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

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Harvard  Stanford  Chicago  Columbia

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How Petrobras Raises Capital From Developed Countries

Petrobrás International Finance Co.  
Cayman Islands

Petrobras Global Finance BV  
Netherlands

Petrobras Global Trading BV  
Netherlands

USA

$5bn

EMU

$0

$1bn

$6bn

Petroleo Brasileiro SA  
Brazil
Example: Petrobras Bond (CUSIP 71645WAR2)

- $2.7 Billion, coupon of 5.375%, 10-year, issued January 2011
- Immediate issuer: Petrobras Int. Fin. Co., Cayman Islands
- Official statistics: bond from Cayman Islands, finance/bank
- Our procedure (downloadable): combine info from 7 commercial sources, exploit chains within and across datasets, majority and priority rules, and penalize tax havens
- Our statistics & analysis: Petroleo Brasileiro SA, Brazil, energy
How Big A Deal is This?

- TH’s account for $>10\%$ of all cross-border portfolio positions. $14\%$ of US foreign portfolio holdings are in Cayman Islands!

- TH issuances account for $\approx 10\%$ of all corporate financing, and nearly $50\%$ of all cross-border issuances!

- For some emerging markets, *nearly all* of corporate sector’s bond financing from developed markets flows through THs

- Rapid growth since at least 2005
Takeaways

▶ Increasingly hard to see true exposures in data. Best example: US holdings of CHN securities underestimated by $600 billion

▶ Changes map of global capital allocations:
  ▶ DM exposure to large EMs much bigger than in official data
  ▶ Corporate bonds (in foreign currency) more important
  ▶ Some “foreign” investment should be considered domestic

▶ Due to TH issuance, China’s official NFA is twice true value
Why Issue in Tax Havens?

1. Avoid taxation (corporate and investor)
2. Avoid capital controls
3. Avoid regulation
4. Access a different investor base
Related Literature

- **Nationality-Based Statistics**: Avdjiev, McCauley, Shin (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)

- **Global Imbalances and China’s NFA**: Bernanke (2005), Gourinchas and Rey (2007), Caballero, Farhi, and Gourinchas (2008), Mendoza, Quadrini, Rios-Rull (2009), Maggiori (2017)

- **Bilateral Capital Flows**: Portes, Rey (2005); Lane, Milesi-Ferretti (2001, 2018); Lane, Shambaugh (2010); Forbes (2010); Koijen, Yogo (2019)

- Many others, see paper...
Agenda

- Residency, Nationality, and Methodology
- A New Map of Global Capital Flows
- Implications of Chinese Offshore Issuance
Residency-based vs. Nationality-based Statistics

- Official statistics are based on Residency, where country reflects location of incorporation of immediate issuer.

- Economic reality closer to Nationality basis, where country reflects the location of ultimate parent or operational HQ.

- **Residency = Nationality:**
  - Non-US governments issue USD bonds in New York (Brazil)
  - American (Global) Depository Receipts (ADRs)

- **Nationality ≻ Residency**
  - Issue through foreign operating subsidiary (Toyota Motors NA)
  - Dual listings: Companies listed in multiple countries

- **Nationality ≻ Residency**
  - Issue in THs through foreign shell-company (Petrobras)
  - Tax inversions to THs (Medtronic)
Aggregate Each Security to Ultimate Parent Company

- Combine information from CGS, Morningstar, Factset, Dealogic, SDC, CIQ, and Orbis

- Map 27 million securities to ultimate parent company

- Greater than the sum of parts: Imagine A connected to B in one source and B connected to C in another

- Human intelligence (our own) for Hong Kong and Luxembourg

- Our algorithm is available online for download. Is transparent, replicable, and adaptable. See globalcapitalallocation.com
## Issuer-Level Reallocations: Examples

### Reallocations Away from Cayman Islands

<table>
<thead>
<tr>
<th>Issuer CUSIP6</th>
<th>Issuer Name</th>
<th>Issuer Residency</th>
<th>Issuer Parent CUSIP6</th>
<th>Parent Nationality</th>
<th>Parent Name</th>
<th>Value Outstanding (USD Billions)</th>
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<td>A. Corporate bonds reallocated away from country</td>
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Merge with MNS Portfolio Holdings Data

- Residency-to-Nationality mapping based on securities issuance

- Merge with Morningstar data on global fund positions developed in Maggiori, Neiman, Schreger (JPE, 2020)

- $33 trillion at security-level for nine DMs

- Confirm representativeness in cross-section of countries

- *Key assumption*: Within each year, asset class, and bilateral country pair the portfolio holdings of mutual funds and ETFs are representative of the universe of portfolio investment
US Positions in Morningstar, Residency vs. Nationality

