

The Dollar Squeeze and Economic Growth

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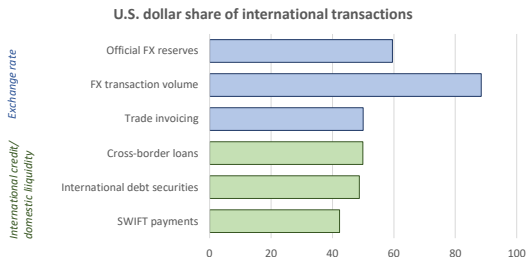


The dominance of the dollar in international finance

*“Why can’t we do trade based on our own currencies?
Who was it that decided that the dollar was the currency
after the disappearance of the gold standard?”*

Luiz Inácio Lula da Silva
President of Brazil (1945–)

The dollar squeeze in international finance



- Half or more of private sector transactions denominated in USD
- Fed spillovers via the dollar affects public policy worldwide
- USD liquidity shortages on foreign borrowers: *dollar squeeze*

Dollar liquidity and economic growth

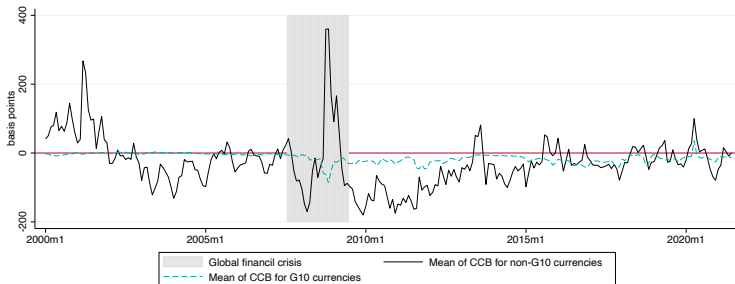
- Does the dollar squeeze matter for economic performance?
- Maybe not:
 - Investment can be financed domestically, negating importance of the exchange rate
 - Even with capital inflows, exchange rate risks can be mitigated via portfolio (hedging) or policy (regime) choices
- But perhaps:
 - Liquidity and financing affect firms' or households' investment and consumption choices
 - Given the dollar's dominance, unsurprising if dollar liquidity matters for growth

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Deviations from covered interest parity post-crisis

- Until the 2007/08 crisis, covered interest parity (CIP) was one of the most robust and reliable relationships in international finance
- This relationship broke down thereafter, leading to persistent deviations from CIP known as the cross-currency basis (CCB)



Understanding dollar liquidity and economic growth

- **Objective:** Exploit the CCB to understand how dollar liquidity affects economic performance
 - Compute CCB vis-à-vis the USD
 - Mix of 50 advanced economies (AEs) and emerging markets (EMs)
 - Before, during, and after the global crisis
 - Match with macro data on output, prices, money stock, exchange rate
- Apply panel vector-autoregression (PVAR) model to system and consider how CCB shocks shape economic outcomes

The dollar squeeze inhibits economic growth

- Dollar squeeze reduces growth...
- ... but not necessarily because of insufficient dollars to support economic activity
 - Only true in a special case
 - For advanced economies during a financial crisis, international liquidity shortages lead to growth contraction
- Under **normal** conditions, the dollar squeeze works by reducing the attractiveness of non-dollar-denominated assets
 - In **EMs**: this prompts substitution into domestic assets, reducing domestic liquidity for investment
 - In **AEs**: this induces local currency appreciation, which weakens export performance

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New insights into the effects of dollar liquidity on growth

- Study the implications of dollar liquidity shortages using a novel measure (CCB)
- Reliance on larger sample of computed CCBs than before
 - Larger sample permits insights into different responses of AEs and EMs to dollar squeeze
- Identify and elaborate on a less-explored channel of international monetary policy spillovers

