

Reserve Requirements as a Financial Stability Instrument

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Coping with spillovers from policy normalization in advanced economies

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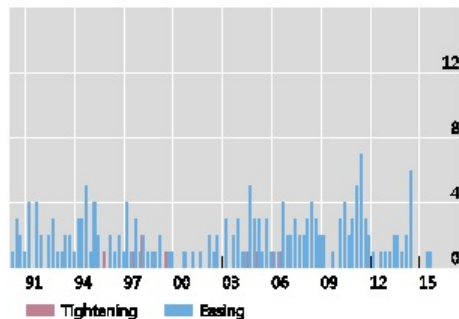
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Motivation

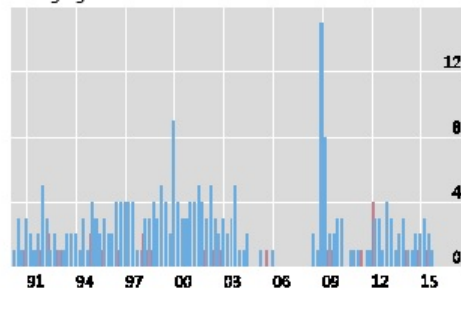
Reserve requirement index

Number of countries

Advanced economies



Emerging market economies



Source: Federico, Vegh and Vuletin (2014); author's calculations.

Non-technical Summary

Focus

What is the trade-off between using reserve requirements (RR) as a macroprudential tool to prevent the buildup of financial vulnerabilities vs using it as a financial policy tool to smooth credit cycles?

Contribution

We estimate the impact of RR through a cost-benefit analysis that considers financial cycle smoothing and financial risk build-up. First, we calculate the expected losses after a tightening of RR. Then we compare it to the benefit in terms of the reduction in financial risk buildup as determined by the expected credit/output gains as a result of lower probabilities of financial distress.

Findings

The trade-off gives more weight to the lower incidence and frequency of financial distress compared to the cost of reducing credit growth through the cycle.

RR have a greater effect for emerging markets (EME) than for advanced economies (AE).

Single RR and RR by maturity have a greater effect than RR by currency.

Data

Sample: 28 countries (5 AE/23 EME), data from 1996Q1 to 2015Q3.
RR index constructed with legal changes¹.

¹Federico, Vegh and Vuletin (2014)

Motivation: Theoretical models

Fernandez and Guidotti (1996): changes in RR affects bank funding structure (mix between capital and deposits)

Glocker and Towbin (2011): increase RR as tax on deposits

- ▮ fall in deposit rate, deposits and increase in consumption. Lower bank funding leads to lower credit and investment.
- ▮ In a SOE, lower capital inflows, exchange rate depreciation, higher net exports

Aikman et al (2016) tightening of MaPP tool reduces credit growth and the probability of financial crisis.

Related Literature

Behn et al (2016): empirical cost-benefit analysis of using capital based MaPP at the bank level for EU countries.

Cordella et al (2012): RR as an effective instrument for countercyclical policies when there are concerns of effects of MP on exchange rates.

Montoro and Moreno (2011): use of RR in Latin America, tightening of financing conditions without attracting capital inflows.

Smoothing of credit cycles

We estimate the following VAR²:

$$Y_t = a_0 + \sum_{i=1}^p A_i Y_{t-i} + \sum_{i=1}^p B_i X_{t-i} + U_t; \quad E(U_t U_t^0) = 0 \quad (1)$$

$Y_t = \text{IPI}_t; \text{CPI}_t; \text{BC2GDP}_t; \text{REER}_t^3; \text{IR}_t; \text{RR}_t; \text{CBRe}\$; \text{Cap}$

$X_t = \text{GRisk}_t; \text{GLiq}_t; \text{GIR}_t; \text{GComm}_t$

Financial costs are given by the response of bank credit over GDP (BC2GDP) to a one standard deviation shock in RR.

Macroeconomic costs are given by the response of industrial production (IPI) to a one standard deviation shock in RR.

²All variables in yoy growth rates, except IR and GIR in deviations

³Appreciation=Increase, Depreciation = Decrease

Impulse Response Functions: RR shock

Impulse Response Functions: MP shock

Financial costs by group and type of RR

Macroeconomic costs by group and type of RR

Impact of global financial factors on domestic variables in EME

Global risk generates an exchange rate depreciation (capital outflows/flight to quality?), lower output growth, higher inflation

MP normalization in AE: lower global liquidity and higher MP rates in AE

Lower liquidity in global financial markets: exchange rate depreciation and reduction in IPI growth, lower external funding for domestic banking sector in EME.

