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**Integration and Convergence of  
Financial Markets  
in the European Union**

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# **Integration and Convergence of Financial Markets in the European Union**

## **ABSTRACT**

The extent of financial integration within the European Union is a debated issue, and there is a presumption that some countries have made relatively less progress on this front. In this paper, the countries in the union are ranked in terms of the degree of financial integration using various measures, including comprehensive Euler-type tests. A distinction is made between regional and global integration. It is seen that the core EU nations are integrated within the EU, but loosely globally, while the opposite holds true of the United Kingdom. Smaller, highly advanced economies such as Sweden are integrated well regionally as well as globally.

## I. INTRODUCTION

The positive impact of the Single Market on trade is not a contentious issue, though the estimates of the *quantitative* effects vary. Nor does it seem that the trade volume effects vary to any great extent across the spectrum of the members of the Common Market. The extent of financial integration is, in contrast, still a debated issue, and there is evidence that some countries have made – relatively – slow progress along this path [see Lemmen and Eijffinger, 1995a]. In this paper, a fresh attempt is made to rank the countries in terms of the extent of financial integration achieved. A distinction is also sought to be made between *regional* and *global* integration, and the convergence achieved after entry into the EMU is weeded apart from the Single Market effects.

Related work available in the literature is discussed in the next section, with the objective of providing the backdrop to the current study; it is not to be interpreted as a comprehensive survey of the literature. Section III supplies the details of the models used for analyzing the financial aspects of the unification process, while IV describes the data used and the empirical results obtained. There is a final, concluding section.

## II. BACKGROUND AND RELATED LITERATURE

There are a number of approaches to the evaluation of the extent of financial openness and integration in the literature. The distinction between these two concepts – of openness and integration – was perhaps thrown up most vividly by the Asian crisis of the mid-90s. The perception that financial openness, which could just entail a complete opening up to international capital flows, does not encompass a process of financial reforms – which is needed for true integration – has been gaining ground [see Le, 2000; Batavia, et.al., 2003]. A number of indices have also been developed which give a pointer to the degrees of financial openness and integration achieved in an economy.

The World Bank Index [World Bank, 2000] takes into account the facilitation of cross-border flows by the home country, and is properly considered an index of financial openness. Other indices used for ranking countries in terms of openness include the ratio of FDI inflows and that of portfolio capital inflows to GDP [see Batavia et.al., 2003]. The ratio of foreign assets held to GDO or exports is sometimes considered an indicator of country-specific risk, with the risk progressively reducing as the ratio increases. However, in general, the components of assets as well as liabilities matter, as again exemplified by the Asian crisis where the affected countries often had a high proportion of short-run debt.

Rankings of countries in terms of financial openness are given in the empirical section (Tables 7 & 8). There we also provide comparisons in terms of some measures of financial integration, which are discussed here in this section. Integration would imply internal reforms as well, not the least in the banking sector, and norms of transparency similar to those prevailing in the most advanced markets. These criteria would weigh at least as important in a process of financial integration as that of providing complete convertibility on the capital account.

The foregoing implies that an economy can be financially more integrated with a distant trading partner than with a geographic neighbor. Eichengreen and Pempel [2002] state that this is true of the East Asian economies, which are financially more, integrated with the industrial nations of the Western Hemisphere than with each other. They attribute this to the fact that trade

liberalization has proceeded further with those geographically distant economies than within East Asia, so that the progress on the financial front is a natural outcome, given the complementary relation between trade and financial flows. We take a leaf out of such reasoning in checking for the degree of financial integration of the EU countries with non-EU markets (primarily the U.S) as well<sup>1</sup>.

There are at least four measures of financial integration mentioned in the literature. These are:

- (a) covered interest parity (CIP),
- (b) uncovered interest rate parity ,
- (c) real interest rate parity (RIP) , and
- (d) the Feldstein – Horioka Index.

Of the interest rate parity conditions, it is the covered parity condition that is usually met first as integration proceeds. and ought to be met by now for the EU countries. But this may not have been achieved even by, say, the mid-90s, and therefore the nominal interest rate differential is often used to represent the degree of financial integration – and the intensity of capital controls – in empirical work on the determinants of integration, as in Lemmer and Eiiiffinger [1995b]. The uncovered interest rate parity condition is more difficult to verify as it incorporates a variable that is not directly observable, the speculative exchange rate premium, though proxies are not hard to come by. Most tests of this condition, which use the forward premium as a proxy for the speculative premium. are not confirmative. Marston [1994] does tackle this problem in a way by employing survey data on exchange rate expectations as a direct measure of the speculative exchange rate premium.

