
Can Macroprudential Policies (MaPs) Counter the Financial Dutch Disease Phenomenon?

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Structure

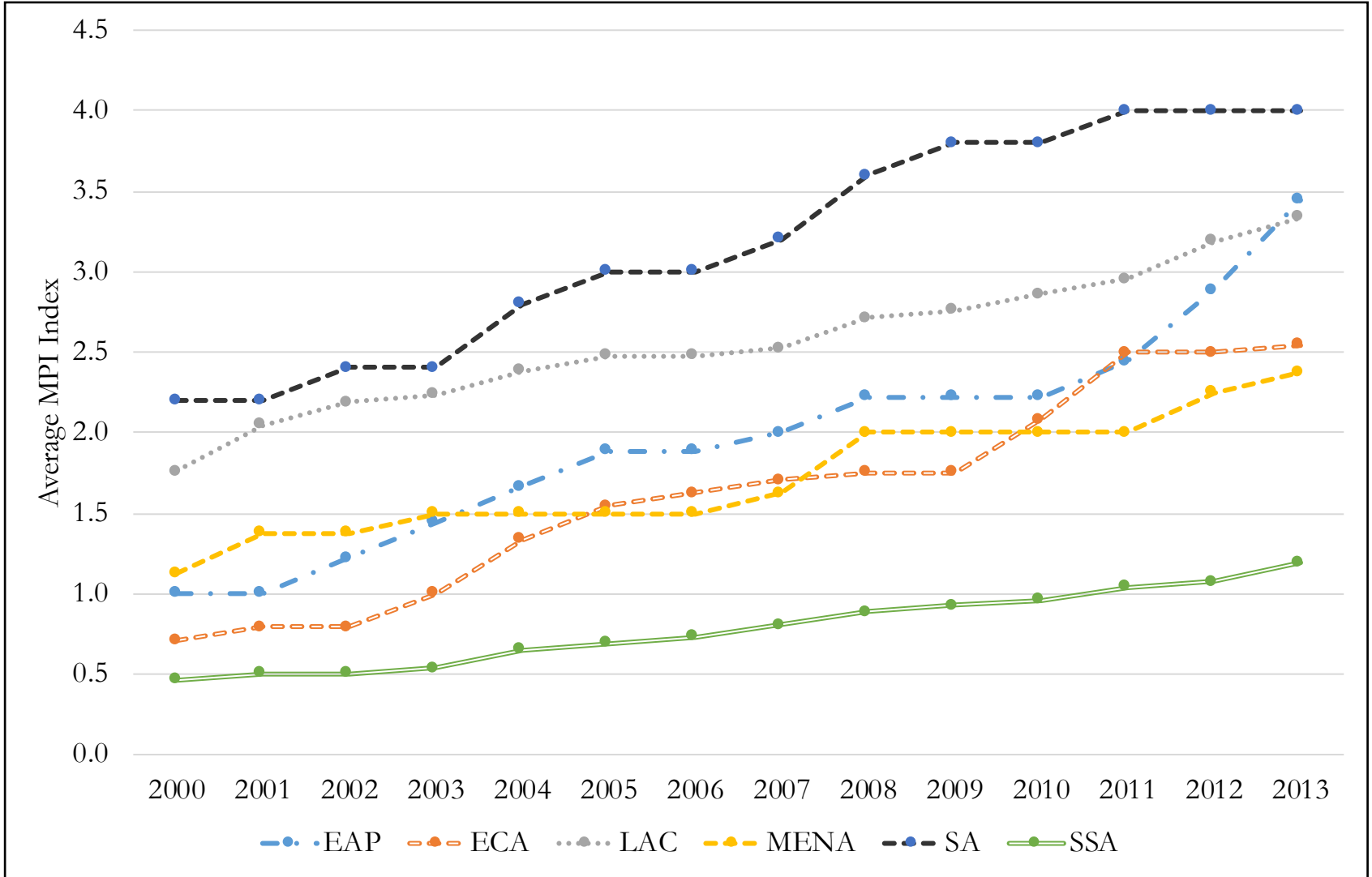
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1. Motivation and Contribution

- The global financial cycle has made macroeconomic management more challenging in emerging market and developing economies (EMDEs) [Rey, 2013; Obstfeld, 2015]
- Beyond the Dilemma versus Trilemma debate there may exist a Quadrilemma where financial stability is an additional goal in addition to exchange rate stability, monetary policy autonomy and financial integration [Aizenman, 2018]
- Emphasis on financial stability has gone hand-in-hand with a growing awareness and use of MaPs
 - Designed to limit systemic vulnerabilities by focusing on the entire financial system, reducing the extent of financial interconnectedness and managing excessive credit growth.

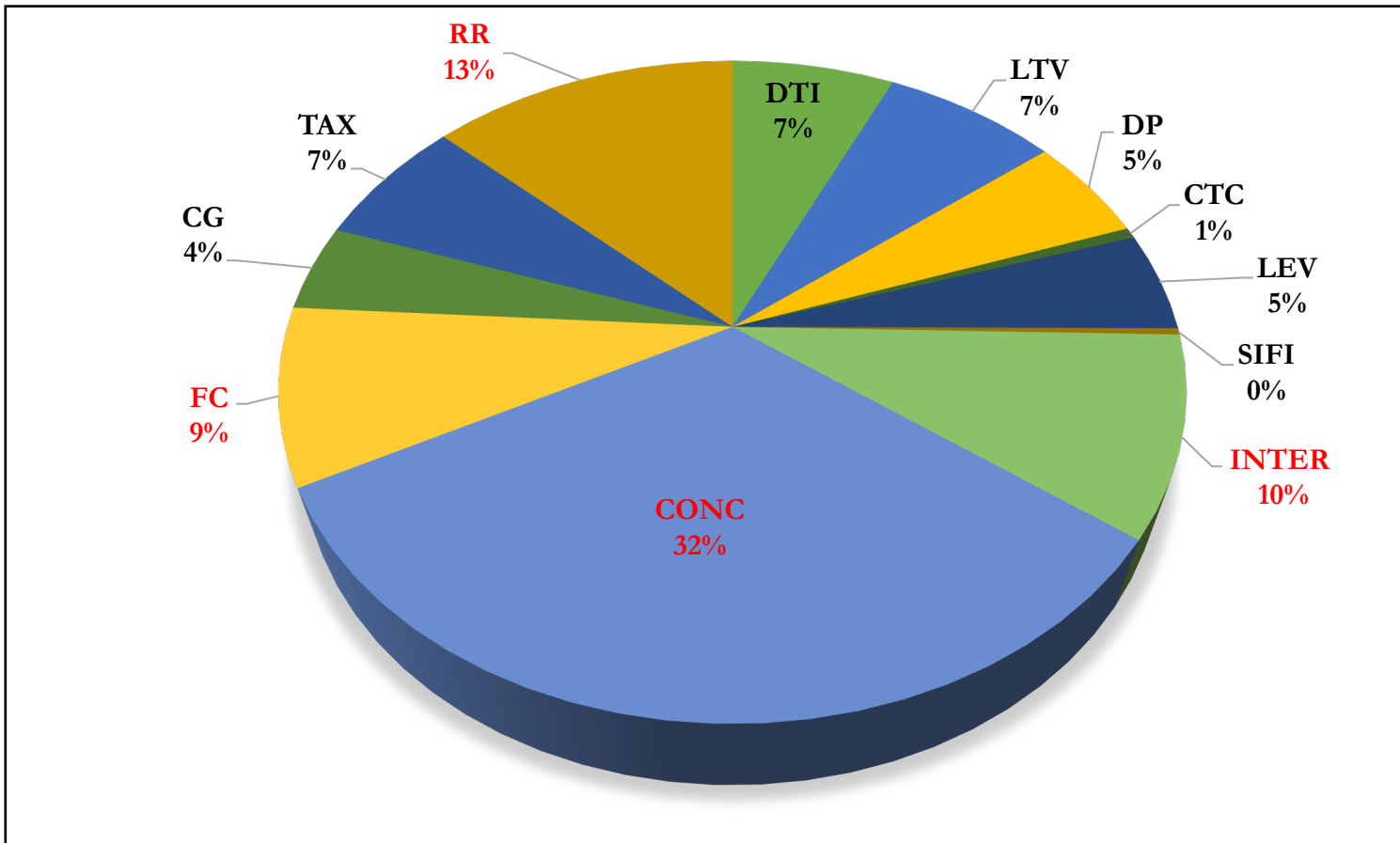
- As of April 2018, 141 countries reported a total of just over 1,300 MaPs or an average of 9.3 per country [IMF, 2018]
 - AEs -- enhancing financial resilience and interconnectedness vs. EMDEs -- constraining credit and property market booms
- Types of MaPs – three broad classifications
 - IMF-FSB-BIS Classification: (a) Capital tools; (b) Asset side tools; and (c) Liquidity related tools
 - **Capital-related:** Dynamic loan loss provisioning; counter-cyclical capital buffers; capital surcharges on systemically important financial institutions; limits on inter-bank exposures
 - **Asset side tools:** Caps on loan-to-value ratios; caps on debt-to-income ratio; leverage ratios; and concentration limits
 - **Liquidity-related:** limits on foreign currency loans; reserve requirement ratios; limits on credit growth; and tax on financial institutions
 - Cerutti et al. (2015): Borrower targeted vs. Financial Institution targeted
 - Limits on Debt-to-Income ratios and loan-to-value ratios are borrower targeted while the rest are financial institution targeted.
 - Price (RR) vs Quantity measures (Concentration and credit limits, DTI, LTV)

Growing Use of MaPs in EMDEs



Source: Authors based on Cerutti et al. (2015)

Usage of Type of MaPs by EMDEs [Average 2000-2013]



Source: Authors based on Cerutti et al. (2015)

- CONC: (Asset) Concentration limits
- RR – Reserve Requirements
- FC: Limits on foreign currency loans
- DP: Dynamic loan-loss provisioning
- DTI: caps on debt-to-income ratio
- LTV: caps on loan-to-value ratio
- CTC: counter-cyclical capital buffers
- CG: limits on credit growth
- TAX: taxes on financial institutions
- INTER: Inter-bank exposures
- SIFI: capital surcharges on systemically important financial institutions
- LEV – leverage ratio

- The top-four categories of MaPs used by EMDEs in our sample are: CONC – Concentration limits; RR – Reserve Requirements; INTER – limits on inter-bank exposures; and FC – Limits on foreign currency loans

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- Growing body of literature examining impact of MaPs on credit growth and asset prices
 - One can think about this issue from the perspective of the real exchange rate (RER), i.e. “Financial Dutch Disease phenomenon” [Corden and Neary, 1982] and vice versa -- MaPs as a means of mitigating impacts of capital outflows
 - Why RER? Price competitiveness and sectoral resource allocation (tradables and nontradables)
 - A typical EMDE has a few policy choices to manage the financial Dutch Disease phenomenon
 - Active use of capital controls -- bluntness of measure/ideological unwillingness?
 - Sterilized foreign exchange intervention -- effectiveness and cost?
 - Tightening fiscal policy -- Re-distributional effects?
 - **Preferred option may well be to use MaPs?**
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- Main focal question of our paper: **How and under what circumstances are MaPs effective in moderating RER movements?**
 - Focus on aggregate MaPs and types, i.e. instruments that target borrowers versus financial-institutions
 - Two specific sub-questions explored in the paper:
 1. **Under what conditions are MaPs most effective?**
 - We consider three characteristics that may impact effectiveness of MaPs: (a) capital account openness; (b) foreign exchange reserves; and (c) financial development
 2. **Are MaPs more effective during periods of rising or falling interest rate differentials?**
 - Motivated by literature that suggests MaPs (and capital controls) are more effective in limiting booms than preventing busts
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2. Preview of Key Findings

1. MaPs consistently moderate the financial Dutch disease through the interest rate channel
 - Impact of MaPs varies by their type, i.e. instruments that target borrowers versus financial-institutions
 - In general MaPs targeting *financial institutions* consistently work better compared to those targeting *borrowers*.
 - Specific MaPs that work: Dynamic loan-loss provisioning, limits on foreign currency loans, reserve requirement ratios and concentration limits more effective.

