CONVERGENCE OF CORPORATE FINANCE PATTERNS IN EUROPE*

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Abstract

We investigate the pattern of corporate financing through bank loans, bond markets and stock markets in the European Union (EU). Specifically, we examine whether the European economies are converging towards a market-oriented or a bank-oriented financial system. Panel unit root tests and GMM regressions are applied to flow of funds data for eight EU countries over the period 1972- 2004. We find that the pattern of corporate financing in the EU mimics elements of the pecking order theory of financing choices. Furthermore, the EU financial system seems to be converging on a variant of the Anglo-Saxon model, with heavy reliance on internal financing and financing from the capital market.

JEL Classifications: E21, E50

Keywords: Corporate financing, EU, GMM, financial convergence

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1. INTRODUCTION

One of the main objectives behind the formation of the European Union (EU) is attainment of financial integration among member countries. Greater financial integration is expected to facilitate financial sector efficiency, macroeconomic stability and effective implementation of monetary policy in the EU (Trichet, 2005). While several studies have examined the degree of financial integration in the EU,[1] we turn our attention to the issue of financial convergence. This paper attempts to investigate convergence in corporate financing patterns and thereby provide insights into a different aspect of EU integration. In this respect, the paper extends the work of Murinde et al. (2004), which tested for convergence in corporate financing patterns in the EU during 1972-1996, by using more recent data for 1972-2004 and by studying a slightly larger set of EU countries, namely Finland, France, Germany, Italy, the Netherlands, Spain, Sweden and the UK.[2] In addition, this study invokes more appropriate econometric techniques by using modern panel unit root tests (introduced by Evans and Karras, 1996), and further by employing a GMM (Generalized Method of Moments) methodology suited for testing convergence in panel data (following Islam, 1995 and Nerlove, 1996).

The pecking order hypothesis of Myers and Majluf (1984) is the most popular theoretical explanation for capital structure choice in non-financial firms. However Corbett and Jenkinson (1997) point out that there is no theoretical framework that can explain cross-country differences in capital structure. While theoretical papers derive different optimal contracts as solutions to the managerial incentive problem, the issue of why managerial incentives differ has been empirically examined by several authors. For instance, La Porta et al. (1997) show that differences in legal environments can affect the

nature of firm financing. Berglof and Claessens (2004) argue that enforcement of corporate governance mechanisms affects firms seeking external financing. We believe that as the member countries of the EU move towards financial integration through harmonization of institutions, this would engender a level playing field for firms in terms of their external financing choices. Indeed Baele et al. (2004) have shown that EU countries have made considerable progress in setting up of common rules in financial markets and providing equal access to financial instruments or services in these markets. As a result we expect the corporate financing patterns of non-financial firms in these countries to converge.

In a previous study, Murinde et al. (2004) found little evidence of convergence in EU countries in terms of bank and bond financing and some evidence of convergence in equity and internal financing with strong growth in the latter which was in line with previous findings (Bertero, 1994; Corbett and Jenkinson, 1996). Our extended sample, as summarized in Figure 1, indicates that the EU has continued to witness convergence in corporate financing with a clear shift from bank financing towards market based financing. The graphs suggest an ongoing switch from bank to equity and bond debt finance and indicate that internal finance is no longer growing strongly. In this paper we undertake formal empirical testing to confirm the above convergence.

[Figure 1 about here]

Mullineux (2007a, 2007b) *inter alia* examines the trends in financial sector convergence, postulating the evolution of a hybrid model in which financial

conglomerates have evolved in the US and Japan similar to the prevailing European universal banking and bancassurance models. And capital markets have become more important in Europe and Japan, leading to some catch up with the US (and the UK). The euro denominated corporate bond market has grown rapidly, since the introduction of the euro in 1999 and overtaken the US dollar denominated market in the middle of the subsequent decade. Our findings confirm the growth in corporate bond financing and suggest that it is at the expense of bank financing. A similar disintermediation involving a switch by large corporates (but not bank dependent SMEs) from bank loan to bond (and shorter term rate and commercial paper) finance has been seen in Japan and the US. However our data set pertains to firms of all size classes since the disaggregated data by asset size was not available.

More generally, financial sector integration is being encouraged in the EU as a way of improving financial service provision, deepening markets and reducing the cost of capital, including the cost of payments and settlement. The introduction of the euro in 1999, aimed to facilitate this process, along with the Financial Services Act Plan (FSAP) adopted by the European Council in March 2000. Thirty eight of its forty two members had been widely adopted by the end of 2004. There is some concern about the continuing high costs of cross-border payments, but the EC is pressing for a single European Payment Area (SEPA) to be completed before the end of the decade. The European Central Bank (ECB) is seeking permission to launch a Europe-wide system itself, as a means of bypassing the obstacles. It should be noted that the FSAP and SEPA cover retail banking initiatives as well as corporate finance (cost of capital and money and capital market liquidity) issues.

