The Global (Mis)Allocation of Capital

Carol Bertaut
Federal Reserve Board

Stephanie Curcuru
Federal Reserve Board

Ester Faia
Goethe University Frankfurt, CEPR

Pierre-Olivier Gourinchas
Berkeley, IMF, CEPR

July 13, 2023

The opinions expressed are those of the authors and do not necessarily reflect the view of the Federal Reserve Board, the Federal Reserve System or the IMF.
Two (seemingly Unrelated) Stylized Facts

- **Excess returns** on US net foreign assets: (Gourinchas and Rey 2007, Curcuru, Dvorak, and Warnock 2008) with top down approach (BEA) or indices: positive, but volatile and imprecisely estimated due to data issues

  - Recent evidence of erosion due to U.S. asset overvaluation (Atkeson, Heathcote, and Perri 2022) with top down approach

- Literature on **mis-allocation within countries** (see Hsieh and Klenow 2009) due to wedge dispersion, and reallocation to the top (see Baqaee and Farhi 2020b)
What This Paper Does

- Connects the two, highlights **allocative role** of capital flows

- Best possible security data, US cross border portfolio securities: **official reporting**, all investors/issuers, returns and asset characteristics (Global Capital Market, Morningstar proprietary data)

  - It settles the question on excess returns and recent trends comparing to other methods

- Link cross border asset holdings to firm wedges (MPK, TFP, market and financial wedges), find reallocation (mostly between firm) to the **top**, relatively to domestic flows: capital flows alleviate misallocation
Related Literature

- **U.S. Excess returns**: Gourinchas and Rey 2007, Lane and Milesi-Ferretti 2007, Curcuru, Dvorak, and Warnock 2008, Atkeson, Heathcote, and Perri 2022

- **Mis-allocation, Reallocation to the Top, Superstars**: Hsieh and Klenow 2009, Autor et al. 2020, Baqaee and Farhi 2020b, Gopinath et al. 2017
  

Results

- Excess return: *positive at 1.8 for all methods, due claims equity composition of 80%* Bond liabilities lower than sovereign distressed ones
  - Divergence of BEA and security method in post-crisis

- International equity claims (*contrary to domestic ones*) allocate to the top (with meaningful magnitudes) of MPK, TFP, Sharpe and intangible distributions (even controlling for fixed effects), more so for Asia and BioTech
  - Firms at the top grew more: ex. in IT/BioTech growth went from 14.9% to 17.2%
  - *Between-firm component* (Melitz and Polanec 2015) accounts for at least 80%; *horse race* (Fair and Shiller 1990) shows predictive power of firm measures
Data and Returns

- **Universe** claims/liabilities, all asset type, all investors, all issuers. **Official reporting**
- Bring back to 1995 matching with Refinitiv and FactSet
- Security-based returns, compare to BEA- and index methods:

\[ r_t^p = \sum_{j=1}^{N} w_{j,t-1}^p r_{j,t}^p \]  

- **Short-run and trends** (moving averages, HP and Hamilton 2018)
- Corrected for **nationality** of firms
Average Portfolio Returns: Security versus BEA

*Excess return positive (across methods), equity returns comparable claims/liabs, bond liabs lower*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity return claims</td>
<td>10.27</td>
<td>17.39</td>
<td>10.13</td>
<td>9.32</td>
</tr>
<tr>
<td>Equity return liabilities</td>
<td>0.69</td>
<td>17.44</td>
<td>10.80</td>
<td>9.71</td>
</tr>
<tr>
<td>Bond return claims</td>
<td>4.89</td>
<td>5.03</td>
<td>4.26</td>
<td>4.70</td>
</tr>
<tr>
<td>Bond return liabilities</td>
<td>3.94</td>
<td>5.07</td>
<td>3.29</td>
<td>4.05</td>
</tr>
<tr>
<td>Total return differential</td>
<td>5.23</td>
<td>-1.93</td>
<td>1.97</td>
<td>1.77</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity return claims</td>
<td>8.42</td>
<td>7.96</td>
<td>8.43</td>
<td>8.28</td>
</tr>
<tr>
<td>Equity return liabilities</td>
<td>1.47</td>
<td>13.26</td>
<td>10.73</td>
<td>8.63</td>
</tr>
<tr>
<td>Bond return claims</td>
<td>5.16</td>
<td>5.82</td>
<td>6.40</td>
<td>5.83</td>
</tr>
<tr>
<td>Bond return liabilities</td>
<td>4.22</td>
<td>3.74</td>
<td>3.45</td>
<td>3.78</td>
</tr>
<tr>
<td>Total return differential</td>
<td>4.18</td>
<td>0.09</td>
<td>1.33</td>
<td>1.83</td>
</tr>
</tbody>
</table>
### Average Portfolio Returns: Security versus Index

