



BANK FOR INTERNATIONAL SETTLEMENTS

# Dealing with financial stability risks: macroprudential and other tools

Presentation for conference on  
**Reserve requirements and other macroprudential policies:  
Experiences in emerging economies**  
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The views expressed in this presentation are those of the author and do not necessarily reflect the position of the Bank for International Settlements. Alan Villegas and Diego Urbina assisted in the preparation of material for this presentation.



## Outline

- Introduction
- When is a policy called “macroprudential”?
- External or foreign currency financing risks
- Domestic financial imbalances
- Other Issues of instrument choice/implementation



## Introduction

- Great deal of interest in “macroprudential” policies to help prevent crises or deal with them.
- Questions: (i) what are macroprudential policies? (ii) how do they work? (iii) role in context of macroeconomic or other policies?
- Examples: (i) External or foreign currency financing risks; (ii) Domestic financial imbalances



## Outline

- Introduction
- When is a policy called “macroprudential”?
  - Tools used and goals
  - Macro versus microprudential
- External or foreign currency financing risks
- Domestic financial imbalances
- Other Issues of instrument choice/implementation



## When is policy called “macroprudential”?

- *Current view: depends on tools used and goals*
- *Tools:* A policy that uses primarily **prudential** tools (ie generally the same tools as those used to limit risks in individual banks) to limit systemic or system-wide financial risk.
- *Goals:* Financial stability (not macroeconomic objectives). Specifically, limit the incidence of disruptions to key financial services with serious consequences for the real economy by
  - Countering financial system amplification of cycles or procyclicality: **Dampening build-up** of financial imbalances and **building defences** that contain the speed and sharpness of subsequent downswings and their effects on the economy;
  - Identifying and addressing **common exposures, risk concentrations, linkages and interdependencies** that imply **contagion and spillover risks** that may jeopardise the functioning of the system as a whole.
  - Some policies (eg capital flow management policies or controls) are not necessarily called “macroprudential” as may reflect both macroeconomic and financial stability goals

Reference: FSB-IMF-BIS (2011): Macroprudential policy tools and frameworks  
[http://www.financialstabilityboard.org/publications/r\\_1103.pdf](http://www.financialstabilityboard.org/publications/r_1103.pdf).



## **Difference between macro and microprudential**

- Since a macroprudential approach focuses on systemic risks it implies differences in how a particular prudential instrument is used or in the amounts used.
- For example, additional capital might be required over and above capital held to deal with risks in the individual bank's balance sheet taken in isolation.
- The additional capital could be set to
  - Prevent booms that could have negative effects on the financial system as a whole
  - Provide buffers that increase resilience
  - Experience with instruments like LTV ceilings or dynamic provisioning suggest that it is difficult to prevent booms, however the buffer effect can be helpful



## Outline

- Introduction
- When is a policy called “macroprudential”?
- **External financing risks**
  - **Lower currency mismatches**
  - **Foreign reserve accumulation and its limitations**
  - **Role of capital flow management policies**
  - **Role of macroprudential and other policies**
- Domestic financial imbalances
- Other Issues of instrument choice/implementation



## Foreign currency financing risks

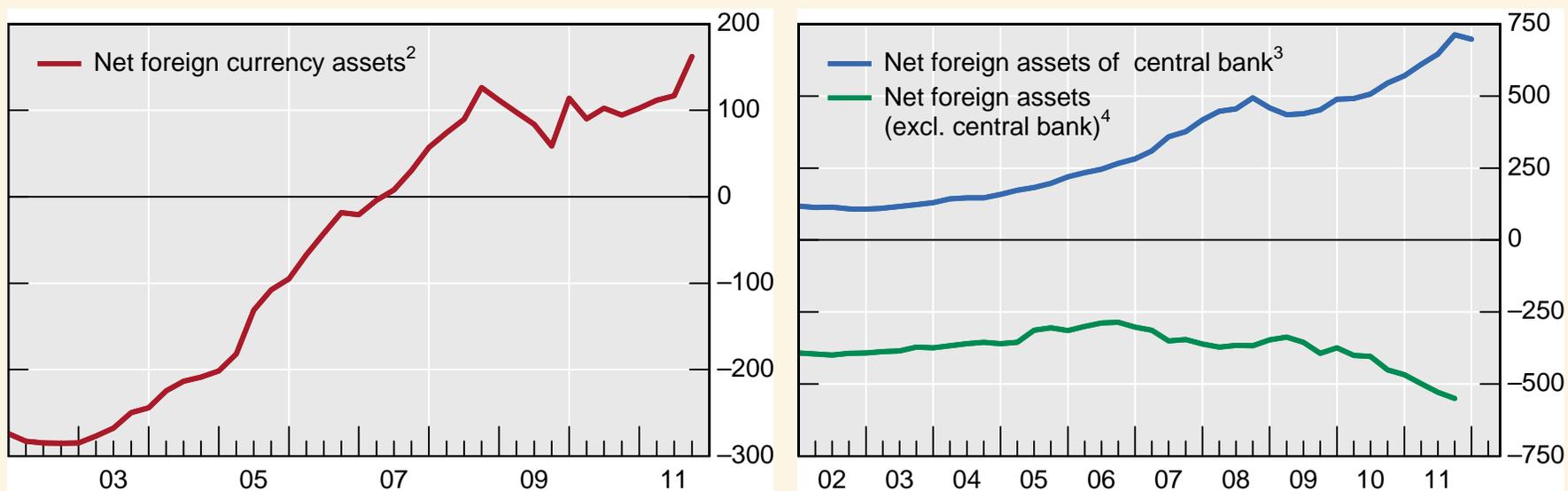
- Global financial crisis spilled over to EMEs as interruptions in foreign currency (specially US dollar financing) apparent in foreign exchange swap markets and sharp increases in sovereign spreads
- In past, such interruptions could trigger crises. This time around EMEs showed much greater resilience.
- For example, based on simple balance sheet indicators (excluding derivatives transactions), currency mismatches have fallen. In EMEs
  - share of foreign currency borrowing in total borrowing has fallen (not shown)
  - net foreign currency asset position has improved; for example went from negative to positive in Latin America over past decade. (Graph for Latin America, left hand panel).



