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

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Chicago

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Columbia

February 2020
How Petrobras Raises Capital From Developed Countries

Petrobras International Finance Co.
Cayman Islands

Petrobras Global Finance BV
Netherlands

Petrobras Global Trading BV
Netherlands

$5bn
$1bn
$1bn
$6bn

USA
EMU

$0
$0

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
- National 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 flows. 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 debt 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 flows:
  - North-to-South flows much larger
  - Corporate bonds (and foreign currency) more important
  - Some “foreign” investment should be considered domestic

- Due to TH issuance, China’s official NFA is twice true value
Related Literature

▶ **Tax Havens, Firm Capital Structure:** Hines, Rice (1994); Desai, Foley, Hines (2005); Huizinga, Laeven, Nicodeme (2008); Zucman (2013, 15); Fuertes, Serena (2016); Hanlon, Maydew, Thorock (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), 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); Gourinchas, Jeanne (2013); Koijen, Yogo (2019)

▶ **Statistical Agencies:** Avdjiev, Everett, Lane, Shin (2018); Bertaut, Bressler, Curcuru (2019); Damgaard et al. (2019)
Why Issue in Tax Havens?

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

- Residency, Nationality, and Methodology

- A New Map of Global Capital Flows
  - Restatement of TIC and CPIS
  - North-to-South Flows Are Much Larger
  - Increasing Importance of Corporate Bond Flows
  - Spurious Foreign Investment

- Implications of Chinese Offshore Issuance
  - VIEs and their Risks
  - China’s International Investment Position
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

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

- Country reported by PMs contains useful information

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

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

### Reallocations Away from Cayman Islands

<table>
<thead>
<tr>
<th>CUSIP6</th>
<th>Name</th>
<th>Residency</th>
<th>Parent CUSIP6</th>
<th>Parent Nationality</th>
<th>Parent Name</th>
<th>Value Outstanding (USD Billions)</th>
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<tr>
<td>91911T</td>
<td>VALE OVERSEAS LTD</td>
<td>CYM</td>
<td>P96620</td>
<td>BRA</td>
<td>VALE SA</td>
<td>12.3</td>
</tr>
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<td>ALIBABA GROUP HLDG LTD</td>
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<td>P78331</td>
<td>BRA</td>
<td>PETROLEO BRASILEIRO SA</td>
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<tr>
<td>G2119W</td>
<td>CHINA EVERGRANDE GROUP</td>
<td>CYM</td>
<td>16891Y</td>
<td>CHN</td>
<td>CHINA EVERGRANDE GROUP</td>
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<td>46017L</td>
<td>UAE</td>
<td>IPIC</td>
<td>5.8</td>
</tr>
</tbody>
</table>

**A. Corporate bonds reallocated away from country**

**B. Equities reallocated away from country**

<table>
<thead>
<tr>
<th>CUSIP6</th>
<th>Name</th>
<th>Residency</th>
<th>Parent CUSIP6</th>
<th>Parent Nationality</th>
<th>Parent Name</th>
<th>Value Outstanding (USD Billions)</th>
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</thead>
<tbody>
<tr>
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<td>BAIDU INC</td>
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<tr>
<td>47215P</td>
<td>JD COM INC</td>
<td>CYM</td>
<td>47215P</td>
<td>CHN</td>
<td>JD COM INC</td>
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<tr>
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<td>64110W</td>
<td>CHN</td>
<td>NetEase Inc</td>
<td>45.6</td>
</tr>
</tbody>
</table>
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*, 2019)

- Funds account for roughly 50 percent of US external assets

- See how investment patterns in MNS change from **Residency** to **Nationality** and apply same changes to official statistics
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
Reallocation Matrices

