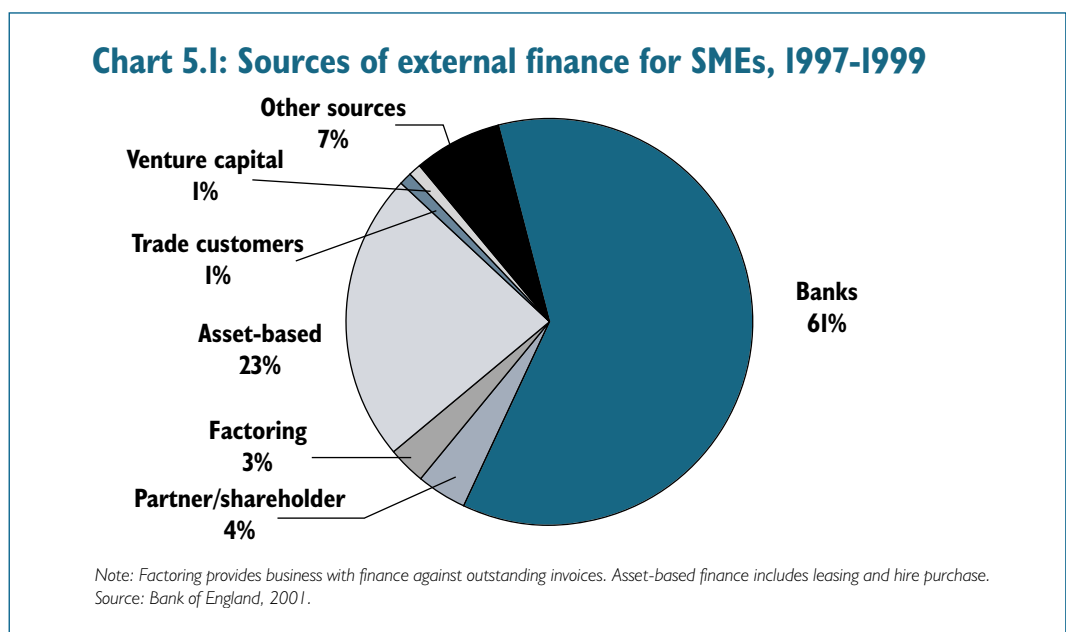


The impact of EMU entry on the cost of capital for small and medium-sized enterprises (SMEs) could be very different from that experienced by larger firms. SMEs tend to raise funds locally and so are unlikely to access the euro bond market. They also tend to rely more heavily than large firms on bank lending and venture equity.

The reduction in currency costs on cross-border finance would be relatively more important for SMEs. However, information and monitoring costs would be likely to remain a constraint on SME's accessing the euro area financial market. Smaller SMEs in particular tend to use primarily local retail finance. Over the long run EMU entry could increase competition in the domestic UK market for bank lending to SMEs, and could increase the size of the venture capital market.

5.1 SMEs are defined as those firms with less than 250 employees. They constitute the majority of UK firms, accounting for 99 per cent of UK enterprises and 43 per cent of non-government employment.¹ (Further details about the structure of UK industry and potential implications of EMU entry can be found in the EMU study *EMU and business sectors*, by HM Treasury.) Removing exchange rate transaction costs and currency risk through EMU entry may be particularly beneficial to UK SMEs.

5.2 At present, all UK firms accessing euro capital markets will face search costs, currency transaction costs and currency hedging costs. For large companies these costs can be spread over high-value transactions and so will be fairly small as a proportion of finance raised. But for SMEs these costs are likely to be a significant hurdle to raising euro finance. As discussed in Section 4, hedging costs may be higher for SMEs than for large firms in relative terms. Information and monitoring costs are also an important factor in SME financing. Finance providers to SMEs require local knowledge of firms and economic conditions, and often monitor the use of finance after it has been provided. Chart 5.1 provides a breakdown of sources of external finance for SMEs. By far the greatest source of external finance is bank lending, accounting for 61 per cent of total external finance.



¹ Small Business Service (2002).

5.3 Asset-based finance and factoring account for the second greatest share. Venture capital is much less significant in volume terms, accounting for just 1 per cent of the total, but is a particularly important potential source of finance for high-growth SMEs.

5.4 The importance of information in SME financing means that even if UK entry to EMU were to reduce the costs of accessing financial markets for SMEs, the importance of local knowledge would remain a constraint on market access. This will particularly be the case for smaller SMEs. This section considers in more detail the possible impact of EMU on bank lending and venture capital.

Impact of EMU on UK bank lending to SMEs

5.5 By removing exchange rate risk and boosting price transparency, EMU entry could potentially increase competition in UK banking by encouraging euro area banks to enter the UK market. The recent Competition Commission (2002) investigation into small business banking concluded that a complex monopoly exists in the supply of banking services to SMEs and identified practices carried out by the eight main clearing banks in the UK which restrict or distort competition and operate against the public interest. The report also proposed a series of remedies, including measures to improve transparency and reduce the costs of switching accounts.