Related literature

- 1 **Deviations from CIP:** Pre-crisis CIP deviations were small and brief (Akram, Rime & Sarno 2008; Clinton 1988), but increased counterparty risk (Baba & Packer 2009), greater hedging demand (Borio *et al.* 2016, rising transactions costs of various kinds (Cenedese *et al.* 2021; Du *et al.* 2018; Liao & Zhang 2020) led to sustained post-crisis deviations (Du, Tepper & Verdelhan 2018; Cerutti, Obstfeld & Zhou 2021) $\Rightarrow$ *causes but not consequences*
- 2 **Global currency:** Global currency competition (Aizenman, Cheung & Qian 2020; Fratzscher & Mehl 2014) and international currencies (Lane & Shambaugh 2010; Matsuyama, Kiyotaki & Matsui 1993) stress dominance of dollar in reserves (Lilley *et al.* 2022), debt (Jiang, Krishnamurthy & Lustig 2021; Maggiori, Neiman & Schreger 2020), and trade (Bruno & Shin 2023) $\Rightarrow$ *real effect of dollar beyond trade?*
- 3 **Dollar liquidity swaps:** Used during the global crisis (Allen *et al.* 2017; Rose & Spiegel 2012) and COVID-19 pandemic (Aizenman, Ito & Pasricha 2022; Bahaj & Reis 2022), but efficacy unclear $\Rightarrow$ *offer additional reason why*
- 4 **International transmission of monetary policy:** Spillovers conventional (Morales *et al.* 2022) and unconventional (Lim & Mohapatra 2016), most using VAR methods (Cesa-Bianchi & Sokol 2022; Miranda-Agrippa & Rey 2020) $\Rightarrow$ *focus mainly on interest rate, not CCB*

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Different measures of liquidity

- Liquidity is a rich financial concept
- Market vs funding liquidity (Brunnermeier & Pedersen 2009)
 - Market liquidity more relevant for currencies
 - Global liquidity matters most for open economies
- No consensus on appropriate measure of global liquidity
 - E.g. excess valuation in asset prices, deposit-OIS spreads
 - But do not isolate *dollar* aspect of global liquidity
- Dollar access is important because shortages (squeezes) can affect even non-dollarized economies

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Covered interest parity

- Covered interest parity is the relationship:

$$e^{n \cdot r_{t,t+n}^*} = e^{n \cdot r_{it,i(t+n)}} \cdot \frac{S_{it}}{F_{it,i(t+n)}} \quad (1)$$

- $r_{it,i(t+n)}$ = interest rate in country i
 - S_t = (directly quoted) spot exchange rate at t
 - $F_{t,t+n}$ = forward rate n periods ahead
- CIP equates the dollar interest rate with its synthetic equivalent
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The cross-currency basis measures deviations from CIP

- With deviations from CIP, a wedge $x_{it,i(t+n)}$ emerges:

$$e^{n \cdot r_{t,t+n}^*} = e^{n \cdot (r_{it,i(t+n)} + x_{it,i(t+n)})} \cdot \frac{S_{it}}{F_{it,i(t+n)}}$$

- Taking logs and solving gives the cross-currency basis:

$$x_{it,i(t+n)} = r_{t,t+n}^* - \left[r_{it,i(t+n)} - \frac{1}{n} (f_{it,i(t+n)} - s_{it}) \right] \quad (2)$$

- CCB is a measure of *deviations* from CIP
- When CCB is **negative**, it signals a dollar **shortage** for borrowers of dollars in country i

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Channels of transmission for the CCB I

- ① *International credit* channel (**direct**) (Miranda-Agrippino & Rey 2020)
 - Financial institutions without easy access to dollars face higher external finance premia
 - Weakens their ability to intermediate between foreign creditors and domestic borrowers
 - Deleverage and reduce lending at home, which contracts aggregate demand
- ② *Domestic liquidity* channel (**indirect**) (Caballero & Krishnamurthy 2009)
 - Reduced opportunity cost of holding dollar is a diminution of the convenience yield
 - Lower convenience yield makes non-dollar-denominated assets more attractive, substitution to domestic assets
 - This tightens the money supply and increases the cost of capital, which lowers consumption/investment and growth
- ③ *Exchange rate* channel (**indirect**) (Avdjiev *et al.* 2019)
 - Lower dollar costs increases attractiveness of dollar assets
 - Exchange rate appreciation to compensate for return differentials
 - If relative prices are unchanged and the Marshall-Lerner condition holds, real exchange appreciation worsens the current account and growth

