FINAL REPORT

Contract no.: HPSE–CT–1999-00039

Title: EUROPEAN INTEGRATION, FINANCIAL SYSTEMS AND CORPORATE PERFORMANCE (EIFC)

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Project's www: http://www.intech.unu.edu

Reference period: from 1-3-2000 to 29-2-2004

Starting date: 1-3-2000 Duration: 48 months

Date of issue of this report: 25 April 2004

Project financed within the Key Action Improving the Socio-economic Knowledge Base

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EIFC ABSTRACT

EU integration is characterized by four specific, yet interconnected, processes: monetary union, enlargement, the single market program and the impact of IT technology. Each of these processes has implications for both the supply and the demand of financial integration and for the finance growth nexus in Europe. Structural trends in the European banking market are accelerating under the pressure of capital market integration. However, European banks are now changing their behaviour in a number of ways. First, their assets are increasingly made up of liquid assets traded on capital markets, and lending to households for consumption purposes (e.g. credit cards). Their assets, liabilities, in contrast, have become less liquid as they provide longer term financial services such as insurance and pensions. In other words, banks have moved away from the tradition function of providing capital for production. So far, little attention has been given to the effect of this process of financial integration on corporate investment in general (and that of small and medium firms in particular) and thus on production, productivity and eventually employment. As far as large firms are concerned, the simultaneous expansion of capital markets has meant that they can issue longer-term bonds to finance capital expansion, and shorter-term commercial bills in order to provide working capital. However, these instruments cannot be issued by smaller firms for three reasons: first, the unit cost is too large in relation to the sums required; second, capital markets require a good deal of information not available for small firms; and third, to be attractive assets must not only have a good yield but also be highly liquid - in other words, issued on a scale which allows for an active market.

Differences across industries may also exist so that, for example, firms in high-tech and newer industries may face stricter constraints to raising external (and internal) funding either in terms of cost and/or availability. This is because: (i) in riskier industries it may be more difficult to raise funding from outside the firm purely because of the risk factor (ii) in more high-tech sectors not only may risk itself be a factor but also the proportion of assets that are realizable may be lower (iii) in high-tech industries innovation is more likely to be of a sort that has not been undertaken elsewhere before and it may be particularly difficult to observe the systematic risk of such projects and thus difficult to determine the appropriate discount rate to use in evaluating investment in the firm and (iv) information asymmetries may also be greater in such industries.

Differences in national systems of innovation across countries may also lead to differing financial constraints upon firms operating in different economies (as the result for example of differing taxes and subsidy regimes, the completeness of markets for finance, the legal environment as regards bankruptcy, government intervention etc.). Of particular interest are differences in the financial environments in different countries. European financial environments are both heterogeneous and changing. On the one hand, there are bank-based systems as typified by the German system and on the other, market-based systems as typified by the UK system. Most continental European systems are largely bank-based although there

are signs of some movement in certain countries (e.g. France) from a bank-based to a market-based system. Alongside these different financial system environments there are different patterns of ownership of industry. The German system reflects greater private control, more concentrated ownership and more pyramid ownership. In the UK the pattern is for less concentrated holdings, less private control and few inter-corporate holdings. The financing of investment by firms also differs across systems. Although self-generated funds are the main finance sources for firms in all countries (except SMEs) these are more important in the UK with bank finance more important in bank-based systems. It is argued that such differences across systems have important implications for the way firms behave. The argument is that bank-based systems with insider control are particularly favourable to longer term steady development built upon the construction of trust-based relations, firm-specific investments and gradual continual change but may generate a higher cost of capital due to bank monopoly power, informational capture (of the firm by the bank) and perhaps undue conservatism. On the other hand market-based systems with outsider control and more arms-length relationships between financiers and managers are seen as more favourable to major change and switches of strategic direction (but with no obligation for financiers to take anything other than a short-term view, encouraging liquidation of investment in the event of dissatisfaction). These arguments lead us to believe that firms will be differentially affected by financial constraints under different national financial systems.

The preference of either a market-oriented or a bank-oriented financial structure depends on how firms are managed. When the production possibility set is known and management decisions can be easily evaluated, bank-oriented financial systems prevail. Whenever, instead, uncertainty about the production function generates uncertainty on the evaluation of management decisions, market-oriented financial systems prevail. Therefore, the superiority of a system depends on the amount and the complexity of information to be taken into consideration in the decision making process. In sectors with many competitors, short production cycles and constant technology, the information set approaches completeness and the relationship between management decisions and the firm's value is known to all agents. In such a case, the relevant problem is to monitor the management decision and the bank-oriented system is preferable one as it guarantees efficient monitoring. On the contrary, in sectors with a small number of firms, long production cycles and frequent technology changes, the information set available to each agent is incomplete, and therefore the mapping between firm's values and investment decisions changes with the different information sets. In such conditions, the main problem for management is to approximate the complete information vector and, given the sectoral structure, financial markets, where a multiplicity of investors estimate their own action-value function, represent a superior alternative with respect to banking. In conclusion, while the empirical literature provides substantial evidence of a positive relationship between financial development and growth most of the key questions addressed by the theoretical debate remain unanswered. There does not to seem to be any compelling evidence that one finance model (bank versus market) is clearly superior in supporting growth, nor does there seem to be

any clear evidence on the direction of causality between real and financial development.

The overall process of EU integration affects the “demand factors” shaping financial regimes. a) as financial integration proceeds so does real integration, however this takes place through a number of growth mechanisms ad growth finance relationships; b) the direction of causality between real and financial integration remains an open issue, and as financial integration is itself influenced by growth, the impact on growth of financial integration may be larger as a virtuous circle develops; c) national sectoral specialization might change in the process and so would the “optimal” demand for external finance, especially as Europe increasingly benefits from technology driven growth; d) the distinction between market and credit based external finance will persist in different country cases as different countries will continue to be characterized by different comparative advantages; e) national inertia may slow down the move towards a common benchmark model. To sum up, it is difficult to envisage one economic model for the EU financial system. The ongoing process of EU integration is likely to generate continuing pressures for change in the demand for finance related to the changes in specialization. It is therefore difficult, if not outright wrong, to single out one model for financial integration. Rather, a number of such models may coexist in the foreseeable future. If we accept the idea that several growth mechanism exist then the analysis of the growth finance nexus should consider the relationship between growth and financial variables conditional upon the specific growth mechanism, which is associated with different countries, sectors and time periods. This could, hopefully, add some new knowledge about the empirical relationship between growth and finance as well as about the features of the EU integration process.

1. Executive summary.

1.1 The aim of this project was to foster research on the fundamental determinants of corporate performance. As European integration continues and capital markets become more integrated, many governments and policy makers have been exploring how they can increase the breath of their capital markets. Increasing emphasis has been placed in recent years to the financial system as an important mechanism directly linked to the performance of the corporate sector. In the framework of this project, we consider the evidence on the influence of evolving financial systems on each of these factors and our work is aiming at the development of comparative research findings on financial systems and corporate finance in European countries.

1.2 Over the years, economic theories have offered different and in some cases contradictory approaches on the relationship between financial development and economic growth. A primary function of financial systems (financial markets and intermediaries) is to move funds from people who save to people who have productive investment opportunities. This primary function can be separated into three basic sub-functions: the mobilization of savings, the acquisition of information, and the management of risk. By fulfilling these functions, financial systems improve both the quantity and quality of real investments and thereby increase income per capita and raise the standard of living.

The conventional neoclassical theory of frictionless competitive models assumed a passive role of the financial sector in economic growth. That brings us back to the foundations of the Arrow-Debreu model. The markets in this context are functioning, access to information is symmetric among involved agents and other frictions are not present. Hence, there is no need for any further consideration on the costs of getting access to information and/or conducting efficient transactions in financial markets. In the neo-classical approach, economic growth is driven by the accumulation of inputs in the production process and technical progress while the role of finance is considered only as a source for the accumulation of capital. Finance is restricted to capital as an important factor and its accumulation as a condition for sustainable economic growth. Also finance contributes to technical progress to the extent that technical advances embodied in the capital stock will influence productivity.

However, since the 1980s, the development of endogenous growth models has stressed the link between financial development and economic growth via the possibility that institutional arrangement could have an impact on growth rates. In the simplest type of endogenous growth model, "AK" financial development could influence the productivity of capital, reduce the lack of resources required for investment and contribute to the efficiency of financial systems via saving rates. In recent years, contributions from the economics of information and contract theory developed a comprehensive analysis of financial systems, in particular the functions of financial intermediaries (banks, stock markets and other financial institutions). This framework for the analysis of financial systems has emphasized the importance of the specific characteristics of financial institutions and the complex relationship between financial systems and economic growth.

1.3 The New Theory of Finance supports the development of specific institutions and the introduction of a financial system that could address the problems of uncertainty. Financial systems contribute to the reduction of the special transaction costs that emanate from the asymmetric information in the relation between borrower and lender. Financial contracts are often designed to ensure comparative advantage between financial intermediaries in the implementation and enforcement of these contracts. The New Theory of Finance tried to develop a comprehensive framework on financial deepening and sustainable economic performance. They support the implementation of financial market regulation to the extent that is facilitates solutions to information and incentive problems. The presence of market failures justifies banking regulations. In addition these theories emphasized the importance of the implementation of macroeconomic monetary policy in each country and the role of central banks in this process. Another dimension in this debate is the need for regulation and supervision that focuses on the performance of the financial systems is the new global financial and technological environment.

1.4 EU integration is characterized by four specific, yet interconnected, processes: monetary union, enlargement, the single market program and the impact of IT technology. Each of these processes has implications for both the supply and the demand of financial integration and for the finance growth nexus in Europe. Each of these processes is also associated with one dominant growth mechanism which, with some simplification, can be sketched out as follows. Monetary Union spurs growth through the elimination of transaction costs and of currency risk. It also supports growth indirectly through the impulse towards financial integration. In addition, the common monetary policy can influence growth through monetary and price stability and its effects on long term interest rates. The Single Market Program supports growth through two main channels: a larger market size, which allows for the exploitation of economies of scale; a more efficient resource allocation, generated by stronger competitive pressures. Enlargement waves, especially those involving countries with an initially lower GDP per-capita, spur growth through catching-up mechanisms, leading to higher capital accumulation as well as technology transfers from the center to the periphery. Finally, the new IT technologies spur growth through technological innovation and diffusion.
These four process coexist and interact, with different intensities, so it is quite possible that, in a given period of time, a given sector, region, or country is affected by different growth mechanism acting simultaneously. The demand for as well as the supply of financial integration in any specific case reflect this interaction.

The preference of either a market-oriented or a bank-oriented financial structure depends on how firms are managed. When the production possibility set is known and management decisions can be easily evaluated, bank-oriented financial systems prevail. Whenever, instead, uncertainty about the production function generates uncertainty on the evaluation of management decisions, market-oriented financial systems prevail. Therefore, the superiority of a system depends on the amount and the complexity of information to be taken into consideration in the decision making process. In sectors with many competitors, short production cycles and constant technology, the information set approaches completeness and the relationship between management decisions and the firm's value is known to all agents. In such a case, the relevant problem is to monitor the management decision and the bank-oriented system is preferable one as it guarantees efficient monitoring. On the contrary, in sectors with a small number of firms, long production cycles and frequent technology changes,

the information set available to each agent is incomplete, and therefore the mapping between firm's values and investment decisions changes with the different information sets. In such conditions, the main problem for management is to approximate the complete information vector and, given the sectoral structure, financial markets, where a multiplicity of investors estimate their own action-value function, represent a superior alternative with respect to banking. In conclusion, while the empirical literature provides substantial evidence of a positive relationship between financial development and growth most of the key questions addressed by the theoretical debate remain unanswered. There does not to seem to be any compelling evidence that one finance model (bank versus market) is clearly superior in supporting growth, nor does there seem to be any clear evidence on the direction of causality between real and financial development.

1.5 Structural trends in the European banking market are accelerating under the pressure of capital market integration. However, European banks are now changing their behaviour in a number of ways. First, their assets are increasingly made up of liquid assets traded on capital markets, and lending to households for consumption purposes (e.g. credit cards). Their assets, liabilities, in contrast, have become less liquid as they provide longer term financial services such as insurance and pensions. In other words, banks have moved away from the tradition function of providing capital for production. As far as large firms are concerned, the simultaneous expansion of capital markets has meant that they can issue longer-term bonds to finance capital expansion, and shorter-term commercial bills in order to provide working capital. However, these instruments cannot be issued by smaller firms for three reasons: first, the unit cost is too large in relation to the sums required; second, capital markets require a good deal of information not available for small firms; and third, to be attractive assets must not only have a good yield but also be highly liquid - in other words, issued on a scale which allows for an active market.

There are three major recent policy studies on this topic: Sapir, A. ed. 2003 *An Agenda for a Growing Europe: Making the EU Economic System Deliver* Brussels: European Commission;
EC, 2002. Report by the Economic and Financial Committee (EF) on EU financial integration. *Economic Papers No 171* (ECFIN/194/02); and Committee of Wise Men, 2001. *Final Report of the Committee of Wise Men on the Regulation of European Securities Markets ('Lamfalussy Report')* Brussels. However, little attention has been given to the effect of this process of financial integration on corporate investment in general (and that of small and medium firms in particular) and thus on production, productivity and eventually employment. Indeed it is often simply assumed that a more efficient financial market will simply stimulate economic growth and thus employment, without analysing the process by which this is to take place. The economic – and indeed social – function of financial institutions is to intermediate between savers (households) and investors (firms) and they way that they do this will profoundly affect the structure of the production and employment.

1.6. In this section we address whether changes in European financial markets are likely to have diminished the importance of financial constraints to innovative activity in Europe. Of these changes, we emphasise four. The principal change in the European financial environment is the advent of EMU. The prime direct embodiment of EMU was the move first to rigidly fixed exchange rates between member countries and then to a common currency. (It should be noted of course that the UK has not as yet joined the EMU). It was argued that EMU would

eliminate foreign exchange risk to a great degree and as such encourage investment and innovation.

Danthine et al. (2000) point out that non-EMU currency risk (in particular that associated with the US dollar) was a much larger risk factor than intra-EU currency risk and as such the reduction of currency risk resulting from EMU may only have a limited impact upon portfolios. They do however report that as a result of the elimination of foreign exchange risk with monetary union and as an implication of transparency, a single European yield curve for the private debt market emerged. Private interest rates across EMU participants had almost completely converged by June 1996, and as of May 1998 when irrevocable exchange rates were instituted, the by then almost identical yield curves of different countries collapsed into a single yield curve. Since the second half of 1998 this yield curve also has moved down.

However, the impact of EMU on the cost of capital for 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. Thus downward movements of the yield curve are unlikely to have much impact on SMEs. SMEs are also more likely to rely more heavily than large firms on bank lending and venture capital.

A further direct consequence of EMU is that the central banks of countries belonging to the Euro zone now have only loose control over their own monetary policy. That policy will be set zone-wide with individual country financial markets determining how the innovation performance of firms of different sizes will be affected . Differences in monetary transmission mechanisms resulting from different financial structures will thus mean that the single monetary policy conducted by the ECB may well have different effects on innovation in different countries.

The second major change we observe is that indicators suggest that the euro area is moving towards a more equity-oriented structure as shown by the growth of the stock market in nearly all countries (see Mayer, 1999) and new markets being established. For example several stock exchanges (Frankfurt, Paris, Amsterdam, Milan and Brussels) launched markets for high growth company stocks integrated under the EURO.NM initiative. This should lead to (i) geographical location diminishing as a determinant of where companies choose to list and multi-market listing growing in importance; (ii) minority shareholders becoming more vocal; and (iii) attempts to be made by the EC to harmonize governance, information disclosure, investor protection and take-over rules across countries. Primarily however it is to be expected that companies will find it easier to raise finance locally from equity markets. However this opening up of local equity markets may not be of great advantage to smaller firms who rely upon debt and particularly bank finance.

The third major change has been in the European banking environment. With EMU there will be more pressure for less segmentation of national banking markets and as other institutional and regulatory barriers fall this is likely to be further emphasised. This is expected to increase competition and reduce costs and therefore charges. There have already been a steady stream of bank mergers in European banking throughout the 90s. This has led to larger banks and a beginning of cross border expansion. Most bank mergers in the 90s have been domestic, but the domestic proportion is now falling. However, even in early 2000, European banking

markets were still highly fragmented along national lines with shares of domestic inter-bank claims standing at roughly 64% and that of domestic loans in total loans at roughly 80%. Molyneux (2001) argues that although increasingly foreign banks constitute a significant proportion of banking assets (in 1996, 57% in the UK, 48% in Belgium, 14% in France and 35% in Portugal but less than 8% in all other countries) such banks still play only a minor role in domestic retail and corporate banking. Nor is there any evidence (Schenk, 2000) to suggest that banking mergers increased internal efficiency in terms of cost improvements, he in fact suggests that one effect of increasing bank size has been to increase the costs and reduce the availability of loans to SMEs. There does not seem any evidence (Danthine et al., 2000) that changes in banking markets have as yet led to cheaper or more readily available finance to SMEs. This may be because SMEs (particularly very small firms) are typically very reluctant to change banks because of the perceived complexity of switching for little benefit, the importance of maintaining relationships with a particular bank, informational capture by the relationship lender, and the ability of the existing bank to negotiate lower charge if there is a threat of switching (see Competition Commission, 2002).

Finally, there have been changes over time in financial products and instruments available on the market. Molyneux and Shamroukh (1999) argue that the major financial innovations of the last twenty years have reflected two interrelated trends. The first is securitisation and the second is the growth of the Off Balance Sheet Activities (OBSA) of banks. They note the development and growth of a number of specific markets and products, for example: (i) the growth of the Eurodollar market from the early 1970s; (ii) the establishment of the Eurobond market in 1974 and is subsequent growth; (iii) the launch and growth of issues of Floating Rate notes and Eurodollar floating rate notes; (iv) the development of note issuance facilities, revolving underwriting facilities, eurocommercial paper and euro medium-term notes in the euronote market; (v) the growth of the syndicated loans market; and (vi) extensions of bank asset securitisation. One might think once again that such changes would facilitate investment and innovation by firms. However, the potential impact is much more likely to be felt by large firms rather than SMEs.

Overall it seems that, although such a conclusion is not undisputed (Hooker, 2003), there is little evidence or argument to support the view that recent events have made financial constraints to innovation irrelevant to smaller firms in Europe. If anything, the analysis above suggests that the availability of finance to larger firms is being made easier while that to SMEs is being less affected.

1.7 Despite the growth of the diffusion literature one factor that seems to have merited very little attention to date is the role of financial factors in the diffusion process, where financial factors may be taken to encompass all issues relating to the funding of those capital expenditures that are a part of the technological diffusion process. Although some empirical work has introduced finance indicators as an explanatory variable in diffusion equations this is not common and even in such cases is not justified on any theoretical grounds. This may be a significant omission. It is also a curious omission, for the role of financial factors in two related fields i.e. R&D determination and investment in plant and equipment has been discussed quite extensively. The main aim of the Warwick team in the first phase of their study was to undertake a preliminary discussion of how and why financial factors may impinge upon the diffusion process. Given that there is a close relation between the analysis of

diffusion and the analyses of investment and R&D we proceed by first exploring the arguments that have been presented as to why financial factors may play a role in the determination of these.

The analysis of technological diffusion has largely ignored the possibility that firms may be constrained in the diffusion process by the availability and costs of finance and/or different financial instruments. Building upon the literature relating to investment, R&D and finance we have argued that this may be a significant omission. In fact the diffusion process may well involve considerable uncertainty, information asymmetries, new types of assets, intangible assets and firm specific assets to a degree greater than investment in general. If so this may mean that financial constraints are particularly significant in the diffusion process. We have also argued that these constraints may be of differing importance across countries with different capital markets and different institutions and may also have changed over time as financial markets mature and or develop. Given the paucity of work in this area there is a need for further research. Suggestions have been made to advance our knowledge through both theoretical modelling and through empirical analysis using existing data sets.

There are many reasons postulated as to why financial constraints might exist. These are reviewed in Canepa and Stoneman (2003a) as well as in Hall (2002). The existence of uncertainty and thus risk is a sine qua non of such constraints. Beyond this, the most commonly argued reasons for such constraints are asymmetric information between borrower and lender and moral hazard resulting from the separation of ownership and control, although capital market incompleteness and inefficiency, the problems of measuring risk, taxes, subsidies, bankruptcy costs et. al. may also have roles to play. Furthermore the literature argues that the importance and relevance of financial constraints may also differ across firm sizes, industries and countries.

