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The financing and technology decisions of SMEs: I. Finance as a determinant of investment

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This paper surveys the theoretical and empirical literature on the financing of investment in order to lay the foundation for subsequent analysis of technology investments by Southern European SMEs. By adapting a variety of approaches to suit this purpose, a number of findings for policy are reached. In particular, it is found that support for highly successful SMEs is distinct from support for struggling SMEs, and that each has different implications for innovation and employment. Furthermore, policy to encourage banking efficiency and policy to stimulate venture capital investment are seen as competing ways forward, with potentially very different results for SMEs' technology investment. The most significant suggestion of this paper, however, is that finance may determine not just the level but also the nature of technology investment.

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Financing SMEs' technology investments in Southern Europe

This is a series of five papers which forms the financing section of the above EC project, addressing the problems facing technology-based manufacturing SMEs in Southern Europe with particular reference to the changes initiated by economic and monetary union in Europe (EMU). This is the first of two papers which together make up the foundation of the series. Together they will consider the range of decisions facing small firms which seek to make investments in technology. Although largely survey papers, they will represent an original contribution as a synthesis of the existing research into a development application. The third paper will present a rigorous model of the conclusions reached here, the fourth will analyse the results of survey and interview data collected by project partners in Greece, Spain and Portugal, and a final paper will consider the likely impact of EMU and make policy recommendations on this basis. This first concentrates on the financing aspect, leaving detailed discussion of technology decisions and policy to the subsequent paper.

The financing and technology decisions of SMEs:
I. Finance as a determinant of investment

This paper will consider the range of literature on the financing of investment, and assess it within the context of small and medium-sized enterprises. It will be seen how the financial constraint may be binding on SMEs investing in technology, and policy options discussed with a view to overcoming this constraint. In particular, the possibility of slower intervention in the banking sector with a more widespread impact will be examined as compared to more sudden and narrowly targeted venture capital policy. The subsequent paper will consider first the specifics of technology investment within the SME life-cycle model and then in much greater detail the policy options resulting from combining the finance and technology life-cycles.

In order to make any educated judgment on the types of policies which would best support technology-based SMEs, we must examine the details of their investments in technology. The structure of this paper will be as follows. Section I examines the reasons for concentrating on SMEs, and some current work on European technology policy in order to ensure a focus on suitable policy questions throughout. Section II will survey the (overwhelmingly Anglo-Saxon) literature on SME financing, and in particular how different types of suppliers of funds - insiders, third party equity investors, venture capitalists, banks, stock markets - appear to be optimal at different stages of the firm's life cycle. Section III will consider some of the resulting policy issues (although these are dealt with in most detail in the second paper). In section IV a range of facts about the structure of capital markets in Southern Europe will be presented, allowing some conclusions to be drawn about the level of consistency between US/UK-based theory and Southern European reality. Some preliminary conclusions will then be outlined; these will provide the framework for the discussion in the second part of the paper which focuses on the technology acquisition literature (again in a life-cycle model) and draws conclusions on policy for Southern Europe.

The reason for this paper on financing appearing before an explicit discussion of technology in its sister paper is this: although it might be assumed that firms will make the decision to invest and *then* seek finance, the survey presented here implies that the binding nature of the financial constraint is such as to invert this order. This is one of the key findings of this paper - that finance determines not only the level but also the nature of technology investments by SMEs - and will be established in section II.i.

Section I: The meaning of SMEs

Two questions will be answered in this section; firstly, what do we mean by 'small and medium-sized enterprises,' and secondly, what is their significance for a country's economy? It is crucial to understanding the issues raised in this paper that we clarify the definition of SMEs as opposed to large corporations (LCs). In essence, it is captured by the relationship between ownership and control. "An archetypal owner-controlled firm (eg SME) is one in which a family or small group of people own at least half of the shares and effectively determine the policy of the firm." [Fitzgerald, 1997, p.3]. This has a number of significant corollaries.

Where ownership and control are combined in the same individual or group, the decision-making process is removed immediately from the corporate setting in which such questions are usually discussed. While there do exist family-owned LCs, e.g. the Agnelli empire in Italy, or in Germany the BMW group, their structure is completely different. Although control is more centralised, the interests of other shareholders must be considered in all decision-making.[1] With no such structure, SMEs live and die by their owners - and death is frequent. The mortality rate of SMEs is high because often the retirement of the primary owner signals the winding-up of the firm. Where the owner is a family rather than an individual, the SME may be more likely to survive, as the inheritance of the younger generation, but the high mortality rate of firms is clearly related to this close connection of owner and business.

The importance of the owner(s) in decision-making has other implications. There is a growing literature on the edge of economics which recognises these, and discusses the strategies of SMEs in a personal, almost psychological manner with reference to the owner/manager [see, e.g., Lefebvre et al. 1994, for a discussion and model of the influence of CEO perceptions on SME technology policy]. The personal nature of such decisions is inescapable, but this does not mean that it is not useful and indeed sensible to continue with economic analysis as the main tool to gain understanding.

It is necessary to be aware that the goals of the individual are not necessarily those predicted by the simple theory of the firm - owners may define success in terms of growth in market share, profits, productivity, revenue, etc., and to an extent the firm's incentives may be 'distorted' by the presence of the pivotal owner/manager - whether the need for income rather than asset growth drives decisions and, for instance, leads to lower retained profit levels. The objective function of the owner-manager , or controlling family, captures important aspects

[1]Agnelli in fact manages to wield impressively wide-ranging power by the instrument of 51% shareholdings in companies which own 51% of others, which in turn own 51% of the true businesses. Such 'pyramiding' is common in Germany, Sweden and especially in Italy (Berglof, 1997, p.102).

of SMEs as against LCs.

We may consider the owner/manager's definition of success for the firm as a function of the (current and expected future values of the) associated income (Y), value of the firm (V), levels of personal control (C) and exposure (E); the latter is weighted by the management's risk aversion factor *p*:[2]

$$S=S(Y, V, C, pE) \quad \text{where } S'(Y), S'(V), S'(C)>0, S'(E)<0 \qquad ...(1).$$

The expected income stream will depend positively on profits but have a negative correlation with investment - higher income being equivalent to lower *retained* profits and thus lower investment. Expected value of the firm will depend positively on investment levels (which depend positively on financing received and retained profits but negatively on risk aversion). Level of personal control of the firm will depend negatively on equity issued while exposure is a function of personal debt and guarantees given or collateral put up for loans.

In terms of finance, then, the owner may be unwilling for reasons of risk aversion to take on the debt required for expansion, or alternatively unwilling to issue private equity which would dilute their control. The expected response of LC managers, in particular their preference for sources of finance, to differ. These issues will be considered further in section II.i; here we merely note this feature.

Finally, it is important to note that the size of SMEs' labour force or turnover remain the defining features for most governmental regulatory and data collation purposes. The Department of Trade and Industry (DTI) in the UK defines micro firms as having 0-9 employees, small firms 0-49 and medium firms 50-249. Although the cut-off points chosen are not based on data analysis, there is a degree of consistency across different statistical bodies. The DTI criteria are almost identical to those of the European Commission, although the latter also stipulate an independence criterion which limits the percentage of the firms' shares which may be held by larger firms, and either a turnover or balance sheet limit which must not be breached.

The British Bankers' Association use only a turnover criterion (which for small businesses must not exceed £1million).[3] It is clear from Table I of the Bank of England's 1999 report on small businesses (reproduced above) that turnover and labour force size are not in constant

[2]A later paper in this series will present a more detailed model based on this approach. Along with other factors, the determinants of the risk aversion factor will be examined more closely at this stage.

[3]Bank of England, 1999.

proportion across categories of firm size nor over time; but such are the limitations of any essentially arbitrary criteria. At present, the employee criterion is the most widely used, and as such will be the implicit definition throughout this paper. As a caveat, it is not clear that a specific link between size - by any of these definitions - and ownership, as described above, need necessarily exist.[4]

Source: Bank of England, 1999, p.10, data from DTI Statistical Bulletins.

