BANK FOR INTERNATIONAL SETTLEMENTS

Effects of monetary and macroprudential policies – Evidence from Asia and the Pacific

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Widespread adoption of financial stability objectives

Financial stability objectives in laws or statutes in the Asia-Pacific region — Table 1

Objective appears to apply in principle to all the central bank's activities and functions			
China	Hong Kong SAR	Indonesia	Malaysia
New Zealand	Singapore	Thailand	
Objective is attached to a specific function or task			
Australia	Japan	Korea	

Source: Jeanneau (2014); BIS; central bank websites

Objectives adopted alongside traditional anchors

Monetary policy frameworks in the Asia-Pacific region — Table 2

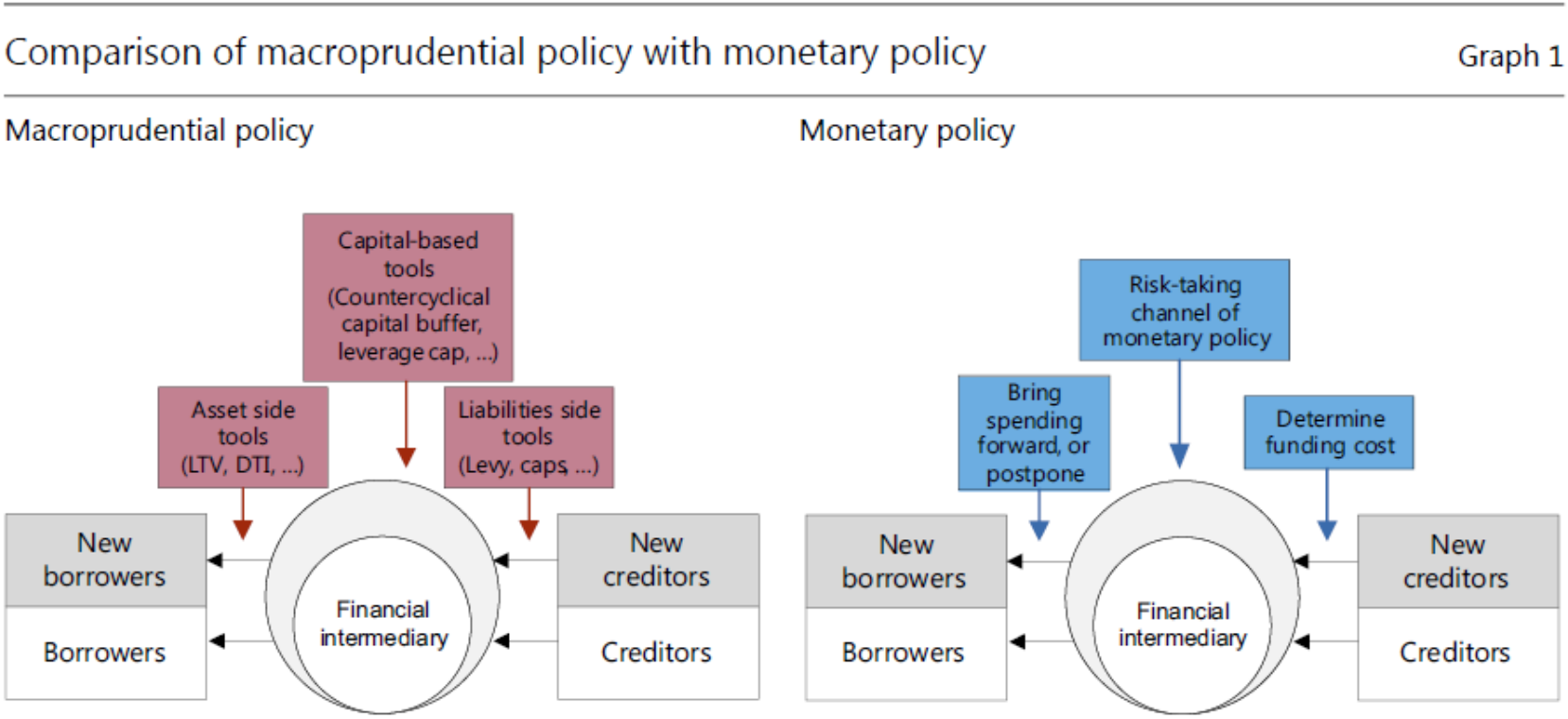
Inflation targeting framework or similar	Exchange rate anchor	Other regimes[1]
Australia	Hong Kong SAR (US dollar)	China
India	Singapore (composite)	Malaysia
Indonesia		
Japan[2]		
Korea		
New Zealand		
Philippines		
Thailand		

[1] Includes countries that have no explicitly stated targeting regime in terms of inflation or an exchange rate. [2] Japan is not formally an inflation targeter, but follows a monetary policy regime with a "price stability target" of 2 percent.

Source: Central bank websites.