Smaller firms may be relatively more tightly constrained because (i) the availability of internally generated funds may be more limited for smaller firms than larger firms (ii) problems of information asymmetries may also be more severe for such firms (iii) smaller, newer firms may have no track record upon which to base a case for funding and/or there may be fewer realizable assets to use as collateral and (iv) the costs (to funding providers) of search may mean also that the supply of finance to smaller firms may be more severely limited.

Differences across industries may also exist so that, for example, firms in high-tech and newer industries may face stricter constraints to raising external (and internal) funding either in terms of cost and/or availability. This is because: (i) in riskier industries it may be more difficult to raise funding from outside the firm purely because of the risk factor (ii) in more high-tech sectors not only may risk itself be a factor but also the proportion of assets that are realisable may be lower (iii) in high-tech industries innovation is more likely to be of a sort that has not been undertaken elsewhere before and it may be particularly difficult to observe the systematic risk of such projects (Goodacre and Tonks, 1995) and thus difficult to determine the appropriate discount rate to use in evaluating investment in the firm and (iv) information asymmetries may also be greater in such industries.

Differences in national systems of innovation (see Nelson, 1993) across countries may also lead to differing financial constraints upon firms operating in different economies (as the result

for example of differing taxes and subsidy regimes, the completeness of markets for finance, the legal environment as regards bankruptcy, government intervention etc.). Of particular interest are differences in the financial environments in different countries. European financial environments are both heterogeneous and changing (see Stoneman, 2001b). On the one hand, there are bank-based systems as typified by the German system and on the other, market-based systems as typified by the UK system. Most continental European systems are largely bank-based although there are signs of some movement in certain countries (e.g. France) from a bank-based to a market-based system. Alongside these different financial system environments there are different patterns of ownership of industry. The German system reflects greater private control, more concentrated ownership and more pyramid ownership. In the UK the pattern is for less concentrated holdings, less private control and few inter-corporate holdings. The financing of investment by firms also differs across systems. Although self-generated funds are the main finance sources for firms in all countries (except SMEs) these are more important in the UK with bank finance more important in bank-based systems.

It is argued that such differences across systems have important implications for the way firms behave. The argument is that bank-based systems with insider control are particularly favourable to longer term steady development built upon the construction of trust-based relations, firm-specific investments and gradual continual change but may generate a higher cost of capital due to bank monopoly power, informational capture (of the firm by the bank) and perhaps undue conservatism. On the other hand market-based systems with outsider control and more arms-length relationships between financiers and managers are seen as more favourable to major change and switches of strategic direction (but with no obligation for financiers to take anything other than a short-term view, encouraging liquidation of investment in the event of dissatisfaction). These arguments lead us to believe that firms will be differentially affected by financial constraints under different national financial systems.

1.8 The linkage between employment and output is not automatic, both because increased productivity may be gained by increased work intensity (‘labour shedding’) as well as investment in new technologies, and because employment creation may be only temporary and not based on generation of new skills. In consequence, labour market flexibility may increase sustainable employment only if the higher profitability for firms leads to new investment. And for this investment to take place it must be supported by adequate financial support – not only in terms of interest rates but also maturity of loans and risk sharing. In consequence, the low interest rates achieved in the EU through inflation targeting and labour market reforms are not sufficient in themselves to ensure sustainable employment growth.

It is well known that small and medium enterprises provide the bulk of employment - and thus by extension the greater part of in-firm labour skilling (‘on the job learning’) – in Europe. Indeed they not only provide three quarters of all jobs, but also half of all output. We would expect therefore, that when financial structures, integration and policy are considered at the European level, that the role of SME’s and employment would be a central consideration. We would expect a consideration of this relationship in discussions of both the long-term growth process and of macroeconomic fluctuations within the business cycle. Unfortunately this is not the case. This is particularly serious because SME’s (and thus employment and skilling) are more vulnerable to changes in the financial environment than large firms, given their fragile

balance sheets and vulnerability to exogenous market shocks that is reflected in their high birth and death rates.

1.9 Better access of new technology-based firms to venture capital has long been at the core of Europe's policy strategy for innovation and growth. In June 1998, the Cardiff European Council adopted the five-year Risk Capital Action Plan prepared by the European Commission (1998a) to promote the development of an integrated pan-European risk capital market. Yet relatively little has been known until recently about the economic determinants and institutional requirements of an *efficient* venture capital industry.

The research findings of WP-6 support the views that international interdependence in venture capital is mainly due to information spillovers in primary equity markets, where the expectation of a hot issue market can serve as an effective coordinating mechanism for individual investments. In the presence of information spillovers, agents' individual expectations are formed endogenously. They often motivate investments in the early or expansion stage of new technology-based firms because exiting via an initial public offering (IPO) tends to be much more profitable during a hot issue market. In the aggregate, however, one cannot rule out reverse causality: an expanding number and volume of venture capital investments may help to make the arrival of a hot issue market more likely and increase its size, given that the main purpose of venture capitalists' management services is to select and prepare suitable start-ups for an early IPO. The empirical observation of a close link between the volatility of primary equity markets and the volume of venture capital investments suggests that either a third variable is responsible or that a new theoretical interpretation is required in which those cyclical co-movements are self-reinforcing. I will argue that by creating social multipliers, information spillovers in primary equity markets can lead to non-ergodic growth and multiple equilibria in the development of venture capital. The main contribution of this paper is to study the empirical implications of this interpretation and to discuss some of the policy issues it raises.

Because the policy implications of social multipliers may vary depending on their actual size, it is important to identify the underlying causes empirically and to use empirical findings when the size of the relevant social multiplier must be predicted in order to assess the likely impact of a specific policy proposal. A social multiplier that is relatively small may not imply multiple equilibria. But the presence of multiple equilibria may bring national and European policy objectives into conflict with each other. More precisely, if multiple equilibria are due to countryspecific economies of scale that one county exploits at the expense of another, policymakers will have to deal with an irreducible zero-sum aspect in the distribution of venture capital across countries. In this case, unless countries can find a cooperative solution, the dynamics of the allocation process will be characterized by international path dependence and a country with an initial advantage can expect to enjoy a long-term lead.

However, path dependence and multiple equilibria need not always imply locational competition in the absence of government co-operation. Instead, international linkages in financial markets may serve to coordinate national cycles in venture capital investments and boost the overall volume of venture capital inflows, creating a positive sum game for all. In this case, economies of scale in venture capital, such as learning by doing in an emerging industry, would accrue to the European economy as a whole and government co-operation

might be superfluous. Efficient policies towards venture capital therefore require a thorough empirical analysis of how the link between primary equity markets and national venture capital investments actually works. For this purpose, I propose to think of venture capital investments as growth options that are exercised when a venture-backed start-up has its IPO.

On the whole, Europe's venture capital industry is still too dependent on subsidies and - without substantial gains in efficiency - it may remain so for quite some time. Public support for venture capital has been substantial in many European countries during the 1990s and continues to be so. This should be a matter of some concern since subsidies can create a variety of incentive problems of their own. For example, subsidies may attract poor managers into venture capital organizations and reduce their quality of screening and of the corporate governance services they provide portfolio firms. In this case, subsidies may even raise the total user costs of venture capital for those technology-based start-ups that primarily want to benefit from the advertisement and certification effect of having won venture capital backing. For some start-ups, the direct financial resources that a venture capitalist provides may be much less important than the effective support in going public. If public funding were always limited to addressing identifiable market failures, as proclaimed by the European Commission (2000), the inefficiencies from subsidies would be reduced. But to limit subsidies strictly to market failures requires that governments accept not only the extremely cyclical nature of the venture capital industry, but also the strongly divergent investment patterns across countries and regions that is implied by the theory of non-market interaction.

1.10 The overall process of EU integration affects the “demand factors” shaping financial regimes. a) as financial integration proceeds so does real integration, however this takes place through a number of growth mechanisms ad growth finance relationships; b) the direction of causality between real and financial integration remains an open issue, and as financial integration is itself influenced by growth, the impact on growth of financial integration may be larger as a virtuous circle develops; c) national sectoral specialization might change in the process and so would the “optimal” demand for external finance, especially as Europe increasingly benefits from technology driven growth; d) the distinction between market and credit based external finance will persist in different country cases as different countries will continue to be characterized by different comparative advantages; e) national inertia may slow down the move towards a common benchmark model. To sum up, it is difficult to envisage one economic model for the EU financial system. The ongoing process of EU integration is likely to generate continuing pressures for change in the demand for finance related to the changes in specialization. It is therefore difficult, if not outright wrong, to single out one model for financial integration. Rather, a number of such models may coexist in the foreseeable future. If we accept the idea that several growth mechanism exist then the analysis of the growth finance nexus should consider the relationship between growth and financial variables conditional upon the specific growth mechanism, which is associated with different countries, sectors and time periods. This could, hopefully, add some new knowledge about the empirical relationship between growth and finance as well as about the features of the EU integration process.

2. Background and objectives

The EIFC project covered six areas, i.e (i) comparative analysis of European financial systems, (ii) the impact of financial markets' integration on regulation and technological change, (iii) financial markets and investment, (iv) financial markets, growth dynamics and labour markets, (v) financial markets and diffusion of innovation and (vi) venture capital in Europe. In what follows, we provide a summary of the core research questions and research findings of the EIFC project.

Comparative analysis of European financial systems (WP-1)

The first workpackage in the framework of the EIFC project focused on the interaction between European integration, financial systems at the country level and corporate performance. This interaction is important for several reasons. First, the effectiveness of different financial systems may be influenced by the degree of product market integration. For example, competition in product markets may be particularly needed to encourage corporate performance where there is limited competition in capital markets for the ownership of firms. And, second, corporate performance may be affected by degrees of market de-regulation and changes in the industrial organisation structure of the banking sector. It has been suggested, for example, that competition in financial markets may undermine the ability of firms and financial institutions to establish long-term relations. Attempts, therefore to extend competition in the financial sector may have significant effects on the way in which the corporate sector functions.

Four major factors are driving the recent restructuring in the European financial services sector, roughly defined by their international, regional and national dimensions:

1. the ongoing globalisation of world capital markets, which is providing technological opportunities, new scale economies and thus an increasingly oligopolistic market;

2. increasingly large accumulations of liquidity world-wide, which in the absence of assured returns from productive investment is seeking a haven in financial investments;

3. the prospect of increased cross-border competition for financial services within the Euro-zone; and

4. the particular institutional structures of banking and insurance systems.

The view that there are important interactions between financial systems and corporate performance leads to a systemic approach to corporate performance. According to this, the performance of manufacturing industries must be considered in the context of the overall structure of economies. Differences across countries in the structure of capital markets, industrial organisation aspects of manufacturing sectors and product markets are all closely interlinked. It is therefore impossible to consider significant changes in one independent of the others. Several questions arise from the description above on the role played by the finance and credit variables in aggregate and sectoral performance: a) to what extent different

aggregate investment behaviour is influenced by different financial markets. This issue is particularly relevant given the, still for many years to come, segmentation of national financial and credit markets in EMU. b) To what extent sectoral specialization and performance is assisted or even anticipated by national and international financial markets in EU countries. c) To what extent flexibility and mobility of industrial systems are assisted and supported by financial markets. d) Is there a linkage between innovation and change in industrial sectors and innovation and change in financial sectors? e) To what extent national versus sectoral elements influence the interaction between finance and investment?

The hypothesis that there is a possibility to have different levels of corporate performance, depending on the initial level of efficiency of financial systems, raises the question of the appropriate sequence of policy reforms. As is well known from the normative theory of economic policy, in second-best situations where some optimality conditions are not fulfilled - as for instance when a financial threshold is binding - appropriate policies in other areas may be quite different from those usually advocated in first-best situations without distortions. In particular, policies which promote the adoption of specific forms of financial intermediation have to take account of the product and industrial organisation context within which they are being contemplated.

Irrespectively of singling out one or more economic models it is necessary to define benchmarks so as to shape policy action accordingly. To discuss how to define a best practice for financial integration let us first consider the results of Giannetti, Guiso, Jappelli, Padula, and Pagano (2002), henceforth GGJPP. GGJPP have assessed the growth gains for EU countries that would be obtained if EU financial markets were to reach a degree of what they consider "optimal" integration,. They define integration not necessarily as the case in which all EU national financial markets reach the same level of development but as the case in which all EU firms have the same (benchmark) access to financial markets. They determine such a benchmark by taking as given the "demand" factors while considering changes in the "supply" factors. They assume that industrial specialization in each country does not change, i.e. the "demand" factors remain unchanged, and that optimal access to external finance is sector specific, i.e. it is determined by technological factors. They simulate the impact on growth of changes affecting the "supply" factors. More precisely, they assume changes in creditor's protection, the quality of accounting standards, and the rule of law. They consider two cases of best practice. One is represented by the US financial market, a "suboptimal" case is represented by a degree of EU financial integration matching that of UK, the Netherlands, and Sweden. In defining such benchmarks they disregard the distinction between bank-based and market-based systems. They show that, if EU financial integration were to reach either one of the two benchmark levels, as a result of changes in "supply" factors, substantial increases in national growth rates would follow.

GGJPP provide a useful starting point for the definition of a best practice in financial integration . However, as we have discussed above, it is not fully satisfactory to assume that demand factors in financial integration remain unchanged. The best practice case needs to be considered taking into account changes in the "demand" factors. In Mariani and Padoan (2003) we take this aspect into consideration by elaborating on the implications of the Lisbon Strategy, i.e. the strategy that aims at making Europe the most dynamic knowledge based economy by 2010. Three main conclusions emerge: a) taking into account the indicators that

have been adopted to provide guidelines for the Lisbon Strategy it is possible to identify a "common economic model" based on a correlation between growth, employment, and innovation activities; b) EU countries display a high heterogeneity in their growth models and national economies can be classified into three different groups. One group (strong structure, group 1) includes the large continental economies and the UK, where the employment rate and R&D investment are above average. (We define this group as the "Lisbon benchmark"). A second group (group 2, weak structure) includes the Mediterranean countries and Belgium, where employment performance has been much less satisfactory. A final group (group 3 followers) includes the Nordic countries and Ireland. These results are consistent with the view that national diversities are relevant as in the EU coexist small dynamic economies that are able to exploit the benefits of innovation and a number of economies, including some large continental countries, that are lagging behind and/or face low employment opportunities.

Financial markets integration, regulation and technological change (WP-2)

This work package explored on the main features of two landmark regulatory developments that are likely to have a significant impact on the way European banks and other financial firms operate. The barrage of measures outlined in the Financial Services Action Plan (FSAP) seek to promote a more integrated, efficient and safer European financial marketplace. The ultimate aim is to create a single market across the broader spectrum of the financial services industry thus facilitating cross-border trade and improving competition, innovation and access to lower cost finance for individuals and companies. This, of course, is an ambitious objective and one that has become increasingly important since the advent of the single currency. One can see that the removal, or reduction, of existing barriers is likely to have a substantial impact in promoting European wide change in the financial industry. Sectors that are currently viewed as the least integrated - such as mortgage business, pensions, SME finance, insurance, securitisation activity and so on may well experience the biggest changes.

Having said this, however, the implementation of Basel 2 is likely to have a larger impact on the strategic behaviour of banks. As in the original 1988 Accord it will set the benchmark for regulators over the next decade and longer. The 1988 rules were transformed into EU legislation without major changes and (by all accounts) it has served its purpose well. A major issue relates to how the EU should implement the new Accord. The new rules need to be implemented with the authority of a Directive but have the flexibility embodied under the Lamfalussy framework. The new rules require the stipulation of minimum standards that allow for flexibility in implementation but also credibility in ensuring that they establish a uniform and competitively equivalent framework for financial service regulation in the EU. Where the new rules allow for substantial flexibility - such as in the area of operational risk - minimum standards can be set with national supervisory agencies having substantial discretion in implementation. In the supervisory review (Pillar 2) and market discipline (Pillar 3) these areas also lend themselves to the setting of minimum standards based on mutual recognition and home country control that embrace the single market programme ethos. Interestingly, both Basle 2 and the FSAP place considerable emphasis on areas that are among the least integrated in the European financial services industry - retail lending, SME finance, bancassurance, securitisation and the regulatory treatment of collateral. The removal of barriers to trade in these areas coupled with new capital rules governing their regulation are likely to create a

paradigm shift in the way in which this types of business is conducted over the next decade or so.

A critical element in the integration process of European capital markets is the success of the EU's Financial Services Action Plan (FSAP). This seeks to introduce a wide range of legislation aimed at reducing barriers and promoting cross-border trade in financial services - especially for capital markets and retail / SME financial service areas. As was the case in 1992, it is likely that the expectation of further financial market integration will encourage market participants to adjust their strategies in the light of these developments. Or to put it another way, many banks are likely to accelerate their plans to sell financial products cross-border given the changing environment. Stock and derivative markets will be encouraged to consolidate and investment and pension funds in the Euro zone will increasingly embrace the equity market culture and so on. Regulatory standards in the financial sector will move in line with international best practise and further harmonisation will take place. The challenge for the financial services industry is to reorganise and adapt to this new environment. Targeting a successful pan-European strategy post-2005 (the deadline for the FSAP) will be of critical importance for financial services firms in general.

Financial markets and investment (WP-3)

A great deal of work has been carried out in analysing the likely impact of the move to a single European monetary policy. This work suggests a number of possible effects concerning the symmetry or otherwise of both macroeconomic fluctuations and monetary policy conduct. Monetary policy work has also focused on possible asymmetric effects, through the credit channel, in particular. The behaviour of financial markets is critical here. Since banks in different financial systems may respond differently to identical policy shifts, in terms of their volume of loans, they play a direct role in determining the strength of the credit channel. Financial markets also play a key (but indirect) role in determining the *differential* response of financially constrained and unconstrained firms. It is this secondary role as a 'filter' of policy changes that workpackage 3 focused on.

A key hypothesis is that the structures of countries' financial markets determine how their monetary policy affects the investment performance of firms of different sizes. A number of papers have examined the financing of firms of different sizes and the responses it triggered. A rather smaller number of papers in recent years have combined this size-based view of financial constraints with consideration of monetary policy efficacy and the differential impact of monetary policy on firms of different sizes. Small and large firms exhibit different patterns of behaviour in terms of their employment practices and their rates of technology enhancement. Since the relative growth rates and death rates of small and large firms depend on their investments, which in turn are affected by the financial market they operate in, this has implications for the resulting rates of aggregate economic performance, employment and technological progress. Financial constraints are more or less binding for firms of different sizes (and ages). For this reason, evidence of a credit channel of monetary policy is also suggestive of a differential impact of monetary policy on firms of different sizes.

The model proposed by the Oxford team provides a formalisation of an intuitive explanation of the stylised facts of firm size, on the basis of information asymmetries in financial markets. The importance of financial market factors in determining the performance of firms is clear, as is that of financial constraints. To see financial markets as the driver of the stylised facts of firm size is not a great step then, and the model provides a feasible explanation of how this may occur. By using this as the basis for examining the impact of monetary policy, it is now possible to strip out general (non-policy related) firm size effects, and focus clearly on policy.

The purpose of this model is to consider the impact of monetary union on private investment, employment and technological progress in the euro zone. Of these three variables, investment is the primary focus. The difference in policy transmission will be examined by taking countries in turn, and examining the impact of monetary policy on private investment for given size distributions of firms and sizes and structures of financial markets. The model does not allow for direct empirical testing at the aggregate level, where our interest lies, so the work must progress further by testing the aggregate implications. Taking aggregate investment levels as the dependent variable, then, empirical work will proceed by identifying the financial market and firm size characteristics which the model predicts to drive the relationship between monetary policy and investment. Three significant innovations are offered here. Firstly, it should be clear that it is not only micro firms who risk being denied access to credit in the event of monetary tightening. The model indicates that the risk of losing financing forms a constraint on investment for most firms. For this reason, we use data from the BACH database of harmonised balance sheet data for aggregate size classes of firm reflecting the full size distribution, not just the percentage of employment provided by micro firms. A second improvement is in the approach to finance. Previous research uses measures for the extent of public equity and bond markets as a percentage of GDP, in order to evaluate the extent of non-bank finance. However, research in the 'net sources and uses of funds' tradition has uncovered the importance of private equity in funding actual investment by firms. The implication here is that the dichotomy between high internal finance Anglo-Saxon financial market structures and the bank-based Japanese system is misleading.

As the focus is investment, it is critical to understand the actual net sources of finance, which are used to fund investments. For example, where a banking sector is large but firms hold significant deposits as well as debt, the actual role of banks in funding investment will be seriously overstated by simple size statistics. For this reason, then, financial market data from the World Bank's Financial Development Database will be used in conjunction with variables created from balance sheet data to reflect the actual sources of investment finance. In particular, the true dependence of different size classes of firm (changing over time) can be captured in this way. Finally, as detailed in the previous section, the role of policy reversals is emphasised as central to changes in firms' perceptions of the risk of losing financing, and hence in their investment decision processes. Capturing this more complex relationship may be difficult, but the intuitive appeal of the underlying theory suggests the exercise may be a rewarding one.