Table I: The changing composition of UK business stock

Number of businesses %	Micro (0-9 employees)	Small (10-49 employees)	Medium (50-249 employees)	Large (250+ employees)
1994	94.37	4.63	0.91	0.09
1995	94.50	4.63	0.79	0.08
1996	94.70	4.43	0.78	0.09
1997	94.90	4.24	0.76	0.09
Employment %				
1994	28.17	15.92	19.38	36.54
1995	31.66	16.28	17.93	34.12
1996	30.58	15.27	17.78	36.37
1997	30.22	14.47	17.38	37.93
Turnover %				
1994	18.43	14.75	26.03	40.78
1995	20.67	16.89	24.99	37.45
1996	24.98	17.30	21.07	36.65
1997	23.05	16.41	22.22	38.32

The second preliminary point to be made concerns the importance of SMEs to the functioning of a society and the performance of an economy. From society's perspective, SMEs utilise the bulk of the labour force[5] - even though they (generally) produce proportionally less output - so their social role as employment providers is very significant. It is sensible then to target policy in this area. However, this raises the question of whether policy should be aimed at encouraging the *growth* of SMEs - away from this employment provider characteristic - or in fact prolonging their lifespan and current status to stabilise it. That is, should policy target successful SMEs or unsuccessful ones? This interesting question we leave for the present, but revisit in the second part of this paper where policy is discussed in detail.

It is worth mentioning here, however, that the social value of SMEs may be particularly important where the concentration of large firms, and also the availability of capital, is less -

[4]It is curious to note that the ratio of output to labour (i.e. turnover to employees) is roughly 1:1 over the four years covered in Table I; the expectation would be very strongly that LCs would have a superior return to labour from higher capital intensity. Whether this reflects a tendency for UK SMEs to use more part-time workers or some other statistical anomaly is not clear; the third paper of this series will examine data on this and other aspects of SMEs in detail.

[5]SMEs in the EUR-12 were responsible for 66% of employment in 1994 (Eurostat), but this trend was considerably exaggerated in Southern Europe (e.g. 80% in Spain).

for instance, in Southern Europe. The generally accepted lower capital-labour ratio of SME production (as opposed to that of LCs) favours support for SMEs where capital is relatively more scarce. The role of economic policy in tackling this particular question of scarcity - by improving the allocative efficiency of financial markets - is at the root of this project.

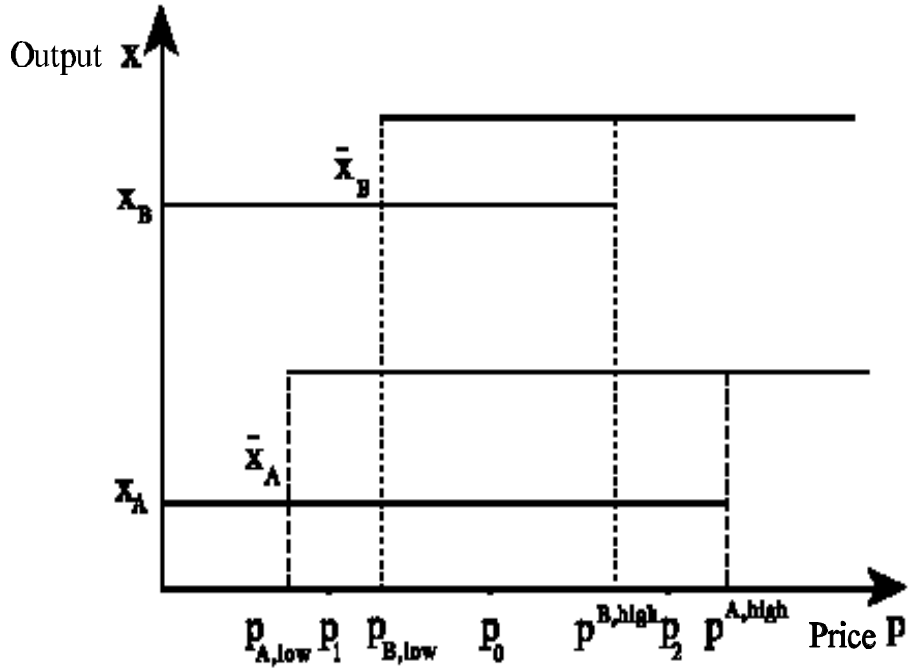
Furthermore, regional governments (and hence regional policy) will necessarily concentrate on a larger number of smaller firms than national government; given the small proportion of firms which are LCs, the numbers based in each region are small also, and as exemplified by Spanish R&D subsidies LCs tend to receive public money from central government [nearly 90% of LCs' total subsidies] while regional authorities target their local SMEs - with more than 90% of the relevant budget (Instituto Nacional de Estadistica, 1997 - data from 1994).

A hypothesis of SMEs' economic importance states that the reaction of firms to economic conditions with regard to the size of their labour forces will depend to an extent upon the size of the firm. Fendel & Frenkel (1998) provide both a supporting model and empirical evidence for Germany. Their model's results are summarised by Fig.1, where X represents output, subscripts A and B refer to small and large firms respectively, and the intervals between high and low prices (P) indicate the firms' zones of inaction - where the price of their output has changed through changes in economic conditions, but due to the presence of sunk costs (incurred by altering the size of the labour force) insufficiently to make changes in production profitable - increasing production incrementally is not carried out until the high price is reached, nor reduction in slumps until the low price. Evidently the zone of inaction for small firm A is considerably larger than that of large firm B, thus explaining - on the basis of reasonable assumptions - why SMEs can have an employment-stabilising influence.[6]

The positive social value of SMEs' production - on the basis of externalities of employment provision and stabilisation - may reasonably be considered then to outweigh its private value. On this basis the role of SMEs in general in the economies of Southern Europe, where structural unemployment remains high, is both beneficial and important from a research perspective.

[6]Note, however, that by an analogous argument, SMEs will be slower to alter their product range also (in response to a change in economic conditions), which may diminish their chances of success.

Fig.1: The Dynamics in Aggregate Employment with Firms of Different Size



In terms of specifically technology-based SMEs, their importance stems from a number of theoretical grounds. Firstly, the dominant endogenous growth literature can be thought of as tracing its roots back to Schumpeter's (1934) theories of innovation and entrepreneurship.[7] The significance to economic growth of innovation, or in another light, that of absorbing and making use of technological knowledge and innovation from elsewhere, is no longer questioned. There is a well-researched possibility that smaller firms are able to hire better employees by using more tailored or more performance responsive packages, that they have superior internal communication and cost-consciousness, and can thus overcome diseconomies of scale in conducting R&D.[8]

[7] Aghion & Howitt, 1998 is both a seminal work in this field an also an indication of the field's importance - essentially, they have produced a development economics textbook which champions the endogenous growth literature, and breaks decisively from previous textbooks which largely favoured, and certainly saw no further than, the McKinnon-Shaw financial liberalisation approach. [It should be noted that the strand of the endogenous growth literature which concentrates (as Schumpeter) on R&D and innovation as drivers of growth is now only one of a number.]

[8] The claim that smaller firms may be better innovators, first made by Cooper (1964) remains controversial. Cohen (1995) identifies this as the second most empirically researched field in industrial organisation. Much work supports Cooper's claim (see Canback, 1997 for a survey), but Tether (1998) surveys a number of recent studies which have done so and attacks their implicit assumption that the innovations of small firms are as valuable as those of large firms, and offers new evidence that suggests firms are on the whole equally efficient in innovation.

As above then, it may be suggested that the social value of SMEs' innovation outweighs its private value. The implications of industrial clustering and knowledge spillovers - i.e. that there are significant and exploitable externalities to agglomeration of innovative industry in particular, in the form of gains from specialisation, labour force improvements, horizontal and vertical cooperation - underline the potential importance of technology-based SMEs.

On the whole, however, technology-based SMEs - it will be seen - are more likely to invest in technology purchases than R&D - but the implications of this are also very much beneficial. The lack of research carried out in Southern European countries is strikingly illustrated by Fig.2 below, taken from Eaton et al. (1998); 'researchers' here are defined as "total research scientists and engineers as a fraction of the labour force, while the lighter bars represent only those who both work in and are funded by the business sector" - p.7, ibid. Their analysis of European technology policy indicates that measures to increase research would increase productivity but also benefit others, notably Japan and the USA, who are operating closer to their research potential. They analyse a variety of policies, from improved patent protection to increased schooling to research subsidies, and conclude instead that specifically targeted policies to facilitate the *adoption* of innovations would have the best results in terms of European productivity and competitive advantage - again, the case for intervention of some sort is made, and again it has particular importance for Southern Europe.

This is a second strong reason then why government intervention might be warranted to encourage technology-based SMEs in Southern Europe. It is the nature of the optimal intervention which this paper and subsequent ones will aim to pinpoint. We may ask why Southern Europe is a particular candidate for policy analysis. Briefly, relatively low capital-labour ratio, relatively high unemployment and relatively underdeveloped capital markets all contribute; and the dependence on regional subsidies further underlines the importance of adopting best policies to ensure the most efficient allocation. In this section then we have examined the differences between SMEs and LCs in terms of ownership and control, and established the importance of SMEs in the provision and stabilisation of employment. Finally, we have seen the potential for SMEs to play a positive role in European technology policy.

