

The Size of the Informal Venture Capital Market in the United Kingdom

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ABSTRACT. Despite its undoubted importance to the financing of entrepreneurial ventures, there are few reliable measures of the size of the informal venture capital market. This paper reviews three methods used to generate such estimates – market-based approaches, firm-based approaches and the capture-recapture approach – and develops an alternative approach that is based on scaling up from the visible segment of this market represented by business angel networks. This methodology is applied to provide the first formal estimate of the size of the informal venture capital market in the United Kingdom. Informal venture capital investment is shown to broadly equate to the amount of institutional venture capital provided to start-up and early stage ventures. Reflecting the smaller average size of investments in the informal venture capital market, however, eight times as many businesses raise finance from business angels than from institutional venture capital funds.

1. Introduction

Private individuals who make investments directly in unlisted companies in which they have no family connection – so-called “business angels” – are recognised as occupying a vital position in the spectrum of entrepreneurial company finance options (ACOST, 1990; Mason and Harrison,

2000; Harrison and Mason, 1999; Roberts, 1991; Sohl, 1999). Business angels fill the financing gap between founder, family and friends (the 3 “F”s), finance that is likely to be exhausted in getting beyond the prototype or proof-of-concept stage, and the stage at which institutional venture capital funds might become interested. Because of their high transaction costs, venture capital funds typically have a high minimum investment size, a minimum efficient overall fund size and a correspondingly restricted number of portfolio companies which can be evaluated, invested in and monitored (Gifford, 1997; Murray and Marriott, 1998). In the U.K. there are very few funds that are willing to invest less than £500,000, and the average investment by a venture capital fund in an early stage business is over £1 million (BVCA, 2000). In the U.S.A. the average size of venture capital investments (excluding leveraged buyouts) has continued to rise throughout the 1990s, to \$1.4m per deal in 1998 (Sohl, 1999), a trend which had earlier been identified and described as the removal of “venture” from venture capital (Bygrave and Timmons, 1992). This is, in part, a reflection of the increasing financing requirements of the current generation of technology start-ups. However, it is also a consequence of the increased amount of money being invested in the venture capital industry by financial institutions which has had the effect of raising the average size of investment: “the math is pretty simple. It becomes obvious that you can’t keep adding companies to your portfolio” (Gannon, 1999, p. 39).

Business angels, in contrast, invest relatively small amounts per deal – typically less than £100,000 in the U.K. and \$250,000 in the U.S.A., although deal sizes are larger where angel syndicates are involved – and they generally invest at

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the start-up and early stages of business development (Harrison and Mason, 1992a; Freear et al., 1995). Moreover, business angels invest more than just cash: they generally invest with a view to becoming actively involved in the businesses in which they invest. Most are successful entrepreneurs and so are able to contribute know-how, experience, contacts and skills as well as play a mentoring role (Harrison and Mason, 1992b; Ehrlich et al., 1994; Lumme et al., 1998). Based on these differences, a number of commentators have suggested that the informal venture capital – or business angel – market and the institutional venture capital market are complementary in terms of providing sequential investment in different financing rounds, information flow and even co-investment (where the involvement of the business angel can alter the economics of the small scale investment for the venture capital fund) (Freear and Sohl, 1990; Freear et al., 1994; Sohl, 1999; Harrison and Mason, 2000).

Despite the importance of the informal venture capital market there is very little evidence on its size. This is because business angels are a largely invisible population. They prize their privacy and anonymity (Wetzel, 1981; Benjamin and Margulis, 1996). The same considerations are likely to make them reluctant to respond to surveys (Haar et al., 1988). There are no directories of business angels and no public records of their transactions (Wetzel, 1981). In this paper, therefore, we critically review a number of approaches that have been taken to estimate the size of the informal venture capital market and then develop an alternative methodology in order to provide the first estimate of the size of the informal venture capital market in the U.K.