The main results have been summarised in EIFC Working Paper 04-39 and EIFC Working paper 04-41 as follows. The output gap and GDP growth are positively associated with investment levels, while the cost of capital is negatively associated. Since the latter has been seen to be highly sensitive to monetary policy as well as general economic conditions, and

especially so for smaller firms, it follows that smaller firms' investment levels are most sensitive to monetary policy. Since small and medium-sized firms are disposed to invest more than large firms, all else being equal, this sensitivity should suggest a focus for policymakers, not least at the ECB which must balance the needs of economies with very different size distributions of firms.

Medium-sized firms' investment levels are most sensitive to their ability to access net sources of external funds, whether as equity or long-term debt. In each case, greater access produces a significantly stronger response in investment level than that common to all sizes of firm. If raising the investment level is a policy objective then, medium firms may well be the class on which to concentrate directed funding or other initiatives.

In EIFC Working paper 04-41 we identified a shift in funding patterns across the 1990s consistent with the idea of a growing pan-European capital pool, showing that larger firms' access to long-term debt had improved markedly while that of small and medium firms had fallen. Time is needed before it can clearly be identified to what extent structures have changed, and how much of this is simply the response to economic conditions (as identified here). But given the possibility at least that the classes of smaller firms which dominate European employment are seeing their most important source of external finance for investment directly threatened by a shift towards market finance and away from intermediary finance, policymakers cannot afford to pursue an imagined Anglo-American convergence without focusing directly on the impacts on the financing of the European firms making the actual investments that drive growth, employment and technological progress in the EU.

Financial markets, growth dynamics and labour markets (WP-4)

The Rome team worked on a survey of the literature on the relationship between finance and growth and discusses the implications of this relationship for European integration. A first goal of this review was to discuss the channels financial systems promote growth through. As standard theory shows, financial systems preserve the efficiency of the payments systems, and they contribute to saving allocation. By performing these two functions financial systems improve the quality of investment as well supporting as its amount. It is also well known that saving allocation can be carried out both directly, through financial markets, and indirectly, through banks. So we review how the literature has investigated which of the two channels is most appropriate to support growth. There is wide agreement that banks play a key role in the initial stages of economic development while opinions are divided so as to the role of bank financed growth in more mature stages of development. Looking at facts, one can find evidence both for the supremacy of market-oriented financial systems, peculiar to the Anglo-Saxon economies, and for bank-oriented systems, peculiar to continental European economies and to Japan. From a theoretical point of view two different approaches can be singled out. One, based on neo-classical theory, identifies markets as the most efficient financial system in the long run; a second one, assuming asymmetric information in credit markets, attributes to banks a key role also in the more advanced stages of development.

The preference of either a market-oriented or a bank-oriented financial structure depends on how firms are managed. When the production possibility set is known and management

decisions can be easily evaluated, bank-oriented financial systems prevail. Whenever, instead, uncertainty about the production function generates uncertainty on the evaluation of management decisions, market-oriented financial systems prevail. Therefore, the superiority of a system depends on the amount and the complexity of information to be taken into consideration in the decision making process. In sectors with many competitors, short production cycles and constant technology, the information set approaches completeness and the relationship between management decisions and the firm's value is known to all agents. In such a case, the relevant problem is to monitor the management decision and the bank-oriented system is preferable one as it guarantees efficient monitoring. On the contrary, in sectors with a small number of firms, long production cycles and frequent technology changes, the information set available to each agent is incomplete, and therefore the mapping between firm's values and investment decisions changes with the different information sets. In such conditions, the main problem for management is to approximate the complete information vector and, given the sectoral structure, financial markets, where a multiplicity of investors estimate their own action-value function, represent a superior alternative with respect to banking. In conclusion, while the empirical literature provides substantial evidence of a positive relationship between financial development and growth most of the key questions addressed by the theoretical debate remain unanswered. There does not to seem to be any compelling evidence that one finance model (bank versus market) is clearly superior in supporting growth, nor does there seem to be any clear evidence on the direction of causality between real and financial development.

Our empirical analysis took into account different sources of growth and different national characteristics. Our research findings show that: a) finance affects growth through different channels (GDP, investment, productivity, technology) all of which are relevant in the EU case; b) EU membership has played a role in boosting growth through productivity enhancement; c) both banks and markets have a positive impact on growth; d) the rise of an innovation related bubble at the end of the 80's has increased the importance of market based finance in boosting technology driven growth, but credit finance has maintained a significant role in supporting investment driven growth (which may be associated, in part, with enhanced process innovation, itself related to IT); e) while there is evidence of similar growth finance relations across countries the growth finance nexus is far from homogeneous. National specificities matter both because growth is driven by different factors with different intensity in different countries and because the relative weight of credit and market finance varies across countries; f) market finance is more relevant in countries where technology driven growth is more important.

These results are consistent with some of the predictions of the theory. Financial development (irrespective of the distinction between bank-based and market-based systems) spurs growth through financial efficiency, by contributing to productivity in general or to technological progress. The distinction between embodied or disembodied technological progress matters as far as the different role of market and credit is concerned to the extent that (IT related) innovation and embodied technological progress require more market-based financial systems. But, to the extent that process innovation, itself partly related to new technologies, is investment driven, credit finance might continue to play a relevant role.

These results have been reinforced by the analysis of the interaction between labor markets and financial factors in investment decisions. We have considered labor market conditions within the traditional theoretical framework that assigns a significant role to financial market imperfections in determining capital accumulation. Also taking into account the role of labor markets our results show that financial markets' configuration (market vs. bank-based) does not significantly matter. Investment depends upon the degree of financial market imperfections. A higher degree of imperfections means that a firm's value (or its profitability) depends on its financial policy (liquidity conditions, leverage, etc). Therefore, away from the Modigliani-Miller world, finance matters. Labor market conflicts, that also reflect institutional bargaining set-ups, have two effects on investment. On the one hand, they depress investment by decreasing expected profitability; on the other hand, they make it convenient for firms to substitute labor with capital. The increase of firms' productive capacity and labor saving technologies feed back on the labor market by reducing employment opportunities. Economies characterized by more acute labor conflicts are also those with less favorable financial indicators (i.e. lower liquidity and higher leverage); therefore, in these economies labor conflicts have the largest negative effect on investment and employment opportunities

Further research is certainly needed, extending analysis both in time and across countries and sectors, however what seems to be emerging from a review of the literature is that something has been missing so far in the analysis of the growth-finance nexus or at least in the empirical literature. While differing in their results and in their focus the contributions we have reviewed share one common feature: they consider real growth from one perspective only. To put it differently, they neglect that, while growth ultimately leads to higher GDP, there exist several alternative channels and mechanisms that relate GDP growth to the rest of the system. There is not only one but several growth theories and, if this is the case, then it is not unrealistic to think that different financial mechanisms have different impacts on observed growth –i.e. on GDP growth- according to the different sources –mechanisms- of growth. Hence the inconclusive results so far available in the literature could, in part at least, be the consequence of a missing element in the analysis: different growth mechanisms, which is not captured by simply looking at the rate of growth itself. While there is evidence that finance and growth are correlated it is not clear which one of the two financing models, market based or finance based, is better for growth. Evidence is even less conclusive on another related issue discussed in the literature: to what extent the financial system shapes the "real" system or the opposite holds. Indeed, if anything emerges from evidence available so far is that each of the two main financing models contributes to growth as circumstances, countries and time periods, change.

Moving from this result we have suggested that the research agenda should be refocused as follows. Investigation of the growth finance nexus has so far been based on the assumption that, while several financial models exist, only one growth mechanism is available. We suggest that this is not the case: several growth models exist and each one of them interacts differently with financial systems. We have developed this point with respect to the case of EU integration, which is characterized by several growth mechanisms. For the sake of simplification we have identified a number of growth mechanisms each associated with one specific integration process: market size, geography and resource allocation (single market); lower transaction costs and financial integration (EMU); catching up (enlargement); innovation and diffusion (ICT and the new economy). If we accept the idea that several growth mechanism exist then the analysis of the growth finance nexus should consider the

relationship between growth and financial variables conditional upon the specific growth mechanism, which is associated with different countries, sectors and time periods. This could, hopefully, add some new knowledge about the empirical relationship between growth and finance as well as about the features of the EU integration process.

Financial markets and diffusion of innovation (WP-5)

Despite the growth of the diffusion literature one factor that seems to have merited very little attention to date is the role of financial factors in the diffusion process, where financial factors may be taken to encompass all issues relating to the funding of those capital expenditures that are a part of the technological diffusion process. Although some empirical work has introduced finance indicators as an explanatory variable in diffusion equations this is not common and even in such cases is not justified on any theoretical grounds. This may be a significant omission. It is also a curious omission, for the role of financial factors in two related fields i.e. R&D determination and investment in plant and equipment has been discussed quite extensively. The main aim of the Warwick team in the first phase of their study was to undertake a preliminary discussion of how and why financial factors may impinge upon the diffusion process. Given that there is a close relation between the analysis of diffusion and the analyses of investment and R&D we proceed by first exploring the arguments that have been presented as to why financial factors may play a role in the determination of these.

The analysis of technological diffusion has largely ignored the possibility that firms may be constrained in the diffusion process by the availability and costs of finance and/or different financial instruments. Building upon the literature relating to investment, R&D and finance we have argued that this may be a significant omission. In fact the diffusion process may well involve considerable uncertainty, information asymmetries, new types of assets, intangible assets and firm specific assets to a degree greater than investment in general. If so this may mean that financial constraints are particularly significant in the diffusion process. We have also argued that these constraints may be of differing importance across countries with different capital markets and different institutions and may also have changed over time as financial markets mature and or develop. Given the paucity of work in this area there is a need for further research. Suggestions have been made to advance our knowledge through both theoretical modelling and through empirical analysis using existing data sets.

There are four potentially fruitful approaches that will allow us to move forward on the issue of the role of financial factors in the diffusion of new technology.

Theoretical development. Much of the discussion above has been general rather than specific. Explicit modelling will only generate specific results and testable hypotheses. A first step therefore is to develop a model of technological diffusion under uncertainty (a *sine qua non* of financial factors playing a role) that can illustrate how, to what extent and with what interactions financial factors may impinge on the diffusion process.
The CIS survey. The CIS survey is a good source of data on innovation in Europe. Although not suited to the estimation of econometric models the survey contains much data that will be indicative of the role of financial factors in the innovation process. Using hypotheses derived

from the modelling it will be possible to explore the relative importance of financial factors across countries, industries, firm size and firm types (e.g. domestic versus non domestic firms). In addition with the later CIS2 and CIS3 surveys it will be possible to explore whether there have been significant changes over time.

Stand alone surveys. Although there is no consistent source for data on diffusion across countries and time, there have been a number of stand-alone diffusion surveys undertaken in different countries. There would be some advantage to collecting together the data from and results of these different surveys. On the basis of this data it will be possible to explore whether financial factors have been addressed and if so what role have they been seen to play in different countries.

Econometric analysis. Some of the stand-alone surveys may well contain information upon financial factors or can be supplemented from public sources to provide such information (for example the UK CURDS survey can be supplemented by publicly available data on the firms in the sample to cover variables such as cash flow and profitability). With such data it will be possible to undertake explicit econometric estimation of the predictions of the models discussed under (i) above.

With this framework, we will be able to predict the impact upon the diffusion path of changed attitudes to risk amongst funding providers, greater possibilities of shifting risk resulting from the use of new risk shifting instruments, and greater or lesser funding availability. In addition, the role of differences in attitudes to risk between the firm and the market will be highlighted. A particular issue capable of exploration will be whether more freely available finance enabling firms being better able to weather bad times leading to reduced downside risk will encourage the adoption of new technologies. In addition one should be able to explore whether the availability of internal finance will expedite diffusion. One might think that the availability of internal finance would make it easier to fund investment plans. However, if an investment is funded from internal sources that would not have been funded from external sources, because, say, of different attitudes to risk between the firm and the market, that investment may well lead to a negative impact upon the market value of the firm. If such a negative impact is likely to result the firm is unlikely to want to undertake the investment.

There is a growing body of empirical research relating to the relationship between finance and investment in plant and machinery and or innovation (largely measured by R&D). The two main strands in the literature investigate (i) the sensitivity of the investment rate to cash flow (ii) the results of innovation questionnaire surveys.

The correlation between cash flow and investment is usually investigated by estimating a standard investment demand function (see for example the surveys by Hubbard, 1998 and Hall, 2003). Three main approaches can be identified:

i) estimating a dynamic neoclassical accelerator model in which the profit maximizing firm equates the marginal cost of capital to the marginal product (see Fazzari, Hubbard and Petersen, 1988, and Carpenter and Petersen, 2002 for the US, Devereux and Schiantarelli, 1989 for the UK).

ii) estimating an Euler equation derived for the profit-maximizing firm without including the shadow value of capital among the regressors (see Bond, Elston, Mairesse and Mulkay,1997).

iii) estimating directly the investment demand function where the shadow value of capital is proxied by a *VAR* forecast of firm fundamentals observable to the econometrician (see Bond, Harhoff, and Van Reenen, 1999).

(iv) These methodologies have been applied to investment data for a number of different countries. Overall the voluminous literature presents strong empirical evidence of a correlation between cash flow and investment in plant and machinery and/or R&D. For example, in an early paper Fazzari et al. (1988) found that cash flow tends to affect the investment of low-dividend firms more than that of high dividend firms leading them to conclude that finance rationing matters. An example of the later literature is Carpenter and Petersen (2002) who find that for small, quoted firms in the US, the sensitivity of growth to cash flow of firms that use external equity is lower than that of firms that make little use external equity. Bond et al. (1997) estimate accelerator, error correction model and Euler equations for different countries. Although they find that the simple accelerator equations tend to exaggerate the importance of financial variables relative to richer dynamic specifications, they also find robust results across all econometric models indicating that the sensitivity of investment to financial variables is both statistically and quantitatively more significant in the UK than in France, Germany or Belgium, although there is the possibility that this greater responsiveness may arise because firms in these economies are more sensitive to demand signals in thicker financial equity markets. Canepa and Stoneman (2003b) explore the relatively neglected area of technology diffusion rather than technology generation (R&D) and show, using UK data, that the diffusion of new technology is similarly sensitive to cash flow.

In contrast, Kaplan and Zingales (1997) have argued that studies such as those cited above which estimate the sensitivity of investment to cash flow are fundamentally flawed in that such sensitivities are unable to reflect financial constraints in an unbiased manner. However, the empirical evidence on the relationships between finance, investment and innovation has been further augmented and extended through the analysis of innovation survey data. Canepa and Stoneman (2003a) for example explore Community Innovation Survey (CIS) questionnaire response data to investigate whether European firms consider themselves to be financially constrained in their innovative activity. They find that (i) the cost of finance or the availability of finance ranks among the more significant factors that have acted as hindrances to innovation in Europe, both in 1994 – 1996 and 1998 – 2000; (ii) the probability that a firm's innovative activity will be financially constrained is greater for small firms than for medium and larger firms, in the latter case there being only minor differences between the UK and other countries; (iii) when firms are constrained such that their innovative activity is delayed or reduced, then financial factors (the cost or availability of finance) are more likely to have a high (as opposed to medium or low) impact for small firms than for large firms. Their results also confirm that differences in European financial systems also matter: the market-based economies (e.g. the UK) exhibit greater sensitivity of innovation to financial constraints than bank-based economies (e.g. Germany).

Further research also suggests that capital market imperfections affect SMEs more in high-tech industries than in traditional sectors. For example, Westhead and Storey (1997) examine the relative importance of several potential problems faced by high-tech SMEs. Their multivariate analysis on a sample of UK firms shows that technologically sophisticated high-tech firms were significantly more likely to report the presence of a continual financial constraint than less high-tech firms. In a similar study of Italian high-tech firms, Giuduci and Paleari (2000) confirm that 50% of the sample companies experienced difficulties in financing their innovative projects. The work of Canepa and Stoneman (2003a) confirms these findings and extends them to the majority of European countries.

To summarize, although there is not universal acceptance that European firms do face financial constraints (see for example Wagenvoort, 2003), the overview of various empirical studies relating to investment in plant and machinery, R&D and diffusion suggests that:

(i) small firms are more likely to be financially constrained in their innovative activity
(ii) firms (especially small and start-up firms) in R&D intensive industries face a higher cost of capital.
(iii) the evidence for a financing gap for large and established firms is harder to establish

the Anglo Saxon economies, with their thick and developed stock markets and relatively transparent ownership structures typically exhibit greater sensitivity of innovation to cash flow than continental economies.

Venture capital in Europe (WP-6)

Venture capital is often referred to as a prerequisite for productivity and employment growth. In line with the American tradition, venture capital is understood as offering financial means to young high-technology enterprises in combination with management support for these enterprises by an experienced intermediary, the venture capitalist. The role of venture capital in facilitating employment and productivity growth has made venture capital a major target of financial market policies by European governments. They made a variety of attempts to ease the access to equity capital for young high-technology enterprises by improving the regulatory conditions venture capitalists face in the European markets and by granting rather generous subsidies.

The US venture capital market can serve as a benchmark for the discussion of the development in the European markets for private equity. In the US, venture capital is predominantly invested in relatively young, high technology enterprises. During the 1990s, pension funds were the main capital provider to venture capital funds. These funds were managed by independent venture capitalists that often specialized on particular stages of enterprises' development and/or particular technologies. The various European markets for venture capital, by contrast, are relatively small compared with the US market. This follows from the comparisons of investments in young enterprises relative to GDP and from investments in particular high technology areas. Moreover, banks were the main capital provider in the 1990s. Only at the end of the 1990s, did the importance of pension funds increase. In Europe, venture capitalists are often dependent on their capital providers. Especially banks prefer to invest in their own subsidiaries and not in an independent venture

capital fund. However, there are also some interesting similarities between the European markets for private equity. First, all European markets experienced substantial growth in terms of investments in enterprises' early and expansion stages as well as in terms of new funds raised, which jumped significantly at the end of the 1990s. And second, the importance of banks as capital providers for private equity has decreased in almost all European countries, while the capital amounts contributed by pensions funds have raised during the 1990s. In comparison to the United States, some countries have similar amounts invested in enterprises' early stages, while all European countries have considerably lower volumes invested in enterprises' expansion stage relative to GDPs. In 1999, US investments in enterprises' early stages accounted for one per mil, investments in enterprises' expansion stage for about three per mil of GDP. Dutch, Belgian and Swedish private equity investors' investments in enterprises' early stages also accounted for one per mil of the respective GDPs. As mentioned above, the United Kingdom is the leading country in Europe with respect to investments in enterprises' expansion stage.

European markets for private equity vary considerably with respect to the investments in young high-technology enterprises, as well as with respect to the types of passive investors who invest capital in private equity funds. In some countries, private equity investors predominantly receive capital from banks, in others the main capital providers are pension funds, while in a third group of countries, governments play an important role in providing financial means for young high-technology enterprises. This is important because many European countries have introduced public policies to stimulate venture capital activity, which cannot be identified in aggregated data on private equity activity in Europe. In order to assess the comparative efficiency of European venture capital empirically, WP-6 developed an econometric model and used data from a variety of sources for estimation and testing of hypotheses.

3. Methodology and Research Findings

Economic Growth and Financial Intermediation

Over the years, economic theories have offered different and in some cases contradictory approaches on the relationship between financial development and economic growth. Bagehot and Schumpeter pointed out the contribution of banks in the improvement of welfare and economic development a long time ago. A primary function of financial systems (financial markets and intermediaries) is to move funds from people who save to people who have productive investment opportunities. This primary function can be separated into three basic sub-functions: the mobilization of savings, the acquisition of information, and the management of risk. By fulfilling these functions, financial systems improve both the quantity and quality of real investments and thereby increase income per capita and raise the standard of living.

The conventional neoclassical theory of frictionless competitive models assumed a passive role of the financial sector in economic growth. That brings us back to the foundations of the Arrow-Debreu model. The markets in this context are functioning, access to information is symmetric among involved agents and other frictions are not present. Hence, there is no need for any further consideration on the costs of getting access to information and/or conducting efficient transactions in financial markets. In the neo-classical approach, economic growth is driven by the accumulation of inputs in the production process and technical progress while the role of finance is considered only as a source for the accumulation of capital. Finance is restricted to capital as an important factor and its accumulation as a condition for sustainable economic growth. Also finance contributes to technical progress to the extent that technical advances embodied in the capital stock will influence productivity.