Comparison of macroprudential policy with monetary policy

Graph 1



Source: Shin (2015)

This paper

- **Documents the effects of monetary and macroprudential policies in inflation targeting economies in the Asia-Pacific region, using structural vector autoregressions**

- **Financial stability objective based on the stock of total credit in the economy**

- **Some implications for China**

Our main results

- **Macroprudential policies affect credit but also real GDP and inflation**
- **Effects of monetary and macroprudential policy shocks appear to be quite similar**
- **Periods with low inflation and buoyant credit growth are common in the data - there could be (short-run) policy challenges**

Some related literature

- **Effects of macroprudential policies and the channels through which they operate (eg Bruno et al, 2016; Kuttner and Shim, 2016; Cerutti et al, 2016)**

- **Links between monetary policy and financial stability (eg Borio and Lowe, 2004; Smets, 2014; Woodford, 2012)**

- **Theoretical research incorporating monetary and macroprudential policies in a unified framework (eg Angelini et al, 2014)**

Some channels for macroprudential policy

- **Increase in reserve requirements may raise the costs of funding and lending rates, reducing the stock of credit (Reinhart and Reinhart, 1999)**

- **Tighter debt-service-to-income ratios can lower the demand for housing or consumption (Kuttner and Shim, 2016)**

- **Prudential tools may have macroeconomic effects through changes in credit, loan rates, output and prices (Cecchetti and Kohler, 2014)**

Financial stability – definition and instruments

- **Measure of financial stability based on total credit**
  - **Credit gap used as early warning indicator of banking system distress (eg Borio and Lowe, 2002; Borio and Drehmann, 2009)**

- **Macroprudential tools, using the database for policy actions on housing markets by Shim et al (2013)**
  - **Includes both monetary measures and prudential tools**

VAR framework

- **Structural panel VAR model, identified using recursive zero restrictions**
- **Estimated for Australia, Indonesia, Korea and Thailand, using quarterly data**
- **Five endogenous variables**
  - ***R*: policy interest rate**
  - ***PP*: macroprudential instrument (index)**
  - ***CRD*: total credit extended to the private sector**
  - ***CPI*: consumer price index**
  - ***RGDP*: real GDP**
- **Exogenous variables: Fed funds rate, US real GDP**

VAR framework – identification of policy shocks

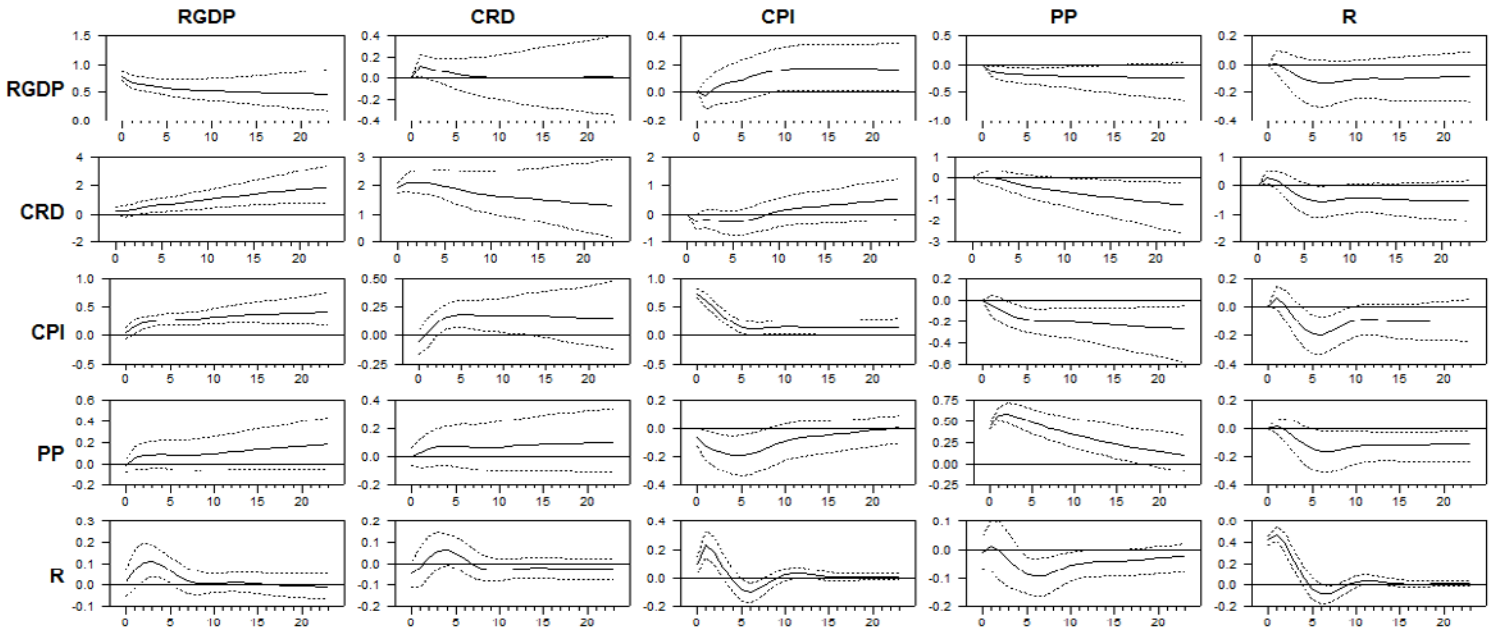
- ***RGDP***, ***CPI***, ***CRD*** **ordered before the two policy instruments; extension of Christiano et al (1999)**