The development of a single European financial market, to the extent that remains possible under globalization, also has implications for the conduct of monetary policy (Trichet, 2005). Changes in interest rates now have more similar effects in the various parts of the EU. Harmonisation of home loan markets may reduce financial instability and lower costs of capital may increase investment and growth. Therefore, financial integration in the EU can be expected to boost economic growth and aid financial stability. In this context, the issue of whether financial systems across EU countries are converging becomes important. Our work is focused on a particular aspect of financial convergence, viz. financing patterns.

The remainder of the paper is organized as follows. Section 2 provides an overview of empirical modeling of convergence. Section 3 presents the results from panel unit root tests of convergence followed by the results from GMM regressions in Section 4. Finally, Section 5 summarizes and concludes the paper.

2. MODELING CONVERGENCE

Bulk of the literature on convergence can be traced back to Barro and Sala-i-Martin (1992) who developed regression based tests for growth convergence. Subsequent developments in the convergence literature have proceeded in two broad directions. The first is the approach of Evans and Karras (1996) who developed a formal test of convergence that is based on panel unit root tests. The second is the work by Islam (1995) and Nerlove (1996) who extended the Barro and Salai-i-Martin framework to

allow for testing of convergence in a panel framework. We conduct both the above types of tests in this paper and hence provide a brief overview of each.

2.1 UNIT ROOT AND STATIONARITY TESTS OF CONVERGENCE

While the classical growth regression approach is quite popular in the literature, it has faced criticism on account of ignoring time-series properties of the data. Evans (1996) recommended exploiting both the time-series and the cross-section information provided by panel data in order to evaluate the convergence hypothesis. Evans and Karras (1996) showed that, economies can be said to converge if and only if there exists a common trend in output y_{it} (logarithm of output per worker in economy i during period t) such that $E_t (y_{n,t+1} - a_{t+1}) = \mu_n$, where a_t is the common trend and μ_n is a constant. Evans and Karras (1996) posited this question as a test of stationarity of the mean-differenced series, $z_{it} = y_{n,t+i} - \bar{y}_{t+i}$. In this paper we replace y_{it} with the relevant corporate financing variable viz. bank financing (BANK), equity financing (EQUITY), bond financing (BOND) and internal financing (INTERN) respectively for non-financial firms in the EU where we consider the share of each mode of financing in total financing as the relevant endogenous variable, y_{it} (the data are described in details later).

To ascertain stationarity of the mean-differenced data, we conduct five panel unit root tests and two stationarity tests which we briefly describe here. For conducting the panel unit root tests of the mean-differenced data, we first use the test given by Levin, Lin and Chu (LLC, 2002). This is essentially a pooled Augmented Dickey-Fuller (ADF) test but is general enough to allow for individual fixed effects as well as time effects in the data. Next we employ Breitung's (2000) test which is similar to LLC expect for the

way in which it uses proxies to estimate the auto-regressive coefficients. However the major limitation of these tests is that each cross-section in the panel is assumed to share the same auto-regressive coefficient. Thus rejection of the null of non-stationarity implies that the rate of convergence is same across all units. This assumed homogeneity of the unit root was overcome by Im, Pesaran and Shin (IPS, 1997; 2003) who estimated individual-specific ADF tests and then computed the mean of the different t-statistics. Thus, the IPS test does not assume that all series are stationary under the alternative, but is consistent under the alternative that only some of the series are stationary. Therefore, we employ the IPS test as a robust means of testing our convergence hypothesis. We also use the Fisher-ADF test and the Fisher-PP test (Maddala and Wu, 1999; Choi, 2001). The Fisher tests are similar to the IPS test in the sense that they combine independent unit root tests (conducted as chi-square tests in this case) of the individual series.

Finally, we apply a stationarity test, viz. the Hadri test (Hadri, 2000) which is a residual based Lagrange multiplier test with the null hypothesis of stationarity of the series. This test has high power and has the advantage of being robust to non-normality. We also provide results from a variant of the Hadri test that is heteroscedasticity consistent. In sum, we choose to consider such a large variety of tests because each of them has its own relative advantages and we are able to arrive at a balanced conclusion by considering all the tests. This helps us to obtain robust results for unconditional convergence in corporate financing patterns.

2.2 TESTS OF CONDITIONAL CONVERGENCE USING GMM REGRESSIONS

The previous framework provides only an examination of unconditional convergence where different initial conditions among the countries cannot be controlled for. The classical growth regression approach of Barro and Sala-i-Martin (1992) allows testing for conditional as well as unconditional convergence of countries based on their GDP per capita. The classical framework was based on cross-section data but was later extended by Islam (1995) and Nerlove (1996) to fit panel data. Islam (1995) shows that the classical model can be modified to form the following estimable expression based on panel data:

$$y_{it} = \gamma y_{it-1} + x_{it}^{/}\beta + \mu_i + u_{it} \qquad (1)$$

where $t=1$ to T, represents year and $i=1$ to N represents country; y_{it} stands for GDP per capita for country i in year t; x_{it} stands for all the determinants of growth; μ_{it} represents the country-specific effects; and u_{it} is white noise. In the above expression, if the estimated γ turns out to be less than one, then we can deduce that there is convergence across the units and over the time period considered. Moreover, the inverse of γ indicates the speed of convergence.