2. Approaches to estimating the size of the informal venture capital market

Previous attempts to estimate the size of the informal venture capital market, and to compare this with the scale of the formal, or institutional, venture capital market, have followed one of three approaches: market-based approaches, firm-based approaches, and a capture-recapture approach. Each of these approaches has a number of deficiencies.

Market-based approaches

The first attempt to estimate the size of the informal venture capital market was by Wetzel (1986a, b). In an exercise which he described as “playing with numbers” he estimated that the US informal venture capital market in the early 1980s comprised 100,000 business angels who invested around \$5 billion in 25,000 businesses. This estimate is derived from a consideration of both the demand and supply sides in the market.

Approached from the *demand* side, Wetzel noted that the number of business start-ups each year exceeds 500,000. He assumes, following Birch (1979), that 95% are too small and have too limited growth prospects to require outside equity financing,¹ leaving 25,000 start-ups annually that do require outside financing. If these start-ups each raise an average of \$200,000, the aggregate equity funding of these ventures amounts to \$5 billion annually. However, as only around 1,000 of these firms attract finance from venture capital firms it must be assumed that the remainder attract funding from business angels. This estimate of the size of the informal venture capital market is corroborated by a *supply* side analysis. Wetzel noted that 40% of the Forbes 400 Richest People in America are self-made (the typical background of active business angel investors). If this proportion applies to the population with a net worth in excess of \$1 million then this gives a total of 200,000 potential business angels. If half invest in any year, and the average amount invested is \$50,000, then this gives 100,000 business angels who invest \$5 billion. If it is further assumed that a typical deal comprises four investors to reflect the high degree of syndication in the U.S. informal venture capital market (Gaston, 1989a) then this suggests that 25,000 businesses raise angel finance. In a later paper Wetzel (1987) suggested that business angels finance between 20,000 and 50,000 firms each year for an aggregate dollar investment of between \$5 billion and \$10 billion. Wetzel subsequently revised his estimate to reflect the growth of the informal venture capital market in the U.S. In the early 1990s he suggested that there were 250,000 angels in the U.S. who invested \$10–\$20 billion a year in over 30,000 ventures (Wetzel, 1994).²

The merit of this attempt to estimate the size

of the informal venture capital market was that it was the first to provide a sense of perspective and demonstrated how much larger this market was than the institutional venture capital market. However, as Wetzel himself acknowledged, the actual estimate was crude, based on just a few fragmentary pieces of data ("quasi facts") and some "machinations" and "fancies" (Wetzel, 1986a, p. 87). Nevertheless, these estimates were instrumental in establishing the informal venture capital market as a legitimate field of study and a focus of policy analysis and debate.

Firm-based approaches

Gaston (1989a) and Arum (1987), in a series of studies funded by the U.S. Small Business Administration, attempted to provide a more rigorous approach to estimating the scale of the informal venture capital market in the U.S.A. (see also Gaston and Bell, 1988). The estimation procedure involved a two stage process. First, a random sample of firms on the U.S. Small Business Administration microdata file, a comprehensive listing of firms in the U.S.A., was undertaken to identify those firms that had raised finance from business angels. Second, a survey was undertaken of the investors that had been identified in the first stage. National estimates for the number of investors (stock) were derived through the following procedure:

- (i) the total number of firms was multiplied by the percentage having business angels;
- (ii) this statistic was then multiplied by the average number investors per firm to give the total stock of investors;
- (iii) the stock of investors was then multiplied by the average equity investment per investor per firm to give the amount invested;
- (iv) this figure was then divided by the investment holding period to give a point estimate of the annual amount of informal equity investment.

