The effects of international bank lending on emerging markets

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Disclaimer: views are our own and not necessarily those of the BIS or the IMF.

Gross cross-border flows: a source of vulnerability for EMEs

- Capital flows are at the core of international macro:
  - Pull/push factors
  - Correlate with boom-bust cycles
- Increasing attention to gross cross-border (XB) bank flows
  - Transmission of risk perceptions and financial conditions
- Importance of XB credit to EMEs:
  - High exposure ($\approx$ 30% of Non-FDI liabilities)
  - Outgrows local credit

What is the causal effect of cross-border bank credit on macrofinancial outcomes in EMEs?

Empirical Challenge:

- Hard to disentangle from local and foreign confounding factors
- External shocks $\Rightarrow$ banking flows **but**:

  External shocks affect local conditions through other channels

Our Approach:

- Focus on *causal* role of XB flows rather than global fin. cycle
- Use the variation of *bilateral* country-level claims from confidential BIS data
- Exploit size distribution of claims: *large concentration*
- We build a *granular IV* as in Gabaix & Koijen '20

This paper

Method:

- Estimation of dynamic effect of k flows
  - Local projections with *granular IVs*
  - Non-linear extension: Role of k controls?

Data:

- Sample: 22 EMEs, 1990q1 to 2018q4 ▸ Countries
- BIS locational banking statistics (residence)

Main Findings:

- Increase in XB bank lending loosens financial conditions
- And also impacts real variables to some degree
- Effect is stronger for countries with low k controls
- Our GIVs are relevant in first stage regressions, orthogonal to the global financial cycle (GFCy)
  - Alternative IVs either not relevant or correlate with GFCy

Model setup for international bank lending

Model for a domestic variable F (e.g. RGDP)

$$F_{i,t} = \alpha \tilde{y}_{i,t} + \gamma^F X^F_{i,t} + \varepsilon_{i,t} \tag{1}$$

where:

- i indexes the EME countries
- t denotes time
- $\tilde{y}_{i,t}$ is the growth of aggregate international bank claims
- $\varepsilon_{i,t}$ is an unobserved variable
- X is a vector of control variables

Model setup for int'l bank lending: bilateral claims

- We observe growth in claims from country j to country i, $y_{i,j,t}$
- Growth in total claims $\tilde{y}_{i,t}$ is related to bilateral observations:

$$\tilde{y}_{i,t} = \sum_j s_{i,j,t-1} \cdot y_{i,j,t} \tag{2}$$

  where $s_{i,j,t-1}$ is the country j's initial share

- Use the variation at the bilateral level + size distribution

Factor model for bilateral claims

Bilateral bank claims are given by:

$$y_{i,j,t} = \lambda_{i,j} \cdot \underbrace{\eta_{i,t}}_{\text{Common Factors}} + \underbrace{\gamma^y X^y_{i,j,t}}_{\text{Controls}} + \underbrace{u_{i,j,t}}_{\text{Idiosyncratic Shocks}} \quad (3)$$

- $\lambda_{i,j}$ capture heterogeneous sensitivities
- $\eta_{i,t}$ correlated with **domestic** & **foreign** ($\star$) confounding factors:

$$\eta_{i,t} = (F_{i,t}, F^{\star}_{i,t})$$

- $u_{i,j,t}$ will be used to build an optimal IV

  $\Rightarrow$ $u_{i,j,t}$ are key for our identification strategy

Empirical strategy

1. From observed *bilateral* claims:
   1.1 Remove the estimated commonality in bilateral claims:

$$\widehat{u}_{i,j,t} = y_{i,j,t} - \widehat{\lambda_{i,j}} \cdot \widehat{\eta_{i,t}} - \hat{\gamma}^{y} X^{y}_{i,j,t}$$

   - Conservative approach: # factors recommended +1 Table

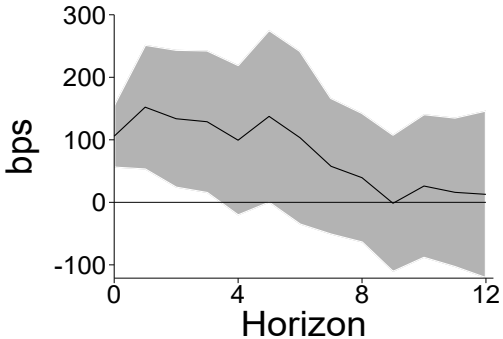
   1.2 Build optimal GIV $z_{i,t}$ using $\hat{u}_{i,j,t}$

2. Estimate 1st stage: regress $\tilde{y}_{i,t}$ on $z_{i,t}$:

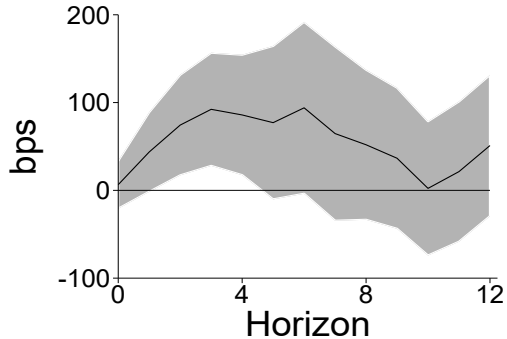
$$\tilde{y}_{i,t} = M z_{i,t} + \tilde{\gamma} X^{F,y}_{i,t} + v_{i,t}$$

3. Estimate IRF using local projections (**2nd stage**):
   - Regress $F_{i,t+k}$ on $\hat{\tilde{y}}_{i,t}$ (eq. (1))

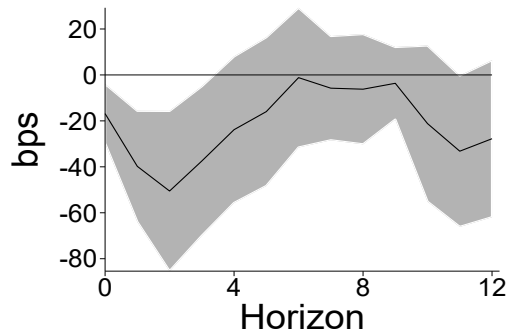
Intn'l bank lending causes financial loosening and affects the real economy