In this paper, our objective is to adopt the above framework for testing convergence in growth rates of corporate financing patterns of EU countries. In what follows we explain how we adopt the growth regression framework to the context of corporate financing. The flow of funds data that we use decomposes the aggregate economic activity of a country to the flow of funds in the government, private, household and financial sectors. Therefore, a convergence in national economic growths[3] does not automatically imply that there will be convergence in each of the disaggregated sectors of

the economies. This motivates the modeling of convergence in a disaggregated component of the aggregate economies, i.e. the financial sector in our case. Analogous to the neo-classical production function that is typically assumed for the macro-economy, we conceptualise the economic activity in the financial sector in terms of corporate financing being produced by employing different inputs such as those implied by monetary policy and other control variables (Murinde et al., 2004). Therefore, we replace GDP per capita in the traditional growth model by the types of corporate financing. In other words, in equation (1) we replace y_{it} by the share of corporate financing from a particular source. Consequently, we are able to test for convergence among EU countries in terms of their corporate financing patterns.

However the main problem with the model outlined in equation (1) is that the lagged dependent variable y_{it-1} and the country-specific effects μ_{it} are correlated, which means that the usual panel estimators are biased and inconsistent. The Generalized Method of Moments (GMM) methodology is a convenient means of estimating this model where instrument variables are used for y_{it-1} and moment conditions are exploited in the estimation (Hansen, 1982; Arellano and Bond, 1991). In this paper we follow Arellano and Bover's (1995) methodology of orthogonal deviation that removes the unobserved country-specific effects. The orthogonal deviation transformation expresses each observation as the deviation from the mean of future observations for the same country and it weights each deviation to standardize the variance. The advantage of using this transformation is that the transformed errors will be serially uncorrelated and homoskedastic.

We apply the above methodology to estimate four different equations. First, we estimate the convergence model for bank financing based on the following equation:

$$BANK_{it} = \gamma BANK_{it-1} + \beta_1 BMY_{it} + \beta_2 ER_{it} + \beta_3 IR_{it} + \beta_4 OPEN_{it} + + u_{it} \quad (2)$$

where BANK is bank financing by non-financial companies (NFCs), BMY is the ratio of money supply to GDP, ER is the nominal exchange rate, IR is the nominal interest rate and OPEN is a measures of the degree of openness calculated as the ratio of exports and imports to GDP. While the control variables BMY and IR are proxies for monetary policy and are consistent with the idea of monetary convergence as stipulated by the European Commission (Murinde et al., 2004), ER and OPEN are expected to control for the influence of trade policy and terms of trade on corporate financing.

The second equation that we estimate is based on the role of equity markets in providing finance to NFCs:

$$EQUITY_{it} = \gamma EQUITY_{it-1} + \beta_1 BMY_{it} + \beta_2 ER_{it} + \beta_3 IR_{it} + \beta_4 OPEN_{it} + + u_{it} \quad (3)$$

where EQUITY is equity financing by the NFCs and the control variables are the same as before. We also estimate an equation based on bond financing of NFCs:

$$BOND_{it} = \gamma BOND_{it-1} + \beta_1 BMY_{it} + \beta_2 ER_{it} + \beta_3 IR_{it} + \beta_4 OPEN_{it} + + u_{it} \quad (4)$$

where BOND is bond financing by the NFCs and the control variables are the same as before. Finally, we test convergence in the use of internal finance by NFCs by estimating the following equation:

$$INTERN_{it} = \gamma INTERN_{it-1} + \beta_1 BMY_{it} + \beta_2 ER_{it} + \beta_3 IR_{it} + \beta_4 OPEN_{it} + + u_{it} \quad (5)$$

where INTERN is internal financing by the NFCs and the control variables are the same as before.

The data for this study are taken from the OECD flow-of-funds tables and covers the period 1972-2004 for eight EU member countries, viz. Finland, France, Germany, Italy, the Netherlands, Spain, Sweden and the UK. We define the endogenous variables i.e. the corporate financing variables as percentages of total, e.g. $BANK_{it}$ refers to the percentage of bank borrowing by NFCs in country *i* in year *t* out of total financing. The data on macroeconomic variables are collected from IMF's International Financial Statistics database. Mean values of the corporate finance data are plotted in figure 1. As mentioned earlier, the evolving patterns provide preliminary indication of a shift from bank based financing to market sources. Table 1 presents a correlation matrix of all the main variables that we study.

3. RESULTS FROM PANEL UNIT ROOT TESTS

Panel unit root and stationarity tests have the advantage that they take account of time-series properties of the variables while examining convergence. Thus we employ a variety of such tests for examining convergence in corporate financing in the EU. We conduct five panel unit root tests and two panel stationarity tests on each corporate financing variable and the results for all the eight countries in our sample are presented in Table 2. We find that for bank financing the results are overwhelmingly in favour of convergence as the null hypothesis of non-stationarity of the data gets rejected by all the five unit root tests (albeit marginally for the LLC test at the level of 10%). Furthermore, the Hadri tests of stationarity do not reject the null hypothesis of stationarity. However

for equity financing, the results do not indicate convergence. Although the Fisher-PP test rejects the null hypothesis, however the rest of the tests do not provide evidence to suggest a convergence in equity financing among the sample countries.