- **Interest rates set considering output, prices and credit, given the financial stability objective (eg Bailliu et al, 2012)**

- **Macroprudential policy set considering credit, but potentially also output and prices (Angelini et al, 2014; Gelain and Ilbas, 2014)**

Impulse responses from panel VAR model

Graph 2

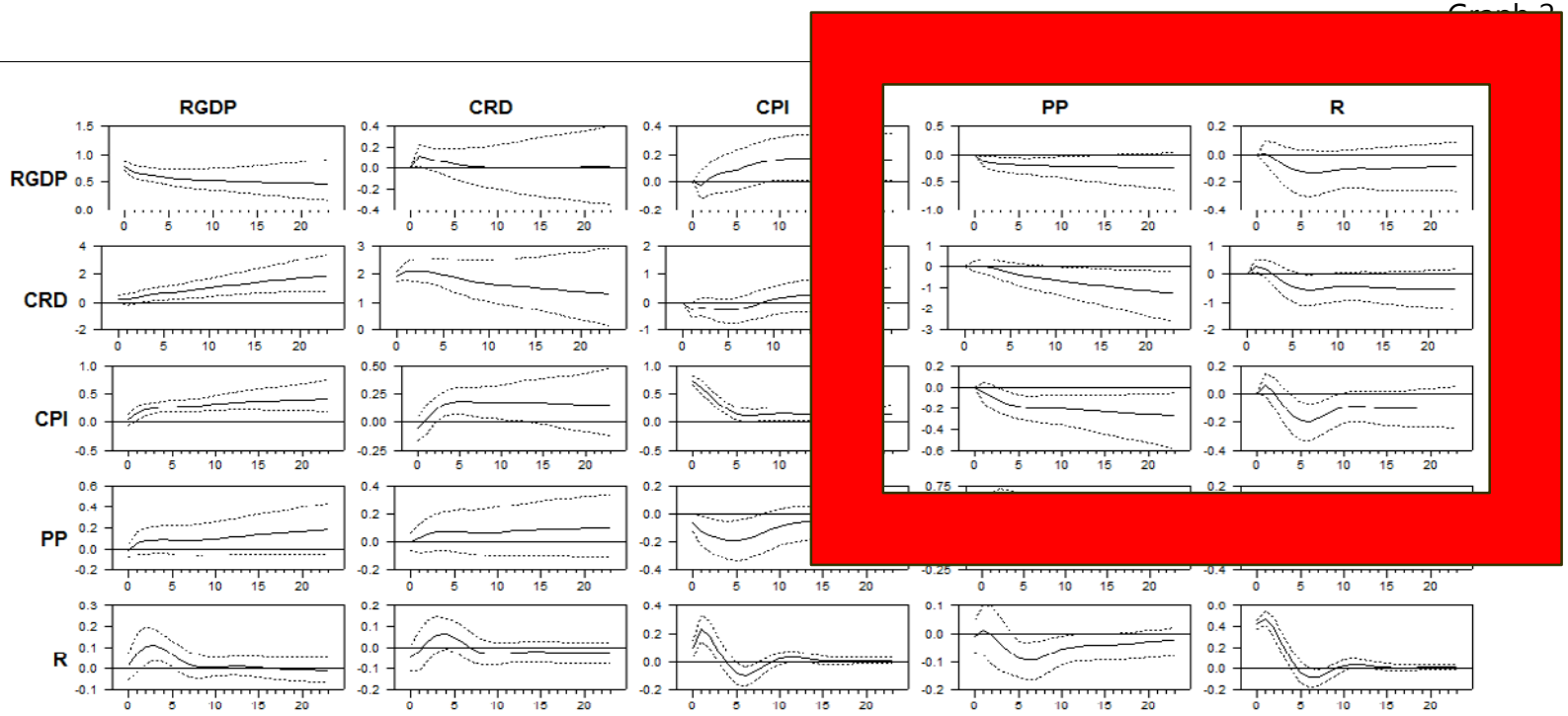


Note: The column headings denote the shocks and the row headings the responses of the indicated variable to each shock. *RGDP* = real GDP, *CRD* = total credit, *CPI* = consumer price index, *PP* = macroprudential policy measure, *R* = policy interest rate. For example, the impulse response in the first row, fifth column, shows the response of real GDP to an interest rate shock.