**Same in comparison with index**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity return claims</td>
<td>10.27</td>
<td>7.39</td>
<td>10.13</td>
<td>9.32</td>
</tr>
<tr>
<td>Equity return liabilities</td>
<td>0.69</td>
<td>17.44</td>
<td>10.80</td>
<td>9.71</td>
</tr>
<tr>
<td>Bond return claims</td>
<td>4.89</td>
<td>5.03</td>
<td>4.26</td>
<td>4.70</td>
</tr>
<tr>
<td>Bond return liabilities</td>
<td>3.94</td>
<td>5.07</td>
<td>3.29</td>
<td>4.05</td>
</tr>
<tr>
<td>Total return differential</td>
<td>5.23</td>
<td>-1.93</td>
<td>1.97</td>
<td>1.77</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Index</th>
<th>2005-2009</th>
<th>2010-2014</th>
<th>2015-2020</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity return claims</td>
<td>11.66</td>
<td>7.22</td>
<td>8.76</td>
<td>9.18</td>
</tr>
<tr>
<td>Equity return liabilities</td>
<td>-0.47</td>
<td>19.30</td>
<td>10.33</td>
<td>9.76</td>
</tr>
<tr>
<td>Bond return claims</td>
<td>5.62</td>
<td>4.42</td>
<td>3.60</td>
<td>4.49</td>
</tr>
<tr>
<td>Bond return liabilities</td>
<td>4.37</td>
<td>4.29</td>
<td>3.29</td>
<td>3.94</td>
</tr>
<tr>
<td>Total return differential</td>
<td>6.35</td>
<td>-2.19</td>
<td>1.01</td>
<td>1.68</td>
</tr>
</tbody>
</table>
Role of Asset Composition

Privilege due to claims tilted toward equities (75%), liabilities tilted toward bonds (Asia roughly 75%)
Summary of Return Results

- Divergence across methods mainly on liabilities post-crisis
- Rise in cost of debt liabilities, though still smaller than for sovereign distressed countries
- Rise in trends of all returns
Equity Valuations from BEA to TIC

Cumulative annual U.S. cross-border valuation on portfolio equity (share of GDP)

BEA & TIC securities level

-2 -1 0 .1 .2
share of GDP

year

BEA portfolio equity TIC portfolio equity
To correctly identify the allocation of the excess return (see Bertaut, Bressler, and Curcuru 2019)

Security-by-security: info on constituent from MSCI, textual analysis or manually (Tecent and Baidu do not show in indices, reassigned manually)
Firms’ Wedges: Structural Estimation


- **Elasticity**: \( \beta_{X_{jt}} = \frac{X_{jt} \partial Q_{jt}}{Q_{jt} \partial X_{jt}} \) elasticity of production to each input \( X_{jt} \)

- **Mark-ups** Given \( \mu_{jt} = \frac{P_{jt}}{MC_{jt}} \) and \( \beta_{X_{jt}} \):

\[
\mu_{jt} = \frac{\beta_{X_{jt}}}{S^*_{X_{jt}}}
\]  

where \( S_{X_{jt}} = \frac{W_{X_{jt}} X_{jt}}{P_{jt} Q_{jt}} \) is the share of revenues on any given input.

