

Characteristics and Determinants of Informal Investment in Singapore

POH KAM WONG & YUEN PING HO

Entrepreneurship Centre, National University of Singapore, Singapore

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ABSTRACT *Since Wetzel (1982, 1983) identified the business angel as a primary source of risk capital, there has been increased interest in the role of informal investors in the formation of new business ventures in the developed OECD countries. However, there remains little known about informal investors in developing or newly industrialized economies such as Singapore. Based on data collected using the Global Entrepreneurship Monitor (GEM) methodology (Reynolds et al., 2002), this paper examines the characteristics of informal investors in Singapore, and analyses the key determinant factors that differentiate individuals who become informal investors from those who do not make informal investments. In particular, we examine if these factors differ depending on the relationship between the investor and entrepreneur. We also investigate the differences between determinants of higher and lower value investment propensities. The findings reveal that knowing entrepreneurs personally was the factor with the strongest influence on informal investing propensity in Singapore. Other findings suggest that informal investing propensity in Singapore is less influenced by demographic factors and income, and more by prior entrepreneurial experience and self-perceived skills with new business formation.*

KEY WORDS: Informal investment, entrepreneurial ventures, business angels, Singapore, risk capital

Introduction

The role of informal investors in the formation of new business ventures has been of increasing interest to researchers and policy makers since Wetzel's (1982, 1983) seminal studies identified the business angel as a primary source of risk capital. Recent studies by Bygrave *et al.* (2002), Autio *et al.* (2003) and Ho and Wong (2005) have found that informal investments contribute to entrepreneurial activity at the national level. Several studies have also estimated that the market for business angel capital is several times the size of the formal venture capital industry, as documented for specific countries such as the US (Benjamin and Margulis, 1996; Wetzel and Freear, 1988) and the UK (Harrison and Mason, 1992; Mason and Harrison, 2000a) as well as in a cross-national context (Reynolds *et al.*, 2002). This has led to interest

Correspondence Address: Poh Kam Wong, Entrepreneurship Centre, National University of Singapore, E3A Level 6, 10 Kent Ridge Crescent, Singapore 119260. Email: pohkam@nus.edu.sg

in the individual investor as the unit of analysis, with several studies compiling the profile of business angels, usually in terms of demographics (Mason and Harrison, 1992; Wetzel, 1983) and more selectively, in terms of psychological profiles (Duxbury *et al.*, 1996) and attitudes and behaviour (Aram, 1989; Landström, 1995; Prowse, 1998).

While these studies have done much to shed light on the characteristics of informal investors, they are mainly based on samples of informal investors in the industrialized OECD countries. Little is understood about informal investors in fast developing economies such as Singapore. Other than Wong and Ho's (2003) profile of 140 Singaporean informal investors covered by the Global Entrepreneurship Monitor (GEM) survey from 2000 to 2002, Hindle and Lee's (2002) study of a small sample of 29 business angels is the only prior study focusing on informal investors in this country. In this paper, we present the first statistical analysis of the characteristics and determinants of informal investment in Singapore, by drawing on data collected over five years of Singapore's participation in the Global Entrepreneurship Monitor (GEM) project, from 2000 to 2004. In particular, we distinguish between two groups of informal investors: 'business angels' and 'family investors'. A 'business angel' is defined as an individual who has in the past three years invested his personal wealth in an entrepreneurial venture started by someone else with whom he or she has no family ties, excluding the purchase of publicly traded shares or mutual funds. A 'family investor' is defined as an individual who has in the past three years provided financing to an entrepreneurial venture started by a family member or relative, excluding the purchase of publicly traded shares or mutual funds.

Wright *et al.* (1998) spelt out the need to compare the attitudes, behaviour and characteristics of potential and active angels to identify differences and devise strategies to mobilize potential investors. While we have a good grasp on the profile of a 'typical' angel investor, especially in advanced countries, there is little definitive research on what explains individuals' propensity to become business angels. The work of Maula *et al.* (2005) using data on Finnish adults represents a first attempt to identify the determinants of angel investing propensity, focusing on distinguishing between family and non-family investors. Wong *et al.* (2005b) extended the framework used by Maula *et al.* to include concepts related to trust and risk in decision making (Dibben, 2000). Applying the framework to a large, multi-nation sample of adults from 17 countries, Wong *et al.* (2005b) investigated if the determinants of angel investing propensity differ according to the degree of familiarity between the business angel and the entrepreneur who is the recipient of the investment.

