Globalization and Asset Prices

Columbia Business School

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I. Globalization: Definition

Two aspects of globalization:

**Economic Integration:**
- Trade Liberalization
- Dummy
  
  \[ \text{De Jure} \]
  
  \[ \text{De Facto} \]
  
  \[ \text{Exports + Imports} \]
  
  GDP

\[ \text{Wacziarg and Welch (2004)} \]

**Financial Integration:**

- Capital Account Openness Index
  
  \[ \text{Quinn and Toyoda 2001)} \]

- Equity Market Openness
  
  \[ \text{Bekaert and Harvey (2005)} \]
I. Globalization: Definition

- **De Jure Openness ≠ De Facto Integration**
  - Liberalization process is gradual and complex
  - Capital controls may not have been effective
  - Liberalization may not be credible
  - Indirect access may already exist

- Other factors may “segment” markets:
  - political risk
  - corporate governance issues
  - liquidity
  - monetary policy (coordination)
  - currency risk
  - technological factors
I. Globalization: Definition

Trade and Financial Openness

Jan-70 Jan-72 Jan-74 Jan-76 Jan-78 Jan-80 Jan-82 Jan-84 Jan-86 Jan-88 Jan-90 Jan-92 Jan-94 Jan-96 Jan-98 Jan-00 Jan-02 Jan-04

TO FO
I. Globalization: Definition

- Globalization may have wide-ranging effects:
  - Expected Returns, Correlation and Volatility [International Finance]
  - Consumption Risk Sharing, Efficacy of Macroeconomic Policy [International Economics]
  - Investment, Economic Growth [Development Economics]

- Focus Presentation: Effects on Asset Prices; in particular Equity Returns
II. Globalization & Asset Prices

Equity Returns
- Cash Flows
- Discount Rates
  - Real Rates
  - Term Premiums
  - Equity risk premiums

Bond Returns
- Inflation

Economic Integration
- Specialization
- Exposure to world shocks

Financial Integration

Economic Integration
II. Globalization & Asset Prices

◆ Two concrete questions:

1. Has globalization lowered the cost of (equity) capital?

2. Has globalization led to a convergence of asset prices across countries?
III. Globalization and the Cost of Capital

Equity

Asset Prices and Market Integration

Prices

Segmented

Integrated

Return to Integration

Time

High Expected Returns

Announcement of Liberalization

Implementation

Low Expected Returns

\( P_S \)

\( P_I \)
III. Globalization and the Cost of Equity Capital

◆ Capital Asset Pricing Model Intuition (See Bekaert-Harvey (1995)):

Local CAPM: \[ E_{t-1}[r_{it} - r_f] = \lambda_i \text{Var}_{t-1}[r_{it}] \quad \text{Segmented Regime} \]

World CAPM: \[ E_{t-1}[r_{it} - r_f] = \beta_i E_{t-1}[r_{wt} - r_f] = \lambda_w \text{Cov}_{t-1}[r_{it}, r_{wt}] \quad \text{Integrated Regime} \]

with \[ \lambda_w = \frac{E_{t-1}[r_{wt} - r_f]}{\text{Var}_{t-1}[r_{wt}]} \]

\[ \text{Cov}_{t-1}[r_{it}, r_{wt}] << \text{Var}_{t-1}[r_{it}] \]
III. Globalization and the Cost of Equity Capital

- Formal Empirical Evidence by Bekaert and Harvey (2000); Henry (2000); Kim and Singal (2000):

<table>
<thead>
<tr>
<th></th>
<th>Magnitude</th>
<th>Statistically significant</th>
<th>Economically significant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected Returns</td>
<td>5 to 100 bp decrease</td>
<td>yes</td>
<td>maybe</td>
</tr>
<tr>
<td>Return to Integration</td>
<td>3.5% to 9%; 20% (6 months)</td>
<td>sometimes</td>
<td>yes</td>
</tr>
</tbody>
</table>

