Globalization and Asset Prices

Columbia Business School

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I. Globalization: Definition

◆ Two aspects of globalization:

|	De Jure	De Facto
Economic Integration:	Trade Liberalization Dummy [Wacziarg and Welch (2004)]	[Exports + Imports] / GDP
Financial Integration:	• Capital Account Openness Index [Quinn and Toyoda 2001)]	Capital Flow Data
	• Equity Market Openness [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
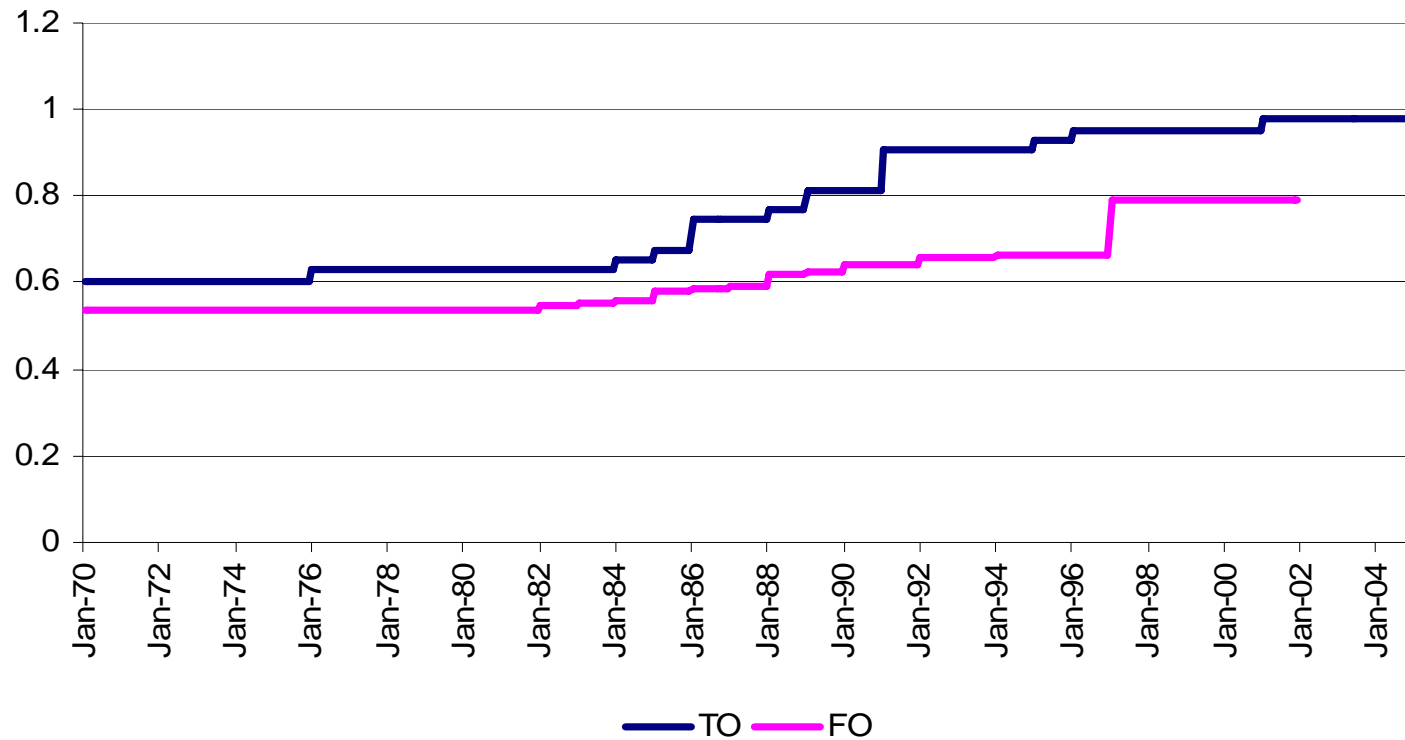
I. Globalization: Definition

