.98)	(0.28)		(0.26)	(0.20)
Δ ln TT	0.07	0.11	0.34***		0.04	0.07
	(0.64)	(1.02)	(2.87)		(0.31)	(0.63)
Period23 Dummy	0.10**	0.11***	-0.04		0.20***	0.19***
	(2.32)	(2.61)	(-0.88)		(3.43)	(3.40)
Observations	150	150	44		106	106
Countries	75	75	22		53	53
R^2	0.10	0.15	0.19		0.13	0.17
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.00	0.76	0.82		0.01	0.52
p-value: $\beta^{NFAxR} \neq \beta^{RSRV \times KAClosed}$		0.00				0.00

Empirics: REER / X-Sections / Period 123

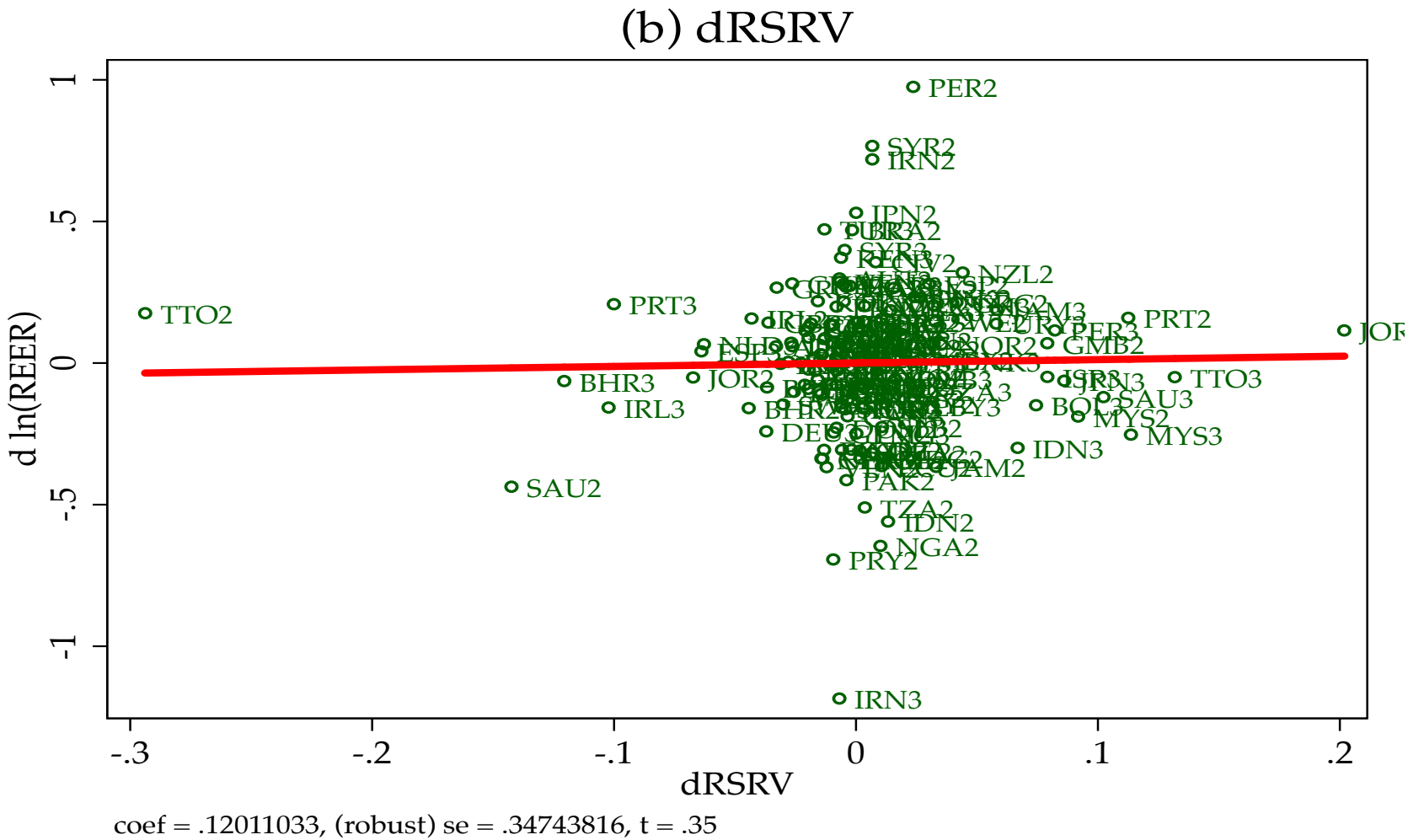
Figure 1a: Real Exchange Rate Determination: Developing Countries, Period 123 (1975-2007)



coef = .23685162, (robust) se = .09866104, t = 2.4

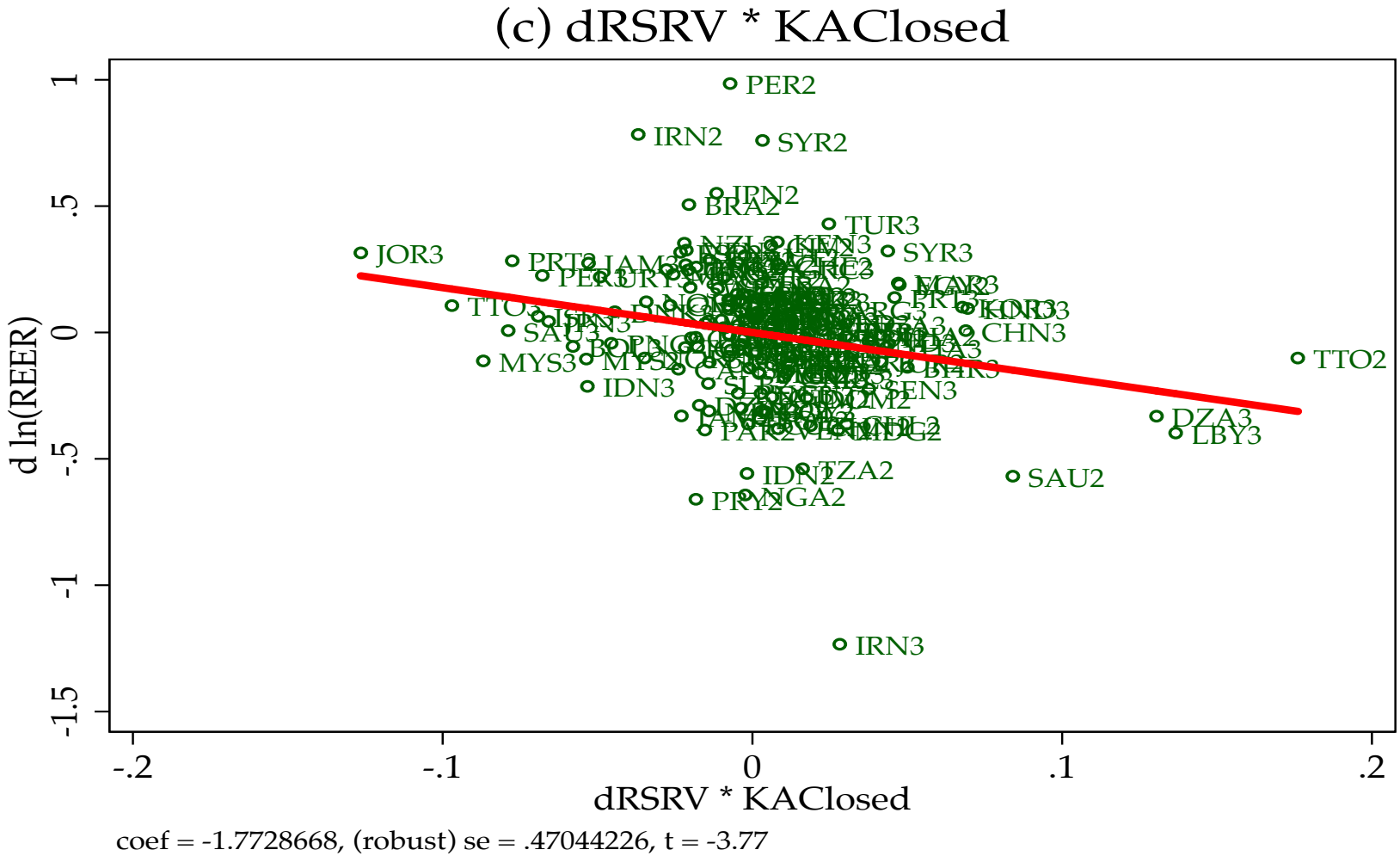
Empirics: REER / X-Sections / Period 123