Sources: authors' calculations.

Impulse responses from panel VAR model

Graph 2



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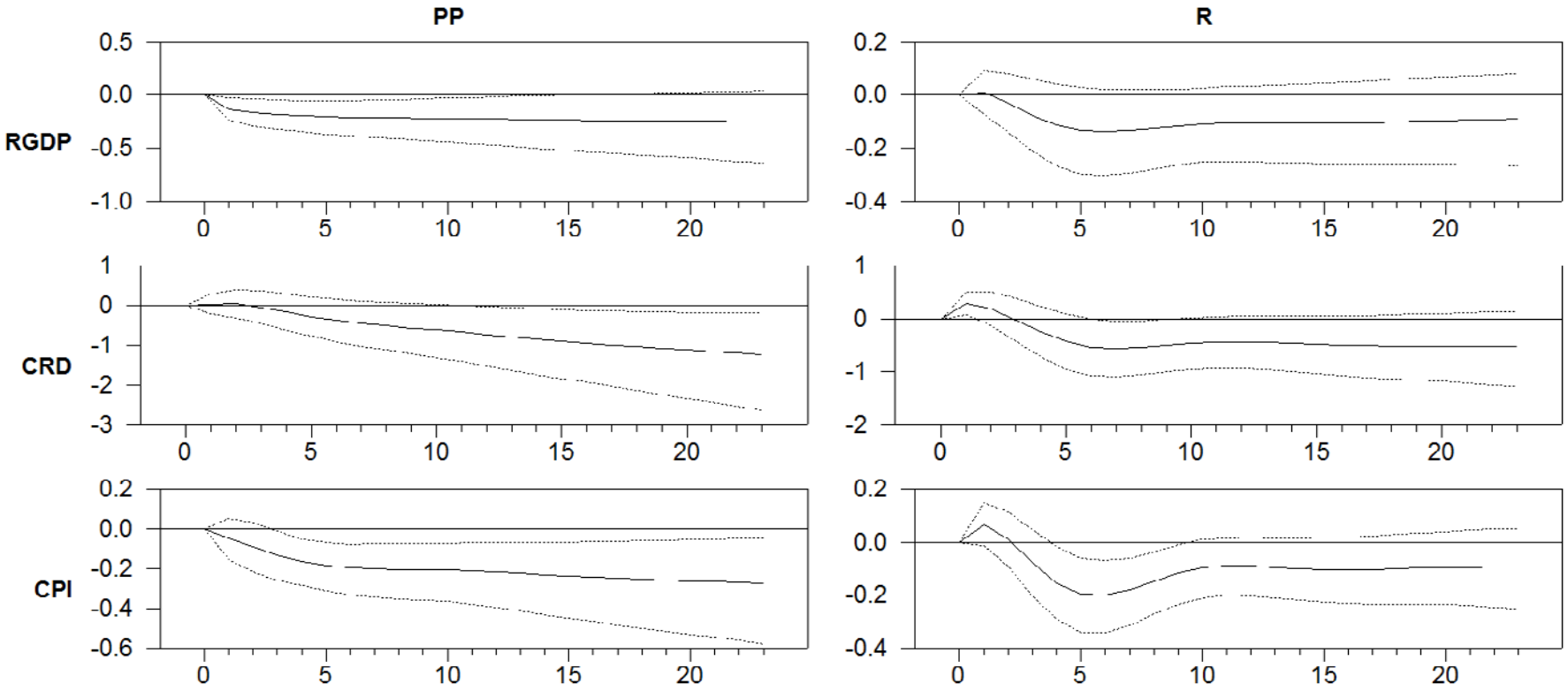
Sources: authors' calculations.

Similar effects of interest rate and macroprudential policies



Responses of variables to shocks

- **The ratio of the responses of credit and prices is 3.0 for monetary policy shocks; 2.2 for macroprudential shocks, after two years have passed from the shock**

Comparison of the relative credit, price and GDP responses under monetary and macroprudential shocks