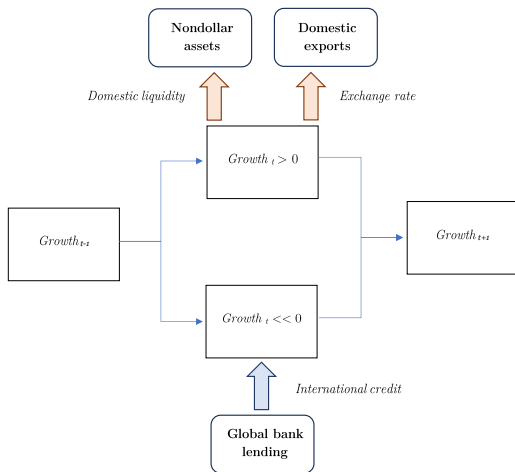
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Channels of transmission for the CCB II



Econometric methodology

The PVAR system takes the form:

$$\mathbf{Y}_{it} = \sum_{j=1}^p \mathbf{Y}'_{i,t-j} \boldsymbol{\beta}_j + \mathbf{X}'_{i,t} \boldsymbol{\gamma} + \boldsymbol{\alpha}_i + \boldsymbol{\epsilon}_{it}, \boldsymbol{\epsilon}_{i,t} \sim \text{IID}(\mathbf{0}, \boldsymbol{\Sigma}),$$

- $\mathbf{Y}_{i,t}$: $(1 \times k)$ vector of endogenous variables
 - $\mathbf{Y}^p = [\text{CCB } GDP]$ (parsimonious model)
 - $\mathbf{Y}^c = [\text{CCB } GDP \text{ CPI } M2 \text{ ER}]$ (comprehensive model)
- $\mathbf{X}_{i,t}$: $(1 \times m)$ vector of exogenous covariates
- $\boldsymbol{\alpha}_i$ is a $(1 \times k)$ vector of country fixed effects
- $\boldsymbol{\epsilon}_{it}$ is a $(1 \times k)$ vector of idiosyncratic errors
- $\mathbf{E}(\boldsymbol{\epsilon}_{it}) = \mathbf{0}$, $\mathbf{E}(\boldsymbol{\epsilon}'_{it} \boldsymbol{\epsilon}_{it}) = \boldsymbol{\Sigma}$, and $\mathbf{E}(\boldsymbol{\epsilon}'_{it} \boldsymbol{\epsilon}_{is}) = \mathbf{0}$ whenever $t > s$

Identification strategy I

- Cholesky-style timing assumptions
- **Key assumption:** CCB more exogenous than GDP (parsimonious model)
 - Economic activity do not affect dollar funding conditions contemporaneously, but with a lag
 - Unexpected shocks to the CCB observed by market participants instantaneously (interest and exchange rates determined in continuously-traded financial markets)
 - CCB available at high frequency, while GDP updated at a quarterly frequency, often with delays
 - Funding decisions adjusted thereafter and only then shows up as changes in demand and output

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Identification strategy II

- Other timing assumptions (comprehensive model)
 - Prices as less endogenous than the money supply (and both less than output) (Favara & Giordani 2009; Mumtaz & Surico 2009)
 - Exchange rate most endogenous, after money stock (Bjornland 2008; Kim 2002); monetary policy also cannot respond within the same period to output and the price level (Kim & Roubini 2000; Sims & Zha 2006)

Identification strategy III

① Different timing assumptions:

- Permutations of other variables (i.e. $Y = [CCB \dots ER]$)
- Exchange rate most exogenous mostly exogenous (i.e. $Y = [ER \ CCB \dots]$ or $Y = [CCB \ ER \dots]$)

Identification strategy IV

- ③ Instrumental variables (IV) local projections
 - Instrument with (either or both) lags of the synthetic *Treasury* rate and domestic monetary policy shock
 - Monetary policy shocks **relevant** (alter liquidity in the economy) and satisfy **exclusion restriction** since unanticipated by construction
 - Synthetic treasury rates **relevant** ($\rho(CCB, r_{synth}) = -0.39, p = 0.00$), but lagged values do not systematically alter contemporaneous CCB