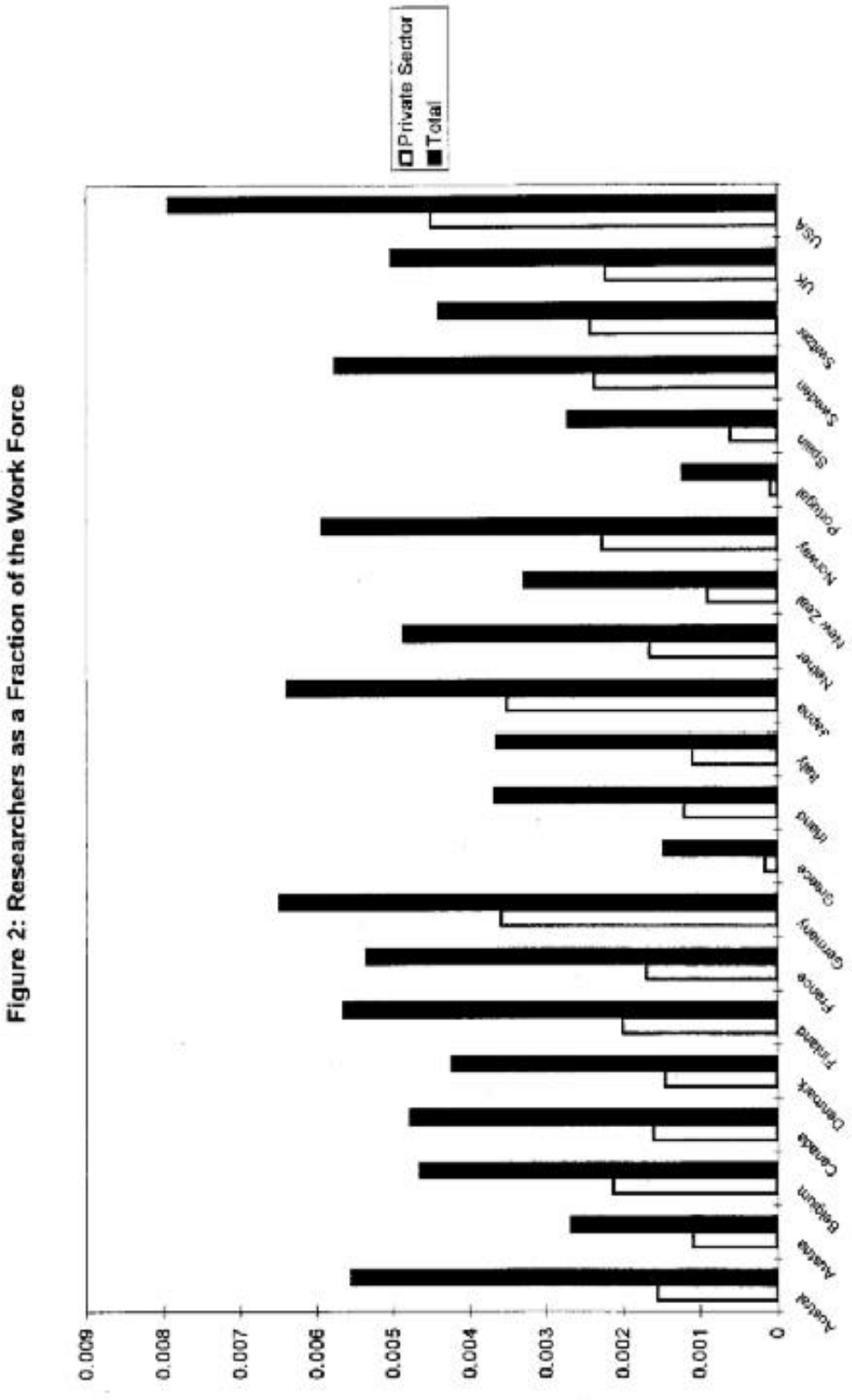


Figure 2: Researchers as a Fraction of the Work Force

Section II: SMEs' financing decisions

This section will survey the literature on SMEs financing. As mentioned above, this literature is almost exclusively written from an Anglo-Saxon perspective about Anglo-Saxon market features. Rather than attempt to establish on a point-by-point basis the relevance to Southern European markets, however, we present the survey and its results in terms of policy implications and then turn to consider how well these fit the stylised facts of Southern Europe. Our expectation is that we will find Southern European SMEs to be relatively more constrained.

SMEs operating in any economy and any industry face financial constraints. SMEs in industries which require of potential investors to overcome costs of obtaining information - say on the particular products and market of a technology-based firm - will face greater constraints; the cost of overcoming informational asymmetries will reduce the number of potential investors. SMEs operating in economies with relatively more scarce finance, through a lower capital to labour ratio, or less developed capital markets - such as those of Greece, Portugal or Spain - will also have particular difficulties. In the light of the above portrayal of the wider importance of these economic actors, policy aimed at minimising their financial constraints is clearly called for. It is necessary therefore to acquire a solid understanding of the nature of the constraints in order to be in a position to make policy recommendations.

Figure III provides an outline of the stages of funding for a start-up firm which successfully grows into a large company, based on Berger & Udell's (1998) comprehensive analysis of the USA data on SMEs and small business investment companies (SBICs).[9] Essentially, firms start up with funding from the owner(s) and possibly friends, and to move onto the first stage of external funding they generally require third party equity investment[10] or venture capital. Banks provide ongoing assistance but for reasons of asymmetric information and resulting costs are unwilling to make large loans for investment projects at an early stage.

[9]This paper is a hugely useful and wide-ranging discussion of the financing of small businesses, written by two American economists who work mainly on banking issues. It will be referred to at length throughout this section.

[10]NB 'Angel finance' is the Anglo-Saxon variant of third party equity investment; see section II.i for formal definition of this term.

Fig.III: Firm Continuum and sources of finance[11]

Firm Size >---------->			
Firm Age >---------->			
Information Availability >---------->			
Very small firms, possibly with no collateral and no track record.	Small firms, possibly with high growth potential but with limited track record.	Medium-sized firms, some track record, some collateral available if necessary.	Large firms of known risk and track record.
|<--Insider Finance-->|			
|<-----Angel Finance----->|<--Venture Capital-->|		<----------Public Equity---------->	
|<----------Trade Credit---------->			
			|<--Commercial Paper-->|
|<----Short-term financial institution loans---->			
|<----Intermediate-term financial institution loans---->			
	|<--Mezzanine-->|		|<-----Medium-term-----> |
	fund financing		notes
		|<------Private placements------>|	
			|<--Public debt--> |

Source: Berger & Udell, 1998, p55..

It is necessary to consider the specific financing constraints which face SMEs, and the process

[11]Fig.III is best interpreted as only referring to successful firms - thus, with age, the survivor bias ensures that the firms are tending to grow in terms of value.

of starting up a firm which avoids, rather than overcoming, these constraints (II.i). We will then turn (II.ii) to the role of banks in providing funds, and analyse their decision processes. The final section will deal with the spectrum of other capital fund suppliers, focussing specifically on third party equity investors and venture capitalists.[12]

II.i: SME start-up and financing constraints

SMEs face serious problems resulting from the presence of asymmetric information. Start-ups are generally financed by individual entrepreneurs, with possible help from family and friends. This creates only the weakest of signals to other potential suppliers of funds. The basic path of funding is then to receive investment from a third party (non-market) equity investor (TPE).[13] Some bank debt may also be forthcoming depending on a variety of factors such as collateral which will be discussed in section II.ii. These signals, and the short track record of the firm, may then tempt a venture capital company to become involved, making a substantial investment on the grounds of the chances of exiting their investment via a profitable flotation (an initial public offering, or IPO). [NB. In order for this possibility to exist, there must exist both a suitable stock market and a range of individual investors who might also be willing to take on the risk of the SME - neither of which are characteristic of Southern Europe.]

The primary constraint is that potential investors or creditors face costs of obtaining possibly substantial information on the firm and its market before a positive decision can be made. Obviously this is a particularly high hurdle to overcome when the firm is involved in technological investment which requires very specific expertise for successful evaluation. In many cases it may not appear profitable to engage in this learning exercise, and rejection is the decision made. Intangibility of the firm's assets will also reduce the redeemable value in the event of bankruptcy, further discouraging investors.