The real interest rate parity condition is usually taken to be a test of complete financial integration, encompassing both a test of capital mobility and one of *macroeconomic convergence*. The reasons for this condition not being fulfilled can be numerous, and it should be fair to suggest that financial integration has proceeded further in terms of short-run flows, whereas international substitutability when it comes to long-term bonds, equities and real investments is still lagging behind.

More specifically, the RIP condition also implies that the purchasing power parity (PPP) condition, which is a long-run price convergence condition, is met. In fact, the non-fulfillment of the RIP condition can be considered due to an integration or country risk premium, and a convergence premium, with the former relating to the non-fulfillment of the CIP condition and the latter to that of the PPP condition:

$$(1) \text{RIPV}_t = [i_{h,t} - i_{f,t} - F_{p,t}] + [\pi_{h,t} - \pi_{f,t} - F_{p,t}]$$

Where *RIPV* is the deviation form the real interest rate parity condition,  $i_{h,t}$  is the home nominal interest rate at time  $t$ .  $i_f$  is the nominal foreign interest rate,  $F_p$  is the forward exchange rate premium or the expected rate of appreciation,  $\pi_h$  is the inflation at home and  $\pi_f$  is the inflation abroad. Actual inflation rates proxy for expected rates. The first term in equation (1) should have approached zero with integration in the Single Market, while the macroeconomic

<sup>1</sup> From the point of view of risk-sharing through international diversification, a larger union with non-heterogeneous members may be better, and it is not really clear that only members with synchronized macroeconomic shocks should participate. An implication for risk-sharing is that globalization may be a better strategy than regional groupings, and that is the reason why we check for global as well as regional financial integration.

convergence premium should be reduced after entry into the EMU. However, we let the figures speak for themselves in the empirical section (IV).

The Feldstein – Horioka Test [1980] (hereafter F-H Test) for financial integration has also been used as extensively as the interest rate parity conditions, and is considered equivalent to the RIP condition, since it deals with investment flows that depend on real interest rates. However, a zero F-H coefficient for the national savings ratio variable as a determinant of investment in a regression, which is deemed to represent complete financial integration, has never been thrown up in empirical estimates. It is something of a paradox that cross-section and time series studies show a rising coefficient, indicating falling integration over time. Such a result emerges in Feldstein [1983], Penati and Dooley [1984], Dooley, Frankel and Matheison [1984, 1988], Obstfeld [1986] and Frankel [1986]. A number of subsequent studies have suggested reasons why national savings and investment levels may be correlated even if real interest rate parity held. One explanation is that large countries (such as Germany) that can influence the level of world real interest rates will tend to have positively correlated savings and investment rates. Another view, that ‘endogenous’ government policies (say, with respect to the current account) may be the reason for the F-H Coefficient being closer to one than zero for most countries has been put forward by Fieleke [1982], Tobin [1983], Weatphal [1983], Summers [1988], Roubini [1988], and Bayoumi [1990]. However, this problem could be handled by having a data set over a long period of time (to take care of cyclical effects), and it does seem worthwhile to compare financial integration levels in the EU countries in terms of this well-known coefficient also. However, since we are already incorporating the real interest rate parity test, which is considered equivalent to a test of the F-H condition, we do not include the latter separately.

Another test of financial integration is based on the Euler equation, which characterizes inter-temporal expenditure, and proceeds by correlating consumption levels across countries - since the welfare gains made possible by the globalization of capital markets include the smoothing of the time paths of consumption<sup>2</sup>. Using a related test, Lemmen and Eijffinger [1995] have ranked the EU countries in the following fashion in terms of progress in financial integration: high integration in Belgium, Germany, the Netherlands and the United Kingdom; medium levels of integration in Austria, Denmark, Finland, France, Ireland, Italy, Spain and Sweden, and low levels of integration in Greece and Portugal. In this study we work with more recent data, and provide individual country rankings.