5.6 As outlined in Section 4, evidence from the euro area on the impact of EMU on banking competition is mixed. The dominant trend in the euro area in recent years has been toward increased concentration in the banking sector. Merger activity has predominantly involved banks from the same country and retail financial services in the euro area are still largely segmented on national lines. Cross-border mergers, which the euro might have been expected to stimulate, have so far been limited mostly along distinct regional lines such as Scandinavia (e.g. Nordea NB). However, there is some evidence² of increasing cross-border provision of banking services, which may improve the competitive environment.

5.7 It is not surprising that cross-border retail banking services have been slow to develop in the euro area, as national regulations act as a barrier and local knowledge of domestic economic conditions is very important in lending to SMEs. New entrants are also likely to be put off by reluctance on the part of SMEs to switch banks. The Competition Commission (2002) investigation found that SMEs were very reluctant to change banks because of the perceived complexity of switching for little financial benefit, the significance of maintaining relationships with a particular bank or relationship manager, and the ability of the existing bank to negotiate lower charges if there is a threat of switching. The behavioural remedies are designed to tackle the barriers to switching, but will take some time to fully take effect, so in the short term new entrants are unlikely to capture a sizeable share of the UK market.

5.8 Overall, it seems unlikely that EMU entry would lead to an immediate and significant increase in competition in SME bank lending. The importance of local knowledge and the reluctance of SMEs to switch banks will constrain new euro area entrants into the UK market. This does not mean that EMU entry would not promote competition over the longer run. Despite the constraints outlined above, EMU entry could promote increased price transparency and so spur competition in the sector. However, the impact is unlikely to be large in the short run.

² European Central Bank (2000).

Impact of EMU on UK venture capital and other equity financing

5.9 Although representing a small component of the financing of SMEs, venture capital and related forms of equity financing can be a vital source of capital for high-risk and high-growth ventures. Such firms may be unsuitable candidates for debt financing due to a lack of collateral, the lack of a track record, and long time horizons until positive cash flow is expected.³ Equity financing through venture capital may be more suitable in these instances.

5.10 As well as providing finance, venture capitalists often have technical, financial and management expertise which allows them to better judge higher risk projects than a bank lender. Venture capitalists have an incentive to use any relevant expertise they may have to boost returns.

The UK and EU venture capital industries

5.11 The UK venture capital industry is the largest in Europe, accounting for 29 per cent of total European venture capital investment in 2001. It accounted for the equivalent of 0.7 per cent of UK GDP in 2001. Total funds raised by UK private equity firms in 2001 reached £12.7 billion, up by 18 per cent from 2000. An important characteristic of the UK venture capital market is that it is still skewed towards later-stage investments. Only around 9 per cent of total funds were allocated to start-up or early-stage projects in 2001, although this represents a 30 per cent increase on 2000 levels (British Venture Capital Association, 2002). There is also a strong regional bias with the South East and London receiving 52 per cent of UK venture capital investment.

5.12 In most of the rest of Europe the venture capital industry is much less developed than in the UK or the US. The size of the sector has increased rapidly in recent years. Funds of €38.2 billion were raised in Europe⁴ in 2001, compared with just €5.5 billion in 1995 (European Venture Capital Association (EVCA), 2002). The UK accounted for €20.5 billion of the 2001 European figure. The market in the US is much larger, though since the bursting of the Internet bubble in 2000, funds raised from US venture capital have declined sharply. The amount invested fell to \$40.6 billion in 2001, from \$106 billion in 2000 but remains significantly higher than the \$7.37 billion invested in 1995.⁵ Moreover, of the US total, 22 per cent went to early-stage investments in 2001.

5.13 Large UK institutional investment funds, in particular insurance companies, seem averse to venture capital and to start-ups in particular. Those institutional investment firms which invested in private equity in the US in 2001 allocated 7.5 per cent of their funds to it, compared to just 3.7 per cent in equivalent UK funds. Indeed much of the growth in venture capital in the UK in recent years has been from US institutions. That said, the amount invested by UK pension funds in venture capital doubled from £0.8 billion in 2000 to £1.6 billion in 2001.

The implications of EMU for venture capital in the EU

5.14 Could financial integration in EMU promote the creation of a much larger venture capital industry in the EU, perhaps similar to that in the US? In part, this depends on the factors that make the US market so much larger than the EU.

³ For a review of SME financing issues and trends in the UK, see Lund and Wright (2001).

⁴ Data are for the UK, France, Germany, Italy, Spain, the Netherlands, Switzerland, Belgium, Denmark, Finland, Norway, Ireland, Poland, Austria, Portugal, Hungary, Greece, the Czech Republic, Iceland and Slovakia.

⁵ These figures are from the US National Venture Capital Association, which uses a narrower definition of venture capital than the EVCA.

