Redrawing the Map of Global Capital Flows: The Role of Cross-Border Financing and Tax Havens

Antonio Coppola  Matteo Maggiori  Brent Neiman  Jesse Schreger
Harvard  Stanford  Chicago  Columbia

October 2020
How Petrobras Raises Capital From Developed Countries
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Petroleo Brasileiro SA
Brazil
Petrobras International Finance Co.
Cayman Islands
USA
EMU
$0
$0

Petrobras International Finance Co.
Cayman Islands

Petroleo Brasileiro SA
Brazil
How Petrobras Raises Capital From Developed Countries

Petrobras International Finance Co.
Cayman Islands

USA

$1bn

Petroleo Brasileiro SA
Brazil

$0

EMU

$1bn

$0
How Petrobras Raises Capital From Developed Countries

Petroleo Brasileiro SA
Brazil
Petrobras International Finance Co.
Cayman Islands
Petrobras Global Finance BV
Netherlands
Petrobras Global Trading BV
Netherlands
$1bn
$1bn
USA
EMU
$0
$0
How Petrobras Raises Capital From Developed Countries

Petrobras International Finance Co.
Cayman Islands

Petrobras Global Finance BV
Netherlands

Petrobras Global Trading BV
Netherlands

Petroleo Brasileiro SA
Brazil

$5bn

$1bn

$1bn

$6bn

USA

EMU
New Map of Global Capital Allocation

How big of a deal is this?
- Tax haven issuances account for $\approx 10\%$ of all corporate financing, and nearly $50\%$ of all cross-border issuances

Takeaways:
- Developed market exposure to large emerging markets bigger than in official data
- Corporate bonds (in foreign currency) more important
- Some “foreign” investment should be considered domestic
- Due to tax haven issuance, China’s official NFA is twice true value
Related Literature

- **Nationality-Based Statistics**: Avdjiev, McCauley, Shin (2016); Fuertes and Serena (2016); Bertaut, Bressler, Curcuru (2019); Damgaard et al. (2019)

- **Tax Havens, Firm Capital Structure**: Hines, Rice (1994); Desai, Foley, Hines (2005); Huizinga, Laeven, Nicodeme (2008); Zucman (2013, 15); Fuertes, Serena (2016); Hanlon, Maydew, Thornock (2015); Bilicka (2019); Guvenen, Mataloni, Rassier, Ruhl (2019)

- **Effect of FDI**: Holmes, McGrattan, Prescott (2015); Blanchard, Acalin (2016); Horn, Reinhart, Trebesch (2019)


- **Bilateral Capital Flows**: Portes, Rey (2005); Lane, Milesi-Ferretti (2018); Benetrix, Lane, Shambaugh (2015); Forbes (2010); Koijen, Yogo (2019)

- Many others, see paper...
Map 27m securities from issuer (Residency) to ultimate parent (Nationality)

Combine info from CGS, Morningstar, Factset, Dealogic, SDC, Capital IQ, and Orbis

<table>
<thead>
<tr>
<th>Issuer</th>
<th>Residency</th>
<th>Parent</th>
<th>Nationality</th>
<th>Value ($B)</th>
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<td>Gazprom PJSC</td>
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<td><strong>B. Equities</strong></td>
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<td>Alibaba Group Holding Ltd.</td>
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Reallocation Matrices

- Merge mapping with Morningstar data on mutual fund and ETF positions
- Key assumption: Within each year, asset class, and bilateral country pair, fund holdings are representative of the universe of portfolio investment

<table>
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<tr>
<th>Destination</th>
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Reallocation Matrix for US Corporate Bond Investments
Reallocation Matrices

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Reallocation Matrix for US Corporate Bond Investments
Restating TIC for the US: Corporate Bonds

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### Restating CPIS for the EMU: Total Bonds

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Developed Market Investment in BRICS Bonds

![Graph showing the share of external bond portfolio in BRICS for various countries.
- Investing Country: AUS, CAN, CHE, DNK, EMU, GBR, NOR, SWE, USA
- Nationality and Residency categories are represented by different colors (blue and red).
- The x-axis represents the investing countries, and the y-axis shows the share of the external bond portfolio in BRICS.](image-url)
Deeper Look at Source-Destination, 2012

(a) Flow of U.S. Corporate Bond Investments to BRICS

(b) Flow of EMU Bond Investments to BRICS

British Virgin Islands
Cayman Islands
Ireland
Luxembourg
Netherlands
Other Tax Havens
South Africa
Brazil
China
India
Russia
Brazil
China
India
Russia

$36B
$40B
$2B
$0B
$41B
$8B
$4B
$16B
$5B
$44B
$139B
$2B
$0B
$41B
$44B
$139B
$2B
$0B
$41B

$14B
$1B
$12B
$8B
$5B
$14B
$1B
$12B
$8B
$5B
$14B
$1B
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$8B

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Restating TIC for the US: Equity

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## Equity Reallocations to China

