Firm-level Evidence on Globalization

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Motivation

- What is driving the rise in comovement across national stock markets:
  - Financial integration?
  - Real integration?
  - Temporary factors?
Starting Point

- How best to diversify portfolio risk in stock returns: across countries or industries?
- Baca et al. (2000) & Cavaglia et al. (2000) find that the importance of global industry effects has grown in recent years.
- What are the industry effects capturing?
Innovations

• Different data set:
  – Wide coverage.
  – Less survivorship bias in the data.

• Different model: ‘identified’ factor model
  – Relax key assumption in dummy variable model.

• Balance sheet data on sales growth, asset growth and the return on assets: is there real integration in addition to integration in financial markets?
The Data

- Monthly stock market and annual balance sheet data for 10,000 firms in 42 developed and emerging markets from 85:1 – 02:2.
- Data include 2,000 companies that become inactive, due to bankruptcy or merger.
- Firms belong to one of 40 industry sectors.
Dummy Variable Model

- Fixed effects model: following Heston and Rouwenhorst (1994) regress value-weighted cross-section of international stock returns on country and industry dummies.

- Factor model in which factor loadings are assumed to be 0 or 1. Coefficients are the factor realizations.

\[
R_{it} = \alpha_t + \sum_{j=1}^{J} \beta_{jt} I_{ij} + \sum_{k=1}^{K} \gamma_{kt} C_{ik} + e_{it}
\]
The Relative Importance of Country, Industry and Diversification Effects in International Stock Returns

2-Year Averages of R2

- 90:3 to 92:2
- 92:3 to 94:2
- 94:3 to 96:2
- 96:3 to 98:2
- 98:3 to 00:2
- 00:3 to 02:2

- Country, Industry and Diversification Effects
- Country Effects
- Industry Effects
- Diversification Effects
The Relative Importance of Country versus Industry Factors in International U.S. Dollar Sales Growth

- Country Effects
- Industry Effects

R2

- 1996
- 1997
- 1998
- 1999
- 2000
The Relative Importance of Country versus Industry Effects in International U.S. Dollar Asset Growth

- **Country and Industry Effects**
- **Country Effect**
- **Industry Effect**

**Graph Details:**
- **Y-Axis:** R2 values ranging from 0.0 to 0.5
- **X-Axis:** Years 1996 to 2000
- Data points show the relative importance of country and industry effects over these years.
The Results

- Importance of country-specific shocks has fallen from the mid-90s, even though this period coincides with the Asian crisis.
- This is true for international stock returns and for real (balance sheet) variables.
- The importance of global industry effects has grown. Is this globalization?
- Idiosyncratic and global components?
The Factor Model

\[ R_{it} = \alpha_t \lambda_i + \sum_{j=1}^{J} \beta_{jt} \lambda^I_{ij} + \sum_{k=1}^{K} \gamma_{kt} \lambda^C_{ik} + e_{it} \]

- Fixed effects => Random effects model.
- Relax restriction that factor loadings be 0 or 1.
- Allow different companies in the same country (industry) to have different exposures to country (industry) shocks—as well as to global shocks.
- Test restriction that loadings same across firms.
Assumptions

• Same distributional assumptions as in the factor models in the APT literature.

• Key difference: this model is ‘identified’ via zero restrictions on the factor loadings.

• Factors can be given economic interpretation such as global, country and industry shocks:
  – Factors are \textit{ex ante} orthogonal.

\[
\text{var}(R_{it}) = \lambda_i^2 + \sum_{j=1}^{J} \lambda_{ij}^2 + \sum_{k=1}^{K} \lambda_{ik}^2 + \sigma_i^2
\]
<table>
<thead>
<tr>
<th></th>
<th>Global</th>
<th>Country</th>
<th>Industry</th>
<th>Idiosync</th>
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<tr>
<td>All firms</td>
<td>8.98</td>
<td>27.93</td>
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<td>TQI\text{sales}</td>
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<td>22.37</td>
<td>11.21</td>
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<td>12.36</td>
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The Explanatory Power of the Global, Country and Industry Factors in the Factor Model
(Based on ex post factor realizations, equal-weighting and balanced sample: 445 firms)
Preliminary Conclusions

• Q: What is driving the rise in comovement across national stock markets?
• A: Decline in the importance of country-specific shocks.
• Q: Is this driven by financial market integration, balance sheet integration, or is this a temporary phenomenon?
• A: Some evidence of balance-sheet integration.
Work Ahead

• Gibbs-sampler:
  – Standard deviation
  – Able to deal with very large cross section

• Factor model with time-varying coefficients.

• Apply factor model to balance sheet data.