Increase in MP rates: Exchange rate depreciation, lower external funding to EME, lower credit growth and IPI growth.

RR are expected to be used as a complement to domestic MP by reacting countercyclically to smooth credit cycles while MP reacts to contain inflationary pressures coming from XR passthrough to inflation.

Impact of global financial factors on domestic variables EME

Table: Effect of global variables on domestic variables

	Grisk	GIR	GLiq	GGrowth	GCommP
IPI	0:009	0:546	0:264	0:439	0:040
REER	0:000	0:788	0:003	0:127	0:018
Credit to GDP	0:000	0:001	0:000	0:000	0:000
Interest rate	0:005	0:140	0:040	0:082	0:003
RR index	0:000	0:001	0:000	0:000	0:000

, , refer to P value < 1%, 5% and 10%, respectively.

Buildup of Financial Risk

For each country i date t financial stress episodes $y_{it} = 1$.

Estimate a logistic-based early warning system model

$$P(y_{it} = 1) = \frac{\exp(\beta_i + X_{it}^0)}{1 + \exp(\beta_i + X_{it}^0)} \quad (2)$$

X_{it} = RR, Credit to GDP gap, GDP, inflation, policy rate, exchange rate, plus global and banking sector controls.

Benefit = - prob * credit (IPI) loss

Financial Distress Index

Index of financial distress in stock market (STX)

$$VSTX = \frac{\sum_{i=0}^{P-1} \log(rSTX_{t-i})}{20}; \quad CSTX_t = 1 - \frac{rSTX_t}{\max_{i=0}^{521} rSTX_{t-i}} \quad (3)$$

Index of financial distress in exchange rate market (FX)

$$VFX = \sum_j \log(REER_t^j); \quad CFX_t = \sum_j REER_t^j - REER_t^{\delta_j} \quad (4)$$

Aggregation

$$\hat{Z} = F_n(Z_t < Z) \quad Z_t = \sum VSTX; CSTX; VFX; CFX$$

$$I_{STX} = \frac{VSTX + CSTX}{2} \quad I_{FX} = \frac{VFX + CFX}{2}$$

Financial distress index (FSI)

$$FSI_t = I_t - C_t \quad I_t^0 \quad I_t = [I_{STX}; I_{FX}] \quad (5)$$

Financial Distress Episodes

Logistic Early Warning System Model⁴

⁴Model includes global and banking sector controls

Net Benefit: preliminary results

Conclusions

The benefit of using RR is that it can reduce the build-up of systemic risk and the incidence and severity of financial distress episodes. On the other hand, the cost of using RR is associated with a reduction of credit in normal times.

We find that the net benefits of using RR are positive. Therefore, using this macroprudential policy as a financial stability tool is quite useful.

RR have a greater effect on EME than on AE. Single RR and RR by maturity have a greater effect than RR by currency.

To do:

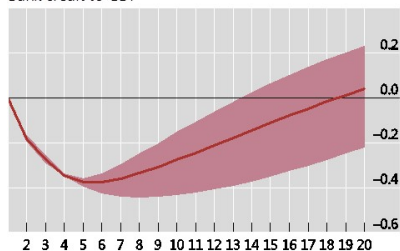
- Country level calculations

- Include difference in financial distress cost between episodes where countries use RR or not

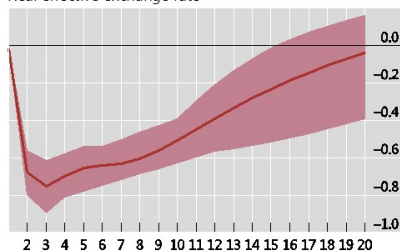
Annex. Impulse Response Functions: RR shock

Response to a one s.d. shock of RR

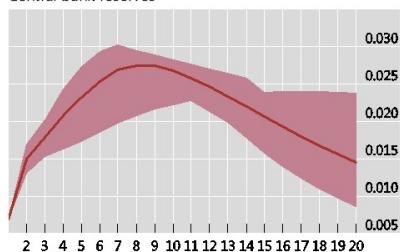
Bank credit to GDP



Real effective exchange rate



Central bank reserves



Banks capitalization