- Corporate Bonds: BRA, CHN, IND, ISR, and RUS issue via CYM, BMU, PAN, VGB
- Equities: CHN, PER (and USA ... not shown) issue via CYM, BMU, IRL, and LUX

(a) USA, Corporate Bonds

(b) USA, Equities
What share of investments in each country on residency basis go to others when on a nationality basis? (*rows sum to 100%*):

<table>
<thead>
<tr>
<th>Share Reallocated To:</th>
<th>Destination</th>
<th>BRA</th>
<th>CHN</th>
<th>CYM</th>
<th>GBR</th>
<th>LUX</th>
<th>USA</th>
<th>RoW</th>
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*Reallocation Matrix for US Corporate Bond Investments (Sample)*
Reallocation Matrices

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</table>

*Reallocation Matrix for US Corporate Bond Investments (Sample)*
Reallocation Matrices

- Nine countries (AUS, CAN, CHE, DNK, EMU, GBR, NOR, SWE, and USA)
- Annual matrices for 2007-2017
- Separate matrices for equities, corporate bonds, and all bonds
- Full nationality-based reallocation or tax haven only
Can’t Use Issuance Data Alone: Country Portfolios Differ!

“Home Bias in Tax Havens” for Bonds

[Bar chart showing the share of TH investment reallocated to different countries, with blue bars for Domestic Investment and red bars for RoW Investment.]
Agenda

- Residency, Nationality, and Methodology
- A New Map of Global Capital Flows
- Implications of Chinese Offshore Issuance
Restating Official Statistics

- With reallocation matrices, can transform residency-based datasets into nationality-based measures

- Apply to two residency-based datasets:
  - TIC: US bilateral foreign portfolio investments, enters official US BoP statistics
  - CPIS: many countries foreign bilateral portfolio investments, produced by IMF
### Restating TIC for the US: Corporate Bonds

<table>
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<tr>
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Restating TIC for the US: Equity

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Restating CPIS for the EMU: Total Bonds

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<td>1,904</td>
<td>2,109</td>
<td>2,092</td>
</tr>
<tr>
<td>EMU</td>
<td>8,855*</td>
<td>8,255</td>
<td>8,301</td>
</tr>
</tbody>
</table>

* EMU total includes all CPIS positions and positions for full nationality.
## Restating CPIS for the EMU: Equity

<table>
<thead>
<tr>
<th>Destination</th>
<th>Tax Haven Only</th>
<th>Full Nationality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CPIS</td>
<td>Position</td>
</tr>
<tr>
<td>Brazil</td>
<td>53</td>
<td>54</td>
</tr>
<tr>
<td>Bermuda</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>Cayman Islands</td>
<td>223</td>
<td>0</td>
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<td>China</td>
<td>96</td>
<td>333</td>
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<tr>
<td>Hong Kong</td>
<td>64</td>
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<td>India</td>
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<td>86</td>
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<td>Russia</td>
<td>46</td>
<td>53</td>
</tr>
<tr>
<td>United States</td>
<td>1,666</td>
<td>2,026</td>
</tr>
<tr>
<td>EMU</td>
<td>4,791*</td>
<td>4,381</td>
</tr>
</tbody>
</table>
DM Investment in BRICS Bonds

Investing Country
AUS CAN CHE DNK EMU GBR NOR SWE USA
Nationality Residency

Share of External Bond Portfolio in BRICS

Nationality

Residency

AUS CAN CHE DNK EMU GBR NOR SWE USA
Surge in DM Investments in BRICS

- DM investment in large EMs much larger than thought
  - US invests 68bn in Brazilian corporate debt, not 8bn
  - US invests 695bn in Chinese equity, not 154bn
  - UK invests 98bn in Chinese equity, not 48bn
  - EMU invests 107bn in Russian debt, not 36bn

- Implications for voluminous gravity literature (and anything that uses CPIS!)
Corporate Borrowing More Important

- Corporate bonds surge in importance vs. sovereign bonds
  - US investment in Brazilian bonds that is corp is 70%, not 25%
  - US investment in Russian bonds that is corp is 50%, not 0%
  - UK bond positions jump in key EMs due to offshore corporates (60% for Brazil, 100% for China, and 150% for Russia)

- Nearly all these offshore issuances are *not* in local currency

- Implications for currency composition of external portfolio debt
Currency Composition of Brazil’s Foreign-Held Bonds

- Residency
- Nationality

Local Currency Share


Residency Nationality

Local Currency Share

.6 .8
Spurious Foreign Investment

- Some reclassifications send the positions back to the investors’ countries – foreign investment that isn’t really foreign!

- Huge for US, moderate for UK, small elsewhere.