Based on this approach Gaston estimates that the U.S.A. has a stock of 720,000 business angels (one investor for every 241 adults, or 1 for every 115 families). The number of firms raising informal venture capital was estimated to be 87,000, and the annual flow of informal venture capital was estimated to be \$32.7 billion. These figures differ

significantly from those provided by Wetzel (1986), largely due to differences in the investment profiles of the investors identified in the two studies and to the restriction of estimates of the population of business angels in the Wetzel estimates to those with net wealth above \$1 million³ (see Gaston and Bell, 1988, pp. 154–161). This amount (\$32.7 billion) was eight times larger than the flow of institutional informal venture capital investments and it almost exceeded all other formal sources of external equity in the U.S.A. (e.g. venture capital, IPOs, SBICs, private placements, S-18 registrations, small firm cash offerings). Adding loans and loan guarantees (estimated to amount to \$22.9 billion) made by business angels increased by 70% the amount that business angels supply to entrepreneurial businesses. Moreover, the majority of business angels wanted to invest more than the volume of opportunities that they received permitted. This notional supply of finance was estimated to be \$19.3 billion. The total amount of equity and near equity investment, including the notional amount available, was therefore estimated to be \$74.9 billion.

The primary weakness of this approach is that it is based on extremely low responses to the surveys which provide the basic information for the calculations. Gaston (1989b, p. 224) acknowledges that "non-response was typically large." The SBA surveys that provided the basis for Gaston's estimate (Gaston and Bell, 1986, 1988; Arum Associates, 1987) were based on 435 usable responses from 2,900 business angels identified from three stage one surveys involving a total of 240,000 firms. Arum's survey of business angels in the Great Lakes region, which involved an initial mailing of 20,000 firms, resulted in the identification of 200 business angels, of whom just 68 responded to the second stage questionnaire (in most cases after several telephone reminders), with just 55 of these responses being from qualified business angels (Arum, 1989). As a result, these point estimates of the scale of the informal venture capital market are subject to considerable margins of error. The Gaston national estimate of \$32.7 billion, for example, is the best estimate within a range from \$15.6 billion to \$58.6 billion (Gaston and Bell, 1988, p. 176), and the Arum regional estimate of \$2.88 billion is subject to 95% confidence limits between \$400 million

and \$7.9 billion. As Arum (1987, p. 13) notes, "because of the small samples involved in estimating the sample means . . . this point estimate is subject to considerable uncertainty." Gaston and Bell (1988) discuss the sensitivity of their estimates (which, as they point out, are based on components which are themselves estimates) and attempt to assess their plausibility. They conclude that despite the range of possible values, they are at least of the same order of magnitude (unlike the Arum estimates): "while the point estimates are consistent with other available information, they are only a first approximation. They need to be validated, and adjusted if necessary, by directly comparable independent data which, at present, do not exist" (Gaston and Bell, 1988, p. 163). This validation still needs to be done.

The capture-recapture approach

A third approach to estimating the size of the informal investor population is the capture-recapture statistical method used by Riding and Short (1987). Conceptually, the problem of estimating the population of investors in a defined geographical territory is similar to that encountered in biology where the problem is to estimate the population of a species. The capture/recapture approach is a way in which the size of a population can be estimated without having to resort to a census. A key feature of this technique is that it provides a means of controlling for sample deficiencies which can arise when certain respondents are highly visible or invisible in social settings. The analysis is based on the number of times each of the 50 investors in a sample of business angels in Ottawa-Carleton was nominated by others in the sample. The model predicts the unsampled balance of the population. This procedure produced an estimate of 87 as the size of the informal investor population in Ottawa-Carleton. This is about 5% of the population who exhibit demographic characteristics similar to those of active investors.

This is an ingenious approach to the problem of estimating the size of the informal investor population and is worthy of replication in other geographical contexts. However, there are a number of limitations to its applicability. First, the approach is best suited to generate estimates for cities and regions rather than at the national scale:

given that the informal venture capital market is not a national one, but a series of regional and local markets, this is an appropriate approach, but the results from one region cannot be extrapolated to the national level. Second, the approach does not necessarily provide the basis for estimating the pool of finance invested or available for investment by the population of business angels. Third, the technique relies on the identification of a sufficiently broadly-based sample of business angels to generate meaningful estimates of the population, but the basis for doing so is not clear. Fourth, the technique assumes the existence in a region of a single population of business angels who can be identified and recognised by other business angels and who are equally networked to other business angels: if there are diverse sub-populations of business angels which are more or less separate, the technique will tend to underestimate the total population.⁴ Finally, application of the technique relies on the willingness of investors in the original sample to volunteer the names of other angels known to them: however, investors may be unwilling to do so (Lumme et al., 1998).