International markets typically provide national agents with a wider range of investment opportunities, and makes also possible higher rates of output growth. But a striking result in this stream of analysis is that under certain assumptions (including the absence of transaction costs), domestic consumption is related to world output, and not to domestic output. This can be captured in cross-country correlations of consumption and output, where consumption correlations should be larger than the correlations of outputs. This has given rise to the so-called ‘consumption correlation puzzle’, with empirical work throwing up consumption correlations smaller than output coefficients [Baxter and Crucini, 1995, Stockman and Terna, 1995; Obstfeld, 1994, Olivei, 2000]. However, it is still possible to rank countries in terms of the level of integration given by the results, and we do proceed with that task in the present study.

Thus, the work on gauging the level of financial integration in the recent decades of reforms and internationalization have encompassed tests on interest rate parity (*nominal* as well as *real*) and the Feldstein-Horioka and the Euler equation tests, not to mention the use of the ratios of

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<sup>2</sup> The correlation of consumption across countries in a globalized financial environment is easily derived [see Obstfeld and Rogoff, 1996].

financial openness. Usually, the tests on financial integration involve the determination of co-integrating relationships, similar to the work on real integration done with variables such as industrial production [see for instance, Buch and Döpke, 1999]. In the present study, rankings on global and regional financial integration are discussed according to almost all of these criteria.

### III. MODELS FOR ESTIMATION

Equation (2) is the covered interest rate parity condition tested for individual EU countries, against the German mark prior to the formation of the monetary union, and against the Euro rates beyond that date:

$$(2) \quad i_{j,t} = \alpha_0 + \beta_0 * i_{f,t} + \varepsilon_{0,t} \quad \dots i = 1, \dots, 15.$$

$i_{h,t}$  is the short-run interest rate at period  $t$  in the member country, while  $i_f$  the corresponding rate for the EU area as a whole, proxied by the German rate. The regression provides estimates of the coefficients ' $\beta_0$ ', which can be used for country-ranking purposes.

The interest rate parity condition in relation to US short-run rates is also estimated as below, providing information about the degree of *global* financial integration:

$$(3) \quad i_{j,t} = \alpha_1 + \beta_1 * i_{u,t} + \varepsilon_{1,t}$$

In equation (3),  $i_{u,t}$  is the US short-run (three-month) interest rate on bonds.

As described in the previous section, the integration and the convergence premiums, corresponding to the non-fulfillment of the CIP and PPP conditions respectively, can be obtained. The convergence premium can be calculated as:

$$(4) \quad P_{c,t} = \pi_{h,t} - \pi_{f,t} - F_{p,t}$$

Where  $\pi_{h,t}$  is inflation in the individual country while  $\pi_{f,t}$  is inflation in the EU area as a whole.  $F_{p,t}$  is the three month forward exchange rate premium for the national currency.

The convergence premium represented in equation (4) may be expected to reduce or even go to zero as a country enters the EMU, but this has to be empirically verified as stated earlier. It may be possible to *proxy this premium* in related empirical analyses by the *volatility of the exchange rate* with the Euro, which is, by definition zero for an EMU member.

Equation (5) below is the real interest rate ' $r$ ' parity test for the EU area, while (6) tests for the country's real interest rate integration with the dollar area:

$$(5) \quad r_{h,t} = \alpha_2 + \beta_2 * r_{f,t} + \varepsilon_{2,t}$$

$$(6) \quad r_{h,t} = \alpha_3 + \beta_3 * r_{u,t} + \varepsilon_{3,t}$$

To make a ranking of financial integration based on consumption and output correlation, we do the following. An aggregate time series of EU consumption is calculated, weighing individual country consumption by the population variable.

The individual country consumption levels are regressed on this aggregated variable. Correlation coefficients are computed for country and aggregate EU consumption levels, and the following equation is estimated for each country:

$$(7) \quad C_{h,t} = \alpha_4 + \beta_4 * C_{EU,t} + \varepsilon_{4,t}$$

Where  $C_{h,t}$  is the individual country consumption level, while  $C_{EU,t}$  is the aggregate, country-weighted EU consumption level. We also estimate the relation between individual country consumption and output levels (with *some* resemblance at least to an ordinary consumption function!):

$$(8) \quad C_{h,t} = \alpha_5 + \beta_5 * Y_{h,t} + \varepsilon_{5,t}$$

In equation (8),  $Y_{h,t}$  are the individual country output (GDP) levels. The correlation coefficients (see Table 6 section IV) together with the regression coefficients in (7) and (8) provide a basis for making inter-country comparisons (in section IV) of the degree of financial integration achieved.