Figure 1b: Real Exchange Rate Determination: Developing Countries, Period 123 (1975-2007)



Empirics: REER / X-Sections / Period 123

Figure 1c: Real Exchange Rate Determination: Developing Countries, Period 123 (1975-2007)



coef = -1.7728668, (robust) se = .47044226, t = -3.77

Empirics: REER / X-Sections / Period 12

Table 4: Determinants of the Real Effective Exchange Rate: Cross-Sectional Analysis

Dependent variable: Δ log(REER)	Period 12 (Average 86–96 minus Average 75–85)					
	Full Sample		Advanced Countries		Developing Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
Δ NFAxR	0.38**	0.39**	0.19	0.15	0.33*	0.34*
	(2.19)	(2.22)	(0.73)	(0.56)	(1.73)	(1.75)
Δ RSRV	0.32	0.62	0.21	0.10	0.12	0.35
	(0.50)	(0.81)	(0.31)	(0.14)	(0.18)	(0.42)
Δ RSRV × KAClosed		-1.53		1.79		-1.01
		(-0.86)		(0.95)		(-0.54)
Δ ln YD	-0.10	-0.09	-0.33	-0.25	-0.18	-0.17
	(-0.60)	(-0.56)	(-0.81)	(-0.54)	(-1.05)	(-1.03)
Δ ln TT	0.43**	0.40**	0.45**	0.49**	0.36*	0.34*
	(2.47)	(2.30)	(2.52)	(2.55)	(1.74)	(1.69)
Observations	75	75	22	22	53	53
Countries	75	75	22	22	53	53
R^2	0.16	0.17	0.17	0.18	0.12	0.13
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.93	0.77	0.98	0.95	0.79	0.99
p-value: $\beta^{NFAxR} \neq \beta^{RSRV \times KAClosed}$		0.29		0.42		0.49

Empirics: REER / X-Sections / Period 23

Table 5: Determinants of the Real Effective Exchange Rate: Cross-Sectional Analysis

Dependent variable: Δ log(REER)	Period 23 (Average 97–07 minus Average 86–96)					
	Full Sample		Advanced Countries		Developing Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
Δ NFAxR	0.15**	0.19***	-0.17	NA	0.22**	0.28***
	(2.12)	(2.83)	(-1.50)		(2.21)	(2.96)
Δ RSRV	**-0.96*** **	**-0.23**	-0.12		**-1.06*** **	**-0.08**
	(-3.37)	**(-0.62)**	(-0.14)		**(-2.72)**	**(-0.15)**
Δ RSRV × KAClosed		**-1.06****				**-1.31****
		(-2.33)				**(-2.40)**
Δ ln YD	0.13	0.14*	-0.03		0.16	0.15
	(1.57)	(1.74)	(-0.11)		(1.62)	(1.52)
Δ ln TT	-0.16	-0.14	0.34		-0.15	-0.14
	(-1.22)	(-1.12)	(1.69)		(-1.10)	(-1.05)
Observations	75	75	22		53	53
Countries	75	75	22		53	53
R^2	0.18	0.22	0.16		0.18	0.24
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.00	0.28	0.96		0.01	0.50
p-value: $\beta^{NFAxR} \neq \beta^{RSRV \times KAClosed}$		0.01				0.01

Other Specifications and Robustness

Annual panel with fixed effect; link

- Consistent with cross-sectional analysis, but statistically more significant.

Robustness :

- Continuous, instead of binary, measure of capital controls. link
- Without oil exporters. link
- Other REER measures. link
- Other capital control measures. link
- Crisis periods. link
- Dynamic OLS specification, incorporating possible cointegration between variables.

Basic Model: Exogenous Capital Account Policies

Develop a theory to account for new stylized facts from the empirical work.

Small open economy, 2 goods, 2 periods, 2 financial markets (domestic and int'l).

Infinitesimally small but identical agents.

Consumption good is

$$c_t = \left((\theta^T)^{\frac{1}{\sigma}} {c_t^T}^{\frac{\sigma-1}{\sigma}} + (\theta^N)^{\frac{1}{\sigma}} {c_t^N}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}.$$

Utility maximization

$$max_{\{c_{0,1}^T,\, c_{0,1}^N,\, d^*,\, a\}} \quad \left\{ u(c_0) + \frac{1}{1+r^*} u(c_1) \right\},$$

where $u(\cdot)$ is standard CRRA utility function with risk-aversion parameter γ,

Basic Model: Exogenous Capital Account Policies

subject to

$$\begin{aligned} c_0^T + p_0 c_0^N + a + \tau(d^*, \kappa) &\leq (1+\omega) y^T + p_0 y^N + d^* + T_0, \\ c_1^T + p_1 c_1^N + (1+r^*) d^* &\leq (1+\bar{g}) y^T + p_1 y^N + (1+r) a + T_1, \end{aligned}$$

where

c_t^T, c_t^N	T and NT consumption
y^T, y^N	T and NT endowment
p_t	the price of the nontradable goods in period t
d^*	external private debt
a	domestic public asset (= reserves)
ω	shock to initial level of wealth (endowment) of T sector
$\bar{g}$	growth of future endowment of T sector
r^*, r	international and domestic interest rates
$\tau(d^*, \kappa)$	"Pigouvian or Tobin" tax on d^*(indexed by policy κ)
T_t	government lump-sum transfer (taxes are rebated)

Basic Model: Exogenous Capital Account Policies

Real exchange rate is

$$rer_t \equiv p_t.$$

The government budget constraint is

$$\begin{aligned} rsrv^* + T_0 &\leq a + \tau(d^*, \kappa), \\ T_1 + (1+r)a &\leq (1+r^*)rsrv^*, \end{aligned}$$

where $rsrv^*$ is the official external asset, that is reserve accumulation.

Assumption about tax function monotonicity and convexity.

Assumption 1

$$\begin{aligned} 1 > \tau_i(d^*, \kappa) &\geq 0 \quad for \quad i = 1, 2, \\ \tau_{ij}(d^*, \kappa) &\geq 0 \quad for \quad i, j = 1, 2. \end{aligned}$$

where $\tau_i(\cdot)$, $\tau_{ij}(\cdot)$ denote the partial derivative with respect to ith and jth arguments.

Basic Model: Exogenous Capital Account Policies

The feasible consumption sets are

$$\begin{aligned} c_0^T &= (1+\omega)y^T - (rsrv^* - d^*), \\ c_1^T &= (1+g)y^T + (1+r^*)(rsrv^* - d^*), \\ c_0^N = c_1^N &= y^N. \end{aligned}$$

Note that $rsrv^*$ is *public* external assets, and $-d^*$ is *private* external asset.

The equilibrium conditions are then

$$\begin{aligned} \frac{\theta^N}{\theta^T}\frac{c_t^T}{c_t^N} &= p_t^\sigma = rer_t^\sigma, \quad \text{for } t = 0, 1; \\ 1 - \tau_1(d^*, \kappa) &= \frac{\lambda_1}{\lambda_0}, \\ 1 - \tau_1(d^*, \kappa) &= \frac{1+r^*}{1+r}. \end{aligned}$$

Note that τ_1 is a marginal tax rate, and λ_t is a Lagrangian multiplier.