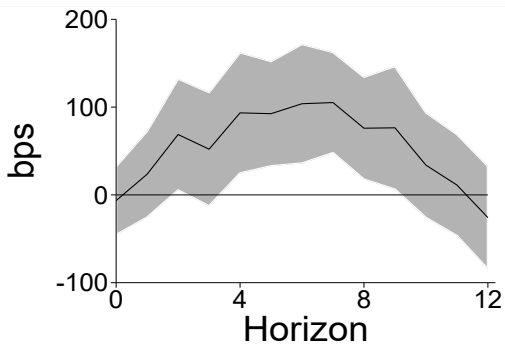
(a) NEER



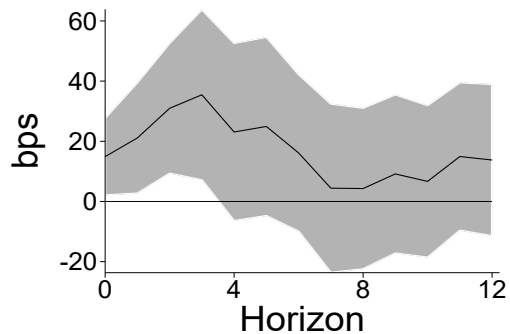
(b) Housing prices



(c) Corp. Spread



(d) Credit growth



(e) Real GDP

Conclusions

- Novel evidence on the *causal* effect of XB lending on EMEs
  - Exploit heterogeneity in bilateral country-level XB banking data in BIS data to build GIVs

- Increase in XB banking lending eases financial conditions and expands economy
  - Larger effects for countries with low k controls ▸ k controls
    $\rightarrow$ k controls can help cushion destabilising effects of XB flows

- Our GIVs improve upon IVs from literature
  - Relevant in 1st stage regressions ▸ 1st stage
  - Uncorrelated with GFCy ▸ Table

The full paper can be found in the following link or scanning this QR code

https://www.bis.org/publ/work899.pdf

APPENDIX

Effects are larger for countries with low k controls

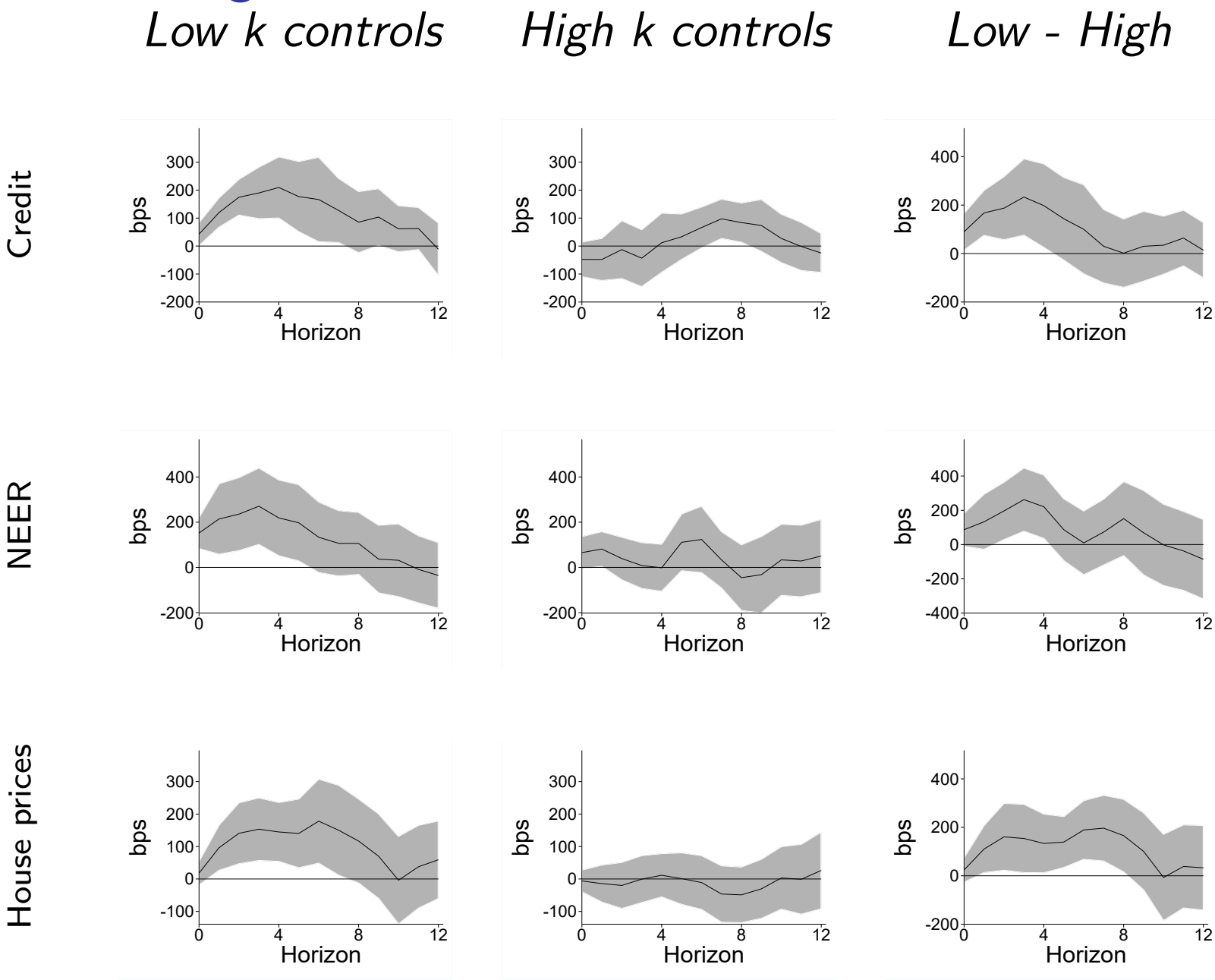


Figure 1: Panel A

Robustness

- Our GIVs are
  - Relevant in first stage regressions ▸ Table
  - Uncorrelated with measures of the GFCy ▸ Table, despite the fact XB lending is strongly correlated ▸ Table
- Results are robust to
  - a balanced panel of lending partners
  - excluding domestic crises from the sample
  - alternative factor estimation method
- Alternative instruments:
  - **Not relevant in 1st stage** ▸ Table