However, since the 1980s, the development of endogenous growth models has stressed the link between financial development and economic growth via the possibility that institutional arrangement could have an impact on growth rates. In the simplest type of endogenous growth model, "AK" financial development could influence the productivity of capital, reduce the lack of resources required for investment and contribute to the efficiency of financial systems via saving rates. In recent years, contributions from the economics of information and contract theory developed a comprehensive analysis of financial systems, in particular the functions of financial intermediaries (banks, stock markets and other financial institutions). This framework for the analysis of financial systems has emphasized the importance of the specific characteristics of financial institutions and the complex relationship between financial systems and economic growth.

The new theories of finance have introduced analytical models, which tried to capture this complexity in theoretical and empirical work on the contribution of the financial sector to economic growth (Tsuru, 2000, p.5). The New Theory of Finance is based on the economics of information and gives a great deal of attention to the issue of interpersonal resources transfer (Stiglitz and Weiss, 1981). This theory draws on neo-classical assumptions with one significant exception, that is their approach on asymmetrical information among economic agents. The effect of interpersonal resource transfer on financial markets can exercise positive or negative influence on the process of a country's economic development. There are three

major channels through which the financial system can promote growth (e.g., see Pagano 1993 and Levine 1997). First, the provision of financial services can encourage the mobilization of savings from many disparate savers. Financial systems affect growth by improving the efficiency with which those savings are used and increasing the amount of funds allocated to firms, thereby facilitating the growth of capital and productivity. That is, financial systems can raise firm investment by reducing liquidity risk and idiosyncratic risk. Moreover, financial systems, by mitigating risk (particularly liquidity risk), affect positively economic growth, since they eliminate the premature liquidation of firm capital. Second, better screening and monitoring of borrowers can lead to more efficient resource allocation. For instance, well-developed stock markets enhance corporate control by (i) aligning the interests of managers with those of firm owners, and (ii) facilitating takeovers to mitigate the principal-agent problem and so encourage economic growth. Furthermore, financial intermediaries can promote growth by economizing on the costs of gathering information by replacing many monitors with one delegated monitor. Third, improvements in risk-sharing can enhance savings rates and promote innovative, high-quality projects. For example, stock markets reduce liquidity risk by allowing agents who receive liquidity shocks to readily and cheaply sell their shares in firms. Similarly, financial intermediaries, particularly banks, mitigate liquidity risk by issuing demand deposits and by pooling savings of individuals.

New theories of financial intermediation give to the financial sector a more prominent role in accomplishing an efficient allocation of capital. This approach of the economic function of finance is linking financial intermediaries with transaction costs and asymmetric information. Furthermore, financial intermediaries accumulate special knowledge in evaluating and monitoring projects and they develop comparative advantages in evaluating risks and designing financial contracts (Thiel, 2001, p. 15) In fact, a large number of recent papers concentrated on the interaction between the size of the financial system and the level of economic development. They emphasized the differences in the way firms finance investment in bank-based systems and market-based systems (Santos, 2000, p.3). The bank-based systems facilitate the mobilization of resources, the monitoring of managers and managing risks and the identification of good projects. On the contrary the market-based systems mainly facilitate diversification and the customisation of risk management devices. This system quickly reveals information in public markets and thus may hinder incentives for identifying innovating projects and also it may impede efficient capital allocation to new and innovative firms (Beck, 2000, pp.2-3). Firms operate, moreover, in an imperfectly competitive environment, which comprises, apart from conventional enterprises, newly-created enterprises in new and emerging technological areas. The availability of external and internal finance and the terms on which that will be obtained can influence their investment capabilities and their performance. Capital markets are characterized by imperfections, resulting from information asymmetries and agency costs. Internal finance is often less costly than external finance because agency cost is not available to new firms. Thus, the availability of internal funds can influence significantly the financing of investment and the choice of investment opportunities.

The structure and the development of financial system evolves as a result of the interactions between markets, institutions, financial instrument, technology and rules that define the organisation of the financial system. Empirical research has indicated the parallel existence of financial intermediaries and markets and has stressed the differences between bank-based systems and market-based systems and the role of various financial intermediaries. In practice

the distinction of financial structure is made between bank-based and market-based financial system. There are many differences between the financial systems with a dominant role for banks and those with a dominant role for financial markets. In short, bank finance is the intermediation between surplus and deficit spending households and market finance is between borrower and lender. Bank finance is associated with debt while market finance with equity. Empirical evidence suggest that an important difference between these two systems is in asset distribution among financial intermediaries. Also, differences between countries are the outcome of a complex interaction between diversity in regulation, culture and tradition. Significant impacts on the structure of the financial system stem mainly from financial regulation, which is the result of politics, ideology and culture system (Scholten, 301 & 320). Recently another approach has been proposed on the relationship between financial structure and growth. It stressed the impact of legal system on innovation and growth. The legal system can determine the effectiveness of the financial system in facilitating innovation and growth (La-Porta, 1997 and 1998).

So far, we have discussed the argument that financial systems affect long-run economic growth. In this section, we examine whether the specific organization of the financial System that is, financial structure (the mixture of financial markets and intermediaries) matters for growth. In particular, we investigate whether a market-based financial system is more growth-promoting than an intermediary-based system (and vice versa), or whether it is the combination of both types of system that most affects long-run growth. To do so, we first explain how financial intermediaries and markets (i) aid savings mobilization, (ii) evaluate investment opportunities and exert corporate control, and (iii) facilitate risk management. In other words, we will focus on the three main functions of intermediaries in financial markets. After a brief discussion of these challenges we will examine the financial services view and the law and finance view on the role of financial markets. They argue that intermediaries and markets are complements in addressing these challenges and in the provision of growth-enhancing financial services.

In their first role, financial intermediaries boost the mobilization of savings in at least two ways. First, they lower transactions costs associated with collecting savings from numerous individuals in the economy. Second, financial intermediaries mitigate the moral hazard and adverse selection problems that make individuals less willing to relinquish control of their savings. By alleviating the asymmetric information problems and by reducing transactions costs, financial intermediaries ease savings mobilization and thereby increase economic growth. The channels through which financial intermediaries encourage long-run growth are as follows: (i) by mobilizing savings, financial intermediaries increase capital formation, which in turn increases the national savings rate, and (ii) by exploiting economies of scale, thereby reducing transactions costs per unit of transactions as the size of a transaction increases, financial intermediaries improve the allocation of savings.

Secondly, when borrowers have private information about the quality of their projects ex ante (adverse selection), screening by the intermediary is essential to provide agents with incentives to accurately report whether the project is bad or good. Without screening, “bad” borrowers may pretend to be “good”, and this may lead to underinvestment in good projects, since lenders cannot observe the true type of borrowers. Indeed, screening has played a major part in developing theories of credit rationing (e.g., see Stiglitz and Weiss 1981). Because it is

costly to screen projects, it is optimal to delegate the acquisition of information to intermediaries to avoid the duplication of costly information acquisition (e.g., see Boyd and Prescott 1986).

Furthermore, when borrowers have private information regarding the realization of projects (moral hazard), state verification or monitoring by the intermediary is necessary to provide incentives to agents to truthfully report the outcome of the projects. Failure to do so may result in a lower return to the lender. Since it is costly to assess the actual state (costly state verification), it is more efficient to have only one agent do the assessment for a group of agents (Townsend 1979, Diamond 1984, Williamson 1987, Bernanke and Gertler 1989, and Thadder 1995). For example, in his seminal work, Diamond (1984) shows that the costs of monitoring decline as the intermediary deals with an increasing number of borrowers. In other words, financial intermediaries exploit economies of scale in the monitoring of firms. Moreover, financial intermediaries can mitigate the so-called free-rider problem in the private production of information. The free-rider problem emerges when individuals who do not pay for information take advantage of the information that other individuals have paid for. A direct consequence of the free-rider problem is that it prevents the private market from producing enough information to eliminate the asymmetric information that leads to adverse selection and moral hazard.

Financial intermediaries, particularly banks, can avoid the free-rider problem by making primarily private loans rather than purchasing securities that are traded in the open market. Because private loans are not traded, no one can free-ride on the intermediary that is monitoring and screening projects. As a result, financial intermediaries have greater incentives to acquire the costly information. By reducing duplication and free-riding, financial intermediaries improve the ex ante assessment of investment opportunities (screening) and the ex post exertion of corporate control once those investments have been funded (and so address the principal-agent problem). This, in turn, improves capital allocation and boosts economic growth.

And third, financial intermediaries may facilitate risk-sharing by reducing transactions costs. Standard risk-diversification arguments concentrate primarily on cross-sectional risk-sharing, which requires that individuals, at a given point in time, diversify their portfolio of assets. If there are fixed costs associated with each transaction of assets, financial intermediaries, by taking advantage of economies of scale, can reduce the costs of holding a diversified portfolio of assets. Furthermore, intermediaries may ease the intertemporal smoothing of risks that cannot be diversified at a given point in time, such as oil-price shocks and other macroeconomic shocks, by averaging those shocks over time in a way that decreases their adverse effects on welfare (Allen and Gale 1997 and Levine 2000). Intertemporal risk-smoothing requires that investors accept lower returns than what the market offers in some period (particularly in good times), to get higher returns relative to the ones offered by markets in other periods (especially during recessions). Financial intermediaries are well suited to provide intertemporal risk-sharing, because it requires the accumulation of large reserves in safe assets. Markets are unable to provide this insurance since, in markets, investors continually adjust their portfolios to earn the highest rate of return (the arbitrage opportunity).

Such intertemporal risk-sharing can be illustrated by the sharp increase in oil prices in the early 1970s, and by the stock market boom in the 1980s. In the former case, given that claims on intermediaries were constant in value, households in Japan and Germany (both intermediary-based systems) did not experience a decline in wealth like those in the United States and the United Kingdom, and as a result they did not face substantial fluctuations in their consumption. Thus, intermediary-based financial systems were able to smooth the oil-price shock rather than pass it on to households. In the boom of the 1980s, however, households in the United States and United Kingdom (who have most of their wealth in stock markets) obtained higher returns and used those returns to finance a higher consumption profile. German and Japanese households, on the other hand, did not gain as much from the boom, since their savings were mostly in intermediaries, where they were promised fixed returns. This example shows that financial systems, where bank deposits represent a large fraction of total wealth, can protect households from swings in the value of assets resulting from aggregate shocks. Obviously, households in the United States and United Kingdom can hold bank deposits, but the returns are not as high. In fact, Allen and Gale (2000, 155) argue that the problem is that intermediaries in market-based systems have to compete with financial markets, and competition from markets may prevent intermediaries from providing risk smoothing to households. In other words, either intermediaries have to pass on risks to households or they have to hold safer assets, which earn lower returns."

Intermediaries can also mitigate liquidity risk (Diamond and Dybvig 1983, Bencivenga and Smith 1991, and Holmstr.om and Tirole 1998). Many high-return investments require a long-term commitment of capital, but risk-averse agents are generally hesitant to relinquish control of their savings for extended periods. Financial intermediaries, however, make long-term investments more desirable, since they pool savings, which can be made liquid whenever needed. More precisely, financial intermediaries invest just enough in short-term assets to satisfy those with liquidity needs and at the same time make a long-run commitment of capital to firms. By facilitating start-up of high-return investments, financial intermediaries improve the allocation of capital and thereby encourage economic growth. Intermediaries, particularly banks, may be more effective at providing external finance to new firms that require staged finance, because intermediaries can more credibly commit to making additional funding available as the project develops, while markets have a more difficult time making credible long-term commitments. To put it differently, since it is easier to renegotiate bank loans than to restructure corporate bonds, intermediaries may have a comparative advantage (Lummer and McConnell 1989 and Gilson, Kose, and Lang 1990). Financial markets (bond and equity) are not very effective at providing pre-committed stage financing, because with publicly traded securities it is generally not possible to design a mechanism where the owners of the securities act collectively to determine whether additional funds should be provided. Thus, financial intermediaries would encourage the start-up of innovative projects and long-run economic growth.

Financial markets and intermediaries (financial systems) emerge to reduce transaction and information costs. In doing so, financial markets and intermediaries both provide key financial functions: savings mobilization, information acquisition, and risk management. The financial services view focuses on these functions and emphasizes the important role of a well-functioning financial system (both financial markets and intermediaries) in providing these services. Specifically, according to the financial services view, the central question is the

overall quantity and quality of these financial services, and not the specific organization of the financial system (market- or intermediary-based). In other words, the issue of market- versus intermediary-based systems is of secondary importance.

The financial services view argues that markets and intermediaries are alternatives that perform more or less the same functions but in different ways and possibly with different degrees of success (Boyd and Smith 1996 and Allen and Gale 1999). For example, by encouraging competition for corporate control and by creating alternative ways of funding investment opportunities, financial markets mitigate the adverse effects of powerful intermediaries. Rajan (1992) shows that \the firm's choice of borrowing sources (bank and bond finances) and the choice of priority for its debt claims attempt to optimally circumscribe the powers of banks." Besanko and Kanatas (1993) characterize an economy in which bank and (bond) market finances coexist such that the market reduces the incentive of the bank to excessively monitor the firm. Another argument put forward in favour of the complementarity of financial services provided by markets and intermediaries is that both intermediaries and markets have a comparative advantage at dealing with different types of information.

Intermediaries can benefit from increasing returns to scale in mitigating asymmetric information, but may be unsuccessful when dealing with uncertainty, innovation, and new ideas. In contrast, markets may be more effective at financing industries that are new or where relatively little relevant data are generated; that is, industries in which information is sparse and diversity of opinion persists. Demirg. u¢c-Kunt and Levine (1996) use firm-level data to show that increases in securities market development actually tend to increase the use of bank finance in developing countries. Thus, these two elements of the financial system may act as complements during the development process. It may be desirable to avoid viewing intermediary- and market-based systems as representing a trade-off. A careful empirical study by Levine (2000) the first cross-country examination of financial structure and growth that uses a broad data set of countries is strongly supportive of the financial services view.

This prompts the following question: what conditions are necessary to provide better financial services? The law and finance view (also called the legal-based view) addresses this question. It is put forward by Laporta et al. (1997, 1998, 1999). They reject the debate centered on bank vs. market-based interpretations. Levine (2000), building on Laporta et al., argues that creating strong legal systems that support the right of outside investors (both equity and debt investors) and then efficiently enforcing those codes is crucial for providing growth-enhancing financial services." Intuitively, this is a simple idea, since a promise to deliver one unit of financial services tomorrow is worthless if delivery cannot be enforced. As a result, the law and finance view conjectures that the overall financial development defined by the legal and regulatory systems predicts economic performance better than any measure of financial structure per se. In fact, Chakraborty and Ray (2001), in a model where financial structure arises endogenously, show that it is entirely possible for two countries to have distinctly different financial systems but enjoy similar growth rates over time (as in the case of Germany and the United States.) This supports Levine's (2000) and Demirg. u¢c-Kunt and Levine's (2001) empirical findings that the specific type of financial system is not important for explaining differential growth rates across nations. Their conclusion emerges from cross-country regressions, industry panel estimations, and firm-level analyses. They stress that elements of a country's characteristics and the quality of its financial services are more

important for fostering long-run economic growth. In short, they find no support for the intermediary- and market-based views of financial structure and growth, but find strong support for the financial services view and legal-based view. Similarly, other evidence exists that financial markets and intermediaries are complements rather than substitutes. Demirg. u¢c-Kunt and Levine (1996) show that countries with well-developed stock markets also have well-developed banks and non-bank financial intermediaries, while countries with weak stock markets tend to have weak banks and financial intermediaries.

Although conclusions must be formulated cautiously, our survey of the literature suggests that there is strong evidence that the mixture of financial markets and intermediaries is not important for explaining differential growth rates across countries. Countries do not grow faster, and firms' access to finance is not systematically easier in either market- or bank-based systems. For example, Germany and Japan major bank-based systems and the United States and United Kingdom the foremost market-based systems have had different financial systems, but they have had similar growth rates over time. This might imply that the most important factor is that a sound legal system effectively protects the rights of investors and enforces contracts efficiently. This in turn would improve the operations of financial markets and intermediaries, with positive implications for long-run growth. Our survey of the literature, however, suggests that there is more support for the financial services and the law and finance views. Thus, most researchers on this topic feel that financial intermediaries and markets are complements in the provision of growth-promoting financial services. Both market- and intermediary-based systems have their own comparative advantages: (i) financial markets are better at financing new technologies and projects where there is little agreement on how firms should be managed, while (ii) intermediaries are effective at mitigating moral hazard and adverse-selection problems that exist between lenders and borrowers. This is explained by the fact that intermediaries, particularly banks, have developed expertise to distinguish between bad and good projects.

Economies that have well-developed financial markets and intermediaries have an advantage. For example, financial markets, by providing an alternative source of financing, reduce the adverse effects of excessive intermediary power. Thus, financial structure (the degree to which the financial system of countries is intermediary- or market-based) is not important for explaining differential growth rates across economies. Countries do not grow faster, and firms' access to external finance is not systematically easier, in either market-or intermediary-based systems. For example, Allen and Gale (2000, 21) claim that in the end, it is not a question of markets versus intermediaries, but rather of markets and intermediaries. This conclusion is consistent with the broad empirical analysis of financial structure and economic growth by Demirg, et. al (2001,p. 12). Through a diverse set of analyses, the answers are surprisingly clear " . . . Overall financial development matters for economic success, but financial structure per se does not seem to matter much." This suggests an important message when it comes to institutional changes and the overall adjustment of financial systems. What really matters is the proper functioning of both markets and intermediaries, rather than the degree to which national financial systems are market- or bank-based.

Financial systems provide financial services to the corporate sector. These services are crucial for firm creation, industrial expansion and growth. The level of investment (in physical capital and R&D) in firms is influenced, among other things, by the availability of cash flow. This

implies that financial constraints play a more severe role in the market-oriented financial systems. Empirical studies in OECD countries find that cash flow and profits play an important role for financing investment in France, Germany and the United Kingdom. However, it was more important was in the U. K. than other European countries. This implies that financial constraints may be significant in the more market-oriented UK financial system. Empirical literature stresses the correlation of investment with cash flow in firms, which face financial constraints. However the 'Tree cash flow" theory supports that financing constrained firms which have excessive internally generated funds tend to promote over-investment where there are few sound investment opportunities. The double-edged nature of cash flow is also related to a question of how a firm can efficiently allocate its funds to different functions. In the case of a diversified conglomerate there has been extensive discussions on whether corporate headquarters by forming internal capital markets can allocate capital across divisions efficiently or not. In addition empirical studies found a small positive impact between financial pressure (interest payments relative to cash flow) and capital productivity (Tsuru, 2000, p.20).

The New Theory of Finance supports the development of specific institutions and the introduction of a financial system that could address the problems of uncertainty. Financial systems contribute to the reduction of the special transaction costs that emanate from the asymmetric information in the relation between borrower and lender. Financial contracts are often designed to ensure comparative advantage between financial intermediaries in the implementation and enforcement of these contracts. The New Theory of Finance tried to develop a comprehensive framework on financial deepening and sustainable economic performance. They support the implementation of financial market regulation to the extent that is facilitates solutions to information and incentive problems. The presence of market failures justifies banking regulations. In addition these theories emphasized the importance of the implementation of macroeconomic monetary policy in each country and the role of central banks in this process (A. Winkler, 1998). Another dimension in this debate is the need for regulation and supervision that focuses on the performance of the financial systems is the new global financial and technological environment.

Trends in European Financial Markets

By necessity much of the empirical support for propositions relating to financial constraints in Europe is predicated upon data compiled largely prior to the recent important changes to national financial systems in Europe. In this section we address whether these changes themselves are likely to have diminished the importance of financial constraints to innovative activity in Europe. It should be noted that for most firms in most countries, the dominant source of investment funds is still internal and as such the impact of such recent developments on innovative activity may be quite limited.

Of the changes that have been occurring we emphasise four. The principal change in the European financial environment is the advent of EMU. The prime direct embodiment of EMU was the move first to rigidly fixed exchange rates between member countries and then to a common currency. (It should be noted of course that the UK has not as yet joined the EMU). It was argued that EMU would eliminate foreign exchange risk to a great degree and as such encourage investment and innovation.

Danthine et al. (2000) point out that non-EMU currency risk (in particular that associated with the US dollar) was a much larger risk factor than intra-EU currency risk and as such the reduction of currency risk resulting from EMU may only have a limited impact upon portfolios. They do however report that as a result of the elimination of foreign exchange risk with monetary union and as an implication of transparency, a single European yield curve for the private debt market emerged. Private interest rates across EMU participants had almost completely converged by June 1996, and as of May 1998 when irrevocable exchange rates were instituted, the by then almost identical yield curves of different countries collapsed into a single yield curve. Since the second half of 1998 this yield curve also has moved down.