[Table 2 about here]

The bond financing results are in favour of convergence as indicated by the unanimous rejection of the null hypothesis in all the unit root tests. It may be noted that although the Hadri test rejects the null hypothesis of stationarity at the 10% level, the heteroscedasticy consistent version of the test provides evidence for convergence. The results for internal finance are not entirely unanimous. While the LLC test fails to reject the null hypothesis of non-stationarity, the Fisher-PP test rejects it only at the 10% level of significance. However all the other tests provide results to indicate convergence in internal financing. In sum, the above tests strongly indicate that there has been convergence in the corporate financing patterns of the EU countries in terms of bank and bond financing. Our results provide weak evidence in favour of convergence in terms of equity and internal financing.[4]

We also conduct the panel unit root tests for only the countries that have adopted euro as their currency (i.e. excluding Sweden and the UK). The results are presented in the Appendix Table A1. The results are almost similar to those obtained for the full sample, except for mixed results in the case of equity financing. Hence, the convergence hypothesis appears to hold for bank finance and bond finance whereas the results are mixed for equity finance and internal finance (the Hadri tests of stationarity indicate

convergence whereas the unit root tests do not). These results reinforce our earlier findings for the EU countries. Hence, our results strongly suggest that NFCs in euro countries have converged in terms of their bank and bond financing patterns, whereas the results for equity and internal finance are mixed. Finally we conduct the panel unit root tests on our sample only for the countries that were EU members from the beginning of our data period, i.e. 1972. Hence, we leave out the new entrants, viz. Finland, Spain and Sweden, from our sample. The results are presented in the Appendix Table A2. These results suggest that these countries exhibited convergence in terms of bank finance and bond finance, thereby re-affirming our previous results.

To summarize, our panel unit root tests indicate that the EU countries have exhibited convergence in their corporate financing patterns in terms of their bank financing and equity financing. This pattern of convergence has been consistent across the countries that have adopted the euro as their currency as well as for the founder EU member countries.

4. RESULTS FROM GMM REGRESSIONS

While the above tests examined financial convergence only in an unconditional sense, we now move to the formal testing for convergence based on the modification of the classical regression approach as outlined in equations (2) to (5). These set of regressions, based on the dynamic panel GMM methodology, allow us to assess unconditional as well as conditional convergence. The results of the estimation of equations (2) to (5) all the eight countries in our sample are presented in Table 3. The coefficients of the lagged

financing variables are less than one in all cases except for internal financing. This indicates that there has been convergence in corporate financing patterns in terms of bank, equity and bond financing across the eight countries in our sample over the period 1972-2004. However, the speed of convergence varies across the source of finance. Considering un-conditional convergence, bond finance appears to have exhibited the quickest convergence followed by equity and bank finance in that order. This pattern is repeated even when factors affecting financial convergence are controlled for, i.e. in the case of conditional convergence once again it is bond finance that exhibits the fastest convergence followed by equity and bank finance in that order. Our results indicating slow convergence of bank finance are comparable with the results of Murinde et al. (2004) who observed a lack of convergence in financing from this source.

[Table 3 about here]

Therefore, based on a more recent and expanded dataset, we observe that the EU countries have begun to converge in terms of the use of bank financing by NFCs, although the speed of convergence is the slowest for this source of finance. Another interesting finding is that EU countries exhibit convergence in bond financing and in fact this variable shows the fastest conditional as well as unconditional convergence, whereas Murinde et al. (2004) did not observe any convergence in financing from this source. This indicates that in recent years, NFCs in European countries have shown a tendency to source similar proportions of their total financing requirements from the bond markets. Our GMM results indicate convergence in equity financing whereas the panel unit root

tests did not suggest convergence in this source of financing. These are not necessarily conflicting since the GMM results indicate conditional convergence whereas the unit root tests examined unconditional convergence. Hence, our results suggest that while EU countries did not exhibit a common trend in terms of equity financing, there was conditional convergence in the sense suggested by the growth regression approach, i.e. countries with lower initial levels of equity financing exhibited higher growth in financing from this source (i.e. a catch-up effect).

The role played by introduction of the euro in 1999 in the patterns of corporate financing is examined by including a dummy variable (EURODUM) for the year 1999 in the above specifications.[5] For the bank finance models, the results for the impact of the introduction of the euro suggests that while there has been convergence in bank financing, the introduction of the euro has actually led to an increase in dependence on bank borrowings. Similarly, the coefficient of the dummy variable is positive and significant in all cases of the equity financing and bond financing models suggesting that NFCs in the European countries increased their financing from equity issues and bond markets subsequent to the introduction of the Euro. However the introduction of the euro appears to have reduced the dependence on internal financing. These results indicate a convergence towards a variant of the Anglo-Saxon model of corporate financing characterized by increased importance of market based sources of finance and reduced role of internal finances in providing funds to the NFCs.