Table 1

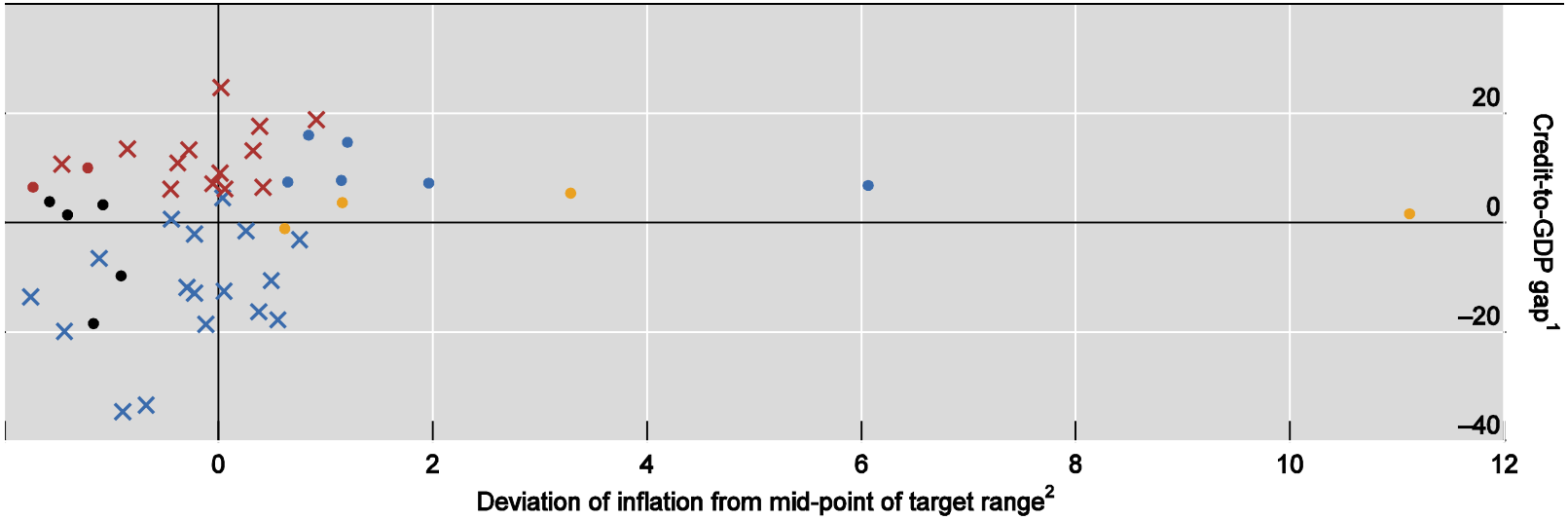
Horizons	1 year	2 year	3 year	4 year
CRD/CPI	48.5%	65.3%	67.0%	60.0%
CRD/RGDP	53.4%	69.0%	55.3%	51.3%

The table shows the probabilities that the ratio of credit-to-price and credit-to-GDP responses are higher under monetary policy shocks than under macroprudential shocks.

Source: authors' calculations.

Inflation outcomes and credit gaps

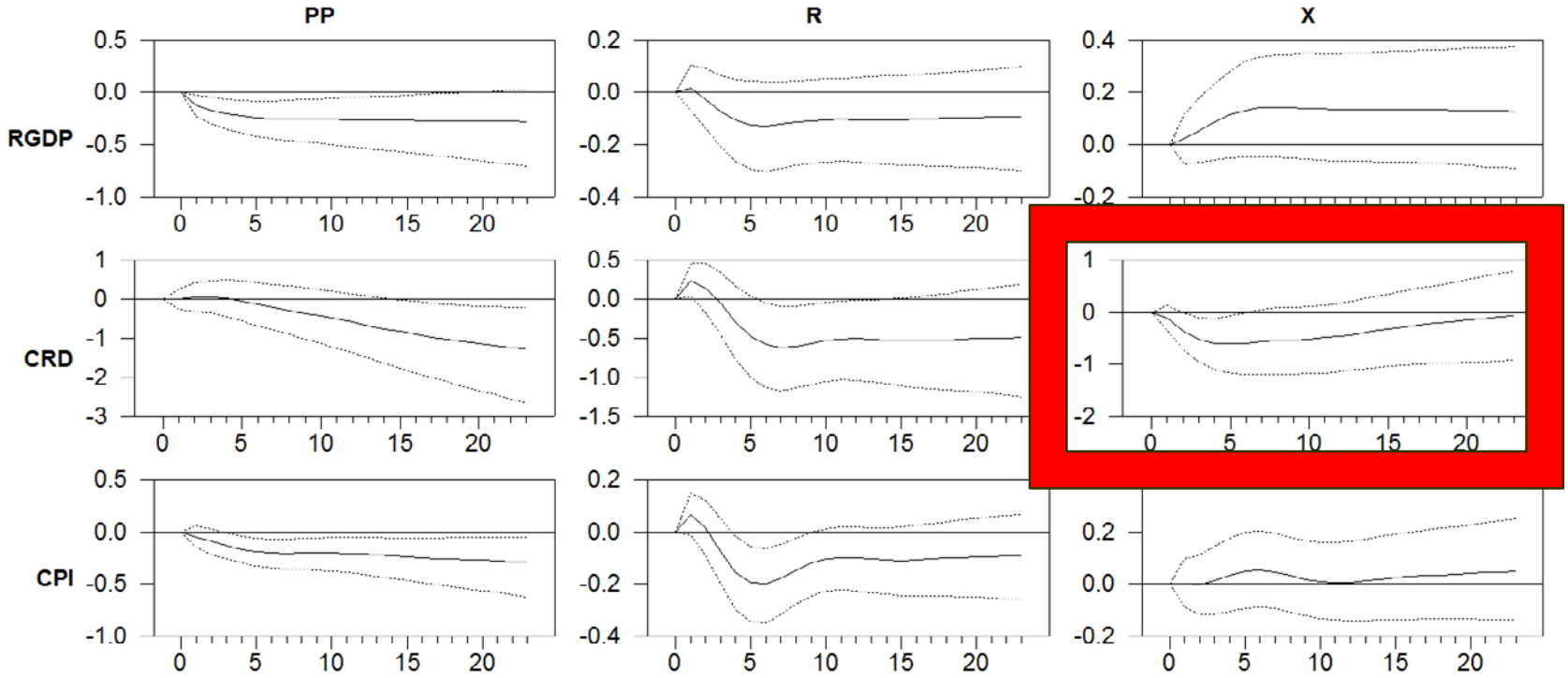
Australia, Indonesia, Korea and Thailand, 2000–12 Graph 1