→ Possible conjectures as to why borrower-specific MaPs do not work:

- Limited in scope?
 - Corporate vs household borrowers
 - Within households – Impact only subset of households because of lack of financial access
- Opportunity for circumvention?
 - Either in terms of moving to non-bank financial institutions or obtaining multiple loans from the same institution (disguised loans) – eg. LTV cum DTI
 - Lack of information or co-ordination across financial institutions -- same loans from multiple borrowers

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2. MaPs tend to be more effective only in EMDEs that:
 - maintain relatively open capital accounts
 - possess low foreign exchange reserves
 - are financially well-developed

 3. Evidence of asymmetry -- moderating effect of MaPs significant only during periods of rising rather than falling interest rates, i.e. capital inflow booms rather than busts
 - However, MaPs more effective during periods of increasing RIR differentials only in sub-sample of high capital account openness and low foreign exchange reserves
 - MaPs could act as substitutes for capital controls and FX reserves
 - Role of Financial Development is inconclusive
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3. Review of Selected Literature

Authors	MaP Database	Focus	Key Findings
Lim et al. (2011)	Data constructed from IMF financial stability survey and other internal desk surveys	Impact of MaPs on credit growth on leverage for 49 countries (2000-2010)	Selected MaPs can reduce pro-cyclicality of credit growth and leverage; results are not dependent on the country though effect varies based on phase of business cycle
Zhang and Zoli (2014)	Own data but mainly builds on Lim et al. (2011)	Impact of MaPs and capital flow management measures on housing prices and credit growth covering 46 economies (13 from Asia) over 2000-2013	Housing related MaPs – particularly loan-to-value caps and housing tax measures have curtailed growth in housing prices, credit and bank leverage.
Akinci and Olmstead-Rumsey (2015)	Own data but mainly builds on Lim et al. (2011) and Cerutti et al. (2015)	Effectiveness of MaPs on credit growth and housing prices covering 57 economies from 2000 to 2013	MaPs associated with lower credit growth, housing credit growth and housing price inflation; Targeted MaPs to prevent housing price rises relatively more effective.

Authors	MaP Database	Focus	Key Findings
Kuttner and Shim (2013)	Builds on data from Shim et al. (2013)	Impact of effectiveness of non-interest rate policy tools including MaPs on housing prices/housing credit for 57 countries (1980-2012)	While housing credit growth is affected by changes in the various MaPs, the debt-service-to-income (DSTI) ratio is the most robust indicator
Bruno et al. (2015)	Builds on Shim et al. (2013)	Comparative analysis of effectiveness of MaPs and CFMs in 12 Asia-Pacific economies over 2004-2013	MaPs and bank-based/bond market CFMs help to slow down banking and bond inflows; MaPs are more effective when they complement monetary policy.
Başkaya et al. (2015)	MaP data based on Shim et al. (2013)	Impact of financial development on the effectiveness of MaPs across panel of 37 economies over 1996 to 2011	While quantity-based tools are effective in lessening credit cycles irrespective of the level of financial development, price-based tools effectively curb excess variations in total credit in relatively more developed financial markets.

Authors	MaP Database	Focus	Key Findings
Cerutti et al. (2015)	Data constructed from IMF survey on Global Macroprudential Policy Instruments (GMPI)	Document the use and effectiveness of MaPs in handling credit growth and house prices across large panel of 119 countries from 2000-2013	More financially open economies and those with deeper and more developed financial systems have weaker correlations between implementation of MaPs and mitigation of credit booms; MaPs work better during boom periods.
Erdem et al. (2017)	MaP data from Cerutti et al. (2015)	Impact of global liquidity on credit growth and role of MaPs in limiting it – 30 countries from 2000 to 2013	MaPs are effective in dampening domestic credit growth during a phase of credit expansion
Aizenman et al. (2017)	MaP data from Cerutti et al. (2015)	To what extent MaPs affect the financial linkages between center economies (CEs) and peripheral ones (PHs) for a panel of 119 countries from 2000 to 2013	Impact of MaPs are asymmetrical; when lax monetary policy of a CE results in capital inflows into a PH, MaPs are quite effective in affecting the financial link between CEs and PHs; MaPs are more effective in countries that run current account deficits financed by portfolio flows, hold lower FX reserves, and have relatively closed financial markets

4. Data and Empirical Model

- Panel data for 93 EMDEs spanning 2000 to 2013 – Sample dictated by GMPI data
- Identification: Two-Way Fixed Effects Model (Benchmark)
 - System-GMM estimation as robustness
 - Parsimonious model:

$$REER_{it} = \delta_i + \beta_1 RIR\ diff_{it} + \gamma \mathbf{Z}_{it} + \beta_2 MaP_{it} + \beta_3 MaP * RIR\ diff_{it} + \rho_t + u_{it}$$

- $REER_{it}$ is measure of Real Effective Exchange Rate (REER) country i at time t
- $RIR\ diff_{it}$ captures Real Interest Rate (RIR) difference between country i 's RIR at time t and real US Fed Funds Rate at time t
- \mathbf{Z}_{it} is a vector of economic determinants of REER in country i at time t
- δ_i is country fixed effects
- ρ_t is time fixed effects
- u_{it} is the idiosyncratic error term

Variables

- Dependent Variable: REER Index
 - Data for 172 trading partners in the world, compiled by the Bruegel Institute

- Focal determinant of REER: RIR Differential [Hoffmann and Macdonald, 2009]
 - Increase in RIR in the home country could trigger surge in capital inflows leading to REER appreciation and loss in external competitiveness, i.e. the financial Dutch Disease phenomenon

- Economic determinants of REER based on literature [Edwards, 1988; Macdonald, 1997; Chinn, 2006; De Broeck and Wolf, 2006; Elbadawi and Soto, 2007; Combes et al. 2012; Kakkar and Yan, 2014]
 - GDP Per Capita/Labor Productivity
 - Government Consumption Expenditure
 - Terms of Trade
 - External Liabilities
 - Exchange Rate Regimes

Priors

- How effective are MaPs in moderating REER appreciation?
 - β_3 -- key parameter of interest that enables us to test effectiveness of MaPs on REER via the interest rate channel
 - If interaction term (β_3) between MaP and RIR is negative this implies MaPs help moderate financial Dutch disease through interest rates
 - Imposition of MaPs on its own could amplify REER appreciation if it gives rise to greater macroeconomic resilience hence attracting higher capital inflows

Priors

- **GDP Per Capita/Labour Productivity (+)**
 - *Ceteris Paribus*, higher levels of economic development in a country could increase the demand for non-tradables resulting in a REER appreciation
 - Higher labour productivity could result in appreciation pressures of REER *a la* Balassa-Samuelson effect
- **Government Consumption Expenditure (% of GDP) (+)**
 - Positive relationship between REER and government consumption expenditure if a significant proportion of such expenditures are towards the non-tradable sector in an economy
- **Terms of Trade Index (+/-)**
 - Higher export prices relative to import prices could result in higher demand for both non-tradables and tradables leading to RER appreciation; this income effect could be countered by substitution effect if lower import prices lead to greater demand for tradables and consequent RER depreciation.
- **Stock of External Liabilities (% of GDP) (+)**
 - Higher stock of capital inflows could result in REER appreciation
- **Exchange Rate Regimes (-)**
 - Greater ER flexibility should reduce the extent of speculative capital inflows, hence helping moderate RER appreciation [Combes et al. 2012]

Table 2: Correlation Matrix

	REER	RIR Diff	GDPPC	Lab Prod	Gov Exp	TOT	Ext Liab	EX Regime	MaP	Chinn-Ito	Credit-to-GDP	FB Asset
REER	1											
RIR Diff	0.0847	1										
GDPPC	-0.0399	-0.1076	1									
Lab Prod	0.114	-0.1295	0.8418	1								
Gov Exp	0.0637	-0.0732	0.296	0.2683	1							
TOT	0.1243	-0.0561	0.005	0.1142	0.0353	1						
Ext Liab	-0.0119	0.0008	0.0912	0.0438	0.0455	-0.1138	1					
EX Regime	-0.1497	0.0866	-0.0589	-0.032	-0.198	0.0213	-0.0047	1				
MaP	0.0809	0.1053	0.1342	0.0627	-0.0957	0.0005	-0.0142	0.0306	1			
Chinn-Ito	-0.0199	-0.016	0.3763	0.2966	-0.0112	-0.091	0.1337	0.0311	0.0399	1		
Credit-to-GDP	0.0936	-0.0267	0.4614	0.3294	0.1073	-0.1158	0.1624	-0.0406	0.1615	0.1232	1	
FB Asset	-0.0344	0.1351	0.07	-0.0125	0.2788	-0.2065	0.0859	-0.1646	-0.2435	0.2763	-0.1959	1

5. Empirical Results

- Tables (1) & (2): Summary Statistics and Correlation Matrix
- **Are MaPs effective in managing the financial Dutch Disease phenomenon?**
 - Table (3): Baseline Fixed Effects Results
 - Table (4): Effectiveness of Individual MaPs
 - Table (5): System-GMM Estimation

Table 3: Do MaPs Moderate Financial Dutch Disease? Baseline Fixed Effects Estimates

	(1)	(2)	(3)	(4)
Dep Var: REER	Baseline	MaP	Borr MaP	Fin MaP
RIR Differential	0.220***	0.452***	0.253**	0.493***
	(0.0518)	(0.136)	(0.119)	(0.141)
GDP Per Capita	0.277***	0.334***	0.339***	0.330***
	(0.0485)	(0.0491)	(0.0490)	(0.0491)
Gov Exp	0.00671***	-8.58e-05	-0.000498	-9.33e-05
	(0.00192)	(0.00206)	(0.00206)	(0.00205)
TOT	0.000209	0.000500**	0.000486**	0.000492**
	(0.000219)	(0.000220)	(0.000222)	(0.000219)
External Liab	-0.00580*	-0.00312	-0.00320	-0.00302
	(0.00339)	(0.00283)	(0.00284)	(0.00282)
Ex Regime	-0.0225***	-0.0136**	-0.0142**	-0.0126**
	(0.00571)	(0.00637)	(0.00640)	(0.00639)
Ex Regime*RIR		-0.0718*	-0.0363	-0.0829*
		(0.0441)	(0.0442)	(0.0451)
MaP		0.00282		
		(0.00794)		
MaP*RIR		-0.0898***		
		(0.0322)		
Borr-Targeted MaP			-0.0139	
			(0.0148)	
Borr MaP*RIR			-0.0570	
			(0.109)	
Fin Inst- Targeted MaP				0.0106
				(0.00974)
Fin Inst MaP*RIR				-0.110***
				(0.0359)
Constant	2.505***	2.102***	2.073***	2.120***
	(0.370)	(0.373)	(0.373)	(0.372)
Observations	1,017	773	773	773
R-squared	0.217	0.328	0.322	0.329
Number of countries	84	78	78	78
Country FE & Year FE	YES	YES	YES	YES

Table 3: Do MaPs Moderate Financial Dutch Disease? Baseline Fixed Effects Estimates

	(1)	(2)	(3)	(4)
Dep Var: REER	Baseline	MaP	Borr MaP	Fin MaP
RIR Differential	0.220***	0.452***	0.253**	0.493***
	(0.0518)	(0.136)	(0.119)	(0.141)
MaP		0.00282		
		(0.00794)		
MaP*RIR		-0.0898***		
		(0.0322)		
Borr-Targeted MaP			-0.0139	
			(0.0148)	
Borr MaP*RIR			-0.0570	
			(0.109)	
Fin Inst-Targeted MaP				0.0106
				(0.00974)
Fin Inst MaP*RIR				-0.110***
				(0.0359)
Observations	1,017	773	773	773
R-squared	0.217	0.328	0.322	0.329
Number of Countries	84	78	78	78

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

Table 3: Impact of MaPs on REER

- An increase in the RIR differential by ten basis points results in an appreciation of REER by approximately two percent in the baseline and four percent in the augmented specification with MaPs
- Results confirm key hypothesis regarding stronger role for MaPs in moderating impact of capital flows via the interest rate channel
 - Financial-institution targeted MaPs are effective in moderating REER appreciation relative to borrower-type MaPs.
- GDP per capita and terms of trade influence REER as hypothesized and are statistically significant
- Moderating impact of exchange rate flexibility through RIR (interaction term) is negative and significant, consistent with priors
- Stock of external liabilities carries the wrong sign but not statistically significant
 - May be due to the composition of capital flows (mobile capital versus FDI) [Combes et al. 2012]