We draw on the work of Maula *et al.* (2005) and Wong *et al.* (2005b) and additionally introduce the concept of social networks as another dimension of the propensity to become informal investors. Using this expanded framework, we examine the factors that differentiate Singaporeans who become informal investors from those who do not make informal investments. In particular, we examine if these factors differ depending on the relationship between the investor and entrepreneur, where the nature of the relationship reflects differing risk perceptions. We also investigate the differences between determinants of higher and lower value investment propensities, as another instance of differing risk perceptions.

Literature Review

The first part of this literature review will focus on the relevant entrepreneurship research pertaining to business angels, particularly studies on the characteristics of individual informal investors. While these are almost entirely descriptive in nature, they are helpful to identify possible determinants of angel investing propensity. The subsequent sections will explore selected areas in the fields of psychology, sociology, economics and finance, focusing on theoretical and empirical studies that have bearing on explaining decisions and behaviours in the process of making informal angel investments.

Entrepreneurship Literature on Informal Investors

The literature on informal investors has usually focused on the subset categorized as business angels. Wetzel's (1983) influential study on American business angels identified this group of investors as one which plugs the capital gap by financing entrepreneurial firms that other investors are reluctant to fund. This seminal study emphasized that business angels are a source of risk capital (thereby excluding the 'love money' financing provided by family and friends) and was the first to profile the demographic characteristics, preference patterns and expectations of business angels. It paved the way for further research by establishing several parameters of interest in the study of business angels: investment history, venture life cycle preference, involvement in investee companies, geographic patterns, industry preference, risk perceptions and exit expectations.

Subsequent studies have built upon Wetzel's work on establishing the characteristics of business angels (Mason and Harrison, 2000b), sometimes classifying such investors as 'informal venture capitalists'. This choice of terminology emphasized that the informal investors being studied were regarded primarily as individuals who make investment decisions associated with risks. Where business angels are not specified as the sample being analysed, studies have tended to make no distinction between business angels and the broader class of informal investors that include family investors.

Researchers have studied the characteristics of business angels in various countries such as USA (Aram, 1989), UK (Harrison and Mason, 1992), Sweden (Landström, 1993), Canada (Farrell, 1998; Riding *et al.*, 1993), Japan (Tashiro, 1999), Australia (Hindle and Wenban, 1999) and Singapore (Hindle and Lee, 2002). These studies have established and consolidated our present understanding of the typical business angel to be male, of high net worth, middle-aged and with entrepreneurial experience.

While there is a 'typical' demographic for business angels, studies that examine their characteristics and investment behaviour in greater detail have concluded that business angels are heterogeneous. Several studies have attempted to develop classification systems of business angels based on various characteristics such as level of entrepreneurial activity and intensity of investment (Coveney and Moore, 1998), how angel investors view their portfolio firms from an agency theory perspective (Landström, 1992) and angel investors' level of competence and investment activity (Sørheim and Landström, 2001). An earlier study by Gaston (1989) identified

10 categories of business angels but did not provide details on the methodological basis for the classification. Of these categorization studies, Sørheim and Landström's (2001) work on Norwegian angel investors uses the broadest sample of informal investors. The cluster analysis yielded four distinct types of angel investors—'lotto investors' characterized by low investment activity and limited knowledge and skills to add value to their investee firms; 'traders' who primarily provide financial resources as characterized by their high investment activity but low level of entrepreneurial competency; 'analytical investors' who are competent in entrepreneurial skills but have low investment activity; and 'business angels' who generally make many investments and contribute knowledge and skills to their investee firms. This study, together with earlier work, reinforces the conventional conceptualization of 'business angels' or 'informal venture capitalists' as individuals who invest their own money, time and expertise in unlisted firms in which they have no familial connections.

The first generation of business angel studies did not specifically address the motivations for informal investment, focusing instead on the criteria used to make investment decisions, including characteristics of the entrepreneur and the proposed investment project (Mason and Rogers, 1996; Riding *et al.*, 1993). It was implicitly understood that the primary motive for angel investors is one of economic benefits, although early work by Wetzel (1981, 1983) identified participation in the entrepreneurial process as a potential non-financial motivation. Sullivan and Miller (1996) used social psychological factors to empirically formalize a schema that identified three categories of motivations for business angels: economic, altruistic and hedonistic. Van Osnabrugge and Robinson (2000) also found that while reasons for angel investment vary, they fit into three categories: opportunity for financial gain, playing a role in the entrepreneurial process and other non-financial factors (such as a sense of social responsibility).

While the literature has explained the motivations of business angels, very little work has focused on differentiating between business angels and non-investors. Duxbury *et al.* (1996) departed from the norm of business angel research by contrasting the personality profiles of investors with those of non-investors. In another study, Freear *et al.* (1994) examined the difference between business angels and high net worth individuals with no venture investment history and attempted to understand the propensity of the latter group to join the fold.