## More resilience

### Net foreign currency asset position<sup>1</sup>

In billions of US dollars



<sup>1</sup> Outstanding positions as of period-end; sum of Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela. <sup>2</sup> Net foreign assets of the monetary authorities and deposit money banks (IMF monetary survey) plus non-bank foreign currency cross-border assets with BIS reporting banks less non-bank foreign currency cross-border liabilities to BIS reporting banks minus international debt securities outstanding in foreign currency. <sup>3</sup> Net foreign assets of central bank (IMF-IFS line 11n or line 11 minus line 16c). <sup>4</sup> Net foreign currency assets (from left-hand panel) minus net foreign assets of central bank.

Sources: Goldstein and Turner (2004); IMF; BIS international banking and financial statistics.



## Foreign financing risks may remain

- While overall NFCA position is positive, the negative NFCA position when exclude monetary authorities suggests that rest of the economy is not generating enough foreign currency to match foreign liabilities (Graph right hand panel)
- Even if aggregate position were balanced, currency mismatches might remain for some borrowers in foreign currency.
  - Currency mismatches typically limited in banks but not among nonbank borrowers (eg foreign currency borrowing by households in CE earning in local currency). Implies credit risk for bank lenders.
  - Currency mismatches from derivatives transactions during global crisis, in Korea, Brazil and Mexico
- Risks may be accentuated if banks rely on short-term (wholesale) external financing to hold illiquid claims in domestic or foreign currency



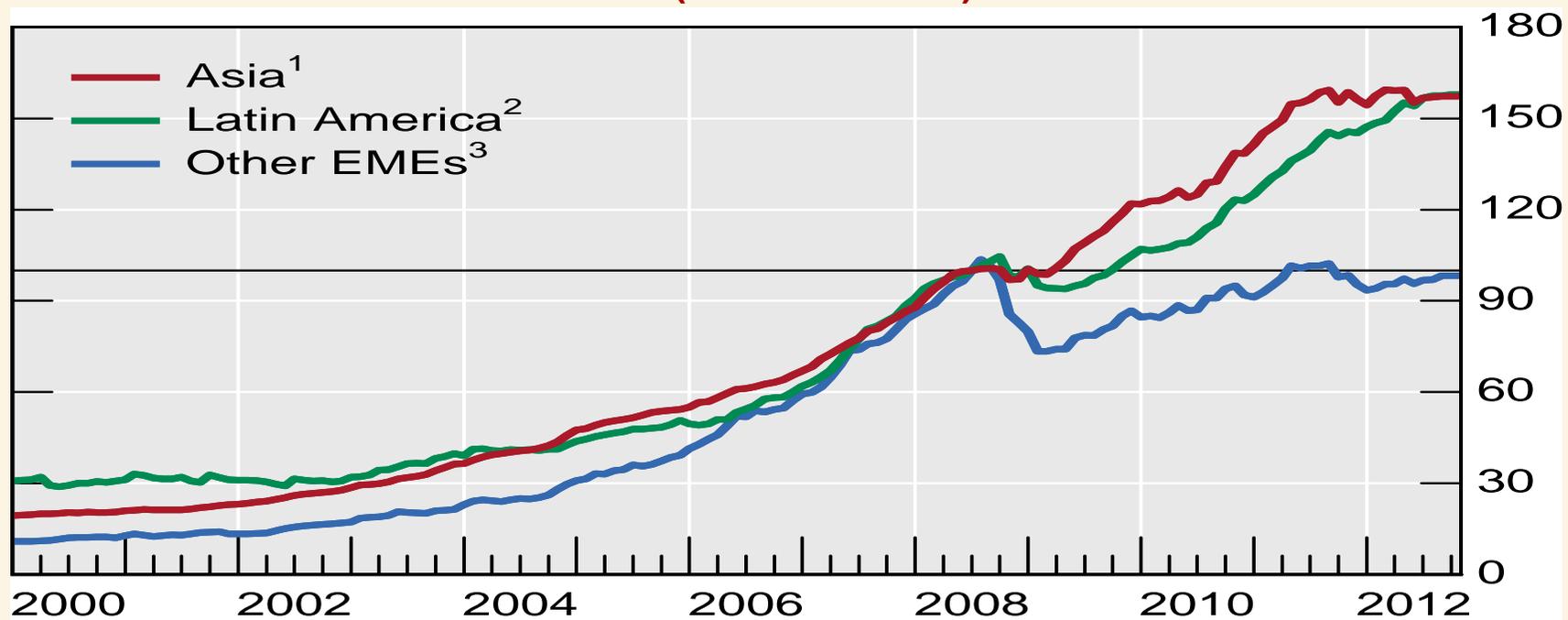
## Policy options for external or foreign currency financing risks

- Increase resilience via foreign reserve accumulation
- Limit buildup of risks via capital flow management policies
- Limit private buildup of risks:
  - (Macro) prudential regulation
  - Financial deepening to encourage effective private risk transfers/management
- Issue: Can deeper/more resilient financial sector reduce reliance on foreign reserve accumulation or reliance on capital flow management policies?