[1] Yearly total credit-to-GDP gaps. [2] Deviation of inflation is expressed as the difference between actual inflation and the mid-point of inflation target (average of lower and upper bound of target range), based on yearly data (defined as year-on-year inflation rate at the end of the year). For Thailand, core inflation and target; for Korea, core inflation and target for 2000-2006 and headline CPI inflation and target for 2007-2012; headline CPI inflation and target for other countries.

Sources: Datastream; national data; BIS calculations.

Extensions: inclusion of exchange rate

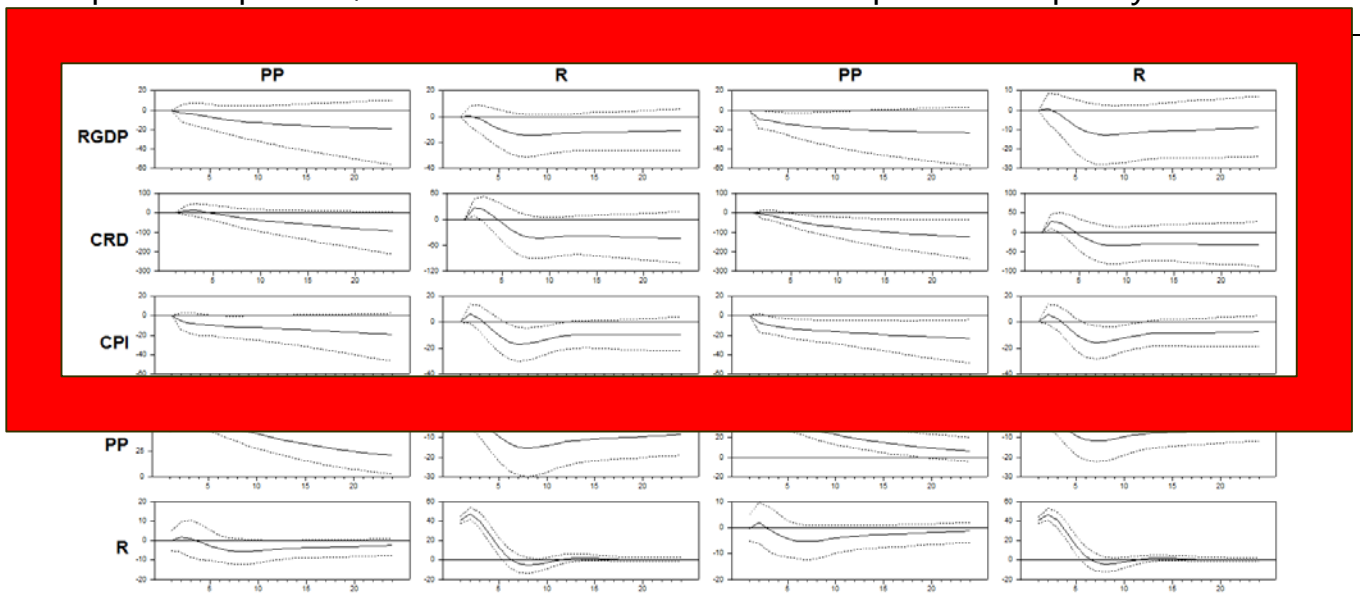


Other extensions and robustness tests

- **Consumption and investment responses to shocks**
  - **Both fall in response to contractionary macroprudential policy shocks**
- **Alternative identification of policy shocks**
- **Different sources for macroprudential policy actions (Lim et al, 2013; Akinci and Olmstead-Rumsey, 2015)**

