The dollar and real economic activity: an evolving relationship

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*The views expressed here are the authors’ and not necessarily those of the Bank for International Settlements
Post-crisis developments in the banking sector
Total assets and book equity of 17 US banks

Total assets and book equity of 17 US banks: in log scale

The beta coefficient shows the trend growth rate in natural logarithm. For instance, a 0.15 value corresponds to around 15% growth rate per annum. Banks: Bank of America Corporation; Bank of New York Mellon Corporation; Capital One Financial Corporation; Citigroup Inc.; Citizens Financial Group Inc.; Fifth Third Bancorp; JPMorgan Chase & Co.; Morgan Stanley; Goldman Sachs Group Inc.; Northern Trust Corporation; PNC Financial Services Group Inc.; Regions Financial Corporation; State Street Corporation; SunTrust Banks Inc.; Truist Financial Corporation; U.S. Bancorp and Wells Fargo & Company.
Total assets and book equity of 26 euro area banks

Banks: AIB Group Plc; Banca Monte dei Paschi di Siena SpA; Banco Bilbao Vizcaya Argentaria SA; Banco Bpm SpA; Banco de Sabadell SA; Banco Popular Español SA; Banco Santander SA; Bank of Ireland Group; Bankia SA; BNP Paribas SA; CaixaBank SA; Commerzbank AG; Crédit Agricole SA; Crédit Industriel et Commercial SA; Deutsche Bank AG; Dexia SA; Erste Group Bank AG; ING Groep NV and Nordea Bank Abp.; Intesa Sanpaolo SpA; KBC Group NV; Natixis SA; Raiffeisen Bank International AG; Société Générale SA; UniCredit SpA; Unione di Banche Italiane SpA.
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Cumulative dividends since 2007 have eroded bank equity

<table>
<thead>
<tr>
<th>%</th>
<th>USD, bn</th>
</tr>
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<tbody>
<tr>
<td>80</td>
<td>1,200</td>
</tr>
<tr>
<td>70</td>
<td>800</td>
</tr>
<tr>
<td>60</td>
<td>400</td>
</tr>
<tr>
<td>50</td>
<td>74</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Region</th>
<th>Dividends 2007-2018 (DIV, rhs)</th>
<th>Retained earnings 2018 (REA, rhs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>1,066</td>
<td>265</td>
</tr>
<tr>
<td>EA</td>
<td>413</td>
<td>249</td>
</tr>
<tr>
<td>Other Europe</td>
<td>345</td>
<td>74</td>
</tr>
<tr>
<td>Japan</td>
<td>180</td>
<td>0</td>
</tr>
</tbody>
</table>

Yellow: Cumulative dividends from 2007 to 2018 (DIV, rhs)
Blue: Retained earnings in 2018 (REA, rhs)

Blue / (Blue + yellow) (lhs)
Low price-to-book ratios create incentive to pay out equity

Bank equity price-to-book ratio

United States  Euro area  Japan
Leverage of US securities broker-dealer sector

Leverage\(^1\)

Leverage and VIX index

1 Calculated as total assets divided by equity.

Sources: Federal Reserve, Flow of Funds; Bloomberg; BIS calculations.
Leverage of US securities broker-dealer sector and VIX index

\[ \text{Leverage} = \frac{\text{total assets}}{\text{equity}} \]

\[ \begin{align*}
\text{Ln(VIX)} & \quad \text{Assets/equity} \\
1 & \quad 10 \\
2 & \quad 20 \\
3 & \quad 30 \\
4 & \quad 40
\end{align*} \]

\[ \text{Ln(VIX) (lhs)} \quad \text{Leverage (rhs)}^{1} \]

\[ ^{1} \text{Calculated as total assets divided by equity.} \]
Sources: Federal Reserve, *Flow of Funds*; Bloomberg; BIS calculations.
Leverage no longer dances to the tune of the VIX index

1 Calculated as total assets divided by equity.
Sources: Federal Reserve, *Flow of Funds*; Bloomberg; BIS calculations.
CIP deviation
Avdjiev, Du, Koch and Shin (AER Insights 2019)