However, the impact of EMU on the cost of capital for 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. Thus downward movements of the yield curve are unlikely to have much impact on SMEs. SMEs are also more likely to rely more heavily than large firms on bank lending and venture capital.

A further direct consequence of EMU is that the central banks of countries belonging to the Euro zone now have only loose control over their own monetary policy. That policy will be set zone-wide with individual country financial markets determining how the innovation performance of firms of different sizes will be affected . Differences in monetary transmission mechanisms resulting from different financial structures will thus mean that the single monetary policy conducted by the ECB may well have different effects on innovation in different countries.

The second major change we observe is that indicators suggest that the euro area is moving towards a more equity-oriented structure as shown by the growth of the stock market in nearly all countries (see Mayer, 1999) and new markets being established. For example several stock exchanges (Frankfurt, Paris, Amsterdam, Milan and Brussels) launched markets for high growth company stocks integrated under the EURO.NM initiative. This should lead to (i) geographical location diminishing as a determinant of where companies choose to list and multi-market listing growing in importance; (ii) minority shareholders becoming more vocal; and (iii) attempts to be made by the EC to harmonize governance, information disclosure, investor protection and take-over rules across countries. Primarily however it is to be expected that companies will find it easier to raise finance locally from equity markets. However this opening up of local equity markets may not be of great advantage to smaller firms who rely upon debt and particularly bank finance.

The third major change has been in the European banking environment. With EMU there will be more pressure for less segmentation of national banking markets and as other institutional and regulatory barriers fall this is likely to be further emphasised. This is expected to increase competition and reduce costs and therefore charges. There have already been a steady stream of bank mergers in European banking throughout the 90s. This has led to larger banks and a beginning of cross border expansion. Most bank mergers in the 90s have been domestic, but the domestic proportion is now falling. However, even in early 2000, European banking markets were still highly fragmented along national lines with shares of domestic inter-bank claims standing at roughly 64% and that of domestic loans in total loans at roughly 80%. Molyneux (2001) argues that although increasingly foreign banks constitute a significant

proportion of banking assets (in 1996, 57% in the UK, 48% in Belgium, 14% in France and 35% in Portugal but less than 8% in all other countries) such banks still play only a minor role in domestic retail and corporate banking. Nor is there any evidence (Schenk, 2000) to suggest that banking mergers increased internal efficiency in terms of cost improvements, he in fact suggests that one effect of increasing bank size has been to increase the costs and reduce the availability of loans to SMEs. There does not seem any evidence (Danthine et al., 2000) that changes in banking markets have as yet led to cheaper or more readily available finance to SMEs. This may be because SMEs (particularly very small firms) are typically very reluctant to change banks because of the perceived complexity of switching for little benefit, the importance of maintaining relationships with a particular bank, informational capture by the relationship lender, and the ability of the existing bank to negotiate lower charge if there is a threat of switching (see Competition Commission, 2002).

Finally, there have been changes over time in financial products and instruments available on the market. Molyneux and Shamroukh (1999) argue that the major financial innovations of the last twenty years have reflected two interrelated trends. The first is securitisation and the second is the growth of the Off Balance Sheet Activities (OBSA) of banks. They note the development and growth of a number of specific markets and products, for example: (i) the growth of the Eurodollar market from the early 1970s; (ii) the establishment of the Eurobond market in 1974 and is subsequent growth; (iii) the launch and growth of issues of Floating Rate notes and Eurodollar floating rate notes; (iv) the development of note issuance facilities, revolving underwriting facilities, eurocommercial paper and euro medium-term notes in the euronote market; (v) the growth of the syndicated loans market; and (vi) extensions of bank asset securitisation. One might think once again that such changes would facilitate investment and innovation by firms. However, the potential impact is much more likely to be felt by large firms rather than SMEs.

Overall it seems that, although such a conclusion is not undisputed (Hooker, 2003), there is little evidence or argument to support the view that recent events have made financial constraints to innovation irrelevant to smaller firms in Europe. If anything, the analysis above suggests that the availability of finance to larger firms is being made easier while that to SMEs is being less affected.

European Financial Markets, Investment and Employment

The process of financial integration in Europe has gathered pace in recent years with the introduction of the EMU, but reflects a much longer and deeper process of capital market liberalisation and expansion of large financial intermediaries. This process has been extensively studied, but mainly from the point of view of financial market efficiency – particularly the degree of inter-bank bank competition on the one hand, and the allocation of investment across stock markets on the other.

The aims of the financial strategy of the EC are clear and logical from the point of view of ensuring financial competition and efficiency in the conventional sense (EC, 2002). The first objective is to reduce the cost of capital (that is, bank lending rates) by lowering intermediation margins through competition. However, real interest rates are falling worldwide

due to the inflation targeting discussed above, while long term rates are converging globally due to the integration of financial markets. The net benefit of lower margins, while not negligible in terms of costs to borrowers, in relation to the stimulus to investment is likely to be small. More important to SMEs are the length and conditions of loans (including collateral) on the one hand, and the level of credit available on the other. In fact, lower profit margins on conventional lending may well have the unintended effect of making this access more rather than less difficult.

The second strategic objective is to increase the size of the European savings pool in terms of both 'depth' (i.e. liquidity of assets) and 'breadth' (i.e choice of assets) available. This in turn will give savers access to better yields and opportunities for risk diversification. A key future aspect of this trend is the pan-European pooling of pension funds, but for the present the trend is most marked in the pooling of bank assets in a single money market and, to a lesser extent, a concentration of equity and corporate bond issues on the leading European markets. However, as we shall see, this may cause problems for smaller borrowers such as SMEs because of the difficulty of accessing this central pool of savings which involves not only greater size for marketable assets, but also more stringent information requirements – making access for unquoted companies almost impossible. In other words, a reform which may increase the efficiency of the financial system from the point of view of large firms may not do so from the point of view of small firms.

Third, cross-border financial services sales to be promoted in order to increase competition. Policy makers are well aware that increased competition at the European level may mean increased market concentration on relatively few banks, but this would still imply more competition in any one national market, because concentration levels are already high there. It is not clear, however, this process will lead to better support for SMEs or not because lending to smaller clients tends to become standardised and detailed local knowledge of productive systems is lost. Of course these trends need not necessarily lead to a lack of investment finance for SMEs, if appropriate compensatory action is taken. However this must logically be in the sphere of financial regulation itself – and not relying on enterprise promotion schemes at the local level or even national innovation systems.

There are four major drivers for change in European capital markets (Committee of Wise Men, 2001). First, there is the growth of the corporate securities market itself, supported by the demand for such securities (including equity) on the part of insurance and pension funds. Second, there is the 'Europeanisation' of this market on the part of both issuers – increasingly using the two main markets in London and Frankfurt – and investors, who also cross borders in order to access liquid asset markets. The third driver is the competition between exchanges to provide these services – with scale economies rewarding the 'winners' but leaving local national or sub-national exchanges narrow and shallow – in the sense of quoting few securities and providing little turnover even in those quoted. And fourth, there is increasing pressure for consolidation of clearing and settlement consolidation in order to reduce costs, increase liquidity and reduce risk of payments failure.

These drivers clearly lead to greater efficiency in European capital markets. However, pan-European markets for corporate capital favour the large firms that can access these markets and for whose securities there is sufficient demand. The elimination of exchange rate volatility

premium reduces the cost of borrowing of course (Fratzscher, 2001), and capital market integration itself should save up to 2% in the cost of foreign borrowing (Hardouvelis et al , 1999). The entry costs for small firms remain far too high to make this a viable option (Canepa & Stoneman, 2002).

Based on US experience, European financial policy makers had hoped that dedicated exchanges specialising in venture capital could fill this gap. A laqrge range of intiatives of this type have been established, including both exchanges as such and public-sector backed funds to help issue securities and to provide a demand for them EU (Schertler, 2001). However, after the initial enthusiasm of the late 1990s, the sector has declined and many of these initiatives have been discontinued. As Figure 5 demonstrates, the size of the sector remains extremely small in relation to the size of the economy – and even more so in relation to the capital needs of SMEs, which account as we have seen for half of all output. Even in the UK, where the ventrure capital sector is most developed, it remains marginal and confined largely to 'new technology' issues.

The reasons are not hard to find. First, SMEs themselves are family-owned and managed in Europe, so that the venture capitalist can neither acquire substantive control (or participate in control) of the firm, nor intervene effectively in its management. In consequence there is a major moral hazard issue that makes SME equity unattractive to European institutional investors. Second, the success of the sector in the US is based on new-technology firms that a key venture capitalist takes from the startup stage to subsequent flotation on the venture capital market, providing management skills as well as funds. The attraction is the speculative capital gain rather than long-term dividend income. Most European SMEs do not offer these prospects of short-term investor gain. Third, as we shall see below, there is little or no demand for SME issues on the part of major financial institutions such as insurance and pension funds.

Structural trends in the European banking market are accelerating under the pressure of capital market integration. There are three major recent policy studies on this topic: Sapir, A. ed. 2003 *An Agenda for a Growing Europe: Making the EU Economic System Deliver* Brussels: European Commission; EC, 2002. Report by the Economic and Financial Committee (EF) on EU financial integration. *Economic Papers No 171* (ECFIN/194/02); and Committee of Wise Men, 2001. *Final Report of the Committee of Wise Men on the Regulation of European Securities Markets ('Lamfalussy Report')* Brussels. However, little attention has been given to the effect of this process of financial integration on corporate investment in general (and that of small and medium firms in particular) and thus on production, productivity and eventually employment. Indeed it is often simply assumed that a more efficient financial market will simply stimulate economic growth and thus employment, without analysing the process by which this is to take place. The economic – and indeed social – function of financial institutions is to intermediate between savers (households) and investors (firms) and they way that they do this will profoundly affect the structure of the production and employment.

Indeed, It is clear from various recent studies that there is stong process of banking concentration under way that is accompanied by a process of 'disintermediation' (McKinsey 2001; Marques & Molyneux, 2002). 'Dinintermediation' in this context refers to changes in the assets and liabilities of banks. Traditionally banks have been regarded as intermediaries

between saving households and investing firms. Households require liquidity, which is provided by banks through deposit accounts; and firms require capital, provided by longer-term bank loans. Banks thus transform the maturity of savings, and use their expertise in evaluation firms (and their investments) to contain the risk inherent in such a transformation. Banks' income under this traditional model comes from the difference between deposit and lending rates.

However, European banks are now changing their behaviour in a number of ways. First, their assets are increasingly made up of liquid assets traded on capital markets, and lending to households for consumption purposes (e.g. credit cards). Their assets, liabilities, in contrast, have become less liquid as they provide longer term financial services such as insurance and pensions. In other words, banks have moved away from the tradition function of providing capital for production. As far as large firms are concerned, the simultaneous expansion of capital markets has meant that they can issue longer-term bonds to finance capital expansion, and shorter-term commercial bills in order to provide working capital. However, these instruments cannot be issued by smaller firms for three reasons: first, the unit cost is too large in relation to the sums required; second, capital markets require a good deal of information not available for small firms; and third, to be attractive assets must not only have a good yield but also be highly liquid - in other words, issued on a scale which allows for an active market.

The linkage between employment and output is not automatic, both because increased productivity may be gained by increased work intensity ('labour shedding') as well as investment in new technologies, and because employment creation may be only temporary and not based on generation of new skills. In consequence, labour market flexibility may increase sustainable employment only if the higher profitability for firms leads to new investment. And for this investment to take place it must be supported by adequate financial support – not only in terms of interest rates but also maturity of loans and risk sharing. In consequence, the low interest rates achieved in the EU through inflation targeting and labour market reforms are not sufficient in themselves to ensure sustainable employment growth.

It is well known that small and medium enterprises provide the bulk of employment - and thus by extension the greater part of in-firm labour skilling ('on the job learning') – in Europe. Indeed they not only provide three quarters of all jobs, but also half of all output. We would expect therefore, that when financial structures, integration and policy are considered at the European level, that the role of SME's and employment would be a central consideration. We would expect a consideration of this relationship in discussions of both the long-term growth process and of macroeconomic fluctuations within the business cycle. Unfortunately this is not the case. This is particularly serious because SME's (and thus employment and skilling) are more vulnerable to changes in the financial environment than large firms, given their fragile balance sheets and vulnerability to exogenous market shocks that is reflected in their high birth and death rates.

In reality, concern for employment, skilling and SME investment is widespread. However, this concern is expressed at the level of the local authority or sub-national region, and reflected at the level of national governments and the European Commission as an issue of regional development or social inclusion. It is not a central concern of European financial policy debate, design or implementation in key areas such as prudential bank regulation, pension fund

portfolios or capital market institutions. This paper attempts to provide a first sketch of how these issues might be addressed in an integrated fashion in the context of investment finance designed to support sustainable long-term labour productivity growth.

Modern research on financial transmission mechanisms indicates that the impact on investment follows two distinct, yet complementary, channels. First, the level of credit available to firms has a greater effect on investment levels than the price (i.e. the interest rate). Second, the balance-sheet effects of the form that this finance takes on the relationship between assets and liabilities – particularly any maturity mismatch – are central to investment decisions. In this context, there are good theoretical and empirical reasons to believe that there are strong asymmetries in this relationship according to the size of the firm (Vermeulen, 2000). The problem that lies at the centre of this research project is that these asymmetries are such that large firms are much less vulnerable to shifts in the level and composition of credit than small and medium firms for two reasons: first, that large firms have access to larger and deeper 'pools' of finance at the national and international level; and second, that large firms are the preferred clients of financial intermediaries.

Once the single currency had been established, monetary policy within the EMU has been reduced to a single objective – inflation targeting – and a single instrument, the short term interest rate. The European Central Bank (ECB) has no clear responsibility for anti-cyclical intervention, let alone longer term full employment. It has no responsibility for exchange rate management, let alone for maintaining trade competitiveness. It has no responsibility for the stability or integrity of the European financial system, let alone the support of investment and growth. In other words, when establishing a central bank the EMU in fact divested this central monetary institution of the macroeconomic responsibilities and powers possessed by the national central banks of which it was the inheritor. This fiscal passivity has a further implication of relevance: the slow development of a European market in government debt – sovereign bonds having been historically the basis for capital market development. It also limits the attraction of Euro-denominated bonds as a reserve asset for central banks, corporate treasuries and pension funds around the world.

Moreover, not only does this approach have considerable costs in terms of stability and investment, there is also considerable theoretical and empirical evidence that inflation targeting is via interest rates as a monetary policy is ineffective. The only reliable outcome is excessive credit restriction with real growth restriction effects (Blinder, 1998; Arestis & Sawyer, 2003). As Mankiw (2003) points out in a recent authoritative survey of monetary economics, while traditional approaches to monetary policy had relied upon transmission to lower inflation through output (and employment) depression through the Phillips curve, this tradeoff seems to have been overcome in advanced economies through labour market reform which have allowed low inflation and low inflation to co-exist. Modern theory now suggests that the role of monetary policy is to respond to independent and unpredictable monetary shocks arising from the private sector or from abroad – and these in turn become endogenised through the central bank obligation to adjust interest rates to inflation (the so-called 'Taylor rule') which the private sector itself includes in its forcasts. In other words, monetary discretion is lost.

The 'new monetary policy' (NMP) is understood to include: a numerical and official inflation target; monetary policy exercised through interest rates; an independent central bank; and no

other objectives of monetary policy (Arestis and Sawyer, 2003). This clearly describes the EMU situation. The monetary policy rule that generates interest rate responses to inflationary shocks replaces, in effect, the traditional 'LM curve' in the Keynesian model of the closed economy. The standard modern macroeconomic model of the inter-temporal adjustment of expenditure by representative agents replaces the traditional 'IS curve' in the Keynesian model. A key feature of the NMP is thus the reliance on central bank credibility to elicit the required private sector response to official policy.

However, there is growing empirical evidence that a nominal anchor will not stabilise output due to the asymmetric effects of interest rates (which act on asset stocks rather than expenditure flows) and that an active fiscal policy should be combined with an active monetary policy, rather than relying upon a single rule-bound instrument. Moreover, transparency in central bank decisions (e.g. publication of board minutes) may not have the strong effect on expectations that the NMP assumes it does – and in any case such transparency is not a characteristic of the ECB. Finally, the cost-side of inflation is ignored in the NMP model. In sum, the 'credit and balance sheet channels' for monetary transmission that should be explicitly considered in any monetary policy model – as pointed out in Section 2 above – are not a feature of the NMP.

Moreover, the transmission mechanism of interest rates themselves differ between countries as well as by firm size. This is particularly important in the case of housing markets – where mortgage lending terms vary widely according to local social regulatory systems – but applies in effect to all forms of longer-term lending. Asymmetric transmission mechanisms are especially important in housing but also apply to longer-term lending more generally (Hartmann et al 2003). Most attention has been focussed so far on the asymmetric effect of interest rates on the housing market, where historically low rates can lead to 'overheating' of real estate prices and thus the danger of asset price bubbles followed by sudden collapse (Maclennan et al, 1999). The same argument applies to the case of SME lending, except that in the absence of the collateral provided by real estate, credit rationing is more stringent for lending to the firm itself, so that low interest rates do not generate more funding. None the less, the overvalued real estate assets of the owner of the firm (i.e. the family loan) can lead to over-borrowing.

We know very little about what drives financial reform and integration. At any given moment a financial system may be thought of as being the result of "demand" and "supply" of financial integration. Demand factors are determined by the structure of the economy, including industry specialization; i.e. the amount of external finance as well as the vehicle of its provision, either through market (or arms' length) or bank based (or dedicated) relations, reflect the technological requirements of agents (i.e. firms) that are the users of external finance. Supply factors include institutional, legislative, and regulatory aspects and norms that shape the behavior of financial intermediaries. Changes in financial systems therefore reflect changes in demand or supply factors, or both. In what follows we consider the implications of our research results on the integration of national financial systems in Europe, that still largely reflect country specific characteristics, into a EU-wide financial system and we ask which broad policy guidelines can be suggested in order move towards further financial integration in the EU.

We discuss the above according to four criteria: a) economics, i.e. what is the economic blueprint around which to organize financial integration in the EU; b) best practice, i.e. the identification of a benchmark to guide the practical implementation of financial integration; c) incentives for policy makers to take the appropriate action towards financial integration; d).control over outcomes i.e. the capability to obtain the desired outcomes through policy action and the possibility to generate sufficient leadership to establish and support financial integration and to overcome collective action problems associated with the establishment of supranational regimes.

The innovative activity of small and medium enterprises in Europe is constrained by financial factors and this problem is widespread despite the diversity and heterogeneity of member states' national innovation systems and also persists, despite many financial innovations that have been introduced in the last five-to-ten years. According to Hall (2002) a financial constraint is said to exist when, even if there are no externalities involved in the firm's investment activity, there is a wedge (perhaps even a large wedge) between the rate of return required by an entrepreneur investing his own funds and that required by external investors. Stiglitz and Weiss (1981) consider a firm to be credit rationed if it does not get as much credit as it wants although it is willing to meet the conditions set by the lender on equivalent credit contracts. In essence therefore a firm is credit or financially constrained if it cannot raise external funding at the market price or in order to raise external funding it has to pay over the market price.

There are many reasons postulated as to why such financial constraints might exist. These are reviewed in Canepa and Stoneman (2003a) as well as in Hall (2002). The existence of uncertainty and thus risk is a sine qua non of such constraints. Beyond this, the most commonly argued reasons for such constraints are asymmetric information between borrower and lender and moral hazard resulting from the separation of ownership and control, although capital market incompleteness and inefficiency, the problems of measuring risk, taxes, subsidies, bankruptcy costs et. al. may also have roles to play. Furthermore the literature argues that the importance and relevance of financial constraints may also differ across firm sizes, industries and countries.

Smaller firms may be relatively more tightly constrained because (i) the availability of internally generated funds may be more limited for smaller firms than larger firms (ii) problems of information asymmetries may also be more severe for such firms (iii) smaller, newer firms may have no track record upon which to base a case for funding and/or there may be fewer realisable assets to use as collateral and (iv) the costs (to funding providers) of search may mean also that the supply of finance to smaller firms may be more severely limited.

Differences across industries may also exist so that, for example, firms in high-tech and newer industries may face stricter constraints to raising external (and internal) funding either in terms of cost and/or availability. This is because: (i) in riskier industries it may be more difficult to raise funding from outside the firm purely because of the risk factor (ii) in more high-tech sectors not only may risk itself be a factor but also the proportion of assets that are realisable may be lower (iii) in high-tech industries innovation is more likely to be of a sort that has not been undertaken elsewhere before and it may be particularly difficult to observe the systematic risk of such projects (Goodacre and Tonks, 1995) and thus difficult to determine the

appropriate discount rate to use in evaluating investment in the firm and (iv) information asymmetries may also be greater in such industries.