Table 4: Effectiveness of Individual MaPs

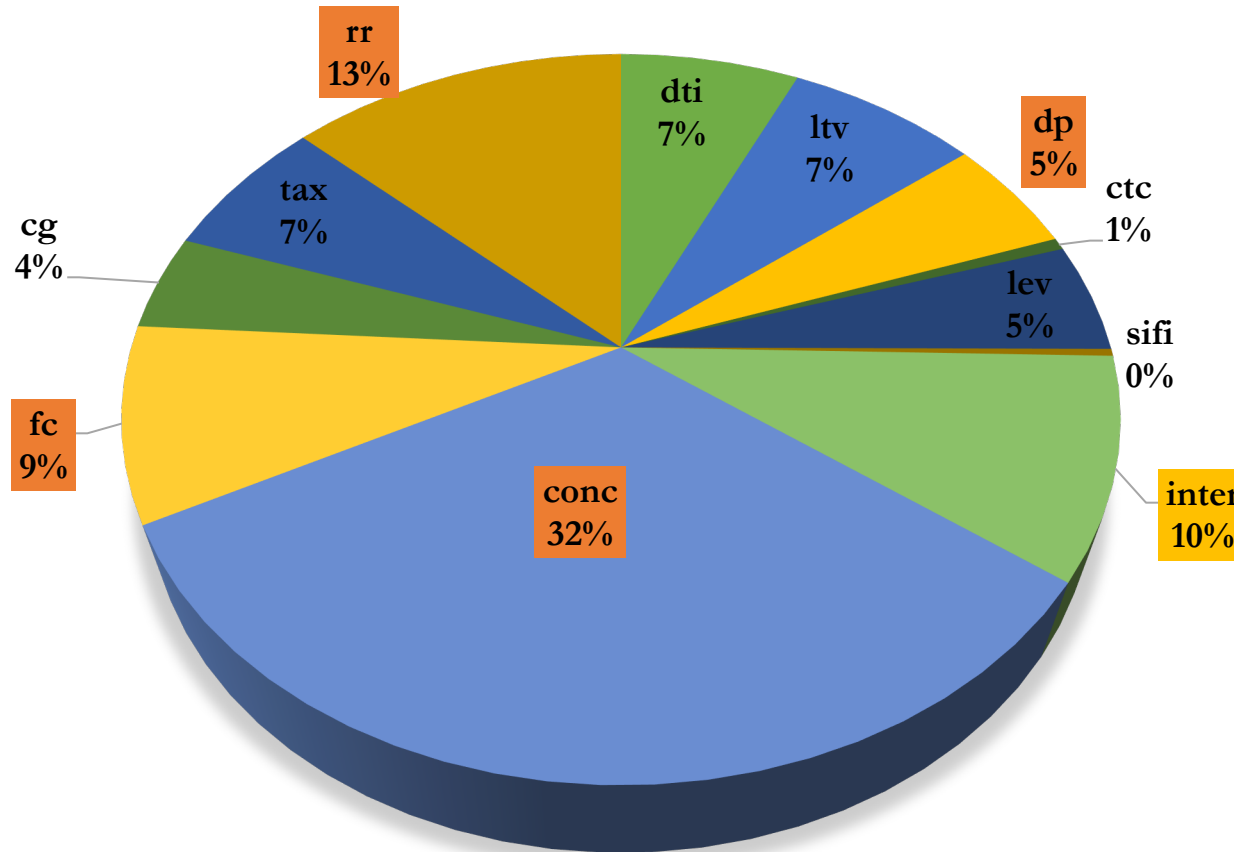
	(1)	(2)	(3)	(4)
Dep Var: REER	DP	CONC	FCL	RR
RIR Differential	0.297**	0.424***	0.227*	0.373**
	(0.118)	(0.136)	(0.118)	(0.120)
DP	0.0664**			
	(0.0307)			
DP*RIR Diff	-0.727***			
	(0.198)			
CONC		0.0409**		
		(0.0201)		
CONC*RIR Diff		-0.246**		
		(0.0974)		
FC			-0.0436	
			(0.0297)	
FC*RIR Diff			-0.425**	
			(0.169)	
RR				0.0157
				(0.0393)
RR*RIR Diff				-0.162*
				(0.0969)
Observations	773	773	773	773
R-squared	0.333	0.328	0.333	0.313
Number of countries	78	78	78	78

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

Table 4: Impact of Types of MaPs on REER

- Specific types of financial-institution targeted MaPs significant in moderating REER include:
 - Dynamic loan-loss provisioning requirements mandating banks to hold more loan-loss provisions during boom periods
 - Imposing asset (concentration) limits
 - Limiting foreign currency loans designed to reduce vulnerabilities to foreign currency risks; and
 - Raising reserve requirement ratios aimed at limiting credit growth in the economy

Types of MaPs



- CONC: (Asset) Concentration limits
- RR – Reserve Requirements
- FC: Limits on foreign currency loans
- DP: Dynamic loan-loss provisioning
- DTI: caps on debt-to-income ratio
- LTV: caps on loan-to-value ratio
- CTC: counter-cyclical capital buffers
- CG: limits on credit growth
- TAX: taxes on financial institutions
- INTER: Inter-bank exposures
- SIFI: capital surcharges on systemically important financial institutions
- LEV – leverage ratio

Source: Authors based on Cerutti et al. (2015)

- Four of the top-five MaPs widely used on average in our sample are significant
 - CONC – Concentration limits; RR – Reserve Requirements; FC – Limits on foreign currency loans; DP – Dynamic loan-loss provisioning requirements

Table 5: System-GMM Estimation

- We re-estimate using a system-GMM estimator to deal with potential endogeneity and reverse causality concerns
- Results are consistent with the baseline results regarding the nexus between MaPs and REER via the interaction with RIR
- All financial-institution targeted instruments are statistically significant and consistent with earlier findings
 - Limits on foreign currency loans sole exception

Table 5: System-GMM Estimation

	(1)	(2)	(3)	(4)	(5)
Dep Var: REER	MaPs	DP	CONC	FCL	RR
REER_{t-1}	0.746***	0.737***	0.746***	0.758***	0.744***
	(0.00329)	(0.00833)	(0.00553)	(0.00737)	(0.00491)
RIR Differential	0.0385***	0.0576***	0.0553***	0.0869***	0.0223
	(0.00714)	(0.0221)	(0.0196)	(0.0111)	(0.0159)
MaP	0.00706***				
	(0.000486)				
MaP*RIR Diff	-0.0773***				
	(0.00290)				
DP		0.0806***			
		(0.00715)			
DP*RIR Diff		-0.351***			
		(0.0354)			
CONC			0.0380***		
			(0.00250)		
CONC*RIR Diff			-0.297***		
			(0.0193)		
FC				0.0101**	
				(0.00473)	
FC*RIR Diff				-0.0306	
				(0.0486)	
RR					0.0296***
					(0.00578)
RR*RIR Diff					-0.264***
					(0.0244)
Observations	800	800	800	791	800
Number of countries	78	78	78	77	78
Number of Instruments	73	73	73	73	73

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; A test of serial correlation for the error terms of the differenced equation confirms the validity of the Roodman corrected instruments. *** p<0.01, ** p<0.05, * p<0.1

What Determines the Effectiveness of MaPs?

■ Table (6): Degree of Capital Account Openness

- ❑ Several EMDEs may not actually use explicit capital controls preferring to use MaPs more proactively/counter-cyclically
- ❑ A priori, MaPs might be expected to be more effective when there is greater degree of capital account openness if MaPs and capital controls are viewed as substitutes
- ❑ On the other hand, in more open economies, high possibility of “circumvention” of MaPs, making them less effective [Cerutti et al. 2015]

■ Table (7): Foreign Exchange (FX) Reserves

- ❑ MaPs might be relatively more effective in countries with low reserves because they can be substitutes in managing financial stability? [Aizenman et al. 2017]

■ Table (8): Financial Development

- ❑ Since MaPs predominantly work through the financial system, *ceteris paribus*, higher levels of financial development should make MaPs more effective [Baskaya et al. 2015]

Table 6: Does the Extent of Capital Account Openness Matter?

	(1)	(2)	(3)	(4)
Dep Var: REER	High KA Open	Low KA Open	FI-MaP Hi KaOp	FI-MaP Lo KaOp
RIR Differential	0.280***	0.234**	0.246***	0.240**
	(0.0924)	(0.0907)	(0.0892)	(0.0933)
MaP	0.0183*	-0.00779		
	(0.0104)	(0.0132)		
MaP*RIR	-0.0963**	-0.0277		
	(0.0418)	(0.0500)		
Fin Inst- Targeted MaP			0.0134	0.00754
			(0.0125)	(0.0168)
Fin Inst MaP*RIR			-0.0823**	-0.0265
			(0.0432)	(0.0581)
Observations	388	410	388	410
R-squared	0.265	0.230	0.260	0.230
Number of countries	48	49	48	49

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

- MaPs are relatively more effective in countries with high degrees of capital account openness

Table 7: Does the Extent of FX Reserves Accumulation Matter?

	(1)	(2)	(3)	(4)
Dep Var: REER	High Res	Low Res	FI-MaP Hi Res	FI-MaP Lo Res
RIR Differential	0.255**	0.310***	0.198*	0.363***
	(0.113)	(0.0854)	(0.108)	(0.0889)
MaP	-0.0287***	0.0550***		
	(0.0101)	(0.0131)		
MaP*RIR	-0.0343	-0.221***		
	(0.0417)	(0.0525)		
Fin Inst- Targeted MaP			-0.0227	0.0538***
			(0.0139)	(0.0144)
Fin Inst MaP*RIR			-0.0134	-0.254***
			(0.0475)	(0.0573)
Observations	438	356	438	356
R-squared	0.368	0.293	0.284	0.140
Number of countries	55	45	55	45

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

- Significance of MaP*RIR only in the sample with low FX reserves

Table 8: Does the Extent of Financial Development Matter?

	(1)	(2)	(3)	(4)
Dep Var: REER	High FD	Low FD	FI-MaP Hi FD	FI-MaP Lo FD
RIR Differential	0.396***	0.209**	0.325**	0.189**
	(0.124)	(0.0881)	(0.155)	(0.0902)
MaP	-0.0369***	-0.00232		
	(0.0130)	(0.0115)		
MaP*RIR	-0.115**	-0.0384		
	(0.0526)	(0.0468)		
Fin Inst- Targeted MaP			-0.0341	-0.00738
			(0.0267)	(0.0137)
Fin Inst MaP*RIR			-0.0877*	-0.0258
			(0.0481)	(0.0523)
Observations	315	443	315	443
R-squared	0.228	0.242	0.207	0.242
Number of countries	53	55	53	55

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

- MaPs are more effective when countries have high degrees of FD as proxied by credit-to-GDP ratio
- Results robust to alternative indicators of FD including private sector credit by deposit money banks and composite Financial Institutions Depth Index (World Bank)

Asymmetry of Real Interest Rates and Effectiveness of MaPs

- Growing recognition that MaPs play a role in helping countries regain a degree of monetary policy autonomy during periods of capital inflow booms rather than busts [Aizenman et al., 2017; Cerutti et al., 2017; Erdem et al., 2017]
- Test if there is an asymmetry in the impact of MaPs on REER during periods of *rising* versus *falling* RIR differentials (**Table 11**)
 - We create a binary variable that takes the value 1 for $d(\text{RIR}) > 0$ and 0 for $d(\text{RIR}) < 0$
- Also check if the nexus between effectiveness of MaPs and RIR asymmetry is conditioned on varying degrees of capital account openness (**Table 12**), FX reserves (**Table 13**) and financial development (**Table 14**).

Table 11: RIR Asymmetry and Effectiveness of MaPs

	(1)	(2)
Dep Var: REER	Decreasing RIR	Increasing RIR
RIR Differential	0.153	0.485***
	(0.166)	(0.124)
MaP	-0.00741	0.0122
	(0.0107)	(0.0151)
MaP*RIR	-0.0885	-0.116**
	(0.0604)	(0.0541)
Observations	368	258
R-squared	0.345	0.400
Number of countries	62	60

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

- MaPs only effective when RIR differential is increasing which suggests they are better at preventing RER appreciations due to capital inflows than outflows
 - Akin to literature on effectiveness of capital controls
 - Consistent with some of the related literature like Aizenman et al. (2017) and Cerutti et al. (2017) who find that MaPs work better during boom periods

**Table 12: RIR Asymmetry and Effectiveness of MaPs:
High and Low Capital Account Openness Sub-Samples**

	(1)	(2)	(3)	(4)
Dep Var: REER	High Ka Open		Low Ka Open	
	RIR<0	RIR>0	RIR<0	RIR>0
RIR Differential	0.285	0.598**	0.0428	0.441**
	(0.219)	(0.268)	(0.205)	(0.191)
MaP	0.00211	0.0540**	-0.0165	0.00211
	(0.0161)	(0.0260)	(0.0163)	(0.0274)
MaP*RIR	-0.146	-0.166**	-0.0894	-0.203
	(0.0899)	(0.0791)	(0.0729)	(0.125)
Observations	177	131	190	125
R-squared	0.474	0.516	0.370	0.459
Number of countries	39	34	40	35

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

- MaPs tends to be effective in periods of increasing RIR differentials only in the sub-sample of high capital account openness → MaPs could act as a substitute for capital controls to prevent booms

**Table 13: RIR Asymmetry and Effectiveness of MaPs:
High and Low FX Reserves Sub-Samples**

	(1)	(2)	(3)	(4)
Dep Var: REER	High FX Reserves		Low FX Reserves	
	RIR<0	RIR>0	RIR<0	RIR>0
RIR Differential	0.376	0.681**	-0.159	0.579***
	(0.316)	(0.312)	(0.518)	(0.136)
MaP	-0.0346**	-0.0251	0.0409	0.117***
	(0.0134)	(0.0196)	(0.0373)	(0.0291)
MaP*RIR	-0.0712	-0.0924	-0.180	-0.310***
	(0.0856)	(0.0909)	(0.154)	(0.0863)
Observations	214	148	154	110
R-squared	0.407	0.490	0.390	0.543
Number of countries	44	44	34	30

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

- MaPs are effective during periods of increasing RIR differentials only in the sub-sample of countries with low FX reserves → MaPs could act as a substitute for FX intervention.