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>Destination</th>
<th>BRA</th>
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<th>GBR</th>
<th>LUX</th>
<th>USA</th>
<th>RoW</th>
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<td>LUX</td>
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<td>USA</td>
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*Reallocation Matrix for US Corporate Debt Investments (Sample)*
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*Reallocation Matrix for US Corporate Debt 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. The chart compares Domestic Investment and RoW Investment for AUS, CAN, CHE, DNK, EMU, GBR, NOR, SWE, and USA.]
Agenda

- Residency, Nationality, and Methodology
- A New Map of Global Capital Flows
  - Restatement of TIC and CPIS
  - North-to-South Flows Are Much Larger
  - Increasing Importance of Corporate Bond Flows
  - Spurious Foreign Investment
- Implications of Chinese Offshore Issuance
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Restating National Statistics

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

- Key assumption: reallocation matrices, made from data on funds, representative of total investment for each bilateral

- Apply to two residency-based datasets: TIC and CPIS
## Restating TIC for the US: Corporate Debt

<table>
<thead>
<tr>
<th>Destination</th>
<th>Tax Haven Only</th>
<th>Full Nationality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TIC</td>
<td>Position</td>
</tr>
<tr>
<td>Brazil</td>
<td>8</td>
<td>50</td>
</tr>
<tr>
<td>Bermuda</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Cayman Islands</td>
<td>80</td>
<td>1</td>
</tr>
<tr>
<td>China</td>
<td>3</td>
<td>47</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>India</td>
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<tr>
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<td>Luxembourg</td>
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<tr>
<td>Russia</td>
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<td>12</td>
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<tr>
<td>United States</td>
<td>5,247*</td>
<td>5,352</td>
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## Restating TIC for the US: Equity

<table>
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<tr>
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<th>Δ</th>
<th>Full Nationality Position</th>
<th>Δ</th>
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<tr>
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<tr>
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<td>-29</td>
<td>4</td>
<td>-29</td>
</tr>
<tr>
<td>Russia</td>
<td>55</td>
<td>7</td>
<td>61</td>
<td>7</td>
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<tr>
<td><strong>United States</strong></td>
<td><strong>19,284</strong></td>
<td><strong>526</strong></td>
<td><strong>19,977</strong></td>
<td><strong>693</strong></td>
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</tbody>
</table>
## Restating CPIS for the EMU: Total Debt

<table>
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<th>Destination</th>
<th>CPIS</th>
<th>Tax Haven Only</th>
<th>Full Nationality</th>
</tr>
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<tbody>
<tr>
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</tr>
<tr>
<td>United States</td>
<td>1,904</td>
<td>2,109</td>
<td>2,092</td>
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<tr>
<td><strong>EMU</strong></td>
<td>8,555*</td>
<td>8,255</td>
<td>8,308</td>
</tr>
</tbody>
</table>

*Excluding the United States.
Restating CPIS for the EMU: Equity

<table>
<thead>
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<th>Destination</th>
<th>CPIS</th>
<th>Tax Haven Only Position</th>
<th>Δ</th>
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<td>-404</td>
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</table>
Agenda

- Residency, Nationality, and Methodology

- A New Map of Global Capital Flows
  - Restatement of TIC and CPIS
  - North-to-South Flows Are Much Larger
  - Increasing Importance of Corporate Bond Flows
  - Spurious Foreign Investment

- Implications of Chinese Offshore Issuance
  - VIEs and their Risks
  - China’s International Investment Position
North to South Flows: BRICS Debt

Share of External Bond Portfolio in BRICS

Investing Country

Nationality Residency

<table>
<thead>
<tr>
<th>Country</th>
<th>Share</th>
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<tbody>
<tr>
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<tr>
<td>CAN</td>
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<tr>
<td>CHE</td>
<td>0.06</td>
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<td>DNK</td>
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<tr>
<td>EMU</td>
<td>0.1</td>
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<tr>
<td>GBR</td>
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<tr>
<td>NOR</td>
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<tr>
<td>SWE</td>
<td>0.01</td>
</tr>
<tr>
<td>USA</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Legend:
- Blue: Nationality
- Red: Residency
Surge in North-to-South Flows