- Compustat matches better than Worldscope; Significant (Kolmogorov Smirnov) shifts in all distributions
Allocation of Shares along the Firm Distribution

Univariate Firm Level Specification, in Diff and Diff:

\[
\tilde{s}_{i,t} = \frac{s_{i,t}}{\bar{s}_{i,t}} = \gamma + \alpha x_{i,t} + \epsilon_{i,t}
\]  

(3)

\(\tilde{s}_{i,t}\) portfolio share, \(s_{i,t}\) holdings, \(\bar{s}_{i,t}\) firm market cap, \(x_{i,t}\) wedge of firm \(i\)

Panel specification:

\[
\tilde{s}_{i,t} = \gamma + \sum_i \alpha_i x_{i,t} + f_i + f_t + \epsilon_{i,t}
\]  

(4)

Horse Race:

\[
\tilde{s}_{i,t} - \tilde{s}_{i,t-1} = \alpha + \beta_1 (\hat{s}_{1,i,t} - \hat{s}_{1,i,t}) + \beta_2 (\hat{s}_{2,i,t} - \hat{s}_{2,i,t}) + \epsilon_t
\]  

(5)
Dynamic Reallocation: Within-Between Decomposition

\[ FM_t = \sum_i s_{i,t}^{net} \omega_{i,t} \]  \hspace{1cm} (6)

where \( s_{i,t}^{net} = s_{i,t} - \bar{s}_t \)

\[ FM_t - FM_{t-1} = \sum_i s_{i,t}^{net} \omega_{i,t} - \sum_i s_{i,t}^{net} \omega_{i,t} = \]

\[ = \sum_i s_{i,t-1}^{net} (\omega_{i,t} - \omega_{i,t-1}) + \sum_i (s_{i,t}^{net} - s_{i,t-1}^{net}) \omega_{i,t-1} + \]

\[ \underbrace{\sum_i (s_{i,t}^{net} - s_{i,t-1}^{net}) (\omega_{i,t} - \omega_{i,t-1})}_{\text{within term}} \]

\[ \underbrace{\sum_i (s_{i,t}^{net} - s_{i,t-1}^{net}) (\omega_{i,t} - \omega_{i,t-1})}_{\text{between term}} \]

\[ \underbrace{\sum_i (s_{i,t}^{net} - s_{i,t-1}^{net}) (\omega_{i,t} - \omega_{i,t-1})}_{\text{cross-term}} \]
Allocation to the Top: MPK

Allocation to the Top of the Distribution of MPK
Allocation to the Top: Mark-ups

US firms held by foreign investors: portfolio share of market cap vs firm markup
Compustat markups, nonfinancial firms, full data sample (1995-2020)

Foreign firms held by US investors: portfolio share of market cap vs firm markup
Compustat markups; full sample (1995-2020)

US firms held by foreign investors: portfolio share of market cap vs firm markup
Worldscope markups, nonfinancial firms, full data sample (1995-2020)

Foreign firms held by US investors: portfolio share of market cap vs firm markups
Allocation Domestic Equity Share

Allocation to the Top only for International Securities

US firms held by domestic investors: portfolio share of market cap vs firm mrpk
all firms; Compustat MRPK, full sample 1995-2020

US firms held by domestic investors: portfolio share of market cap vs firm markup
Compustat markups, nonfinancial firms, full data sample (1965-2020)
Allocation to the Top: By Region

U.S. shares of Asian firms have higher MPK than other regions
U.S. invests more to top in BioTech
Allocation to the Top: U.S. Firms By Sector

portfolio share of market cap vs firm markup; by industry
Compustat markups, full data sample (1995-2020)

consumer

extract_chem_metals

financial

it_pharma_serv

manuf_constr

util_tran

markup_op_csppc_flag_w

95% CI  Fitted values
The Role of Intangibles

Claims allocate to firms with high intangibles

**US firms held by foreign investors: portfolio share market cap vs firm intangible capital**
Compustat intangible capital; all firms; full sample (1995-2020)

**Foreign firms held by US investors: portfolio share of market cap vs firm intangibles**
European firms; Compustat intangibles; full sample (1995-2020)
Allocate to firms with higher probability of default
Allocation to Sharpe Ratio

*But U.S. investors get compensated for that, foreign do not*
Rising Reallocation to the Top

Between Firm component larger

Frgn investment in US equity: contributions over time to higher MRPK portfolios
portfolio shares of market cap & firm MRPK (nonfinancial firms; Compustat MRPK)