◆ 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
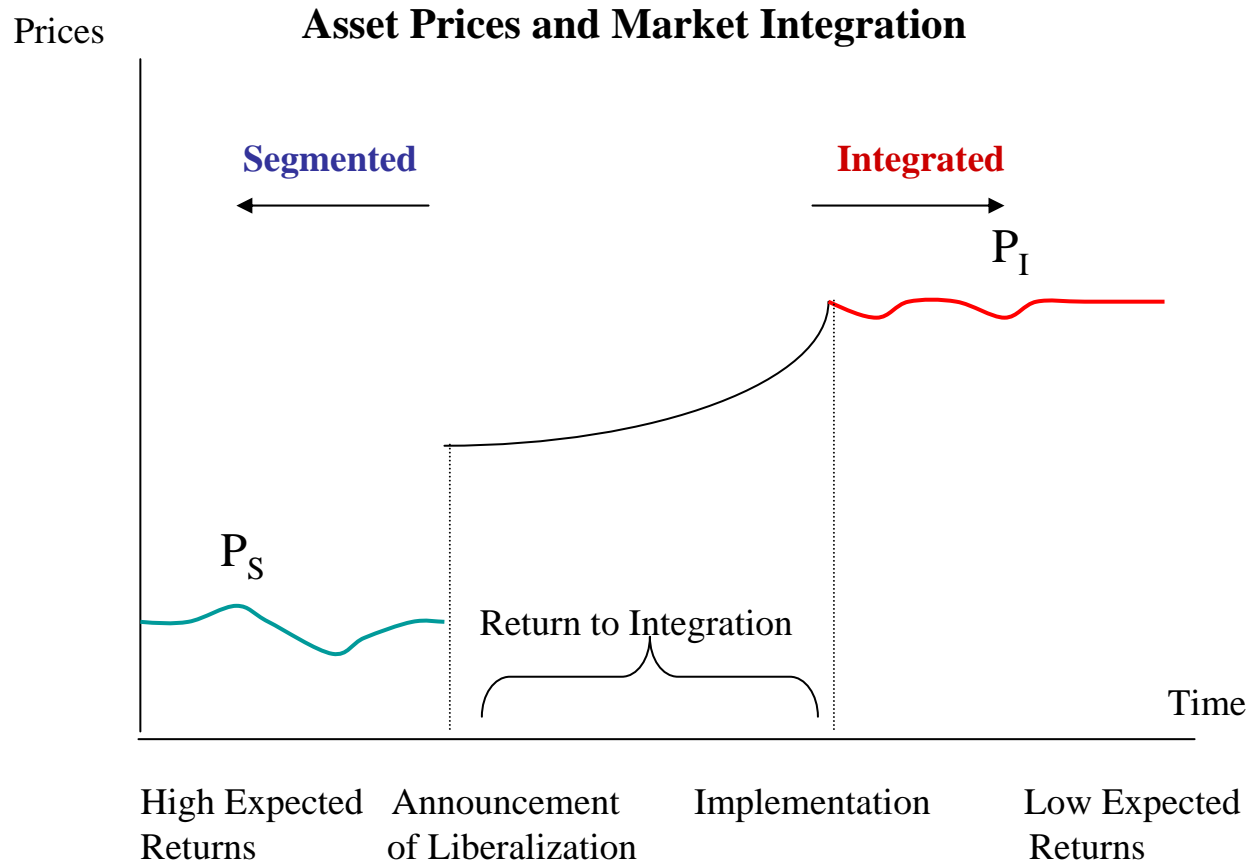
II. Globalization & Asset Prices
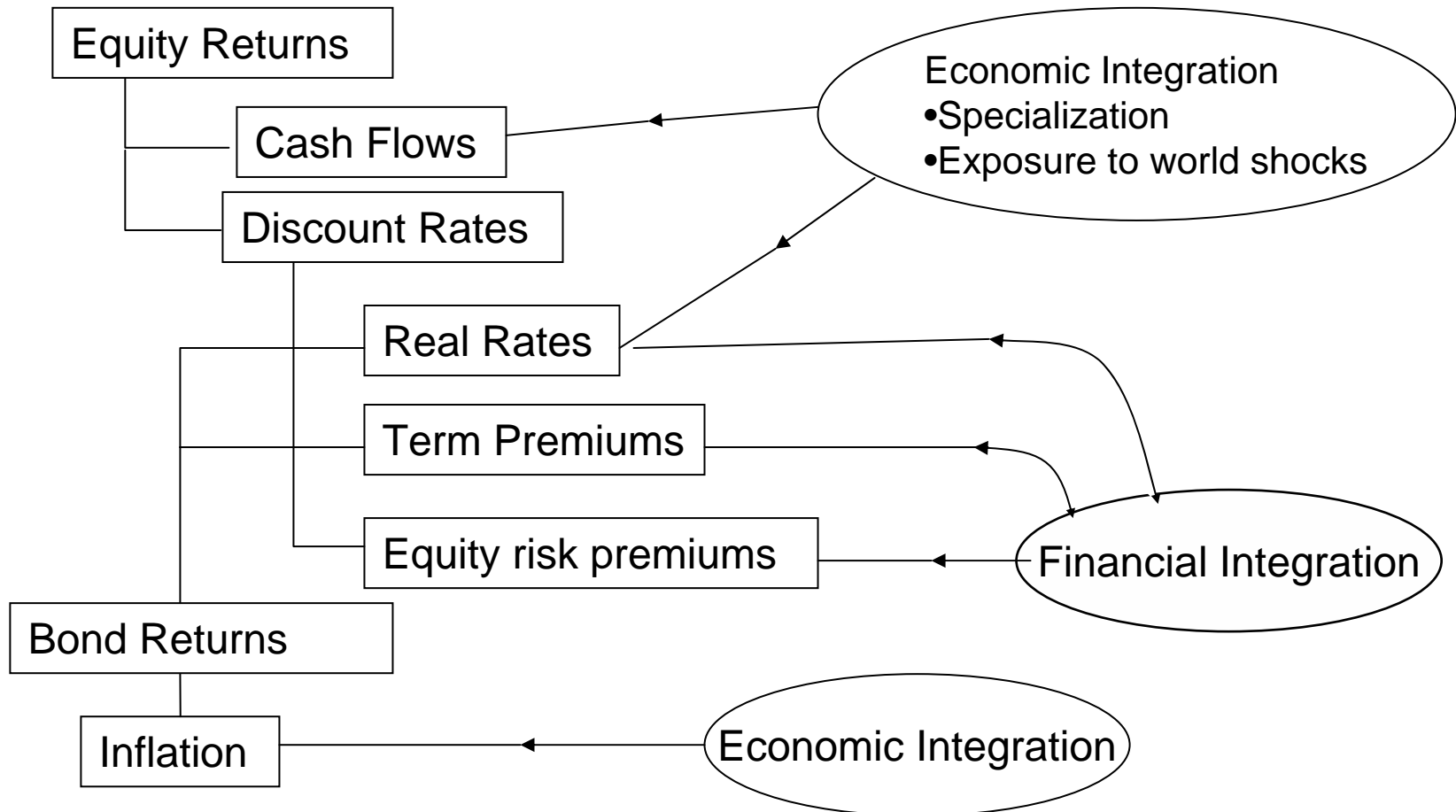
II. Globalization & Asset Prices

◆ Two concrete questions:

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

2. Has globalization led to a convergence of asset prices across countries?

Asset Prices and Market Integration

Prices

Segmented

Integrated

P_I

P_S

Return to Integration

Time

High Expected Returns | Announcement of Liberalization | Implementation | Low Expected Returns

III. Globalization and the Cost of Equity Capital

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

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

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

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

$$\mathrm{Cov}_{t-1}\left[r_{it}, r_{wt}\right] <<<< \mathrm{Var}_{t-1}\left[r_{it}\right]$$

III. Globalization and the Cost of Equity Capital

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

	Magnitude	Statistically significant	Economically significant
Expected Returns	5 to 100 bp decrease	yes	maybe
Return to Integration	3.5% to 9%; 20% (6 months)	sometimes	yes