Summary

Although these approaches to estimating the size of the informal venture capital market have provided useful insights into the scale of this market in North America they have significant deficiencies which limits the reliability of the estimates that are produced. For this reason alone it seems appropriate to seek an alternative approach to estimating the scale of the market. Furthermore, these estimates are now dated: despite the increased interest in the informal venture capital market, from both a research (Mason and Harrison, 2000) and policy perspective (Aernoudt, 1999), there have been no attempts to estimate the scale of the market since the late 1980s. But even more significantly for our purposes, neither the market-based approach nor the firm-based approach are appropriate for generating estimates of the size of the informal venture capital market in the U.K. because they have specific data requirements which cannot be met. Furthermore, the capture-recapture approach is inappropriate as a means of generating estimates of the size of the informal venture capital market for a country the

size of the U.K. Thus, estimating the size of the informal venture capital market in the U.K. requires a *different* approach which is compatible with data availability.

3. Estimating the size of the informal venture capital market in the U.K.

In this section we present an alternative approach to estimating the size of the informal venture capital market, and in so doing provide the first-ever estimate of the size of the informal venture capital market in the U.K.⁵ However, it is important to note that we do not argue that this approach is necessarily better than those reviewed in the previous section; indeed, in the concluding section of the paper we highlight ways in which the methodology can be refined. Moreover, it is not a universal method. Rather, it is an approach that can be applied in the U.K. using available data.

As noted earlier, the informal venture capital market is largely invisible on account of the preference of business angels for anonymity. However, with the establishment of business angel networks (BANs) a small part of this market place – just the tip of the iceberg – is now visible, and can provide the basis for generating an estimate of the total size of the marketplace. BANs are intermediary organisations which seek to reduce the inefficiency of the informal venture capital market by providing a channel of communication which enables investors and entrepreneurs seeking finance to find one another more easily (Harrison and Mason, 1996). As such, they address the primary inefficiency in the market for informal venture capital, which is not the availability of capital per se, but the availability and flow of timely information on both the demand and supply sides (Wetzel, 1986a, b; 1987).

Estimating the number of business angels

There are currently 48 BANs in the U.K. which are listed in a directory which is published annually by the British Venture Capital Association (BVCA, 1999b). This directory includes information on the number of investors currently registered with each BAN. Those BANs that were listed in the 1999–2000 directory have a total of 5,651 registered investors.⁶ This includes

both active investors and also “virgin” angels who are looking to make their first investment. This figure is used as the basis for estimating the total number of business angels in the U.K. However, before making any extrapolation from these figures it is necessary to make two categories of adjustments. First, adjustments have to be made to reflect both over- and under-counting in BAN membership. Second, those business angels who are members of any BAN represent only a small proportion of the population of business angels: this proportion must be estimated.

The main source of under-counting arises because some investors who register with BANs are representing other investors. For example, professional advisers (e.g. accountants) often register with BANs with a view to identifying investment opportunities on behalf of their clients. Some business angels may also register on behalf of investor syndicates. Sources of over-counting are rather more significant. First, some of those who register with BANs are not genuine investors. They may either register for reasons other than to find investment opportunities (e.g. business intelligence) or else are other types of investor (e.g. venture capital fund, corporate investor). Second, some business angels register with more than one BAN. There is no information available to allow us to gauge, and therefore adjust for, the under-counting or the first source of over-counting. However, evidence is available to adjust for over-counting that arises from investors registering with more than one BAN. This evidence, from a survey of business angels who are members of BANs, found that business angels are registered with an average of 1.4 BANs (Mason and Harrison, 1997b).