**Table 14: RIR Asymmetry and Effectiveness of MaPs:
High and Low Financial Development Sub-Samples**

	(1)	(2)	(3)	(4)
Dep Var: REER	Low Financial Development		High Financial development	
	RIR<0	RIR>0	RIR<0	RIR>0
RIR Differential	0.158	0.325**	0.206	0.340
	(0.202)	(0.153)	(0.308)	(0.511)
MaP	0.000675	0.0466*	-0.0583***	-0.0833**
	(0.0166)	(0.0254)	(0.0153)	(0.0312)
MaP*RIR	-0.0485	-0.225**	-0.0250	-0.0516
	(0.0746)	(0.0917)	(0.101)	(0.127)
Constant	1.800***	0.434	0.779	-2.321
	(0.619)	(0.811)	(1.221)	(2.445)
Observations	209	143	144	103
R-squared	0.415	0.506	0.502	0.427
Number of countries	44	43	40	41

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

- MaPs are effective during periods of increasing RIR differentials only in the sub-sample of countries with *low* financial development – regardless of the proxy used.

6. Summary and Conclusion

- Do MaPs affect external competitiveness narrowly captured by the real exchange rate?
- Our empirical analysis for a panel of over 90 EMDEs for period 2000-2013 reaches following conclusions:
 - Strong and consistent evidence that MaPs enable moderation of the financial Dutch disease through the interest rate channel.
 - This effect only limited to MaPs that target financial institutions and not those that target borrowers.
 - Dynamic loan-loss provisioning, limits on foreign currency loans, reserve requirement ratios and concentration limits are impactful.

6. Summary and Conclusion

- Moderating effect of MaPs significant only during periods of rising rather than falling RIR differentials suggesting MaPs more impactful in preventing booms than mitigating busts.
- Results are limited to countries with high capital account openness and low FX reserves, suggesting that MaPs act as a substitute to both capital controls as well as foreign exchange intervention in preventing booms.
- Results for financial development inconclusive (price vs quantity MaPs?).



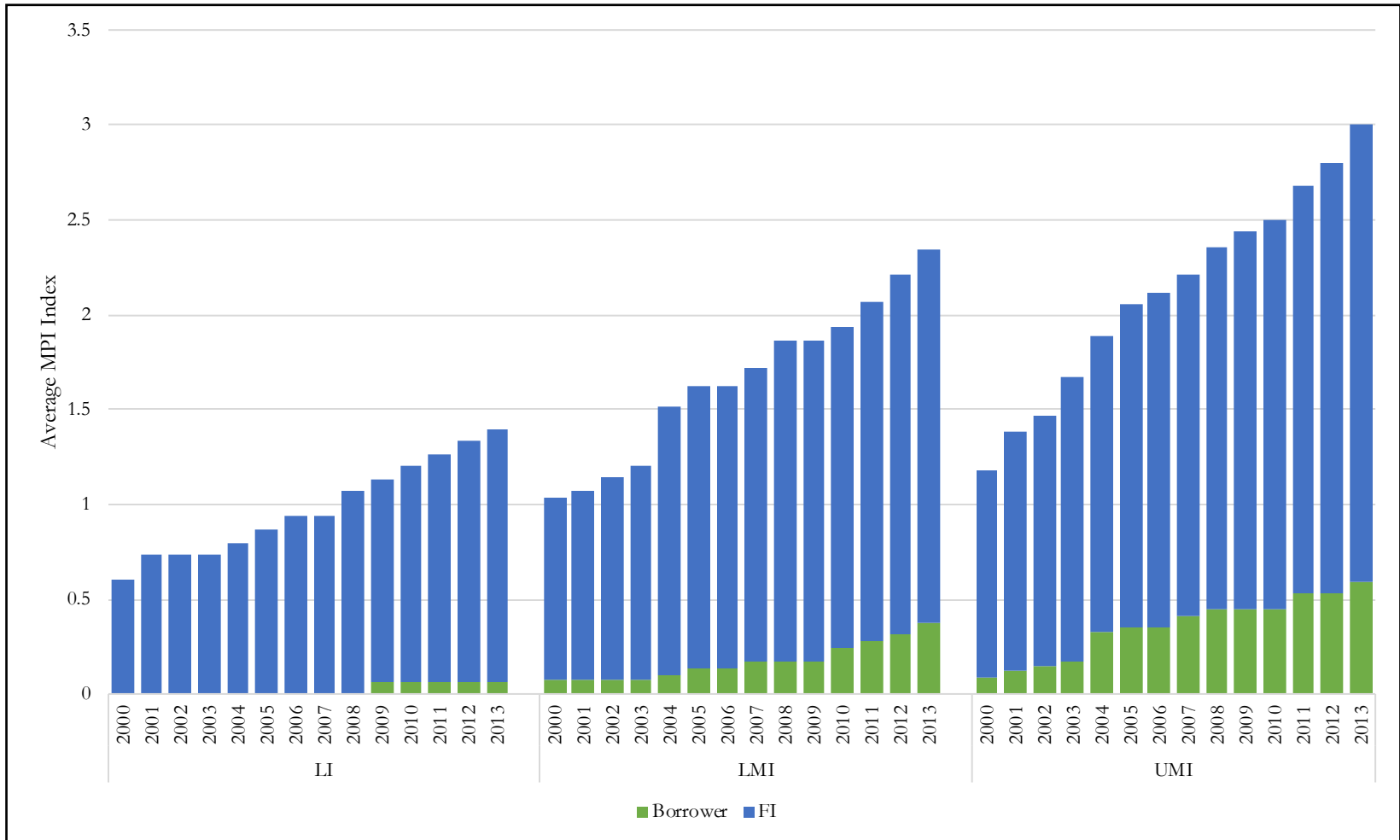
Thank You!

Extra Slides

Table 1: Summary Statistics

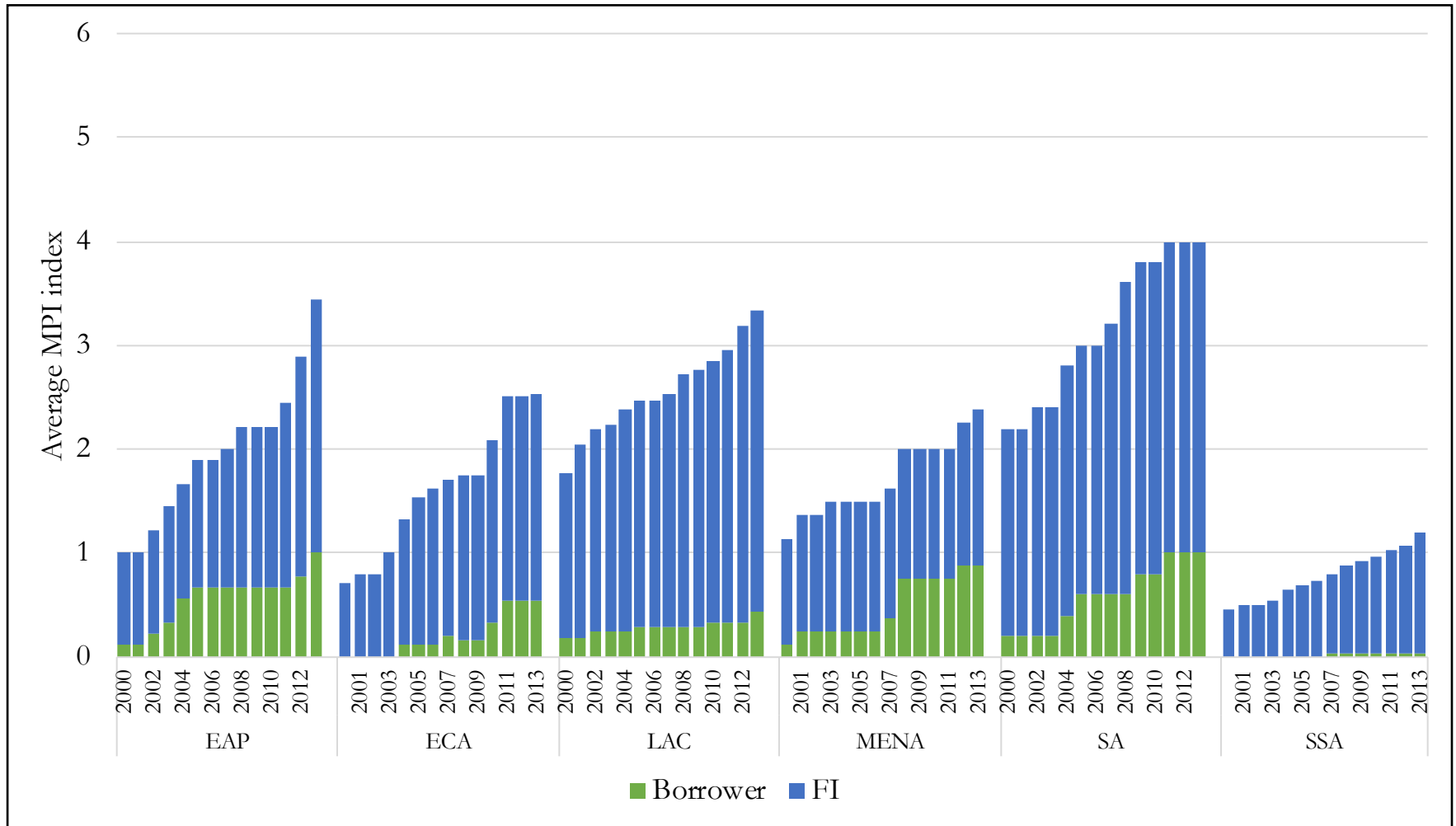
Variable	Obs	Countries	Mean	SD	Min	Max
Ln REER	1911	101	4.613514	0.228144	3.495625	6.178507
RIR Diff (%)	1384	88	0.087	0.261923	-0.9658	5.707863
Ln GDPPC	1924	103	7.514911	1.203259	4.848116	10.08132
Ln Lab Prod	1880	99	9.643493	1.006249	6.941504	11.81936
Gov Exp (%)	1901	103	14.92204	5.478901	0	47.19156
TOT Index	1747	103	110.534	32.6152	21.39672	290.9035
Ext Liab (%)	1922	102	0.959912	1.726503	0.039322	36.80625
EX Regime	1596	101	2.494987	1.163973	1	4
MaP	1302	93	1.72427	1.675893	0	9
Chinn-Ito Index	1864	100	0.469453	0.336647	0	1
Credit-to-GDP (%)	1868	101	34.82821	29.36717	1.17	165.72
FB Asset (%)	822	95	47.82603	31.88416	0	100

Average MPI Index by Income Level and Type of MaP



Source: Authors based on Cerutti et al. (2015)

Average MPI Index by Region and Type of MaP



Source: Authors based on Cerutti et al. (2015)

- Relatively more usage of financial institution targeted MaPs in EMDEs

3. Review of Selected Literature

- Emphasis of literature to date seems to have been on effectiveness of MaPs in limiting pro-cyclicality of credit growth and/or house price inflation across a cross-section of countries. -- Focus on panel studies
- **Lim et al. (2011)** examine the impact of MaPs on credit growth and leverage using data for 49 countries over period 2000 to 2010
 - MaP data from 2010 IMF financial stability survey and internal surveys of desk economists
 - Key findings: Selected MaPs can reduce pro-cyclicality of credit growth and leverage and that results are not dependent on country though effect varies based on phase of business cycle
- **Kuttner and Shim (2013)** investigate effectiveness of various housing-related MaPs in moderating house prices and housing credit for a panel data of 57 economies over the period 1980: q1 to 2011: q4 (based)
 - MaP data on housing market based on Shim et al. (2013)
 - Key findings: While housing credit growth is affected by changes in the various MaPs, the debt-service-to-income (DSTI) ratio is the most robust indicator

