Gauging procyclicality and financial vulnerability in Asia through the BIS banking and financial statistics

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* The views expressed here are the authors’, not necessarily those of the Bank for International Settlements.
Retrospective

- On the 10th anniversary of the GFC and the 21st anniversary of the Asian financial crisis,
  - Take perspective of contemporary observer
  - Showcase the BIS international banking statistics

- Focus on cross-border dimension, because:
  - That’s where the measurement takes place
  - Procyclical components of bank balance sheets often show up most clearly
Spain: Banking sector credit composition and funding

Total credit by main activity and type of spending

Dec 1998: 414 billion
Dec 2008: 1.87 trillion

Total credit by source of funding

Source: Bank of Spain.
Korea: Non-core liabilities and capital flow

Non-core liabilities of banking sector as a proportion of M2

Gross capital flows

Three modes of leveraging up

Mode 1: Increased leverage due to equity buyback

Mode 2: Increased leverage due to fall in asset value

Mode 3: Increase borrowing to fund asset growth

Figure 15. **Three modes of leveraging up:** Mode 1 is through an equity buyback through a debt issue. Mode 2 is through a dividend financed by asset sale. Mode 3 is through increased borrowing to fund new assets. In each case the grey area indicates balance sheet component that is held fixed.

For global banks, mode 3 applies.
Example of global bank

![Graph showing the relationship between annual change in equity and debt and annual asset change (billion euros). The graph includes a linear regression line with the equation y = 0.996x - 3.15 and an R² value of 0.9985. The data points are differentiated by color: red for debt change and blue for equity change.](image-url)
Global banking and EMEs
Broad trends in international bank lending, by lender nationality

Sources: IMF, *World Economic Outlook*; BIS locational banking statistics and consolidated banking statistics on IC basis.
Broad trends in international bank lending, by borrower location

Sources: IMF, World Economic Outlook; BIS locational banking statistics.
Cross-border banking developments in the run-up to 1997
Growth of cross-border claims on AFC-5 countries

Break- and exchange rate adjusted quarterly growth, 12Q moving average

Source: BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 1991

Source: IMF, *World Economic Outlook*; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 1992

Source: IMF, *World Economic Outlook*; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 1993

Source: IMF, *World Economic Outlook*; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 1994

Source: IMF, World Economic Outlook; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 1995

Source: IMF, *World Economic Outlook*; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 1996

Source: IMF, *World Economic Outlook*; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 1997

Source: IMF, World Economic Outlook; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 1998

Source: IMF, *World Economic Outlook*; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 1999

Source: IMF, *World Economic Outlook*; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 2006

Source: IMF, *World Economic Outlook*; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 2007

Source: IMF, *World Economic Outlook*; national data; BIS locational banking statistics.
Cross-border bank claims as share of GDP
Stock and 12-quarter growth rates, end-June 2008

Source: IMF, World Economic Outlook; national data; BIS locational banking statistics.
Cross-border claims by counterparty sector

Source: BIS locational banking statistics.
Cross-border claims by counterparty sector

Source: BIS locational banking statistics.
Cross-border claims by counterparty sector

Source: BIS locational banking statistics.
International claims by counterparty sector

Source: BIS consolidated banking statistics on IC basis.
International claims by counterparty sector

Source: BIS consolidated banking statistics on IC basis.
International claims by counterparty sector

Source: BIS consolidated banking statistics on IC basis.
International claims by maturity

Source: BIS consolidated banking statistics on IC basis.
International claims by maturity

Source: BIS consolidated banking statistics on IC basis.
International claims by maturity

Source: BIS consolidated banking statistics on IC basis.
Short-term international bank claims as a share of GDP
Stock and 12-quarter growth rates, end-June 1991

Source: IMF, World Economic Outlook; national data; BIS consolidated banking statistics.
Short-term international bank claims as a share of GDP
Stock and 12-quarter growth rates, end-June 1994

Source: IMF, *World Economic Outlook*; national data; BIS consolidated banking statistics.
Short-term international bank claims as a share of GDP
Stock and 12-quarter growth rates, end-June 1997

Source: IMF, *World Economic Outlook*; national data; BIS consolidated banking statistics.
International claims on Emerging Asia, by lending banking system

Source: BIS consolidated banking statistics on IC basis.
International claims on Emerging Asia, by lending banking system

Source: BIS consolidated banking statistics on IC basis.
International claims on Emerging Asia, by lending banking system

Source: BIS consolidated banking statistics on IC basis.
International claims, by borrowing country group

Sources: BIS locational and consolidated banking statistics on IC basis.
International claims, by borrowing country group

Sources: BIS locational and consolidated banking statistics on IC basis.
Cross-border claims, by currency