Each increase in the firm's financing and track record represents further available signalling information, however, so over the life cycle of a successful start-up both informational opacity

[12]Note that leasing does not feature as an alternative financing method, despite its importance in some economies - i.e. Ireland (46% of private investment). In this paper it may be considered as a form of repayment finance analogous to collateral lending, but other work in this project will look in greater detail at the practice, particularly focussing on the role of technology suppliers as providers of leasing finance as well as technical expertise and training.

[13]Such investors, typically referred to as business 'angels' in the literature on Anglo-Saxon economies, operate rather differently in Southern Europe. Section II.iii deals with such agents in more detail. The general term 'third party equity investor' was coined by Prof. EVK Fitzgerald.

and the associated financial constraints should be diminishing.[14] Subsidies or tax breaks to encourage more rigorous auditing standards for SMEs would clearly be useful here also. Furthermore, the larger a company, the more diversified its activities and thus the lower the expected variance of its profits, again encouraging investment as the cycle continues. While specific financing decisions will be examined in later sections, the general literature is considered here. First, though, it is necessary to understand the SME's position and preferences for financing.

Textbook managerial economics (e.g. Reekie & Crook, 1995) predicts a 'pecking order' for types of company financing which rests on the relative control impact of each. Internal finance - the reinvestment of profits - will be the preferred option, largely because it does not involve the creation of external constraints on the behaviour of the firm. Debt will then be preferred to equity because it is simply a commitment to repay (except in the event of bankruptcy, an important consideration which will be taken up later), rather than a potential source of control, so the distortion to firm objectives is minimised by choosing debt. The recent trend for LCs to buy back their own equity through bond issues at low current rates is evidence of such a preference set (although bond finance generally involves a longer repayment period than bank debt). For LCs, then, equation (1) may be written to incorporate this pecking order:

$$S=S(Y, V, C, pE) \qquad \text{where } S'(Y), S'(V), S'(C)>0, S'(E)<0 \quad ...(1),$$

$$\text{and also } S'[V'(rp)]+S'[Y'(rp)]>S'[V'(d)]+S'[E'(d)]>S'[V'(e)]+S'[C'(e)] \quad ...(1').$$

That is, the net benefit of an increase in retained profits (rp) exceeds those of an increase in bank debt (d) which in turn exceed those from increased equity (e). In each case the marginal increase in the 'success' rating S is that resulting from the marginal increase in the firm's value net of the marginal change in either income, control or exposure. Condition (1') can be summed up, as Baumol (1965, p.74, italics in original) put it, "...the bulk of business enterprise should finance its investment insofar as possible entirely out of retained earnings *because that is, characteristically, the cheapest way to raise additional funds.*"

Brouwer & Hendrix (1998) claim that this order is reversed for high-tech start-ups; a claim which may hold water, as we shall see below. However, what they go on to use as justification is in fact a description of the *actual* constraints on such a start-up rather than a reversal in pecking *preferences*: "Since internal finance (cash flows) cannot meet [the firm's] capital demands and debt is hard to come by, equity capital figures as the prime financial resource."

[14]We return to the complementarities between types of financing in section III.

(p.334) In other words, equity is the easiest, rather than the preferred, option.

This is in fact where the potential conflict arises with the preferences of the key figure in the SME, the owner/manager. Equity may be the easiest form of finance to obtain, but will - as stated above - reduce the entrepreneur's control of the firm directly. Unwillingness to allow such a dilution of control over the firm which supports them and which they have created from nothing, even if it is a necessary condition for growth, represents an ownership barrier to expansion. Clearly this is stronger in owner-managed SMEs than it would be in LCs. Another such barrier may result from an owner/manager's risk aversion and hence unwillingness to use personal debt to provide capital to the firm (when it is too young or too short of tangible assets to receive debt in its own right). Furthermore, the firm's ability to access profits as internal finance will be reduced if profit off-take represents the main income of the entrepreneur.

On this basis, in fact, the pecking order of finance may truly be reversed for start-up firms. Condition (1') for LCs would thus become (1") for SMEs:

$$S'[V'(e)]+S'[C'(e)]>S'[V'(d)]+S'[E'(d)]>S'[V'(rp)]+S'[Y'(rp)] \quad ...(1").$$

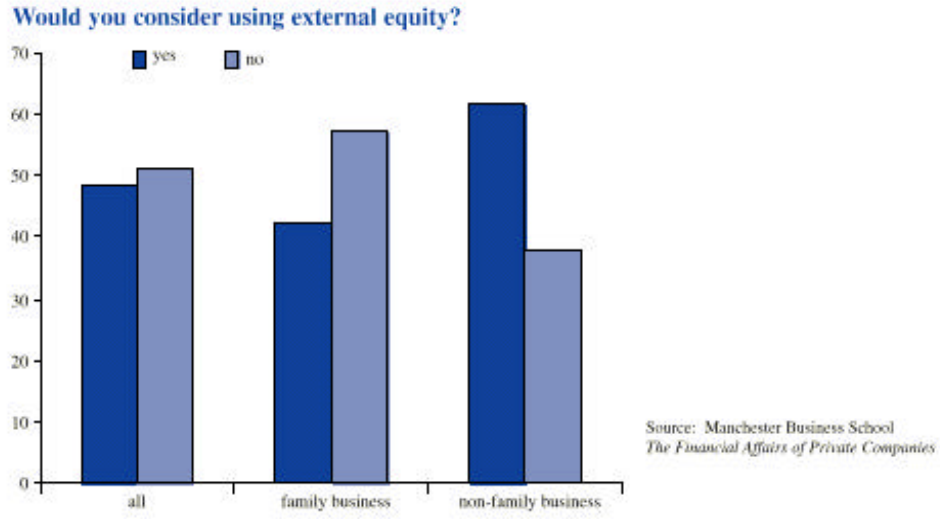
If internal financing reduces the owner/manager's income, and debt is seen as too great (and personal) a commitment, equity financing of the firm may in fact be the *preferred* option - Fig.IV illustrates this possibility for the UK. It is not unreasonable to think that an increase in debt might be seen as preferable to a reduction in income, particularly for reasonable assumptions about the prospects of the firm, and thus the order could indeed be totally reversed. This is not however a quantifiable fact, since it seems clear that financing preferences are dominated by external constraints.

Source: Bank of England, 1999, p.51.

What is more important however is this: that it is the actual constraints which are binding on the individual's preferences, rather than vice versa. Taking the extent of profit off-take and thus the availability of internal finance (as a function of profits) as given, the firm's ability to expand is constrained by the availability of (any) finance - not the order in which that finance would be preferred. Thus we consider financial constraints before investment decisions.

There are three main hypotheses of financial constraints on firms. The first, the collateral hypothesis (Fisher, 1916) states that the collateral value of a firm will be affected by the interest rate - i.e. an increase will reduce the discounted value of the balance sheet, thereby restricting the availability and increasing the cost of (external) finance. The bank lending hypothesis results from the view that restrictive monetary policy will cause an inward shift in the supply curve of bank loans (e.g. in Fig.VI below) and thus a reduction in the activity of bank-dependent firms. Finally, the internal finance hypothesis simply states that capital market imperfections - ie those resulting from asymmetric information problems - will cause profits

Fig.IV: Equity preferences among UK SMEs



to be the main explanatory variable of investment. This last is given empirical support by Carpenter et al. (1995) who are the first to undertake a full comparison of the three;[15] it is also the most consistent with the view that financial constraints prevent *any* external finance being made available, rather than affecting the *amount* of external finance.
In this section we have brought together a diverse literature on firms' financial decisions, and

[15]Carpenter et al. construct tests with time and sectoral heterogeneity in order to be able to distinguish between the three types of constraint. Although their evidence is consistent with each, the internal finance hypothesis seems best to fit the observed facts. Note that this and most empirical work on this subject is conducted using large firm data.

one which allows the following argument to be made. Firstly, it has been seen through equation (1) how LCs and SMEs may differ in their preferences for types of financing, for reasons of control and risk exposure which are markedly opposite for the employed manager of a large company and the owner-manager of a smaller firm; this suggests that SMEs are more likely to be constrained in any decision, and furthermore that the constraint is the lack of availability of *any* financing rather than the preferences for different types. Secondly, it has been observed that financial constraints on large firms are a well-established phenomenon - the debate centres on how precisely the constraint operates and how this affects macroeconomic policy (Carpenter et al., 1995).