Differences in national systems of innovation (see Nelson, 1993) across countries may also lead to differing financial constraints upon firms operating in different economies (as the result for example of differing taxes and subsidy regimes, the completeness of markets for finance, the legal environment as regards bankruptcy, government intervention etc.). Of particular interest are differences in the financial environments in different countries. European financial environments are both heterogeneous and changing (see Stoneman, 2001b). On the one hand, there are bank-based systems as typified by the German system and on the other, market-based systems as typified by the UK system. Most continental European systems are largely bank-based although there are signs of some movement in certain countries (e.g. France) from a bank-based to a market-based system. Alongside these different financial system environments there are different patterns of ownership of industry. The German system reflects greater private control, more concentrated ownership and more pyramid ownership. In the UK the pattern is for less concentrated holdings, less private control and few inter-corporate holdings. The financing of investment by firms also differs across systems. Although self-generated funds are the main finance sources for firms in all countries (except SMEs) these are more important in the UK with bank finance more important in bank-based systems.

It is argued that such differences across systems have important implications for the way firms behave. The argument is that bank-based systems with insider control are particularly favourable to longer term steady development built upon the construction of trust-based relations, firm-specific investments and gradual continual change but may generate a higher cost of capital due to bank monopoly power, informational capture (of the firm by the bank) and perhaps undue conservatism. On the other hand market-based systems with outsider control and more arms-length relationships between financiers and managers are seen as more favourable to major change and switches of strategic direction (but with no obligation for financiers to take anything other than a short-term view, encouraging liquidation of investment in the event of dissatisfaction). These arguments lead us to believe that firms will be differentially affected by financial constraints under different national financial systems.

European Venture Capital

Better access of new technology-based firms to venture capital has long been at the core of Europe's policy strategy for innovation and growth. In June 1998, the Cardiff European Council adopted the five-year Risk Capital Action Plan prepared by the European Commission (1998a) to promote the development of an integrated panEuropean risk capital market. Yet relatively little has been known until recently about the economic determinants and institutional requirements of an *efficient* venture capital industry. To fill this gap, the EIFC research consortium included an empirical project on European Financial Markets, Venture Capital and High- Tech Firms, for which field work was begun in late *2000* - right after the millennium bubble in technology stocks had burst. From this vantage point, a wealth of new empirical data has been used to explore ideas and test theoretical propositions that attempt to

explain the genesis and development of Europe's venture capital since 1990.[1] WP-6 examined the relevance of these trends to specific policy issues, such as the merits of targeted subsidies for venture capital, the deregulation of access to primary equity markets and the appropriate level of policy making within Europe's common market national or supranational - among others.

In all EU countries, except for the Netherlands, a strong upswing beginning in 1997 and lasting until *2000* takes the volumes of early stage venture capital investments ITom below 0.2 to a multiple of the initial level - in most countries to around 1.0 per mil of GDP) Against this strong surge in venture capital at the end of the 1990s, all contemporaneous differences across countries fade into the background. Instead, it appears that international interdependence holds the key to understanding Europe's experience with venture capital in the 1990s. This has implications both for the design of government policy and for the choice of methods to study the empirical determinants of venture capital activity. Policies must target the efficiency of the venture capital industry, not the aggregate investment volume within a given country or region. And the empirical methods must not fall into the trap of treating countries' individual experiences as observations from completely separate experiments. An appropriate method must allow for some form of cross-country and inter-temporal dependence so that the role of a common European experience in the development of countries' individual venture capital industries can be identified in the data.

The research findings of WP-6 support the views that international interdependence in venture capital is mainly due to information spillovers in primary equity markets, where the expectation of a hot issue market can serve as an effective coordinating mechanism for individual investments. In the presence of information spillovers, agents' individual expectations are formed endogenously. They often motivate investments in the early or expansion stage of new technology-based firms because exiting via an initial public offering (IPO) tends to be much more profitable during a hot issue market. In the aggregate, however, one cannot rule out reverse causality: an expanding number and volume of venture capital investments may help to make the arrival of a hot issue market more likely and increase its size, given that the main purpose of venture capitalists' management services is to select and prepare suitable start-ups for an early IPO. The empirical observation of a close link between the volatility of primary equity markets and the volume of venture capital investments suggests that either a third variable is responsible or that a new theoretical interpretation is required in which those cyclical co-movements are self-reinforcing. I will argue that by creating social multipliers, information spillovers in primary equity markets can lead to non-ergodic growth and multiple equilibria in the development of venture capital. The main contribution of this paper is to study the empirical implications of this interpretation and to discuss some of the policy issues it raises.

[1] For the purpose of this study, venture capital is understood to be only the subset of private equity that combines temporary equitY participation in a privately held start-up with active monitoring and control so that passive share holdings in unlisted firms are excluded. Venture capitalists are specialized financial intermediaries that raise capital mainly from institutional investors and seek to exit from their investments via an IPQ or a trade sale as soon as the start-up has established a track record in the market place. An efficient venture capital sector thus provides two sorts of benefits to society: it helps to overcome financing constraints for high-tech start ups, when they are shunned in credit markets, and it serves as a filter for untested technology ventures seeking to attract expansion finance in primary equity markets.

Because the policy implications of social multipliers may vary depending on their actual size, it is important to identify the underlying causes empirically and to use empirical findings when the size of the relevant social multiplier must be predicted in order to assess the likely impact of a specific policy proposal. A social multiplier that is relatively small may not imply multiple equilibria. But the presence of multiple equilibria may bring national and European policy objectives into conflict with each other. More precisely, if multiple equilibria are due to country specific economies of scale that one county exploits at the expense of another, policymakers will have to deal with an irreducible zero-sum aspect in the distribution of venture capital across countries. In this case, unless countries can find a cooperative solution, the dynamics of the allocation process will be characterized by international path dependence and a country with an initial advantage can expect to enjoy a long-term lead.

However, path dependence and multiple equilibria need not always imply locational competition in the absence of government co-operation. Instead, international linkages in financial markets may serve to coordinate national cycles in venture capital investments and boost the overall volume of venture capital inflows, creating a positive sum game for all. In this case, economies of scale in venture capital, such as learning by doing in an emerging industry, would accrue to the European economy as a whole and government co-operation might be superfluous. Efficient policies towards venture capital therefore require a thorough empirical analysis of how the link between primary equity markets and national venture capital investments actually works. For this purpose, I propose to think of venture capital investments as growth options that are exercised when a venture-backed start-up has its IPO.

The Risk Capital Action Plan of the European Commission aimed at five overarching objectives - to overcome market fragmentation, to reduce institutional and regulatory barriers, to increase the number of small high-tech businesses, to improve the human resources available for entrepreneurship and innovation and, finally, to remove cultural barriers against venture capital and entrepreneurship. The short-term measures of the plan included a reform of the European patent system, a detailed examination of the cost to European firms of raising debt and equity finance as well as a review of the implementation and possible amendment of the prospectus directive to facilitate companies raising cross-border capital, for example through an IPa. The medium-term measures of the plan included the adoption of prudential rules to allow institutional investors to invest more in venture capital, the reform of legislation on insolvency and bankruptcy as well as an assessment of reform requirements in the taxation of venture capital funds, capital gains in unlisted firms, stock options and start-up firms in general venture capital in the late 1990s, whereas only a few may have been really important. Moreover, in the presence of non-market interaction, it would be wrong to equate a large volume of venture capital investments with a high level of efficiency. As a window on the efficiency, this paper has suggested to look at the determinants of underpricing. The findings are broadly in line with previous studies that have provided evidence on the determinants of underpricing. The bulk of the evidence lends support to the winner's curse hypothesis by corroborating the importance of uncertainty and asymmetric information as well as the role of financial intermediaries in certifying the unobservable qualities of issuers and lowering the level of underpricing. For example, Ljungqvist (1997) found that the stock market trend, the macroeconomic climate, inside retention rates and an issue's inverse offer size affect underpricing positively on Germany's primary equity market even before the 1990s' boom. Over longer horizons, however, he showed German IPOs to be poor investments loosing more

than 12 per cent over the first three years of trading relative to the market, exclusive of the initial underpricing return. A qualitatively similar picture now emerges from the bubble years of the Neuer Markt.

For the French primary market: Faugeron-Crouzet et al. (2001), for example, show that the degree of underpricing varies with the type of subsequent securities issued within a four-year period after an IPO on France's second-tier market between 1983 and 1994.Underpricing averaged 31 percent for firms that issued further equity shares, but only 13 percent for those that subsequently issued convertible bonds or securities with warrants attached. However, this evidence was mainly driven by IPOs that were introduced at fixed prices, not by auction methods like the book building procedures now popular in most countries. With this qualification in mind, the authors suggest that market feedback also plays a role in explaining issuing behaviour after a successful IPO.

On the whole, Europe's venture capital industry is still too dependent on subsidies and - without substantial gains in efficiency - it may remain so for quite some time. Public support for venture capital has been substantial in many European countries during the 1990s and continues to be so. This should be a matter of some concern since subsidies can create a variety of incentive problems of their own. For example, subsidies may attract poor managers into venture capital organizations and reduce their quality of screening and of the corporate governance services they provide portfolio firms. In this case, subsidies may even raise the total user costs of venture capital for those technology-based start-ups that primarily want to benefit from the advertisement and certification effect of having won venture capital backing. For some start-ups, the direct financial resources that a venture capitalist provides may be much less important than the effective support in going public. If public funding were always limited to addressing identifiable market failures, as proclaimed by the European Commission (2000), the inefficiencies from subsidies would be reduced. But to limit subsidies strictly to market failures requires that governments accept not only the extremely cyclical nature of the venture capital industry, but also the strongly divergent investment patterns across countries and regions that is implied by the theory of non-market interaction.

4. Patterns of Growth and Financial Systems

What does economic analysis of the growth finance nexus, say about the most appropriate model for financial integration in the EU? The theoretical and empirical debate on the growth finance relationship that has developed over the last decade has centered on the relative merits of bank-based versus market-based financial systems (See EIFC Working Papers 01-5, WP 03-23 and WP 03-26). However, the empirical analysis remains largely inconclusive on this issue. For example, some results indicate that the source of external financing does not matter for the impact on growth. Other contributors highlight the role of specific national differences in the growth finance nexus and note that there does not seem to be any compelling evidence that one financial model (bank versus market) is clearly superior in supporting growth, nor does there seem to be any clear evidence on the direction of causality between real and financial development. What matters is the size of financial systems as well as legal aspects such as governance rules and creditors protection, that reflect the “supply” factors of financial

integration. The size of financial markets is also important in that it allows for a diversification, and to some extent a complementarity, of external finance sources. The issue of the source of finance, however, has been reconsidered against the background of the wave of technological innovations related to the communication and information technologies. In such a framework the dilemma between bank-or market-based financial systems can be restated as follows. Market-based systems operate more efficiently whenever "innovation" is the central driving force of growth. However, in Europe the banking system has played an important role in the financing of venture capital and start-ups in the ICT sector. Bank-based models should, in principle, work better in the capital-deepening phase of the spread of the new technologies, but successful OECD countries with a more developed stock market are also those were an investment boom has materialized.

Our research has provided further empirical evidence in this respect with particular emphasis on the characteristics of the EU integration process. Our starting point has been the consideration that most of the empirical contributions share one common feature: they consider real growth from one perspective only. In so doing such contributions neglect that, while growth ultimately leads to higher GDP, there exist several alternative channels and mechanisms that lead to GDP growth. There is not one, but several growth drivers and, therefore it is not unrealistic to think that different financial mechanisms have a different impact on growth according to the different sources –mechanisms- of growth. Therefore, the analysis of the growth finance nexus implies looking at what is the most effective finance model for each of the possible growth and specialization models. Sectors behave differently from one another as they respond to different growth mechanism and they also respond differently to financial conditions. Different growth mechanism operate at the more aggregate, regional and national, levels as well as at the sectoral one. And the process of European Integration offers a clear example in this respect. In sum, "demand" factors are very relevant in shaping the EU financial system.

EU integration is characterized by four specific, yet interconnected, processes: monetary union, enlargement, the single market program, the impact of IT technology. Each of these processes has implications for both the supply and the demand of financial integration and for the finance growth nexus in Europe. Each of these processes is also associated with one dominant growth mechanism which, with some simplification, can be sketched out as follows. Monetary Union spurs growth through the elimination of transaction costs and of currency risk. It also supports growth indirectly through the impulse towards financial integration. In addition, the common monetary policy can influence growth through monetary and price stability and its effects on long term interest rates. The Single Market Program supports growth through two main channels: a larger market size, which allows for the exploitation of economies of scale; a more efficient resource allocation generated by stronger competitive pressures. Enlargement waves, especially those involving countries with an initially lower GDP per-capita, spur growth through catching-up mechanisms, leading to higher capital accumulation as well as technology transfers from the center to the periphery. Finally, the new IT technologies spur growth through technological innovation and diffusion.
These four process coexist and interact with different intensities, so it is quite possible that, in a given period of time, a given sector, region, or country is affected by different growth mechanism acting simultaneously. The demand for as well as the supply of financial integration in any specific case reflect this interaction.

The overall process of EU integration affects the "demand factors" shaping financial regimes. a) as financial integration proceeds so does real integration, however this takes place through a number of growth mechanisms ad growth finance relationships; b) the direction of causality between real and financial integration remains an open issue, and as financial integration is itself influenced by growth, the impact on growth of financial integration may be larger as a virtuous circle develops; c) national sectoral specialization might change in the process and so would the "optimal" demand for external finance, especially as Europe increasingly benefits from technology driven growth; d) the distinction between market and credit based external finance will persist in different country cases as different countries will continue to be characterized by different comparative advantages; e) national inertia may slow down the move towards a common benchmark model. To sum up, it is difficult to envisage one economic model for the EU financial system. The ongoing process of EU integration is likely to generate continuing pressures for change in the demand for finance related to the changes in specialization. It is therefore difficult, if not outright wrong, to single out one model for financial integration. Rather, a number of such models may coexist in the foreseeable future.

Next, we ask to what extent can we expect a convergence towards the "Lisbon benchmark" identified by the strong structure group. Estimates of the probability of transition between the three clusters over the period 1980-2000 indicate a strong inertia. The probability of remaining in a cluster at the end of a period is large. Nonetheless, in spite of a large inertia the probability of weak structure countries (group 2) to move on to the group of followers (group 3) is 13 per cent. While followers have a probability of 24 per cent to move on to the strong structure group (group 1). Once a country leaves the weak structure group it is practically impossible to fall back into it while there is a high probability of falling back from the strong structure group to the group of followers. Cluster analysis allocates 58 pert cent of the countries into the strong country group, 14 per cent in the followers' group, and 29 per cent in the weak countries' group. The analysis of Markov process leads countries to converge towards one single cluster or towards increased diversification. At the end of the process the percentage of countries in the followers' group rises to 40 per cent while the weak structure group falls to 10 per cent. Group 1 initially shrinks to 44 per cent and eventually rises back to 50 per cent. In general, the overall structure of EU economies improves as the share of weak structure countries falls significantly. However, there is not a full convergence towards the "Lisbon benchmark" .

The definition of a benchmark should take into account both supply and demand factors in financial integration. If the EU makes some progress towards the objectives of the Lisbon Strategy demand factors will enhance the role of knowledge driven growth and the need of appropriate finance. While we cannot assume full convergence towards the Lisbon benchmark, the economic structure of the EU does change and so does the external financing requirement. The successful implementation of the Lisbon Strategy would significantly change the "demand" side of financial integration and demand factors could shift the EU financial structure towards a more market-based or arms-length relationship. Convergence towards the Lisbon benchmark should also be facilitated in those countries and sectors where technology intensive growth is more relevant and where market based finance is more present. Risks of polarization and marginalization of peripheral segments of the EU economy cannot be ruled out, especially in regions where SME's prevail. To avoid polarization, strengthen cohesion.

and support progress towards the Lisbon objectives a more innovation friendly financial system should be developed.

The stronger incentives to move towards greater financial integration should lie with those countries that would benefit most from deeper financial integration and from a more knowledge intensive economy. As shown by GGJPP the benefits of financial integration for growth are most relevant in countries which exhibit the highest degree of financial backwardness, Greece, Italy, Portugal, and Spain, but also Belgium, Denmark, and Germany. We obtain similar results if we consider the convergence towards the Lisbon benchmark. Countries in the weak structure group are also those which are lagging behind in financial integration, Weak real and financial structures go together. Strong structure countries include those with "benchmark financial markets" such as UK and Sweden , but also countries that could benefit for further financial integration such as France, Germany, Austria, and Finland. Financial integration could make these countries even "stronger". Finally, followers include Ireland, which would also greatly benefit from financial integration, but also the Netherlands, which given their already high level of financial integration, could obtain additional gains from real integration.

GGJPP also show that financial integration is best achieved by improvements in the legal environment in which financial markets operate, given that financially backward countries are also those displaying the least advanced legislation in accounting standards, creditors protection, and rule of law. Calcagnini and Saltari (2003) show that economies characterized by more intense labor conflicts are also those with less favorable financial conditions (i.e. lower liquidity and higher leverage); therefore, in these economies labor conflicts have the largest negative effect on investment and employment opportunities. These countries also display the most restrictive legislation in other markets. As Boeri, Nicoletti and Scarpetta (2000) show the countries with most restrictive regulations are, to a large extent, the same countries included in the "weak structure "group and the laggards in financial integration, while countries included in the "strong structure" and "followers" groups display less restrictive regulation. This implies that while these countries would gain most from deeper integration they also face the greatest obstacles since they would have to implement reforms in a large number of sectors and markets and not only in financial markets. Is it reasonable to assume that reform efforts can take place simultaneously in more than one area? An optimistic view suggests that reforms have a cascading effect. If initial reforms produce positive results the momentum for reforms my increase, generating a positive cumulative effect. As far as financial reforms are concerned Abiad and Mody (2003) show that such reforms are driven also by specific factors, including the outbreak of financial crises and the presence of regional leaders adopting best practices. Countries that are in more backward positions in financial integration would gain most from adapting their "supply" factors to best practice standards. However. they would also gain most from moving towards production structures where knowledge intensive activities are more relevant and by improving their labor market institutions. The issue arises of how to implement a sequence of reforms affecting both demand and supply factors in financial integration.

Incentives to act as well as benchmarks to shape policy action may not be sufficient to achieve a better financial integration. We neglect here how to implement changes in demand factors largely related to the implementation of the Lisbon Strategy. Supply factors, such as legislative

and regulatory structures, and accounting standards are under the control of national authorities. Supranational frameworks such as those defined under Basle 2 and EU wide frameworks such as the FSAP, provide pressure for change. Is the combination of national and supranational action sufficient to change the supply environment to achieve benchmark financial integration? To the extent that national, rather than supranational, standards are adopted a mechanism of institutional competition is set in motion. One cannot rule out a scenario of increasing divergence as more advanced countries continue to implement reforms while laggard countries fail to do so. Integration from the "supply" side will proceed to the extent that best practices and institutional imitation prevail over national inertia. The mere fact that a benchmark model can be identified does not guarantee that convergence towards it will advance.

Institutional change in international systems requires leadership, the action of one or more leading actors providing political and institutional drive to the project. Progress towards monetary union was initially based on German leadership, during the EMS, to achieve monetary stability, and Franco-German leadership in the transition from the EMS to EMU. Transition toward a fully integrated EU financial market still lacks such a clear leadership, as the best EU performers are either the small countries or the UK, which has still not adopted the euro. The Commission has been playing a leadership role in pushing reforms. But prudential and regulatory functions remain with national authorities and central banks. Agreement over international standards such as those defined under Basle 2 can, in part, provide indirect leadership. The implementation of the FSAP will also provide impetus. It remains to be seen to what extent this will be enough to overcome national inertia. National financial systems will continue to coexist for some time to come given deeply entrenched national traditions and different speeds in adopting reform policies. To overcome national inertia and facilitate the adoption of best practices, especially in the definition of "supply" factors, more leadership at the supranational level may be needed. It remains to be seen whether frameworks such as Basle 2 and the FSAP will provide enough pressure in this respect.

5. Dissemination and exploitation of results.

The EIFC project was implemented in a period of significant changes in European financial markets. The speed of capital markets integration in the EU has generated a lot of interest among policy makers, academics and research students for up to date information and analysis. From the very beginning we invested resources and effort in good quality research publications. Our working papers were initially presented at workshops and conferences and went through a refereeing processes from invited external discussants. We followed that approach in the four project workshops and the last one in Kiel eventually became a book editing meeting where several distinguished colleagues acted as discussants to our final chapters for the forthcoming book on European Financial Markets, Investment and Technological Performance, Oxford University Press (forthcoming in 2005).