#### IV. DESCRIPTION OF DATA AND EMPIRICAL RESULTS

The specified equations are run with annual data for the period 1978 – 2002, and with quarterly data for the period 1985 – 2002. The data source for all the variables is the publication *International Financial Statistics* (IFS), published by the International Monetary Fund, and the linked websites.

Table 1 below provides the results of the nominal interest rate parity tests for individual countries, using German short-run nominal rates.

**Table 1: Nominal Interest Rate Parity Tests using EU (Germany)  
Short-Run Rates Quarterly Data 1985-2002**

Country	Adj-squared	t value	Coefficient
Austria	0.93	26.9***	0.98
Belgium	0.83	18.31***	1.09
Denmark	0.55	9.14***	1.14
Finland	0.54	9.15***	1.52
France	0.63	10.86***	1.06
USA	0.008	0.77	0.09
Greece	0.52	8.71***	2.3
Ireland	0.40	6.92**	1.30
Italy	0.38	6.65**	1.20
Netherlands	0.83	18.37***	1.25
Portugal	0.27	4.72**	1.18
Spain	0.43	7.35***	1.41
Sweden	0.03	1.3	1.0
UK	0.29	5.44**	0.87

In table 1, significance of the coefficient at 1% level, 5% and 10% levels are signaled by three, two and one stars respectively. As can be seen from the table, all the coefficients, except for that of the US, and, quite surprisingly, that of Sweden, are highly significant. There is no ready explanation for the non-significance of the Swedish coefficient, though it may be pointed out that Sweden had capital controls until the early 1990s.

The coefficients for Austria, Belgium, France, Denmark, Italy, Netherlands, and Portugal indicate that these countries have achieved almost full financial integration. This is as expected, especially for the European core, the Benelux-Italy-German group. Spain, Finland and Ireland also exhibit high values of the coefficient. On the other hand, the United Kingdom has a relatively low value of 0.87 for the integration coefficient.

It would be interesting to compare the process of financial integration within Europe with that occurring – for the EU countries – on a global scale. For this, the results of the estimation using US short-run interest rates as the independent variable will provide interesting information.



**Table 2: Nominal Interest Rate Parity with US Interest Rates  
Quarterly Rates 1985-2002**

Country	Adj-squared	t value	Coefficient
Austria	0.01	-	-
Belgium	0.08	2.4*	0.31
Denmark	0.11	2.98*	0.56
Finland	0.29	5.42**	1.15
France	0.16	3.66*	0.58
Germany	0.008	0.77	0.09
Greece	0.16	3.7*	1.32
Ireland	0.09	2.65*	0.63
Italy	0.3	5.5**	1.09
Netherlands	0.12	3.13*	0.49
Portugal	0.19	3.72*	1.22
Spain	0.25	4.89**	1.1
Sweden	0.07	2.18*	1.98
UK	0.63	10.9***	1.3

In contrast to the results tabulated in Table 1 the European core exhibits much less financial integration on a global scale, as measured by the integration with the North American market. For Germany, the coefficient is not even significant at 10% levels or more. One important exception to the 'core' story is Italy, which shows a high (close to unity) and highly significant coefficient. Finland, Spain, Greece and Portugal also seem to be highly integrated with the US market.

The results for Sweden and the UK are especially interesting. Sweden seems to be well integrated with the US financial markets, while results of the previous estimation showed that she had no significant level of relation with the aggregate European or German market. For the UK, financial integration has clearly proceeded further with her trans-Atlantic partner than with the rest of Europe, the results showing an integration coefficient, which is highly significant and slightly greater than unity.

Let us now see how the country relations fare under the more rigorous test of real interest rate parity. Table 3 below gives the results of the real interest rate parity test within the European Union.

**Table 3: Nominal Interest Rate Parity Tests using German (EU) real interest rates 1985-2002**

Country	Adj-squared	t value	Coefficient
Austria	0.03	1.24	0.15
Belgium	0.36	6.26**	0.92
Denmark	0.23	4.51*	0.71
Finland	0.77	15.25***	1.58
France	0.55	-9.19***	-15.19
USA	0.07	2.26*	0.32
Greece	0.35	6.11**	2.17
Ireland	0.46	7.72***	1.27
Italy	0.55	9.28***	1.24
Netherlands	0.49	8.18***	1.25
Portugal	0.05	1.83	29.35
Spain	0.36	-6.31**	-1.27
Sweden	0.03	1.52	1.20
UK	0.29	5.34**	0.57

It can be seen that the European core holds up quite robustly even in the case of the demanding real interest rate parity test; Belgium, Netherlands and Italy have highly significant coefficients that are close to unity. The French coefficient is also significant at the one percent level. Finland, Greece and Ireland also exhibit large coefficients of integration that are highly significant, while Denmark shows a fairly low level of real interest rate parity. The Swedish coefficient, true to form, considering the result of the nominal parity test, is not significant. Portugal shows no evidence of real interest rate parity attainment, as is the case, quite remarkably, with no ready explanation at hand, for Austria. The UK level of real financial integration is lower than that of all the other EU nations that show a significant coefficient.