Thirdly, as will be established in more detail below, access to external finance is relatively more limited for smaller firms. Fourthly, although we leave specific consideration of technology investment to the sister paper, we may consider the result of Brown (1997) that innovative firms in particular are financially constrained because the "assumption of perfect capital markets is least likely to be satisfied for the class of firms which devote resources towards the development of innovative products or processes."

The conclusion we must reach is evident: if LCs are financially constrained, and they are, the same must be true *to a considerably greater degree* for SMEs, especially those which innovate. We now turn to consider the specific nature of these constraints.

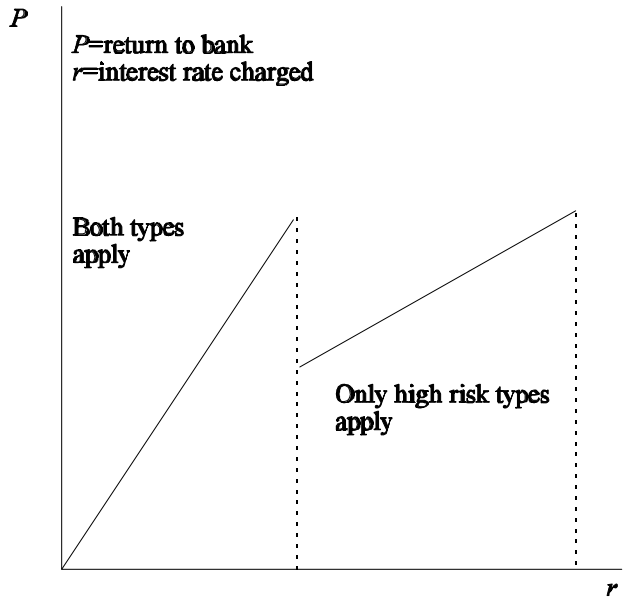
I1.ii: Banks and SMEs

As discussed above, banks face information costs which must be overcome before the suitability of a small firm as a loan customer can be established. These costs may be such as to prevent the bank conducting due diligence - it may simply dismiss the loan application out of hand. There are a number of ways to solve the problem that outright rejection may dominate as a strategy, and we consider these in turn.

The obvious tool to use is the interest rate on the loan - the price of credit set to equate supply and demand. However, the well-known Stiglitz-Weiss credit rationing model (Fig.V) rules out such an equilibrium. The credit market is characterised as an Akerlof (1970)-type market for 'lemons,' wherein less risky borrowers are driven out of the credit market by their high risk counterparts, causing market failure which is solved by credit rationing. The crucial feature on which the model depends for its results is that the expected return on a bank loan is *not* a monotonic function of the nominal interest rate of the loan. The 'backward bending' loan supply curve in Fig.VI represents such a schedule, and is based on the following reasoning.

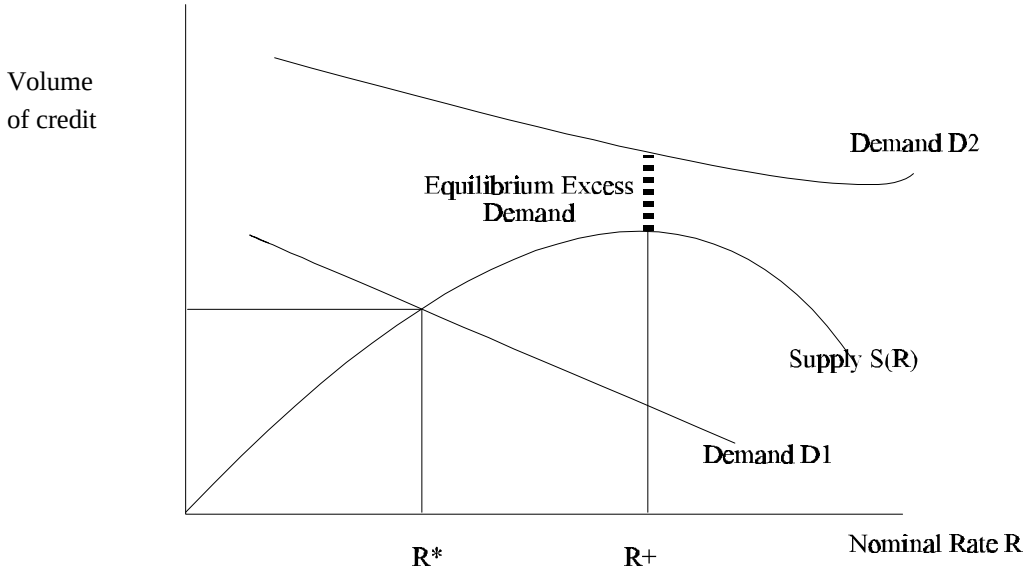
Banks face a range of borrowers who are differentiated by an unobservable risk parameter (instead of unobservable we may say 'not *costlessly* observable'), and therefore cannot easily discriminate between them. Increasing the interest rate (e.g. from r_1 to r_2 in Fig.V) will cause some of those potential borrowers whose risk is relatively lower (and whose expected return in the successful case is lower than the new higher interest rate) to drop out of the market, while those with more risky projects are unaffected. In essence, when the bank raises prices, it generates an adverse selection of potential customers for itself. Therefore at some point, increasing the interest rate will reduce the expected return to the bank, so they will offer less credit at higher rates. Given this, firms will choose to access the same volume of loans at the lower rate (before the maximum of the loan schedule). Since for SMEs facing financing constraints, demand for credit is high, we may assume that the second schedule (D2) is the relevant one for our discussion. The solution, as in Fig.VI (overleaf), is to allow the existence of excess demand *in equilibrium* with the interest rate R* and a random selection of customers to make up the required volume of credit while others are randomly refused credit. Thus firms are rationed without an option.

Fig.V Stiglitz-Weiss adverse selection of borrowers



Source: Goodhart, 1989, p.172

Fig.VI: Equilibrium credit rationing



Source: Freixas & Rochet, 1997, p.140.

It is obviously easier for banks to assess the risk of some borrowers than others. Small firms with little track record involved in products or markets requiring technical expertise are clearly among the most costly to assess. Possible solutions include the provision of collateral (or guarantees) by the firm (or owner), loan commitments or lines of credit, debt covenants and maturity, and the building of a relationship.[16]

Collateral can take a number of forms - inside collateral is a pledge of assets which the firm owns, outside collateral a pledge of other assets (usually the owner's), and guarantees a slightly different case wherein the guarantor's liability is general not limited to specified assets. Since the minimum value to the firm and its owner of a failed project is now negative rather than zero, the adverse selection problem described above is mitigated.[17] Furthermore, moral hazard (and associated agency costs) will be reduced by either form of 'outside' pledge since the owner's incentives are now more closely linked to those of the bank.

A significant drawback of collateral or guaranteed borrowing is that the quality of the signal sent to other potential funders is reduced - the loan no longer represents the bank having backed the firm's chances in the same way, and furthermore such contracts will reduce the

[16]This list and the structure of the following section is due to Berger & Udell, 1998.

[17]Note, however, that Stiglitz & Weiss are assuming there exist some costs of bankruptcy already.

value of claims that other investors hold in the event of failure. Their importance is undeniable however - in the USA, roughly 40% of loans (Ang et al., 1995) and 60% of their value (Avery et al., 1998) to small businesses are backed by outside pledges. Such outside pledges are particularly important for firms with less tangible assets such as we may be the case with technology-based SMEs.[18]

Loan commitments are forward contracts which commit lenders to providing loans over a period, at fixed rates, as long as the firm has not suffered a reversal of fortune. Lines of credit are "generally pure revolving credits that allow the firm to borrow as much of the line as needed at any given time over the time interval specified" (Berger & Udell, 1998, p.28). These instruments are on the whole used, as might be expected, to provide working capital, but the duration can also allow the purchase of machinery and some construction. Incremental technology investment may also be possible, and the effect of such agreements on future funding is potentially significant.

The theory is mixed, however. On the one hand, agreements involving various options can be used to reveal borrower 'type' to the lender, or to allow the lender to influence the firm's activity, reducing information problems in each case. On the other hand, the advance nature of these agreements may be considered analogously to the real options approach to investment under uncertainty to yield positive values to *not* making the commitment, if information to the detriment of the lender becomes available over the course of the commitment's lifetime but prior to its exercise by the firm. On the whole, this is an unlikely source of aid to the SME seeking to make a one-off block investment. Taken with trade credit and profits, however, it will provide the firm with the ability to upgrade slowly over time.