That process introduced a quality control device in our work programme and improved the final output. In the working paper series we have published 42 studies. These papers have attracted a lot of attention from the research and policy community at large. That trend is clearly demonstrated in the number of downloads of our papers (see Annex 8.4). On the top of the dissemination of electronic papers, we prepared 50 hard copies of all the EIFC working papers in-house at UNU-INTECH. These papers have been sent to resources persons in this field of studies (bankers, high-level policy makers, distinguished academics, libraries).

The dissemination of our research findings was one of the main objectives of the EIFC research team. Three successful dissemination workshops were organized in Germany, UK and Rome in 2003 and 2004 respectively. That was an opportunity to present our work to a wider audience and to invite other research teams for an exchange of experience and research findings in an area of highly topical research. Annex 8.5 presents a detailed account of all the meetings, workshops and conferences which took place in the last four years. We hope that it conveys the lesson which we learned during the implementation of these activities, i.e. our decision to deal with policy research is an open-interdisciplinary process and to forge links with other research groups working on similar issues paid off and improved the quality of our work in an environment of objective and well documented research.

The policy relevance of our research findings and the emphasis on dissemination has not distracted the EIFC partners from their effort to publish academic papers and other refereed publications. The project has produced five volumes[2], many articles in journals and some chapters in edited volumes. On many occasions we have addressed academic and policy audiences with presentations drawing on our work. We will continue this part of our dissemination work in the next year or so.

[2] Anthony Bartzokas (2004) *Financial Systems, Corporate Investment in Innovation and Venture Capital*, Edward Elgar; Anthony Bartzokas, *European Financial Markets, Investment and Technological Performance*, Oxford University Press, forthcoming in 2005; Anthony Bartzokas and Phil Molyneux, *Financial Markets and the Corporate Sector*, Macmilan, forthcoming in 2005; Giorgio Calcagnini and Donald Hester (2002) *Banking Changes in the European Monetary Union*, Carosi Publishers, Rome and Andrea Schertler (2003) *Dynamic Efficiency and Path Dependencies in Venture Capital Markets*, Kiel Studies 327,Springer-Verlag Berlin.

Senior colleagues in the six research teams in the EIFC project offered research training to graduate students and post doctoral researchers. Three PhD Dissertations have been produced with significant financial and intellectual support from the EIFC project in Kiel, Rome and Oxford. UNU-INTECH supported the work of two graduate students and Warwick hosted the post-doctoral training programme of a competent econometrician.

6. Acknowledgements

The EIFC research partners have introduced a challenging research agenda. Eventually, we extended the scope of some of our activities in an attempt to develop further the research agenda and the dissemination of the project. The support staff at UNU-INTECH and other research partners provided enthusiastic support and created a stimulating environment for academic research. Special thanks to Mr Martin Reed, Ms Jacqueline van Kesteren, Mr Ad Notten, Ms Marijike Roovlik and Ms Eveline in de Braek who took care of the EIFC working paper series. Mr Marc Vleugels coordinated the administrative and financial aspects of the project and worked hard to keep our interest for academic work within budget lines and deadlines.

Our EU scientific officer was Dr Peter Fisch. Dr Fisch encouraged us to keep up with unfolding developments in European financial markets and emphasized the importance of up do date analysis integrated in a solid academic framework. His positive approach facilitated our work and on several occasions motivated our efforts.

Many colleagues took the time to present papers, attend meetings and act as referees of our work in workshops and conferences. We would like to thank all of them for their positive response to our invitation. Their contributions have been highly appreciated by all the EIFC partners.

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8. Annexes

Annex 8.1 : List of Publications (refereed publications and book chapters)

Anthony Bartzokas (2004) Financial Systems, Corporate Investment in Innovation and Venture Capital, Edward Elgar.

Anthony Bartzokas, European Financial Markets, Investment and Technological Performance, Oxford University Press, forthcoming in 2005.

Anthony Bartzokas and Phil Molyneux, Financial Markets and the Corporate Sector, Macmilan, forthcoming in 2005.

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Alessandra Canepa and P. Stoneman, "Financial Constraints on Innovation: A European cross-country study", in M. Waterson (ed.), *Competition, Monopoly and Corporate Governance: Essays in Honour of Keith Cowling*, Edward Elgar, Cheltenham, pp 42 – 67, September 2003.

A.Canepa and P. Stoneman, "Comparative International Diffusion: Patterns, Determinants and Policies", *Economics of Innovation and New Technology*, 13(3), 279 – 298, 2004.

A.Canepa and P. Stoneman, "Financing Constraints in the inter Firm Diffusion of New Process Technologies", to be published in a special edition of *the Journal of Technology Transfer* in honour of Ed Mansfield, Autumn, 2004.

Molyneux, P, E.P.M. Gardener and J. Williams (2003) 'Competitive Banking in the EU and Euroland' in the Handbook of International Banking, edited by A.W Mullineux and V. Murinde, Chapter 5, pp130-155 (Edward Elgar: Cheltenham).

Molyneux, P (2003) 'Determinants of Cross- Border Mergers in European Banking' in Foreign Direct Investment in the Real and Financial Sector of Industrialised Countries, edited by H. Herrman and R. Lipsey , Chapter 10, pp273-290 (Springer-Verlag: Berlin).

Molyneux, P and B.Casu (2003) A Comparative Study of Efficiency in European Banking. Applied Economics, 35(17), pp. pp. 1865 – 1876.

'Productivity in European Banking - A Comparison of Parametric and Non-Parametric Approaches' (with B.Casu and C. Girardone) (forthcoming in the Journal of Banking & Finance).

Molyneux, P, J.Wilson and J.Goddard (2002) 'Dynamics of Growth and Profitability in Banking' (forthcoming in the *Journal of Money, Credit & Banking*).

Molyneux, P, J.Wilson and J.Goddard,(2002) 'The Profitability of European Banks - A Cross-Sectional and Dynamic Panel Analysis' (forthcoming in the Manchester School).

Molyneux, P, 'Efficiency in the Factoring Industry' (with F.Fiordelisi) (forthcoming in Applied Economics).

Pier Carlo Padoan and Stefano Manzocchi, The Growth Finance Nexus in the Recent Economic Debate (in Italian). 2001 - Forthcoming in the Proceedings of annual meeting of the Italian Economic Association Rome October 2001.

Pier Carlo Padoan and Stefano Manzocchi, The Role of Financial Markets in Economic Performance. The EU and the US -forthcoming in the proceedings of the conference on "Alliance capitalism in the New Transatlantic Economy" Halifax September 2003.

Enrico Saltari and Riccardo Tilli (2004) Labor Market Performance and Flexibility: Which Comes First?, B.E. Journals in Macroeconomics, Vol. 4: No. 1.

Andrea Schertler, A Comparative Overview of Venture Capital in Europe and the United States. International Journal of Entrepreneurship Education, Vol 1(4): 2002/2003.

Andrea Schertler, Explaining cross-country variations in venture capital investments: Theory and empirical evidence. Kredit & Kapital (forthcoming).

Andrea Schertler (2003) Dynamic Efficiency and Path Dependencies in Venture Capital Markets", Kiel Studies 327,Springer-Verlag Berlin.

Michael Stolpe, Die Fehlbewertung junger Aktiengesellschaften beim Gang an die Boerse – Ursachen und wirtschaftspolitische Konsequenzen. (The mispricing of initial public offerings – its causes and policy implications.) Zeitschrift für Wirtschaftspolitik 52 (2003): 128—151. (with C. Ploog).

Michael Stolpe, Working paper (not included in the EIFC series) "Distribution Dynamics in European Venture Capital", Kiel Working Paper 1191, December 2003.

P. Stoneman, "Technological Diffusion: aspects of self-propagation as a Neo-Schumpeterian characteristic", to be published in H. Hanusch and A. Pyka (eds.), "A Companion on Neo Schumpeterian Economics", Edward Elgar Publishing Limited, forthcoming 2004.

Annex 8.2 : List of Conference Presentations

Anthony Bartzokas, Financial Systems and Corporate Performance, Jean Monnet Lectures, University of Berlin, 28 October 2002.

Anthony Bartzokas, Financial Systems and Corporate Performance: a Synthesis of Research Findings, University of Athens, 6 December 2003.

Calcagnini G. Invited Presentation on "Labour and Financial Market Determinants of Investment Decisions in Europe" Labour Market Policy Group, Department of Labour, Wellington (NZ).

A.Canepa and P. Stoneman, “Financial Constraints to Innovation in the UK and other European countries: evidence from CIS2 and CIS3”, Modelling Innovation: A CIS User Group Conference, DTI Conference Centre, June 6, 2003.

A.Canepa and P. Stoneman, “Financial Constraints to Innovation in Europe – new evidence”, European Financial Markets, Investment and Technological Performance, University of Warwick, Feb 11th, 2004.

A.Canepa and P. Stoneman, “Financial Constraints to Innovation in Europe – evidence and policy” presented at a final EIFC conference, Institut fur Weltwirtschaft der Universitat Kiel, Feb 23, 2004.Kiel, Feb 2004

Alex Cobham, Investment finance and monetary policy in Europe, Gorman Seminar at Nuffield College, Oxford.

K. Kaivanto and P. Stoneman, “The Public Provision of Sales Contingent Contracts as an Additional Technology Policy Instrument” European Financial Markets, Investment and Technological Performance, University of Warwick, Feb 11th, 2004.

Morelli P., P. C. Padoan, L Rodano (2002): *The Lisbon Strategy to the New Economy. Some Economic and Institutional Aspects* . presented at the XIV Villa Mondragone International Economic Seminar. “Institutions and Growth: The Political Economy of International Unions and the Constitution of Europe”. Rome, 21-23 June

Pier Carlo Padoan and Stefano Manzocchi, The Growth Finance Nexus in the Recent Economic Debate (in Italian). Presented at the 2001 annual meeting of the Italian Economic Association Rome October 2001.

Pier Carlo Padoan and Stefano Manzocchi, The Role of Financial Markets in Economic Performance. The EU and the US, Presented at the conference on "Alliance capitalism in the New Transatlantic Economy" Halifax September 2003.

Andrea Schertler, . Conference titled "Le capital risque en Europe: Comparisons internationales" in Paris, 2002. Presentation of the paper: Venture Capital in Europe’s Common Market: A Quantitative Description.

Dr Andrea Schertler, DB-Research Workshop "Neue Märkte und Venture Capital: Was kommt nach dem Platzen der Blase?" (Geplatzte Traeume: Zieht der Boersenkrach den deutschen Venture-Capital-Markt mit in die Tiefe?) presentation based on the paper: Venture Capital in Europe’s Common Market: A Quantitative Description.

Dr Andrea Schertler, Annual Conference of the "Verein fuer Socialpolitik" in Zuerich, 2003. Presentation of the paper: Driving Forces of Venture Capital Investments in Europe.

Michael Stolpe, Kiel dissemination workshop on venture capital, June 5, 2003: "Welfare Benefits from Bubbles in Primary Equity Markets: First Evidence from France and Germany", a joint presentation by Stolpe and E. Paracuelles of the Kiel Institute's Advanced Studies Program.

Michael Stolpe, “The empirical dynamics of venture capital backed IPOs as an efficiency-enhancing learning process” paper presented at the International Conference: Financial Systems, Corporate Investment in Innovation and Venture Capital, Brussels, 7 and 8 November 2002. Jointly Organized by the EU-DG Research and the Institute for New Technologies of the United Nations University.

Annex 8.3: EIFC Working Papers (final drafts presented at workshops/conferences)

WP 01-1 European Financial Markets after EMU: A Review of Recent Literature and Evidence, Anthony Bartzokas (December 2001).

WP 01-2: Financial Structure and Investment Decision: A Survey of Theoretical and Empirical Work, Enrico Saltari (December 2001).

WP 01-3: Technological Diffusion and the Financial Environment, Paul Stoneman (November 2001).

WP 01-4: Venture Capital in Europe's Common Market: A Quantitative Description, Andrea Schertler (November 2001).

WP 01-5: The Growth-Finance Nexus and European Integration. A Review of the Literature, A. Carettoni, S. Manzocchi, and P.C. Padoan (December 2001).

WP 01-6: EMU, Monetary Policy and the Role of Financial Constraints, Alex Cobham (December 2001).

WP 01-7: Heterogeneity and Change in European Financial Environments, Paul Stoneman (November 2001).

WP 01-8: Financial Factors and the Inter Firm Diffusion of New Technology: a Real Options Model, Paul Stoneman (December 2001).

WP 02-9: Finance, Investment and Innovation: Empirical and Theoretical Challenges, Leonardo Becchetti and Jaime Sierra (March 2002).

WP 02-10: The Certification Role of Private Equity Investors: Evidence from Initial Public Offerings on the Nouveau Marché and the Neuer Markt, Andrea Schertler (March 2002).

WP 02-11: Financial Constraints on Innovation: A European cross-country Study
A. Canepa and B. Stoneman (April 2002).

WP 02-12: The Determinants of Underpricing: Initial Public Offerings on the Neuer Markt and the Nouveau Marché, Andrea Schertler (March 2002).

WP 02-13: Technological and Structural Change in the European Banking Industry, Marie Panopoulou (May 2002).

WP 02-14: Integration of European Banking and Financial Markets, by David Marques Ibanez, European Central Bank and Phil Molyneux, Professor University of Wales, Bangor and Erasmus University, Rotterdam (May 2002).

WP 02-15: The Diffusion of New Process Technologies: International Comparisons, A. Canepa and P. Stoneman (September 2002).

WP 03-16: Regulation and Financial Innovation Trends in European Banking and The Impact on the Supply And Demand for Financial Services in Europe, Philip Molyneux (December 2002).

WP 03-17: Financial Sector, Regulation And Corporate Performance: The Case Of Spain, Santiago Carbó (December 2002).

WP 03-18: Corporate Finance When Monetary Policy Tightens: How Do Banks And Non-Banks Affect Access To Credit? Paul Mizen and Cihan Yalcin (November 2002).

WP 03-19: External And Internal Financial Structures In Europe: A Corporate Finance Perspective, Claudia M. Buch, Ralph P. Heinrich and Andrea Schertler (December 2002).

WP 03-20: Shareholder Wealth Effects of European Domestic and Cross-Border Takeover Bids, Marc Goergen, and Luc Renneboog (October 2002).

WP 03-21: Technical Change, Costs and Profits in European Banking, Phil Molyneux (December 2002).

WP 03-22: Convergence And Divergence In The European Financial Services Sector: The Pace Of Diffusion Of Banking Technologies And Regulations In European Financial Environments, And Strategic Behaviour Of Incumbent Financial Firms, Bert Flier, Frans A. J. van den Bosch and Henk W. Volberda (February 2003).

WP 03-23: The Growth-Finance Nexus And European Integration: A Macroeconomic Perspective, Fabio Mariani and Pier Carlo Padoan (January 2003).

WP 03-24: Learning And Signalling In The French And German Venture Capital Industries, Michael Stolpe (March 2003).

WP 03-25: Investment And Financing Constraints: What Does The Data Tell? Philip Vermeulen (September 2002).

WP 03-26: Labour and Financial Market Determinants of Investment Decisions in Europe, Giorgio Calcagnini (January 2003).

WP 03-27: Driving Forces Of Venture Capital Investments In Europe: A Dynamic Panel Data Analysis, Andrea Schertler (September 2003).

WP 03-28: Financing Constraints in the Inter Firm Diffusion of New Process Technologies, Alessandra Canepa and Paul Stoneman (September 2003).

WP 03-29: Changes In German Finance: Introducing More "Market" Into A Bank-Based System, Sigurt Vitols (December 2003).

WP 03-30: “Does Size Matter?” Financial Restructuring under EMU, Philip Molyneux (June 2003).

WP 03-31: Ingredients for the New Economy: How Much Does Finance Matter?
M. Bugamelli, P. Pagano, F. Paternò, A.F. Pozzolo, S. Rossi and F. Schivardi (August 2003).

WP 03-32: Corporate Financing in the Netherlands: Some Empirical Evidence
Rezaul Kabir (November 2003).

WP 03-33: Volatility Spillover Effects in European Equity Markets: Evidence from a Regime Switching Model, Lieven Baele (November 2003).

WP 04-34 Banks, Financial Innovations and Regional Growth, Santiago Carbó Valverde, Rafael López del Paso and Francisco Rodríguez Fernández (April 2004).

WP 03-35: An efficiency analysis of banking systems: a comparison of European and United States large commercial banks using different functional forms, Bernardo Maggi and P. S. Rossi (April 2003).

WP 03-36: The Financing Role of the Stock Market in the French Corporate Economy, Mary O’Sullivan (December 2003).

WP 03-37: Financial Markets and the European Economy: a Synthesis of Research Findings, Anthony Bartzokas (April 2004).

WP 03-38: The Public Provision of Sales Contingent Contracts as a Policy Response to Financial Constraints to Innovation in European SMEs.” Alessandra Canepa, Kim Kaivanto and Paul Stoneman (February 2004).

WP 03-39: Investment finance and monetary policy in Europe, A. Cobham (April 2004).

WP 03-40: European Financial Market Integration, Private Investment and Employment Creation, Valpy FitzGerald (March 2004)

WP 03-41: Sources of finance for European investment, A. Cobham (April 2004).

WP 03-42: Patterns of Growth and Financial Systems in Europe, Anthony Bartzokas (May 2004).

Annex 8.4: Downloads of EIFC Working papers

EIFC WORKING PAPERS - Number of downloads per year/month

Year/month	Number of downloads
January- December 2002	15,459
January-September 2003	20,597
October 2003	3,372
November 2003	3,185
December 2003	3,452
January 2004	3,793
February 2004	3,254
March 2004	4,876
TOTAL (so far)	57,988

Annex 8.5: Conferences and Workshops

FIRST EIFC WORKSHOP
Maastricht 16-17 February 2001, Kasteel Vaeshartelt

FRIDAY, 16 FEBRUARY 2001

9.30 – 9.45 Registration
9.45 - 10.00 Introduction by Anthony Bartzokas (UNU/INTECH)
10.00 – 10.45 EMU, Capital Markets Unification and Corporate Investment, by Valpy FitzGerlad (University of Oxford)
10.45 – 11.30 Venture Capital in Europe — Policy Issues and Research Agenda by Michael Stolpe (The Kiel Institute of World Economics)

11.30 – 11.45 Tea/coffee

11.45 – 12.20 Financial Systems and Industrial Restructuring by Anthony Bartzokas (UNU/INTECH)
12.20 – 12.45 Changes in Patterns of Specialization and the Role of Finance. Sectoral and Microeconomic Aspects by Pier-Carlo Padoan (University of Rome "La Sapienza)

12.45 – 14.00 Lunch

14.00 – 14.15 Improving the Human Potential and the Socio-Economic Knowledge Base Programme, an introduction by Peter Fisch, European Commission, DG Research
14.15 –17.00 Detailed discussion on the workprogramme with 20-25 minutes presentations on the six work packages
20.00 – 21.30 Dinner: Restaurant "Pauwenhof" Boschstraat 70, Maastricht

Saturday 17 February 2001

9.30 – 10.30: Does Size Matter? Financial Restructuring under EMU, invited presentation by Philip Molyneux (University of Wales)
10.30 – 11.30 Observed and Fundamental Price Earnings. Is there a dragging anchor for high-tech stocks? invited presentation by Michele Bagella and Leonardo Becchetti (University of Rome)

11.30 –12.00 Tea/Coffee

12.00 – 13.00 On the Performance of Banking Mergers Some Propositions and Policy Implications. invited presentation by Hans Shenck (University of Tilburg)

13.00 – 14.00 Lunch
14.00 –15.30 Further discussion on project implementation.