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Standard vs. VIE Structure

Standard Structure

- Foreign Shareholders
- Operating Company
- Chinese Shareholders

Outside China
Inside China
Standard vs. VIE Structure

**Standard Structure**

- Foreign Shareholders
- Operating Company
- Chinese Shareholders

**VIE Structure**

- Foreign Shareholders
- SPV
- Listed Company
- Operating Company
- Chinese Owners
- Contracts
- WFOE

**Outside China**

- Inside China
Implications for China’s Net Foreign Assets (NFA)

Net Foreign Asset Position ($NFA$) captures net claims on RoW:

$$NFA = A - L$$

$$\Delta NFA = CA + \text{Valuation Changes}$$

VIE structure causes underestimation of $L$

- Missing valuation changes
Implications for China’s Net Foreign Assets (NFA)

**Standard Structure**

- **Foreign Shareholders**
  - Operating Company
  - Chinese Shareholders
  - China’s portfolio liabilities, linked to stock price

**VIE Structure**

- **Foreign Shareholders**
  - Listed Company
  - China’s FDI liabilities, not linked to stock price
  - Operating Company
  - WFOE
  - Chinese Owners
  - Contracts
Valuation Effects Not Captured in China’s

- Focusing on surge in value of VIEs from 2016:Q4 to 2018:Q1:

<table>
<thead>
<tr>
<th>VIE Market Value</th>
<th>FDI Equity Liabilities</th>
<th>FDI Debt Liabilities</th>
<th>FDI Liabilities From HKG, VGB, or CYM</th>
<th>Portfolio Equity Liabilities</th>
<th>Portfolio Debt Liabilities</th>
<th>Loan Liabilities (Ex. Reserves, TCs)</th>
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</thead>
<tbody>
<tr>
<td>Growth in USD Billions, 2016Q4 - 2018Q1</td>
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![Chart showing growth in USD billions from 2016Q4 to 2018Q1 for different categories including VIE Market Value, FDI Equity Liabilities, FDI Debt Liabilities, FDI Liabilities From HKG, VGB, or CYM, Portfolio Equity Liabilities, Portfolio Debt Liabilities, Loan Liabilities (Ex. Reserves, TCs).]
China NFA, Share of GDP

- Official

2005: $1.4T
2007: 0.05
2009: 0.1
2011: 0.15
2013: 0.2
2015: 0.25
2017: 0.3
NFA Mismeasurement is Large

![Graph showing China NFA, Share of GDP from 2005 to 2017.](chart)

- **Official**
- **With VIE Adjustment, Baseline**
- **Double Chinese Holdings**
- **Assets Correctly Marked**

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<th>Year</th>
<th>Official</th>
<th>With VIE Adjustment, Baseline</th>
<th>Double Chinese Holdings</th>
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Much More in Paper and Online

- **Sales based reallocation**
- Currency composition of emerging market bonds
- Spurious foreign investment
- Full reallocation and issuance matrices by country, year, asset class
- Disaggregated bilateral investment data (currency, industry, by asset class)
A Different Mapping: Sales-Based Reallocation

- Use Factset GeoRev to measure geography of firm revenue
- Assign firms to *multiple* countries according to share of sales
- Interesting measure for exposure to demand shocks

![Graphs showing investment in Chinese equities and domestic share of equity investments](graphs.png)

(a) Investment in Chinese Equities

(b) Domestic Share of Equity Investments
The Rise of China in the US External Portfolio

![Graph showing the share of external investment from 2007 to 2017. The data is represented by a line graph with years on the x-axis and the share of external investment on the y-axis. The line shows a fluctuating trend with minor peaks and valleys over the years.](image-url)
The Rise of China in the US External Portfolio

![Line chart showing the share of external investment over years (2007-2017). The chart compares Residency, Nationality, and Sales.]

- **Residency**: A red line indicating a relatively steady but slightly fluctuating trend in external investment share.
- **Nationality**: A blue line showing an overall upward trend with some fluctuations, peaking significantly in 2017.
- **Sales**: This category is not prominently represented in the chart.
The Rise of China in the US External Portfolio

![Graph showing the rise of China's external portfolio share from 2007 to 2017. The graph includes lines for Residency, Nationality, and Sales. The share of external investment for Residency and Nationality is relatively flat, while Sales show a significant increase over the years.](image-url)
Conclusion

- Novel View of Global Capital Allocations

- Methodology:
  - Pierce veil of THs and restate bilateral investments
  - Restate commonly used public datasets

- Takeaways:
  - Official statistics poorly reflect true risk exposures
  - DM exposure to large EMs much bigger than in official data
  - Drives huge NFA mismeasurement in China (elsewhere?)

- Follow Global Capital Allocation Project, download data, and use codes at www.globalcapitalallocation.com
Confirming Representativeness Assumption: Bonds

(c) U.S. Corporate Bond Position $\Delta$'s

(d) Norway’s Bond Position $\Delta$’s

In both cases, holdings information improves over pure issuance information.