Debt covenants can force borrowers to seek the consent of the lender before enacting a change of policy, and thus reduce information problems. However, small firms rarely have sufficient quality of auditing to allow for the terms of the covenant (e.g., based on restricting changes the firm can make in a particular financial ratio). Instead, contracts of short maturity are used. These limit the period over which the firm may alter its behaviour or suffer failure before the bank is able to force renegotiation, and as such can successfully change the nature of the problem. Now it seems the firm cannot access long-term funding simply because of its size - the general problem considered here again.

The solution - as far as bank funding is concerned, would seem to be the establishment of a relationship between the bank and the SME which allows the bank to build up a credit history

[18]The use of the owner's home as collateral is frequent, but even with an intangible technology-based firm a supply, or franchise, contract represents a form of guarantee to the bank.

along the SME's life cycle and thus more cheaply provide funding at the appropriate time. US data indicates that small businesses who define a commercial bank as their primary financial institution have been involved in a relationship with that bank for more than 9 years on the average.[19] Fig.VI from Bornheim & Herbeck (1998) illustrates the potential benefits of this relationship.

In line with Diamond (1984) and the work thereafter, banks generate private information about borrower quality and thus the cost of capital is reduced in two ways by the relationship. Firstly, there is a direct effect on the price of the loan. Petersen & Rajan (1994) find evidence for the US of a negative correlation between loan rate and length of relationship, and also of a (weak) signalling effect reducing indirectly the cost of capital elsewhere.[20] Furthermore, the extent of credit availability - i.e. loan size - over time is shown to rise (with strong statistical significance). This implies that the reduction in loan rate does not result from rationing. Collateral demands ought also to fall (Boot & Thakor, 1994).

From the lender's perspective, relationships will allow them to overcome informational problems and thus benefit not only from their private knowledge of the firm but also the reduced monitoring effort involved. However, the snare of informational capture of the firm by the bank is lurking. While it is difficult to conceive of banks seriously attempting to trap a small business customer, this is not necessary for the idea of informational capture to be accepted as having importance in the relationship. It may become difficult for the firm to turn elsewhere if it is perceived that the 'relationship bank' has turned down requests for funding. This may mean that the relationship will reduce effective competition for the bank and thus increase costs to the firm, but more likely the negative impact will be simply to limit the firm's options. For this reason, the net marginal benefits curve in Fig.VII becomes negative after a certain length of relationship.[21]

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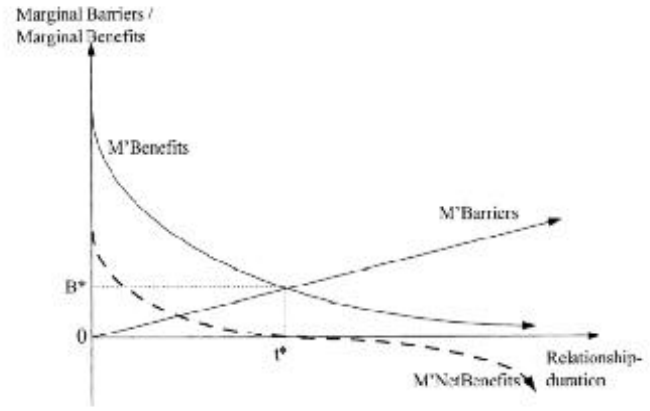
[19]Berger & Udell, 1998, from SBIC data.

[20]This indirect effect is questioned by Bornheim & Herbeck (1998) on the grounds that Sharpe (1990) proposes - namely that this signal is evident to bad businesses who will therefore look to take advantage by remaining at the same bank. In other words, no separating equilibrium need necessarily exist.

[21]There is little explicit evidence on this, but Ongena & Smith (1997) find in a study of public Norwegian firms that the maturity of the relationship with a bank is positively correlated with the incidence of relationships ending - the longer it has lasted, the more likely it is to end. Benefits are reaped in the early stages, as Fig.VII suggests, and over time the incremental negative benefit builds until it is optimal to bank elsewhere. But this is only one piece of evidence, so the accuracy of the model is far from established.

Figure VII: Marginal benefits of, and barrier to, SME-bank relationships



Source: Bornheim & Herbeck (1998), p.328.

This is the moment (t*) when the incremental value of remaining with the bank becomes zero and then negative. It will however remain in the firm's interest to continue the relationship as long as the net marginal benefits are not sufficiently negative to eliminate the gains already made. Note also that the level of active competition will have a clear effect on the ability of firms to change banks without arousing suspicions.

Aoki & Dinc (1997) present a more realistic interpretation of the benefits to financiers of such relationships which avoids the explicit idea of exact capture. They define relational financing as "a type of financing in which *the financier is expected to make additional financing in a class of uncontractible* [sic] *states in the expectation of future rents over time.* [They define] types of financing that are not relational as *arm's length* financing." (p.5). The definition of relationships is thus extended to include e.g. step-financing by venture capitalists as discussed below, not just SME-bank associations; in the former case, the venture capitalist expects to make entrepreneurial rents (from the IPO), while in the latter the bank expects, for example, informational rents. Despite the eventual extraction of rents which justifies the financiers' role, relationship banking seems to be the best method for the firm to overcome problems of asymmetric information which restrict bank funding.

Aoki & Dinc's relational financing is a model which favours the specialisation view of European financial sector changes over the disintermediation alternative.[22] They suggest that

[22]NB. The 'specialisation' view holds that as banks in general move out of intermediation and into the provision of financial services, this will leave opportunities in for niche banks specialising in, e.g., industrial loans. The alternative is that disintermediation will leave no intermediaries to lend to small businesses. These and other arguments will be discussed more fully in the fourth paper of this series.

relational financing can be encouraged as the institutional 'norm' through policy, and that this can be positive in certain situations. The worry that European banks are moving inexorably toward the provision of financial services to the exclusion of industrial loans and other intermediary services may be eased by the implementation of policy to promote specialisation. The 'optimistic' outcome of banking changes is that niche banks arise to fulfil such duties and through their superior knowledge of firms and local/market expertise overcome much of the informational costs which face more general competitors at present - those banks which are most likely to withdraw completely.[23]

As an extension, to capture earlier and more fully the benefits of relational financing, Petersen & Rajan (1994) suggest the bank making its commitment to the long-term explicit by taking an equity stake in the firm. While banks across Europe (and especally in the South) are attempting to rid themselves of equity stakes in large firms to which they have become trapped as lenders, this would be an unpopular position to advocate; but not necessarily a bad one.

Clearly it would not be viable at the outset of the relationship, but it seems reasonable to theorise that at a certain point in the relationship the option value to the bank of not having committed to the longer-term will become zero, and an equity investment at this stage would not only make the signal clear but also reassure the firm by changing the bank's incentive structure against the possibility of exploiting its informational advantage.

This section has seen the use of various tools to reduce the difficulties associated with informational asymmetries between SMEs and banks, and the general significance of relationship banking. We ought also to consider the role of relational venture capital financing, which leads us into the next section: the role of equity investors requires detailed attention, as the main alternative to bank funding and also as a complementary source.

I1.iii: SME equity

The most common form of equity investment is that from third part equity investors (TPEs). In Southern Europe these are typically local investors with attributes such as a network of contacts, knowledge of bureaucratic procedure or relevant experience. Business angels are the type of TPE on which the literature is based, since these are the prevalent set in Anglo-Saxon economies. They are generally high net-worth and/or high income individuals with time and probably expertise which allows the acquisition of information about the firm's

[23]The question of European banking changes will be examined in detail in the fourth paper of this series.

product(s) and market, and in that sense are closer to venture capitalists than the Southern European variety. While there is a dearth of research on TPE financing *except* for angel finance, the following case has been directed at this latter:

> "...studies of the angel capital market are virtually nonexistent and it is safe to say that policymakers and academics know almost nothing about the characteristics of this market, except that it is likely to be a large and important market for small private firms to raise equity."
>
> - Prowse, 1998, p.786.

This provocative comment is not unfounded. However, it does overestimate the importance of a market which provides - according to SBIC data - just 3.59% of total finance to small businesses in the US (a country with a relatively highly developed angel finance market). But then again, this - and venture capital at 1.85% - "considerably understates the role of the external private equity market [because these groups] invest very selectively and target small companies with significant upside potential." (Berger & Udell, 1998, p.15).