US investment in foreign equity: contributions over time to higher MRPK portfolios
portfolio shares of market cap & firm MRPK (nonfinancial firms; Compustat MRPK)

Frgn investment in US equity: contributions over time to higher markup portfolios
portfolio shares of market cap & firm markup (nonfinancial firms; Compustat markup)

US investment in foreign equity: contributions over time to higher markup portfolios
portfolio shares of market cap & firm markup (nonfinancial firms; Compustat markup)
### Horse Race

$R^2$ for prediction with all 5 variables: 0.3643

<table>
<thead>
<tr>
<th></th>
<th>MPK</th>
<th>Intangibles</th>
<th>TFP</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mark-up</td>
<td>0.3456</td>
<td>0.3317</td>
<td><strong>0.3567</strong></td>
<td>0.3353</td>
</tr>
<tr>
<td>MPK</td>
<td></td>
<td>0.340</td>
<td><strong>0.3587</strong></td>
<td>0.3423</td>
</tr>
<tr>
<td>Intangibles</td>
<td></td>
<td></td>
<td><strong>0.3579</strong></td>
<td>0.3358</td>
</tr>
<tr>
<td>TFP</td>
<td></td>
<td></td>
<td></td>
<td><strong>0.3582</strong></td>
</tr>
</tbody>
</table>
Conclusions

- Portfolio Returns are positive, stable: composition of portfolio differs across countries

- Allocation of Shares at the Top of MPK, contrary to domestic equity: allocative role of capital flows

- U.S. investors allocate to firms high in intangibles

- Foreign investors channel capital to U.S. firms with credit frictions

- Reallocation increased over time
Mark-ups Kernels in TIC: US Firms

- Financial
- Oil, Gas, Metals, Mining
- IT, Electronics, Pharma, Misc
- Utilities & Transportation
- Manufacturing & Construction
- Consumer

Density plots showing kernel density estimates for different industries, with bandwidth values specified for each plot.
Mark-ups Kernels in TIC: Foreign Firms

- **financial**
  - Kernel: epanechnikov, Bandwidth: 0.1761

- **oil gas metals mining**
  - Kernel: epanechnikov, Bandwidth: 0.0920

- **IT electronics pharma misc**
  - Kernel: epanechnikov, Bandwidth: 0.2654

- **utilities & transportation**
  - Kernel: epanechnikov, Bandwidth: 0.1238

- **manufacturing & construction**
  - Kernel: epanechnikov, Bandwidth: 0.0473

- **consumer**
  - Kernel: epanechnikov, Bandwidth: 0.0772
**Example of Importance**

**Table:** List of top countries based on nationality reassignment of equities and bonds for 2020. Units are million of dollars

<table>
<thead>
<tr>
<th>Top countries</th>
<th>Equity reassignment</th>
<th>Top countries</th>
<th>Bonds reassignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>995618</td>
<td>United States</td>
<td>529363</td>
</tr>
<tr>
<td>China</td>
<td>766978</td>
<td>China</td>
<td>34040</td>
</tr>
<tr>
<td>France</td>
<td>48849</td>
<td>Brazil</td>
<td>26944</td>
</tr>
<tr>
<td>Italy</td>
<td>33398</td>
<td>Switzerland</td>
<td>24143</td>
</tr>
<tr>
<td>Sweden</td>
<td>30036</td>
<td>Germany</td>
<td>23317</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>40954</td>
<td>U. K.</td>
<td>23065</td>
</tr>
<tr>
<td>Brazil</td>
<td>23413</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Under nationality correction U.S. investors earn returns in Asia and tax havens**
Regional Returns: Asia and Tax Havens

Nationality Equity Returns

Nationality Equity US-Tax Havens

Nationality Equity Asia-US

Nationality Privilege
The Divergence in the Liabilities

Figure: Liability Dynamic

Figure: Differential
Some Erosion: The Rise in the Cost of Bonds

Liability Equity

Claims Equity

Liability Bonds

Claims Bonds
Rising Trends

Differential Securities

Differential BEA

Differential Index

Across Methods