Impulse responses, alternative measures of macroprudential policy actions

Figure 4



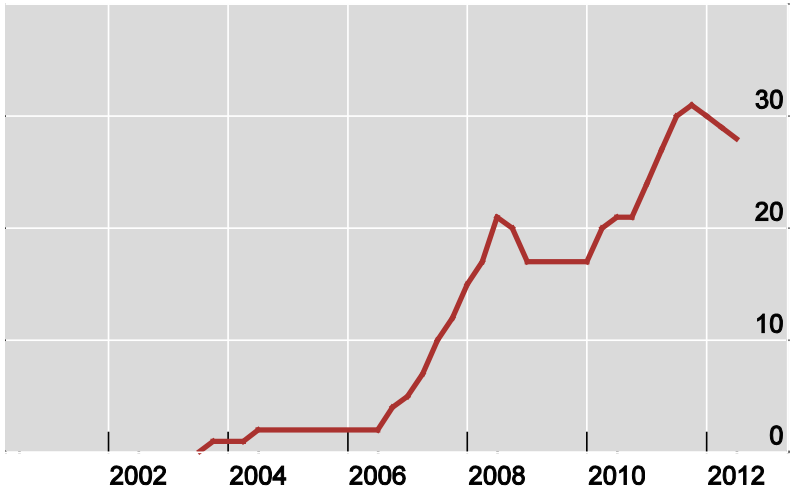
Note: The column headings denote the shocks and the row headings the responses of the indicated variable to each shock. *RGDP* = real GDP, *CRD* = total credit, *CPI* = consumer price index, *PP* = macroprudential policy measure, *R* = policy interest rate. For example, the impulse response in the first row, second column, shows the response of real GDP to an interest rate shock. The first two columns show the responses with the macroprudential policy indicator based on Lim et al (2013). The third and fourth columns show the responses with the macroprudential policy indicator based on Akinci and Olmstead-Rumsey (2015).

Sources: authors' calculations.

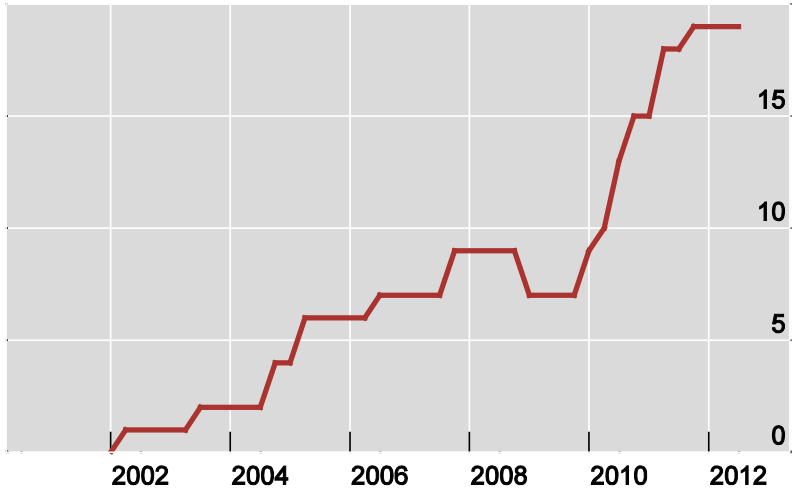
Macroprudential policy actions in China

Graph 4

Monetary measures, index[1]



Prudential measures, index[2]