Whether entry of a country into the EU mattered in terms of the patterns of corporate financing is examined by including a dummy variable (ENTRYDUM) for the years of EU entry in the above specifications. While the results for the bank finance,

bond finance and internal finance models do not show any impact of entry, the coefficient of the dummy variable is negative and significant in almost all specifications of the equity finance models. These results indicate that entry into the EU was characterized by NFCs of member countries reducing their dependence on equity financing.

We also re-estimate the model specifications only for the countries that have adopted the euro thus leaving out Sweden and UK in these set of estimations. The results from these estimations are reported in Table 4. The results are almost the same as obtained for the entire sample earlier. Hence, the euro countries have exhibited both unconditional and conditional convergence in their corporate financing patterns. Bond finance appears to have exhibited the quickest convergence, in this case followed by bank finance and equity finance in that order.

[Tables 4 and 5 about here]

We then re-estimate the model specifications only for the countries that were EU members from the beginning of our data period, i.e. we leave out Finland, Spain and Sweden, from our sample. See Table 5. Once again we observe that there has been convergence in corporate financing patterns across this sample of countries, including internal financing in this case. Considering un-conditional or conditional convergence, bond finance appears to have exhibited the quickest convergence followed by equity finance, bank finance and internal finance in that order.

5. CONCLUDING REMARKS

Recent studies, based on micro as well as macro level approaches have shown that the EU is undergoing financial integration (Baele et al., 2004; Gaspar et al., 2003; Kiehlborn and Mietzner, 2005). In this context, the present paper examines a particular aspect of the financial integration process, namely corporate financing patterns. We examine convergence in the corporate financing patterns of European countries during the period 1972 to 2004. Employing a number of modern panel unit root tests, we find evidence for convergence in bank and bond finance, but we do not obtain unanimous results for equity finance and internal finance. We then apply the dynamic panel variant of the traditional growth regression approach.

Our results suggest that NFCs in Europe are converging in terms of the proportion of funds they access from banks, equity issues and bond markets. In sum, it appears that financial integration in EU has been characterized by NFCs increasingly taking recourse to bond and equity markets for their financing needs. Hence to some extent this indicates a move from bank-based financing to the Anglo-Saxon mode of market based financing. Whether this has also been accompanied by a shared reduction in internal financing is however not consistently borne out by our results.

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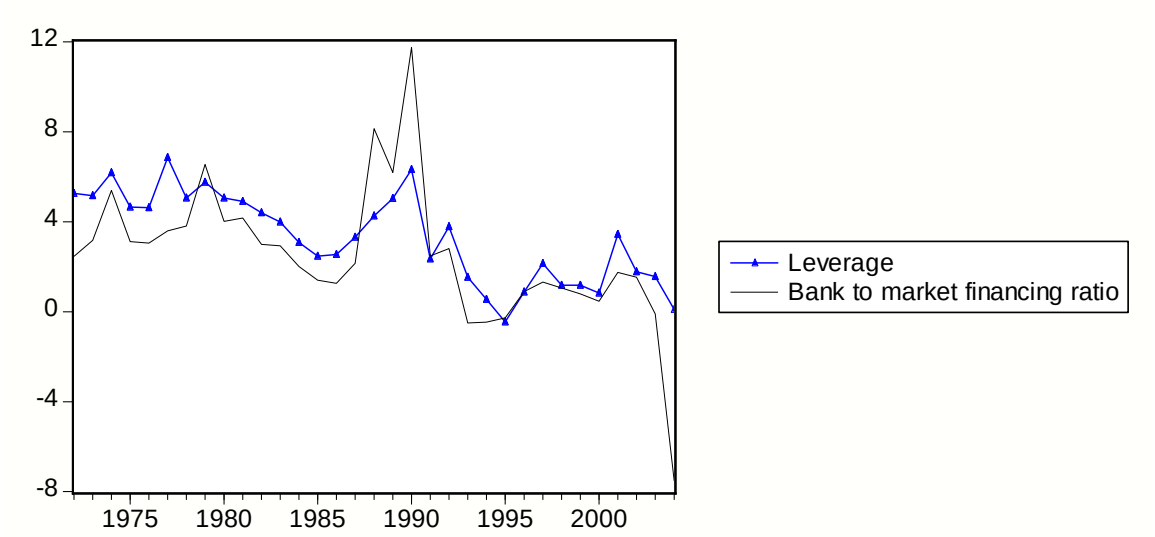
Figure 1: Evolving corporate financing patterns in the EU



Note: Mean values are plotted for each year. Leverage refers to the ratio of debt (bank+bond) financing to equity financing; bank to market financing ratio refers to the ratio of bank financing to market (equity+bond) financing.