5.15 One reason may be that it is easier for venture capitalists in the US to exit their investments through public share offerings. There is a divide in the EU between countries with equity-orientated financial systems, such as the UK and Netherlands, which support relatively large venture capital industries, and other non-equity-orientated markets where it is less developed. The rise in private pension funds, growth of institutional investors, an increase in equity market integration, and the development of technology-based equity exchanges have all promoted the development of the EU equity market in recent years. This will also promote the development of the EU venture capital market. Other factors may hold back development, for example, the regulatory environment for venture capital in the US is seen to be more favourable than the EU.

5.16 A crucial question is whether EMU has promoted an integrated market for venture capital in the euro area, or whether it is still largely fragmented on national lines. If the latter were the case then there would be little to gain from euro area entry. There are obvious reasons why venture capital may remain fragmented. It relies on the availability of information on the risks of a project, and involves close co-operation between the venture capitalist and the SME. This suggests that venture capitalists may have a strong home bias, preferring to deal with SMEs that operate in local markets with which they are familiar. Some evidence for this comes from the strong South East bias to venture capital in the UK where most private equity firms are based. In addition, the differing regulatory environments for private equity in Europe may also act to sustain a fragmented market.

5.17 EMU may also affect expected returns. If EMU promotes trade integration, investors may view UK start-ups and small businesses as entrants to the euro area market rather than the domestic market. Expected returns may rise as a consequence. Higher expected returns may be one explanation for the strength of the US venture capital market; US start-ups enter a large integrated market and if they prosper then growth can be very rapid.

The implications of EMU for venture capital in the UK

5.18 The UK venture capital sector currently accounts for 28 per cent of the EU total. EMU entry could potentially more than double the pool of funds which UK SMEs could access without currency risk. Plus growth in EU equity markets may promote the further development of the EU industry.

5.19 However, the flow of funds could also go the other way, with UK venture capitalists switching funding to a more accessible euro area market. EMU entry could encourage UK firms to build on their existing advantage in the European market. In 2001, the UK invested €2.8 billion of venture capital in other European countries, while Germany invested €0.9 billion and the Netherlands €0.3 billion. EMU could boost the quantity of UK venture capital that goes to non-UK EU SMEs, supporting an outflow of financing from the UK.

Conclusion on the impact of EMU on UK SME financing

5.20 SMEs tend to raise finance in different ways to large firms, often relying on particular banks. Venture capital is a small proportion of SME financing, but is important to high growth firms. EMU entry would reduce the costs of raising cross-border funds within the euro area for SMEs. But information and monitoring costs are likely to remain an important constraint on SMEs accessing the euro area wholesale capital market. Smaller SMEs in particular are likely to remain reliant on local retail finance. While EMU entry could increase competition in the market for bank lending to SMEs and increase the amount of venture capital available to UK firms, both are likely to be limited by home bias.

6

THE STRUCTURE OF UK CORPORATE FINANCING AND EMU

UK firms are typically characterised as having a different capital structure from those in the euro area: ownership is equity orientated and highly diversified.

Some analysts suggest this structure leads to capital market imperfections which raise the cost of capital, though evidence on this is far from clear. It's also unclear whether EMU will have a significant impact on these structures. Many indicators suggest the euro area is moving more toward a UK-style equity-orientated structure.

6.1 The previous sections focused on the implications for UK firms of access to a wider euro area financial market. But the structure of financial markets and of corporate ownership can also affect the cost of capital. UK financial structures are different to those of much of the euro area. UK large firms rely more on equity to raise capital, while in the euro area bank lending is more important. UK firms also have less concentrated ownership than euro area firms.

6.2 Modigliani and Miller (1958) look at how a firm chooses its capital structure, and show that in a world with perfect capital markets, without corporation tax or bankruptcy costs, a firm's capital structure (i.e. its debt-to-equity ratio) has no effect on the value of the firm. However, tax and bankruptcy costs do affect the optimal capital structure of firms. For example, as interest payments on debt are tax deductible, introducing corporation tax to firms' decisions creates an incentive for 100 per cent debt financing. The higher the debt gearing, the less tax a firm has to pay, and the higher in theory the value of the company. This is in turn mitigated by the increased risk of bankruptcy associated with rising debt-to-equity ratios, so that the optimal proportion of debt finance for any individual firm is somewhere between 0 per cent and 100 per cent.

6.3 In addition, the structure of financial markets and corporate financing may affect the cost of capital through informational asymmetries. All financing arrangements will be subject to some degree of **asymmetric information**, for example, it is likely that the borrower will know more about the risk of a project than the lender. This may lead to **adverse selection**, where the lender requires a premium to compensate for the chance of risk being higher than anticipated. The lender's lack of control over a project also introduces problems of **moral hazard**. Unless the lender can formulate a contract which completely aligns their interests with that of the borrower, the borrower has an incentive to opt for excessively risky projects; anticipating this, lenders will demand a premium to compensate for the extra risk.