- Key drivers:
  - CLOs backed by US loans, resident in Cayman Islands (Liu and Schmidt-Eisenlohr, 2019)
  - Irish tax inversions (famous case: Medtronic)
  - UK regional water suppliers (Thames Water, etc.)
Agenda

- Residency, Nationality, and Methodology
- A New Map of Global Capital Flows
- Implications of Chinese Offshore Issuance
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

**Inside China**
- Operating Company
- Chinese Owners
- Chinese Shareholders

**Outside China**
- Foreign Shareholders

**VIE Structure**
- Foreign Shareholders
- Listed Company
- SPV
- WFOE
- Contracts

- Operating Company
- Chinese Owners
- Chinese Shareholders
Standard vs. VIE Structure

**Standard Structure**

- **Foreign Shareholders**
  - Outside China
  - Operating Company
  - Chinese Shareholders

- **Operating Company**
  - Chinese Owners
  - Chinese Shareholders

**VIE Structure**

- **Foreign Shareholders**
  - Outside China
  - Listed Company
  - WFOE

- **Listed Company**
  - SPV
  - Contracts
  - Zero interest loan
  - Call option agreement
  - Power of attorney
  - Exclusive provider
Shaky Exposure to Chinese VIEs Larger Than Thought

- Investments in VIEs risky due to government enforcement, punitive taxation, owner expropriation, etc. Trade war?!

- We didn’t identify the risk. We show it’s *much* bigger.

- Alibaba’s prospectus for IPO on NYSE (SEC Form F-1):

  “If the [Chinese] government deems that the contractual arrangements in relation to our variable interest entities do not comply with [Chinese] governmental restrictions on foreign investment, or if these regulations or the interpretation of existing regulations changes in the future, we could be subject to penalties or be forced to relinquish our interests in those operations.”
Implications for China’s Net Foreign Assets (NFA)

- Net Foreign Asset Position \((NFA)\) captures net claims on RoW:
  \[
  NFA = A - L \\
  \Delta NFA = CA + \text{Valuation Changes}
  \]

- China’s large positive NFA is 2nd/3rd largest (with Germany) and is major contributor to global imbalances

- But \(L\) may be too small if, due to offshore issuance, liabilities associated with VIEs not linked to value of listed company

- China’s true NFA may be half of official value, and more like Norway, Switzerland, or Singapore
Implications for China’s NFA: What’s the Benchmark?

Standard Structure

Foreign Shareholders

Operating Company

Chinese Shareholders

Outside China

Inside China
Implications for China’s NFA: What’s the Benchmark?

Standard Structure

- **Foreign Shareholders**
  - Outside China
  - Inside China

  - China’s portfolio liabilities, linked to stock price

- **Operating Company**
  - Chinese Shareholders
Implications for China’s NFA: What’s the Benchmark?

### Standard Structure

- **Foreign Shareholders**
- **Operating Company**
- **Chinese Shareholders**

### VIE Structure

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

Outside China

Inside China

Contracts
Implications for China’s NFA: What’s the Benchmark?

**Standard Structure**

- Foreign Shareholders
- Operating Company
- Chinese Shareholders

**VIE Structure**

- Foreign Shareholders
- Operating Company
- WFOE
- Chinese Owners

China’s FDI liabilities, not linked to stock price
Does VIE Structure Result in Mismeasurement of NFA?

- Unclear exactly how positions associated with VIEs are booked. But they do not appear linked to listed company market values.
Might the VIEs Be in Other Liabilities Categories?

Focusing on surge in value of VIEs from 2016:Q4 to 2018:Q1:
Counterexample: USA Common Equity Position in CYM
Counterexample: South Africa’s FDI Position in China

Naspers has held constant ~ 31% share in Tencent
Implications for China’s NFA: Foreign Assets

Standard Structure

Foreign Shareholders

Operating Company

Chinese Shareholders

Inside China

Outside China

<VIE Structure>

Foreign Shareholders

Listed Company

SPV

WFOE

Chinese Owners

Contracts

Chinese Shareholders
Implications for China’s NFA: Foreign Assets

Standard Structure

- Foreign Shareholders
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Inside China

Outside China

VIE Structure

- Foreign Shareholders
- Operating Company
- Chinese Owners

- Listed Company
- WFOE
- Chinese Shareholders

- Investment Vehicles
- SPV

China’s assets, linked to stock price?
NFA Mismeasurement is Potentially Large

China NFA, Share of GDP

- 2005
- 2007
- 2009
- 2011
- 2013
- 2015
- 2017

$1.4T$

0.05
0.1
0.15
0.2
0.25
0.3

Official NFA Position
Much more external adjustment has occurred than is thought
Disproportionate focus on Chinese holdings of US Treasuries
Broader conjecture on FDI (ala Blanchard-Acalin, 2016)
Conclusion

- Novel View of Global Capital Allocations

- Methodology:
  - Algorithm for piercing veil of THs and restating bilateral investments
  - Provide new data and 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