# Foreign reserves

(June 2008=100)



1 Asia: China, Taiwan, Honk Kong SAR, India, Indonesia, Korea, Malaysia, Philippines, Singapore, and Thailand.

2 Latin America: Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.

3 Other EME's: Czech Republic, Hungary, Poland, Russia, South Africa and Turkey.

Sources: IMF; national data.

Foreign reserves: (1) accumulate in 2000s; (2) flatten or decline right after Lehman bankruptcy; (3) have rebounded since 2008 (over 50% higher than June 2008 level in Asia, some countries much higher), (4) trend flattened in 2011.H2 with renewed accumulation in 2012.



## Limitations of foreign reserve accumulation

- While they help meet foreign currency financing requirements, foreign reserve holdings do not necessarily stabilise market expectations. Concerns that drawdowns could create stigma or adverse investor sentiment
  - Foreign reserves do not appear to have dampened increases in sovereign spreads following the Lehman bankruptcy (Graph, right hand panel)
  - BIS studies on determinants of sovereign ratings (Borio Packer 2004) or of ratings-implied expected loss (Remolona, Scatigna and Wu, 2007). Foreign reserves do not appear in preferred specifications.
  - May reflect non-linear relationship – foreign reserves generally past threshold at which they might contribute to improve ratings?
  - Drawdowns of foreign reserves less effective in stabilising FX markets than Fed swap lines (Baba and Shim (BIS Quarterly Review, 2010))

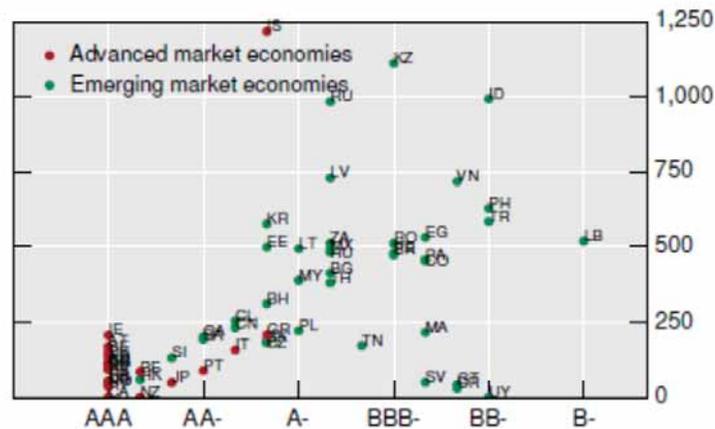
Moreno, R (2010) The role of foreign reserves and alternative foreign currency resources during the crisis.

[https://www.flar.net/documentos/3379\\_2.\\_Ramón\\_Moreno.pdf](https://www.flar.net/documentos/3379_2._Ramón_Moreno.pdf)

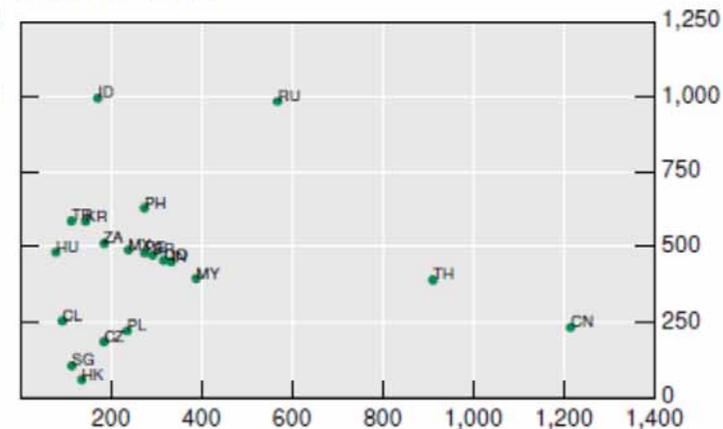


### Changes in CDS premia and explanatory variables<sup>1</sup>

#### Sovereign ratings<sup>2</sup>



#### Foreign exchange reserves to short-term external debt<sup>3</sup>



AR = Argentina; AT = Austria; AU = Australia; BE = Belgium; BG = Bulgaria; BH = Bahrain; BR = Brazil; CA = Canada; CH = Switzerland; CL = Chile; CN = China; CO = Colombia; CR = Costa Rica; DE = Germany; DK = Denmark; DO = Dominican Republic; EG = Egypt; ES = Spain; FR = France; GB = United Kingdom; GR = Greece; GT = Guatemala; HK = Hong Kong SAR; ID = Indonesia; IE = Ireland; IL = Israel; IT = Italy; JP = Japan; KR = Korea; KZ = Kazakhstan; LB = Lebanon; MA = Morocco; MX = Mexico; MY = Malaysia; NL = Netherlands; NO = Norway; NZ = New Zealand; PA = Panama; PE = Peru; PH = Philippines; PK = Pakistan; PL = Poland; PT = Portugal; QA = Qatar; RU = Russia; SA = Saudi Arabia; SE = Sweden; SG = Singapore; SV = El Salvador; TH = Thailand; TN = Tunisia; TR = Turkey; US = United States; UY = Uruguay; VE = Venezuela; VN = Vietnam; ZA = South Africa.

The change in CDS spread for Argentina (B), Pakistan (B), Ukraine (B+) and Venezuela (BB-) (not shown in the graph) are respectively 3777.4, 4155.7, 2856.8 and 2695. Foreign exchange reserves to short-term external debt for Argentina and Venezuela are 202.7 and 504.3 percent, respectively.