- Supporting evidence from ADR announcements. *(See Foerster and Karolyi, 1999)*
IV. Globalization and Return Convergence

Popular question: Did globalization increase country return correlations? (see e.g. Longin and Solnik, JIMF, 1995)

Return Correlations Caveats:

1. Correlations increase when world market is more volatile.

2. Correlations increase in bear markets.
   [Longin and Solnik (2001, JF); Ang and Bekaert (2002, RFS)]

3. Correlations do no correct for industry structure.
IV. Globalization and Return Convergence
### IV. Globalization and Return Convergence

<table>
<thead>
<tr>
<th>Versus U.S.</th>
<th>Bull Market Correlations</th>
<th>Bear Market Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>0.189</td>
<td>0.452</td>
</tr>
<tr>
<td>France</td>
<td>0.297</td>
<td>0.429</td>
</tr>
<tr>
<td>Germany</td>
<td>0.203</td>
<td>0.452</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>0.106</td>
<td>0.373</td>
</tr>
<tr>
<td>Japan</td>
<td>0.053</td>
<td>0.263</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.358</td>
<td>0.578</td>
</tr>
<tr>
<td>Spain</td>
<td>0.261</td>
<td>0.483</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0.304</td>
<td>0.568</td>
</tr>
<tr>
<td>EMF (Index)</td>
<td>0.286</td>
<td>0.492</td>
</tr>
</tbody>
</table>

Author’s Computations
Volatility bias in correlations:

Let \( r_i \) = excess equity return on country \( i \)
Let \( r_w \) = excess equity return on world market

Assume:

\[ r_i = \beta_i r_w + \epsilon_i \]

Then:

\[ \rho_{i,w} = \beta_{i,w} \frac{\sigma_w}{\sigma_i} \]

\( \Rightarrow \) Globalization likely reflected in time-variation in \( \beta \)'s.
[Bekaert, Harvey (1997, JFE); Ng (2000, JIMF); Fratzscher (2002, IJ FE); Baele (2005, JFQA)]

• Test for trends
[Longin and Solnik (1995); Bekaert, Hodrick and Zhang (2005)]
IV. Globalization and Return Convergence

◆ Bekaert, Hodrick, Zhang: “International Stock Return Comovements”
  • weekly return data 1980-2003, July
  • 23 MSCI countries, 26 industries (developed markets)

◆ Questions:
  1. Did correlations between U.S. and other countries increase? (1 year of weekly data, rolling)
  2. Did correlations between European countries increase?
IV. Globalization and Return Convergence

US Correlations

-0.4 -0.2 0 0.2 0.4 0.6 0.8 1

USUK USBD USJP
IV. Globalization and Return Convergence

Germany Correlations

BDFR  BDLK  BDIR  BDSW
IV. Globalization and Return Convergence

Model:

\[ R_{j,t} = E(R_{j,t}) + (\beta_{j,t}^{glo})' F_t^{glo} + (\beta_{j,t}^{reg})' F_t^{reg} + \varepsilon_{j,t} \]

- Betas, factor variances, and idiosyncratic variances may change over time.
- All models are re-estimated every 6 months. Parameters are assumed constant during the estimation interval.

Implication:

\[ \text{cov}(R_{j1}, R_{j2}) = B'_{j1} \Sigma F B_{j2} + \text{cov}(\varepsilon_{j1}, \varepsilon_{j2}) \]

- If the factor model is correct, covariances of residuals = 0.
IV. Globalization and Return Convergence