SECOND EIFC WORKSHOP
ROME, OCTOBER 19 - 20, 2001

Friday, October 19th

11,00	Welcome address	*Giorgio Ruffolo* President of CER
11,15	Introduction	*Anthony Bartzokas - Pier Carlo Padoan*

11,30 -- 13,00 **1st Session Invited contributions**
P. Brenton: "The Extent of real economic Integration in Europe"
E. Bonaccorsi "Bank Competition and Firm Creation"

13.00 - 14.30 Lunch at CER

14,30 - 16,00 **2nd Session "The Growth Finance Nexus"**
E. Saltari "Financial Structure and Investment Decision: a Survey of Theoretical and Empirical Work"
S. Manzocchi - P. Padoan "The Growth Finance Nexus and European Integration. A review of the literature"

16,00 - 16,30 coffee break

16,30 - 18,00 **3rd Session Presentation on Work Packages 2 - 3**
A. Cobham - V. Fitzgerald "Financial Markets as a filter"
P. Molyneux "Trends in European Regulation and the Internal Market in Banking and Credit Institutions"

Saturday October 20th

9,30 - 12,30 **3rd Session "The European Financial Environment after EMU**"
A Bartzokas "European Financial Markets after EMU: a Review of recent Literature
P. Stoneman " The European Financial Environment"
M. Stolpe "Venture Capital in Europe's Common Market: a Quantitative Description"
12,30 - 13,30 **Final Assessment of the workshop-future research perspectives**.
A. Bartzokas and *P. Padoan*

INTERNATIONAL CONFERENCE
EUROPEAN FINANCIAL MARKETS AND THE CORPORATE SECTOR
Maastricht, 4 and 5 October 2002

Friday, 4 October 2002

SESSION I: FINANCIAL INTEGRATION AFTER THE EMU

Dr Philip Vermeulen, (European Central Bank) *Financing Constraints and investment in European firms*

Michael Thiel (European Commission, Directorate General Economic and Financial Affairs) *Bond market integration in the EU*

Bert Flier, Frans A. J. van den Bosch and Henk W. Volberda (Rotterdam School of Management) *Convergence and divergence in the European financial services sector*

SESSION II: COUNTRY CASE STUDIES-I

Sigurt Vitols (Wissenschaftszentrum Berlin fuer Sozialforschung) *Changes in German Finance: Introducing more "Market" into a Bank Based System*

Santiago Carbo (University of Granada) ***Financial Sector. Regulation and Corporate Performance: the case of Spain***

M. Bugamelli, P. Pagano, F. Paternò, A.F. Pozzolo, S. Rossi and F. Schivardi, (Research Department, Bank of Italy) *Ingredients for the New Economy: How Much Does Finance Matter?*

Paul Mizen (University of Nottingham and Jean Monnet Fellow, European University Institute): *Corporate Finance When Monetary Policy Tightens: How Do Banks and Non-Banks Affect Access to Credit?*

Saturday, 5 October 2002

SESSION III: FINANCIAL INTEGRATION AND EUROPEAN EQUITY MARKETS

Claudia Buch, Ralph Heinrich and Andrea Schertler (Kiel Institute for the World Economy) *External and Internal Financial Structures in Europe: A Corporate Finance Perspective*

Rudi Vander Vennet and Lieven Baele (University of Ghent) *Volatility Spillover Effects in European Equity Markets: Evidence from a Regime Switching Model*

Marc Goergen (University of Manchester Institute of Science and Technology) and Luc Renneboog (Tilburg and Oxforfd University) *Shareholder wealth effects of European Domestic and Cross-border Take-over Bids*

SESSION IV: COUNTRY CASE STUDIES-II

Mary O'Sallivan (INSEAD) *The Stock Market, Corporate Finance and Corporate Investment in France*

Rezaul Kabir (Tilburg University) The Netherlands –title TBA

Ari Hyytinen, I. Kuosa and T. Takalo (The Research Institute of the Finnish Economy): *Law or Finance: Evidence from Finland*

Ray Kinsella (University College Dublin) Ireland – title TBA

ROUNDTABLE: Chair: Iain Begg (South Bank University, UK), Jaap Spronk (Erasmus University, Rotterdam) and Phil Molyneux (University of Wales)

THIRD EIFC WORKSHOP
Maastricht, 3 October 2002
UNU/INTECH Conference Room, 1st Floor

9.00–9.30: Introductory remarks by Anthony Bartzokas (UNU/INTECH)
9.30-10.10: Fabio Mariani and Pier-Carlo Padoan (University of Rome "La Sapienza" and Centro Europa Ricerche) *The Growth-Finance Nexus and European Integration: A Macroeconomic Perspective*
10.10-10.50: Giorgio Calcagnini (University of Urbino) and Enrico Saltari (University of Rome "La Sapienza) *Labour and Financial Market Determinants of Investment Decisions in Europe*
10.50 –11.10: Discussion

11.30-12.10: Valpy FitzGerlad (University of Oxford) *European capital market regulation: implications for investment and employment*
12.10-12.50: Alex Cobham (University of Oxford) *Monetary policy, firm size and implications for European investment and employment*

12.50-13.10: Discussion

14.00-14.40: Michael Stolpe (The Kiel Institute of World Economics) *Dynamic Efficiency in Venture Capital backed IPOs in France and Germany*
14.40-15.20: Andrea Schertler (The Kiel Institute of World Economics) *Venture Capital in Europe: A Panel Analysis*
15.20: 15.40: Discussion

16.00-16.30: Philip Molyneux (University of Wales) *Regulation and Financial Innovation Trends in European Banking and the Impact on the Supply and Demand for Financial Services in Europe*
16.30-17.00: Anthony Bartzokas (UNU/INTECH) *European Financial Markets and the Corporate Sector (an overview of the EIFC Conference papers)*
17.00-17.15: Discussion
17.15-18.00: Discussion on the next phase of the project

INTERNATIONAL CONFERENCE:FINANCIAL SYSTEMS, CORPORATE INVESTMENT IN INNOVATION AND VENTURE CAPITAL
Brussels, 7 and 8 November 2002
Jointly Organized by the EU-DG Research and the Institute for New Technologies of the United Nations University

Thursday, 7 November 2002
9.00 – 9.45 Registration
9.45 – 10.00 Introduction and Welcome by the European Commission and UNU/INTECH

10.00-13.00 SESSION I: FINANCIAL AND INSTITUTIONAL CONDITIONS FOR INVESTMENT IN INNOVATION, Chair: Anthony Bartzokas (UNU/INTECH)
10.00-10.30: Bronwyn Hall (University of Berkeley & Oxford University): *Financing Private Sector Investment in Research and Development*
10.30-11.00: William Lazonick (INSEAD, Paris): *Corporate Governance, Innovative Capability, and Industrial Organization in the New Economy*
11.00-11.15: Discussion
11.15-11.30: Coffee
11.30-12.00: Martin Kenney (University of California, Davis): *Emerging trends in the global Venture Capital Industry*
12.00-12.30: Colin Mayer (Oxford University): *The Financing and Governance of New Technologies*
12.30-13.00: Discussion

14.00-17.0 SESSION II: PATTERNS OF FINANCING INVESTMENT IN INNOVATION, Chair: Sunil Mani (UNU/INTECH)
14.00-14.30: Michael Stolpe (Kiel Institute of the World Economy) *The empirical dynamics of venture capital backed IPOs as an efficiency-enhancing learning process*
14.30-15.00: Dorothée Rivaud-Danset (Universite de Reims and CEPN-CNRS) *Innovation and New Technologies: Corporate finance and financial constraints*
15.00-15.15: Discussion
15.15-15.45: Coffee
15.45-16.15: Sophie Manigart (Ghent University), Katleen Baeyens (Ghent University)and Ilse Verschueren, Free University Brussels: *Financing and Investment Interdependencieas in unquoted belgian Companies: The Role of Venture Capital*
16.15-16.45: Clement Wang (Centre for Entrepreneurship, National University of Singapore): *Linkage between Venture Institutions and Portfolio Companies: Comparison Between VCs and non-VCs in Singapore*
16.45-17.00: Discussion
17.00 end of day 1

Friday, 8 November 2002

9.00 – 12.30 SESSION III: VENTURE CAPITAL AND NEW TECHNOLOGY FIRMS IN INDUSTRIALISING COUNTRIES, Chair: Nikos Kastrinos (EU, DG Research)
9.00-9.30: Anthony Bartzokas and Sunil Mani (UNU/INTECH) *Institutional Support for Investment in New Technologies in Industrialising Countries: the Role of Venture Capital*
9.30-10.00: Steve White (INSEAD, Paris) and Jian GAO (Tsinghua University): *China's venture capital industry and technology-based entrepreneurship: Institutional trajectories and system structure*
10.00-10.30: B.Bowonder, (Administrative Staff College of India, Hyderabad): *Venture Capital and Innovation: The Indian Experience*
10.30-10.40: Discussion
10.40-11.00: Coffee
11.00-11.30: Gil Avnimelech and Morris Teubal (Hebrew University): *Emergence and development of Venture Capital in Israel and the Role of Policy: a Macro/Microeconomic Perspective*
11.30-12.00: Lazlo Szerb and Attila Varga (University of Pecs, Hungary) *High Tech Venture Capital Investment in a Small Transitional Country: the case of Hungary*
12.00-12.30: Discussion
12.35- 13.30: Lunch

13.30 – 14.45 SESSION IV: POLICY FRAMEWORK FOR VENTURE CAPITAL AND NEW TECHNOLOGY FIRMS, Chair: Nikos Kastrinos (EU, DG Research)
13.30-14.00: G?nseli Baygan (OECD) *A comparison of venture capital policies and programs in selected OECD countries*
14.00-14.30: Lawrence M. Rausch, (National Science Foundation, USA): *After the Bubble: Where Are U.S. Venture Capitalists Investing?*
14.30-14.45: Discussion
14.45-15.00: Coffee

15. 00 – 16.30 ROUNDTABLE: MAIN FINDINGS AND POLICY IMPLICATIONS,
Anthony Bartzokas (UNU/INTECH, Chair), Ricardo Lago (former Deputy Chief Economist, European Bank for Reconstruction and Development), Charles Oman (OECD Development Centre), Isi Saragossi (DG RTD, European Commission).

DISSEMINATION WORKSHOP: THE FUTURE OF THE VENTURE CAPITAL INDUSTRY, JUNE 5 2003

This workshop was organised by Michael Stolpe at the Kiel Institute for World Economics in the framework of the project European Financial Markets, Venture Capital and High-Tech Firms within the international research programme European Integration, Financial Systems and Corporate Performance (EIFC), financed by the European Commission, DG Research, under Contract No. HPSE—CT—1999—00039. The workshop took place in the library's main reading room.

I. The Role of Venture Capital in Primary Equity Markets: Empirical Evidence

9.00 – 9.45 h — Underpricing of Venture-Backed and Non Venture-Backed IPOs: Germany's Neuer Markt
Stefanie Franzke, Center for Financial Studies at the University of Frankfurt
Discussant: *Matija Denise Mayer, University of the Federal Armed Forces at Hamburg*

9.45 – 10.30 h — Driving Forces of Venture Capital Investments in Europe: A Dynamic Panel Data Analysis
Andrea Schertler, Kiel Institute for World Economics
Discussant: *Matija Denise Mayer, University of the Federal Armed Forces at Hamburg*

10.45 – 11.30 h — Learning and Signalling in the French and German Venture Capital Industries
Michael Stolpe, Kiel Institute for World Economics
Discussant: *Matija Denise Mayer, University of the Federal Armed Forces at Hamburg*

II. The Management of Venture Capital after the Slump

11.30 – 12.15 h — Risk, Self Selection and Advice: Banks versus Venture Capital
Martin Dietz, University of St. Gallen, Switzerland
Discussant: *Peter Nippel, University of Kiel*

-- Lunch break --

13.15 – 14.00 h — Exit Timing of Venture Capitalists in the Course of an Initial Public Offering
Uwe Walz, Center for Financial Studies at the University of Frankfurt
Discussant: *Eike Houben, University of Kiel*

III. Government Policy

14.00 – 14.45 h — Welfare Benefits from Bubbles in Primary Equity Markets – First Evidence from France and Germany

Euben Paracuelles, Advanced Studies Program, and Michael Stolpe, Kiel Institute for World Economics
Discussant: *Thomas Lux, University of Kiel*

15.00 – 15.45 h

Capital Market Institutions and Venture Capital: Do They Affect Unemployment and Labour Demand?
Rainer Fehn and Thomas Fuchs, IFO Institute for Economic Research, Center for Economic Studies and University of Munich
Discussant: *Vivian Carstensen, University of Lueneburg*

DISSEMINATION WORKSHOP: FINANCE, INSTITUTIONS, AND GROWTH.
WHAT MODEL FOR EUROPE?
Rome, February 20, 2004.

9:00 WELCOME, GIORGIO RUFFOLO, PRESIDENT CENTRO EUROPA RICERCHE

9:15 Opening Remarks , Pier Carlo Padoan University of Rome, La Sapienza and IMF
9:30 Growth and financial systems in Europe (Fabio Mariani, ULB, Brussels, Pier Carlo Padoan)
10:15 Labor Market Institutions, Finance and Growth (Giorgio Calcagnini University of Urbino, Enrico Saltari, University of Rome)

11:00 *Coffe Break*

11:15 Bank Performance in Europe and the US. A comparative analysis (Bernardo Maggi, University of Rome, Stefania Rossi, University of Rome)
Discussants Paolo Guerrieri,University of Rome "La Sapienza"
Stefano Manzocchi, University of Perugia

12:00 Panel discussion. Growth, Finance, and Regulation in Europe
Marcello De Cecco University of Pisa
Marcello Messori, University of Rome, Tor Vergata
Giovanni Pittaluga, University of Genova
Salvatore Rossi, Head, Research Department, Bank of Italy

DISSEMINATION WORKSHOP: EUROPEAN FINANCIAL MARKETS, INVESTMENT AND TECHNOLOGICAL PERFORMANCE
Scarman House, Warwick Business School, 11th February 2004

Welcome: Paul Stoneman (Warwick), Valpy FitzGerald (Oxford)
10.30 Introduction "European Integration, Financial Systems and Corporate Performance (EIFC), a pan European Research Programme", Anthony Bartzokas (Maastricht), Valpy Fitzgerald (Oxford) and Paul Stoneman (Warwick).

11.15 Coffee

Session 1: Finance and firm behaviour
"Financial constraints to innovation in Europe - new evidence", Alessandra Canepa (York) and Paul Stoneman (Warwick)
"Corporate investment and monetary policy in Europe", Alex Cobham (Oxford)

13.00 Lunch

14.00 Session 2: Financial markets and EMU
"Does size matter? Financial restructuring under EMU", Phil Molyneux (Bangor)
'The finance-growth nexus: a regional perspective', Santiago Carbo Valverde and Frabncisco Rodriguez (Granada)

Session 3: Policy

"The public provision of sales contingent contracts as an additional technology policy instrument", Kim Kaivanto (Lancaster) and Paul Stoneman (Warwick)
"Policy implications of patterns of European financial market development", Valpy FitzGerald (Oxford)
17.00 Close

BOOK EDITING WORKSHOP: EUROPEAN INTEGRATION, FINANCIAL SYSTEMS AND CORPORATE PERFORMANCE

Kiel Institute for World Economics on February 23, 2004

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08:30 08:35	–	Welcome to the Kiel Institute: Michael Stolpe
08:35	–	**Financial Markets and the European Economy**
09:35		*Speaker*: Anthony Bartzokas, Institute for New Technologies at the United Nations University, Maastricht, and University of Athens
		Discussant: Lukas Menkhoff, University of Hannover
09:35	–	The Growth-Finance Nexus and European Integration: A Macroeconomic Perspective
10:35		*Speaker*: Pier Carlo Padoan, University of Rome "La Sapienza" and Board of Executive Directors, International Monetary Fund
		Discussant: Michael Funke, University of Hamburg
		– Coffee –
10:50	–	Corporate Investment and Monetary Policy in Europe
11:50		*Speaker*: Alexander Cobham and Valpy FitzGerald, Oxford University
		Discussant: Christian Pierdzioch, Kiel Institute for World Economics
11:50	–	Labour and Financial Market Determinants of Investment Decisions in Europe
12:50		*Speaker*: Giorgio Calcagnini, University of Urbino, and Enrico Saltari, University of Rome "La Sapienza"
		Discussant: Andrea Schertler, Kiel Institute for World Economics
		– Lunch –
14:00	–	Financial Constraints to Innovation in Europe: Evidence and Policy
15:00		*Speaker*: Paul Stoneman, Warwick University, and Alessandra Canepa, University of York
		Discussant: Werner Bönte, University of Hamburg
		– Coffee –
15:15	–	**Europe's Entry into the Venture Capital Business: Efficiency and Policy**
16:15		*Speaker*: Michael Stolpe, Kiel Institute for World Economics
		Discussant: Douglas J. Cumming, University of Alberta and Center for Financial Studies at the University of Frankfurt

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Annex 7.6: List of deliverables and final research output (25 April 2004)

No	Deliverable title	Current Status	Comments *[Additional research output was delivered in most of the cases. However, we kept the initial list deliverables that became a way to clasify our final re4search output]*
1	**Differential Effects of European Monetary Policy on Investment, Technology and Employment**	Delivered	WP 01-6: EMU, Monetary Policy and the Role of Financial Constraints, Alex Cobham (December 2001)
2	**Review of Recent Analytical Literature on Competition in the Banking Sector**	Delivered	WP 03-35: An efficiency analysis of banking systems: a comparison of European and United States la commercial banks using different functional forms, Bernardo Maggi and P. S. Rossi (April 2004). WP 02-14: Integration of European Banking and Financial Markets, by David Marques Ibanez, Europ Central Bank and Phil Molyneux, Professor University of Wales, Bangor and Erasmus Univers Rotterdam (May 2002). WP 03-30: "Does Size Matter?" Financial Restructuring under EMU, Philip Molyneux (June 2003).

3	**Comparative studies of European Financial Systems and Economic Performance (10 country case studies)**	Delivered	WP 01-1 European Financial Markets after Emu: A Review of Recent Literature and Evidence, Anth Bartzokas (December 2001). WP 01-7: Heterogeneity and Change in European Financial Environments, Paul Stoneman (Novem 2001). WP 03-17: Financial Sector, Regulation And Corporate Performance: The Case Of Spain Santiago Carbó (December 2002). WP 03-18: Corporate Finance When Monetary Policy Tightens: How Do Banks And Non-Banks Af Access To Credit? Paul Mizen and Cihan Yalcin (November 2002). WP 03-19: External And Internal Financial Structures In Europe: A Corporate Finance Perspective, Clau M. Buch, Ralph P. Heinrich and Andrea Schertler (December 2002). WP 03-20: Shareholder Wealth Effects Of European Domestic And Cross-Border Takeover Bids, M Goergen, Luc Renneboog (October 2002). WP 03-22: Convergence And Divergence In The European Financial Services Sector: The Pace Diffusion Of Banking Technologies and Regulations In European Financial Environments, And Strate Behaviour Of Incumbent Financial Firms, Bert Flier, Frans A. J. van den Bosch and Henk W. Volbe (February, 2003). WP 03-29: Changes In German Finance: Introducing More "Market" Into A Bank-Based System, Sig Vitols (December 2003). WP 03-31: Ingredients for the New Economy: How Much Does Finance Matter? M. Bugamelli P. Paga , F. Paternò, A.F. Pozzolo, S. Rossi and F. Schivardi (August 2003). WP 03-32: Corporate Financing in the Netherlands: Some Empirical Evidence, Rezaul Kabir, Tilb University, The Netherlands (November 2003). WP 04-34 Banks, Financial Innovations and Regional Growth, Santiago Carbó Valverde, Rafael López Paso and Francisco Rodríguez Fernández (April 2004).

4	**The consequences of European Regulatory Integration for Investment, Technology and Employment**	Delivered	WP 04-39: Corporate Investment and Monetary Policy in Europe, A. Cobham (April 2004).
5	**Integration of Financial Markets and Technological Development**	Delivered	WP 02-9: Finance, Investment and Innovation: Empirical and Theoretical Challenges, Leonardo Becch and Jaime Sierra (March 2002).
6	**Macroeconomic Implications of the EMU: a Policy Perspective**	Delivered	WP 04-40: European Financial Market Integration, Private Investment and Employment Creation, Va FitzGerald (March 2004). WP 04-41: Sources of finance for European investment, A. Cobham (April 2004).
7	**Regulation Policies and European Financial Integration**	Delivered	WP 03-16: Regulation And Financial Innovation Trends In European Banking And The Impact On T Supply And Demand For Financial Services In Europe, Philip Molyneux (December 2002).
8	**Financial markets, Structural and Microeconomic Change**	Delivered	WP 01-2: Financial Structure and Investment Decision: A Survey of Theoretical and Empirical Wo Enrico Saltari (December 2001).
9	**Corporate Investment in a Microeconomic Growth Framework**	Delivered	WP 01-5: The Growth-Finance Nexus and European Integration. A Review of the Literature, A. Caretto S. Manzocchi, and P.C. Padoan (December 2001).

10	**Modelling the Diffusion of Financial Innovations: Empirical Evidence and Methodological Approaches**	Delivered	WP 01-3: Technological Diffusion and the Financial Environment, Paul Stoneman (November 2001).
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24	**Final Synthesis Report**	Delivered	Submitted, 25 April 2004 WP 03-37: Financial Markets and The European Economy: a Synthesis of Research Findings, Anth Bartzokas (April 2004). WP 03-42: Patterns of Growth and Financial Systems in Europe, Anthony Bartzokas (May 2004).