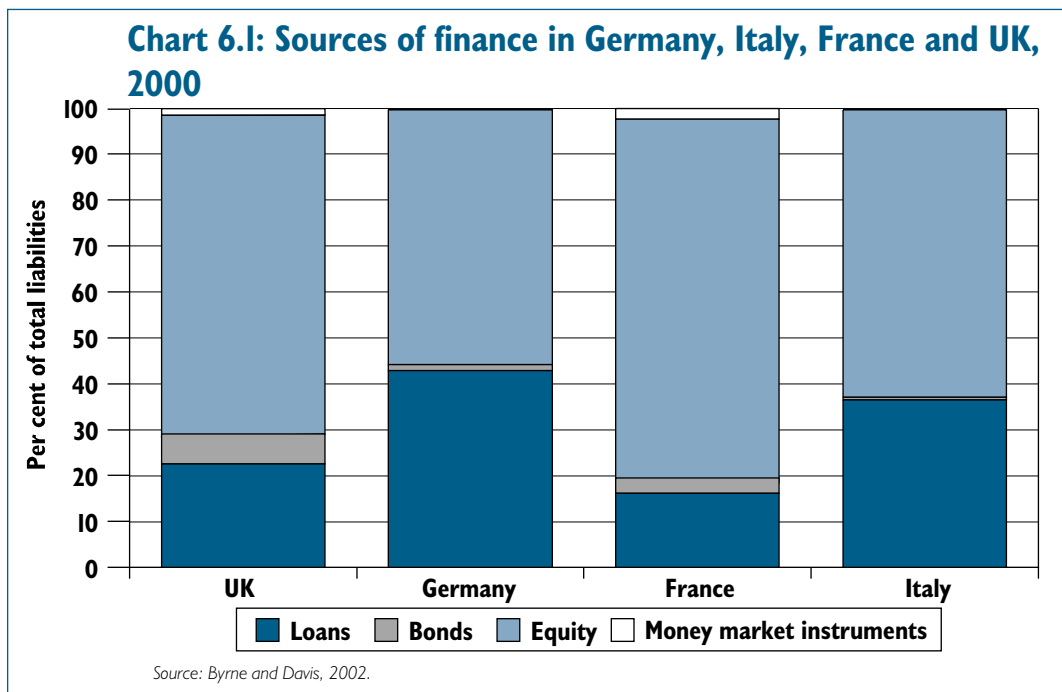
6.4 Because of these factors, the type of finance a company uses can affect the cost of capital. For example, the provision of bank lending often involves a close relationship between the bank and borrower which can potentially reduce asymmetric information. External finance tends to be more costly than internal finance, unless loans are fully collateralised, due to asymmetry of information. This means the availability of internal finance may be an important determinant of investment. When cash flow is low, perhaps due to an economic downturn, investment may fall. In the absence of complete information, a financier will use a firm's net worth to provide an indication of the risk of a project. If corporate profitability and net worth decline, the cost of capital may rise as lenders demand a greater risk premium, leading to a fall in aggregate investment. These issues are not captured in standard models of investment, which assume the cost of capital is determined by forward-looking estimates of project risk, not by current net worth.¹

¹ See for example, Ashworth and Davis (2001). These issues are also discussed in the EMU study by HM Treasury *EMU and the monetary transmission mechanism*.

6.5 Evidence suggests these effects are particularly strong in the UK, suggesting problems such as adverse selection and moral hazard may be particularly acute here. Ashworth *et al.* (2001), Schiantarelli (1996) and Bond (1999) survey the literature and find evidence for cash flow being an important driver of investment in the UK, and find that the effect is more significant in the UK than in other European countries. One reason why these inefficiencies might be more prevalent in the UK is the structure of the financial market and corporate ownership.

Structure of corporate finance in the UK

6.6 Why should the UK structure of corporate financing lead to greater inefficiencies than in the rest of Europe? It is typically assumed that the UK has a quite different structure of corporate financing than some other countries in Europe. Chart 6.1, based on data constructed by Byrne and Davis (2002),² indicates that the UK has high levels of equity, while in Germany and Italy bank lending is more important.



6.7 Aggregate data on equity and bank lending does not present the whole picture. Factors such as the concentration and institutional structure of corporate financing are also important. Bond (1999) and Mayer (1999a) identify two main factors that differentiate the UK system from that of Germany and other continental European countries:

- institutional shareholders, such as pension funds, own a higher proportion of the shares of UK companies than elsewhere. Because these institutions spread risk by diversifying their assets, UK firms generally have a much less concentrated ownership structure. In other European countries institutional investors are less important, and so firms have more concentrated ownership structures. For example, around 16 per cent of the 20 largest firms in the UK in 1999 had a single shareholder owning 25 per cent or more of the equity. In France and Germany, 80 per cent of the largest firms had a large single shareholder (Mayer, 1999a); and

² HM Treasury is grateful to the authors for kindly making their dataset available for use.

- banks own more corporate equity in Europe. Banks owned 6 per cent of corporate equity in France, and 13 per cent in Germany,³ over the period 1980-1990; the equivalent figure in the UK was 2 per cent (Mayer, 1999a).