    EBP of Gilchrist & Zakrajsek '12 as in Zeev '19
    "Host" shocks as in Avdjiev et al '20
  - **Strongly correlated with GFCy measures** ▸ Table

    US broker-dealer leverage as in Cesa-Bianchi et al '19
    Bartik-type of instrument as in Blanchard et al '16 with LBSR
    "Common" shocks as in Avdjiev et al '20

Country sample

Table 1: Country sample list

Argentina	Hungary	Poland
Brazil	India	Russia
Bulgaria	Indonesia	South Africa
Chile	Israel	Thailand
China	Malaysia	Turkey
Colombia	Mexico	Ukraine
Czech Republic	Peru	
Egypt	Philippines	

This table shows the list of 22 countries covered in our sample.

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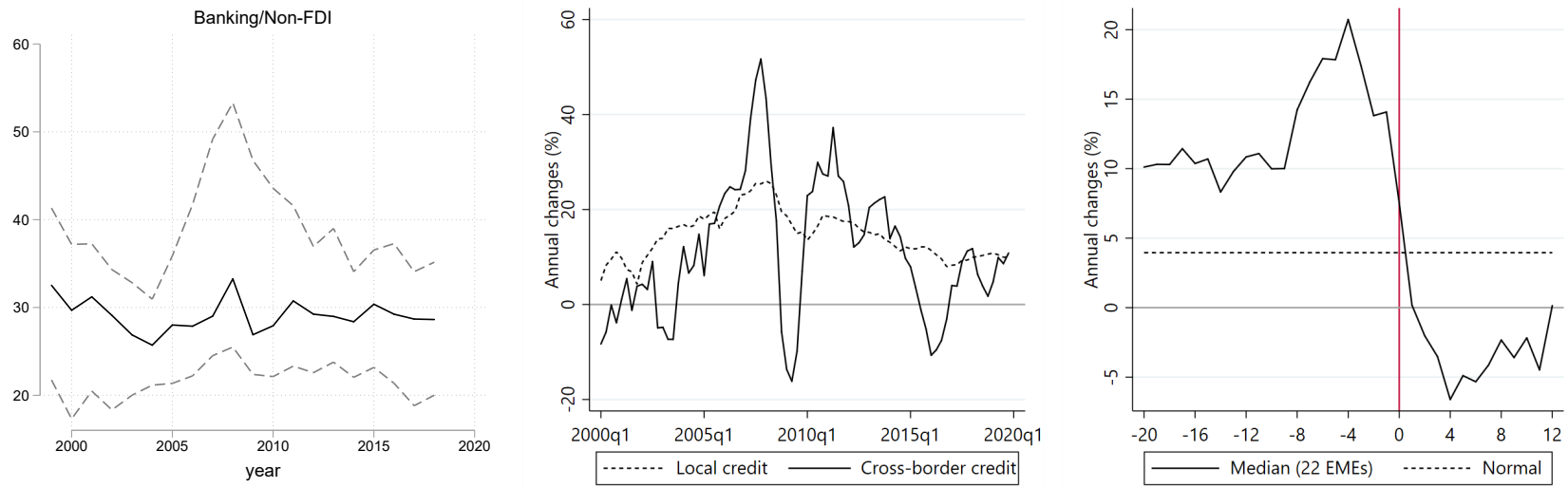
XB in perspective

Figure 2: XB credit to EMEs matters, outgrows local credit & peaks ahead of crises



Source: BIS Locational Banking Statistics; BIS GLIs; IMF.

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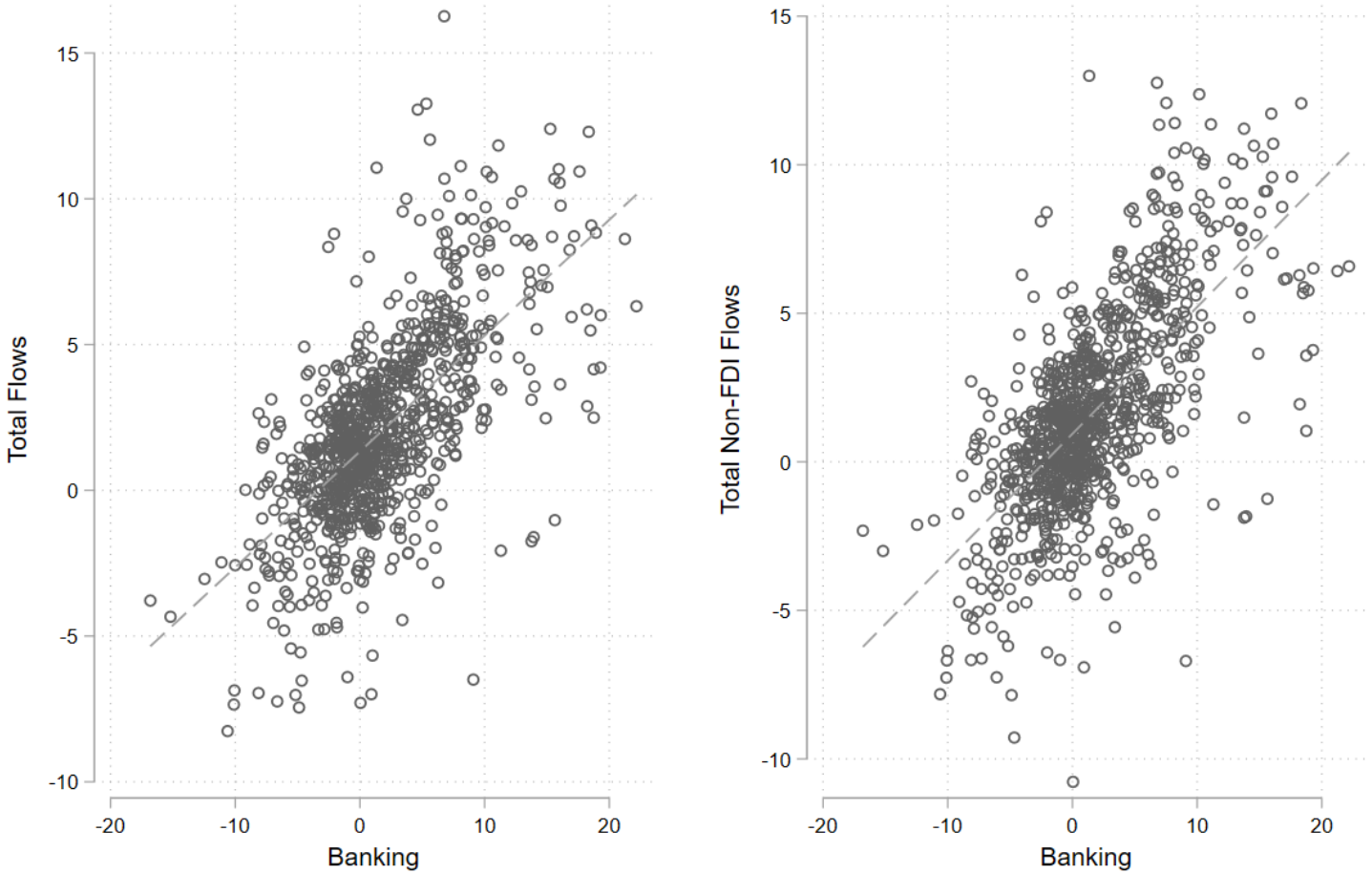
Cross-border lending and IIP