Basic Model: Propositions - Standard Results

Standard wealth effect:

Proposition 1a

Given the level of reserve accumulation ($rsrv^*$) and the degree of capital control parameter (κ), and increase in the current endowment of tradable goods (ω) will cause an appreciation of the current real exchange rate,

$$\frac{\partial rer_0}{\partial \omega} \geq 0.$$

Proposition 1b

Given the level of reserve accumulation ($rsrv^*$) and the degree of capital control parameter (κ), and increase in the current endowment of tradable goods (ω) will cause an increase in NFA ex. Reserves ($-d^*$)

$$\frac{\partial (-d^*)}{\partial \omega} \geq 0.$$

Basic Model: Propositions - New Results

Reserve accumulation $rsrv^*$ as a fiscal instrument:

Proposition 2

Given current endowment (ω) and the degree of capital control index (κ), increasing reserve accumulation ($rsrv^*$) will depreciate the current real exchange rate. That is,

$$\frac{\partial rer_0}{\partial rsrv^*} \leq 0.$$

Capital control κ with $\tau_{12}(\cdot) \geq 0$:

Proposition 3

Given current endowment (ω) and reserve accumulation ($rsrv^*$), increasing the degree of capital control index (κ) will depreciate the current real exchange rate, That is,

$$\frac{\partial rer_0}{\partial \kappa} \leq 0.$$

Full Model: Endogenous Capital Account Policies

Endogenize capital account policies.

- Why does a government intervene?
- Or what can a government do/observe that private agents cannot do/observe?

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Two motives for recent reserves increase,

- Precautionary motive : Crisis loss (ξ^T).
- Mercantilist motive : Export driven growth externality (ν).

Two policy instruments with two frictions,

- Liquid assets, assumed to be (marginally more) costly for private agents.
- Learning-by-doing externality from *aggregate* exports.

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Closed form solutions for monotone mapping.

- ξ^T and $\nu \rightarrow$ *rsrv* and κ (and implied *rer*).

Full Model: Endogenous Capital Account Policies : Setup

First period $t = 0$ is divided into two sub-periods;

- $t = 0-$: Decision / contract for financial transaction.
- $t = 0+$: State realizes. Financial contract needs to be honored.

At $t = 0+$, crisis with fixed probability π,

- Output loss : $\xi^T(\xi^N)$ share of in tradable (nontradable) endowments.
- Exclusion from international financial market.
- But government *rsrv* can be liquidated (at a cost η) if crisis occurs.

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Learning by doing externality;

- $g = \bar{g} + g(ex_0, \nu)$, if no crisis,
- $\hat{g} = \bar{g}$, if crisis.

Full Model: Endogenous Capital Account Policies Constrained Social Planner's Problem

Feasible consumption sets (where hats denote the crisis state)

$$
\begin{aligned}
c_0^T &= (1+\omega)y^T - (rsrv^* - d^*), \\
c_1^T &= (1+\bar{g}+g(ex_0,\nu))\,y^T + (1+r^*)(rsrv^* - d^*), \\
\\
\hat{c}_0^T &= (1+\omega-\xi^T)y^T - \eta(rsrv^*, y^T) - (-d^*), \\
\hat{c}_1^T &= (1+\bar{g})y^T + (1+r^*)(-d^*), \\
\\
c_0^N &= y^N, \\
c_1^N &= y^N, \\
\\
\hat{c}_0^N &= (1-\xi^N)y^N, \\
\hat{c}_1^N &= y^N.
\end{aligned}
$$

Full Model: Endogenous Capital Account Policies Constrained Social Planner's Problem

Aggregate export,

$$ex_0 \quad = \quad (1+\omega)y^T - c_0^T = rsrv^* - d^*.$$

Growth rate,

$$g(ex_0, \nu)y^T = \nu(rsrv^* - d^*).$$

First order conditions for consumption with Lagrange Multipliers,

$$\begin{aligned} \lambda_0 &= \frac{1+r^*+\nu}{1+r^*}\lambda_1, \\ \hat{\lambda}_0 &= \frac{1+r^*}{1+r^*}\hat{\lambda}_1. \end{aligned}$$

Full Model: Endogenous Capital Account Policies Constrained Social Planner's Problem

Seek closed form solutions for *rsrv* and κ (and implied *d* and *rer*).

For tractability now assume also: log utility ($\gamma = 1$), unit elasticity between T & NT ($\sigma = 1$), and fixed cost for liquidation ($\bar{\eta}$). Then, at the social optimum:

$$
\begin{aligned}
-d_1^{*opt} &= \frac{1}{2+r^*}\left(-(1+\bar{g})+(1+\omega)+(-\xi^T-\bar{\eta})\right)\cdot y^T, \\
rsrv_1^{*opt} &= \frac{1}{2+r^*}\left(\frac{\nu(1+\bar{g})}{1+r^*+\nu}-(-\xi^T-\bar{\eta})\right)\cdot y^T, \\
rer_0^{opt} &= \frac{\theta^N}{\theta^T}\cdot\frac{1+r^*}{2+r^*}\cdot\left(1+\omega+\frac{1+\bar{g}}{1+r^*+\nu}\right)\cdot\frac{y^T}{y^N}.
\end{aligned}
$$

ω : current productivity
ξ^T : crisis loss
ν : growth externality
$\bar{\eta}$: liquidation penalty

Full Model: Endogenous Capital Account Policies Constrained Social Planner's Problem

Proposition 4

Fixing all other parameters, if an economy has a higher output loss in a crisis (ξ^T), optimal reserve accumulation increases while the real exchange rate is not affected.

$$\frac{\partial rsrv_1^{*opt}}{\partial \xi^T} = \frac{\partial - d_1^{*opt}}{\partial \xi^T} > 0,$$

$$\frac{\partial rer_0^{opt}}{\partial \xi^T} = 0.$$

Full Model: Endogenous Capital Account Policies Constrained Social Planner's Problem

Proposition 5

Fixing all other parameters, if an economy has a higher growth externality (ν), optimal reserve accumulation increases while the real exchange rate is depreciated.

$$\frac{\partial rsrv_1^{*opt}}{\partial \nu} > 0, \quad \frac{\partial - d_1^{*opt}}{\partial \nu} = 0,$$
$$\frac{\partial rer_0^{opt}}{\partial \nu} < 0.$$

Full Model: Endogenous Capital Account Policies
Optimal Capital Account Policy

The **Optimal Capital Account Policy** is to set $rsrv^* = rsrv_1^{*opt}$, and optimal capital control κ satisfying

$$1 - \tau_1(d_1^{*opt}, \kappa) \quad = \quad \frac{(1-\pi)\lambda_1^{*opt} + \pi\hat{\lambda}_1^{*opt}}{(1-\pi)\lambda_0^{*opt} + \pi\hat{\lambda}_0^{*opt}}.$$

Theorem 1 (Precaution Versus Mercantilism)

All else equal, if an economy has a higher output loss in a crisis (ξ^T), the optimal degree of capital control decreases. And if an economy has a higher growth externality (ν), the optimal degree of capital control increases. That is,

$$\frac{\partial \kappa^{opt}}{\partial \xi^T} \leq 0, \quad \textit{and} \quad \frac{\partial \kappa^{opt}}{\partial \nu} \geq 0.$$

link

Capital Account Policy and Growth

Capital account policy and growth.

- Is the policy statistically associated with growth?

Focus on period 23,

- Cross section and annual Panel.

link

Empirics: Capital Account Policy and Growth

Table 17: Cross Section: Capital Account Policy and Growth of Real GDP and TFP

Dependent variable:	Period 2 and 3 (1986–2007)			
	Real GDP per Capita Growth		TFP Growth	
	All	w/o Oil	All	w/o Oil
	(1)	(2)	(3)	(4)
Δ RSRV	**-0.65****	**-0.54**	**-0.47****	**-0.61****
	(-2.02)	**(-1.01)**	**(-2.37)**	**(-2.48)**
Δ RSRV × KAClosed	**1.66*****	**1.33***	**0.59****	**0.66****
	(2.77)	**(1.80)**	**(2.49)**	**(2.37)**
Initial Real GDP per capita or TFP	0.06	0.03	-0.54***	-0.57***
	(1.30)	(0.59)	(-7.28)	(-6.04)
Schooling	0.03**	0.03*	0.01	0.01
	(2.24)	(1.90)	(1.43)	(1.13)
Inst. Quality	-0.06	-0.03	0.03***	0.03*
	(-1.66)	(-0.87)	(2.98)	(1.80)
Trade Openness	0.15***	0.05	0.01	0.01
	(3.01)	(0.57)	(0.56)	(0.27)
Credit to GDP	-0.00	-0.00	-0.00	-0.00
	(-0.33)	(-0.09)	(-0.77)	(-0.32)
Terms of Trade (% change)	0.09	0.06	0.03	-0.01
	(0.97)	(0.63)	(0.52)	(-0.17)
Observations	64	54	61	52
Countries	64	54	61	52
R^2	0.39	0.29	0.70	0.69

Conclusion

We provide new stylized facts.