<sup>1</sup> Change in senior five-year CDS premia, 1 September, 2008 to peak through 31 December, 2008; in basis points. <sup>2</sup> Standard & Poor's sovereign foreign currency ratings long term, on 31 August, 2008. <sup>3</sup> As of end-of-August 2008, in percent.

Sources: BIS; Bloomberg; Datastream; Markit; Standard & Poor's; World Bank; national data.

Post Lehman bankruptcy: Higher ratings, lower increase in premia;  
no correlation for FX reserves/ST debt



## **Evidence on effectiveness: foreign reserves versus swaps**

- Fed swaps with central banks in other advanced economies helped restore normalcy in global dollar markets after Lehman bankruptcy, by lowering level and volatility of LIBOR-OIS and CIP deviations (Baba and Packer 2009 )
- Brazil: Announcement of Fed swap line reduced the spread between the onshore US dollar rate and LIBOR, with a larger impact than announcements of various kinds of foreign currency liquidity provision (Stone et al, 2009).
- Korea: Fed swap disbursements more effective than foreign reserve disbursements in reducing deviations from covered interest parity (Baba and Shim (2010)). Drew on data of central bank swap auctions using foreign reserves versus central bank loan auctions using Fed swaps.



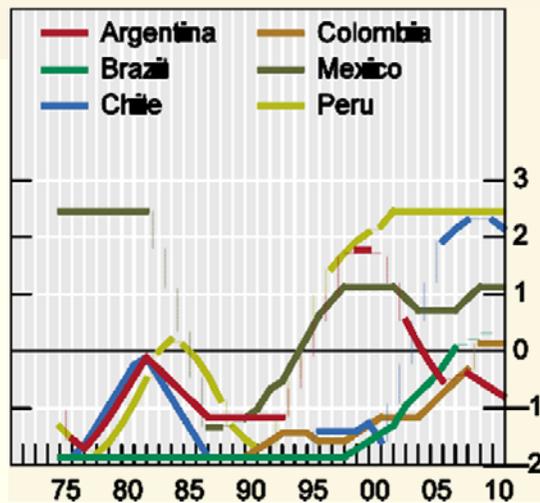
## Capital flow management policies

- Capital flows sometimes seen as contributing to build up of risks, if so restrictions on capital flows could enhance financial stability
- Typical goals: limit capital inflows with focus on external borrowing, particularly short-term. Maintain free access to FDI
- Evidence/experience
  - De jure indicators (Graph Chinn Ito index): more open capital accounts over time in some countries. But generally openness not complete and experience mixed in Asia.
  - With the recovery of capital flows in 2010-2011 a number of countries (Brazil, Korea) introduced capital flow management policies

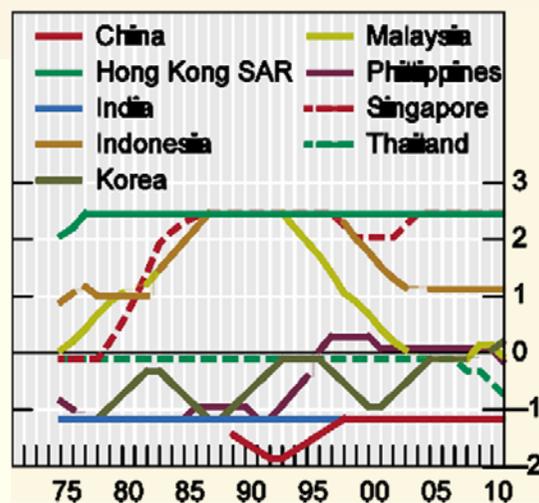


# Trends in capital account openness

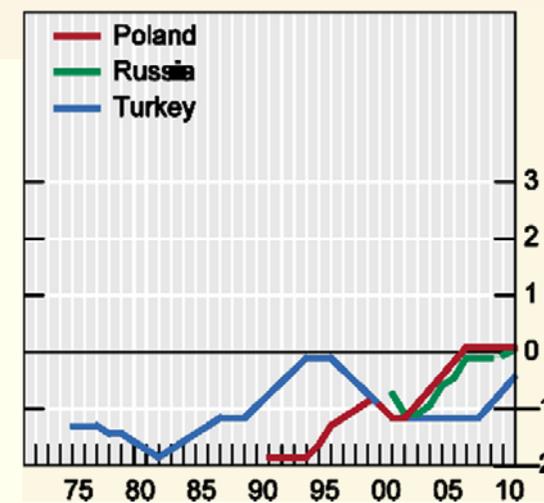
Latin America



Asia



Other emerging markets



<sup>1</sup> Chinn-Ito index (KAOPEN) is an index measuring a country's degree of capital account openness. 5 year moving averages.

Source: Chinn, M D and H Ito (2008): "A New Measure of Financial Openness", *Journal of Comparative Policy Analysis*, Vol 10, Issue 3, pp 309-322.



## Example of recent capital flow management: Brazil

- 2010-2011: Strong capital inflows to Brazil and appreciation pressures on real. Nonresident investors took forward positions in the onshore and offshore markets in order to profit from higher Brazilian interest rates. Counterparties: Local banks which hedged by borrowing FX.
- *Transactions tax*. Brazil's imposed a tax (IOF, Imposto sobre Operações Financeiras) on portfolio inflows (especially to bond markets).
- *Unremunerated reserve requirements (URR)*. Brazil (January 2011, effective 4 Apr 2011), imposed a 60 percent unremunerated reserve requirement on banks' USD short foreign exchange (FX) positions in the spot market exceeding \$3 billion or Tier 1 capital (whichever is lower).
- Two possible motivations
  - *Financial stability*. With large short FX spot positions (ie short-term foreign borrowing) banks could be hurt by a sharp depreciation of the Brazilian currency, the real.
  - *Macroeconomic*. By raising the cost of short FX positions, this measure could discourage a kind of "carry trade", thus dampening appreciation pressure on the real.