Figure 3: Growth in cross-border bank claims and international liabilities are strongly correlated



The sample comprises 22 EMEs, as presented in Table 1.

Our GIVs are relevant in first stage regressions

Table 2: First stage statistics for linear model

depvar	Coef.	SE	R^2	Countries	Observations
NEER	0.946***	(0.027)	0.843	20	1707
REER	0.946***	(0.027)	0.842	20	1707
RER US	0.964***	(0.025)	0.877	17	1309
Sov spread	0.867***	(0.060)	0.755	21	1549
Corp spread	0.869***	(0.077)	0.727	19	955
FCI	0.878***	(0.064)	0.775	18	1523
Housing prices	0.969***	(0.037)	0.852	19	1069
Stock prices	0.884***	(0.069)	0.784	20	1443
Equity prices	0.884***	(0.062)	0.764	18	1424
Credit growth	0.962***	(0.023)	0.884	17	1451
Real credit	0.960***	(0.023)	0.883	17	1463
RGDP	0.885***	(0.058)	0.781	22	1900
Consumption	0.944***	(0.028)	0.853	22	1662
Investment	0.947***	(0.028)	0.855	22	1639
Exports	0.942***	(0.029)	0.854	22	1657
Imports	0.944***	(0.029)	0.851	22	1584
Trade Balance	0.857***	(0.070)	0.765	21	1627
FX debt	0.879***	(0.064)	0.784	18	1580
Inflation	0.881***	(0.064)	0.784	18	1580
Short-term interest rate	0.936***	(0.029)	0.864	17	1059
Long-term interest rate	0.911***	(0.048)	0.838	17	822

*** p<0.01, ** p<0.05, * p<0.1

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Bank lending and the global financial cycle co-move

Table 3: International banking flows and measures of the global financial cycle

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Banking Flows	Banking Flows	Banking Flows	Banking Flows	Banking Flows
GFCy	0.0218***	0.0145***	0.0190***		0.0107***
	(0.00162)	(0.00250)	(0.00170)		(0.00258)
*PC*1		0.00768***		0.0149***	0.00860***
		(0.00202)		(0.00132)	(0.00201)
VIX			-0.00103***	-0.00133***	-0.00110***
			(0.000205)	(0.000198)	(0.000205)
Observations	2,435	2,435	2,435	2,435	2,435
R-squared	0.070	0.075	0.080	0.080	0.086
Country FE	YES	YES	YES	YES	YES
Countries	22	22	22	22	22

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

This table shows the results of a panel regression of international banking flows on different measures of the global financial cycle. *GFCy* stands for the global financial cycle as measured by Miranda-Agrippino and Rey (2019). *PC*1 stands for the first principal component of capital flows. *VIX* stands for the CBOE Volatility Index.

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Our GIVs are orthogonal to the global financial cycle

Table 4: GIVs and the global financial cycle

VARIABLES	(1) *GIV*	(2) *Host*	(3) *BOGC*	(4) *Common*	(5) *BD*
GFCy	-0.000183	-0.700***	0.0394***	6.066***	4.490***
	(0.00154)	(0.151)	(0.00339)	(0.614)	(0.864)
*PC*1	-0.000350	0.438***	0.0131***	0.112	2.461***
	(0.00120)	(0.117)	(0.00264)	(0.479)	(0.675)
VIX	-7.39e-05	-0.0831***	-0.00363***	0.246***	0.287***
	(0.000122)	(0.0120)	(0.000269)	(0.0487)	(0.0684)
Observations	2,435	2,355	2,435	111	116
R-squared	0.000	0.025	0.303	0.689	0.592
Country FE	YES	YES	YES	NO	NO
Countries	22	22	22		

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

GFCy stands for the global financial cycle as measured by Miranda-Agrippino and Rey (2019). *PC*1 stands for the first principal component of capital flows. *VIX* stands for the CBOE Volatility Index.