Selected Literature

- **Zhang and Zoli (2014)** examine the impact of MaPs and capital flow measures in 13 Asian economies as well as 33 advanced and emerging over the period 2000:q1 to 2013:q2
 - Data from Lim et al. (2011) as well as national central banks' and banking supervisors' websites
 - Key findings: Housing-related MaPs appear to have contributed to reduce credit growth in Asia
- **Cerutti, Claessens, and Laeven (2015)** document use of MaPs across 119 countries from 2000-2013 across various instruments
 - Data from the 2013 IMF Survey, Global Macroprudential Policy Instruments (GMPI)
 - Key findings: More open economies and those with deeper and more developed financial systems have a weaker correlations between implementation of MaPs and mitigation of credit booms; MaPs work better during boom periods

Selected Literature

- **Akinci and Olmstead-Rumsey (2015)** construct indices of MaPs for 57 advanced and emerging countries over the period 2000: q1 to 2013: q4 to examine effect of MaPs on credit growth
 - MaP data from national sources and the GMPI (Cerutti, Claessens, and Laeven, 2015)
 - Key findings: Dynamic panel regressions find that tightening of MaPs is associated with lower bank and credit growth and house price inflation
- **Bruno, Shim and Shin (2015)** analyze the use and effectiveness of MaPs and capital flow management for 12 Asia-Pacific countries over period 2004: q1 to 2013: q4
 - Data sourced from the BIS Quarterly Review (Shim et al. 2013)
 - Key findings: MaPs (as well as capital flows management tools) help to slow down banking and bond inflows and that they are more effective when they complement monetary policy rather when they work at cross-purposes

Selected Literature

- **Başkaya, Kenç, Shim and Turner (2015)** examine impact of financial development on the effectiveness of MaPs across panel of 37 economies over the period of 1996: q1 to 2011: q4
 - MaP data from based on Shim et al. (2013)
 - Key findings: While quantity-based tools are effective in lessening credit cycles irrespective of the level of financial development, price-based tools effectively curb excess variations in total credit in relatively more developed financial markets

- **Erdem, Ozen and Unalmis (2017)** address the effectiveness of MaPs in controlling domestic credit growth using data for 30 emerging economies over the period 2000 to 2013
 - MaP data from national sources and the GMPI (Cerutti, Claessens, and Laeven, 2015)
 - Key findings: MaPs are effective in dampening domestic credit growth during a phase of credit expansion

Selected Literature

- **Aizenman, Chinn and Ito (2017)** examine the effect of monetary policies of central economies on peripheral ones for a panel of 119 countries from 2000 to 2013
 - MaP data from the GMPI (Cerutti et al., 2015)
 - Key findings: Impact of MaPs are asymmetrical and arise when lax monetary policy of a central or influential economy results in capital inflows into a peripheral or economy and MaPs are more effective in countries that run current account deficits financed by rising portfolio flows

Table 3: Do MaPs Moderate Financial Dutch Disease? Baseline Fixed Effects Estimates

	(1)	(2)	(3)	(4)
Dep Var: REER	Baseline	MaP	Borr MaP	Fin MaP
RIR Differential	0.220***	0.452***	0.253**	0.493***
	(0.0518)	(0.136)	(0.119)	(0.141)
GDP Per Capita	0.277***	0.334***	0.339***	0.330***
	(0.0485)	(0.0491)	(0.0490)	(0.0491)
Gov Exp	0.00671***	-8.58e-05	-0.000498	-9.33e-05
	(0.00192)	(0.00206)	(0.00206)	(0.00205)
TOT	0.000209	0.000500**	0.000486**	0.000492**
	(0.000219)	(0.000220)	(0.000222)	(0.000219)
External Liab	-0.00580*	-0.00312	-0.00320	-0.00302
	(0.00339)	(0.00283)	(0.00284)	(0.00282)
Ex Regime	-0.0225***	-0.0136**	-0.0142**	-0.0126**
	(0.00571)	(0.00637)	(0.00640)	(0.00639)
Ex Regime*RIR		-0.0718*	-0.0363	-0.0829*
		(0.0441)	(0.0442)	(0.0451)
MaP		0.00282		
		(0.00794)		
MaP*RIR		-0.0898***		
		(0.0322)		
Borr-Targeted MaP			-0.0139	
			(0.0148)	
Borr MaP*RIR			-0.0570	
			(0.109)	
Fin Inst- Targeted MaP				0.0106
				(0.00974)
Fin Inst MaP*RIR				-0.110***
				(0.0359)
Constant	2.505***	2.102***	2.073***	2.120***
	(0.370)	(0.373)	(0.373)	(0.372)
Observations	1,017	773	773	773
R-squared	0.217	0.328	0.322	0.329
Number of cid	84	78	78	78
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 4: Effectiveness of Individual MaPs

	(1)	(2)	(3)	(4)
Dep Var: REER	DP	CONC	FCL	RR
RIR Differential	0.297**	0.424***	0.227*	0.373**
	(0.118)	(0.136)	(0.118)	(0.120)
GDP Per Capita	0.331***	0.327***	0.342***	0.369***
	(0.0486)	(0.0488)	(0.0484)	(0.0458)
Gov Exp	-0.000516	-5.75e-05	-0.000417	0.000219
	(0.00204)	(0.00206)	(0.00204)	(0.00201)
TOT	0.000509**	0.000482**	0.000428*	0.000251
	(0.000218)	(0.000220)	(0.000219)	(0.000218)
External Liab	-0.00307	-0.00325	-0.00312	-0.00312
	(0.00281)	(0.00282)	(0.00281)	(0.00284)
Ex Regime	-0.0147**	-0.0121*	-0.0166***	-0.0125**
	(0.00633)	(0.00640)	(0.00641)	(0.00624)
Ex Regime*RIR	-0.0469	-0.0711	-0.0181	-0.0603
	(0.0428)	(0.0447)	(0.0440)	(0.0412)
DP	0.0664**			
	(0.0307)			
DP*RIR Diff	-0.727***			
	(0.198)			
CONC		0.0409**		
		(0.0201)		
CONC*RIR Diff		-0.246**		
		(0.0974)		
FC			-0.0436	
			(0.0297)	
FC*RIR Diff			-0.425**	
			(0.169)	
RR				0.0157
				(0.0393)
RR*RIR Diff				-0.162*
				(0.0969)
Constant	2.130***	2.140***	2.067***	1.809***
	(0.371)	(0.371)	(0.369)	(0.347)
Observations	773	773	773	773
R-squared	0.333	0.328	0.333	0.313
Number of cid	78	78	78	78
Country/Year FE	YES	YES	YES	YES

Table 5: MaPs and Financial Dutch Disease - System-GMM Estimation

	(1)	(2)	(3)	(4)	(5)
Dep Var: REER	MaPs	DP	CONC	FCL	RR
REER _{t-1}	0.746*** (0.00329)	0.737*** (0.00833)	0.746*** (0.00553)	0.758*** (0.00737)	0.744*** (0.00491)
RIR Differential	0.0385*** (0.00714)	0.0576*** (0.0221)	0.0553*** (0.0196)	0.0869*** (0.0111)	0.0223 (0.0159)
GDP Per Capita	0.000767 (0.000498)	0.00342*** (0.00103)	0.00103* (0.000564)	-0.000412 (0.00110)	0.00337*** (0.000932)
Gov Exp	-0.000164 (0.000146)	-0.000654*** (0.000227)	-0.000196 (0.000149)	-0.000632** (0.000255)	-0.000676*** (0.000241)
TOT	0.000702*** (3.98e-05)	0.000634*** (7.62e-05)	0.000621*** (3.55e-05)	0.000665*** (8.85e-05)	0.000681*** (4.75e-05)
Ext Liab	0.00353*** (0.000205)	0.00343*** (0.000259)	0.00316*** (0.000162)	0.00353*** (0.000222)	0.00314*** (0.000242)
Ex Regime	-0.00484*** (0.000772)	-0.00493*** (0.00129)	-0.00528*** (0.000893)	-0.00583*** (0.00128)	-0.00478*** (0.00111)
MaP	0.00706*** (0.000486)				
MaP*RIR Diff	-0.0773*** (0.00290)				
DP		0.0806*** (0.00715)			
DP*RIR Diff		-0.351*** (0.0354)			
CONC			0.0380*** (0.00250)		
CONC*RIR Diff			-0.297*** (0.0193)		
FC				0.0101** (0.00473)	
FC*RIR Diff				-0.0306 (0.0486)	
RR					0.0296*** (0.00578)
RR*RIR Diff					-0.264*** (0.0244)
Constant	1.103*** (0.0190)	1.143*** (0.0438)	1.104*** (0.0257)	1.080*** (0.0380)	1.103*** (0.0245)
Observations	800	800	800	791	800
Number of countries	78	78	78	77	78
Number of Instruments	73	73	73	73	73

Table 6: Does MaP Effectiveness Vary by Income Levels?

	(1)	(2)
Dep Var: REER	MIC	LIC
RIR Differential	0.548***	0.442*
	(0.155)	(0.253)
MaP	-0.00891	0.0789**
	(0.00940)	(0.0345)
MaP*RIR	-0.0897**	-0.214*
	(0.0419)	(0.105)
Observations	565	143
R-squared	0.312	0.201
Number of countries	56	13

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

- Given higher “extensity of MaP implementation” by EMDEs relative to the industrialized countries do we observe any differences in MaP effectiveness across income groups?
 - No substantive differences between MICs and LICs

Table 6: Does MaP Effectiveness Vary by Income Levels?

	(1)	(2)
Dep Var: REER	MIC	LIC
RIR Differential	0.548***	0.442*
	(0.155)	(0.253)
GDP Per Capita	0.353***	-0.522**
	(0.0361)	(0.206)
Gov Exp	0.00679***	-0.0109*
	(0.00254)	(0.00591)
TOT	0.000699***	0.000300
	(0.000263)	(0.00106)
External Liab	-0.00331	-0.118
	(0.00295)	(0.136)
Ex Regime	-0.0150*	0.0296
	(0.00787)	(0.0207)
Ex Regime*RIR	-0.0772	-0.0705
	(0.0538)	(0.0824)
MaP	-0.00891	0.0789**
	(0.00940)	(0.0345)
MaP*RIR	-0.0897**	-0.214*
	(0.0419)	(0.105)
Constant	1.700***	7.696***
	(0.272)	(1.352)
Observations	565	143
R-squared	0.312	0.201
Number of countries	56	13
Country FE	YES	YES
Year FE	YES	YES

Table 7a: Effectiveness of MaPs: Does the Extent of Capital Account Openness Matter?

	(1)	(2)
Dep Var: REER	High KA Open	Low KA Open
RIR Differential	0.280***	0.234**
	(0.0924)	(0.0907)
GDP Per Capita	0.353***	0.243***
	(0.0417)	(0.0519)
Gov Exp	0.0136***	-0.00248
	(0.00301)	(0.00270)
TOT	-0.000319	0.000830**
	(0.000316)	(0.000335)
External Liab	-0.00233	-0.0504
	(0.00249)	(0.0323)
Ex Regime	-0.0134*	-0.00733
	(0.00765)	(0.00917)
MaP	0.0183*	-0.00779
	(0.0104)	(0.0132)
MaP*RIR	-0.0963**	-0.0277
	(0.0418)	(0.0500)
Constant	1.595***	2.810***
	(0.326)	(0.370)
Observations	388	410
R-squared	0.265	0.230
Number of cid	48	49
Country FE	YES	YES
Year FE	YES	YES

Table 7b: Effectiveness of Types of MaPs: Does the Extent of Capital Account Openness Matter?

