



Working Paper D.1.1a

How does European Integration affect the European Stock Markets?

Burcu Erdogan

Berlin

05.03.2009

Outline

- 1 Motivation
- 2 Literature
- 3 Methods to Measure Financial Integration
 - Correlation Analysis
 - β -Convergence
 - σ -Convergence
- 4 Empirical Analysis
 - Data
 - Correlation Analysis
 - σ -Convergence
 - β -Convergence
- 5 Conclusion

Outline

- 1 Motivation
- 2 Literature
- 3 Methods to Measure Financial Integration
 - Correlation Analysis
 - β -Convergence
 - σ -Convergence
- 4 Empirical Analysis
 - Data
 - Correlation Analysis
 - σ -Convergence
 - β -Convergence
- 5 Conclusion

The integration of the financial markets adds to...

The integration of the financial markets adds to...

- effective transmission of the common monetary policy

The integration of the financial markets adds to...

- effective transmission of the common monetary policy
- economic growth

The integration of the financial markets adds to...

- effective transmission of the common monetary policy
- economic growth

by removing frictions and barriers to exchange and by allocating the capital more effectively.

The integration of the financial markets adds to...

- effective transmission of the common monetary policy
- economic growth

by removing frictions and barriers to exchange and by allocating the capital more effectively.

Integrated stock markets...

The integration of the financial markets adds to...

- effective transmission of the common monetary policy
- economic growth

by removing frictions and barriers to exchange and by allocating the capital more effectively.

Integrated stock markets...

- generate a larger pool of funds other than the limited local financing.

The integration of the financial markets adds to...

- effective transmission of the common monetary policy
- economic growth

by removing frictions and barriers to exchange and by allocating the capital more effectively.

Integrated stock markets...

- generate a larger pool of funds other than the limited local financing.
- promote to decreasing the cost of equity capital.

The integration of the financial markets adds to...

- effective transmission of the common monetary policy
- economic growth

by removing frictions and barriers to exchange and by allocating the capital more effectively.

Integrated stock markets...

- generate a larger pool of funds other than the limited local financing.
- promote to decreasing the cost of equity capital.
- increase the number of productive investments and flourish the economic growth.

The integration of the financial markets adds to...

- effective transmission of the common monetary policy
- economic growth

by removing frictions and barriers to exchange and by allocating the capital more effectively.

Integrated stock markets...

- generate a larger pool of funds other than the limited local financing.
- promote to decreasing the cost of equity capital.
- increase the number of productive investments and flourish the economic growth.
- enable households to smooth their consumption in a better way.

The integration of the financial markets adds to...

- effective transmission of the common monetary policy
- economic growth

by removing frictions and barriers to exchange and by allocating the capital more effectively.

Integrated stock markets...

- generate a larger pool of funds other than the limited local financing.
- promote to decreasing the cost of equity capital.
- increase the number of productive investments and flourish the economic growth.
- enable households to smooth their consumption in a better way.

Research questions

Research questions

- Does integration in European money and bond markets affect the European stock markets?

Research questions

- Does integration in European money and bond markets affect the European stock markets?
- How strongly are the European stock markets integrated?

Research questions

- Does integration in European money and bond markets affect the European stock markets?
- How strongly are the European stock markets integrated?
- Has the degree of integration changed over time?

Research questions

- Does integration in European money and bond markets affect the European stock markets?
- How strongly are the European stock markets integrated?
- Has the degree of integration changed over time?

Outline

- 1 Motivation
- 2 Literature
- 3 Methods to Measure Financial Integration
 - Correlation Analysis
 - β -Convergence
 - σ -Convergence
- 4 Empirical Analysis
 - Data
 - Correlation Analysis
 - σ -Convergence
 - β -Convergence
- 5 Conclusion

□ Baele et al. (2004)

- Baele et al. (2004)
- Adam et al. (2002)

- Baele et al. (2004)
- Adam et al. (2002)
- Fratzscher (2002)

- Baele et al. (2004)
- Adam et al. (2002)
- Fratzscher (2002)
- Babetskii et al. (2007)

- Baele et al. (2004)
- Adam et al. (2002)
- Fratzscher (2002)
- Babetskii et al. (2007)
- Cecchetti et al. (2002)

- ▣ Baele et al. (2004)
- ▣ Adam et al. (2002)
- ▣ Fratzscher (2002)
- ▣ Babetskii et al. (2007)
- ▣ Cecchetti et al. (2002)

Our contributions...