<table>
<thead>
<tr>
<th></th>
<th>correlation sample</th>
<th>trend lower</th>
<th>upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>all countries</td>
<td>37%</td>
<td>-0.763</td>
<td>1.258</td>
</tr>
<tr>
<td>G7</td>
<td>37%</td>
<td>-0.827</td>
<td>1.272</td>
</tr>
<tr>
<td>Europe</td>
<td>54%</td>
<td>0.177</td>
<td>0.983</td>
</tr>
<tr>
<td>Far East</td>
<td>30%</td>
<td>-1.377</td>
<td>1.226</td>
</tr>
<tr>
<td>US vs. Far East</td>
<td>27%</td>
<td>-0.662</td>
<td>0.483</td>
</tr>
<tr>
<td>US vs. Europe</td>
<td>39%</td>
<td>-0.978</td>
<td>1.748</td>
</tr>
<tr>
<td>US vs. all other countries</td>
<td>35%</td>
<td>-0.966</td>
<td>1.436</td>
</tr>
</tbody>
</table>

- Only in European countries do we find evidence of a positive trend in correlations.
- Trend due to time variation in $\beta'$s
IV. Globalization and Return Convergence

- Evidence from parameterized $\beta'$s for developed markets mixed!

  ➡️ Links with measures of trade/financial market integration not always significant.

  ➡️ Gradual integration.

  ➡️ Regional integration more important than global integration?
IV. Globalization and Return Convergence

Informal evidence from bivariate country by country regressions:

<table>
<thead>
<tr>
<th></th>
<th>70’s</th>
<th>80’s</th>
<th>90’s</th>
<th>+2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>All developed (except USA)</td>
<td>0.178</td>
<td>0.409</td>
<td>0.257</td>
<td>0.300</td>
</tr>
<tr>
<td>EMU</td>
<td>0.174</td>
<td>0.462</td>
<td>0.013</td>
<td>0.082</td>
</tr>
<tr>
<td>Europe, outside EMU</td>
<td>0.029</td>
<td>0.281</td>
<td>0.129</td>
<td>0.358</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>70’s</th>
<th>80’s</th>
<th>90’s</th>
<th>+2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>All developed (except USA)</td>
<td>0.738</td>
<td>0.449</td>
<td>0.750</td>
<td>0.644</td>
</tr>
<tr>
<td>EMU</td>
<td>0.649</td>
<td>0.422</td>
<td>0.975</td>
<td>0.900</td>
</tr>
<tr>
<td>Europe, outside EMU</td>
<td>0.837</td>
<td>0.623</td>
<td>0.923</td>
<td>0.607</td>
</tr>
</tbody>
</table>
IV. Globalization and Return Convergence

Baele, Ferrando, Hordahl, Krylova and Monnet (OREP, 2004)
## IV. Globalization and Return Convergence

◆ Further evidence from parameterized $\beta'$s:

<table>
<thead>
<tr>
<th>Market</th>
<th>$\beta_{US}$</th>
<th>$\beta_{reg}$</th>
<th>$VR_{US}$</th>
<th>$VR_{reg}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Europe</td>
<td>0.042 (0.009)</td>
<td>0.043 (0.007)</td>
<td>0.018 (0.005)</td>
<td>0.021 (0.004)</td>
</tr>
<tr>
<td></td>
<td>[0.224,0.883]</td>
<td>[-0.048,0.971]</td>
<td>[0.026,0.228]</td>
<td>[0.002,0.308]</td>
</tr>
<tr>
<td>Asia</td>
<td>-0.036 (0.013)</td>
<td>0.261 (0.022)</td>
<td>-0.007 (0.004)</td>
<td>0.084 (0.010)</td>
</tr>
<tr>
<td></td>
<td>[-0.055,0.875]</td>
<td>[0.169,0.558]</td>
<td>[0.009,0.182]</td>
<td>[0.056,0.278]</td>
</tr>
<tr>
<td>Latin-America</td>
<td>0.130 (0.013)</td>
<td>0.063 (0.009)</td>
<td>0.033 (0.006)</td>
<td>0.016 (0.004)</td>
</tr>
<tr>
<td></td>
<td>[0.216,1.205]</td>
<td>[-0.015,0.825]</td>
<td>[0.021,0.143]</td>
<td>[0.009,0.185]</td>
</tr>
<tr>
<td>Europe (mean level 90’s)</td>
<td>0.045 [0.410]</td>
<td>0.090 [0.775]</td>
<td>0.075 [0.255]</td>
<td>0.110 [0.210]</td>
</tr>
</tbody>
</table>

Sources:  • Bekaert, Harvey, Ng (2005)
  • Baele (2005)
2006 Data through April 2002. There are no pre-liberalization data for Indonesia.
IV. Globalization and Return Convergence: The Industry-Country Debate

- Industry-Country Debate: Should you diversify across countries or across industries?