Given that our concern is not with SMEs generally but specifically those which seek to make technological investments, it is reasonable to suppose that this category is proportionately over-represented in the group which receives angel and venture capital backing. These SMEs signal by their investment desires that they are interested in growth and as such should not be classified among the overwhelming majority of young firms which would not be candidates for this backing. Furthermore, a study of US venture capital (Kortum & Lerner, 1998) has found that while it funded less than 3% of R&D, it resulted in 15% of industrial innovations. This suggests that there exists some complementarity between improved financial management and innovatory performance, so venture capital's importance may well outweigh proportional usage.[24]

The angel market contrasts sharply with those of banking and venture capital in that it is not intermediated. The individuals invest directly in equity stock of the firm, and may or may not also take board positions and lend their expertise in marketing, management or particular fields of business. They may operate in syndicates as well as individually, but the transaction is ultimately about a personal investment. For this reason, angels invest in areas of their expertise and experience, overcoming some costs of due diligence which underlie the existence of banks as efficient information producers using pooled funds of many small

[24]Although of course there are reasons other than any R&D management ability of venture capitalists why this should be the case; these are discussed below.

depositors. There are also generous tax incentives to such investments - complete tax write-offs for UK individual angels, for instance.[25]

Networks have been founded in the States to better facilitate the dealings between angels and entrepreneurs, often run by nonprofit institutions, and acting as a 'switch' between entrepreneurs' summaries of investment projects and approved angels. Their value remains to be proved. In the UK, regulatory issues can cause problems. The *Informal Investment Quarterly* in Scotland carries 'case studies' about the details of particular companies, their funding requirements and projects and contact information, while pointing out on the same page that business plans are defined as being investment advertisements and as such can only be sent out by people who are authorised under the terms of the 1986 Financial Services Act, like lawyers. The 'case studies' are apparently not business plans, although the line may be a fine one.

These problems aside, it is possible to draw the general distinction between angels as investors for income as opposed to venture capitalists whose goal is capital gain. As such, it is the exit strategy which is particularly important to venture capitalists, and this explains the fact that the 1.85% of US SMEs receiving venture capitalist funding translates to 30% of the IPOs in the 1990s. IPOs are the most attractive form of exit, followed by acquisition by another firm. This apparent greater financial concern indicates as well that venture capitalists are more likely to bring financial expertise than angel investors, who may receive some 'psychic' return on their investment.

The value of a 'job' of sorts, as director or partner, can be considered in economic terms - the associated increase in utility must at least balance the risk which is taken on with the investment. This positive payoff from involvement will lead the angel to consider projects which might be given a lower value by a venture capitalist or other 'disinterested' agent. This return may also be a motivating factor for Southern European TPEs. Having a hand in businesses in the local area may provide a level of prestige with an economic benefit.

Venture capitalists fulfil the function of investors more fully than do angels, who in turn outdo Southern European TPEs. Intermediating the pooled funds of investors and using their expertise to assess a range of investment opportunities, and then to exercise control over the business's performance and their own exit requires a range of skills. The screening necessary to overcome information problems discussed above is followed by a range of tactics to solve

[25]The *Informal Investment Quarterly* advises against investing solely for the tax incentive, yet still describes a well known angel's approach as being "typical among angels - to exploit tax incentives to justify investments." This angel has yet to make a return on any investment, it may be worth noting; two have vanished as complete write-offs.

principal-agent problems.[26] In order to ensure the entrepreneur's effort, and make up for any lack of information or skill, particularly when the problem is exacerbated by an uncertain project value revealed over time, a variety of tactics are used by venture capitalists.

Investments are generally staged so that production options are efficiently exercised and stopping control is optimal; so-called step-financing allows the venture capitalist to monitor the performance of companies or projects with a genuine threat of cutting off investment. This is one reason why the R&D performance of venture capitalists appears particularly impressive - funds are only allocated as long as the project continues on course for success, an option which of course insider investors with no other investments do not have - and thus the results for venture capital firms appear relatively impressive. It may also be the case that venture capitalists pick those opportunities which are either more likely to produce concrete innovations, or indeed those which are sufficiently far down the R&D path that the innovatory stage has been achieved (and funded) already.

In terms of other tools by which venture capitalists retain an element of control, the choice of debt and equity may be manipulated to ensure appropriate incentives, covenants (as in the previous section on banking) may be employed, and the allocation of board membership and voting rights will play a role.

This description - as opposed to that of the banks' decision in the previous section - suggests a great deal of systematic rigour. It would be easy to think - particularly from the rather propagandistic publications of venture capital bodies such as the European Venture Capital Association - that these are the actors best equipped to choose which projects and firms deserve funding. Certainly this would appear to have been the view taken by the Dutch government in the 1980s when a huge amount of money was allocated to encouraging such activity.[27] On this basis, the conclusion to reach would be that governments should indeed devote resources to lightening the regulatory burden on venture capitalists, subsidising directly or through the tax system the IPOs which ensure their continued activity and generally taking the view that they are the experts and should be given as much help as possible since they are best positioned to choose worthy projects. Instead, we pass on to some more reasoned findings.

III: Some policy questions

[26]This section again follows Berger & Udell, 1998.

[27]The success, or otherwise, of this approach will be discussed in detail in the second paper of this series.

The role of the various agents in the SME funding decision have been looked at individually through the predominantly Anglo-Saxon literature. As was stated in the opening remarks the successful SME's standard pattern - if such a thing existed - would be an original personal (insider) investment, the opening of a bank relationship, TPE investment followed by venture capital backing - with bank involvement growing throughout, and finally an IPO. In each case the preceding investment has a positive impact on the chances of each further investment being made. It need not be the case that every successful SME will make use of each type of funding as it grows, and nor yet is it necessary that successful SMEs grow into LCs.

This returns us to a question which was raised in the preliminary remarks of this paper; should policy be focussed on aiding successful SMEs to grow further, or rather on reducing the high mortality rate of (unsuccessful) SMEs? The policy implications may be radically different. If the aim is to capitalise on successful firms' achievements, the focus may well fall on ensuring the smooth operation of suitable regional stockmarkets and the supply of investment at that stage. If on the other hand the aim is to minimise the lack of success at the other end of the scale, it may be necessary to address earlier stage problems of access to bank loans (or perhaps the regulation of potential TPE investors).

The reasons this project is researching technology-based SMEs were set out above - as SMEs, their positive impact on the quantity and stability of employment, and as technology-based firms their contribution to growth through innovation. It seems that both more, and less successful firms might equally fulfil the first role. However, as growth takes SMEs closer to LCs, presumably these benefits diminish, so this suggests a stronger role for helping less successful firms. The contribution of innovative SMEs to growth must surely lead to the reverse conclusion though - the role of policy must be to support those firms which flourish and in doing so encourage a virtuous cycle of technology-driven growth.

Clearly there exist complementarities between the types of financing, and this may alleviate the problem a little. Each further investment by one type of fund supplier will chip away at the problem of informational opacity, making further financing easier. But consider the chain of events in reverse chronological order - from success to start-up. It is the exit which is crucial, be it an IPO or an acquisition (or for that matter a merger, bankruptcy or position of no further expansion). The stronger the chance of an IPO for successful firms (the best exit strategy for equity-holders, as seen above), the better the chances for each start-up to receive financing because the expected return is improving. Whether non-equity holding banks are affected directly is irrelevant - the involvement of venture capitalists is a strong signal to banks given the financial expertise and expectation of high profits which the venture capitalist brings to the table - so the indirect effect of more successful IPOs will be an improved access to bank debt for less mature SMEs.

The conclusion of this then is that a stronger, more efficient stock market for technology-based IPOs will have the desired effects on SMEs at any point on the scale of success - the whole scale should shift up. It should become easier to move from each type of investment backing to the next, simply because the chances of a favourable outcome for equity-holders will have improved. But what of banks? There is clearly an alternative strategy which emphasises these financiers more.

Given that banks appear to be the suppliers of funds which maintain the longest relationships with firms, one may say that perhaps they have the most opportunity to influence the fortune of their clients. Certainly we have seen that there are benefits to the relationship at least up to a point. Early equity involvement of the bank, it was suggested, might achieve these gains more quickly. Moreover, such a signal from the institution which is expected to be in the best informational position about the firm would be strong indeed. A SME with such backing might reasonably expect to find the funding it required from then on, and the bank's position would also encourage greater optimism at market if an IPO was again the eventual exit strategy.