- ▣ Baele et al. (2004)
- ▣ Adam et al. (2002)
- ▣ Fratzscher (2002)
- ▣ Babetskii et al. (2007)
- ▣ Cecchetti et al. (2002)

Our contributions...

- ▣ Application of β and σ -convergence measures on the data from old-established European stock markets.

- Baele et al. (2004)
- Adam et al. (2002)
- Fratzscher (2002)
- Babetskii et al. (2007)
- Cecchetti et al. (2002)

Our contributions...

- Application of β and σ -convergence measures on the data from old-established European stock markets.
- Analysis of European stock market convergence for a longer time span and at an industry level.

- ▣ Baele et al. (2004)
- ▣ Adam et al. (2002)
- ▣ Fratzscher (2002)
- ▣ Babetskii et al. (2007)
- ▣ Cecchetti et al. (2002)

Our contributions...

- ▣ Application of β and σ -convergence measures on the data from old-established European stock markets.
- ▣ Analysis of European stock market convergence for a longer time span and at an industry level.
- ▣ Application of these methods on a higher frequency data.

- ▣ Baele et al. (2004)
- ▣ Adam et al. (2002)
- ▣ Fratzscher (2002)
- ▣ Babetskii et al. (2007)
- ▣ Cecchetti et al. (2002)

Our contributions...

- ▣ Application of β and σ -convergence measures on the data from old-established European stock markets.
- ▣ Analysis of European stock market convergence for a longer time span and at an industry level.
- ▣ Application of these methods on a higher frequency data.

Outline

- 1 Motivation
- 2 Literature
- 3 Methods to Measure Financial Integration
 - Correlation Analysis
 - β -Convergence
 - σ -Convergence
- 4 Empirical Analysis
 - Data
 - Correlation Analysis
 - σ -Convergence
 - β -Convergence
- 5 Conclusion

Methods to Measure Financial Integration

□ Correlation Analysis

Methods to Measure Financial Integration

- Correlation Analysis
- β -Convergence

Methods to Measure Financial Integration

- Correlation Analysis
- β -Convergence
- σ -Convergence

Methods to Measure Financial Integration

- Correlation Analysis
- β -Convergence
- σ -Convergence

Correlation Analysis

A first stance about the degree of the stock market integration.

Correlation Analysis

A first stance about the degree of the stock market integration.

Intuition: The more integrated the markets are, the higher is the co-movement between their prices and the benchmark price.

β -Convergence

β -convergence is an indicator that refers to the speed at which financial markets integrate.

β -Convergence

β -convergence is an indicator that refers to the speed at which financial markets integrate.

$$\Delta R_{i,t} = \alpha_i + \beta R_{i,t-1} + \sum_{l=1}^L \gamma_l \Delta R_{i,t-1} + \epsilon_{i,t} \quad (1)$$

β -Convergence

β -convergence is an indicator that refers to the speed at which financial markets integrate.

$$\Delta R_{i,t} = \alpha_i + \beta R_{i,t-1} + \sum_{l=1}^L \gamma_l \Delta R_{i,t-1} + \epsilon_{i,t} \quad (1)$$

$$R_{i,t} = r_{i,t} - r_{b,t}$$

$r_{i,t}$ = return of the respective aggregate market or industry asset in country i at time t .

$r_{b,t}$ = respective benchmark return of country or industry i at time t .