Source: BIS locational banking statistics.
Cross-border claims, by currency

Source: BIS locational banking statistics.
Cross-border claims, by currency

Source: BIS locational banking statistics.
Global dimension
US dollar-denominated cross-border credit

By residence

By nationality

Source: BIS locational banking statistics.
Euro-denominated cross-border credit

By residence

By nationality

Source: BIS locational banking statistics.
US dollar-denominated cross-border bank claims
In USD billions

Source: BIS locational banking statistics by residence.
US dollar-denominated cross-border bank claims
In USD billions

Source: BIS locational banking statistics by residence.
Exchange rates and banking flows
Growth of USD-denominated cross-border bank lending and the broad USD index

Source: BIS locational banking statistics and nominal effective exchange rate indices.
Why broad dollar index?

- Consider global lender with diversified portfolio of dollar credits to borrowers around the world
- Some borrowers face currency mismatch or otherwise benefit from weaker dollar (e.g., oil firm)
- Dollar depreciation against whole basket implies:
  - Reduction in credit risk for individual borrowers (fall in ε)
  - Reduced tail risk for diversified loan portfolio
  - Reduced Value-at-Risk
  - Increased lending capacity given economic capital
- Broad dollar is proxy for dollar-debt weighted index of the dollar exchange rate.
Panel regression coefficients for bank capital flows

Impact of bilateral dollar appreciation

Impact of broad dollar appreciation
Broad dollar index, bond fund flows and spreads

### Table 1: Broad dollar index, bond fund flows and spreads

<table>
<thead>
<tr>
<th>Dependent variable: bond purchase/TNA</th>
<th>27 int'l currency gov't bond funds investing in 20 EMEs</th>
<th>30 local currency gov't bond funds investing in 20 EMEs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td>(5)</td>
<td>(5)</td>
</tr>
<tr>
<td>Δlog(BER) t-1</td>
<td>0.033***</td>
<td>0.014***</td>
</tr>
<tr>
<td>(8.59)</td>
<td>(3.62)</td>
<td>(8.63)</td>
</tr>
<tr>
<td>Δlog(dollar index) t-1</td>
<td>0.085***</td>
<td>0.066***</td>
</tr>
<tr>
<td>(7.72)</td>
<td>(5.38)</td>
<td>(7.88)</td>
</tr>
<tr>
<td>Ortho. Δlog(BER) t-1</td>
<td>0.006</td>
<td>0.006</td>
</tr>
<tr>
<td>(1.25)</td>
<td>(1.25)</td>
<td>(1.25)</td>
</tr>
<tr>
<td>Ortho. Δlog(dollar index) t-1</td>
<td>0.067***</td>
<td>0.028***</td>
</tr>
<tr>
<td>(4.96)</td>
<td>(2.76)</td>
<td>(2.76)</td>
</tr>
<tr>
<td>No of obs</td>
<td>14303</td>
<td>17931</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.023</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>0.027</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>0.026</td>
<td>0.022</td>
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<tr>
<td></td>
<td>0.026</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>0.026</td>
<td>0.022</td>
</tr>
</tbody>
</table>

Orthogonalised Δlog(BER) t-1: Residual of Δlog(BER) on Δlog(broad dollar index) t-1
Orthogonalised Δlog(dollar index) t-1: Residual of Δlog(dollar index) on Δlog(BER) t-1
Controls: the lagged value of log(VIX), Δlog(US CPI), Δlog(US IP), Δ(US money market rate), Δlog(EME CPI), Δlog(EME IP) and Δ(EME money market rate)

### Table 2: 5-y foreign currency spread for 13 EMEs

<table>
<thead>
<tr>
<th>Dep. variable: 5-y foreign currency spread for 13 EMEs</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δlog(BER) t-1</td>
<td>-0.004*</td>
<td>-0.003</td>
<td>-0.005**</td>
<td>-0.008***</td>
<td>-0.003</td>
</tr>
<tr>
<td>(1.84)</td>
<td>(1.18)</td>
<td>(2.21)</td>
<td>(3.32)</td>
<td>(0.87)</td>
<td>(1.75)</td>
</tr>
<tr>
<td>Δlog(dollar index) t-1</td>
<td>-0.016***</td>
<td>-0.013***</td>
<td>-0.016***</td>
<td>-0.018***</td>
<td>-0.014***</td>
</tr>
<tr>
<td>(5.66)</td>
<td>(4.46)</td>
<td>(5.82)</td>
<td>(4.71)</td>
<td>(2.43)</td>
<td>(4.66)</td>
</tr>
<tr>
<td>Ortho. Δlog(BER) t-1</td>
<td>-0.004</td>
<td>-0.014***</td>
<td>-0.004</td>
<td>-0.004</td>
<td>-0.013**</td>
</tr>
<tr>
<td>(1.27)</td>
<td>(5.04)</td>
<td>(1.27)</td>
<td>(0.76)</td>
<td>(2.16)</td>
<td>(0.76)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.008</td>
<td>0.0010</td>
<td>0.011</td>
<td>0.011</td>
<td>0.085</td>
</tr>
<tr>
<td>Adj. R-squared</td>
<td>0.007</td>
<td>0.010</td>
<td>0.010</td>
<td>0.010</td>
<td>0.084</td>
</tr>
</tbody>
</table>