Data sources

- Quarterly macro-economic data from 2000Q1 to 2020Q4 (e.g., GDP, CPI, M2, ER, etc.) for 50 countries: Bureau Van Dijk's *EIU Country Data*
- 3-month LIBOR cross-currency basis (CCB): calculated with relevant data from *Bloomberg*
- Other data for robustness: Various sources
 - e.g. unanticipated domestic monetary shocks (Choi, Willems & Yoo 2024, *JME*)
 - e.g. dependency ratio, financial development, and trade openness from World Bank's *World Development Indicators*
 - e.g. political risk data from *International Country Risk Guide*

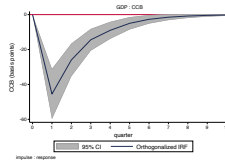
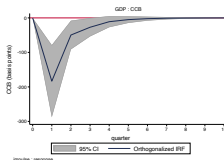
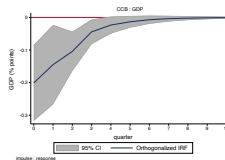
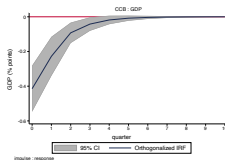
Checks on the baseline specification

- Panel unit root tests
 - Levels, logs of levels, log first differences
 - CCB (stationary in levels), GDP, CPI, M2 and ER (stationary in first differences)
- Panel cointegration tests
 - Group mean and within-panel stats indicate no cointegration
- Spatial dependency tests
 - Little evidence of cross-sectional dependence (CCB), but possible concerns with other variables
- PVAR as baseline, dynamic heterogeneous panels (Dynamic FE/MG, Driscoll-Kraay/dynamic CCE) as robustness
- Information criteria mostly suggest first-order PVAR

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Dollar liquidity shocks *reduce* output growth

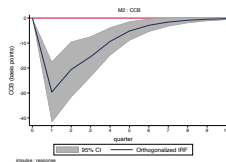
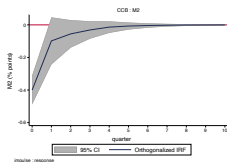


Parsimonious

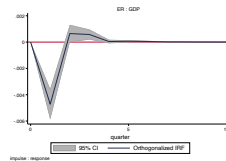
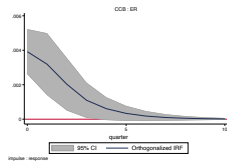
Comprehensive

- One SD $\uparrow$ CCB $\Rightarrow$ $\downarrow$ GDP by 0.5–0.8% points/year, with half in Q1
- Reverse effect also occurs, after a quarter lag

Dollar liquidity shocks on money and the exchange rate

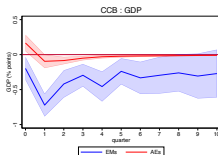


- CCB innovations $\Rightarrow$ $\downarrow$ domestic money supply

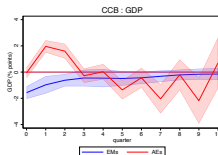


- CCB innovations $\Rightarrow$ exchange rate depreciation

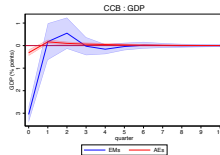
Dollar crunches lead to contractions in AEs during crises



Pre-crisis



Crisis



Crisis and post-crisis

- Dollar liquidity shocks decrease growth in normal times
- Effect reverses for AEs during crisis periods

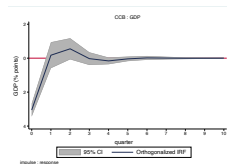
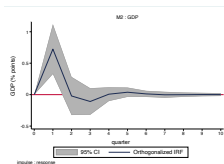
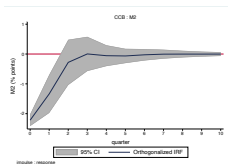
Variance decomposition of liquidity contributions to growth