Results of the real interest rate parity tests in the global context are shown below:

**Table 4: Individual Country Rates against US Rates: Real Rates**

Country	Adj-squared	t value	Coefficient
Austria	0.36	-5.46**	-0.45
Belgium	0.0007	-0.22	-0.03
Denmark	0.006	0.64	0.09
Finland	0.16	3.7*	0.59
France	0.08	-2.5*	-4.93
Germany	0.067	2.26*	0.21
Greece	0.09	2.67*	0.91
Ireland	0.008	0.78	0.14
Italy	0.05	1.92	0.30
Netherlands	0.025	1.36	0.23
Portugal	0.02	1.12	15.89
Spain	0.007	0.7	-0.14
Sweden	0.045	1.76	1.2
UK	0.53	8.86***	0.63

The most striking result in the table above is the extremely significant coefficient for the UK, which also shows a fairly high level of integration. The UK is evidently integrated financially more with the distant North American market than with the home EU territory even tests such as the real interest rate parity condition that stand for comprehensive economic integration are applied. Among other EU countries, only Greece shows proof of real financial integration with the North American market.

The key results from the nominal and real interest rate parity tests for the EU area, and for the EU-North America linkages may be summed up as follows:

*The European core group, i.e., Benelux-Italy-France group, has achieved far-reaching financial integration in nominal and real terms, within the EU area, but is loosely linked to the North American market. An exception here is Italy, which has a high coefficient of integration even with the North American market, for the nominal interest rate parity test.*

*New entrants like Finland, Spain and Ireland are well integrated to the EU market as well as – in nominal terms – to the North American market. Sweden and the United Kingdom stand out in that these countries are clearly linked more to the financial markets in North America than to the European market.*

### **Consumption Correlations and Euler Test Regressions**

Table 5 provides the correlation coefficients between individual country consumption levels and the weighed EU consumption level, and the results of the consumption correlations within the EU are given in Table 6.

**Table 5: Consumption Correlations**

Country	Consumption correlation with EU aggregate consumption
Austria	0.294
Belgium	0.462
Denmark	0.039
Finland	0.094
France	0.443
USA	0.737
Greece	0.418
Ireland	0.456
Italy	0.668
Netherlands	0.285
Portugal	0.495
Spain	0.731
Sweden	0.504
UK	0.365

**Table 6: Consumptions Correlations Matrix**

	Aus	Bel	Den	Fin	Fra	Ger	Gre	Ire	Ita	Net	Por	Spa	Swe	UK	US
Aus	1														
Bel	0.31	1													
Den	0.002	0.41	1												
Fin	0.15	0.21	0.07	1											
Fra	0.31	0.49	-0.05	0.52	1										
Ger	0.16	0.17	0.05	-0.38	0.02	1									
Gre	0.11	0.33	-0.21	0.23	0.26	0.05	1								
Ire	0.14	0.41	0.13	0.17	0.37	0.03	0.14	1							
Ita	0.12	0.13	-0.09	0.21	0.27	0.3	0.16	0.58	1						
Net	0.15	0.24	0.17	-0.70	-0.15	0.18	-0.01	0.18	0.22	1					
Por	0.11	-0.1	-0.42	0.1	0.26	0.15	0.75	0.23	0.40	0.02	1				
Spa	0.26	0.51	-0.12	0.28	0.60	0.28	0.38	0.57	0.53	0.27	0.47	1			
Swe	0.10	0.46	0.20	0.62	0.61	0.09	0.15	0.32	0.36	0.08	0.17	0.61	1		
UK	0.12	0.37	0.23	0.39	0.39	-0.16	0.38	0.38	0.18	0.03	0.25	0.36	0.5	1	
US	0.03	0.40	0.43	0.25	0.17	-0.26	0.15	0.33	-	0.004	-0.09	0.24	0.3	0.64	1

To complement the consumption correlations that were derived, individual country consumption levels were regressed on an aggregate, weighted measure of European Union consumption, and also against own GDP volumes as well as weighted European and United States GDP volumes. With increasing integration, we may expect that country consumption levels be more related to aggregate European consumption than to the domestic output levels. The results, only the significant ones, are reported in Table 7 below.