- Perception: “Country factors are much more important than industry factors”

⇒ Effects of globalization?
# The Industry-Country Debate

| OLD RESULTS  
  (until 1999) | NEW RESULTS  
  (after 1999) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Low correlation between countries</td>
<td>High correlations between countries</td>
</tr>
<tr>
<td>High(er) correlation between industries</td>
<td>Low correlations between industries</td>
</tr>
<tr>
<td>Volatile country factors</td>
<td>Volatile industry factors</td>
</tr>
<tr>
<td>Diversify across countries</td>
<td>Diversify across industries</td>
</tr>
<tr>
<td>Novartis low correlation with Merck</td>
<td>Novartis high correlation with Merck</td>
</tr>
<tr>
<td>IBM high correlation with Merck</td>
<td>IBM low correlation with Merck</td>
</tr>
</tbody>
</table>
Industry-Country Debate

◆ **Key questions:**

• Is the effect permanent?
  - Globalization
  - Regional integration (NAFTA, EU, ASEAN)

• Or might it be temporary?
  - TMT bubble (Brooks and Del Negro, JEF, 2004)
  - Roaring bull, then bear market (increased volatility)
IV. Globalization and Return Convergence

Industry Correlation

- INFO-UTIL
- AUTO-ELEC
IV. Globalization and Return Convergence
### The Industry–Country Debate

Panel B. Country portfolio correlation $\gamma$ – industry portfolio correlation $\gamma$ for full sample

<table>
<thead>
<tr>
<th>Beta Factor cov</th>
<th>With TMT industries</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
<td>$\gamma$^{CORR}</td>
</tr>
<tr>
<td></td>
<td>sample</td>
<td>risk</td>
<td>sample</td>
<td>risk</td>
<td>sample</td>
<td>risk</td>
<td>sample</td>
<td>risk</td>
<td>sample</td>
<td>risk</td>
<td>sample</td>
<td>risk</td>
<td>sample</td>
<td>risk</td>
<td>sample</td>
</tr>
<tr>
<td>mean</td>
<td>-25%</td>
<td>-25%</td>
<td>-42%</td>
<td>-25%</td>
<td>-26%</td>
<td>-26%</td>
<td>-45%</td>
<td>-26%</td>
<td>-45%</td>
<td>-26%</td>
<td>-45%</td>
<td>-26%</td>
<td>-45%</td>
<td>-26%</td>
<td>-45%</td>
</tr>
<tr>
<td>std. dev.</td>
<td>15%</td>
<td>15%</td>
<td>22%</td>
<td>13%</td>
<td>15%</td>
<td>15%</td>
<td>22%</td>
<td>13%</td>
<td>15%</td>
<td>15%</td>
<td>22%</td>
<td>13%</td>
<td>22%</td>
<td>13%</td>
<td>22%</td>
</tr>
<tr>
<td>correl(.,data)</td>
<td>100%</td>
<td>100%</td>
<td>77%</td>
<td>89%</td>
<td>100%</td>
<td>100%</td>
<td>76%</td>
<td>89%</td>
<td>100%</td>
<td>100%</td>
<td>76%</td>
<td>89%</td>
<td>76%</td>
<td>89%</td>
<td>76%</td>
</tr>
</tbody>
</table>