## Capital flow management policies or controls: Tradeoffs

- Could dampen build up of risks (eg exchange rate volatility, capital inflows and domestic credit and asset price booms, risks of capital inflow reversals)
- Limits to effectiveness/costs
  - Target portfolio inflows, when inflows are often mostly FDI (eg Latin America).
  - Less distortionary (or more market friendly) measures are more likely to be circumvented (less effective) – research on the experience of Chile with capital controls suggests that these measures changed the composition but not the overall level of capital flows.
  - More effective measures are likely to increase costs of financing and be more distortionary or adversely affect financial development. Wealthy countries or countries with highly-developed financial systems typically have few capital controls



## External financing risks – prudential regulation

- Banks and other regulated financial institutions (examples)
  - Restrictions on net open positions in foreign currency by banks
  - Limits on wholesale financing and liquidity requirements
  - Higher capital requirements if systemically important
- Transactions outside the regulatory perimeter
  - Limits on bank lending in foreign currency to borrowers with no foreign currency earnings
  - Restrictions on/registration requirements for derivatives transactions



## Foreign financing risks - financial deepening

- Greater reliance on domestic financing, eg via development of domestic bond markets. The presence of such markets helped reduce currency mismatches (Turner, 2012)
- Foreign asset accumulation by domestic financial institutions and hedging markets. Example Chile: Foreign asset accumulation by pension funds provides hedges for other sectors of the economy (Desormeaux et al 2008).
  - 2001-2007 – share of portfolio that could be allocated abroad rose from 15% to 40% (80% in 2011).
  - Allocation of risks: (i) Pension funds bear some market risk, but have little liquidity risk; (ii) As pension funds hedge the risk from foreign assets accumulated they provide hedges for others (eg companies with foreign debt) with foreign liabilities; (iii) banks intermediate the provision of hedges to keep their net foreign currency position closed
  - Chilean financial system weathered the crisis relatively well in spite of large shocks to pension funds (Cowan et al, 2011).
- Sources: Turner, P (2012): “Weathering financial crises, domestic bond markets in EMEs.” [http://asianbondsonline.adb.org/publications/external/2012/Weathering\\_financial\\_crises\\_domestic\\_bond\\_markets\\_in\\_the\\_EMES\\_BIS\\_Jan2012.pdf](http://asianbondsonline.adb.org/publications/external/2012/Weathering_financial_crises_domestic_bond_markets_in_the_EMES_BIS_Jan2012.pdf)
- Desormeaux, J, K Fernandez and P Garcia (2008). “Financial implications of capital outflows in Chile: 1998-2008. BIS Papers No. 44; Cowan K and C Valdivia (2011): “Issues in cross-border funding of Chilean banks,” BIS Papers No. 57.



## Some takeaways

- Foreign reserve accumulation, capital flow management policies, (macro)prudential regulation and financial deepening all play a role in promoting financial stability
- Ways they do it differ.
  - *Increased resilience by building buffers*: Foreign reserve accumulation (buffers by public sector). Macroprudential regulation and financial deepening (buffers by private sector).
  - *Preventing the buildup of risks*. Capital flow management policies and (more restrictive) regulations.
- All trade off effectiveness of policies implemented for some cost (eg quasi-fiscal costs, economic distortions)
- Countries differ on weight given to different approaches. Ongoing research may clarify the relative importance of macroprudential policies compared to other policies (eg macroeconomic) in preserving stability in the face of volatile capital flows
- Should macroprudential regulation and financial deepening policies be encouraged to economise on quasi-fiscal costs of foreign reserve accumulation or avoid distortions associated with capital controls?