Table 1: Correlation matrix of corporate financing and macroeconomic variables for eight EU countries, 1972-2004

	BANK	EQUITY	BOND	INTERN	BMY	ER	IR	OPEN
BANK	1.000							
EQUITY	0.360	1.000						
BOND	0.293	0.634	1.000					
INTERN	-0.866	-0.770	-0.606	1.000				
BMY	-0.076	0.113	0.204	-0.025	1.000			
ER	-0.054	-0.149	-0.143	0.121	-0.150	1.000		
IR	0.232	0.028	0.008	-0.168	-0.110	-0.179	1.000	
OPEN	-0.125	-0.270	-0.179	0.228	-0.212	0.203	-0.429	1.000

Note: BANK is bank financing by the NFCs to total financing, EQUITY is equity financing by NFCs to total financing, BOND is bond financing by NFCs to total financing, INTERN is internal financing by NFCs to total financing, BMY is the ratio of money supply to GDP, ER is the nominal exchange rate, IR is the nominal interest rate and OPEN is the ratio of exports and imports to GDP

Table 2: Panel unit root and stationarity tests: Results for eight EU countries, 1972-2004

	BANK		EQUITY		BOND		INTERN	
Method	Statistic	P-value	Statistic	P-value	Statistic	P-value	Statistic	P-value
Null: Unit root (assumes common unit root process)								
Levin, Lin & Chu	-1.39695	0.0812	0.27109	0.6068	-8.12964	0.0000	-1.10692	0.1342
Breitung t-stat	-4.16643	0.0000	-1.16491	0.1220	-4.20111	0.0000	-2.28877	0.0110
Null: Unit root (assumes individual unit root process)								
Im, Pesaran and Shin W-stat	-3.40697	0.0003	-0.39352	0.3470	-7.77701	0.0000	-2.10592	0.0176
ADF - Fisher Chi-square	41.5028	0.0005	16.5072	0.4182	86.8901	0.0000	26.3358	0.0495
PP - Fisher Chi-square	32.8367	0.0078	26.7665	0.0442	67.7155	0.0000	23.5700	0.0993
Null: No unit root (assumes common unit root process)								
Hadri Z-stat	0.84747	0.1984	0.47226	0.3184	1.42700	0.0768	2.08913	0.0183
Hadri Heteroscedasticity Consistent Z-stat	0.90051	0.1839	1.09923	0.1358	1.03987	0.1492	0.71894	0.2361

Note: The regression for the unit root tests follows from Evans and Karras (1996):

$$\Delta z_{it} = \beta z_{t-1} + \sum_{j=1} \lambda_j \Delta z_{t-j} + \alpha_i + u_{it},$$

where z_{it} is the mean differenced endogenous variable for corporate financing measured as bank financing, equity financing, bond financing and internal financing by NFCs as a ratio of total financing. We employ a variety of modern panel unit root tests based on the above formulation. Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Table 3: GMM estimation results for eight EU countries, 1972-2004

	BANK(-1)	EQUITY(-1)	BOND(-1)	INTERN(-1)	BMY	ER	IR	OPEN	EURODUM	ENTRYDUM	Sargan	d.f.
	0.781 (0.00)										30.60	31
	0.784 (0.00)				-0.079 (0.10)						22.12	30
	0.787 (0.00)					-0.026 (0.00)					29.76	32
BANK	0.773 (0.00)						0.006 (0.00)				25.82	32
models	0.774 (0.00)							-0.233 (0.00)			30.09	32
	0.756 (0.00)				0.135 (0.25)	-0.006 (0.61)	0.012 (0.00)	-0.361 (0.00)			19.22	33
	0.753 (0.00)				0.132 (0.22)	-0.004 (0.78)	0.012 (0.00)	-0.374 (0.03)	0.078 (0.00)		18.81	34
	0.758 (0.00)				0.136 (0.24)	-0.002 (0.81)	0.012 (0.00)	-0.369 (0.00)		0.087 (0.39)	19.68	34
		0.753 (0.00)									31.31	31
		0.704 (0.00)			0.099 (0.01)						23.44	30
		0.750 (0.00)				0.008 (0.00)					31.32	32
EQUITY		0.748 (0.00)					0.001 (0.03)				23.78	32
models		0.750 (0.00)						0.083 (0.00)			27.37	32
		0.690 (0.00)			0.162 (0.00)	0.043 (0.00)	0.003 (0.00)	-0.302 (0.00)			23.91	33
		0.684 (0.00)			0.141 (0.01)	0.043 (0.00)	0.003 (0.00)	-0.308 (0.00)	0.249 (0.00)		23.20	34
		0.723 (0.00)			0.129 (0.02)	0.024 (0.03)	0.002 (0.00)	-0.168 (0.00)		-0.377 (0.00)	24.19	34
			0.356 (0.00)								29.68	31
			0.282 (0.00)		0.110 (0.00)						23.01	30
			0.348 (0.00)			0.005 (0.18)					29.40	32
BOND			0.361 (0.00)				0.002 (0.00)				27.89	32
models			0.344 (0.00)					-0.044 (0.10)			28.19	32
			0.231 (0.00)		0.170 (0.00)	0.048 (0.00)	0.002 (0.03)	-0.273 (0.00)			24.86	33
			0.210 (0.00)		0.167 (0.00)	0.045 (0.00)	0.002 (0.00)	-0.273 (0.00)	0.132 (0.00)		25.83	34
			0.232 (0.00)		0.169 (0.00)	0.048 (0.00)	0.002 (0.03)	-0.262 (0.00)		0.014 (0.82)	25.62	34
				1.001 (0.00)							21.68	31
				1.060 (0.00)	0.242 (0.03)						14.96	30
				1.010 (0.00)		0.031 (0.03)					21.77	32
INTERN				1.023 (0.00)			-0.007 (0.00)				20.52	32
models				1.009 (0.00)				0.261 (0.00)			20.17	32
				1.047 (0.00)	0.175 (0.28)	0.047 (0.00)	-0.009 (0.01)	-0.233 (0.18)			15.24	33
				1.035 (0.00)	0.169 (0.27)	0.047 (0.00)	-0.010 (0.00)	-0.215 (0.20)	-0.286 (0.00)		15.35	34
				1.014 (0.00)	0.159 (0.31)	0.042 (0.00)	-0.009 (0.00)	-0.186 (0.28)		-0.240 (0.58)	15.36	34