β -Convergence

β -convergence is an indicator that refers to the speed at which financial markets integrate.

$$\Delta R_{i,t} = \alpha_i + \beta R_{i,t-1} + \sum_{l=1}^L \gamma_l \Delta R_{i,t-1} + \epsilon_{i,t} \quad (1)$$

$$R_{i,t} = r_{i,t} - r_{b,t}$$

$r_{i,t}$ = return of the respective aggregate market or industry asset in country i at time t .

$r_{b,t}$ = respective benchmark return of country or industry i at time t .

$$r_{b,t} = \sum_{\forall j \neq i} w_{j,t} * r_{j,t}$$

β -Convergence

β -convergence is an indicator that refers to the speed at which financial markets integrate.

$$\Delta R_{i,t} = \alpha_i + \beta R_{i,t-1} + \sum_{l=1}^L \gamma_l \Delta R_{i,t-1} + \epsilon_{i,t} \quad (1)$$

$$R_{i,t} = r_{i,t} - r_{b,t}$$

$r_{i,t}$ = return of the respective aggregate market or industry asset in country i at time t .

$r_{b,t}$ = respective benchmark return of country or industry i at time t .

$$r_{b,t} = \sum_{\forall j \neq i} w_{j,t} * r_{j,t}$$

β -Convergence

$$R_{i,t} = \alpha_i + (1 + \beta)R_{i,t-1} + \sum_{l=1}^L \gamma_l \Delta R_{i,t-1} + \epsilon_{i,t}$$

β -Convergence

$$R_{i,t} = \alpha_i + (1 + \beta)R_{i,t-1} + \sum_{l=1}^L \gamma_l \Delta R_{i,t-1} + \epsilon_{i,t}$$

$(1 + \beta) < 1 \Rightarrow$ No unit root \Rightarrow Convergence

β -Convergence

$$R_{i,t} = \alpha_i + (1 + \beta)R_{i,t-1} + \sum_{l=1}^L \gamma_l \Delta R_{i,t-1} + \epsilon_{i,t}$$

$(1 + \beta) < 1 \Rightarrow$ No unit root \Rightarrow Convergence

A negative β coefficient means that convergence takes place and the size of β is a direct measure of the speed of convergence.

β -Convergence

$$R_{i,t} = \alpha_i + (1 + \beta)R_{i,t-1} + \sum_{l=1}^L \gamma_l \Delta R_{i,t-1} + \epsilon_{i,t}$$

$(1 + \beta) < 1 \Rightarrow$ No unit root \Rightarrow Convergence

A negative β coefficient means that convergence takes place and the size of β is a direct measure of the speed of convergence.

Intuition: Returns in countries or industries, where returns are relatively high, tends to decrease more rapidly than those in countries or industries with low returns.

σ -Convergence

σ -convergence is an indicator to measure the degree of integration.

σ -Convergence

σ -convergence is an indicator to measure the degree of integration.

$$\sigma_t = \sqrt{\left(\frac{1}{N-1}\right) \sum_1^N [\log(r_{i,t}) - \bar{r}_t]^2} \quad (2)$$

σ -Convergence

σ -convergence is an indicator to measure the degree of integration.

$$\sigma_t = \sqrt{\left(\frac{1}{N-1}\right) \sum_1^N [\log(r_{i,t}) - \bar{r}_t]^2} \quad (2)$$

$$\sigma_{s,t} = \alpha_s + \gamma_s * t + u_{s,t} \quad (3)$$

σ -Convergence

σ -convergence is an indicator to measure the degree of integration.

$$\sigma_t = \sqrt{\left(\frac{1}{N-1}\right) \sum_1^N [\log(r_{i,t}) - \bar{r}_t]^2} \quad (2)$$

$$\sigma_{s,t} = \alpha_s + \gamma_s * t + u_{s,t} \quad (3)$$

Convergence takes place...

σ -Convergence

σ -convergence is an indicator to measure the degree of integration.

$$\sigma_t = \sqrt{\left(\frac{1}{N-1}\right) \sum_1^N [\log(r_{i,t}) - \bar{r}_t]^2} \quad (2)$$

$$\sigma_{s,t} = \alpha_s + \gamma_s * t + u_{s,t} \quad (3)$$

Convergence takes place...

if the cross-sectional dispersion of a stock return decreases over time.