6.8 Is there a relationship between the UK's equity-orientated, diversified ownership structures and UK investment's sensitivity to cash flow? A diversified structure of ownership may increase problems of asymmetric information between lenders and firms, leading to adverse selection. Similarly, less concentrated ownership may be associated with weak investor control that could increase moral hazard.

The merits of the UK and German systems

6.9 There is a related debate on the more general respective merits of the UK system versus the German system.⁴ One strand of literature claims the German model, based on concentrated ownership and bank finance, encourages investment and better facilitates monitoring and control of managers. For example, McCauley and Zimmer (1989) argue that close relations between banks and firms in Germany allow firms to borrow more without increasing risk, as bank ownership reduces the risk that a firm will go bankrupt.

6.10 More recent work has emphasised the advantages of the UK model's robust market for corporate control. It is argued that the risk of takeover creates incentives for good management; and that the system may better facilitate the channelling of funds to efficient industries. In the German system, funds may become tied up in inefficient firms at the expense of more dynamic industries. There may be different moral hazard problems associated with the German model, for example, it can be argued that the significant voting power of German banks in many large firms allows them to distort decision making in order to maximise debt (Morck and Nakamura, 1999), or may lead to the rejection of good investment projects (Shleifer and Vishny, 1996). A heavy reliance on bank financing may make economy-wide credit crunches more likely if banking sector profitability falls and may make the banking system more fragile.

6.11 Mayer (1999a) argues there is little empirical evidence to support the view that any one system is inherently superior to the other. He suggests that rather than any one system leading to more superior overall outcomes, the type of system may instead influence the structure of economic activity. For example, diverse ownership patterns may allow for the aggregation of a wide range of risk perceptions and so may be better suited for investment in risky new technologies. Less investor control may also allow managers of such projects more flexibility to change and implement a variety of different approaches. Concentrated ownership involving more monitoring and control by investors may be better suited to large-scale traditional and long-term investments, such as in heavy manufacturing.

Impact of EMU on the structure of corporate finance

6.12 Continued financial market integration in the EU does not necessarily lead to convergence of financial systems (Mayer, 1999a). Alternatively, it could increase competition for incorporation, as companies will increasingly choose to be based wherever the financial market structure and regulatory environment is best suited to their needs. Differentiation may increase, as different systems specialise in different types of activity and attract firms from other countries. However, firms will also consider the cost of different sources of finance, and as discussed in Section 4, EMU entry could result in lower costs for bond and equity financing. Overall, Mayer expects a mix of some convergence where pressure for this is overwhelming; combined with continued differentiation in other areas.

³ Banks in Germany control a higher percentage of the voting rights of firms (McCauley and Zimmer, 1989).

⁴ For example see Mayer (1999b).

6.13 Davis (1999) argues that EMU may promote the development of UK-style capital markets in the euro area. He points to the rise in institutional investment in the euro area, which is being driven by an increasing need for private pension provision. This trend has been occurring for several years: compared to 1980, assets held by institutional investors in Germany had almost doubled by 1997 and had more than trebled in France. Institutional investors tend to hold a greater proportion of their assets in equities and other securitised assets.

6.14 This should increase the demand for equity capital and so lower its cost for firms. But firms will have to accept increased institutional ownership and the importance of relationship banking will be diminished. Davis suggests this may have an adverse impact on financing for small firms, for whom there is some evidence that institutional investment funds are less willing to provide finance.

Conclusion on the impact of EMU entry on UK corporate structure

6.15 If EMU and other financial developments promote the development of a more equity-orientated finance structure in the euro area, then EMU entry is less likely to alter the structure of UK finance, as the UK already has an equity culture.

6.16 It is also possible that other ownership structures will continue to prosper in EMU, as Mayer (1999a) points out. Insofar as EMU promotes country-level specialisation in financial services and reduces the barriers to incorporating in other euro area countries, UK firms may benefit from being better able to utilise different financing structures for different types of investment. However, joining EMU is unlikely to have an immediate beneficial impact on UK firms which rely on bank financing, due to the need for geographical proximity.

7.1 This study sets out to examine the potential impact of EMU entry on the UK cost of capital. For the purposes of exposition, the study divides up the cost of capital into the credit risk-free rate and the market risk premium, and looks for evidence that these elements could fall in the euro area. The particular characteristics of small and medium-sized enterprises (SMEs) are examined in order to see if euro membership could reduce the cost of capital for this group. The study also looks at what the implications for the cost of capital might be of changes in the structure of UK corporate finance prompted by EMU entry.

Credit risk-free rate **7.2** Although some euro area countries, such as Spain and Italy, saw a significant decline in credit risk-free rates as a result of joining EMU, the study finds little scope for UK credit risk-free rates to fall significantly, as markets already expect continued low and stable inflation in the UK. Entry would lead to some shift in the yields on UK government bonds towards those prevailing in the euro area, although the overall impact could be muted by other cyclical impacts at the short end and by credit risk factors at the long end.