- Capital account policy – reserves and capital controls – is associated with real exchange rate depreciation
- And it is more pronounced in developing countries over the last two decades.

We provide new guidance for real exchange rate determinations.

- The model incorporates both *Mercantilist* and *Precautionary* motives together.
- Embeds different rationale for private and public external asset holdings.
- Consistent with empirical evidence on NFA, reserves, RER, trade balance, and GDP growth.

Reserve Accumulation : Balance Sheet Decomposition

We can decompose Net Foreign Asset (NFA)

$$
\begin{aligned}
&= \text{Total Foreign Assets - Total Foreign Liabilities} \\
&= (\text{FDIA}+\text{EQA}+\text{DEBTA}+\text{Reserve}) - (\text{FDIL}+\text{EQL}+\text{DEBTL}) \\
&= \text{Foreign Asset net of Reserve} - \text{Foreign Liabilities} + \text{RES} \\
&= \text{NFAxR} + \text{RES}.
\end{aligned}
$$

Reserve Accumulation : Balance Sheet Decomposition

We can decompose Net Foreign Asset (NFA)

$$
\begin{aligned}
&= \text{Total Foreign Assets - Total Foreign Liabilities} \\
&= (\text{FDIA}+\text{EQA}+\text{DEBTA}+\text{Reserve}) - (\text{FDIL}+\text{EQL}+\text{DEBTL}) \\
&= \text{Foreign Asset net of Reserve} - \text{Foreign Liabilities} + \text{RES} \\
&= \text{NFAxR} + \text{RES}.
\end{aligned}
$$

As of 2011, in developing countries reserve accumulation is

- 22.2% of GDP, 39.8% of Total Foreign Assets, and 143% of DEBTA.

In Advanced countries reserve accumulation is

- 8.9% of GDP, 4.2% of Total Foreign Assets, and 10.7% of DEBTA.

back

Reserve Accumulation : Cross Country Evidence

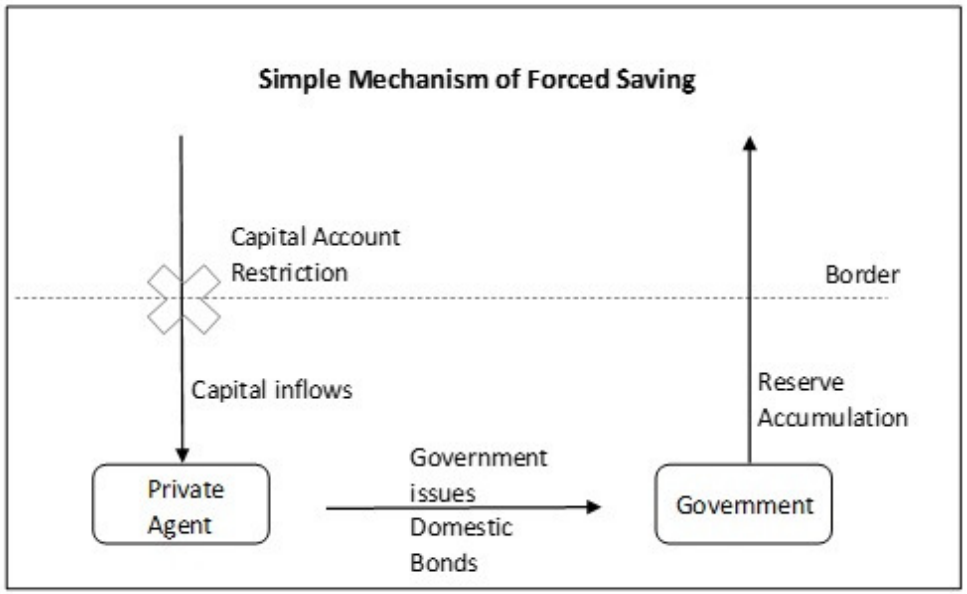
As of Year 2011

Rank	Country	Res (Bil.$)	Percentage of GDP	Percentage of Total Liability	Percentage of Total Asset	Percentage of Debt Asset
1	China	3202.8	42.7	99.8	67.5	331.0
2	Japan	1258.2	21.3	30.9	16.9	27.9
3	Saudi Arabia	540.7	80.8	176.5	51.8	197.5
4	Russia	453.9	22.3	41.3	38.0	123.1
5	Brazil	350.4	13.4	23.6	46.1	188.0
6	Korea	304.3	25.3	36.3	40.5	171.6
7	Hong Kong	285.3	114.8	12.0	9.2	24.8
8	Switzerland	279.4	40.1	10.5	8.0	18.5
9	India	271.3	14.9	37.0	66.8	1171.6
10	Singapore	237.5	86.3	13.0	10.1	18.8
11	Algeria	182.8	91.4	630.7	95.5	2865.6
12	Thailand	167.4	45.2	53.0	60.6	300.8
13	Mexico	144.0	12.3	17.8	34.1	90.0
14	United States	136.9	0.9	0.5	0.6	1.9
15	Malaysia	131.8	44.2	40.4	39.1	188.0
16	Indonesia	106.5	11.9	21.7	57.2	298.9
17	Libya	104.8	302.0	388.2	45.5	158.5
18	Poland	92.6	17.5	18.9	45.9	270.2
19	Denmark	81.7	23.9	11.6	10.4	22.7
20	United Kingdom	79.3	3.1	0.5	0.5	0.9
21	Turkey	78.3	10.1	15.7	46.2	124.4

back

Reserves, Capital Flows, and Trade Flows

In our framework, real exchange rate determination is all about **forced saving**



- If the private agent perceives reserves as their wealth, there is no need to decrease the current consumption (Ricardian Equivalence).
- Thus to force them to decrease consumption, and increase external saving, there need to be capital account restriction.
- We need reserves + capital controls

back

Empirics: Econometric Specification

Cross sectional analysis,

$$\begin{aligned}\Delta \log(REER_{i,T_1T_2}) &= \alpha + D_T + \beta^{NFAxR}\Delta NFAxR_{i,T_1T_2} + \beta^{RSRV}\Delta RSRV_{i,T_1T_2} \\ &\quad +\beta^{R\&KAClosed}\Delta RSRV_{i,T_1T_2} \times KAClosed_{i,T_1T_2} \quad (1) \\ &\quad +\beta^{YD}\Delta log\,(YD_{i,T_1T_2}) + \beta^{TT}\Delta log\,(TT_{i,T_1T_2}) + \epsilon_i, \quad (2)\end{aligned}$$

where T_1T_2 is period 12 and period 23, D_T denotes a period fixed effect for period 12 and period 23 sample.