Panel C. Country portfolio correlation $\gamma$ – industry portfolio correlation $\gamma$ for 1991 - 2000

| Beta Factor cov | With TMT industries |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------|---------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|                | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} | $\gamma$^{CORR} |
|                | sample             | risk              | sample             | risk              | sample             | risk              | sample             | risk              | sample             | risk              | sample             | risk              | sample             | risk              | sample             | risk              |
| mean           | -21%               | -22%              | -45%               | -23%              | -23%               | -23%              | -47%               | -23%              | -47%               | -23%              | -47%               | -23%              | -47%               | -23%              | -47%               | -23%              |
| std. dev.      | 20%                | 20%               | 30%                | 17%               | 20%                | 20%               | 31%                | 17%               | 20%                | 20%               | 31%                | 17%               | 31%                | 17%               | 31%                | 17%               |
| correl(.,data) | 100%               | 100%              | 87%                | 92%               | 100%               | 100%              | 87%                | 91%               | 100%               | 100%              | 87%                | 91%               | 87%                | 91%               | 87%                | 91%               |
| lower          | 1.160              | 1.209             | -3.925             | 0.816             | 1.573              | 1.474             | -4.019             | 0.673             | 1.573              | 1.474             | -4.019             | 0.673             | 1.573              | 1.474             | -4.019             | 0.673             |
IV. Globalization and Return Convergence: The Industry Country Debate

- **Baele – Inghelbrecht (2006)**: Parameterize $\beta$ function
  - Trade integration (global and regional)
  - Industry misalignment

- **Results**:
  - Country diversification remains dominant but margin over industry diversification has decreased
  - TMT bubble caused temporary surge in important industry factors
IV. Globalization and Return Convergence: Contagion

- Contagion = Excess comovements in times of crises

- Critique 1: Forbes and Rigobon (JF, 2002):
  Heteroskedasticity biases bivariate correlations upward in times of high volatility
  - no evidence of contagion during Mexican and South-East Asian crisis.

- Critique 2: Bekaert, Harvey and Ng (JB, 2005)
  Contagion = excess correlation over and above what one would expect from economic fundamentals (trade openness; degree of integration)
  - no evidence of contagion during Mexican crisis
  - evidence of contagion during South-East Asian crisis
Follow Bekaert, Harvey, Lundblad and Siegel (JF, 2006)

Country’s stock market = basket of industries

$IW_{it}$: vector of industry weights

$PE_{it}$: vector of price earnings ratios

\[
\text{Local valuation} = \text{LGO} = IW_{it}'PE_{it}
\]

\[
\text{World valuation} = \text{GGO} = IW_{it}'PE_{wt}
\]

Also define

\[
\text{WGO} = IW_{wt}'PE_{wt}
\]
V. Globalization and Asset Prices

Valuation differentials between equity markets:

\[
LGO_{it} - WGO_{t} = \left[ LGO_{it} - GGO_{it} \right] + \left[ GGO_{it} - WGO_{t} \right]
\]

\[\uparrow\]
World versus local prices (LEGO)

\[\uparrow\]
Industrial structure (GEGO)

\[\Rightarrow\] Graph Smoothed (12 month moving average) Cross sectional standard deviation
V. Globalization and Asset Prices

Valuation and Earnings Growth Dispersion

- CS_t (ValDiff)
- CS_t (Earnings Growth)
- CS_t (LEGO)
- CS_t (GEGO)
V. Globalization and Asset Prices

Valuation Dispersion (Earnings Yield Units)

CS_t (LEGO in EY)  CS_t (GEGO in EY)
Conclusions

- Cost of capital effects of globalization seem consistent with standard theory.
- Globalization has increased country return correlations but must establish:
  - relative role of financial versus trade integration
  - regional versus global integration
- Country return correlations do not correct for:
  - industrial structure
  - temporary movements in factor volatilities
  - changes in cash flow correlations
- Surge in “industry factors” partially temporary
- Correlations cannot be used to measure contagion!