**Table 7: Euler Regressions. Dependent Variable: Country Consumption**

Country	Own GDP	EU GDP	US GDP	EU Consumption	Constant	R Squared
Austria	0.8041 (4.372***)		NOT SIGNIF	NOT SIGNIF	0.4834 (1.01)	0.50
" "		0.512 (1.91*)			1.665 (1.32)	0.14
Belgium	1.213 (2.988**)	NOT SIGNIF	NOT SIGNIF		-1.628 (-1.71)	0.28
" "				0.7155 (2.44**)	-0.356 (-0.41)	0.213
Denmark	1.1406 (5.776***)	NOT SIGNIF	NOT SIGNIF	NOT SIGNIF	-0.9525 (-1.944*)	0.60
Finland	0.6599 (6.711***)	NOT SIGNIF	NOT SIGNIF	NOT SIGNIF	0.7913 (1.97*)	0.672
Germany	1.6295 (12.47***)		NOT SIGNIF		-1.224 (2.554**)	0.876
" "		1.9275 (2.403**)			-1.807 (-0.9)	0.208
" "				2.0965 (5.1***)	-2.5017 (-2.09**)	0.543
Greece	1.4902 (2.058**)		NOT SIGNIF		-0.2593 (-0.138)	0.169
" "		2.40 (2.272**)			-2.612 (-0.45)	0.19
" "				1.5476 (2.157**)	-0.826 (-0.19)	0.175
Ireland	0.8353 (4.072***)				-0.1474 (-1.4)	0.43
" "		1.771 (2.756**)			-0.2954 (0.1795)	0.257
" "			1.0803 (2.817**)		0.6175 (0.713)	0.215
" "				1.0724 (2.403**)	-0.058 (-0.079)	0.21
Italy	1.4784 (5.636***)				-0.5519 (0.85)	0.59
" "		1.554 (4.216***)			-1.1102 (-1.16)	0.447
" "			0.6203 (2.327**)		0.6675 (0.7713)	0.19
" "				1.0447 (4.21***)	-0.058 (-0.079)	0.45
Nether-lands	0.7437 (1.411)	NOT SIGNIF	NOT SIGNIF	NOT SIGNIF	-0.275 (-0.2018)	0.08

**Table 7: Continued**

Country	Own GDP	EU GDP	US GDP	EU Consumption	Constant	R Squared
Portugal	0.8959 (2.105**)		NOT SIGNIF		1.1076 (0.693)	0.17
“ “		1.7563 (2.011**)			-0.3147 (-0.63)	0.16
“ “				1.484 (2.670**)	0.1235 (1.65)	0.25
Spain	1.0211 (8.2788***)		NOT SIGNIF		-0.0861 (-0.228)	0.76
“ “		1.346 (5.203***)			-0.5098 (-0.7)	0.552
“ “				0.8706 (5.026***)	0.4121 (0.5158)	0.534
Sweden	1.1765 (3.543**)	NOT SIGNIF	NOT SIGNIF		-0.819 (-1.86)	0.363
“ “				0.6618 (2.735**)	0.2939 (0.403)	0.254
UK	1.0054 (6.102***)	NOT SIGNIF		NOT SIGNIF	0.1204 (1.29)	0.635
“ “			0.581 (2.498**)		1.205 (1.47)	0.221

In the estimations in Table 7, the country consumption levels were run separately against each independent variable to test their significance (denoted as usual by stars), the objective not being, really, to fit the best possible consumption function. The marking ‘not signif’ indicates that the variable was not found significant in such a test.

The results of the Euler regressions seem to confirm to a large extent the observations that may be made from the analysis of correlations. In the regressions, US GDP is significant only in explaining consumption in the UK, Ireland and Italy. But home GDP and European consumption are more significant than US GDP as determinants of consumption in Italy. Looking at the correlation table, UK consumption is highly correlated with consumption in the US, with a medium level of correlation with the US exhibited also by Ireland, Sweden, Denmark and Finland. Consumption in the four large nations, Germany, France, Italy and Spain are highly correlated with aggregate EU consumption, with Germany and Italy, together with Portugal, Austria and Netherlands exhibiting a very low correlation with US consumption.