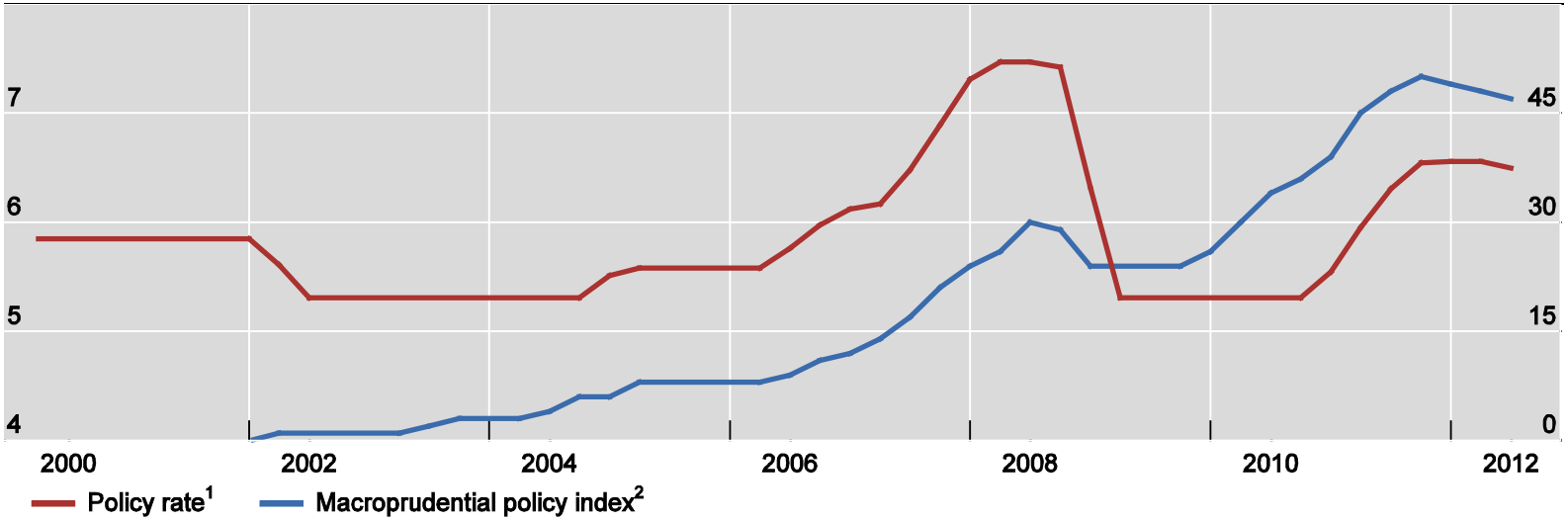


[1] Monetary measures include reserve requirements, credit growth limits and liquidity requirements. A macroprudential policy tightening (loosening), regardless of the type of measure undertaken, increases (decreases) the value of the index by 1, with the new value maintained until another policy action is taken. [2] Prudential measures include maximum loan-to-value ratio, maximum debt-service-to-income ratio, risk weights on housing loans and loan-loss provisioning on housing loans. Index constructed as in Footnote 1.

Source: Shim et al (2013); authors' calculations.

Policy interest rate and macroprudential measures in China

Graph 5

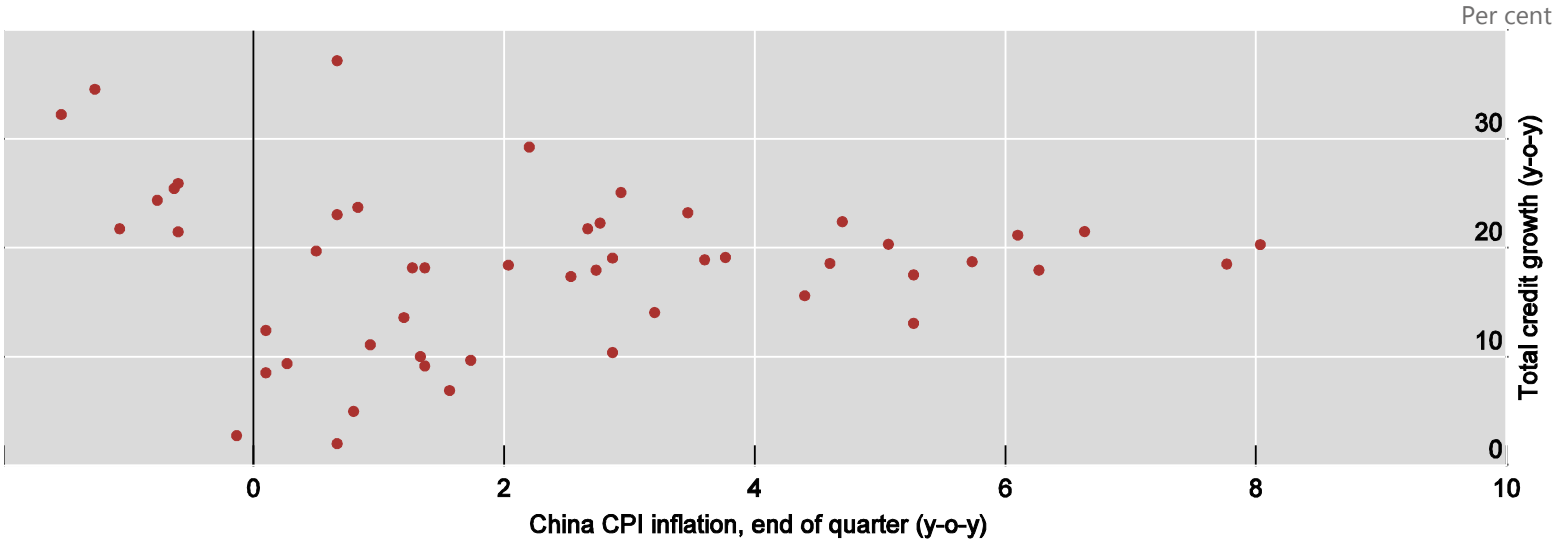


[1] One-year lending rate [2] Includes both monetary and prudential measures; see Graph 4 for details.

Source: Shim et al (2013); authors' calculations.

Inflation outcomes and credit growth[1]

China, Q1:2000-Q2:2012 Graph 6



[1] Total credit to the private non-financial sector

Source: BIS

Conclusions

- We have examined monetary and macroprudential policies in inflation targeting Asia-Pacific economies with financial stability objectives
- Macroprudential policies have affected credit but they have also had impacts on real GDP and inflation, similarly to monetary policy
- Short-run policy challenges could arise during periods of low inflation and high credit growth