- AE investment in large EMs *much* larger than thought
  - US invests $68bn$ in Brazilian corporate debt, not $8bn$
  - US invests $694bn$ in Chinese equity, not $157bn$
  - 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!)
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Corporate Borrowing More Important

- Corporate debt surges in importance relative to sovereign debt
  - 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, 75% for China, and 150% for Russia)

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

- Implications for currency composition of external debt
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Spurious Foreign Investment

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


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

**Inside China**
- Chinese Owners

**Outside China**

**VIE Structure**
- Foreign Shareholders
- Operating Company
- Chinese Owners
- Listed Company
- WFOE
- SPV
- Contracts
  - Zero interest loan
  - Call option agreement
  - Power of attorney
  - Exclusive provider
Shaky Exposure to Chinese VIEs Larger Than Thought

- Value of VIEs super risky due to government enforcement, punitive taxation, owner expropriation, etc. Trade war?!

- We didn’t identify the risk. We just think 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.”
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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

Outside China

Operating Company

Inside China

Chinese Shareholders
Implications for China’s NFA: What’s the Benchmark?

Standard Structure

- Foreign Shareholders
- Operating Company
- Chinese Shareholders

China’s portfolio liabilities, linked to stock price
Implications for China’s NFA: What’s the Benchmark?

<table>
<thead>
<tr>
<th>Standard Structure</th>
<th>VIE Structure</th>
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</thead>
<tbody>
<tr>
<td>Foreign Shareholders</td>
<td>Foreign Shareholders</td>
</tr>
<tr>
<td>Operating Company</td>
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<td>Chinese Shareholders</td>
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<tr>
<td>Operating Company</td>
<td>WFOE</td>
</tr>
<tr>
<td>Chinese Owners</td>
<td>Contracts</td>
</tr>
</tbody>
</table>

Outside China

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

**Standard Structure**

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

**Inside China**

**Outside China**

**VIE Structure**

- **Foreign Shareholders**
- **Operating Company**
- **Listed Company**
- **SPV**
- **WFOE**
- **Contracts**

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.

Examples: Tencent, Alibaba
Might the VIEs Be in Other Liabilities Categories?

Focusing on surge in value of VIEs from 2016:Q4 to 2018:Q1:
Counterexample: USAT Common Equity Positions in CYM
Counterexample: ZAF FDI Positions in CHN

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

VIE Structure

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

Outside China
Implications for China’s NFA: Foreign Assets

**Standard Structure**

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

**Inside China**

**Outside China**

**VIE Structure**

- **Foreign Shareholders**
- **Operating Company**
- **Chinese Owners**
- **WFOE**
- **Listing Company**
- **SPV**
- **Investment Vehicles**

**China’s assets, linked to stock price?**

**Contracts**
NFA Mismeasurement is Potentially Large

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

- **Official**

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2007</th>
<th>2009</th>
<th>2011</th>
<th>2013</th>
<th>2015</th>
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<tr>
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<td>0.2</td>
<td>0.25</td>
<td>0.3</td>
<td>0.3</td>
</tr>
</tbody>
</table>
NFA Mismeasurement is Potentially Large

China NFA, Share of GDP


Official

With VIE Adjustment, Baseline

$1.1T
NFA Mismeasurement is Potentially Large: Robustness

China NFA, Share of GDP

$0.9T$


Official

With VIE Adjustment, Baseline

Double Chinese Holdings
NFA Mismeasurement is Potentially Large: Robustness

China NFA, Share of GDP

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

$1.4T$
Is China as Big a Creditor as you Think?

- 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 capital flows
  - Provide new data and restate commonly used public datasets

- Takeaways:
  - N-to-S flows massively underestimated, biased toward govt debt
  - National statistics poorly reflect true risk exposures
  - Drives huge NFA mismeasurement in China (elsewhere?)

- Follow Global Capital Allocation Project, download data, and use codes at www.globalcapitalallocation.com