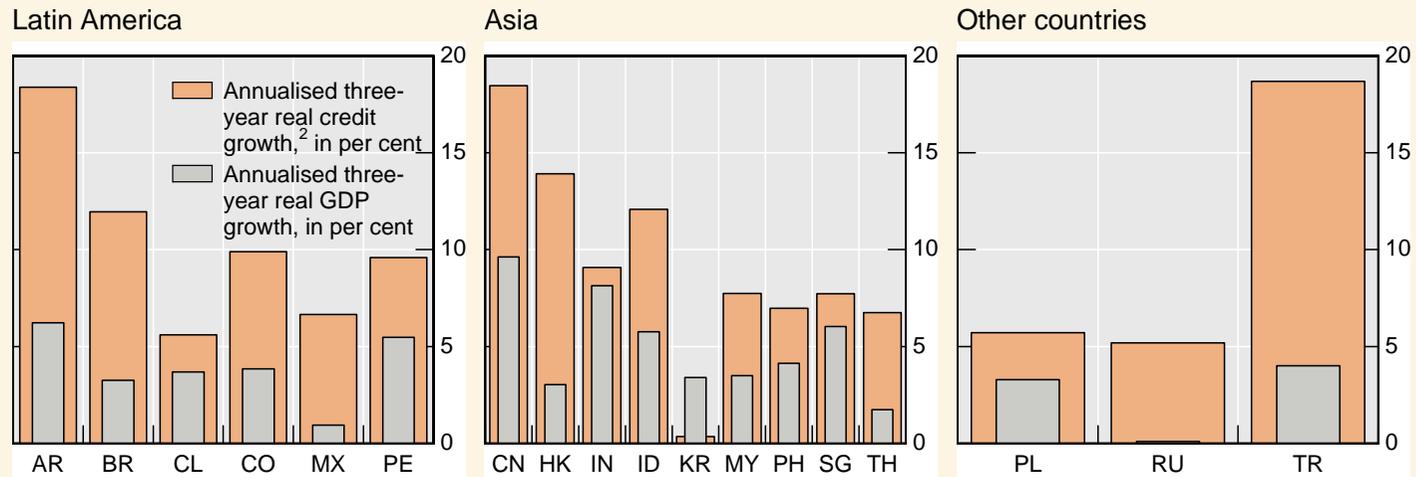


## Domestic financial imbalances

- Focus on credit imbalances – rapid credit growth, credit gaps (Graph)
  - Real credit growth well above real GDP growth in some countries
  - Credit level well above long run trend
- Policies
  - Capital flow management policies – Might be needed if domestic credit growth reflects spillover effects of capital flows
  - Macroprudential and related policies
  - Interaction with monetary policy



Graph  
Credit growth and GDP growth<sup>1</sup>



AR= Argentina; BR=Brazil; CL=Chile; CN=China; CO=Colombia; HK=Hong-Kong; ID=Indonesia; IN=India; KR=Korea; MX=Mexico; MY=Malaysia; PE=Peru; PH=Philippines; PL=Poland; RU=Russia; SG=Singapore; TH=Thailand; TR=Turkey

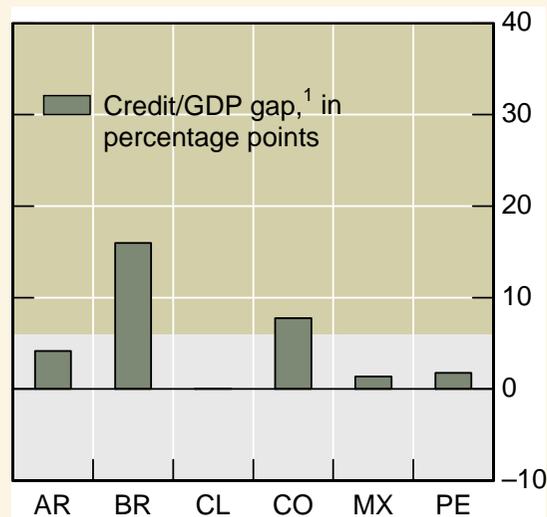
<sup>1</sup> Compounded three-year growth rate, latest figures (from 20084Q to 20114Q.) <sup>2</sup> Total credits to the private non-financial sector.

Sources: IMF; national data; BIS calculations

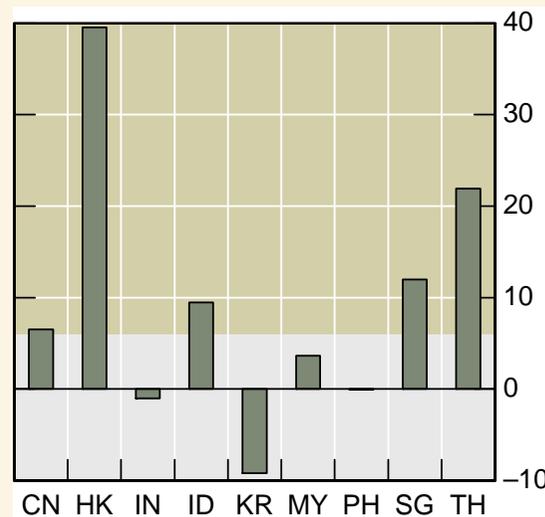


Graph  
Credit gaps

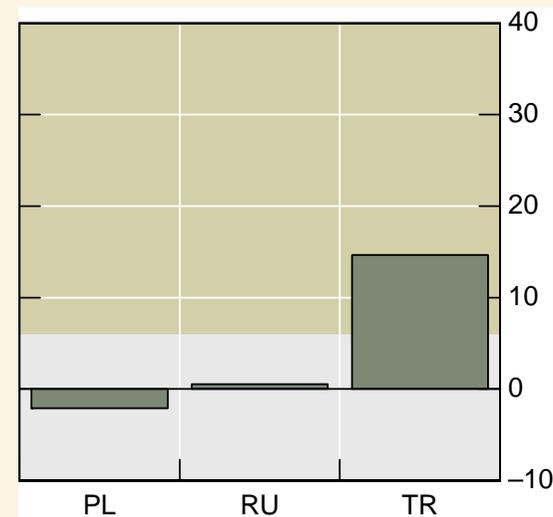
Latin America



Asia



Other countries



AR= Argentina; BR=Brazil; CL=Chile; CN=China; CO=Colombia; HK=Hong-Kong; ID=Indonesia; IN=India; KR=Korea; MX=Mexico; MY=Malaysia; PE=Peru; PH=Philippines; PL=Poland; RU=Russia; SG=Singapore; TH=Thailand; TR=Turkey

The shaded area corresponds to credit gaps in excess of 6%.

<sup>1</sup> Difference between the credit/GDP ratio and the trend of the credit/GDP ratio; latest figures Smoothed with HP filter using lambda equal to 400,000.