<i>Response of</i>	Parsimonious		<i>Response to</i> Comprehensive				
	CCB_t	GDP_t	CCB_t	GDP_t	CPI_t	$M2_t$	ER_t
Full period (2000Q1-2020Q4)							
GDP_{t+10}	0.0164	0.9836	0.0049	0.9397	0.0214	0.0207	0.0133
CCB_{t+10}	0.7400	0.2600	0.8499	0.0671	0.0330	0.0291	0.0209
CPI_{t+10}			0.0019	0.0248	0.8421	0.1159	0.0153
$M2_{t+10}$			0.0253	0.1018	0.0077	0.8634	0.0018
ER_{t+10}			0.0152	0.0183	0.0032	0.0063	0.9570
Pre-crisis (2000Q1-2007Q3)							
GDP_{t+10}	0.0139	0.9861	0.0866	0.7114	0.1467	0.0492	0.0061
CCB_{t+10}	0.9808	0.0192	0.4933	0.3688	0.1157	0.0194	0.0028
CPI_{t+10}			0.0310	0.1178	0.8425	0.0061	0.0026
$M2_{t+10}$			0.1819	0.4145	0.1620	0.2192	0.0224
ER_{t+10}			0.2073	0.3757	0.0829	0.1156	0.2185
Crisis and post-crisis (2007Q4-2020Q4)							
GDP_{t+10}	0.0114	0.9886	0.1089	0.7934	0.0889	0.0029	0.0059
CCB_{t+10}	0.9069	0.0931	0.5814	0.2660	0.0722	0.0781	0.0023
CPI_{t+10}			0.2424	0.2792	0.4655	0.0109	0.0020
$M2_{t+10}$			0.2388	0.2518	0.0342	0.4548	0.0204
ER_{t+10}			0.0052	0.0226	0.1289	0.0124	0.9469

Inspecting the channels of transmission

- Focus on crisis and post-crisis (2007Q4–2020Q4) period
- Use comprehensive model
- Separate into AEs versus EMs

Dollar squeezes hit domestic liquidity in EMs

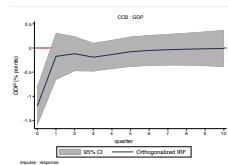
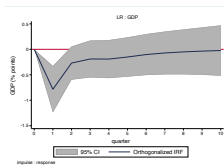
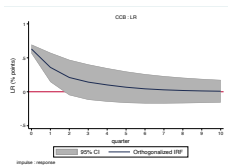


- CCB innovations $\Rightarrow$ $\downarrow$ domestic liquidity
- $\downarrow$ domestic liquidity $\Rightarrow$ $\downarrow$ growth
- Enhanced dollar access leads to crowding out, which shrinks the money supply and domestic liquidity

Unpacking the domestic liquidity channel

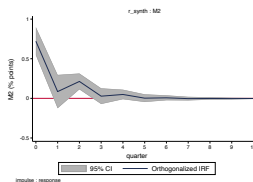
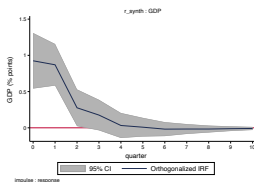
- Post-crisis period coincided with extraordinary dollar liquidity worldwide due to QE
 - Eased global liquidity even for non-U.S. entities (Bauer & Neely 2014; Lim & Mohapatra 2016)
 - But money stock increases may be artificial and not materially improve liquidity access
 - $M2 \Rightarrow \text{Lending rate}$
- If liquidity is what matters, need to rule out interest rate driving the result
 - $CCB \Rightarrow r_{synth}$
- Do output drops affect consumption or investment?
 - $\Delta GDP \Rightarrow \Delta C, \Delta I$

Domestic liquidity channel shows up in rates, too



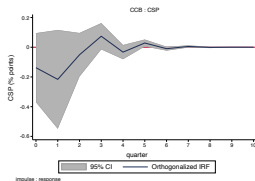
- CCB innovations $\Rightarrow$ $\uparrow$ lending rate
- $\uparrow$ interest rates $\Rightarrow$ $\downarrow$ growth
- CCB innovations $\Rightarrow$ $\downarrow$ growth

Synthetic dollar rate drives CCB variation

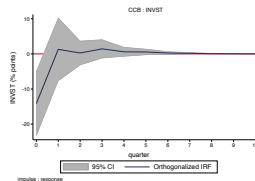


- Synthetic dollar rate innovations $\Rightarrow \uparrow$ growth
 - Changing attractiveness of local-currency assets (rather than interest rate differentials) drives dollar liquidity-output growth relationship
- Synthetic dollar rate innovations $\Rightarrow \uparrow$ domestic liquidity
 - Increased dollar scarcity crowds out available domestic liquidity