Annual panel analysis,

$$\begin{aligned}log(REER_{it}) &= \alpha_i + D_t + \beta^{NFAxR}NFAxR_{it} + \beta^{RSRV}RSRV_{it} \\ &\quad +\beta^{YD}log(YD_{it}) + \beta^{TT}log(TT_{it}) + \epsilon_{it}, \quad (3)\end{aligned}$$

where D_t denotes a year fixed effect, and t denotes years rather than the period T.

back

Empirics: REER / Annual Panel / Period 123

Table 6: Determinants of the Real Effective Exchange Rate: Annual Panel with Fixed Effects

	Period 123 (1975–2007)				
Dependent variable: Δ log(REER)	Full Sample	Advanced Countries	Developing Countries	Financially Open	Financially Closed
	(1)	(2)	(3)	(4)	(5)
NFAxR	0.17***	-0.03	0.19**	0.12	0.21**
	(2.74)	(-0.63)	(2.55)	(1.56)	(2.47)
RSRV	**-0.98*** **	0.20	**-0.89*** **	-0.24	**-1.28*** **
	(-3.39)	(0.63)	**(-2.78)**	(-0.84)	**(-3.88)**
ln YD	0.16**	0.05	0.10	0.22	0.11*
	(2.10)	(0.39)	(1.28)	(0.91)	(1.86)
ln TT	-0.03	0.12	-0.06	0.06	-0.08
	(-0.56)	(1.54)	(-0.90)	(1.07)	(-0.90)
Observations	2,475	726	1,749	1,254	1,221
Countries	75	22	53	38	37
R^2	0.188	0.23	0.273	0.092	0.31
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.000	0.506	0.003	0.257	0.000

back

Empirics: REER / Annual Panel / Period 12

Table 7: Determinants of the Real Effective Exchange Rate: Annual Panel with Fixed Effects

	Period 12 (1975–1996)				
Dependent variable: Δ log(REER)	Full Sample	Advanced Countries	Developing Countries	Financially Open	Financially Closed
	(1)	(2)	(3)	(4)	(5)
NFAxR	0.32***	0.22*	0.30**	0.14	0.42**
	(2.83)	(1.74)	(2.40)	(1.39)	(2.65)
RSRV	**-0.48***	0.38	**-0.57****	-0.33	**-1.06*****
	(-1.75)	(0.88)	**(-2.04)**	(-1.13)	**(-2.95)**
ln YD	0.04	-0.10	-0.05	0.42***	-0.21
	(0.31)	(-0.37)	(-0.35)	(2.85)	(-1.51)
ln TT	0.02	0.13	-0.02	0.11	-0.06
	(0.36)	(1.50)	(-0.20)	(1.42)	(-0.55)
Observations	1,650	484	1,166	836	814
Countries	75	22	53	38	37
R^2	0.158	0.26	0.25	0.24	0.209
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.020	0.725	0.016	0.164	0.001

back

Empirics: REER / Annual Panel / Period 23

Table 8: Determinants of the Real Effective Exchange Rate: Annual Panel with Fixed Effects

	Period 23 (1986–2007)				
Dependent variable: Δ log(REER)	Full Sample	Advanced Countries	Developing Countries	Financially Open	Financially Closed
	(1)	(2)	(3)	(4)	(5)
NFAxR	0.13**	-0.07	0.17**	0.11**	0.23**
	(2.21)	(-1.57)	(2.19)	(2.06)	(2.65)
RSRV	**-0.90*** **	-0.06	**-0.91** **	**-0.41***	**-1.19*** **
	(-3.07)	(-0.24)	**(-2.59)**	**(-1.77)**	**(-3.33)**
ln YD	0.14*	0.05	0.14	-0.10	0.19**
	(1.69)	(0.43)	(1.50)	(-0.57)	(2.08)
ln TT	-0.18**	0.11	-0.19**	-0.04	-0.26***
	(-2.38)	(1.05)	(-2.37)	(-0.36)	(-3.00)
Observations	1,650	484	1,166	836	814
Countries	75	22	53	38	37
R^2	0.174	0.17	0.21	0.067	0.267
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.001	0.986	0.003	0.033	0.000

back

Empirics: REER / X-Sections / Cts. KAControl

Table A1: Determinants of the Real Effective Exchange Rate: Cross-Sectional Analysis, Continuous Capital Control Measures

	Periods 12 (Average 86–96 minus Average 75–85) Periods 23 (Average 97–07 minus Average 86–96), Pooled Sample					
Dependent variable: Δ log(REER)	Full Sample		Advanced Countries		Developing Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
Δ NFAxR	0.18*	0.25**	-0.11	-0.11	0.20	0.31**
	(1.67)	(2.41)	(-1.47)	(-1.44)	(1.65)	(2.60)
Δ RSRV	**-0.66***	**-0.70*****	-0.09	0.05	**-0.96****	**-0.79*****
	(-1.92)	**(-2.82)**	(-0.22)	(0.09)	**(-2.45)**	**(-3.24)**
Δ RSRV × KAControl		**-0.57*****		0.09		**-0.84*****
		(-2.82)		(0.21)		**(-3.90)**
KAControl	-0.04**	-0.02	0.01	0.01	-0.00	0.03
	(-2.21)	(-1.23)	(0.35)	(0.27)	(-0.16)	(1.35)
Δ ln YD	0.05	0.07	0.02	-0.00	0.03	0.01
	(0.49)	(0.68)	(0.09)	(-0.01)	(0.24)	(0.07)
Δ ln TT	0.09	0.10	0.35***	0.35***	0.04	0.04
	(0.82)	(1.01)	(3.02)	(2.93)	(0.36)	(0.40)
Time Dummy	0.07	0.08*	-0.03	-0.03	0.19***	0.19***
	(1.55)	(1.74)	(-0.54)	(-0.53)	(3.21)	(3.23)
Observations	150	150	44	44	106	106
Countries	75	75	22	22	53	53
R^2	0.13	0.17	0.20	0.20	0.13	0.20
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.03	0.00	0.96	0.77	0.01	0.00
p-value: $\beta^{NFAxR} \neq \beta^{RSRV \times KAClosed}$		0.00		0.62		0.00

link

Empirics: REER / Annual Panel / Cts. KAControl

Table 11: Determinants of Real Effective Exchange Rate: Annual Panel with - Continuous Capital Controls

Dependent variable:	Period 123 (1975–2007)					
	Full Sample			w/o Oil Exporting Countries		
log(REER)	Full Sample	Advanced Countries	Developing Countries	Full Sample	Advanced Countries	Developing Countries
	(1)	(2)	(3)	(4)	(5)	(6)
NFAxR	0.15***	-0.05	0.20***	0.22***	0.02	0.33***
	(2.81)	(-0.92)	(2.87)	(3.90)	(0.37)	(6.52)
RSRV	**-0.85*** **	0.39	**-0.86*** **	**-0.61*** **	0.30	**-0.75*** **
	(-3.82)	(0.78)	**(-3.77)**	**(-2.91)**	(1.00)	**(-3.17)**
RSRV × KAcontrol	**-0.22** **	0.32	**-0.26** **	-0.10	0.09	**-0.37*** **
	(-2.16)	(1.25)	**(-2.35)**	(-0.99)	(0.45)	**(-3.30)**
KAControl	-0.00	-0.04	0.01	-0.04**	-0.05**	0.03
	(-0.08)	(-1.60)	(0.28)	(-2.27)	(-2.71)	(1.35)
ln YD	0.14*	-0.04	0.16*	0.08	-0.08	0.16*
	(1.89)	(-0.40)	(1.92)	(0.90)	(-0.48)	(1.73)
ln TT	-0.17**	0.11	-0.17**	0.01	0.18	-0.03
	(-2.20)	(0.89)	(-2.13)	(0.13)	(1.41)	(-0.52)
Obs.	1650	484	1166	1987	687	1300
Num. of Cty.	75	22	53	61	21	40
R^2	0.19	0.08	0.21	0.19	0.19	0.20
p-value: $\beta^{NFAxR} \neq \beta^{RSRV\_KAcon}$	0.00	0.16	0.00	0.02	0.72	0.00

back

Empirics: REER / Annual Panel / Other KAClosed

Table 12: Determinants of the Real Effective Exchange Rate: Annual Panel with Fixed Effects, Other Capital Control Measures