◆ 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

US-UK Exceedance Correlations
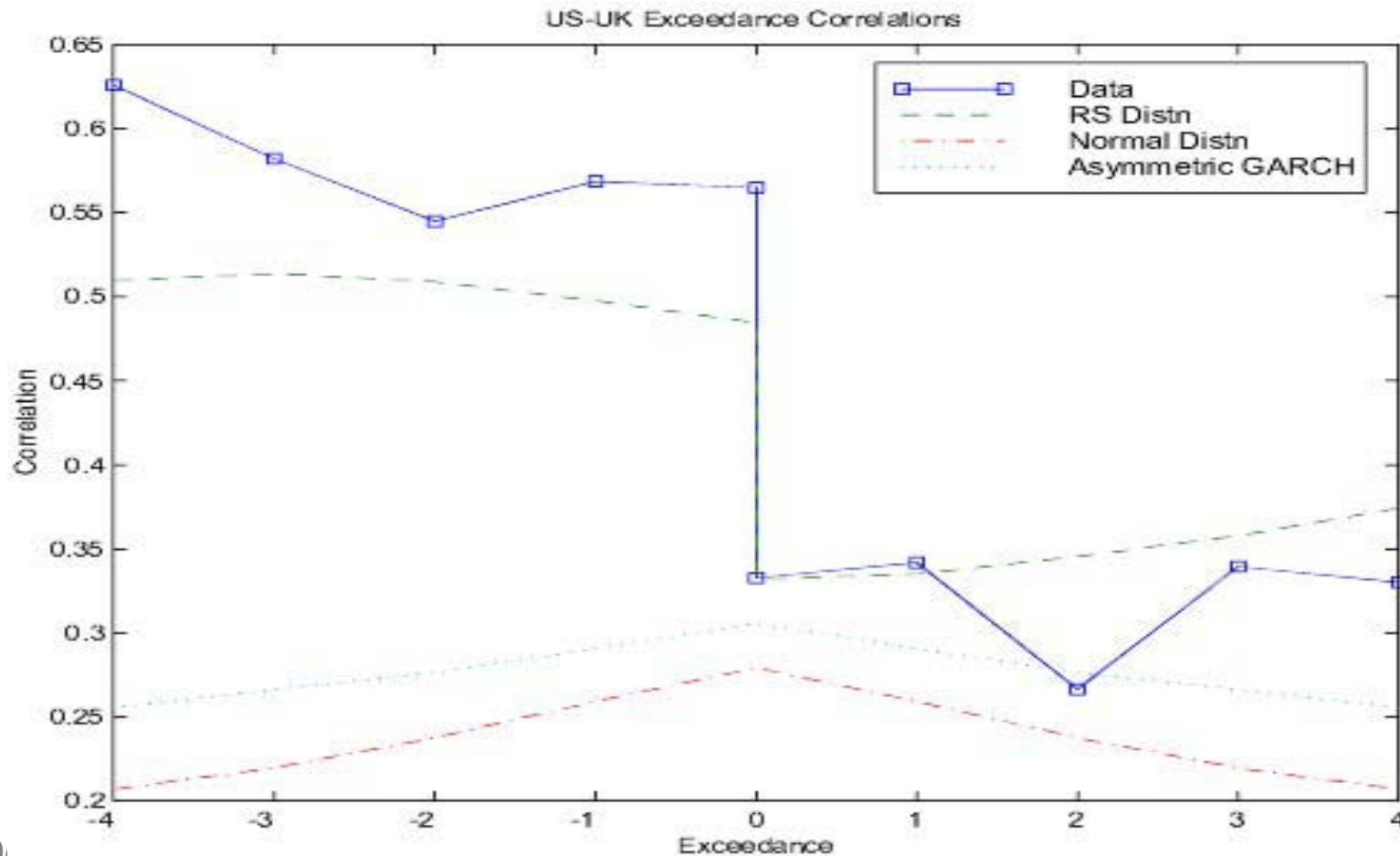
IV. Globalization and Return Convergence

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

Author's Computations

IV. Globalization and Return Convergence

◆ <u>Volatility bias in correlations</u>:

Let r_i = excess equity return on country i

Let r_w = excess equity return on world market

Assume:

$$r_i = \beta_i \; r_w + \varepsilon_i$$

Then:

$$\rho_{i,w} = \beta_{i,w} \; \frac{\sigma_w}{\sigma_i}$$

$\Rightarrow$

• Globalization likely reflected in time-variation in $\beta \text{'s}$.
  [Bekaert, Harvey (1997, JFE); Ng (2000, JIMF); Fratzscher (2002, IJFE); 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?

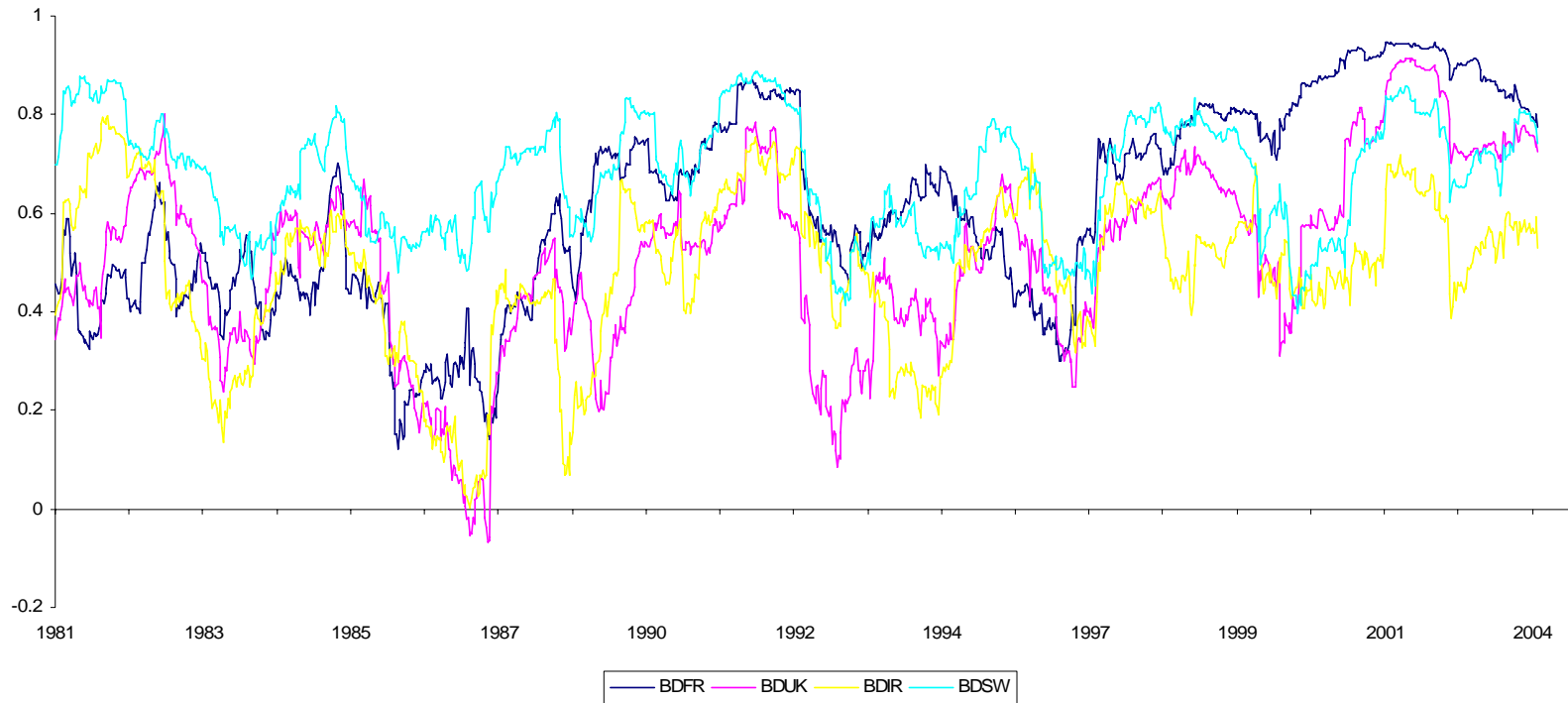# IV. Globalization and Return Convergence