Note: Sargan denotes the test for validity of instruments (instruments are the second lags of corporate financing variables). The numbers in parentheses are p-values.

Table 4: GMM estimation results excluding non-Euro EU countries, 1972-2004

	BANK(-1)	EQUITY(-1)	BOND(-1)	INTERN(-1)	BMY	ER	IR	OPEN	Sargan	d.f.
BANK models	0.797 (0.00)								22.83	31
	0.796 (0.00)				-0.222 (0.00)				15.16	26
	0.803 (0.00)					-0.120 (0.00)			21.79	32
	0.773 (0.00)						0.010 (0.00)		20.62	32
	0.787 (0.00)							-0.371 (0.00)	20.61	32
	0.711 (0.00)				-0.213 (0.00)	-0.366 (0.00)	0.029 (0.00)	-0.782 (0.00)	14.81	29
EQUITY models		0.844 (0.00)							31.23	31
		0.826 (0.00)			0.043 (0.00)				12.35	26
		0.841 (0.00)				0.058 (0.00)			29.47	32
		0.836 (0.00)					0.003 (0.00)		19.62	32
		0.836 (0.00)						-0.106 (0.00)	20.27	32
		0.749 (0.00)			0.427 (0.00)	0.340 (0.00)	0.005 (0.00)	-0.686 (0.00)	14.56	29
BOND models			0.303 (0.00)						23.40	31
			0.227 (0.00)		0.056 (0.01)				16.66	26
			0.302 (0.00)			0.035 (0.00)			26.17	32
			0.264 (0.00)				0.003 (0.00)		23.16	32
			0.298 (0.00)					-0.075 (0.00)	22.21	32
			0.018 (0.00)		0.371 (0.00)	0.260 (0.00)	0.005 (0.00)	-0.627 (0.00)	17.74	29
INTERN models				1.024 (0.00)					20.56	31
				1.044 (0.00)	0.325 (0.00)				14.44	26
				1.031 (0.00)		0.078 (0.00)			23.78	32
				1.015 (0.00)			-0.010 (0.00)		19.75	32
				1.022 (0.00)				0.305 (0.00)	19.37	32
				1.004 (0.00)	0.502 (0.00)	0.291 (0.00)	-0.016 (0.00)	-0.060 (0.66)	12.60	29

Note: Sargan denotes the test for validity of instruments (instruments are the second lags of corporate financing variables). The numbers in parentheses are p-values.

Table 5: GMM estimation results for five EU countries, 1972-2004

	BANK(-1)	EQUITY(-1)	BOND(-1)	INTERN(-1)	BMY	ER	IR	OPEN	Sargan	d.f.
BANK models	0.839 (0.00)								22.02	31
	0.818 (0.00)				0.070 (0.00)				13.91	27
	0.841 (0.00)					-0.004 (0.00)			21.08	32
	0.852 (0.00)						0.001 (0.00)		20.23	32
	0.817 (0.00)							-0.140 (0.00)	17.19	32
	0.826 (0.00)				0.090 (0.01)	0.015 (0.15)	0.001 (0.00)	-0.009 (0.32)	14.44	30
EQUITY models		0.629 (0.00)							24.60	31
		0.569 (0.00)			0.140 (0.00)				15.83	27
		0.624 (0.00)				0.063 (0.00)			23.86	32
		0.634 (0.00)					0.001 (0.00)		19.07	32
		0.628 (0.00)						0.040 (0.00)	19.21	32
		0.547 (0.00)			0.275 (0.00)	0.200 (0.00)	0.001 (0.00)	-0.287 (0.00)	15.41	30
BOND models			0.544 (0.00)						18.86	31
			0.472 (0.00)		0.075 (0.00)				16.37	27
			0.532 (0.00)			0.035 (0.00)			19.09	32
			0.571 (0.00)				0.001 (0.00)		18.62	32
			0.546 (0.00)					0.001 (0.85)	18.15	32
			0.406 (0.00)		0.144 (0.00)	0.108 (0.00)	0.002 (0.00)	-0.171 (0.00)	17.47	30
INTERN models				0.794 (0.00)					20.46	31
				0.843 (0.00)	-0.114 (0.02)				13.94	27
				0.784 (0.00)		-0.096 (0.00)			19.25	32
				0.846 (0.00)			-0.060 (0.00)		17.98	32
				0.836 (0.00)				0.156 (0.00)	17.49	32
				0.860 (0.00)	-0.221 (0.00)	-0.165 (0.00)	-0.007 (0.00)	0.074 (0.52)	15.74	30