Market risk premium **7.3** The study looks at what the impact of joining the larger euro area financial markets could be on the market premium for UK firms. In particular it examines whether they could benefit from lower liquidity and credit risk premia than in the UK market. While there is not yet clear evidence of a fall in the market premium in the euro area, the conditions for such a reduction in costs are developing. Euro-denominated markets are growing in size, investment funds are diversifying across borders, there have been changes in the financial infrastructure and some transactions costs have been falling. For the full gains from these changes to be realised there needs to be significant progress on lowering the remaining legal, regulatory and cultural barriers necessary to complete the EU market in financial services. UK firms can access the euro-denominated market from outside EMU at relatively low cost at present, but entry would increase access at the margin, and have potentially greater benefits for specific groups such as SMEs.

SME financing **7.4** For this reason, the study examines the scope for SMEs to gain from access to euro financial markets. It finds that, as they tend to raise funds locally and rely more heavily on bank lending, there would be little immediate prospect of a significant fall in the cost of capital for most SMEs.

Structure of corporate financing **7.5** UK firms are typically characterised as having a different, more equity-orientated, capital structure than those in the euro area, which are characterised by more of a reliance on bank finance. It is unclear whether EMU will have a significant impact on these structures. Many indicators suggest the euro area is actually moving more toward an equity-orientated structure. If EMU and other financial developments promote the development of a more equity-orientated finance structure in the euro area, then EMU entry is unlikely to alter the structure of UK finance.

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ANNEX A: ECONOMETRIC STUDIES OF EQUITY MARKET INTEGRATION

A1 Several recent studies have used statistical techniques to examine whether EMU equity markets have converged due to economic and financial market integration. The results of these studies are summarised in Tables A1 and A2 and are discussed in more detail below. These studies use two basic approaches:

- analysing the factors which drive equity returns; and
- analysing equity index correlations.

A2 If the euro area is becoming more economically integrated, then individual equity returns will be driven less by country-specific factors and more by euro area-wide and/or sector-wide factors. The first approach analyses the factors which drive equity returns by decomposing the variance of equity returns and attributing it to different sources of risk: world risk, country-specific risk, sector-specific risk, EU-wide risk and idiosyncratic risk. Table A1 shows that since convergence to EMU began, the contribution to returns from sector and EU-wide factors has increased in importance, and country and world factors are stable or have decreased.

Table A1: Summary results of equity market studies, changes to contributions to returns since the start of convergence to EMU

	Contribution to returns from:				
	World	EU	Sector	Country	Idiosyncratic
Tsatsaronis in BIS, 2001			Increased	Stable	
Fratzscher, 2001	Stable	Increased			
Kraus, 2001	Decreased		Increased	Decreased	Increased
Hardouvelis <i>et al.</i> , 1999		Increased		Decreased	

A3 The second approach examines the correlation structure of equity indices; for example, Table A2 indicates that Hardouvelis *et al.* (1999) find that the correlation of national indices to the euro area index has increased. A number of the other results from this approach have less clear-cut implications. For example, Kraus (2001) finds that sector-to-sector correlations have decreased since EMU. Kraus argues that this suggests increased economic integration, as sector returns are now being driven more by diverse sector-specific factors rather than shared country factors.

Table A2: Summary results of equity market studies, changes in correlations of returns since the start of convergence to EMU

	Correlations of returns:			
	Cross sector	Cross country	Country to euro area	Cross country by sector
Adjaoute <i>et al.</i> , 2000		Increased		Increased
Kraus, 2001	Decreased	Decreased		
Hardouvelis <i>et al.</i> , 1999			Increased	
Kempa and Nelles ¹ , 2001		Increased	Increased	

¹Kempa and Nelles (2001) simulate pre- and post-EMU periods by modelling returns with and without exchange rate volatility.

A4 Kraus (2001) also finds that correlation between country indices has decreased - in contrast to Adjaoute *et al.* (2000) who find that this has increased. First intuition might suggest that country correlations would rise in EMU as a single monetary policy increases economic convergence. Kraus (2001) argues that decreased correlation may be due to increased industrial specialisation in EMU, which increases country divergence. However, it seems unlikely that such change would have occurred to any significant degree in the relatively short period of time since EMU began. The difference in the results may be due to different time periods. Kraus compares the periods 1997-1999 and 1999-2000; Adjaoute *et al.* the periods 1990-1994 and 1997-1999.

A5 Adjaoute *et al.* (2000) also find that country correlations based on sector indices have increased in the post-convergence period, though these correlations are less strong than the pure country correlations. The authors argue that as EMU country indices are now more correlated, portfolio allocations based on European sector strategies are superior to those based on EU country strategies, or on home-based sector strategies. The authors argue that financial market integration is driven by economic convergence, which creates incentives for pan-European investment allocations, rather than the removal of currency risk or other factors.

A6 Kempa and Nelles (2001) find that EMU-wide investment strategies dominate home-based investment strategies. They show that both country-to-country and country-to-euro area correlations are higher in the absence of exchange rate volatility, indicating that exchange rates are a source of country-specific risk in the equity market. The paper also estimates national *betas* (see Section 2), and finds that these fall when exchange rate volatility is removed, suggesting the equity cost of capital will be lower in EMU.