Sources: IMF; national data; BIS calculations



## Spillovers from capital flows

- Recent literature— capital controls warranted because they induce risky credit (negative externalities)
- Debt accumulation and asset prices magnify credit booms and busts. Because feedback effects are not internalised by borrowers, a (Pigouvian) tax on borrowing improves welfare. Jeanne and Korinek (2010, 2011).
- Under pegged exchange rates, capital inflows during expansion phase lead to larger wage increases, while during downturns wage rigidity/peg prevent adjustment leading to higher unemployment. A tax on external borrowing in good times and a subsidy on such borrowing in bad times can improve welfare (Schmitt-Grohe and Uribe, 2012).
- Bruno and Shin (2012) – empirical evidence that global liquidity (Vix, foreign bank interoffice flows) spills over into domestic credit



## Macprudential and related instruments

- Reserve requirements (monetary or macroprudential?)
- Additional capital buffers
- Loan loss-provisions based on expected rather than incurred loss. Also set to increase during expansions and decline during downturns
  - Example dynamic provisioning (Spain, Colombia, Peru)
  - Packer and Zhu (2012, WP375): loan loss provisioning has been countercyclical in Asia (in China and Southeast Asia more provisioning when profits are high)
- Liquidity requirements (eg reduce reliance on wholesale financing, liquidity buffer)



## Macroprudential and related instruments

- Ceilings on credit or credit growth. China, Korea (targeting small enterprises)
- Regulations targeting certain sectors (eg Brazil regulations seeking to encourage credit to priority sectors through reserve requirements, or to dampen automobile credit by imposing higher capital requirements).
- Loan-to-value (LTV) ratio ceiling: used in a number of EMEs, including in China, Hong Kong SAR, Korea, Malaysia, Singapore, Thailand and Turkey. LTV ceilings sometimes imposed or lowered during periods of booming property markets (eg HKMA in Oct 2009), thus tending to dampen the procyclicality of LTV ratios. For example,
- Debt-to-income (DTI) ratio ceiling. China, Korea, Thailand in 2000s, Malaysia in 1990s.



## **Dampen the credit cycle or increase resilience?**

- Lim et al (2011): Macroprudential instruments seem to reduce the correlation between credit and GDP growth (With LTV and DTI ceiling and reserve requirements). With ceilings on credit growth or dynamic provisioning, the correlation becomes negative. Panel regression also suggests significant effects
- Tovar et al (2012): effects of reserve requirements on credit growth are moderate and transitory (dynamic panel VAR)



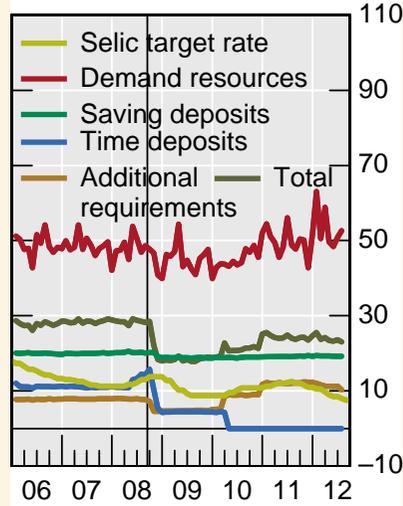
## Interaction with monetary policy

- Macroprudential or related instruments sometimes used as a substitute for monetary policy
- Countries with pegged regimes may use them in the absence of interest rate policy instrument (eg Hong Kong has used LTV ceilings)
- Macroprudential tools might not be easy to adjust as frequently as policy rates. Possible exception: reserve requirements.
  - Used by a number of EMEs, in some cases more frequently after the crisis.

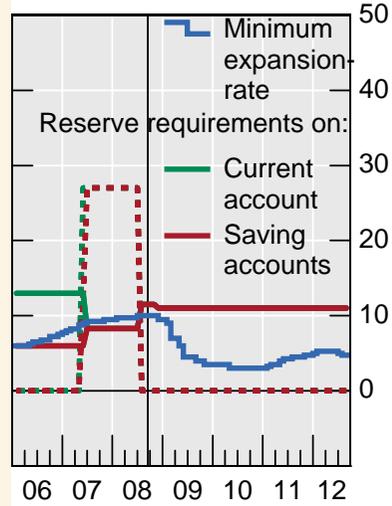


### Domestic reserve requirements and policy rates or short terms rates

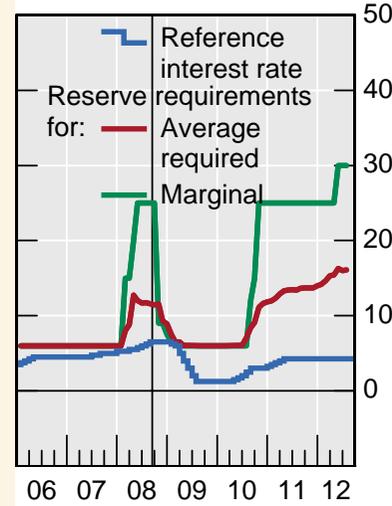
Brazil (effective reserve requirements)



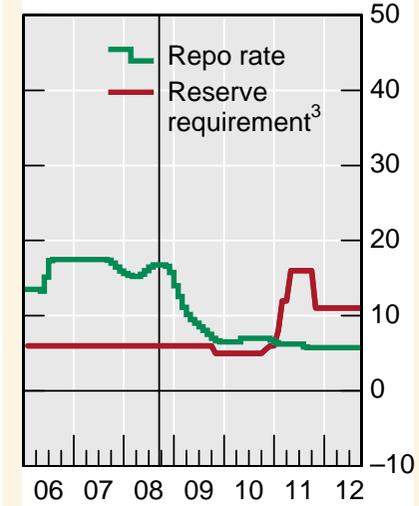
Colombia (marginal reserve requirements in dashed line)