US Correlations
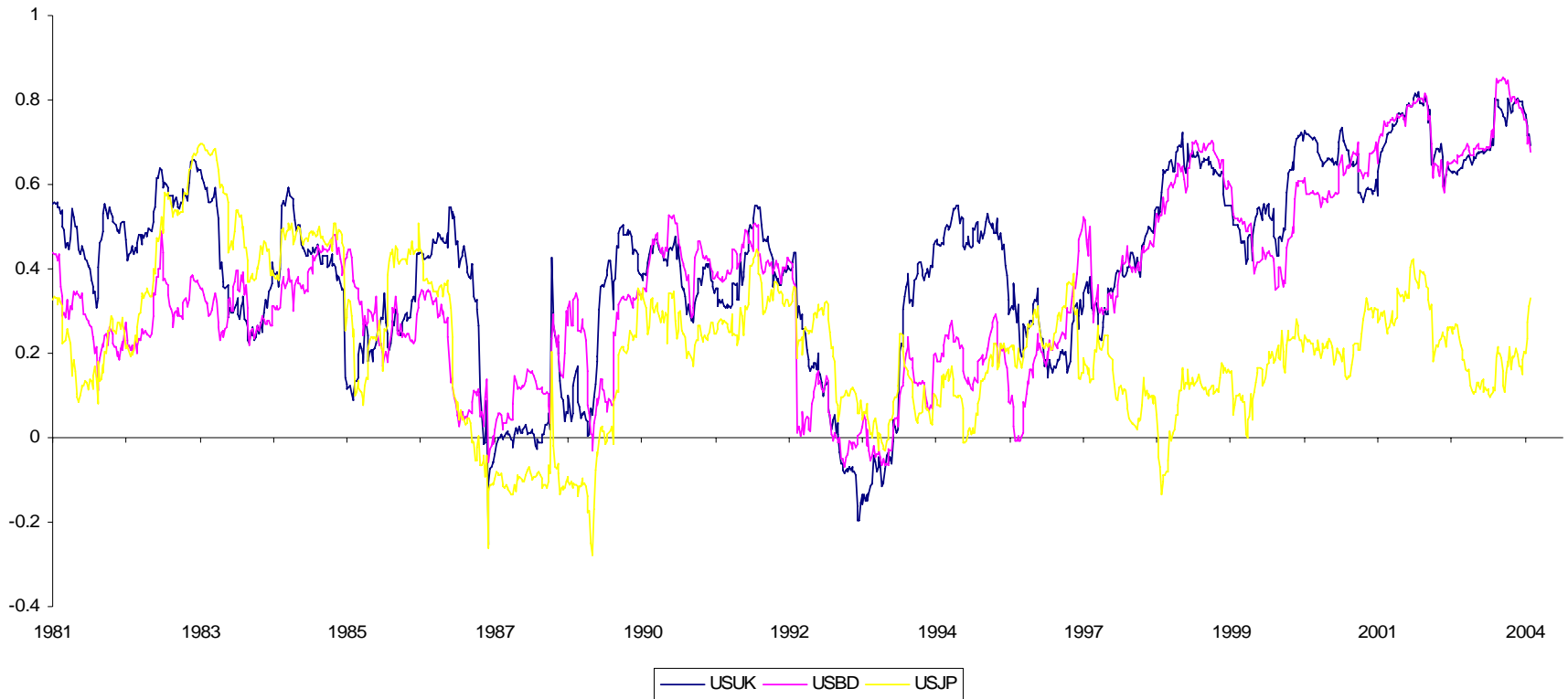
IV. Globalization and Return Convergence

Germany Correlations

IV. Globalization and Return Convergence

◆ Model:

$$R_{j,t} = E\left(R_{j,t}\right) + \left(\beta_{j,t}^{glo}\right)' F_t^{glo} + \left(\beta_{j,t}^{r\varepsilon g}\right)' F_t^{r\varepsilon g} + \varepsilon_{j,t}$$

- 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:

$$\mathrm{cov}\left(R_{j1}, R_{j2}\right) = B'_{j1} \Sigma_F B_{j2} + \mathrm{cov}\left(\varepsilon_{j1}, \varepsilon_{j2}\right)$$

- If the factor model is correct, covariances of residuals = 0.

IV. Globalization and Return Convergence

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

- 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!

$\Longrightarrow$ Links with measures of trade/financial market integration not always significant.

$\Longrightarrow$ Gradual integration.

$\Longrightarrow$ Regional integration more important than global integration?

IV. Globalization and Return Convergence

◆ Informal evidence from bivariate country by country regressions:

WORLD BETA

	70's	80's	90's	+2000
All developed (except USA)	0.178	0.409	0.257	0.300
EMU	0.174	0.462	0.013	0.082
Europe, outside EMU	0.029	0.281	0.129	0.358

REGIONAL BETA

	70's	80's	90's	+2000
All developed (except USA)	0.738	0.449	0.750	0.644
EMU	0.649	0.422	0.975	0.900
Europe, outside EMU	0.837	0.623	0.923	0.607