Crucial to our estimation procedure is information which offers a guide to the proportion of business angels who are members of BANs. Reliable evidence is not available and so in the absence of any alternative information a figure of 20% is used. This scaling factor is based on evidence from a Private Investor Forum organised by London Business School's Forum for Entrepreneurial Management in October 1996, attended by some 40 business angels (Kelly and Hay, 2000). However, it should be noted that managers of BANs regard this as too high a proportion: in their view, BANs have attracted

only 5 to 10% of U.K. business angels. Moreover, the proportion of business angels who are members of business angel networks may vary geographically.

Thus, the *number* of business angels in the U.K. can be estimated as follows:

$$BA_{tot} = (BAN_{memb} \div M) \times S \quad [1]$$

where:

- BAN_{memb} = number of investors registered with BANs in mid-1999 [5,651];
- M = the average number of BANs which these business angels are registered with [1.42];
- S = the inverse of the proportion of business angels registered with a BAN [$100 \div 20 = 5$].

This calculation gives a figure of 20,182 as the estimate for the total number of business angels in the U.K. in 1999. However, this estimate is extremely sensitive to our figure for the proportion of business angels who are members of a BAN (S in equation [1]) which, as noted above, is based on rather flimsy evidence (Table I). In making the estimate in this paper we have used the most conservative of these figures. A key requirement in refining this estimate is to obtain better evidence on the proportion of business angels who are members of a BAN.

Estimating investment activity

Estimating the investment activity of business angels is equally problematic. A survey of investment activity by business angels that is channelled through BANs is published annually alongside the directory of BANs. For 1998–99, business angels registered with BANs invested a total of £20.0

million in equity and loans in 185 companies (BVCA, 1999c). Here again, this constitutes an under-estimate because of non-response from some BANs (3) which are unable to track the outcomes of the introductions that they provide. Previous research has established that business angels who are registered with BANs nevertheless make most of their investments in businesses that they identify from their own personal, informal referral sources, with opportunities referred by BANs comprising only a minority of their investments: a survey of business angels registered with BANs found that since 1993⁷ they had made only 30% of their investments, accounting for 20% of the amount they have invested, in opportunities that they had identified as a result of their membership of a BAN (Mason and Harrison, 1997b).

Following the same approach as used to estimate the number of business angels, this evidence can be used as the basis for estimating the scale of investment activity by business angels, in terms of both the number of investments made and the amounts invested. The number of investments made by business angels in 1998–99 is estimated as follows:

$$N_{inv} = BAN_{inv} \times PI_{inv} \times S \quad [2]$$

where:

- N_{inv} is the total number of investments;
- BAN_{inv} is the number of investments that business angels made through BANs in 1998–99 [185];
- PI_{inv} is the inverse of the percentage of investments that business angels who are members of a BAN make in opportunities that they have identified through a BAN [$100 \div 30 = 3.3$];
- S is as defined in equation [1].

TABLE I
Sensitivity analysis for estimates of the number of business angels

	Member/non-member ratio: 20%	Member/non-member ratio: 10%	Member/non-member ratio: 5%
BAN_{memb}	5,651	5,651	5,651
M	1.42	1.42	1.42
S	5	10	20
BA_{tot}	20,182	40,364	80,729

See text for definition of terms.

This calculation gives an estimate of 3,052 investments in 1998–99.

The estimate for the *amount invested* by business angels in 1998–99 is estimated as follows:

$$N_{\text{amnt}} = \text{BAN}_{\text{amnt}} \times \text{PI}_{\text{amnt}} \times S \quad [3]$$

where:

N_{amnt} is the total amount of investment;

BAN_{amnt} is the amount invested by business angels through BANs in 1998–99 [£20.0 million];

PI_{amnt} is the inverse of the percentage of the amount that business angels who are members of a BAN have invested in opportunities that they have identified through a BAN [$100 \div 20 = 5$];

S is as defined in equation [1].