Note: Sargan denotes the test for validity of instruments (instruments are the second lags of corporate financing variables). The numbers in parentheses are p-values.

Appendix

Table A.1: Panel unit root and stationarity tests: Results excluding non-Euro EU countries, 1972-2004

	BANK		EQUITY		BOND		INTERN	
Method	Statistic	P-value	Statistic	P-value	Statistic	P-value	Statistic	P-value
Null: Unit root (assumes common unit root process)								
Levin, Lin & Chu	-1.49589	0.0673	-0.89357	0.1858	-8.44002	0.0000	-0.11152	0.4556
Breitung t-stat	-4.01631	0.0000	-1.05775	0.1451	-4.72845	0.0000	-1.12894	0.1295
Null: Unit root (assumes individual unit root process)								
Im, Pesaran and Shin W-stat	-3.02376	0.0012	-1.00445	0.1576	-8.2134	0.0000	-1.08854	0.1382
ADF - Fisher Chi-square	29.4868	0.0033	14.5715	0.2657	80.4060	0.0000	14.5814	0.2651
PP - Fisher Chi-square	23.1257	0.0267	13.9236	0.3056	63.9975	0.0000	12.1041	0.4374
Null: No unit root (assumes common unit root process)								
Hadri Z-stat	0.39561	0.3462	0.32403	0.3730	0.15628	0.4379	1.20426	0.1142
Hadri Heteroscedasticity Consistent Z-stat	1.46572	0.0714	0.52801	0.2987	0.30316	0.3809	0.52862	0.2985

Note: See Table 2.

Table A.2: Panel unit root and stationarity tests: Results for five EU countries, 1972-2004

	BANK		EQUITY		BOND		INTERN	
Method	Statistic	P-value	Statistic	P-value	Statistic	P-value	Statistic	P-value
Null: Unit root (assumes common unit root process)								
Levin, Lin & Chu	-1.55054	0.0605	-0.43768	0.3308	-4.68723	0.0000	-1.58974	0.0559
Breitung t-stat	-3.23386	0.0006	-1.5777	0.0573	-3.86892	0.0001	-1.95092	0.0255
Null: Unit root (assumes individual unit root process)								
Im, Pesaran and Shin W-stat	-3.12549	0.0009	-0.76531	0.2220	-4.29365	0.0000	-3.1005	0.0010
ADF - Fisher Chi-square	38.0153	0.0000	14.9266	0.1348	38.5545	0.0000	29.8815	0.0009
PP - Fisher Chi-square	22.0669	0.0148	27.7755	0.0020	30.5764	0.0007	22.5056	0.0127
Null: No unit root (assumes common unit root process)								
Hadri Z-stat	3.72672	0.0001	0.57174	0.2838	1.40502	0.0800	1.36157	0.0867
Hadri Heteroscedasticity Consistent Z-stat	1.46576	0.0714	1.53405	0.0625	1.45977	0.0722	2.05805	0.0198

Note: See Table 2.

ENDNOTES

1. See for example, Baele et al. (2004) and Guiso et al. (2004).

2. The sample selection is driven by data availability. The chosen countries are the only ones for which sufficient data was available for the period studied. Data beyond 2004 was not available for most countries at the time of writing this paper.

3. Crespo-Cuaresma et al. (2008) find evidence for income convergence across EU countries.

4. We also tried to follow Maddala and Wu's (1999) suggestion of using bootstrap samples for the ADF Fisher-type test as it accommodates cross-sectional dependence between units. We used an Eviews (version 6) code developed by Jaqueson K. Galimberti which requires balanced data. Consequently we had to drop Finland and Italy from our sample as they did not have data for all years. We used 10,000 replications to generate the bootstrap test statistics (57.55881 for BANK, 33.58297 for equity, 56.82608 for BOND32.84334 for INTERN) and the p-values indicated that the null hypothesis of non-stationarity is rejected at 1% level of significance for all four variables.

5. We have experimented with other regulatory and policy change variables such as a dummy for the year 1993 (launch of a single European market) and 2000 (adoption of the FSAP) but the convergence results were qualitatively similar to those reported in the paper. Moreover we controlled for structural breaks in the series (detected by Andrews-Quandt tests for unknown break points) but once again the convergence results were qualitatively similar to those reported in the paper.