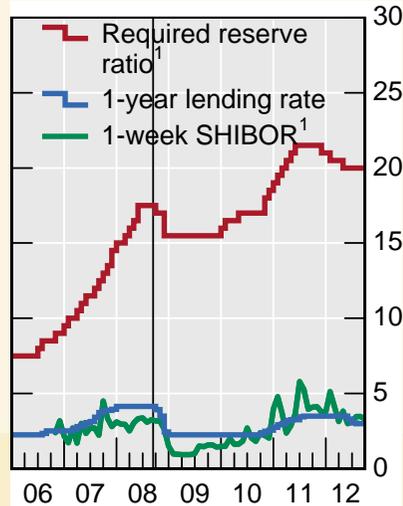
Peru



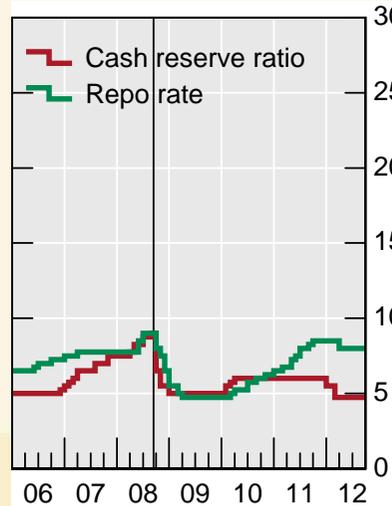
Turkey



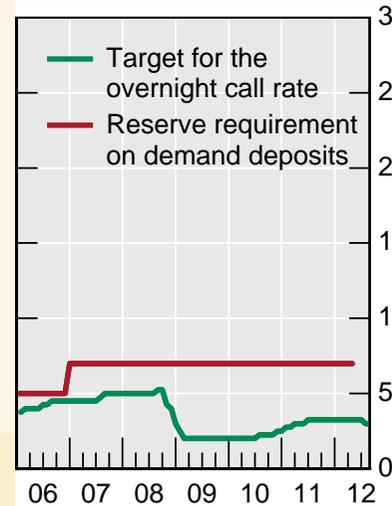
China



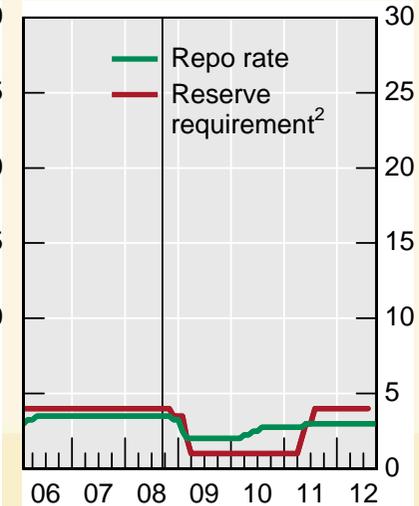
India



Korea



Malaysia





## Why combine reserve requirements and interest rate policy?

- Can help resolve policy dilemmas. During expansion phase of cycle, less likely to attract capital inflows (may raise lending rates without necessarily raising deposit rates). More effective if change in reserve requirements not seen as change in monetary policy.
  - 2008 – high inflation, high capital flows; some raise reserve requirements rather than interest rates. China: Reserve requirements adjusted more often than policy rates. Turkey (not shown): Recently raised reserve requirements, lowered interest rates.
  - Post-Lehman bankruptcy in LAC: tightening financing conditions, probably slower growth, high inflation. Keep policy rate unchanged, lower reserve requirements. Interest rates not lowered until Dec-Jan 2011
- Can strengthen effects of policy rates by reinforcing monetary transmission, particularly when there are imbalances in interbank markets, when monetary transmission is weakened by financial stress or because financial markets are less developed.
- Can dampen credit growth during expansion phase, and boost it during periods of financial stress (countercyclical)
- Lower quasi-fiscal costs to central bank than monetary operations – but costly for banking system)



## Complexity

- Some macroprudential policies rely on rules, but many are implemented in discretionary fashion with no explicit target
- Goals harder to communicate
- Effects more difficult to measure, particularly given preference for combined use of instruments
- Contrast with approach followed in development of inflation targeting monetary framework: single target, a lot of investment in transparency and communication
- Is similar approach possible for macroprudential instruments?



- Thank you!



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# EXTRA SLIDES



# Policymaking from a financial stability perspective – external financing



| Risks                            | Some policies to limit buildup of risks and increase resilience   |   |
|----------------------------------|---|---|
|                                  | Macroeconomic policies  | Macroprudential and other policies  |
| Unsustainable foreign Borrowing  | Fiscal consolidation/public debt management policies to keep debt below certain thresholds<br>Capital flow management policies/controls (restrictions on amounts of foreign borrowing)  |   |
| Currency and maturity Mismatches | Exchange rate flexibility<br><b>Capital flow management policies or controls</b> (restrictions on domestic asset acquisition by foreigners (eg minimum holding periods), unremunerated reserve requirements on foreign inflows, transactions taxes) | Macroprudential policies: limits on domestic bank foreign currency net open positions or maturity mismatches, limits on wholesale (foreign currency) financing, liquidity requirements, restrictions on foreign currency lending to nonbanks with no access to foreign revenues |
|                                  | Public sector: foreign asset accumulation (foreign reserves, sovereign funds) and lower foreign currency borrowing  | Policies that facilitate or encourage issuance of private debt in domestic currency, private foreign asset accumulation and markets for holding foreign currency risks (currency collie   |