Dependent variable:	Edwards Period123		Quinn and Toyoda Period123		Fernando et. al. Period 23	
log(REER)	Financially Open	Financially Closed	Financially Open	Financially Closed	Financially Open	Financially Closed
	(1)	(2)	(3)	(4)	(5)	(6)
NFAxR	0.17**	0.17*	0.22**	0.13	0.04	0.20**
	(2.29)	(1.76)	(2.22)	(1.12)	(0.88)	(2.63)
RSRV	-0.34	**-1.16*** **	-0.18	**-1.37*** **	**-1.04** **	**-0.54*** **
	(-1.08)	**(-3.40)**	(-0.39)	**(-4.65)**	**(-2.21)**	**(-2.88)**
lnYD	0.36**	0.09	-0.09	0.08	-0.47*	0.00
	(2.06)	(1.06)	(-0.25)	(0.90)	(-1.78)	(0.01)
lnTT	0.08**	-0.11	0.02	-0.10	-0.18**	-0.42***
	(2.23)	(-1.10)	(0.28)	(-0.93)	(-2.50)	(-3.78)
Obs.	1,188	1,188	1,089	1,056	660	660
Num. of Cty.	36	36	33	32	30	30
R^2	0.21	0.22	0.09	0.26	0.17	0.23
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.14	0.00	0.09	0.00	0.03	0.00

back

Empirics: REER / Annual Panel / Crisis Period

Table 13: Determinants of the Real Effective Exchange Rate: Annual Panel with Fixed Effects With Crisis Period

Dependent variable:	Full		Advanced		Developing	
log(REER)	Period1234	Period34	Period1234	Period34	Period1234	Period34
	(1)	(2)	(3)	(4)	(5)	(6)
NFAxR	0.08*	0.02	0.03	0.04*	0.17***	0.06
	(1.91)	(1.31)	(1.33)	(2.02)	(2.73)	(1.11)
RSRV	**-0.73*** **	**-0.45*** **	-0.09	-0.34	**-0.72*** **	**-0.44*** **
	(-6.03)	**(-5.25)**	(-0.51)	(-1.56)	**(-4.69)**	**(-4.11)**
ln YD	0.16**	0.14	-0.03	0.32	0.09	0.11
	(2.32)	(1.29)	(-0.31)	(1.54)	(1.49)	(0.88)
ln TT	-0.02	-0.15*	0.12	0.21**	-0.05	-0.18*
	(-0.37)	(-1.67)	(1.27)	(2.60)	(-0.80)	(-1.90)
Obs.	2,775	1,125	814	330	1,961	795
Num. of Cty.	75	75	22	22	53	53
R^2	0.179	0.199	0.243	0.399	0.267	0.235
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.00	0.00	0.49	0.08	0.00	0.00

back

Empirics: REER / Annual Panel / w/o Oil

Table 14: Determinants of Real Effective Exchange Rate: Annual Panel with Fixed Effects Without Oil Exporting Countries

Dependent variable: log(REER)	Period 123 (1975–2007)				
	Full Sample	Advanced Countries	Developing Countries	Financially Open	Financially Closed
	(1)	(2)	(3)	(4)	(5)
NFAxR	0.22***	-0.017	0.27***	0.10	0.28***
	(4.11)	(-0.29)	(4.19)	(1.32)	(3.84)
RSRV	**-0.66*** **	0.31	-0.33	-0.48	**-0.57** **
	(-2.84)	(1.04)	(-1.24)	(-1.34)	**(-2.10)**
ln YD	0.080	0.068	0.0027	-0.047	0.056
	(0.95)	(0.53)	(0.032)	(-0.14)	(0.92)
ln TT	-0.0048	0.16	-0.045	0.11	-0.068
	(-0.083)	(1.70)	(-0.78)	(1.42)	(-0.88)
Obs.	2013	693	1320	990	1023
Num. of Cty.	63	21	40	30	31
R^2	0.16	0.24	0.30	0.08	0.36
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.00	0.33	0.04	0.12	0.01

back

Empirics: REER / Annual Panel / IMF REER

Table 15: Determinants of the Real Effective Exchange Rate: Annual Panel with Fixed Effects, IMF REER Index

	1980–2007 (IMF REER available from 1980 onwards)				
Dependent variable: log(REER)	Full Sample	Advanced Countries	Developing Countries	Financially Open	Financially Closed
	(1)	(2)	(3)	(4)	(5)
NFAxR	0.16***	-0.07	0.25***	0.04	0.22**
	(2.82)	(-1.53)	(2.95)	(0.56)	(2.29)
RSRV	**-0.73*** **	0.27	**-0.68** **	-0.22	**-0.91*** **
	(-3.23)	(1.63)	**(-2.72)**	(-0.72)	**(-3.58)**
ln YD	0.24*	0.10	0.10	0.39**	0.07
	(1.94)	(0.68)	(1.01)	(2.21)	(0.76)
ln TT	-0.06	0.20*	-0.09	0.08	-0.15**
	(-0.96)	(1.85)	(-1.51)	(0.99)	(-2.25)
Obs.	1,534	631	903	942	592
Num. of Cty.	54	22	32	33	21
R^2	0.33	0.15	0.51	0.21	0.53
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.00	0.09	0.00	0.44	0.00

back

Empirics: REER / Annual Panel / BIS REER

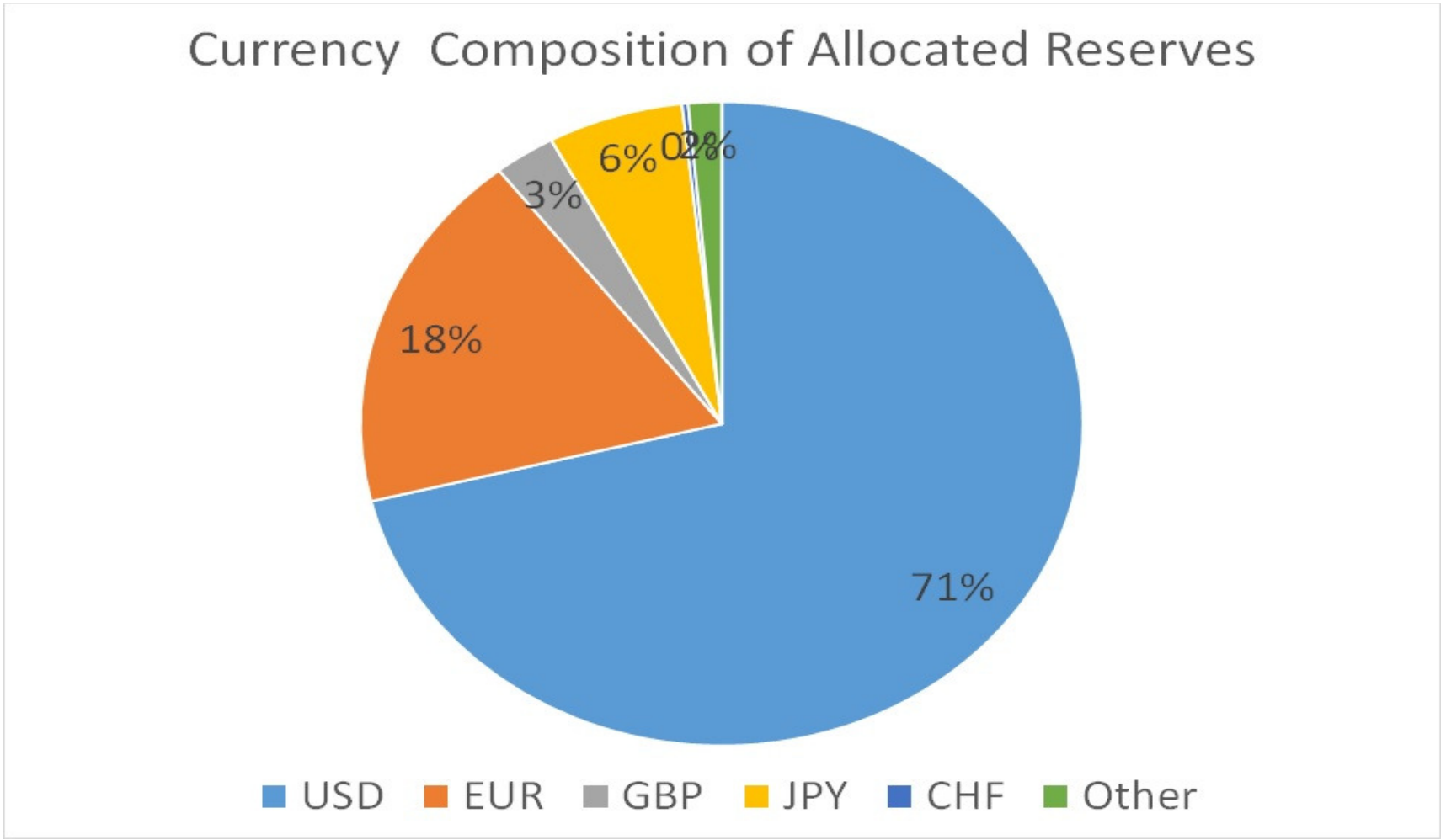
Table 16: Determinants of the Real Effective Exchange Rate: Annual Panel with Fixed Effects, BIS REER Index