Only two previous studies have specifically focused on the social demographic determinants of the propensity of individuals to invest their personal wealth in entrepreneurial ventures. Maula *et al.* (2005) tested a series of hypothesized determinants of informal investment propensity developed from two theoretical bases, Ajzen's (1988, 1991) theory of planned behaviour and the financial economics theory of household portfolio allocation. Using data on Finnish adults, Maula *et al.* confirmed that factors such as age, education, income and gender predict the likelihood of individuals becoming angel investors. Additionally, social psychological factors such as opportunity perception and personal networks were also found to be significant predictors. Using an extended framework applied to business angels and excluding family investors, Wong *et al.* (2005b) generalized the findings of Maula *et al.* (2005) by analysing a large sample of adults from 17 nations. This study also found that the determinants of investing propensity were different for

investments in ventures owned by acquainted entrepreneurs and ventures owned by strangers.

Social Psychological Theory of Planned Behaviour

Ajzen's (1988, 1991) work on the theory of planned behaviour provides a theoretical framework for understanding the decision of individuals to make informal investments. The theory of planned behaviour deconstructs human behaviour as being guided by three constituent belief elements: beliefs about the likely consequences of the behaviour (behavioural beliefs), beliefs about the expectations of other people (normative beliefs) and beliefs about the presence of factors that may affect performance of the behaviour (control beliefs). Behavioural beliefs produce *attitude towards the behaviour*, normative beliefs produce a *subjective norm* and control beliefs produce *perceived behavioural control*. The combination of attitude, subjective norm and perceived behavioural control forms a *behavioural intention*. When the adequate degree of actual control and opportunity is present, individuals will be able to act upon this intention and *perform the behaviour*.

The great contribution of the theory of planned behaviour is the introduction of *perceived behavioural control* as a construct. This is an enrichment to the theory of reasoned action (Fishbein and Ajzen, 1975) from which the theory of planned behaviour was derived and in which human behaviour is assumed to be under volitional control. The theory of planned behaviour recognizes that non-volitional elements are potentially inherent in all behaviours. Perceived behavioural control accommodates these elements of uncertainty that are beyond the individual's volition. This element is of particular importance in the study of business angels because angel investments are associated with risks and uncertainty.

Ajzen (1988) acknowledged the great debt that the theory of planned behaviour owes to the concept of self-efficacy that has received in-depth treatment in the work of Bandura (1977, 1989, 1997). In a recent paper, Ajzen (2002) showed self-efficacy and controllability to be separable components of perceived behavioural control, although the latter can be considered a unitary latent variable. Self-efficacy is not new to the entrepreneurship literature, having been verified empirically as an antecedent for entrepreneurial behaviour (Chen *et al.*, 1998; Krueger *et al.*, 2000). There is no equivalent tradition in linking self-efficacy to angel investment behaviour. Compared to the case of entrepreneurs, it may be argued that angel investors have a lower level of volitional control. The investment behaviour is dependent on the actions and attributes of the entrepreneur, as well as factors internal to the investor. Self-efficacy takes on even greater importance in this context. Additionally, the other component of perceived behavioural control, controllability (beliefs about the extent to which performing the behaviour is up to the investor) also assumes a significant role in the behaviour of investors.

Ajzen (2002) explains that perceived behavioural control refers generally to people's expectations regarding their ability to perform a given behaviour. In Maula *et al.* (2005), Wong *et al.* (2005b) and in the present study, effort is made to operationalize the factors that have an impact on how these expectations are shaped.

Sociological Theory of Social Networks

In recent years, the entrepreneurship literature has highlighted the significance of social networks/capital in the creation and growth of new ventures (Huggins, 2000; Shane and Cable, 2002; Florin *et al.*, 2003; Zhang *et al.*, 2003b). For simplicity in this study, we assume that both social network and social capital are synonymous, although the literature has demonstrated the distinctiveness of each term (Jack, 2002). Social capital refers to the actual and potential resources individuals obtain from knowing others, being part of a social network with others, having a good reputation, or merely from being known to others (Nahapiet and Ghoshal, 1998).