The findings from the analysis of consumption correlations and estimates may be summed up as follows: financial integration within the EU has occurred to the greatest extent for the four largest nations and for Belgium, Ireland and Portugal. Next in the degree of integration would come Greece and Sweden, with Sweden also showing a ‘medium’ degree of financial integration, from the analysis of consumption relationships, with the U.S. The UK, Denmark, Finland and –surprisingly- the Netherlands are very weakly integrated with the EU. The United Kingdom is more integrated financially with the US market, with Ireland, Sweden, Denmark and Finland also showing some degree of integration with the U.S. So Ireland and Sweden – and to some extent Belgium - are countries which have proceeded far in terms of integration in Europe as well as globally.

When these results from the Euler regressions and consumption correlations are matched with the interest rate parity tests, it is possible to make a tentative ranking of the EU countries in terms of the degree of financial integration regionally as well as globally. The following picture seems to emerge:

**Table 8: Degree of Financial Integration**

EUROPEAN UNION			WORLD ECONOMY			Integration in EU and Globally
High Integration	Medium Integration	Low Integration	High Integration	Medium Integration	Low Integration	
Germany	Portugal	UK	UK	Sweden	Germany	Sweden
Spain	Netherlands	Denmark		Ireland	Spain	Ireland
Italy	Finland			Finland	France	Finland
France	Greece			Denmark	Greece	
Belgium	Sweden				Netherlands	
Ireland	Austria				Austria	
					Portugal	
					Italy	

Finally, the convergence premiums for countries within the EMU are given in Table 9 below. Please note that the premiums have been calculated for period averages, and that it is the perceived trend that is of interest, not the actual numbers themselves. Expected exchange rate changes have been proxied by current changes, and the German exchange rate replaces Euro rates for the earlier years.

**Table 9: Convergence Premiums for EMU countries**

Country	1993-95	1997-98	1999-2000	2001-2003
Austria	-0.013	-0.57	0.19	0.33
Belgium	-1.014	-0.4	0.57	0.29
Finland	-4.27	0.81	0.99	-0.31
France	-0.96	-0.51	-0.17	0.29
Greece	19.45	-4.7	-	1.90
Ireland	5.14	-9.3	2.34	2.73
Italy	5.94	-2.44	0.84	1.03
Netherlands	-0.69	1.1	1.103	1.77
Portugal	5.45	-3.67	1.31	2.13
Spain	8.66	3.72	1.60	1.61

The main points to be noted from Table 9 is that macroeconomic convergence does seem to have taken place as countries moved into the monetary union, this phenomenon being especially marked in the case of the countries (Spain, Greece, Portugal) which are late entrants to the European Union. For the older community members like Netherlands, Austria, Belgium and France, the convergence trend is less sharp.

## V. CONCLUDING REMARKS

The process of financial integration that has accelerated in Europe does reveal some interesting trends and patterns. Macroeconomic convergence, as reflected in convergence premiums, has been taking place over the last decade, and picking up pace more in the new entrants to the Union, such as Spain, Greece and Portugal. But the level or the degree of financial integration does not follow the same pattern.

Interest rate parity tests as well as Euler-type estimates for country consumption levels were conducted to study the degree of financial integration of each EU member within the Union as well as globally – with the U.S market serving as a proxy for the rest of the world. The picture that emerges is relatively complex, with country rankings in the degree of financial integration achieved hinging upon whether it is regional or global integration that is being focused upon. The large, core EU nations, Germany, France, Spain, Italy and Belgium, are clearly integrated strongly with the aggregate EU market, and very weakly linked globally. Small open economies that are advanced in skill and knowledge levels, such as Sweden, Ireland and Finland, are integrated - to a medium extent - regionally as well as globally. The new, relatively less advanced, members, Portugal and Greece, are only integrated regionally, and to a lesser extent than the core members. The United Kingdom stands out in that she is integrated strongly to the U.S market, with almost no degree of linkage to the EU.

It should be of interest to also study the extent of financial integration that has occurred in the latest group of –Eastern European – nations to enter the Union. This could throw some light on their ability to move smoothly into the monetary union; as such an analysis could be a useful complement to the tests usually done on asymmetries and common trends for prospective members.



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