Global Financial Communities: Geography and Industry Effects

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Motivation

• Information about firms & equity prices closely linked
• Do geographic or sector/industry classifications relate to frictions in information flow?
  • Which is more important?
Information Network Formulation

- Vertices = firms (global, ex-US)
- Edge sets = proxies for information flow (separate networks):
  - Shared **Director** on Boards
  - Shared **Analyst** covering stocks
  - Shared mention in **News** article
  - High **Correlation** between equity returns
- Community definitions
  - **Country** membership
  - **Sector/industry group** membership
Modularity

\[ Q = \sum_{c_i} \left( \frac{|E_{c_i}^{\text{in}}|}{|E|} - \left( \frac{2|E_{c_i}^{\text{in}}| + |E_{c_i}^{\text{out}}|}{2|E|} \right)^2 \right) \]

- \( |E_{c_i}^{\text{in}}| \) = \# edges between nodes in community \( c_i \)
- \( |E_{c_i}^{\text{out}}| \) = \# edges between nodes in community \( c_i \) and nodes in other communities

- Fitness measure for a given partitioning
- \( Q > 0 \) means edges are denser within-community
Shared Directors Network

Directors Network, sorted by Sector

\[ Q = 0.1 \]
Shared Directors Network

Directors Network, sorted by Sector

Directors Network, sorted by Country

$Q = 0.1$

$Q = 0.66$

Sources: Bloomberg, MSCI/Datastream, Bailard Research.
## Results - Modularities

<table>
<thead>
<tr>
<th></th>
<th>Network Modularities</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Analysts</td>
</tr>
<tr>
<td>Sectors</td>
<td>0.35</td>
</tr>
<tr>
<td>Countries</td>
<td>0.53</td>
</tr>
<tr>
<td>Industry Groups</td>
<td>0.29</td>
</tr>
<tr>
<td>Countries + Sectors</td>
<td>0.25</td>
</tr>
<tr>
<td>Countries + Industry Groups</td>
<td>0.18</td>
</tr>
</tbody>
</table>

- In all cases, countries most closely describe community structure

Sources: Bloomberg, MSCI/Datastream, Thomson Reuters, Ballard Research.
Results - Modularities

• Stocks i,j are connected when $Cor(stock \ i, stock \ j) > \rho$

• For all $\rho$, countries more closely describe community structure

Sources: MSCI/Datastream, Bailard Research.
Results – Impact on Correlations

\[ lm(Cor[i,j] \sim 1 + (cty_i == cty_j) + (sect_i == sect_j) + A[i,j]) \]

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<thead>
<tr>
<th></th>
<th>Network</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Analysts</td>
<td>Directors</td>
<td>News</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.17</td>
<td>0.17</td>
<td>0.16</td>
</tr>
<tr>
<td>(\beta_{cty})</td>
<td>0.06</td>
<td>0.08</td>
<td>0.05</td>
</tr>
<tr>
<td>(\beta_{sect})</td>
<td>0.03</td>
<td>0.03</td>
<td>0.01</td>
</tr>
<tr>
<td>(\beta_{info})</td>
<td>0.11</td>
<td>0.12</td>
<td>0.12</td>
</tr>
</tbody>
</table>

*All significant, p < 0.001*

- Information connections are related to higher return correlations, after controlling for country and sector commonalities
Summary & Implications

• Geography appears the dominant factor in information flow, despite globalization & low communication costs

• ‘Information communities’ have higher return correlations, even after adjusting for country & sector

• Slow diffusion of information has implications for anomalies:
  • Segmented valuations across countries
  • Momentum in country- and stock-cross sections
Thank you!

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