This calculation gives a figure of £500 million.

Here again, these estimates are sensitive to the accuracy of the scaling factor [S] which takes account of the proportion of business angels who are members of BANs (Tables II and III). If this figure is reduced to 1 in 10, rather than 1 in 5, the estimate of investment activity changes to £1.0 billion invested by around 40,000 business angels in over 6,000 companies. If only 5% of business angels are members of business angel networks

then the estimate of the annual amount of investment activity doubles again to £2.0 billion invested by over 80,000 business angels in over 12,000 businesses.

These estimates also assume that business angels who are members of BANs invest on the same frequency and invest the same amounts per deal as those who are not members of BANs. However, it is probable that those business angels who are members of BANs are “big hitters”, making larger and more frequent investments, and therefore join BANs to obtain a greater flow of investment opportunities.⁸ Indeed, the membership fees levied by many BANs might be expected to deter infrequent and small-scale investors from joining.⁹ As most empirical studies of business angels have been based on surveys of investors who are members of BANs (because of the difficulties involved in finding business angels) (e.g. Coveney and Moore, 1998; Mason and Harrison, 1997b) there is no empirical evidence available to either support or challenge the argument. As a consequence, there is no clear empirical justification for scaling these estimates, nor any guide as to what the scaling factor should be. However, it should be recognised that these figures may represent an over-estimate of the size of the informal venture capital market.

To put our estimate of the size of the informal

TABLE II
Sensitivity analysis for estimates of the number of business angel investments

	Member/non-member ratio: 20%	Member/non-member ratio: 10%	Member/non-member ratio: 5%
BAN_{inv}	185	185	185
PI_{inv}	3.3	3.3	3.3
S	5	10	20
N_{inv}	3,052	6,105	12,210

See text for definition of terms.

TABLE III
Sensitivity analysis for estimates of the value of business angel investment

	Member/non-member ratio: 20%	Member/non-member ratio: 10%	Member/non-member ratio: 5%
BAN_{amnt} (£m)	20.0	20.0	20.0
PI_{amnt}	5	5	5
S	5	10	20
N_{amnt} (£m)	500	1,000	2,000

See text for definition of terms.

venture capital market into perspective, the formal, or institutional, venture capital industry made 1,122 financings in 1998, involving a total investment of £3.8bn (BVCA, 1999a). However, much of this has been invested in MBOs and MBIs. It is therefore more meaningful to compare early stage (including seed and start-up) and expansion stage investments by the informal and formal venture capital markets – what Bygrave and Timmons (1992) call “classic” venture capital. The formal venture capital industry made 802 investments in companies at their early and expansion stages, involving a total investment of £1.1bn (BVCA, 1999a). The BVCA’s *Report on Business Angel Investment Activity 1998/99* indicates that 61% of investments by business angels, involving 44% of the amount invested, were in businesses at seed, start-up and other early stages, and a further 25% of both investments and the amount invested, was at the expansion stage (BVCA, 1999b). Applying these proportions to our estimate of annual business angel investment activity suggests that business angels have made about 2,625 investments in businesses at their start-up, early stage and expansion stage, involving a total investment of £350m. In other words, business angels make more than three times as many investments as venture capital funds at the early and expansion stages, but on account of the much larger deal sizes involved, venture capital funds invest more than three times as much. Considering just early stage investments, venture capital funds made 241 investments, involving a total investment of £288m (BVCA, 1999a). In comparison, we estimate that business angels have made over 1,800 early stage investments, involving a total investment of around £220m. Thus, business angels make nearly eight times as many investments as venture capital funds in early stage businesses, although the amounts invested are similar.

The greater relative significance of business angels at the early stage, and their greater significance in terms of number of investments rather than amount invested emphasises that the earlier the financing stage, and the smaller the amount invested, the more important are informal, as opposed to formal, sources of venture capital (Freear and Wetzel, 1990). However, when compared with U.S. estimates (Wetzel, 1987; Gaston, 1989b) where informal venture capital

exceeds the institutional venture capital market in terms of both number of investments made and amount invested, it can be seen that the U.K. informal venture capital market is still relatively underdeveloped.