	(1)	(2)	(3)	(4)
Dep Var: REER	Borr-MaP Hi KaOp	Borr-MaP Lo KaOp	FI-MaP Hi KaOp	FI-MaP Lo KaOp
RIR Differential	0.142**	0.215***	0.246***	0.240**
	(0.0680)	(0.0712)	(0.0892)	(0.0933)
GDP Per Capita	0.357***	0.243***	0.358***	0.210***
	(0.0407)	(0.0425)	(0.0413)	(0.0510)
Gov Exp	0.0141***	-0.00258	0.0132***	-0.00269
	(0.00305)	(0.00265)	(0.00301)	(0.00271)
TOT	-0.000307	0.000815**	-0.000268	0.000880***
	(0.000321)	(0.000332)	(0.000316)	(0.000335)
External Liab	-0.00249	-0.0506	-0.00231	-0.0497
	(0.00250)	(0.0320)	(0.00250)	(0.0323)
Ex Regime	-0.0154**	-0.00683	-0.0139*	-0.00860
	(0.00746)	(0.00904)	(0.00794)	(0.00916)
Borr-Targeted MaP	0.0341	-0.0312		
	(0.0212)	(0.0216)		
Borr MaP*RIR	-0.134	-0.109		
	(0.138)	(0.166)		
Fin Inst- Targeted MaP			0.0134	0.00754
			(0.0125)	(0.0168)
Fin Inst MaP*RIR			-0.0823**	-0.0265
			(0.0432)	(0.0581)
Constant	1.578***	2.808***	1.568***	3.033***
	(0.324)	(0.313)	(0.324)	(0.361)
Observations	388	410	388	410
R-squared	0.258	0.235	0.260	0.230
Number of cid	48	49	48	49
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 8: Effectiveness of MaPs: Does the Extent of Forex Reserve Accumulation Matter?

	(1)	(2)	(3)	(4)
Dep Var: REER	High Res	Low Res	FI-MaP Hi Res	FI-MaP Lo Res
RIR Differential	0.255** (0.113)	0.310*** (0.0854)	0.198* (0.108)	0.363*** (0.0889)
GDP Per Capita	0.644*** (0.0856)	0.228*** (0.0664)	0.489*** (0.0519)	0.139*** (0.0506)
Gov Exp	0.0132*** (0.00474)	0.00246 (0.00223)	0.0162*** (0.00465)	0.00447* (0.00233)
TOT	0.000194 (0.000303)	-0.000329 (0.000392)	0.000102 (0.000292)	-8.84e-05 (0.000415)
Ext Liab	0.0129 (0.0250)	-0.00193 (0.00269)	-0.0102 (0.0232)	-0.000455 (0.00283)
Ex Regime	-0.0236*** (0.00850)	-0.00442 (0.00798)	-0.0184** (0.00879)	0.00334 (0.00857)
MaP	-0.0287*** (0.0101)	0.0550*** (0.0131)		
MaP*RIR	-0.0343 (0.0417)	-0.221*** (0.0525)		
Fin Inst- Targeted MaP			-0.0227 (0.0139)	0.0538*** (0.0144)
Fin Inst MaP*RIR			-0.0134 (0.0475)	-0.254*** (0.0573)
Constant	-0.706 (0.705)	2.981*** (0.450)	0.429 (0.418)	3.476*** (0.339)
Observations	438	356	438	356
R-squared	0.368	0.293	0.284	0.140
Number of cid	55	45	55	45
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 9a: Effectiveness of MaPs: Does the Degree of Financial Development Matter?

	(1)	(2)
Dep Var: REER	High FD	Low FD
RIR Differential	0.396***	0.209**
	(0.124)	(0.0881)
GDP Per Capita	0.394***	0.327***
	(0.0537)	(0.0524)
Gov Exp	0.00576	-0.00148
	(0.00520)	(0.00254)
TOT	0.000259	-3.08e-05
	(0.000356)	(0.000348)
External Liab	-0.00143	-0.114***
	(0.00239)	(0.0298)
Ex Regime	-0.0236***	0.00899
	(0.00798)	(0.00986)
MaP	-0.0369***	-0.00232
	(0.0130)	(0.0115)
MaP*RIR	-0.115**	-0.0384
	(0.0526)	(0.0468)
Constant	1.373***	2.276***
	(0.450)	(0.377)
Observations	315	443
R-squared	0.228	0.242
Number of cid	53	55
Country FE	YES	YES
Year FE	YES	YES

Table 9b: Effectiveness by Types of MaPs: Does the Degree of Financial Development Matter?

	(1)	(2)	(3)	(4)
Dep Var: REER	Borr-MaP Hi FD	Borr-MaP Lo FD	FI-MaP Hi FD	FI-MaP Lo FD
RIR Differential	0.266***	0.182***	0.325**	0.189**
	(0.0949)	(0.0700)	(0.155)	(0.0902)
GDP Per Capita	0.339***	0.322***	0.340***	0.333***
	(0.0486)	(0.0494)	(0.0957)	(0.0531)
Gov Exp	0.00340	-0.00168	0.00618	-0.00163
	(0.00524)	(0.00252)	(0.00813)	(0.00255)
TOT	6.40e-05	-5.29e-05	0.000351	-4.11e-05
	(0.000367)	(0.000351)	(0.000438)	(0.000349)
External Liab	-0.00114	-0.117***	-0.00101	-0.115***
	(0.00242)	(0.0297)	(0.000916)	(0.0298)
Ex Regime	-0.0220***	0.0110	-0.0220*	0.00861
	(0.00812)	(0.00955)	(0.0111)	(0.00992)
Borr-Targeted MaP	-0.0430**	0.0158		
	(0.0203)	(0.0266)		
Borr MaP*RIR	-0.204	-0.210		
	(0.150)	(0.175)		
Fin Inst- Targeted MaP			-0.0341	-0.00738
			(0.0267)	(0.0137)
Fin Inst MaP*RIR			-0.0877*	-0.0258
			(0.0481)	(0.0523)
Constant	1.827***	2.300***	1.782**	2.242***
	(0.410)	(0.364)	(0.769)	(0.379)
Observations	315	443	315	443
R-squared	0.205	0.243	0.207	0.242
Number of cid	53	55	53	55
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 9c: Financial Development and Effectiveness of MaPs: Alternative Definitions of Financial Development

	(1)	(2)	(3)	(4)
Dep Var: REER	Hi FD-1	Lo FD-1	Hi FD-2	Low FD-2
RIR Differential	0.774***	0.139	0.797***	0.132
	(0.215)	(0.0957)	(0.194)	(0.102)
GDP Per Capita	0.619***	0.281***	0.484***	0.432***
	(0.0869)	(0.0609)	(0.0843)	(0.0628)
Gov Exp	0.0166***	-0.00360	0.0146**	-0.00134
	(0.00497)	(0.00240)	(0.00568)	(0.00247)
TOT	0.000691*	-0.000105	0.000600	-0.000416
	(0.000417)	(0.000430)	(0.000410)	(0.000404)
External Liab	-0.00224	-0.117***	-0.000750	-0.125***
	(0.00268)	(0.0295)	(0.00205)	(0.0303)
Ex Regime	-0.0224**	0.0119	-0.0104	-0.00644
	(0.00872)	(0.0109)	(0.00799)	(0.0103)
MaP	-0.0343***	0.0457***	-0.0335***	0.00698
	(0.0107)	(0.0127)	(0.0111)	(0.0119)
MaP*RIR	-0.117*	-0.0658	-0.144**	-0.00811
	(0.0619)	(0.0469)	(0.0557)	(0.0448)
Constant	-0.737	2.664***	0.351	1.594***
	(0.716)	(0.415)	(0.719)	(0.449)
Observations	345	283	254	371
R-squared	0.454	0.408	0.402	0.365
Number of cid	42	35	39	49
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 10a: Effectiveness of MaPs: Does the Degree of Foreign Bank Presence Matter?

	(1)	(2)
Dep Var: REER	High FB	Low FB
RIR Differential	0.630***	-0.152
	(0.163)	(0.171)
GDP Per Capita	0.540**	0.214*
	(0.205)	(0.121)
Gov Exp	0.00438	0.00834
	(0.00430)	(0.00595)
TOT	0.00175**	0.00110*
	(0.000805)	(0.000574)
External Liab	-0.000267	-0.0518
	(0.00112)	(0.0504)
Ex Regime	0.0780**	-0.00758
	(0.0366)	(0.0198)
MaP	0.00296	-0.0430*
	(0.0139)	(0.0231)
MaP*RIR	-0.150***	0.112
	(0.0445)	(0.0964)
Constant	-0.213	2.820***
	(1.669)	(0.876)
Observations	194	244
R-squared	0.525	0.506
Number of cid	38	47
Country FE	YES	YES
Year FE	YES	YES

Table 10b: Effectiveness by Types of MaPs: Does the Degree of Foreign Bank Presence Matter?

	(1)	(2)	(3)	(4)
Dep Var: REER	Borr-MaP Hi FB	Borr-MaP Lo FB	FI-MaP Hi FB	FI-MaP Lo FB
RIR Differential	0.330***	-0.0212	0.628***	-0.137
	(0.0939)	(0.0842)	(0.176)	(0.139)
GDP Per Capita	0.597***	0.481***	0.651***	0.500***
	(0.0655)	(0.0635)	(0.102)	(0.0702)
Gov Exp	0.00637	0.0115***	0.00494	0.0119***
	(0.00404)	(0.00426)	(0.00431)	(0.00432)
TOT	0.00129**	0.00139***	0.00150*	0.00138***
	(0.000627)	(0.000401)	(0.000827)	(0.000395)
External Liab	-0.000653	-0.0396	-0.000764	-0.0349
	(0.00218)	(0.0375)	(0.000745)	(0.0377)
Ex Regime	0.0825**	-0.00166	0.0882***	-0.00428
	(0.0367)	(0.0211)	(0.0248)	(0.0207)
Borr-Targeted MaP	0.0430	-0.0137		
	(0.0271)	(0.0225)		
Borr MaP*RIR	-0.229	0.155		
	(0.182)	(0.136)		
Fin Inst- Targeted MaP			-0.00919	-0.0185
			(0.0137)	(0.0213)
Fin Inst MaP*RIR			-0.153***	0.0997
			(0.0502)	(0.0776)
Constant	-0.630	0.691	-1.058	0.569
	(0.512)	(0.481)	(0.828)	(0.522)
Observations	194	244	194	244
R-squared	0.475	0.434	0.510	0.436
Number of cid	38	47	38	47
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Joint Impacts

- **Table (9): Capital Account Openness and Financial Development**
 - Significance of $MaP \cdot RIR$ for sub-sample of countries with different degrees of capital account openness and financial development

- **Table (10): Capital Account Openness and FX Reserves**
 - Significance of $MaP \cdot RIR$ for sub-sample of countries with different degrees of capital account openness and FX reserves

Table 9: Joint Impact of Capital Account Openness and Financial Development

	(1)	(2)	(3)	(4)
Dep Var: REER	Hi Ka Op & Hi FD	Hi Ka Op & Lo FD	Lo Ka Op & Hi FD	Lo Ka Op & Lo FD
RIR Differential	0.364***	0.184	0.370	0.157
	(0.136)	(0.187)	(0.288)	(0.101)
MaP	-0.00563	0.0287*	-0.00420	-0.0502**
	(0.0227)	(0.0167)	(0.0165)	(0.0205)
MaP*RIR	-0.129**	-0.145	-0.106	-0.007
	(0.0568)	(0.0744)	(0.118)	(0.0537)
Constant	-2.406*	2.892***	3.312***	1.484**
	(1.370)	(0.609)	(1.178)	(0.576)
Observations	167	192	145	251
R-squared	0.477	0.448	0.269	0.469
Number of countries	31	28	30	36

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

- MaPs significant only in the sub-sample of countries with high degrees of capital account openness and high financial development