	1994–2007 (BIS REER available from 1994 onwards)				
Dependent variable: log(REER)	Full Sample	Advanced Countries	Developing Countries	Financially Open	Financially Closed
	(1)	(2)	(3)	(4)	(5)
NFAxR	0.04	-0.09**	0.21*	-0.01	0.17
	(0.67)	(-2.32)	(2.06)	(-0.09)	(1.69)
RSRV	**-0.40*** **	-0.11	**-0.28****	**-0.47*****	**-0.29***
	(-3.60)	(-0.40)	**(-2.13)**	**(-3.81)**	**(-1.95)**
ln YD	0.27**	0.32**	0.21	0.36*	0.19
	(2.24)	(2.08)	(1.53)	(1.97)	(1.32)
ln TT	-0.21**	0.24**	-0.30***	-0.03	-0.31***
	(-2.63)	(2.60)	(-4.52)	(-0.33)	(-4.51)
Observations	574	308	266	392	182
Countries	41	21	19	28	13
R^2	0.23	0.39	0.38	0.24	0.37
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.00	0.94	0.01	0.00	0.01

back

Currency Composition : Year 2000

Out of allocated reserves (78.4% of total reserves)



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Trade Balance : Econometric Specification

Cross Sectional Analysis

$$\begin{aligned} \Delta TradeSurplus_{i,T_1T_2} &= \alpha + D_T + \beta^{NFAxR}\Delta NFAxR_{i,T_1T_2} + \beta^{RSRV}\Delta RSRV_{i,T_1T_2} \\ & \quad \Delta\beta^{R\&KAClosed} RSRV_{i,T_1T_2} \times KAClosed_{i,T_1T_2} + \epsilon_i \end{aligned} \tag{4}$$

where T_1T_2 is period 12 and period 23, D_T denotes a period fixed effect for period 12 and period 23 sample.

Annual Panel Analysis

$$log(REER_{it}) = \alpha_i + D_t + \beta^{NFAxR} NFAxR_{it} + \beta^{RSRV} RSRV_{it} + \epsilon_{it} \tag{5}$$

where D_t denotes a year fixed effect, and t denotes years rather than the period T.

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Empirical Results : Capital Account Policy and Trade Balance

Table 10: Trade Balances and Reserve Accumulations: Annual Panel with Fixed Effects

	Period 123 (1975–2007)				
Dependent variable: Net Exports	Full Sample	Advanced Countries	Developing Countries	Financially Open	Financially Closed
	(1)	(2)	(3)	(4)	(5)
NFAxR	0.00	0.06*	-0.01	0.01	-0.00
	(0.22)	(2.01)	(-0.42)	(0.30)	(-0.12)
RSRV	**0.16****	-0.25	**0.20****	0.11	**0.24****
	(2.16)	(-1.40)	**(2.61)**	(1.03)	**(2.21)**
Observations	2379	705	1674	1211	1168
Countries	75	22	53	38	37
R^2	0.08	0.30	0.09	0.08	0.10
p-value: $\beta^{NFAxR} \neq \beta^{RSRV}$	0.06	0.12	0.02	0.41	0.05

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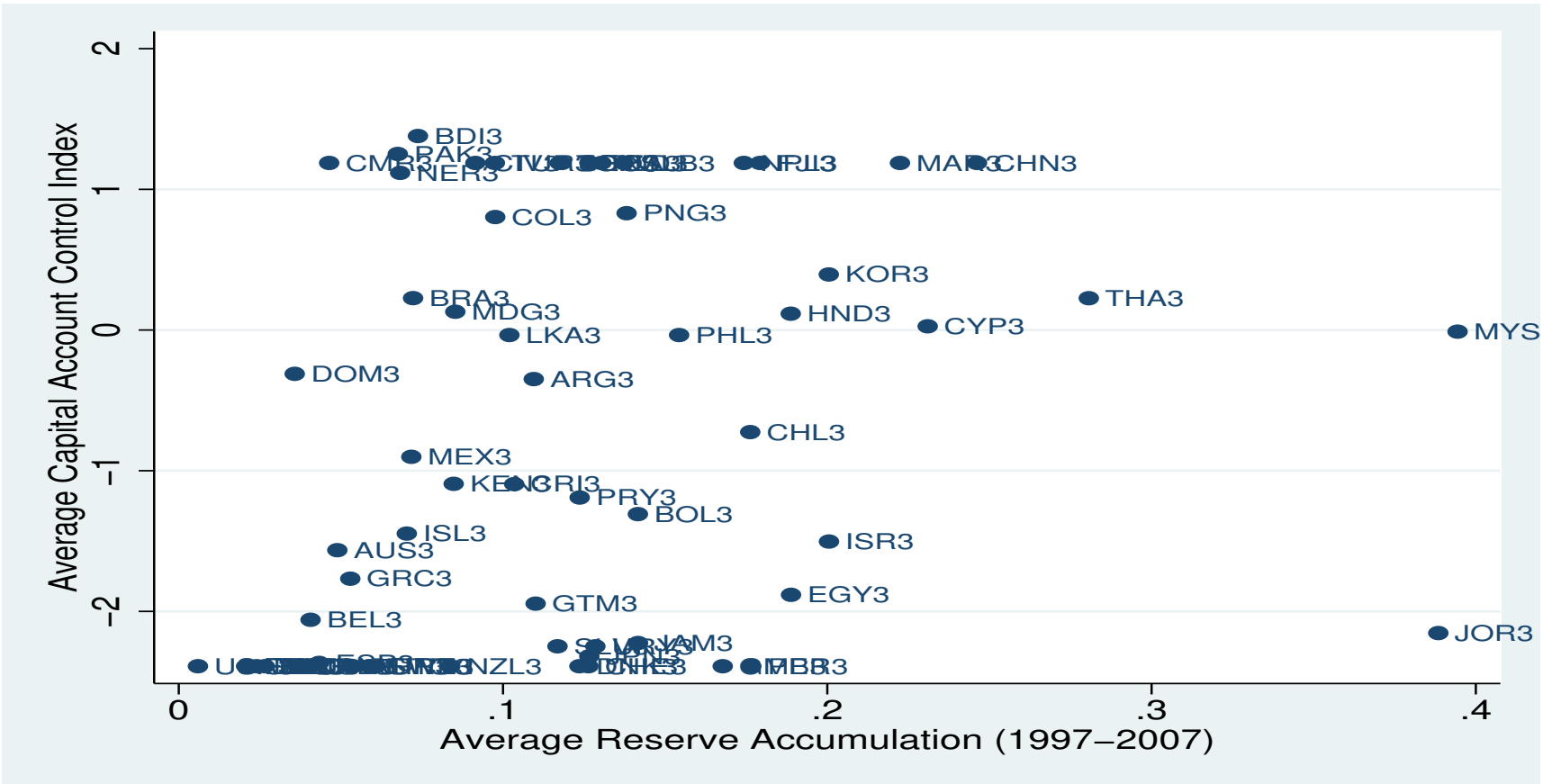
Capital Account Policy - RSRV and KAControl

Scatter-plot : Period3 1997-2007



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Growth : Econometric Specification

Cross Sectional Analysis

$$\begin{aligned} \Delta log(y_i) &= \alpha + \beta^{RSRV} \Delta RSRV_i + \beta^{R\&KAClosed} \Delta RSRV_i \times KAClosed_i \\ &\quad + \beta^{InitialGDP} log(y_{i,0}) + \gamma' Z_i + \epsilon_i, \end{aligned} \tag{6}$$

where y is the average real GDP per capita or TFP for period 2 or 3. The initial value of real GDP per capita or TFP comes from the the last year of the period 1. Z stands for all other controls.