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Our GIVs are orthogonal to the global financial cycle

Table 5: GIVs and the global financial cycle

VARIABLES	(1) *GIV*	(2) *Host*	(3) *BOGC*	(4) *Common*	(5) *BD*
GFCy	-0.000183	-0.700***	0.0394***	6.066***	4.490***
	(0.00154)	(0.151)	(0.00339)	(0.614)	(0.864)
*PC*1	-0.000350	0.438***	0.0131***	0.112	2.461***
	(0.00120)	(0.117)	(0.00264)	(0.479)	(0.675)
VIX	-7.39e-05	-0.0831***	-0.00363***	0.246***	0.287***
	(0.000122)	(0.0120)	(0.000269)	(0.0487)	(0.0684)
Observations	2,435	2,355	2,435	111	116
R-squared	0.000	0.025	0.303	0.689	0.592
Country FE	YES	YES	YES	NO	NO
Countries	22	22	22		

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

GFCy stands for the global financial cycle as measured by Miranda-Agrippino and Rey (2019). *PC*1 stands for the first principal component of capital flows. *VIX* stands for the CBOE Volatility Index.

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Endogenous factors we extract correlate with Avdjiev et al (2020) measures

Table 6: Avdjiev et al (2020) decomposition and endogenous factors

VARIABLES	(1) $E_{i,t}$	(2) $E_{i,t}$	(3) $E_{i,t}$
Host	0.0862*	0.225***	-0.0255
	(0.0453)	(0.0684)	(0.0393)
Borrower	0.196***	0.214***	0.169***
	(0.00754)	(0.00850)	(0.0149)
Common	0.182***	0.188***	-0.0827
	(0.0245)	(0.0237)	(0.0948)
Observations	2,371	1,579	880
R-squared	0.2397	0.3388	0.0977
Countries	22	22	22
Sample Period	Full	Pre-GFC	Post-GFC

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

This table shows the results of regressing our measure of endogenous factors on Avdjiev et al (2020) exact decomposition of international bank lending growth rates.

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First stage statistics for alternative instruments

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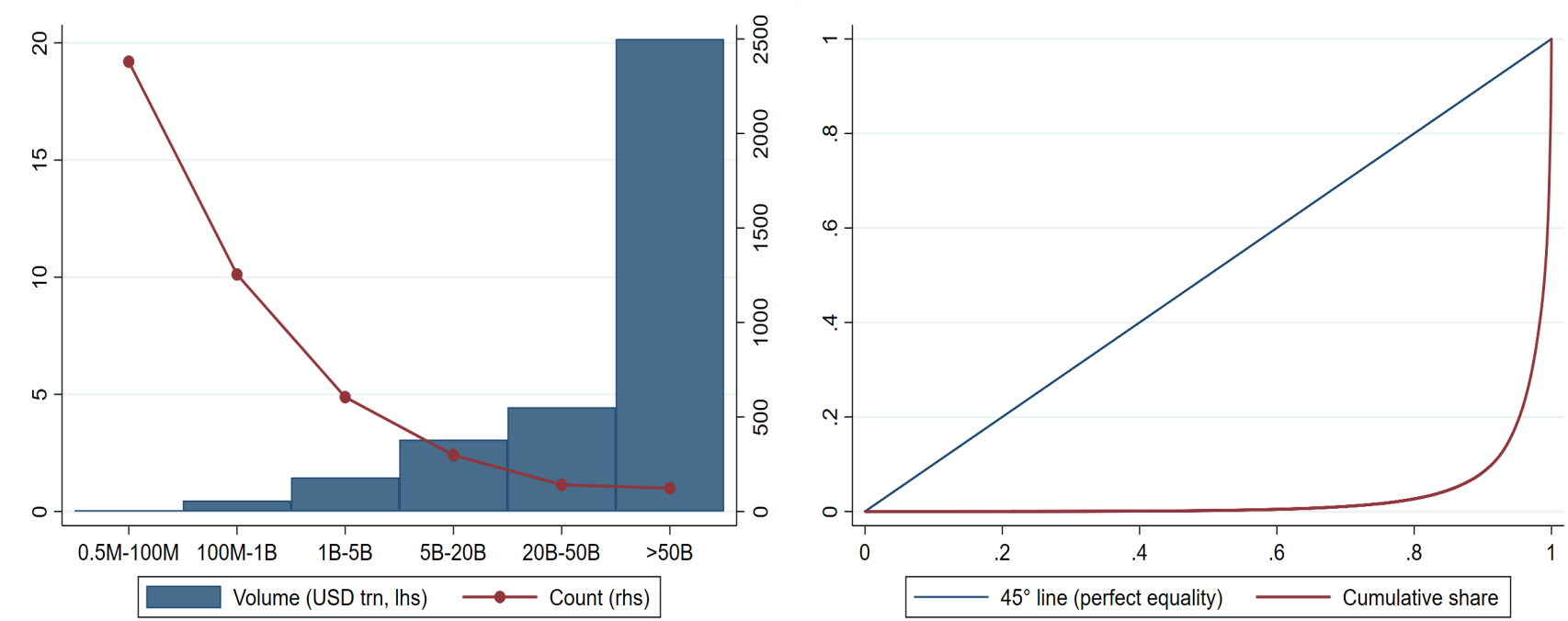
Dep Var/ Instrument	GIV	EBP	Host	Common	BD	BOGC
NEER	***			***	**	***
REER	***			***	**	***
RER US	***			**	**	***
Sov spread	***			***	**	***
Corp spread	***			***	*	***
FCI	***			***	***	***
Housing prices	***			***	***	***
Stock prices	***			***	**	***
Equity prices	***			***	***	***
Credit growth	***			***	**	***
Real credit	***			***	**	***
RGDP	***			***	**	***
Consumption	***			***	*	***
Investment	***			***	*	***
Exports	***			***	*	***
Imports	***			***	*	***
Trade Balance	***			***	*	***
Inflation, consumer prices	***			***	***	***
Short-term interest rate	***			***	**	***
Long-term interest rate	***			***	***	***

*** p<0.01, ** p<0.05, * p<0.1

Results correspond to separate regressions of international banking flows on a set of instruments including control variables from the regression corresponding to 6b. *EBP* is the external bond premium of Gilchrist and Zakrajsek (2012), as in Zeev (2019). *BD Lev* is US broker-dealer leverage, as in Cesa-Bianchi et al (2018). *BOGC* is an instrument constructed using the LBSR data following Blanchard et al (2016).