Output drops due to consumption and investment declines



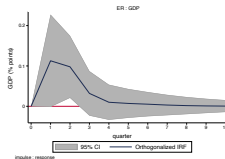
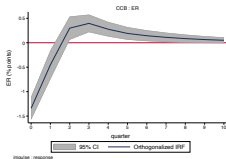
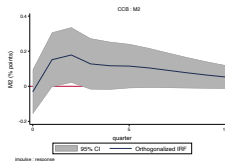
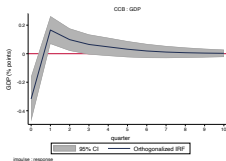
Private consumption



Investment capital

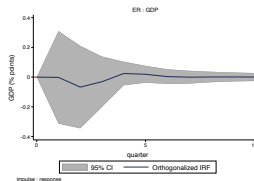
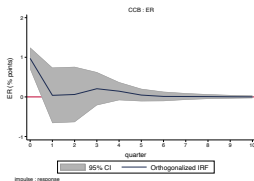
- CCB innovations $\Rightarrow$ $\downarrow$ consumption
 - Positive on impact but negative cumulative effect
- CCB innovations $\Rightarrow$ $\downarrow$ investment
 - Unambiguous decline in investment

Dollar squeezes alter the exchange rate in AEs...



- CCB innovations $\Rightarrow$ $\uparrow$ domestic liquidity, as easier financing allow mature financial markets to offer more domestic non-dollar assets
- But CCB innovations $\Rightarrow$ exchange rate appreciation $\Rightarrow$ growth slowdown

... but the exchange rate doesn't do much in EMs

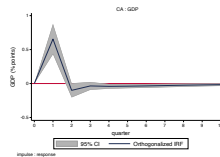
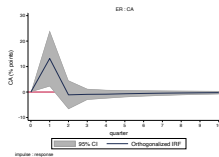
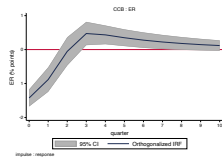


- Innovations to dollar liquidity $\Rightarrow$ Exchange rate depreciation
- But exchange rate does not appear to matter for output in EMs

Unpacking the exchange rate channel

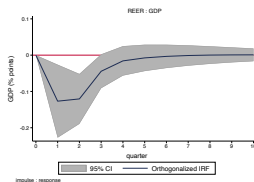
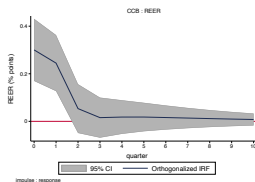
- Exchange rate appreciation deteriorates current account
 - Assumption: slow convergence to PPP and high export/import demand elasticity (Marshall-Lerner)
 - $CPI \Rightarrow CA$
- Response of trade balance to Marshall-Lerner works on the *real* exchange rate
 - $ER \Rightarrow REER$

The exchange rate affects trade, but with lags



- CCB innovations $\Rightarrow$ nominal appreciation
- Stronger (weaker) currency $\Rightarrow$ current account deterioration (improvement)
 - with typical J-curve lags
- $\downarrow (\uparrow) CA \Rightarrow \downarrow (\uparrow) GDP$

Exchange rate effect relies on real exchange rate appreciation



- CCB innovations $\Rightarrow$ RXR appreciation
- RXR appreciation (depreciation) $\Rightarrow$ contraction (expansion)

Robustness

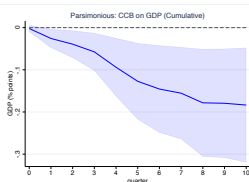
- 1 Add exogenous (structural) controls that may influence output growth [▶▶ Results](#)
 - Democracy, trade openness, dependency ratio, political risk, default risk, financial development
- 2 Replace macro variables in comprehensive specification with other indicators [▶▶ Results](#)
 - CPI $\Rightarrow$ PPI
 - M2 $\Rightarrow$ lending rate
 - Nominal FX $\Rightarrow$ REER
- 3 Potential cointegration & cross-sectional heterogeneity [▶▶ Results](#)
- 4 Change ordering of endogenous variables [▶▶ Results](#)
- 5 Local projections to produce instrumented IRFs of CCB on GDP