4. Conclusion

Previous approaches to estimating the size of the business angel population, and the annual level of investment activity, have several deficiencies. Moreover, these approaches cannot be applied in the U.K. because data requirements cannot be met. The approach that has been developed in this paper arises from data availability. It is based on extrapolating from the visible part of the market place, namely the investment activity that is channelled through BANs. It draws on five sources of information: the number of business angels registered with BANs; survey evidence which indicates the average number of BANs with which business angels are registered; evidence on the investment activity that is recorded by BANs; an estimate of the proportion of business angels who are members of a BAN; and information on the percentage of investments that business angels who are members of a BAN make in opportunities that they have identified through a BAN (as opposed to other information sources).

Our calculations conservatively indicate that there were around 20,000 business angels in the U.K. in 1998–99 (equivalent to one for every 2,200 adults). They invested £500 million in about 3,000 businesses. However, these figures are extremely sensitive to our estimate of the proportion of business angels who are members of a BAN, which is based on admittedly rather flimsy evidence (but is, nevertheless, the only such evidence available). Changing this ratio from 20% to 10% would double our estimate of the scale of the informal venture capital investment activity in the U.K.; changing it to 5% (which is consistent with the professional judgement of BAN managers in the U.K.) would quadruple our estimate. Nevertheless, even if only 5% of business angels in the U.K. are members of a BAN this would mean that there was one business angel for every 540 adults which is half the rate given in Gaston’s estimate for the U.S.A. in the late 1980s (Gaston, 1989b). Despite the differences in

estimation methodology, these estimates appear intuitively reasonable: Gaston's estimates suggest that the U.S. informal venture capital market is more extensive, advanced and highly developed than that in the U.K., which is consistent with research evidence (Harrison and Mason, 1992a). Given the expansion in the U.S. informal venture capital market in the past decade, and the evidence that patterns and levels of entrepreneurial wealth accumulation in the U.S. and Europe have been rather different, the suggestion that the "incidence" of informal investment in the adult population in the U.K. is less than half the rate in the U.S. indicates that there is still scope to increase the significance of informal venture capital for the funding of entrepreneurial businesses.

Improving the very approximate estimates that have been generated by the methodology that has been developed in this paper requires that the data used for extrapolation are enhanced. This can be done in two main ways, albeit at significant cost. First, and most obviously, there is a need to more accurately estimate the proportion of business angels who are members of BANs. Any differences between regions in the proportion of business angels who are members of BANs must also be taken into account. However, we cannot assume that business angels who are members of BANs, and those who are not, invest with the same degree of frequency, nor that they invest similar amounts per investment. Thus, a second requirement is for improved data on investment frequency and size, disaggregated according to whether the investor is a member of a BAN or not. The figures presented here will represent an over-estimate the size of the informal venture capital market if business angels who are members of business angel networks invest more frequently, or make larger investments. A further refinement would be to reflect any differences in the size of investments made by business angels who are members of BANs, between deals that are referred by the network, and those that they identify through other sources. However, given the reliability problems in any method of estimating the size of the informal venture capital market on account of the inherent characteristics of the market it would be appropriate not simply to refine the methodology used in this paper, but also to develop alternative

methodologies to validate, or amend, the figures developed here.