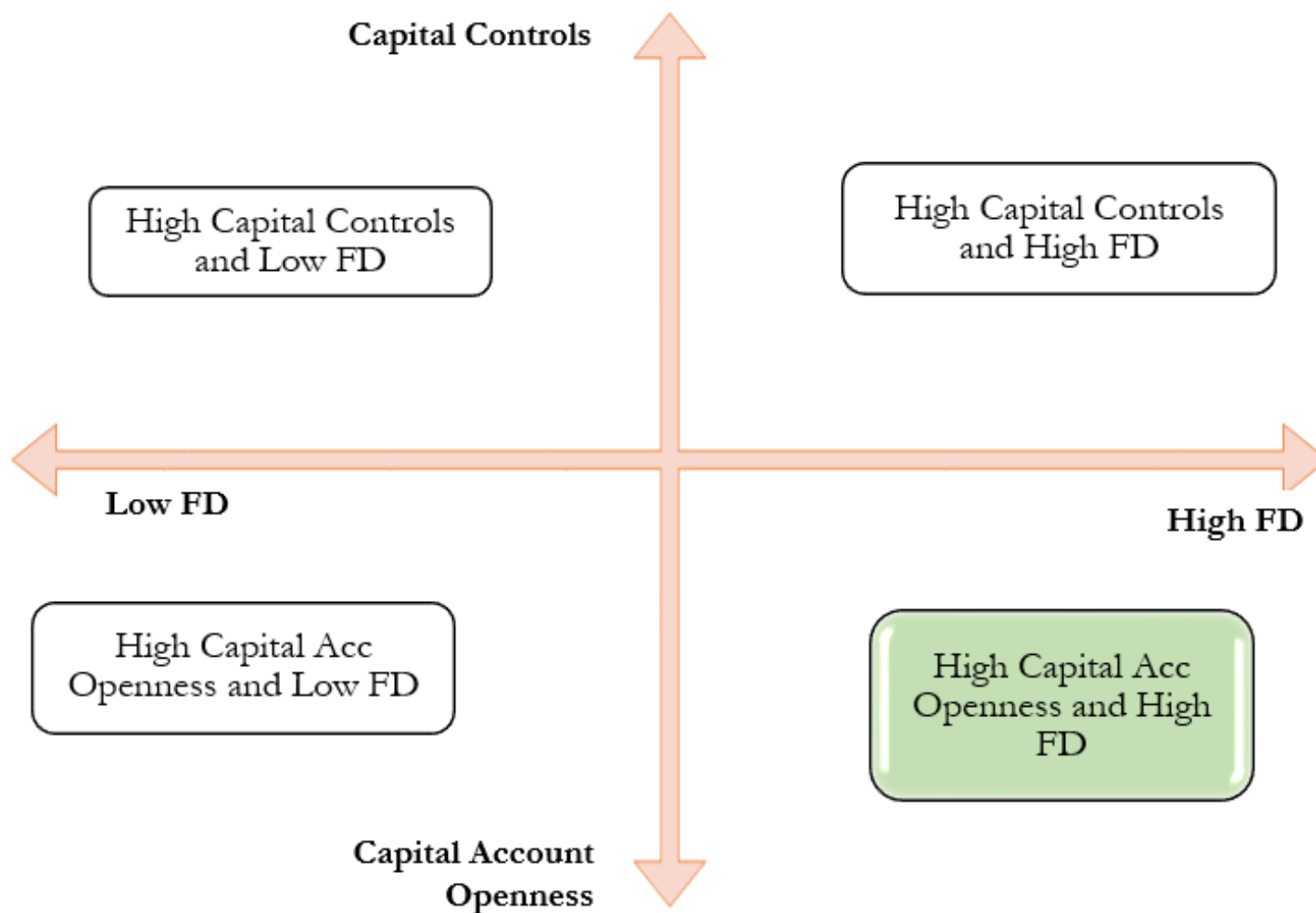
Table 10: Joint Impact of Capital Account Openness and FX Reserves

	(1)	(2)	(3)	(4)
Dep Var: REER	Hi Ka Op & Hi FX Res	Hi Ka Op & Lo FX Res	Lo Ka Op & Hi FX Res	Lo Ka Op & Lo FX Res
RIR Differential	0.503*** (0.142)	0.146 (0.163)	-0.0685 (0.119)	0.354*** (0.113)
MaP	0.0139 (0.0141)	0.0211 (0.0221)	-0.0488*** (0.0215)	0.0445** (0.0224)
MaP*RIR	-0.129** (0.0508)	-0.125 (0.0823)	0.106 (0.101)	-0.250*** (0.0823)
Constant	-0.315 (1.202)	3.181*** (0.610)	0.575 (1.780)	4.306*** (0.596)
Observations	217	171	218	185
R-squared	0.372	0.455	0.442	0.107
Number of countries	37	26	33	23

Notes: Results shown only for the key variables of interest. All regressions include the other control variables listed earlier; robust standard errors clustered for countries in parentheses; includes country and time FE; *** p<0.01, ** p<0.05, * p<0.1

- MaPs significant only in the sub-sample of countries with both high degrees of capital account openness and high FX reserves as well as low capital account openness along with ~~low FX reserves.~~
 - Results may be driven partly by the financial-model of reserves *a la* Obstfeld et al. (2010).

Figure 1: Joint Impact of Capital Account Openness and Financial Development

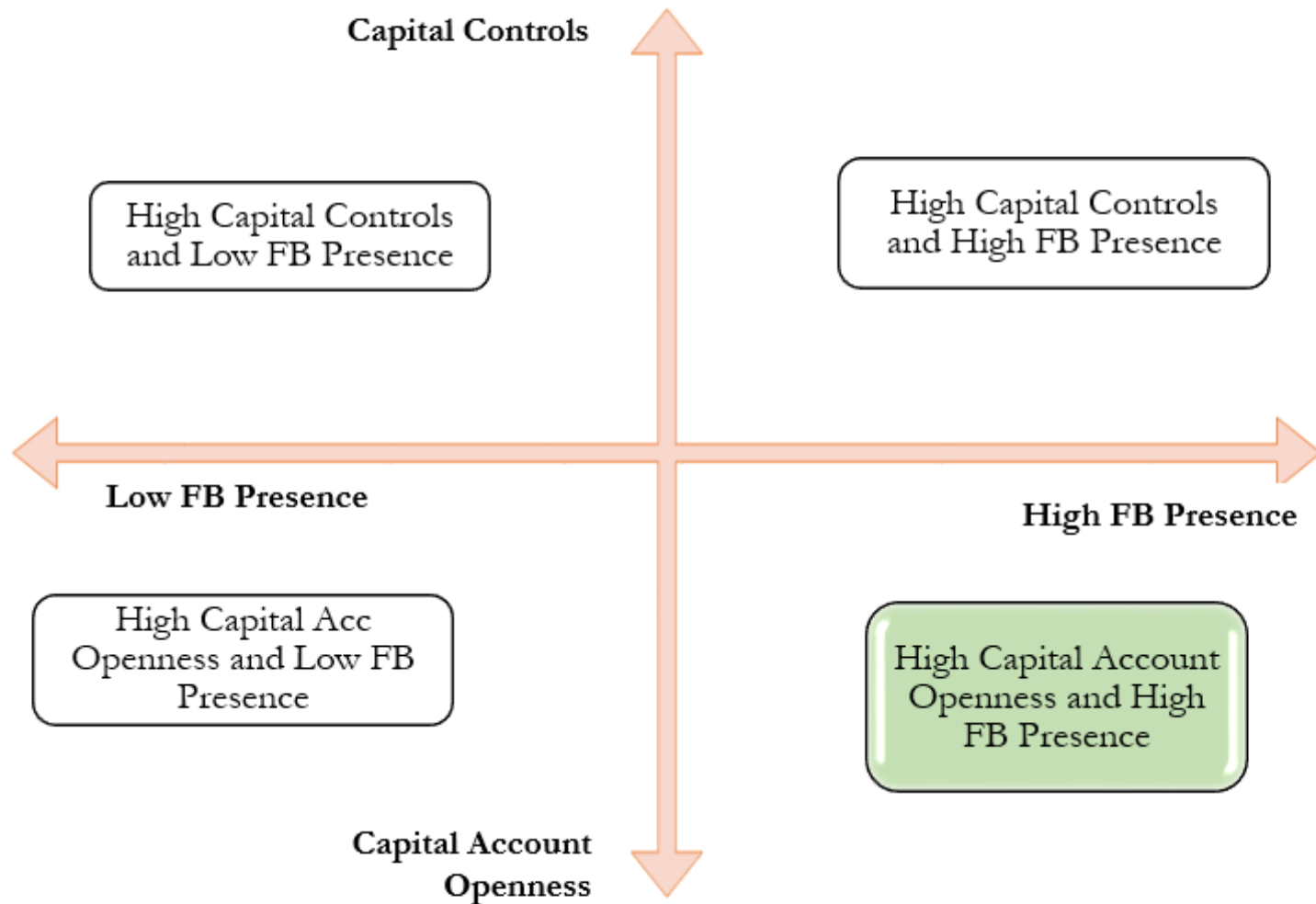


Note: Shaded boxes reveal that the coefficient of the interaction term $MaP \cdot RIR$ is statistically significant at either the 1% or 5% level of significance only for those sub-samples representing those quadrants.

Table 11: Effectiveness of MaPs under Differing Degrees of Capital Account Openness and Financial Development

	(1)	(2)	(3)	(4)
Dep Var: REER	Hi KaOp & Hi FD	Hi KaOp & Lo FD	Lo KaOp & Hi FD	Lo KaOp & Lo FD
RIR Differential	0.364***	0.184	0.370	0.157
	(0.136)	(0.187)	(0.288)	(0.101)
GDP Per Capita	0.820***	0.227***	0.160	0.478***
	(0.154)	(0.0856)	(0.141)	(0.0822)
Gov Exp	0.0150*	0.0107***	0.00317	-0.00858***
	(0.00814)	(0.00339)	(0.00979)	(0.00319)
TOT	0.000506	-0.00170**	0.000150	0.000876**
	(0.000496)	(0.000653)	(0.000833)	(0.000421)
External Liab	-0.00179	-0.0746**	0.0455	-0.0774*
	(0.00243)	(0.0372)	(0.0626)	(0.0424)
Ex Regime	-0.0308**	0.00579	-0.0185**	-0.00941
	(0.0127)	(0.0137)	(0.00927)	(0.0135)
MaP	-0.00563	0.0287*	-0.00420	-0.0502**
	(0.0227)	(0.0167)	(0.0165)	(0.0205)
MaP*RIR	-0.129**	-0.145	-0.106	-0.00708
	(0.0568)	(0.0744)	(0.118)	(0.0537)
Constant	-2.406*	2.892***	3.312***	1.484**
	(1.370)	(0.609)	(1.178)	(0.576)
Observations	167	192	145	251
R-squared	0.477	0.448	0.269	0.469
Number of cid	31	28	30	36
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Figure 2: Joint Impact of Capital Account Openness and Foreign Bank Presence

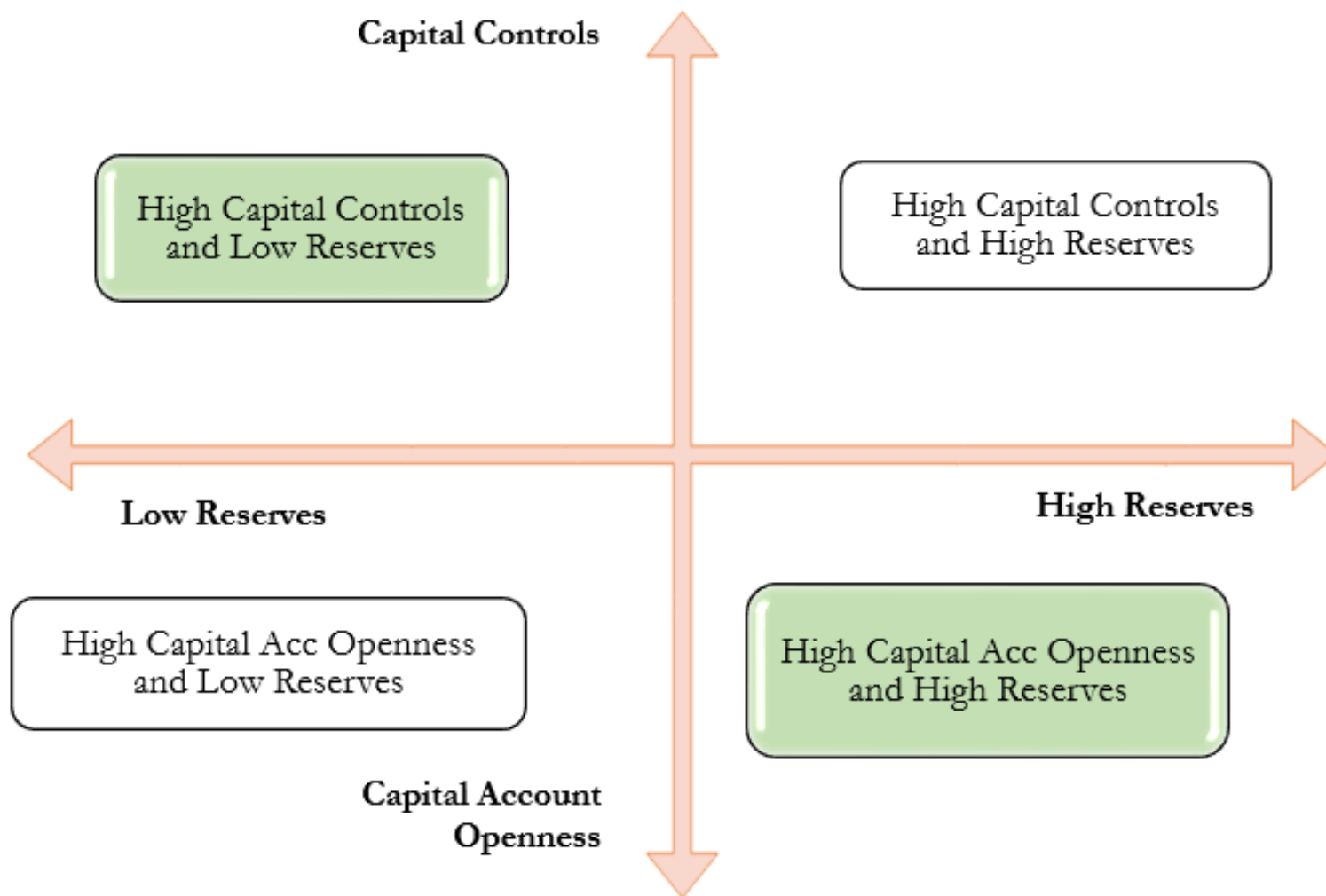


Note: Shaded boxes reveal that the coefficient of the interaction term $MaP \cdot RIR$ is statistically significant at either the 1% or 5% level of significance only for those sub-samples representing those quadrants.