[▶▶ Results](#)

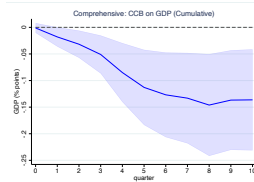
Robustness

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Local projections with instrumented IRFs [▶▶ back](#)



Parsimonious



Comprehensive

- CCB instrumented with by up to 4Q lags of synthetic treasury rate and monetary policy shocks
- More volatile, but negative effect of CCB on growth remains, fading after a year

A set of small navigation icons typically found in Beamer presentations, including symbols for back, forward, search, and other slide controls.

Main takeaways

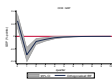
- Dollar squeeze leads to growth contractions
- Squeeze operates differentially in different times and places
 - In AEs during crises, international illiquidity due to limited dollar access reduces growth
 - In EMs during normal times, dollar access reduces domestic liquidity and lowers growth
 - In AEs during normal times, dollar access induces exchange rate appreciation and lowers growth

Policy implications

- Dollar swap arrangements can shield economies from output contractions during crises, but only for AEs
- Lowering cost of dollar financing during financial stress may be counterproductive for EMs
 - Standing FX swap arrangements may promote capital flight if it encourages substitution into safe dollar assets
 - Lower rates or capital controls during crises may support domestic liquidity provision
- Promoting financial deepening in EMs may yield benefits beyond growth, but offer insulation from dollar squeezes

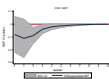
Robustness: Exogenous controls

▶ back



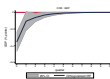
(a)

Democracy,
parsimonious



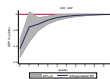
(b)

Democracy,
comprehensive



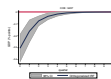
(c)

Trade openness,
parsimonious



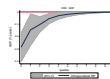
(d)

Trade openness,
comprehensive



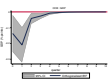
(e)

Dependency,
parsimonious



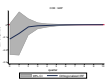
(f)

Dependency,
comprehensive



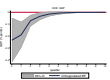
(g)

Political risk,
parsimonious



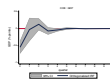
(h)

Political risk,
comprehensive



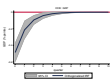
(i)

Default risk,
parsimonious



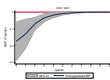
(j)

Default risk,
comprehensive



(k)

Financial development,
parsimonious

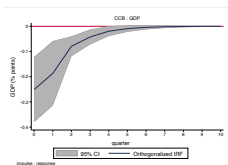


(l)

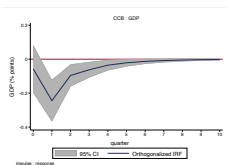
Financial development,
comprehensive

Robustness: Alternative macro variables

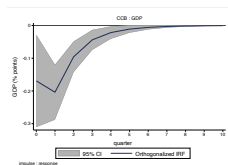
▶ back



(m) CPI $\Rightarrow$ PPI, M2 $\Rightarrow$ lending rate



(n) CPI $\Rightarrow$ PPI, M2 $\Rightarrow$ lending rate

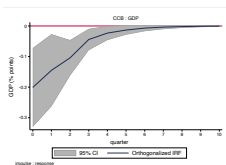


(o) CPI $\Rightarrow$ PPI, M2 $\Rightarrow$ lending rate, nominal FX $\Rightarrow$ REER

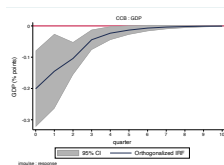
Figure 1: Orthogonalized impulse response functions for dollar liquidity on output with alternative variables, full sample (2000Q1–2020Q4).

Robustness: Different ordering

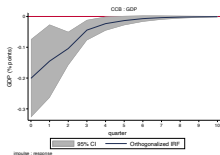
▶▶ back



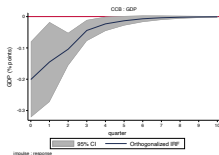
(a) Ordering of CCB CPI M2 GDP ER



(b) Ordering of CCB M2 GDP CPI ER



(c) Ordering of CCB CPI GDP M2 ER



(d) Ordering of CCB GDP M2 CPI ER