Global liquidity and procyclicality*

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* The views expressed here are mine, not necessarily those of the Bank for International Settlements.
Two questions

- Why are global financial conditions so attuned to the strength of the dollar?

- Why is the real economy so sensitive to global financial conditions?
Tensions beneath outward tranquility

- Failure of covered interest parity is window on strains in global financial system

- Covered interest parity
  - “Interest rates implicit in foreign exchange markets are consistent with market interest rates.”
  - Are they?
US dollar interest rate implied by FX swaps

Three-month US dollar interest rate implied by FX swaps\(^1\)

In per cent

\(^1\) Implied US dollar interest rate in an FX swap involving the indicated currency. Three-month US dollar Libor rate is plotted for comparison.

Sources: Bloomberg; Datastream; BIS calculations.
Cross-currency basis against US dollar

FX swap spread, three-month\textsuperscript{1}

Basis points

\textsuperscript{1} Spread between three-month US dollar Libor and three-month dollar rate implied US dollar interest rate in an FX swap involving the indicated currency.

Sources: Bloomberg; Datastream; BIS calculations.
US dollar exchange rate and the cross-currency basis

2 Jan 2007 = 100

Basis points

1 Simple average of bilateral exchange rate of the dollar against CAD, EUR, GBP, SEK, CHF and JPY. Higher values indicate a stronger US dollar.
2 Simple average of the five-year cross-currency basis swaps against CAD, EUR, GBP, SEK, CHF and JPY vis-à-vis the US dollar.

Sources: Avdjiev, Du, Koch and Shin (2016); Bloomberg; BIS calculations.
Reflected symmetry between change in EUR/USD and change in cross-currency basis\(^1\)

Change in EUR/USD exchange rate  Basis points

\[ y = -0.36 - 177x \]
\[ R^2 = 0.49, \text{ P-value} = 0.000 \]

Lhs:  
- EUR/USD spot\(^2\)  
- Five-year EUR/USD basis swap

\(^1\) Changes in quarterly averages.  \(^2\) An increase represents an appreciation of the US dollar against the euro.

Sources: Avdjiev, Du, Koch and Shin (2016); Bloomberg; BIS calculations.
Reflected symmetry between change in EUR/USD and change in cross-currency basis

Change in exchange rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Basis points</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>-0.15</td>
</tr>
<tr>
<td>2008</td>
<td>-0.10</td>
</tr>
<tr>
<td>2009</td>
<td>0.00</td>
</tr>
<tr>
<td>2010</td>
<td>0.05</td>
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<tr>
<td>2011</td>
<td>0.00</td>
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<td>-0.05</td>
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<td>2014</td>
<td>0.05</td>
</tr>
<tr>
<td>2015</td>
<td>0.00</td>
</tr>
<tr>
<td>2016</td>
<td>-0.05</td>
</tr>
</tbody>
</table>

Lhs: EUR/USD spot
Rhs: Five-year EUR/USD basis swap

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1 Changes in quarterly averages.  2 An increase represents an appreciation of the US dollar against the euro.
Sources: Avdjiev, Du, Koch and Shin (2016); Bloomberg; BIS calculations.
Strengthening of the dollar against euro goes hand in hand with more severe market anomaly$^1$

$^1$ Changes in quarterly averages. $^2$ An increase represents an appreciation of the US dollar against the euro.

Sources: Avdjiev, Du, Koch and Shin (2016); Bloomberg; BIS calculations.
Global role of the dollar

- Step 1: invoicing currency for trade

- Step 2: funding currency for investment
  - Oil and gas sector, for example
  - Currency denomination of diversified global portfolio

- Step 3: dollar liabilities of global banks who provide hedging for investors
Cross-border US-dollar denominated assets and liabilities
In USD trillion

By residence

By nationality

1 The break in series between Q1 2012 and Q2 2012 is due to the Q2 2012 introduction of a more comprehensive
reporting of cross-border positions (for more details, see http://www.bis.org/publ/qtrpdf/r_qt1212v.htm).