Mean cross-currency basis spread

1 Average five-year cross currency basis across Australian dollar, British pound, Canadian dollar, Danish krone, euro, Japanese yen, New Zealand dollar, Norwegian krone, Swedish krona and Swiss franc vis-à-vis the US dollar.
Sources: Bloomberg; BIS calculations.
US dollar broad index and the cross-currency basis
Avdjiev, Du, Koch and Shin (AER Insights 2019)

Jan 1997 = 100

US dollar index (lhs)¹  Mean cross-currency basis spread (rhs)²

¹ Federal Reserve Board trade-weighted nominal dollar index, broad, based on goods trade. Higher values indicate a stronger US dollar. ² Average five-year cross currency basis across Australian dollar, British pound, Canadian dollar, Danish krone, euro, Japanese yen, New Zealand dollar, Norwegian krone, Swedish krona and Swiss franc vis-à-vis the US dollar.

Sources: Federal Reserve Bank of St Louis, FRED; Bloomberg; BIS calculations.
US dollar credit to EMEs

1 Annual growth of US dollar-denominated credit or loans to non-banks in EMEs. 2 Annual growth of the Federal Reserve Board trade-weighted nominal dollar index, major EMEs.

Sources: Datastream; Dealogic; Euroclear; FRED; Thomson Reuters; Xtrakter Ltd; national data; BIS locational banking statistics; BIS effective exchange rate statistics; BIS calculations.
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Regression coefficients for bank capital flows

Impact of bilateral dollar appreciation

Impact of broad dollar appreciation

Estimated coefficients from panel regressions, US dollar.
Source: BIS calculations.
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
  - Reduced tail risk for diversified loan portfolio
  - Reduced Value-at-Risk
  - Increased lending capacity given economic capital
- Bruno and Shin (RES 2015)
Strong positive relationship between the average basis and
• the daily dollar beta (for 3M basis); correlation: 85% (LHP)
• the quarterly dollar beta (for 5Y basis); correlation: 97% (RHP)
Evolving relationship between the dollar and PMIs
Headline, new export orders and employment PMIs

Headline

Diffusion index

New export orders

Diffusion index

Employment

Sources: IMF, World Economic Outlook; Datastream; IHS Markit; BIS calculations.

1 A value of 50 indicates that the number of firms reporting improvement and deterioration are equal; a value above 50 indicates improvement. Aggregations based on GDP and PPP exchange rates.

2 For manufacturing, eight AEs and 17 EMEs; for services, five AEs and four EMEs.

3 Global.
PMIs and financial variables

- Purchasing managers closely follow financial markets to assess their financing conditions
  - Correlation between PMIs and high-frequency financial variables
  - Equity prices are good predictors of current-month PMIs (Erik et al 2019).
- Principal components from equities, corporate spreads and the USD
- Focus on $\beta$ from:

\[
PMI_t = \alpha + \beta \Delta pc_t + \varphi PMI_{t-1} + \varepsilon_t
\]  

(1)
Nowcasting exercise

Nowcasting PMIs with the first principal component of financial variables

<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th>Pre-GFC</th>
<th>Post-GFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>$PMI_{t-1}$</td>
<td>0.944*</td>
<td>0.944*</td>
<td>0.943*</td>
</tr>
<tr>
<td>$\Delta pc_t$</td>
<td>0.215*</td>
<td>0.200*</td>
<td>0.077*</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.936</td>
<td>0.910</td>
<td>0.912</td>
</tr>
<tr>
<td>RMSE</td>
<td>0.843*</td>
<td>0.906*</td>
<td>0.950*</td>
</tr>
</tbody>
</table>

* denotes results significance at the 1% level. RMSE is computed as the ratio over a plain AR(1) benchmark; significance is determined by Clark and McCracken (2012) test. Full sample: 2/1998 - 10/2019 (261 observations); pre-GFC: 2/1998 - 12/2007 (119 observations); post-GFC: 1/2010 - 10/2019 (118 observations).