Orthogonalised Δlog(BER) t-1: Residual of Δlog(BER) on Δlog(broad dollar index) t-1
Orthogonalised Δlog(dollar index) t-1: Residual of Δlog(dollar index) on Δlog(BER) t-1
Controls: the lagged value of log(VIX), Δ(US money market rate) and Δ(EME money market rate).
An increase in Δlog(BER) means the appreciation of an EME currency against the US dollar.
An increase in Δlog(dollar index) means the appreciation of a basket of currencies against the US dollar.
From banks to the bond market
From banks to bond markets

US dollar denominated credit to non-banks outside the United States\(^1\)

Amounts outstanding, in trillions of US dollars

<table>
<thead>
<tr>
<th>World</th>
<th>EMEs</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amounts outstanding, USD trn</td>
</tr>
<tr>
<td></td>
<td>%</td>
</tr>
<tr>
<td>00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17</td>
<td>00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17</td>
</tr>
<tr>
<td>60</td>
<td>10.0</td>
</tr>
<tr>
<td>57</td>
<td>8.0</td>
</tr>
<tr>
<td>54</td>
<td>6.0</td>
</tr>
<tr>
<td>51</td>
<td>4.0</td>
</tr>
<tr>
<td>48</td>
<td>2.0</td>
</tr>
<tr>
<td>45</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Lhs: Bank loan share  Rhs: Bonds issued by non-banks  Bank loans to non-banks\(^2\)

Further information on the BIS global liquidity indicators is available at [www.bis.org/statistics/about_gli_stats.htm](http://www.bis.org/statistics/about_gli_stats.htm).

\(^1\) Non-banks comprise non-bank financial entities, non-financial corporations, governments, households and international organisations.  
\(^2\) Loans by LBS-reporting banks to non-bank borrowers, including non-bank financial entities, comprise cross-border plus local loans.

Source: BIS global liquidity indicators.
Amounts outstanding of international debt securities\(^1\)

Emerging market non-bank corporations\(^2\), at quarter end, in trillions of US dollars

Nationality basis\(^3\)

Onshore vs. offshore

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\(^1\) International debt securities are issued outside the local market of the country where the borrower resides.  
\(^2\) Non-bank financial institutions, government and non-financial institutions.  
\(^3\) Nationality basis refers to firms with the headquarters in the EME countries.  
\(^4\) Any other currency except those listed.  
\(^5\) Amounts outstanding of the international debt securities issued by the EME nationals residing in the countries of their headquarters.  
\(^6\) Amounts outstanding of the international debt securities issued by the EME nationals residing outside the countries of their headquarters.

Sources: Dealogic; Euroclear; Thomson Reuters; Trax (Xtrakter Ltd.); BIS calculations.
US dollar-denominated credit to EME non-banks

Source: BIS global liquidity indicators.
USD-denominated debt securities by EME non-banks

Sources: Dealogic; Euroclear; Thomson Reuters; Trax (Xtrakter Ltd.); BIS calculations.
USD-denominated debt securities by EME non-banks

Sources: Dealogic; Euroclear; Thomson Reuters; Trax (Xtrakter Ltd.); BIS calculations.
USD-denominated debt securities by EME non-banks

Sources: Dealogic; Euroclear; Thomson Reuters; Trax (Xtrakter Ltd.); BIS calculations.
Annual gross issuance and maturity of USD IDS
EME non-bank corporations

Sources: Dealogic; Euroclear; Thomson Reuters; Trax (Xtrakter Ltd.); BIS calculations.
Mitigating factors

- Bonds issued by emerging market corporates have long maturities
- EMEs hold substantial foreign exchange reserves
- EME corporate issuers are often global firms with cash flow in foreign currency
Qualifications

- Withdrawal of corporate deposits and MMF holdings have repercussions on domestic banks (Bruno and Shin (RFS 2017))
- Longer maturity is double-edged; longer duration means higher market risk. Portfolio managers with limited appetite for losses more likely to cut and run
- Central banks cannot easily provide liquidity to non-banks
  - Corporate sector may cut investment and curtail operations
  - Sectoral distribution of FX holdings matter

Even central bank with large foreign exchange reserves may find it difficult to head off a slowing real economy when global financial conditions tighten