σ -Convergence

σ -convergence is an indicator to measure the degree of integration.

$$\sigma_t = \sqrt{\left(\frac{1}{N-1}\right) \sum_1^N [\log(r_{i,t}) - \bar{r}_t]^2} \quad (2)$$

$$\sigma_{s,t} = \alpha_s + \gamma_s * t + u_{s,t} \quad (3)$$

Convergence takes place...

if the cross-sectional dispersion of a stock return decreases over time.

Outline

- 1 Motivation
- 2 Literature
- 3 Methods to Measure Financial Integration
 - Correlation Analysis
 - β -Convergence
 - σ -Convergence
- 4 Empirical Analysis
 - Data
 - Correlation Analysis
 - σ -Convergence
 - β -Convergence
- 5 Conclusion

Data

The data covers

Data

The data covers

- monthly stock returns in Euro

Data

The data covers

- monthly stock returns in Euro
- from January 1973 to August 2008

Data

The data covers

- monthly stock returns in Euro
- from January 1973 to August 2008
- for five EU countries: Germany, France, Netherlands, Ireland and United Kingdom (UK)

Data

The data covers

- monthly stock returns in Euro
- from January 1973 to August 2008
- for five EU countries: Germany, France, Netherlands, Ireland and United Kingdom (UK)
- for the following industries for each country: basic materials, consumer goods, industrials, consumer services, health care and financials.

Data

The data covers

- monthly stock returns in Euro
- from January 1973 to August 2008
- for five EU countries: Germany, France, Netherlands, Ireland and United Kingdom (UK)
- for the following industries for each country: basic materials, consumer goods, industrials, consumer services, health care and financials.
- Only for health industry in Ireland, the time series starts later on July 1981.

Data

The data covers

- monthly stock returns in Euro
- from January 1973 to August 2008
- for five EU countries: Germany, France, Netherlands, Ireland and United Kingdom (UK)
- for the following industries for each country: basic materials, consumer goods, industrials, consumer services, health care and financials.
- Only for health industry in Ireland, the time series starts later on July 1981.

Figure 1: Returns of the National Stock Markets

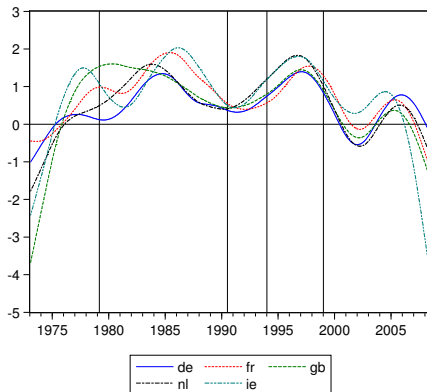
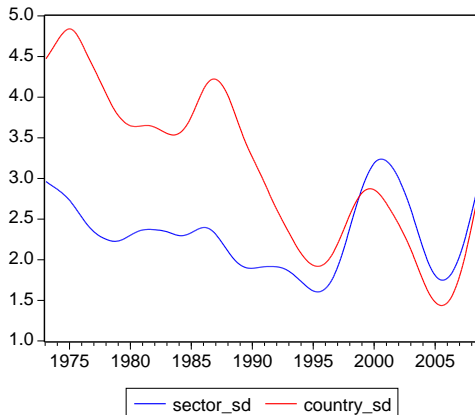