IV. Globalization and Return Convergence

Legend (top chart):
- EU Shock Spillover Intensity
- US Shock Spillover Intensity
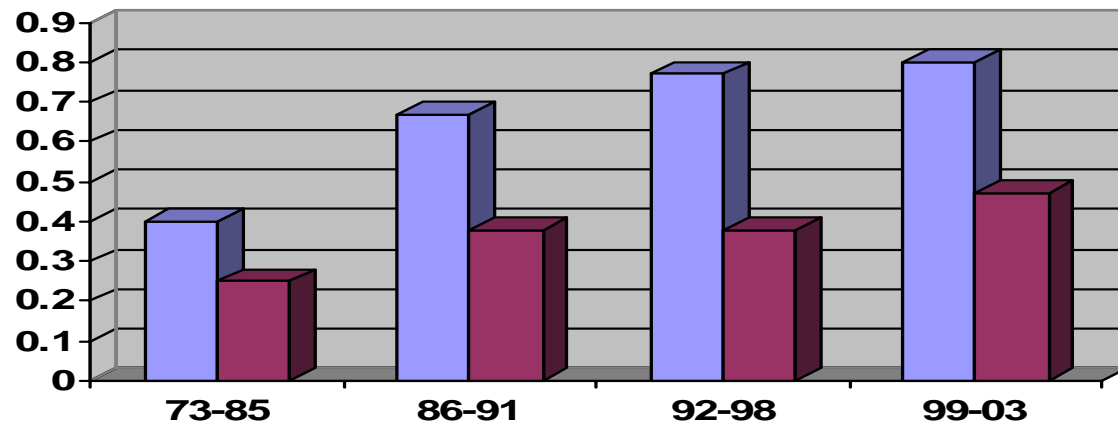
Legend (bottom chart):
- European Shocks
- US Shocks

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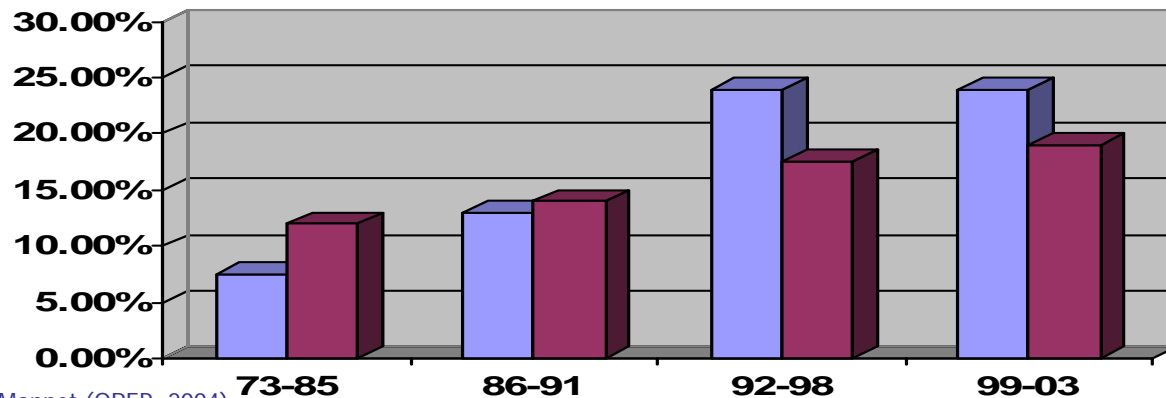
IV. Globalization and Return Convergence

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

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

Sources: • Bekaert, Harvey, Ng (2005)
• Baele (2005)

Beta with World
Pre and Post Bekaert-Harvey Official Liberalization Dates
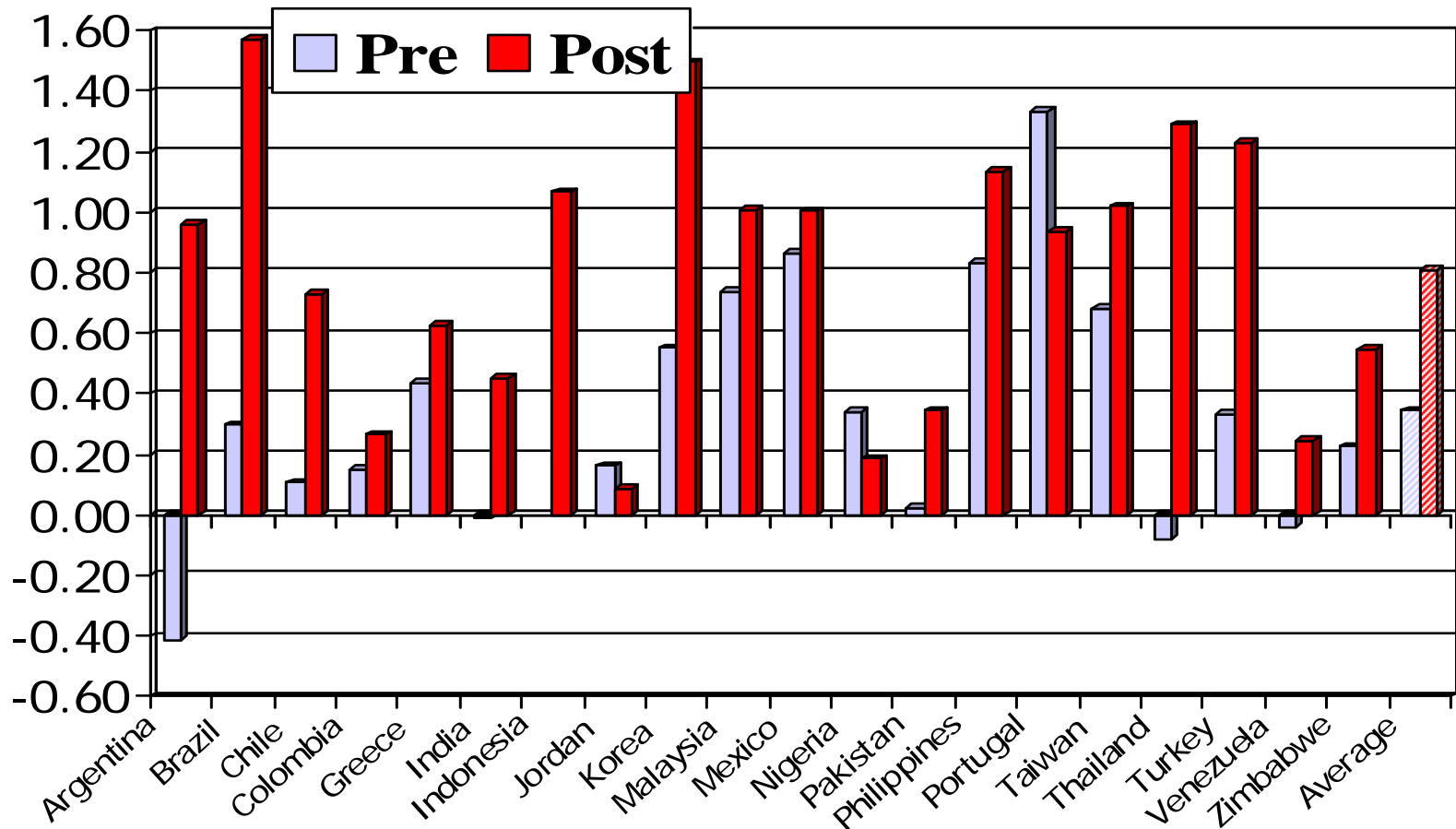
Data through April 2002. There are no pre-liberalization data for Indonesia.