A7 The results of all these studies suggest that the equity market has become more integrated since EMU. The question which remains is what impact this will have on the cost of capital. Kempa and Nelles (2001) show that national *betas*, and therefore the national cost of capital, are lower in the absence of exchange rate volatility. However, as has been discussed, the impact of integration on the cost of capital can work in two directions: increased opportunity for diversification should lower the cost of capital, while increased economic convergence can work in the other direction, by reducing the benefits of diversification.

A8 Hardouvelis *et al.* (1999) make a formal attempt to model implications for the cost of capital. They find that integration has lowered the cost of capital, in other words that the diversification effect dominates the convergence effect. They first use a capital asset pricing model (CAPM) methodology to estimate equity market returns due to EU-wide, country-specific and currency risk factors. They find the proportion of equity returns due to EU-wide risk rose from 25 per cent in 1991-1995 to 65 per cent in 1996-1998. They also estimate integration weights for individual EU countries. Except for the UK these all approach unity at the introduction of the euro in 1999, indicating close correlation between country equity returns and euro area returns.

A9 The authors argue that theory gives no firm indication as to the impact of integration on the cost of capital, but their intuition suggests that it should fall, as EU-wide risk could be expected to be lower than the individual country risk it replaces. Hardouvelis *et al.* (1999) use a model which decomposes the cost of capital into market, currency and local risk components; as integration increases, the local risk and currency risk components decrease and the market-wide risk component increases. The impact on the cost of capital depends on the interaction of these effects.

A10 The key results are shown in Table A3. The estimates suggest that the cost of capital fell by close to 2 per cent for a group of eight¹ EU countries (which includes the UK) over the period examined. This is the combined result of a reduction in local risk of around 3 per cent, a rise in EU-wide risk of 1 per cent and a small increase in currency risk. The counter-intuitive increase in currency risk is attributed to the influence of UK currency variability and to the EMU currencies not having locked together by the end of the estimation period in 1998. The authors expect the currency risk component to fall considerably after EMU is completed. For a group of 12² EU countries, the reduction in the cost of capital was around 1.3 per cent.

Table A3: Impact of integration on cost of capital, per cent

	Period	Total effect	Decomposition of total effect		
			EU wide	Currency	Local
EU7	1992–98	–1.90	1.00	0.24	–3.14
EU12	1996–98	–1.26	0.62	0.15	–2.03

Source: Hardouvelis et al., 1999.

Fratzscher (2001) **All** Fratzscher (2001) tests for euro area financial integration using an uncovered asset return parity model, which relates equity returns to past local, euro area and global market information, and to local, euro area and global shocks. The US acts as a proxy for the global market. Fratzscher (2001) assumes that a more integrated market is one where returns are strongly correlated to euro area shocks. Table A4 illustrates some of the key results. Increasingly large spillovers from euro area shocks to individual euro area country equity returns are found, which the author attributes to increased integration. Averaged over the whole period, a euro area shock of 1 per cent leads to a 0.445 per cent change in returns; in the 1998–2000 period the spillover has increased to 0.911 per cent. The spillover from the US remains fairly constant over the period.

Table A4: Results for equity market integration, per cent

	Impact on euro area returns of 1 per cent shock...	
	... from euro area	... from USA
1986–2000	0.445	0.367
1986–1992	0.270	0.321
1998–2000	0.911	0.345

Source: Fratzscher, 2001.

A12 Similar results are found when the methodology is adjusted to allow time-varying coefficients. The results indicate relatively low integration in the early 1990s, a very rapid increase in the period 1996 to 1999, followed by a levelling off over 1999 to 2000. During the period of rapid expansion the euro area overtakes the US as the major factor influencing returns. (Interestingly, the same pattern is evident for the UK).

A13 The paper attempts to uncover the causes of this integration. The hypothesis used is that exchange rate risk was a significant barrier to financial integration, preventing investors from diversifying across the euro area. This hypothesis is tested by regressing an integration parameter on the exchange rate volatility of each euro area market against the Deutschmark and the US dollar. The resulting coefficients are all negative, indicating that a reduction in volatility leads to increased integration. This result stands when controlled for the correlation between exchange rate stability and real and monetary convergence through EMU, which may also be a reason for financial market integration.

¹ Belgium, Luxembourg, France, Italy, Germany, Netherlands, Spain, UK.

² The above plus Austria, Finland, Ireland and Portugal.

Adjaoute et al. (2000) **AI4** Adjaoute *et al.* (2000) analyse developments in the variance-covariance matrices of country and sector equity returns across the euro area, with the objective of uncovering changes in optimum portfolio allocation strategies for euro area investors. Unlike Fratzscher (2001) their prior assumption is that currency risk has not been a significant explanation for equity portfolio home bias in the past, so that EMU could only be expected to have a minor direct role in promoting portfolio diversification.