Annual Panel Analysis

$$\begin{aligned} log(y_{i,t}) - log(y_{i,t-1}) &= \alpha_i + D_t + \beta^{RSRV} (RSRV_{i,t-1} - RSRV_{i,t-2}) \\ &\quad + \beta^{Initial} log(y_{i,t-1}) + \gamma' Z_{i,t} + \epsilon_{i,t}. \end{aligned} \tag{7}$$

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Empirical Results : Capital Account Policy and rGDP Growth

Table 17a: Annual Panel: Capital Account Policy and Growth of Real GDP per Capita

	Period 2 & Period 3 (1986-2007)					
Dependent variable:	All Sample					
rGDP Growth	All	Fin.Opn.	Fin.Cl.	Adv.	EM	Dev.
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged Δ RSRV	0.07	0.04	**0.23****	0.01	**0.19****	0.02
	(1.18)	(0.56)	**(2.56)**	(0.06)	**(2.60)**	(0.31)
Initial rGDP	-0.05**	-0.09***	-0.02	-0.08***	-0.10***	-0.02
	(-2.54)	(-4.62)	(-0.69)	(-3.10)	(-3.62)	(-0.91)
Schooling	0.01	0.01*	0.00	0.00	0.04**	0.01
	(1.65)	(2.00)	(0.03)	(1.19)	(2.90)	(1.02)
Inst. Quality	0.01***	0.01***	0.00	0.00*	0.01**	0.01*
	(2.93)	(3.90)	(0.81)	(1.82)	(2.60)	(1.90)
Trade Openness	0.03*	0.03***	0.04	0.02***	-0.04	0.05
	(1.69)	(3.51)	(1.28)	(3.51)	(-1.31)	(1.62)
Credit to GDP	-0.00***	-0.00***	-0.00**	-0.00	0.00	-0.00**
	(-3.80)	(-3.08)	(-2.16)	(-1.09)	(0.03)	(-2.26)
Terms of Trade	-0.01	0.04	-0.04*	0.03	-0.11***	0.04*
	(-0.42)	(1.36)	(-2.05)	(0.55)	(-10.11)	(1.85)
Obs.	1231	724	507	424	248	559
Num. of Cty.	64	38	26	22	13	29
R^2	0.18	0.26	0.22	0.44	0.63	0.20

Empirical Results : Capital Account Policy and rGDP Growth w/o Oil

Table 17b: Annual Panel: Capital Account Policy and Growth of Real GDP per Capita

	Period 2 & Period 3 (1986-2007)					
Dependent variable:	w/o Oil Exporting Countries					
rGDP Growth	All	Fin.Opn.	Fin.Cl.	Adv.	EM	Dev.
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged Δ RSRV	0.03	-0.05	**0.23****	-0.06	**0.27*****	-0.03
	(0.38)	(-0.49)	**(2.51)**	(-0.57)	**(3.18)**	(-0.26)
Initial rGDP	-0.09***	-0.11***	-0.08***	-0.09***	-0.10***	-0.08***
	(-6.72)	(-4.86)	(-5.28)	(-3.41)	(-3.39)	(-3.69)
Schooling	0.01**	0.01**	0.02*	0.00	0.04**	0.01
	(2.30)	(2.11)	(1.84)	(0.89)	(2.54)	(1.33)
Inst. Quality	0.01***	0.00***	0.01**	0.00*	0.00	0.01*
	(3.30)	(2.81)	(2.52)	(1.99)	(1.38)	(1.98)
Trade Openness	0.01*	0.03***	-0.03	0.02***	-0.06*	-0.02
	(1.75)	(3.08)	(-0.91)	(2.88)	(-1.85)	(-0.63)
Credit to GDP	-0.00***	-0.00**	-0.00	-0.00	-0.00	-0.00
	(-3.20)	(-2.49)	(-1.60)	(-0.57)	(-0.11)	(-1.35)
Terms of Trade	-0.04	-0.02	-0.05*	-0.03	-0.11***	0.01
	(-1.67)	(-0.67)	(-1.90)	(-0.99)	(-10.45)	(0.51)
Obs.	1037	609	428	405	208	424
Num. of Cty.	54	32	22	21	11	22
R^2	0.24	0.27	0.32	0.48	0.66	0.23

Empirical Results : Capital Account Policy and TFP Growth

Table 18a: Annual Panel: Capital Account Policy and Growth of TFP

	Period 2 & Period 3 (1986-2007)					
Dependent variable:	All Sample					
TFP Growth	All	Fin.Opn.	Fin.Cl.	Adv.	EM	Dev.
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged Δ RSRV	0.03	-0.02	**0.20*****	0.06	**0.14****	-0.01
	(0.47)	(-0.31)	**(3.19)**	(0.96)	**(2.60)**	(-0.14)
Initial TFP	-0.11***	-0.11***	-0.09***	-0.06***	-0.17***	-0.10***
	(-3.95)	(-2.63)	(-3.41)	(-3.77)	(-3.19)	(-2.31)
Schooling	-0.00	-0.00	0.00	-0.00	-0.00	-0.00
	(-0.50)	(-0.61)	(0.41)	(-1.35)	(-0.40)	(-0.07)
Inst. Quality	0.00***	0.00***	0.00***	0.00	0.00	0.00***
	(3.40)	(2.74)	(3.10)	(0.98)	(1.56)	(2.25)
Trade Openness	0.02***	0.02***	0.02***	0.01***	-0.01	0.02***
	(6.13)	(3.37)	(7.78)	(4.05)	(-0.41)	(4.10)
Credit to GDP	-0.00*	-0.00	-0.00*	-0.00	-0.00	-0.00
	(-1.95)	(-1.43)	(-1.75)	(-0.99)	(-0.55)	(-1.08)
Terms of Trade	-0.03***	-0.01	-0.05***	-0.02	-0.10***	-0.00
	(-2.37)	(-0.74)	(-2.75)	(-1.30)	(-7.62)	(-0.03)
Obs.	1187	720	467	424	248	515
Num. of Cty.	61	37	24	22	13	26
R^2	0.18	0.15	0.30	0.18	0.56	0.19

Empirical Results : Capital Account Policy and TFP Growth w/o Oil

Table 18b: Annual Panel: Capital Account Policy and Growth of TFP

	Period 2 & Period 3 (1986-2007)					
Dependent variable:	w/o Oil Exporting Countries					
TFP Growth	All	Fin.Opn.	Fin.Cl.	Adv.	EM	Dev.
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged Δ RSRV	**0.07***	0.03	**0.17*****	0.05	**0.20****	0.04
	(1.79)	(0.64)	**(2.92)**	(0.71)	**(2.86)**	(0.92)
Initial TFP	-0.11***	-0.15***	-0.07**	-0.06***	-0.20***	-0.10***
	(-4.57)	(-4.21)	(-2.63)	(-3.28)	(-3.38)	(-3.01)
Schooling	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(-0.84)	(-0.93)	(-0.44)	(-1.35)	(-0.22)	(-0.56)
Inst. Quality	0.00***	0.00**	0.00***	0.00	0.00	0.00**
	(3.02)	(2.68)	(2.92)	(0.59)	(0.53)	(2.43)
Trade Openness	0.01***	0.02***	0.03	0.01***	-0.00	0.02
	(4.17)	(3.27)	(1.17)	(4.15)	(-0.27)	(0.86)
Credit to GDP	-0.00**	-0.00	-0.00**	-0.00	-0.00	-0.00
	(-2.20)	(-1.46)	(-2.17)	(-1.07)	(-1.28)	(-1.14)
Terms of Trade	-0.03*	-0.01	-0.05*	-0.02	-0.10***	0.01
	(-1.93)	(-0.67)	(-2.07)	(-1.52)	(-6.75)	(0.67)
Obs.	1013	605	408	405	208	400
Num. of Cty.	52	31	21	21	11	20
R^2	0.21	0.24	0.27	0.19	0.65	0.21