International bank lending is very concentrated

Figure 4: Cross-border banking: Small (large) number of large (small) links



(a) Count and volumes by link size

(b) Lorenz curve

Source: BIS Locational Banking Statistics. Data as of end-Q1 2019.

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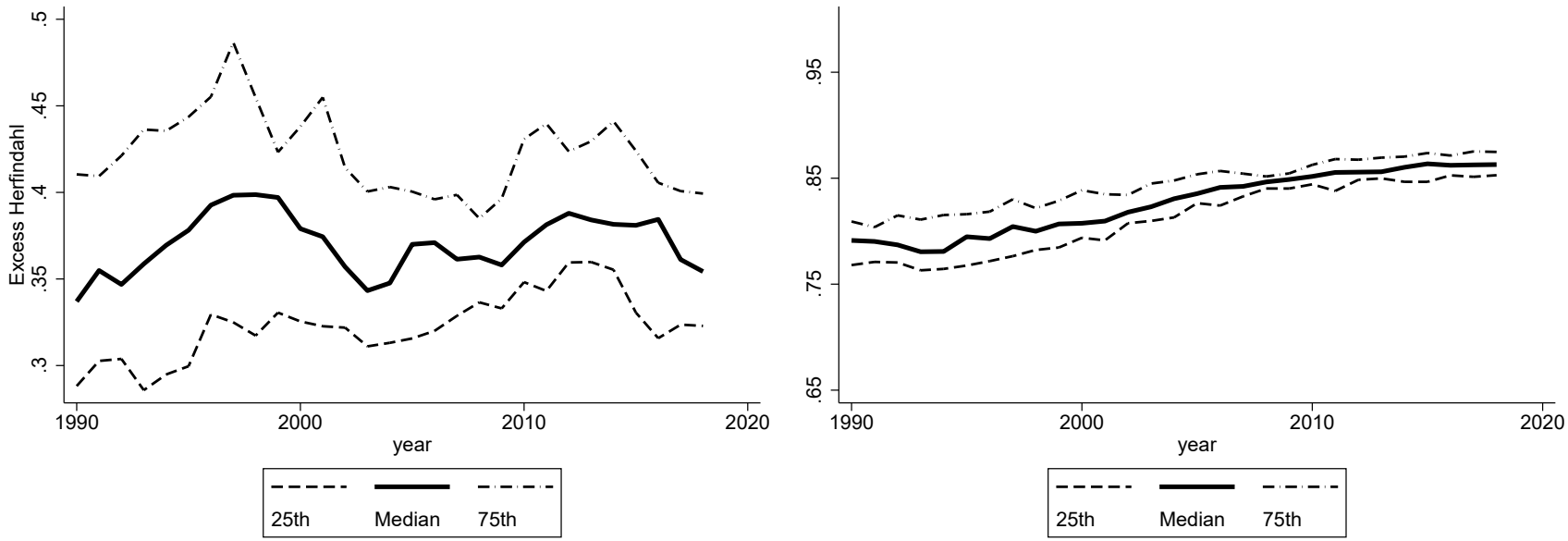
International bank lending is very concentrated

Figure 5: Concentration in cross-border banking



(a) Excess Herfindahl

(b) Gini

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Number of factors from PCA analysis

Table 7: Number of factors selected by model

	Baseline	Constant sample	Crisis	Parallel analysis
Mean	3.00	2.82	2.95	2.50
sd	1.69	1.56	1.62	0.67
Min	2.00	2.00	2.00	2.00
p25	2.00	2.00	2.00	2.00
p50	2.00	2.00	2.00	2.00
p75	3.00	3.00	3.00	3.00
Max	6.00	6.00	6.00	4.00
Av. diff. w.r.t. Baseline	.	-0.18	-0.05	-0.50
Min. diff. w.r.t. Baseline	.	-4.00	-1.00	-4.00
Max. diff. w.r.t. Baseline	.	1.00	0.00	2.00

Notes: This table presents the summary statistics of the number of factors selected for each model after removing the average growth rate. The columns *Crisis*, *Constant sample* and *Parallel analysis* present the statistics for the robustness scenarios

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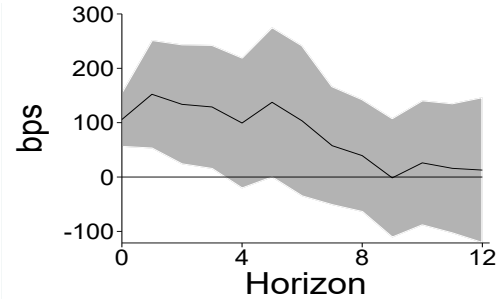
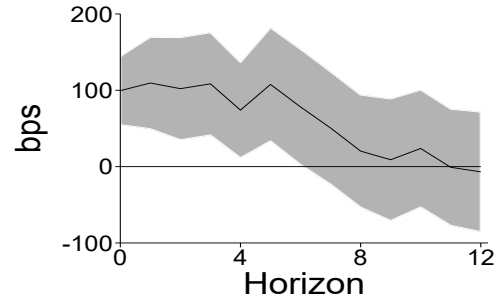
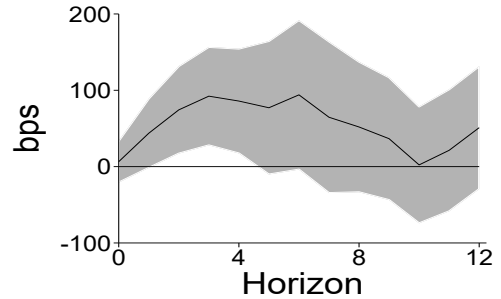
International bank lending shocks cause financial loosening