Sources: Federal Reserve Bank of St Louis, FRED; Bloomberg; Datastream; ICE BofAML indices; IHS Markit; MSCI; authors’ calculations.
Loadings of the first principal component before and after the GFC

- Post-GFC: 1/2010–10/2019 (118 observations)
Main takeaways from nowcasting exercise

- Synthetic index based on PC outperforms the AR(1) benchmark across all sub-periods
- Post-crisis PC loading on the dollar higher, at the expense of VIX
- Sign on USD is negative, i.e. dollar appreciation acts as a drag on PMIs
A small-scale VAR

- VAR ordering
  - World equity returns
  - Changes in broad dollar index
  - Global manufacturing PMI (excluding the US)
  - Global trade growth

- Equity returns and dollar index changes measured over a window that predates the PMI poll
  - "Global equity price shocks" as news before the PMI release
  - "US dollar shocks" as additional news before PMI release
  - "PMI shock" as change in PMIs not already priced into financial variables
Responses of global trade growth to equity price and US dollar shocks


Equity: MSCI Emerging Markets Index, local currency; US dollar: Federal Reserve Board trade-weighted nominal dollar index, other important trading partners, based on goods trade; Trade: CPB World Trade Volume index, seasonally adjusted.
Response of global trade growth to US dollar shocks

Mean point estimate:
- Pre-GFC: 8/1998–12/2007 (113 observations)
- Post-GFC: 1/2010–6/2019 (114 observations)

+/- one standard error:

US dollar = Federal Reserve Board trade-weighted nominal dollar index, other important trading partners, based on goods trade; Trade = CPB World Trade Volume index, seasonally adjusted.
Perspectives on trade and finance linkage
Exports volume growth

AEs = AU, CA, EU, JP, NZ, NO, SE, CH, DK, GB, US. EMEs = AE, AR, BR, CL, CN, CO, HK, ID, IN, KR, MX, MY, PE, PH, PL, RU, SA, SG, TH, TR and ZA.
Sources: IMF, World Economic Outlook; BIS calculations.
Trade policy uncertainty\(^1\)

\(^1\) World Trade Uncertainty Index, constructed by counting the number of times uncertainty is mentioned within a proximity to a word related to trade in the Economist Intelligence Unit (EUI) country reports. The index is an equally weighted average scaled by total number of words in the EUI reports. Sources: Ahir H, N Bloom and D Furceri, “The world uncertainty index”; Brookings analysis of QCEW and EMSI data; BIS calculations.
Exports value growth\(^1\)

1 Simple average of growth rates for periods shown.
Sources: IMF, *World Economic Outlook*; BIS calculations.
Ratio of world goods exports to world GDP

1 Both exports and GDP are measured in constant prices.
Sources: IMF, *World Economic Outlook*; World Trade Organization; Datastream; national data; BIS calculations.
Global goods trade and the dollar

1 Federal Reserve Board trade-weighted nominal dollar index, broad group of major trading partners of the US ("broad"), based only on trade in goods. An increase indicates appreciation of the US dollar.  
2 Both exports and GDP are measured in constant prices. 
Sources: Federal Reserve Bank of St Louis, FRED; IMF, World Economic Outlook; World Trade Organization; Datastream; national data; BIS calculations.
Findings from empirical study using micro data

- Micro study of Mexican exporters
  - Loans matched with borrowing firm and lending bank
  - 4.6 million shipments by destination and 8 digit product category
- Findings
  - Exporters who borrow from banks more dependent on dollar wholesale funding exhibit greater contraction of export shipments when the broad dollar appreciates
  - Evidence for both working capital channel and dollar invoicing channel (Gopinath and Stein (2019), Gopinath et al. (2019))


https://www.bis.org/publ/work819.htm
Broad dollar index

- Broad dollar index has attributes of an indicator of dollar funding conditions
- Indicator of shadow price of bank balance sheet capacity
- Possible role as linchpin that ties together financial and real variables