Table 1: Correlations of Stock returns with EU benchmark returns

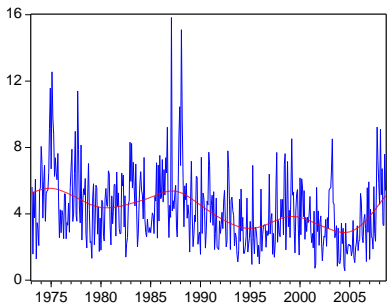
	'73m1-'79m2	'79m3-'90m6	'90m7-'93m12	'94m1-'98m12	'99m1-'08m8
Correlation	Change in correlation w.r.t. previous period				
GERMANY					
Market	0,535	0,006	0,278*	0,037	0,036
B. Mater.	0,460	0,042	0,275*	-0,012	-0,066
Indust.	0,556	-0,131	0,396*	-0,113**	0,156*
Cons. Gds	0,312	0,088	0,334*	0,087	-0,020
Hlth Care	0,389	0,095	0,184*	0,088	-0,141**
Cons. Svs	0,376	0,065	0,210*	-0,146	0,267*
Finan.	0,294	0,222*	0,240*	-0,008	0,068
FRANCE					
Market	0,525	0,049	0,272*	0,038	0,046*
NETHERLANDS					
Market	0,663	0,151*	-0,058	0,049*	-0,034
IRELAND					
Market	0,398	0,235*	0,084	0,077	-0,163**
UNITED KINGDOM					
Market	0,431	0,160*	0,175*	0,100*	-0,048

σ -Convergence

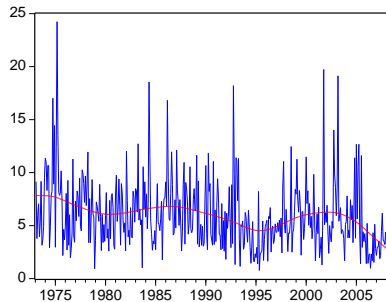
Figure 2: Cross section dispersions, Country-Industry Comparison



σ -Convergence, Industries

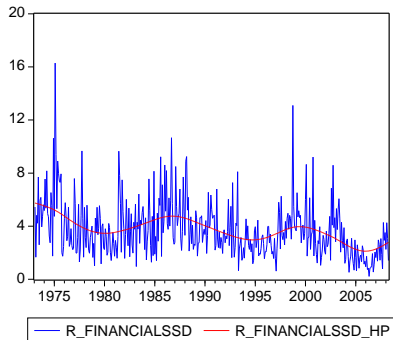
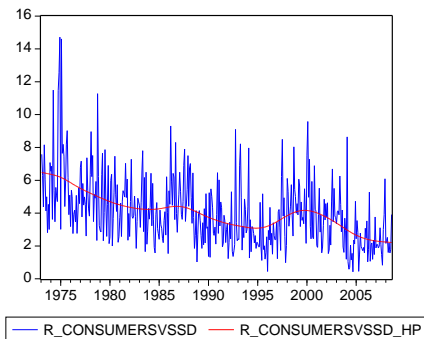


— R_BASICMATSSD — R_BASICMATSSD_HP

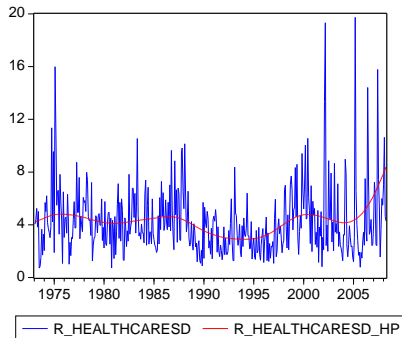
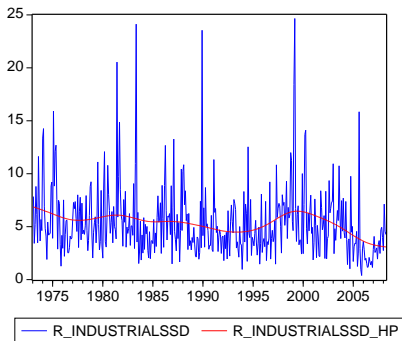