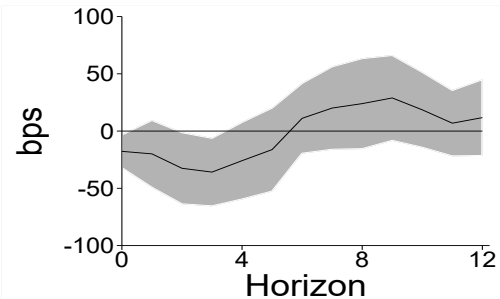
(a) NEER



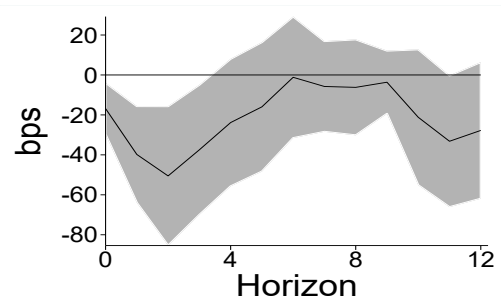
(b) REER



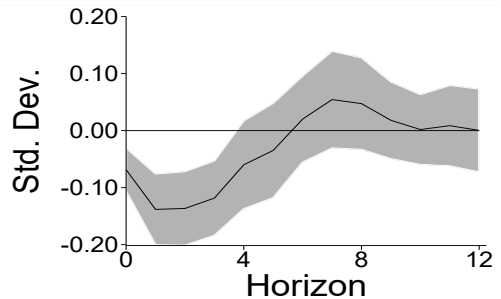
(c) Housing prices



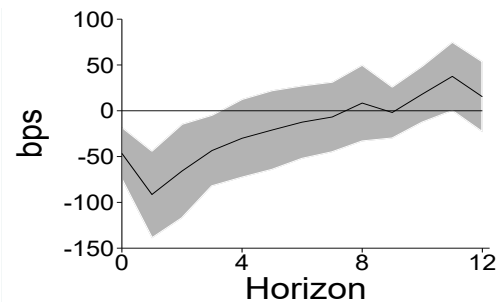
(d) Sov. Spread



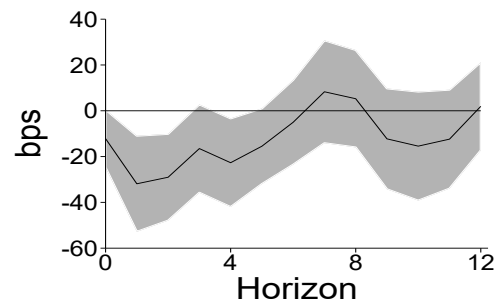
(e) Corp. Spread



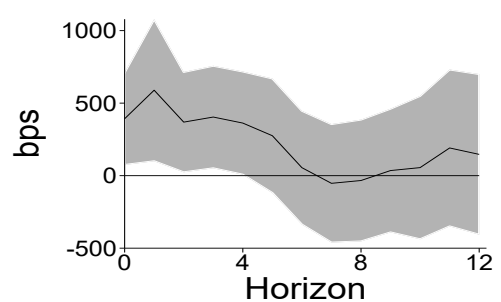
(f) FCI



(g) Short-term interest

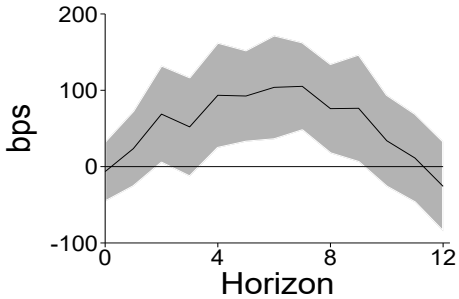


(h) Long-term interest

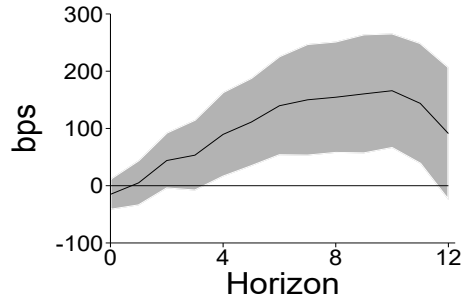


(i) Equity prices

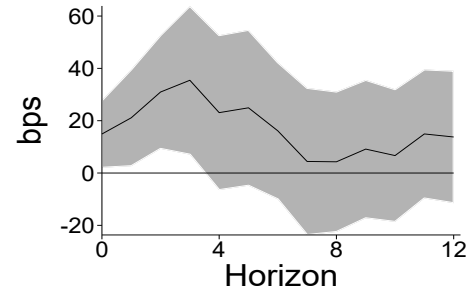
And also affect the real economy



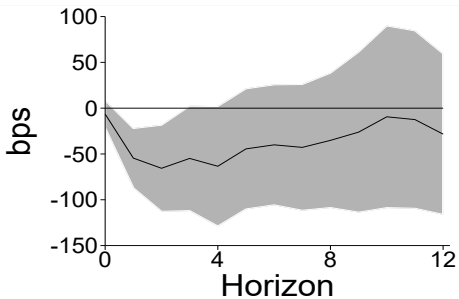
(a) Credit growth



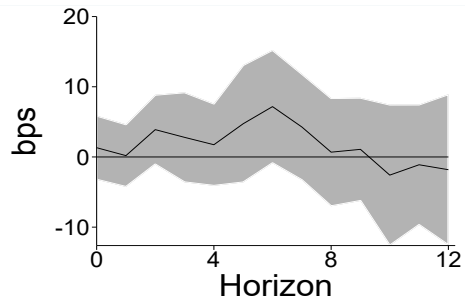
(b) Real priv. credit



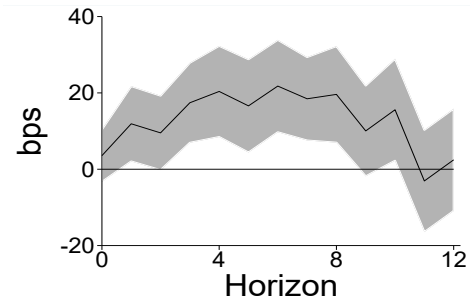
(c) Real GDP