The success of IPO exits is significant then to create expectations and thus incentives for entry-level investors. It depends on the existence of sufficient numbers of, and collective funds of, potential investors willing to accept the associated risks of the shares that the venture capitalists or other equity dealers are selling. As will be seen in the discussion in the next part of this paper on the Dutch case, there are problems which may arise when IPO exits are the focus of government policy. In particular, the Dutch secondary market appears to have unravelled because of a lack of trust in the venture capitalists; their decision to sell was viewed as indicating their valuation of the stock (as insiders) was less than that of the market.

This problem is solved in the USA by obliging the dissolution (at the end of a fixed term) of venture capital funds, which seems a fine straightforward answer; again, a more detailed examination will be made in the second paper. As well as distinguishing between policy for successful and less successful SMEs, or between debt and equity, one further comparison must be made. The role of venture capitalists in the process of technology investment by SMEs has been shown to be very different from that of banks. The agreement of venture capitalists to finance a project leads to a number of outcomes - firstly, the commitment of a single financing package (although each stepped payment is generally contingent to maintain an element of control over the project); secondly, the dilution of owner control as an equity stake is being sold; and thirdly, the input of managerial and financial expertise to the SME's decision making processes, with the specific goal of profitable exit for the venture capitalist.

The involvement of banks is characterised instead by a number of contrasting features. Firstly,

their commitment is more incremental - they begin by providing basic banking services, with no greater obligation than the provision of some overdraft facility, and only as the relationship progresses are they prepared to commit to longer-term debt of larger amounts. Secondly, the control of the owner is not affected by the banks' involvement - the incentive structure may be altered by the existence of guarantees against the owner's other possessions, but the decision processes remain unaltered. Thirdly, the bank *may* contribute managerial and financial expertise to assist the SME, but with no motive other than safe repayment.

The implications of these differences for SMEs and policy provide the general conclusions of this section. The use of policy which supports venture capital will presumably have a more sudden effect in the small number of firms which are affected at all, while encouraging bank lending to small businesses might have a more widely spread, less violent impact on a much greater number of firms. This split will be examined more closely in the second foundation paper.

Section IV: Southern European perspectives

Finally here we may consider how accurately the literature surveyed in this section has reflected conditions in Southern Europe. We must ask how these economies differ, and then how this affects the preliminary policy conclusions reached. The preceding sections have almost exclusively dealt with the literature on financing with no regard to the realities of the structure in Southern European economies. The following characteristics are noteworthy in light of the above discussion.[28]

All have experienced significant liberalisation in their financial sectors in recent years. Spain, for instance, began in the 1970s to eliminate restrictions on the expansion and establishment of banks, and this process continued in the early 1980s along with reductions in the enforced specialisation of industrial banks (medium to long-term financing and promotion of favoured enterprise) and commercial banks (short-term financing). Greek banking was dominated by the state in terms of ownership as much as legislation, controlling 90% of all banking (70% of the commercial sector consisted of just two state-owned banks); the situation here was not seriously addressed until the report of the Karatzas Committee in 1987. In both countries venture capital companies were only legislated for during these liberalisations, and both have been characterised as overly restricted; certainly both have remained very small.

The tax system in Spain has been considered generally favourable to debt as opposed to equity

[28]The following discussion is based on the country reports written for this project, i.e. Lyberaki & Milonas, 1998 (Greece), Martinez Gonzalez-Tablas & Diaz Fuentes, 1998 (Spain) and Simoes & Biscaya, 1998 (Portugal).

financing, but significant changes have been made throughout the last fifteen years. The establishment of a second stock exchange for smaller firms (1986) and the venture capital legislation were complemented by the establishment of mutual guarantee companies and the 'participative credit' scheme. This last was designed to provide long-term finance for SMEs (usually longer than 6 years), with repayments which depend on profits and are subordinated to all others; in essence, this is a selective credit scheme but one which involves an element of risk-sharing by the funder. The mutual guarantee company legislation allows SMEs to join together to guarantee the loans made to individual members, and is thus another instrument (as in section II.ii) with which to secure bank loans.

The Greek experience is indicative of the relative lack of success - in terms of easing financial constraints on SMEs - of these liberalisations and other measures. From 1985-95, equity use increased by a factor of more than ten, short-term debt by 2.5 and long-term by almost two; the average gearing ratio of firms rose from 0.10 to 0.64. The use of retained earnings grew by nearly eight times. These figures do not tell the problems which accompanied this massive expansion of finance - "*there is no indication of a shift in borrowing from short-term to long-term*" - Lyberaki & Milonas, 1998, p.28.

Financing has essentially increased for a certain group of firms - those which can access the stockmarkets (a larger group with the introduction of secondary markets but nonetheless a small minority), those which are able to borrow in foreign currency at relatively favourable interest rates (larger companies which may hedge against currency risk through international trade), and those which are favoured by particular government schemes - again a small minority. *"The average Greek industrial firm must seek financing sources so as to retire part of the short-term debt with long-term debt or equity in order to improve its liquidity as well as its capital structure"* (ibid.) - there continues to be a shortage of funds for long-term investment projects, especially in small and medium-sized firms.

The findings of section II would not seem to be significantly affected by the structure of the economies in question. Clearly there are substantial differences between Southern European and Anglo-Saxon economies, but in terms of policy conclusions the former appear susceptible to similar measures. While the relatively recent liberalisation of the banking sector may encourage support for policy in this area, the small scale of secondary stock markets and the failure of venture capital legislation to promote these activities are also problems which both the literature and evidence point to - these must continue to be the main conclusions of our survey.

Looking in more general terms at a number of stylised features of Southern European economies may produce a less convenient answer however, and will certainly shed more light

on the relevance of section II's policy results. Berglof (1997) discusses two generic types of financing, arm's-length and control-oriented, and it is reasonable to consider Southern Europe in the second of these while the US and UK are firmly in the first. The differences are significant.

Stock markets in Southern Europe do *not* operate as markets for corporate control. Equity ownership tends to be heavily concentrated compared to the Anglo-Saxon case, as evidenced by Table II. The share of the largest owner is strikingly higher for Spain than for the UK. The effect of Southern European investment's control-orientation is important, for instance giving rise to the type of 'pyramiding' of firms cited in the context of the Agnelli empire above. More significantly, there is an effect on smaller investors of highly concentrated ownership.

Table II: Ownership concentration in all listed firms, Spain and UK (1990)

Largest owner's share (%)	>50	20-50	10-20	5-10	<5
Spain	49%	|---------- 49% ----------|			2%
UK	5%	29%	27%	30%	9%

Source: Berglof, 1997 (adapted).

The willingness of investors to take non-controlling stakes is key to successful stock markets of either paradigm. In the control-oriented market, however, the knowledge that all shares are paid the same and that one owner has essentially a controlling interest should be sufficient to ensure that smaller investors can interpret such holdings as a signal which allows them to disregard informational asymmetries and invest. Partly because of the tendency of owner/managership at the level of large firms, firm managers tend to have more autonomy in Southern European economies. In terms of banking, this implies an absence of the relational financing which is institutional in Japan (Aoki & Dinc, 1997) and which has been shown in section II to convey significant potential benefits.

This institutional importance in Japan was responsible for Mayer's (1990) finding that the share of external finance - mainly in the form of bank loans - was considerably higher there than in the UK and USA (which had the heaviest reliance on internal funds) or France and Germany. Japan has since suffered serious difficulties connected to the banks' dangerously close links with their relational clients, and the resulting over-extension of credit. The non-institutional nature of relational financing in Southern Europe then does not mean that relationship banking is not an option, and is probably positive. Southern European banks, as mentioned above, had to an extent found themselves over-extended to clients in which they held equity shares, so the likelihood of relational banking - and the associated risks - becoming institutionalised is small.

The implications of this split between the Anglo-Saxon and Southern European economies in terms of control and arm's-length investment orientation are not completely clear. In stock markets, on the one hand, the entrance of small equity investors may be discouraged by the control orientation of Southern markets - and yet the implicit guarantee of the controlling agent's large shareholding should offset this through reduced agency costs. In banking, relational banking seems to have room to expand but will probably face some resistance. A final point is that the investments of friends and family in Southern Europe may be more important than in the USA in particular on the basis of stronger social bonds acting as guarantees of investment to overcome principal-agent problems.

This paper has shown how the financial constraint will be binding on SMEs investing in technology, and considered a number of policy options to loosen it. In particular, the possibility of slower intervention in the banking sector with a more widespread impact has been examined as compared to more sudden and narrowly targeted venture capital policy. The sister paper will consider first the specifics of technology investment within the SME life-cycle model and then in much greater detail the policy options resulting from combining the finance and technology life-cycles.

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