Sources: BIS locational banking statistics, Tables A5 (by residence) and A7 (by nationality).
Cross-border US-dollar denominated assets and liabilities

In USD trillion

By residence

Assets (+) and liabilities (-) of:
- United States
- Euro area
- United Kingdom
- Switzerland
- Japan
- Other

Sources: BIS locational banking statistics, Tables A5 (by residence) and A7 (by nationality).
Cross-border US-dollar denominated assets and liabilities
In USD trillion

By nationality

Sources: BIS locational banking statistics, Tables A5 (by residence) and A7 (by nationality).
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

2003

Source: BIS locational banking statistics by residence.
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

2005

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

2007

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

2010

Source: BIS locational banking statistics by residence.
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

2012

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

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US dollar-denominated cross-border bank claims
In USD billions

Source: BIS locational banking statistics by residence.
OTC foreign exchange derivatives
Notional principal\(^1\)

By instrument

![Chart showing notional principal by instrument from 1999 to 2015.](chart1)

By sector of counterparty

![Chart showing notional principal by sector of counterparty from 1999 to 2015.](chart2)

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\(^1\) At half-year end (end-June and end-December). Amounts denominated in currencies other than the US dollar are converted to US dollars at the exchange rate prevailing on the reference date.

Source: BIS OTC derivatives statistics.
Risk-taking channel of exchange rates

“When an international currency depreciates, foreigners borrow more in that currency”
US dollar cross-border bank lending depends on the dollar exchange rate

Cross-border bank lending to non-residents vs NEER\(^1\)

20-quarter rolling window regressions\(^2\)

1 Plot of quarterly growth rate of cross-border bank lending in US dollars on quarterly changes in the US dollar nominal effective exchange rate (NEER) for Q1 2003–Q3 2015. Lending refers to loans by BIS reporting banks to all (bank and non-bank) borrowers outside the US. The line is a fitted regression line. Positive changes indicate an appreciation of the dollar. 2 Rolling regression coefficient for 20-quarters window.

Sources: BIS locational banking statistics; BIS effective exchange rate indices; BIS calculations.
Euro-denominated cross-border bank lending

Cross-border bank lending to non-residents vs NEER

Plot of quarterly growth rate of cross-border bank lending in euros on quarterly changes in the euro NEER for Q1 2003–Q3 2015. Lending refers to loans by BIS reporting banks to all (bank and non-bank) borrowers outside the euro area. Positive changes indicate an appreciation of the euro. 2 Rolling regression coefficient for 20-quarters window.

Sources: BIS locational banking statistics; BIS effective exchange rate indices; BIS calculations.
Risk-taking channel in EMEs

- Many have dollar cash flows
  - Exporters
  - Commodity producers

- Some do not
  - Property developers
  - Utilities

- Even with dollar cash flows, strong dollar present strains
  - Commodity prices negatively correlated with the dollar
  - Fiscal tightening
  - Spillover into local currency sovereign yields
Illustrating the risk-taking channel for EMEs
Bilateral USD exchange rate and five-year sovereign CDS, change from end-2012

End-September 2013

BR = Brazil; ID = Indonesia; MX = Mexico; MY = Malaysia; RU = Russia; TR = Turkey; ZA = South Africa.
The size of the bubbles indicates the size of US dollar-denominated credit to non-banks in the respective economies in Q4 2015.

Sources: Avdjiev et al (2015); Datastream; Markit; national data; BIS; BIS calculations.
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Breaking free of the triple coincidence
Unit of analysis is national income (GDP) area
Breaking free of the triple coincidence
GDP boundary defines decision making unit
Breaking free of the triple coincidence
Use of currency largely within GDP boundary

Economic territory 1

Central bank 1

Residents in 1

Economic territory 2

Central bank 2

Residents in 2

Exchange rate
Balance sheets do not map neatly to GDP boundary

Example 1: EME firm borrowing dollars offshore

[Diagram showing a bank, a non-financial corporation, and a border with local currency and US dollars.]
Borrowers in A

Banks in A

Global Banks

Wholesale Funding Market

Borrowers in B

Banks in B

Borrowers in C

Banks in C
Balance sheets do not map neatly to GDP boundary
Example 2: European bank lending dollars in Asia

- Asset side of the global bank could be in a regional financial centre (Hong Kong or Singapore, say)
- Liabilities side of the global bank could in the United States

- What of the European headquarters? Where does it fit in the picture?
Challenges for models of international finance

- General equilibrium models are about GDP components
  - Consumption, investment, ...
- But balance sheets do not always follow the GDP boundary
  - Can be messy to have two overlapping partitions of all decision makers in the world

- Some progress can be made if concern is with *global variables*
  - Global factors determining economic conditions
  - “Global liquidity”
  - Risk-taking channel