— R_CONSUMERGDSSD — R_CONSUMERGDSSD_HP

σ -Convergence, Industries



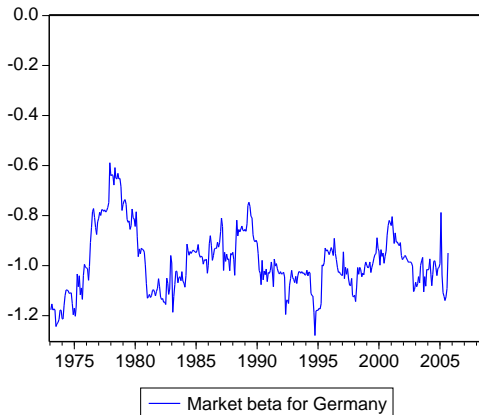
σ -Convergence, Industries



	β -Estimate	Half-life (days)	Trend Coefficient of σ -Convergence (γ_s)
MARKET			
DE	-0,977*	5,501	-0.007*
FR	-1,006*	4,039	
NL	-1,047*	6,808	
IE	-1,021*	5,359	
UK	-0,952*	6,868	
BASIC MATERIALS			
DE	-0,952*	6,863	-0.005*
FR	-1,060*	7,384	
NL	-0,975*	5,621	
IE	-1,077*	8,092	
UK	-1,102*	9,111	
INDUSTRIALS			
DE	-0,943*	7,258	-0.004*
FR	-0,962*	6,372	
NL	-0,907*	8,771	
IE	-1,086*	8,460	
UK	-0,974*	5,701	
CONSUMER GOODS			
DE	-1,169*	11,686	-0.007*
FR	-1,181*	12,167	
NL	-0,939*	7,438	
IE	-1,176*	11,970	
UK	-1,075*	8,013	

	β -Estimate	Half-life	Trend Coefficient of σ -Convergence
HEALTH CARE			
DE	-1,021*	5,385	0.002*
FR	-0,988*	4,670	
NL	-1,058*	7,310	
IE	-1,085*	8,444	
UK	-0,946*	7,139	
CONSUMER SERVICES			
DE	-0,919*	8,290	-0.008*
FR	-0,927*	7,957	
NL	-0,965*	6,225	
IE	-0,865*	10,369	
UK	-1,109*	9,382	
FINANCIALS			
DE	-1,013*	4,826	-0.005*
FR	-1,000*	2,500	
NL	-1,061*	7,454	
IE	-1,048*	6,853	
UK	-1,110*	9,436	

Figure 3: Moving Window estimates of β_t



Outline

- 1 Motivation
- 2 Literature
- 3 Methods to Measure Financial Integration
 - Correlation Analysis
 - β -Convergence
 - σ -Convergence
- 4 Empirical Analysis
 - Data
 - Correlation Analysis
 - σ -Convergence
 - β -Convergence
- 5 Conclusion

Conclusion

- Stock markets that we studied show an increasing degree of integration both at the national market level and also at the industry level, although some differences in the speed and degree of convergence exist among stock markets.

Conclusion

- Stock markets that we studied show an increasing degree of integration both at the national market level and also at the industry level, although some differences in the speed and degree of convergence exist among stock markets.
- The only industry, which does not show a significant degree of convergence, is the health care industry.

Conclusion

- Stock markets that we studied show an increasing degree of integration both at the national market level and also at the industry level, although some differences in the speed and degree of convergence exist among stock markets.
- The only industry, which does not show a significant degree of convergence, is the health care industry.
- The half-lives of shocks to return spreads change between 5 to 10 days on average.

Conclusion

- Stock markets that we studied show an increasing degree of integration both at the national market level and also at the industry level, although some differences in the speed and degree of convergence exist among stock markets.
- The only industry, which does not show a significant degree of convergence, is the health care industry.
- The half-lives of shocks to return spreads change between 5 to 10 days on average.
- In the mid 2000s, the degree of stock market integration falls.

Conclusion

- Stock markets that we studied show an increasing degree of integration both at the national market level and also at the industry level, although some differences in the speed and degree of convergence exist among stock markets.
- The only industry, which does not show a significant degree of convergence, is the health care industry.
- The half-lives of shocks to return spreads change between 5 to 10 days on average.
- In the mid 2000s, the degree of stock market integration falls.