Table 12: Effectiveness of MaPs under Differing Degrees of Capital Account Openness and Foreign Bank Presence

	(1)	(2)	(3)	(4)
Dep Var: REER	Hi KaOp & Hi FB	Hi KaOp & Lo FB	Lo KaOp & Hi FB	Lo KaOp & Lo FB
RIR Differential	0.594***	-0.0851	0.974***	-0.345
	(0.217)	(0.254)	(0.245)	(0.274)
GDP Per Capita	0.502***	-0.00980	0.597**	0.426***
	(0.145)	(0.236)	(0.271)	(0.0800)
Gov Exp	0.00972**	-0.0177**	-0.0107	0.0161***
	(0.00460)	(0.00746)	(0.00973)	(0.00539)
TOT	-0.000293	0.000954	0.00305**	0.00143*
	(0.00101)	(0.000835)	(0.00116)	(0.000744)
External Liab	-0.00106	0.0613	-0.0580	-0.0337
	(0.00206)	(0.0504)	(0.0648)	(0.0382)
Ex Regime	0.0636*	0.0119		-0.0322*
	(0.0358)	(0.0326)		(0.0176)
MaP	0.0141	-0.0418	-0.0177	-0.0133
	(0.0145)	(0.0271)	(0.0281)	(0.0281)
MaP*RIR	-0.173***	0.0492	-0.116	0.203
	(0.0630)	(0.0887)	(0.0868)	(0.135)
Constant	0.0349	4.730**	0.227	1.216**
	(1.236)	(1.831)	(1.876)	(0.552)
Observations	130	99	61	145
R-squared	0.564	0.621	0.638	0.538
Number of cid	24	26	16	29
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Figure 3: Joint Impact of Capital Account Openness and Reserves



Note: Shaded boxes reveal that the coefficient of the interaction term $MaP \cdot RIR$ is statistically significant at either the 1% or 5% level of significance only for those sub-samples representing those quadrants.

Table 13: Effectiveness of MaPs under Differing Degrees of Capital Account Openness and FX Reserves

	(1)	(2)	(3)	(4)
Dep Var: REER	Hi KaOp & Hi Res	Hi KaOp & Lo Res	Lo KaOp & Hi Res	Lo KaOp & Lo Res
RIR Differential	0.503***	0.146	-0.0685	0.354***
	(0.142)	(0.163)	(0.119)	(0.113)
GDP Per Capita	0.566***	0.181**	0.517**	0.0421
	(0.139)	(0.0872)	(0.224)	(0.0926)
Gov Exp	0.0138**	0.0108***	0.0143	0.000170
	(0.00618)	(0.00355)	(0.00930)	(0.00309)
TOT	-7.59e-07	-0.000389	7.57e-05	-0.000358
	(0.000435)	(0.000633)	(0.000698)	(0.000615)
External Liab	0.0145	-0.00393	-0.0976	-0.0326
	(0.0259)	(0.00256)	(0.118)	(0.0397)
Ex Regime	-0.0157	-0.0188	-0.0256	0.00578
	(0.0122)	(0.0140)	(0.0159)	(0.0134)
MaP	0.0139	0.0211	-0.0488**	0.0445**
	(0.0141)	(0.0221)	(0.0215)	(0.0224)
MaP*RIR	-0.129**	-0.125	0.106	-0.250***
	(0.0508)	(0.0823)	(0.101)	(0.0823)
Constant	-0.315	3.181***	0.575	4.306***
	(1.202)	(0.610)	(1.780)	(0.596)
Observations	217	171	218	185
R-squared	0.372	0.455	0.442	0.107
Number of countries	37	26	33	23
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 14: Asymmetry of Real Interest Rates and Effectiveness of MaPs

	(1)	(2)
Dep Var: REER	Decreasing RIR	Increasing RIR
RIR Differential	0.153	0.485***
	(0.166)	(0.124)
GDP Per Capita	0.303***	0.313***
	(0.0682)	(0.0862)
Gov Exp	0.00178	0.00588*
	(0.00372)	(0.00315)
TOT	0.000311	0.000648
	(0.000357)	(0.000526)
External Liab	-0.00276	-0.00290
	(0.00368)	(0.00450)
Ex Regime	-0.0221**	-0.000231
	(0.00874)	(0.0123)
MaP	-0.00741	0.0122
	(0.0107)	(0.0151)
MaP*RIR	-0.0885	-0.116**
	(0.0604)	(0.0541)
Constant	2.255***	1.988***
	(0.529)	(0.644)
Observations	368	258
R-squared	0.345	0.400
Number of cid	62	60
Country FE	YES	YES
Year FE	YES	YES

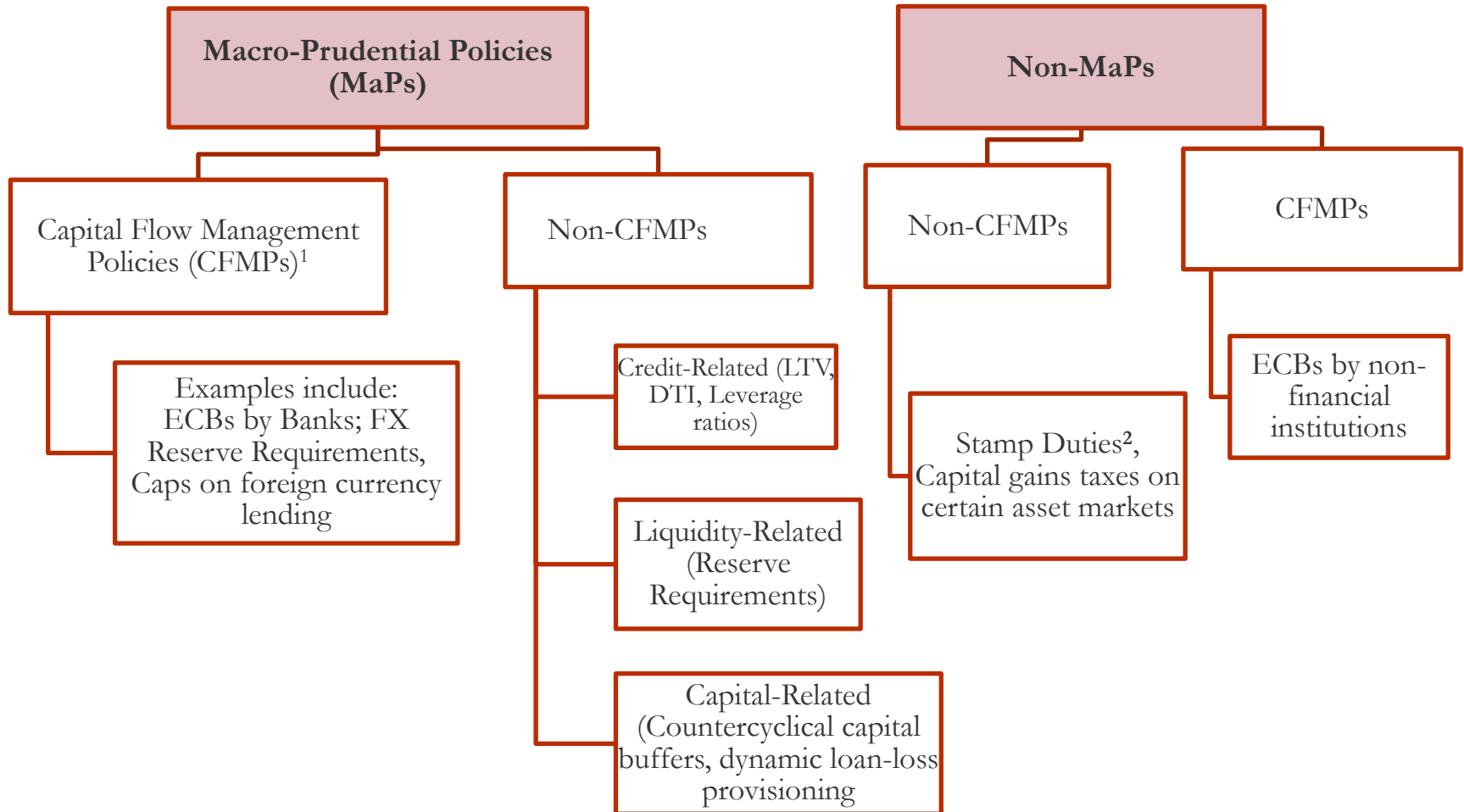
Table 15: Effectiveness of MaPs: RIR Asymmetry and Degrees of Capital Account Openness

	(1)	(2)	(3)	(4)
Dep Var: REER	RIR<0 & Hi KaOpen	RIR>0 & Hi KaOpen	RIR<0 & Lo KaOpen	RIR>0 & Lo KaOpen
RIR Differential	0.285	0.598**	0.0428	0.441**
	(0.219)	(0.268)	(0.205)	(0.191)
GDP Per Capita	0.189**	0.0721	0.308***	0.495***
	(0.0901)	(0.127)	(0.0962)	(0.130)
Gov Exp	0.0146***	0.0107***	-0.00528	0.00674
	(0.00526)	(0.00381)	(0.00470)	(0.00552)
TOT	-0.000453	-0.000671	0.000730	0.00134
	(0.000521)	(0.000708)	(0.000460)	(0.000810)
External Liab	-0.00272	-0.00418	-0.0413	0.0179
	(0.00292)	(0.00373)	(0.0450)	(0.0602)
Ex Regime	-0.0157	0.0176	-0.0196*	-0.0268
	(0.0109)	(0.0167)	(0.0115)	(0.0208)
MaP	0.00211	0.0540**	-0.0165	0.00211
	(0.0161)	(0.0260)	(0.0163)	(0.0274)
MaP*RIR	-0.146	-0.166**	-0.0894	-0.203
	(0.0899)	(0.0791)	(0.0729)	(0.125)
Constant	2.883***	3.760***	2.414***	0.781
	(0.717)	(0.982)	(0.736)	(0.937)
Observations	177	131	190	125
R-squared	0.474	0.516	0.370	0.459
Number of cid	39	34	40	35
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Table 16: Effectiveness of MaPs: RIR Asymmetry and Varying Degrees of FX Reserve Accumulation

	(1)	(2)	(3)	(4)
Dep Var: REER	RIR<0 & Hi Res	RIR>0 & Hi Res	RIR<0 & Lo Res	RIR>0 & Lo Res
RIR Differential	0.376	0.681**	-0.159	0.579***
	(0.316)	(0.312)	(0.518)	(0.136)
GDP Per Capita	0.683***	0.813***	0.132	0.194
	(0.137)	(0.150)	(0.189)	(0.126)
Gov Exp	0.0272***	0.0145*	0.00287	0.00892***
	(0.00913)	(0.00827)	(0.00437)	(0.00328)
TOT	0.000303	0.000265	-0.000780	-0.00136
	(0.000471)	(0.000715)	(0.000763)	(0.000849)
External Liab	0.0241	0.0506	-0.00276	-0.00340
	(0.0388)	(0.0355)	(0.00223)	(0.00400)
Ex Regime	-0.0297**	-0.00516	0.00624	-0.00462
	(0.0125)	(0.0305)	(0.0203)	(0.0165)
MaP	-0.0346**	-0.0251	0.0409	0.117***
	(0.0134)	(0.0196)	(0.0373)	(0.0291)
MaP*RIR	-0.0712	-0.0924	-0.180	-0.310***
	(0.0856)	(0.0909)	(0.154)	(0.0863)
Constant	-1.298	-2.422*	3.635***	3.122***
	(1.163)	(1.249)	(1.312)	(0.832)
Observations	214	148	154	110
R-squared	0.407	0.490	0.390	0.543
Number of cid	44	44	34	30
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Macro-Prudential Policies (MaPs) and Capital Flow Management Policies



Notes:

- 1) Both capital flow and currency restrictions.
- 2) These policies if discriminated by Residency of Buyer – CFM Related

Macro-Prudential Policies (MaPs) and Capital Flow Management Measures