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)
Low correlation between countries	High correlations between countries
High(er) correlation between industries	Low correlations between industries
Volatile country factors	Volatile industry factors
Diversify across countries	Diversify across industries
Novartis low correlation with Merck	Novartis high correlation with Merck
IBM high correlation with Merck	IBM low correlation with Merck
Rouwenhorst (1999, FAJ)	Cavaglia, Brightman, Aked (2000, FAJ)
Griffin and Karolyi (1998, RFS)	Ferreira and Gama (2005, JFQA)
Beckers, Connor, Curds (1996, FAJ)	Brooks and Del Negro (2004, JEF)

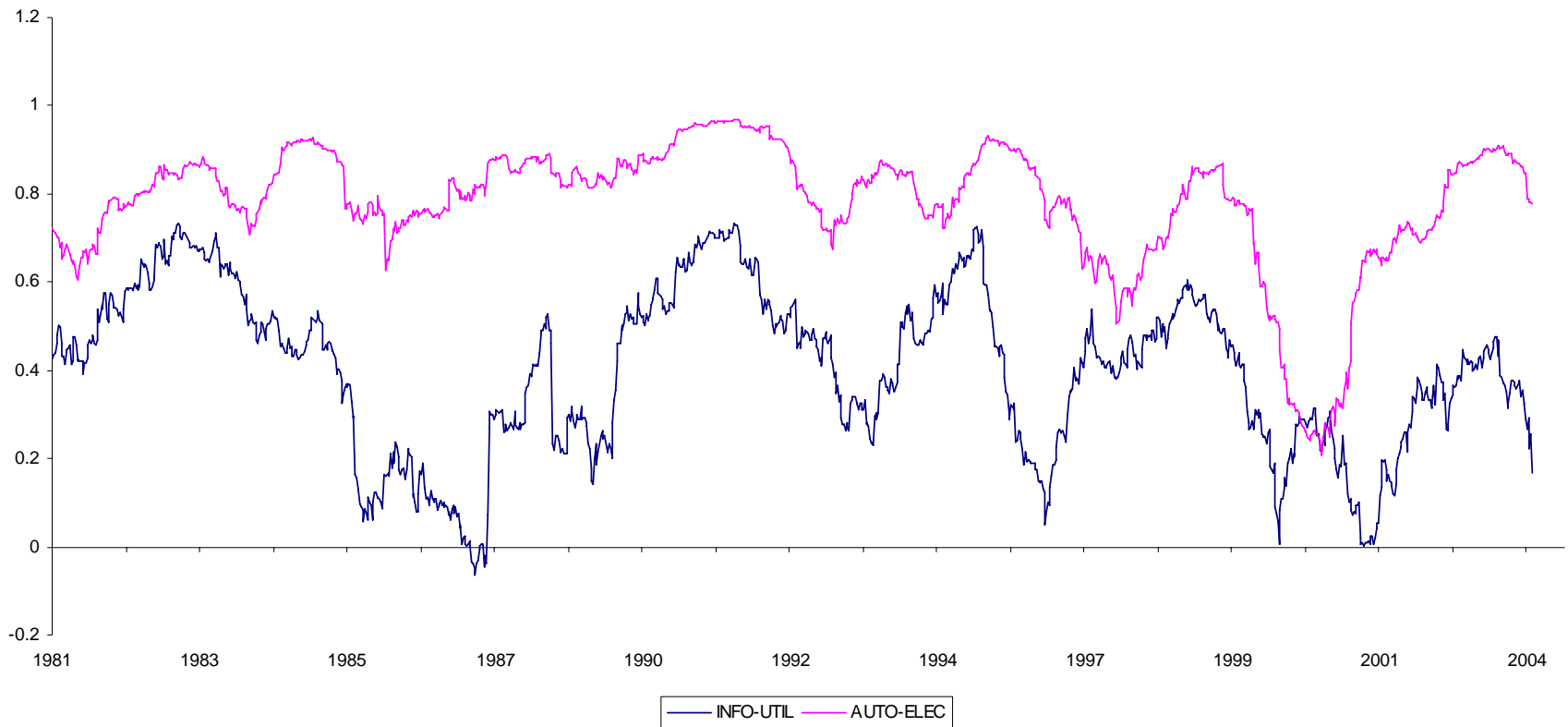# Industry-Country Debate

◆ <u>Key questions</u>:

- 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)
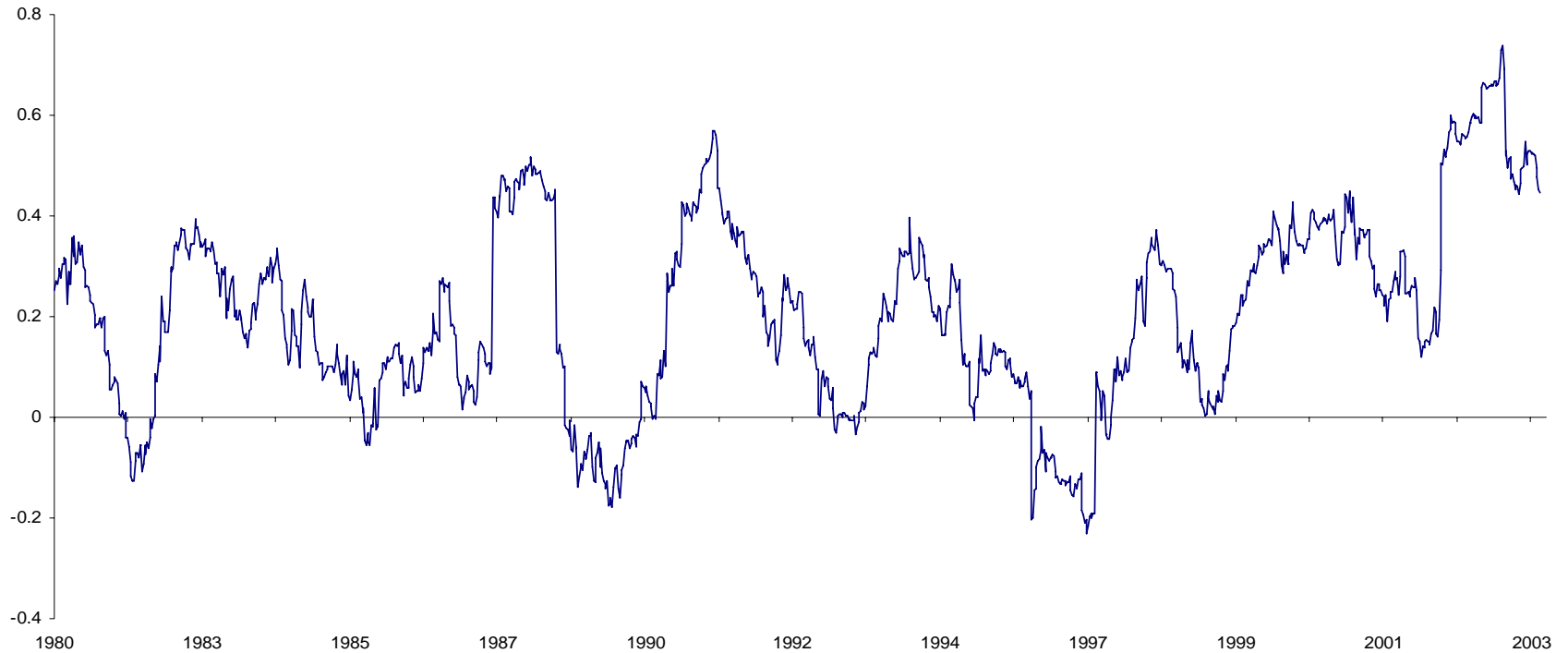
IV. Globalization and Return Convergence

Industry Correlation

IV. Globalization and Return Convergence

CORRELATION BETWEEN MERCK AND NOVARTIS

The Industry–Country Debate

Panel B. Country portfolio correlation γ – industry portfolio correlation γ for full sample

	With TMT industries				Without TMT industries			
	γ^{CORR}_{sample}	γ^{CORR}_{risk}	γ^{CORR}_{risk}	γ^{CORR}_{risk}	γ^{CORR}_{sample}	γ^{CORR}_{risk}	γ^{CORR}_{risk}	γ^{CORR}_{risk}
Beta		Free	Free	TSA		Free	Free	TSA
Factor cov		Free	TSA	Free		Free	TSA	Free
mean	-25%	-25%	-42%	-25%	-26%	-26%	-45%	-26%
std. dev.	15%	15%	22%	13%	15%	15%	22%	13%
correl(.,data)	100%	100%	77%	89%	100%	100%	76%	89%
lower	-3.301	-2.975	-8.135	-1.057	-3.264	-3.425	-6.886	-1.190
upper	3.922	3.600	8.105	1.575	3.817	4.061	6.718	1.698

Panel C. Country portfolio correlation γ – industry portfolio correlation γ for 1991 - 2000

	With TMT industries				Without TMT industries			
	γ^{CORR}_{sample}	γ^{CORR}_{risk}	γ^{CORR}_{risk}	γ^{CORR}_{risk}	γ^{CORR}_{sample}	γ^{CORR}_{risk}	γ^{CORR}_{risk}	γ^{CORR}_{risk}
Beta		Free	Free	TSA		Free	Free	TSA
Factor cov		Free	TSA	Free		Free	TSA	Free
mean	-21%	-22%	-45%	-23%	-23%	-23%	-47%	-23%
std. dev.	20%	20%	30%	17%	20%	20%	31%	17%
correl(.,data)	100%	100%	87%	92%	100%	100%	87%	91%
lower	1.160	1.209	-3.925	0.816	1.573	1.474	-4.019	0.673
upper	4.235	4.132	15.727	2.890	3.694	3.994	15.633	3.158

2006   From Bekaert, Hodrick and Zhang (2005))

IV. Globalization and Return Convergence: The Industry Country Debate

◆ <u>Baele – Inghelbrecht (2006)</u> : Parameterize β function

- Trade integration (global and regional)
- Industry misalignment

◆ <u>Results</u>:

- 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

V. Globalization & Asset Prices

◆ 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

$$Local\ valuation = LGO = IW_{it}'PE_{it}$$

$$World\ valuation = GGO = IW_{it}'PE_{wt}$$

$$Also\ define \qquad WGO = IW_{wt}'PE_{wt}$$

V. Globalization and Asset Prices

◆ Valuation differentials between equity markets:

$$\text{LGO}_{it} - \text{WGO}_t = \left[\text{LGO}_{it} - \text{GGO}_{it}\right] + \left[\text{GGO}_{it} - \text{WGO}_t\right]$$
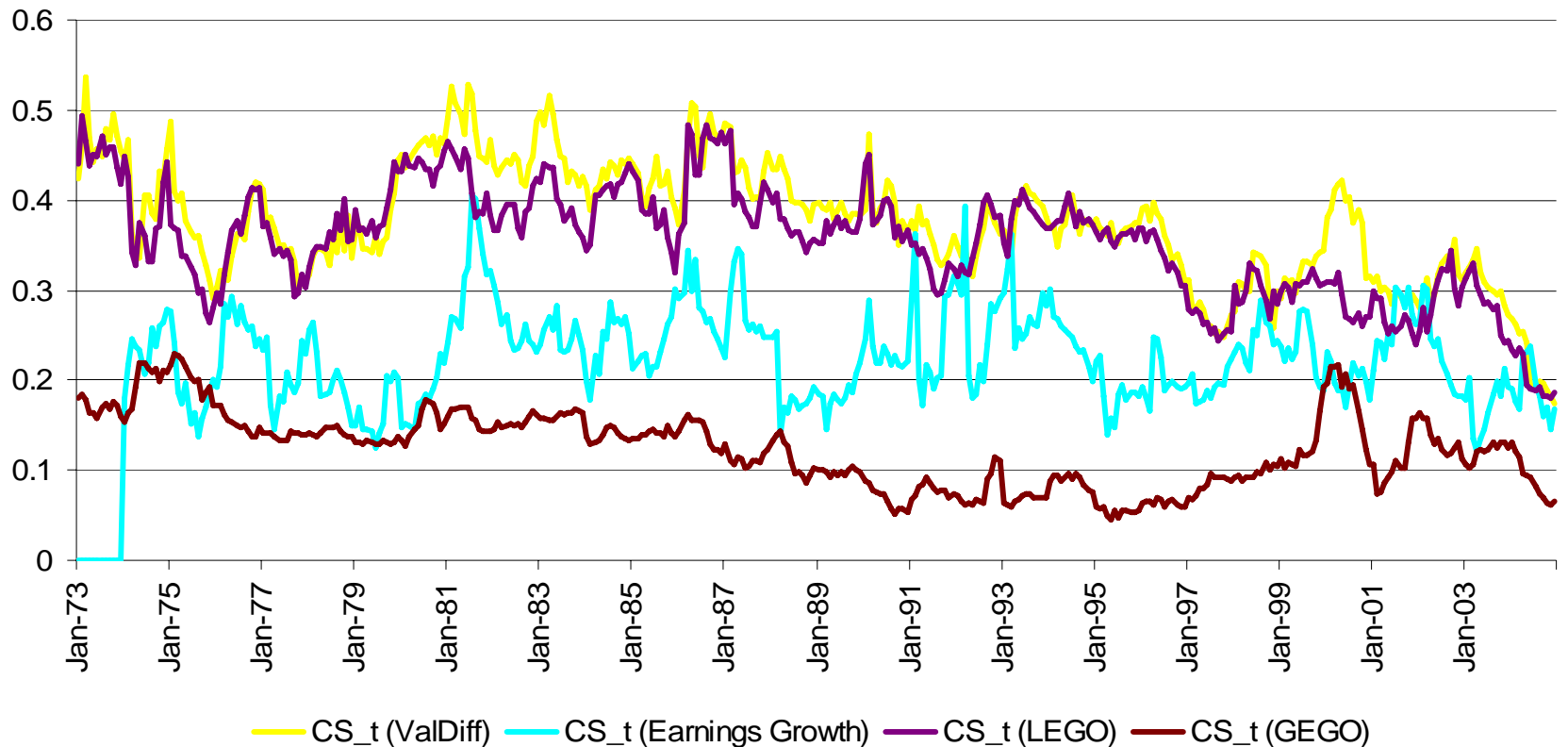
↑
World versus
local prices
(LEGO)

↑
Industrial structure
(GEGO)

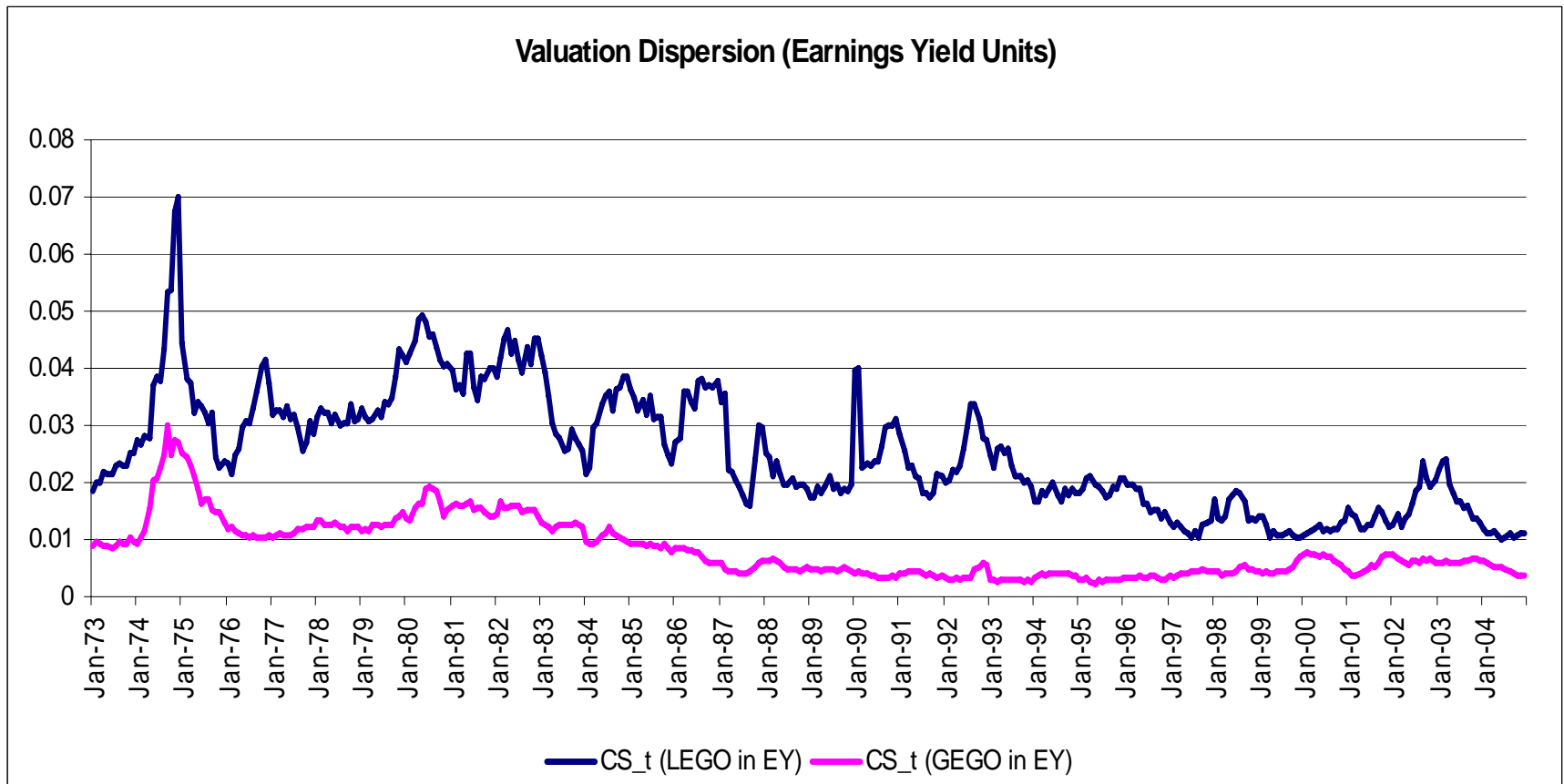⇨ Graph Smoothed (12 month moving average) Cross sectional
standard deviation

V. Globalization and Asset Prices

Valuation and Earnings Growth Dispersion

Legend: 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!