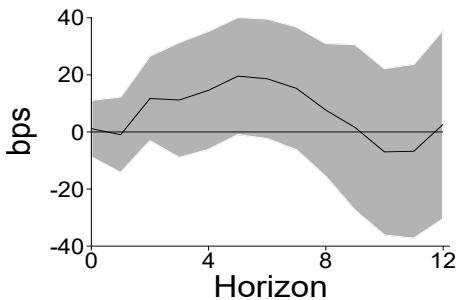
(d) Inflation



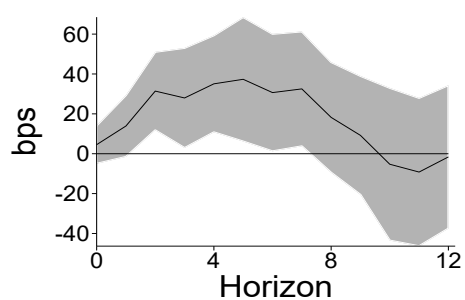
(e) Consumption



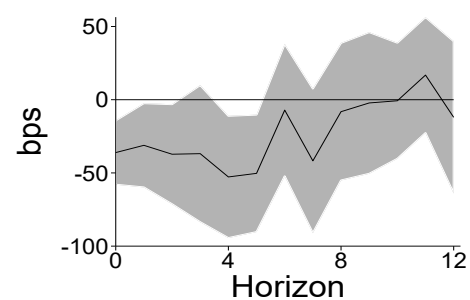
(f) Investment



(g) Exports

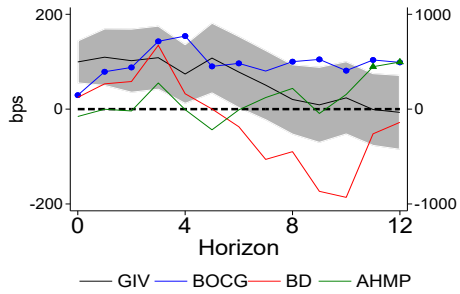


(h) Imports

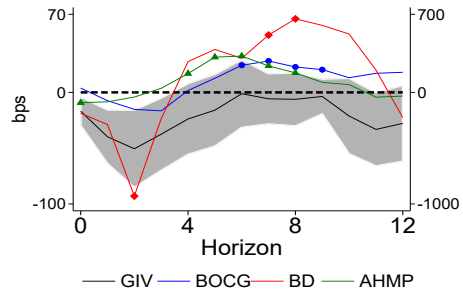


(i) Trade Balance

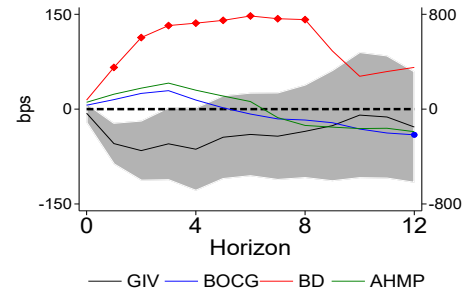
Alternative instruments



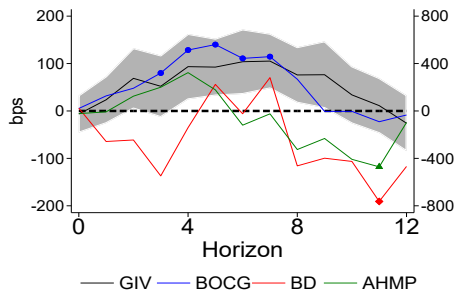
(a) REER



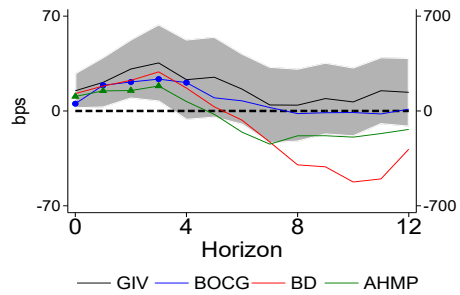
(b) Corp. Spread



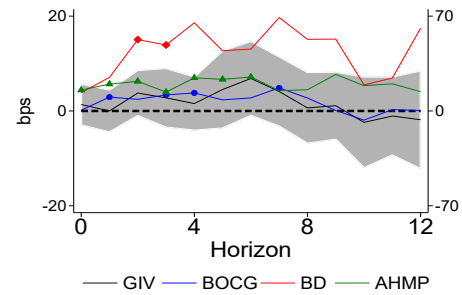
(c) Inflation



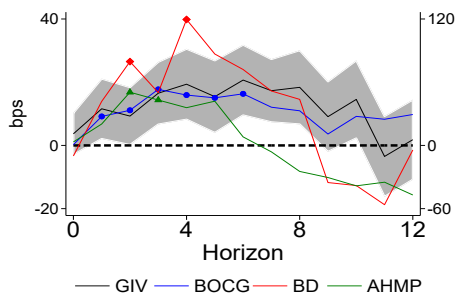
(d) Credit



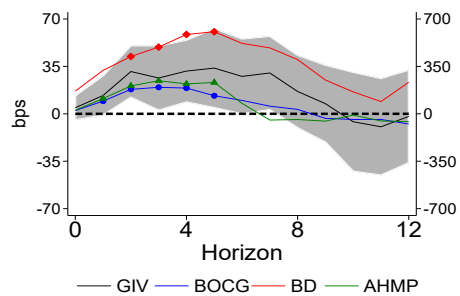
(e) Real GDP



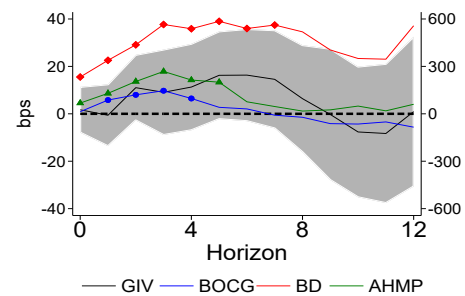
(f) Consumption



(g) Investment



(h) Imports



(i) Exports