AI5 The analysis first compares variance-covariance matrices in the period 1990-1994 to those from 1995-1998. Then a more narrowly defined convergence period is examined: November 1995 to July 1997 compared to August 1997 to April 1999. In both cases, the paper finds that cross-country equity return correlations increased strongly in the second period. To test whether this was simply due to increased capital flows as a consequence of globalisation rather than due to EMU, a similar analysis is undertaken for the rest of the world. Although correlation also increased between other regions of the world over the same time period, the degree of correlation was much less strong than in the euro area.

AI6 The analysis is repeated using sector indices. Again country correlations based on sector indices have increased in the post-convergence period. It is noted that these correlations are less strong than the pure country correlations. The authors argue that, as EMU country indices are now more correlated, investment strategies based on European sector strategies are superior to those based on EU country, or on home-based sector strategies.

AI7 This conclusion is cross-checked through optimal portfolio analysis which confirms that diversification by sector across the euro area is superior to diversification by country across the euro area and to diversification by sector within a country. The authors believe this suggests that rather than becoming more specialised, countries in EMU are becoming more diversified.

Kraus (2001) **AI8** Kraus (2001) examines the impact of EMU on the sources of equity returns using variance decomposition analysis. Five risk factors are used: world risk, European risk, country risk, European sector risk and idiosyncratic risk. Initially, stock returns are regressed solely on the world risk factor. A succession of new models is then regressed, each with one additional factor added; the marginal R^2 of each new model is attributed to the last factor added. The data period is from April 1997 to October 2000.

AI9 The results are shown in Table A5. These indicate that the contribution of world risk to stock returns has fallen significantly, suggesting the European market has become more autonomous since EMU. Country-specific factors have also fallen. Industry-specific factors have increased and now account for 12 per cent of total return variance. There has also been a significant rise in the contribution of idiosyncratic risk, which means that the importance of diversifiable risk has increased sharply since EMU.

A20 Kraus (2001) views the rise in the contribution of industry-specific factors as an important change, which he believes has been driven by two key factors. First, the single monetary policy has removed a significant source of country-specific shocks, so increasing the profile of industry-specific factors. Second, there has been a shift in industry portfolio allocation strategies toward sector strategies, which has had a self-fulfilling role in promoting sector profiles.

Table A5: Sources of equity returns, per cent

	Before EMU	After EMU	Change
World	20.5	8.6	-11.9 ¹
Europe	6.4	6.7	+0.3
Country	9.3	7.1	-2.2 ¹
Sector	6.0	12.0	+6.0 ¹
Unexplained	57.9	65.7	+7.8 ¹

¹ Signifies change significant at 1 per cent level.
Source: Kraus, 2001.

A21 Kraus (2001) then uses a variety of techniques to examine cross-country and industry equity return correlations before and after EMU. This shows that correlations between sectors have fallen significantly since the start of EMU, which is attributed to the reduction in country-specific risk factors making sector risk more pronounced and more diverse. The results also indicate that cross-country correlations have decreased. This runs counter to Kraus' initial intuition – given that EMU countries now share a common monetary policy, he expected to find an increase in cross-country correlations. An explanation may be that country divergence is due to increased industrial specialisation, or that there has been real interest rate divergence.

A22 Another feature of this analysis is that clusters of highly-correlated countries can be identified. In particular the large markets, Germany, France, Netherlands, Spain and Italy, have become very closely correlated. Spain and Italy only joined this cluster after EMU, suggesting that, previously, investors did not perceive them as part of the group of large EU markets, perhaps due to their individual monetary policies. Further analytical techniques also indicate a country size factor in the data, but Kraus (2001) can find no economic rationale for why this should be present.

Kempa and Nelles (2001) **A23** This study analyses national equity indices' correlations over the period 1994 to 1997, and then simulates the impact of EMU by removing exchange rate volatility from the data. The analysis focuses solely on the impact of the exchange rate; there is no attempt to model the impact of economic convergence.

A24 Country-to-country equity index correlations are reported with and without exchange rate volatility. On average, correlations are higher in the presence of exchange rate volatility, indicating that exchange rate movements are a source of country-specific shocks. As would be expected from this result, correlations between national indices and a euro area index are lower in the presence of exchange rate volatility.

A25 Kempa and Nelles (2001) estimate national *betas* with and without exchange rate volatility. *Betas* tend to be lower once exchange rate effects are removed, suggesting that EMU should lower the cost of capital. The next step is to look at the excess returns to investors from investing in an efficiently diversified euro area portfolio, rather than the national market. These are positive with or without exchange rate volatility, suggesting that regardless of the exchange rate regime, EU portfolios offer higher returns than national portfolios. In most cases, the gains are higher in the presence of exchange rate volatility, suggesting that the incentives for diversification are lower in EMU. However, this analysis takes no account of sector returns which may affect this result; for example, the Adjaoute *et al.* (2000) study found that sector portfolio strategies would dominate country strategies in EMU.

B

ANNEX B: CORPORATE BOND SPREADS