Because the estimates generated by this methodology, even in an improved version, are based on country specific data a further limitation of this methodology is that it cannot be used for international comparisons. Thus, further work in assessing the size of the informal venture capital market should be based on the development of a universal methodology, such as the approach used in the Global Enterprise Monitor which is based on random household surveys (Reynolds et al., 1999).¹⁰

Nevertheless, despite the need to refine the methodology and improve the scaling factors, the estimate of the size of the informal venture capital market in the U.K. is a valuable exercise. Even making the assumption that 1 in 5 business angels are members of a BAN (which, as noted above is likely to be an over-estimate), it shows the extent to which business angels exceed venture capital funds as a source of financing for entrepreneurial businesses at their early stage of development. This evidence on the relative importance of the informal venture capital market has implications for two audiences. First, it makes the point to entrepreneurs seeking start-up and early stage finance that unless they are seeking amounts in excess of £250,000 they should direct their efforts towards the informal venture capital market rather than institutional venture capital funds. Second, the figures emphasise to policy makers the significance of this source of finance and the role that it plays in supporting a thriving entrepreneurial economy.

The latter point, in turn, highlights the need for a reappraisal of existing policies by the U.K. and European Commission which seek institutional solutions to increase the availability of early stage equity finance by means of initiatives to stimulate the creation of venture capital funds specialising in early stage investments (Department of Trade and Industry, 1998; Commission of the European Communities, 1998). Indeed, the evidence on the scale of the informal venture capital market should make policy makers reconsider whether there is a shortage of early stage venture capital, or whether the financing difficulties encountered by businesses at their start-up and early growth stages are, in fact, a function of

market inefficiencies, information inefficiencies or demand side constraints (Mason and Harrison, 1999). If policy makers fail to consider this question there is a real danger that their efforts to stimulate the creation of early stage venture capital funds might represent a misallocation of public money, with such money having the potential to be more productive if spent on a range of measures to stimulate the informal venture capital market, including contributing to the running costs of BANs, assistance for investor support (e.g. independent technology evaluation services: Mason and Harrison, 1998), investor education and schemes to help businesses seeking equity finance to become "investment ready" (Ernst and Young/Centre for Innovation and Enterprise, 1997). Admittedly, such considerations may carry less weight in countries and regions where the informal venture capital market is less developed, but even in such circumstances it is appropriate for policy-makers to consider in the light of the evidence in the paper whether initiatives to stimulate business angels might be a more effective means of increasing the supply of early stage venture capital than supporting the creation of venture capital funds, especially in view of the criticisms of such initiatives and their often disappointing outcomes (Murray, 1998).

Notes

¹ Outside equity financing in this context excludes finance provided by founders, family and friends.

² On the supply side, the 1998 Forbes 400 list indicates that 72% are first generation entrepreneurs (compared with about 40% in the mid-1980s); on the demand side the estimates recognise that in addition to the 70,000 or so high-growth potential start-ups annually, external equity capital will be required by at least a proportion of a further 300,000 ventures growing faster than 20% a year, of which 80,000 are growing faster than 50% a year (Sohl, 1999).

³ In the Gaston and Bell (1988, p. 160) survey, the mean and median net worth of the business angels surveyed were \$625,000 and \$750,000 respectively.

⁴ This situation is well illustrated by KPMG's study of the informal venture capital market in Scotland. This study identified two groups of business angels, one group which was well connected to one another though common social backgrounds and commercial contacts, and another group who were isolated on account of their location, employment, history, expertise and contacts (KPMG, 1992).

⁵ Previous estimates of market scale in the U.K. (Mason and

Harrison, 1993) have been based on a less fully specified methodology than presented here.

⁶ Investors registered with VentureNet (1,300) are excluded because we have doubts about the reliability of this figure.

⁷ Most BANs in the U.K. have only been established since 1993 (Mason and Harrison, 1997a).

⁸ However, Kelly and Hay (2000) note that less active investors make greater use of BANs as a source of information on investment opportunities than more active investors.

⁹ For those BANs which charge for membership, the annual fee ranges from £50 + VAT to £350 + VAT per annum.

¹⁰ The U.K. study estimated that 2.5% of adults had personally invested in a start-up that was not their own over the previous three years, amounting to £1.8 billion per annum (Levie, Hay and Reynolds, 1999). However, because of the way in which the question was asked, which did not differentiate between within-family investments and "external" investments, and referring to new businesses, means that it cannot be used as a reference point for the estimates generated in this study.

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