The role of social capital in influencing entrepreneurial propensity is well established. Social capital assists individuals in their pursuits of entrepreneurial goals by providing them with critical information, and other crucial resources such as capital, skills and labour to start business activities (Burt, 1992; Lin, 1999). Furthermore, social capital plays an important role in people's opportunity discovery process by diffusing new and different ideas to them, and providing them with a wider frame of reference (Aldrich and Zimmer, 1986). As identified by Shane and Venkataraman (2000), the opportunity discovery process is made possible by the asymmetrical and limited information held by people, and as a result of this asymmetry, people with high levels of social capital are more likely to discover opportunities than others. Therefore, when effectively leveraged by individuals, social capital provides them with considerable resources to facilitate the identification, evaluation and exploitation of opportunities (Aldrich and Zimmer, 1986).

While less often explored in the context of informal investment, many of the concepts are similarly applicable. Early literature (Aram, 1989; Wetzel, 1983) showed that business angels and informal investors utilize informants, typically co-investors or business associates, to reduce the investment risks arising from imperfections in the informal capital market. Fiet (1995) theorized that investors faced both market and agency risks when selecting investment projects and found tentative evidence that business angels would rely on close business associates for information in an inefficient market. While not focused on the concepts of social networks, several studies of angel investors in the UK (Mason and Harrison, 1994, 2000b), USA (Gaston, 1989) and Sweden (Landström, 1993) determined that informal personal and business networks are the main sources of information for business angels when identifying investment opportunities. Recent work by Sørheim (2003, 2005) has explicitly focused on social capital from the perspective of informal investors. Through qualitative analysis of five experienced angel investors using an integrated social capital framework, Sørheim (2003) found that different sources of social capital played a role in investors' behaviours during the identification and screening/evaluation of investment proposals. A later study using the same data (Sørheim, 2005) found that business angels played a key role in facilitating further financing for their portfolio firms by providing access to venture capitalists and debt financiers, and acting as referrers by capitalizing on their own positive track records and good reputation.

Socio-Psychological Theories of Interpersonal Trust

Social interaction is inherent in all acts of entrepreneurship and small business formation. At the heart of all social interactions is the concept of trust, as expounded in the fields of sociology (Giddens, 1990) and philosophy (Baier, 1986). In economics, trust is a precondition for rational choice (Loasby, 1997). McKnight *et al.* (1998) provide an overview of trust literature that is widely diffused in various fields of study. Explaining the importance of personal networks in the entrepreneurial process, Dubini and Aldrich (1991) describe trust as the element that determines the solidity and permanence of a relationship, reducing the risks for involved parties. In the context of investment decisions in the presence of perceived risk, Ryan and Buchholtz (2001) demonstrated the role of trust as an antecedent to the risk evaluation inherent in investment decisions. This has direct parallels to the case of informal investments.

Dibben (2000) argues that one should focus the unit of analysis to that of the individual when trust concepts are studied in the small business setting. Hence, the issue becomes one of interpersonal trust rather than organizational trust. Rather than focusing on trust attributable to individual character traits (dispositional and learnt trust), Dibben's work focused on *situational trust*, in which trust level is dependent on comprehensible situational cues (CSQ). One approach to typologize situational trust in work relationships is based on familiarity with a particular *situation* and the amount of information available about the situation (Boisot, 1987; Clark and Payne, 1997). In contrast, Lewicki and Bunker (1995, 1996), Boon and Holmes (1991) and Shapiro *et al.* (1992) typologize trust by focusing on familiarity of *individuals* with each other. To operationalize interpersonal situational trust, Dibben (2000) combined these two typologies and identified four types of trust: *dependence* based, *comprehensible situational cue* (CSQ) reliance based, *familiarity* reliance based and *confidence* based. Confidence-based trust is the highest level of interpersonal trust, based on high level of familiarity with the individual and high knowledge level of the situation.

Harrison *et al.* (1997) and Dibben *et al.* (1999) conducted exploratory studies, later extended by Dibben (2000), on the role of trust in the decision-making process of informal investors. They studied how different types and levels of trust relate to the criteria used by investors to establish their *cooperation threshold*, which is the point at which individuals decide to commit to an investment. Simplistically, two aspects of the investor's knowledge are of concern here: the investor's familiarity with the individual entrepreneur and the investor's knowledge of the venture and the surrounding circumstances. These may be paralleled with familiarity reliance-based trust and CSQ reliance-based trust. These studies found that the level of CSQ reliance-based trust is usually low in informal investment scenarios. Angel investors attempt to use familiarity reliance-based trust in the absence of CSQ-based trust. This influences the criteria that investors use to form their cooperation threshold, with self-competence (or self-efficacy) emerging as an important determinant. An investment decision is arrived at if the actual trust level is sufficient to overcome the criteria threshold.

Economic Theory of Household Portfolio Allocation

As defined by Wetzel (1983), informal investment is a class of risk capital for the recipient company. Correspondingly, informal investment is a type of risk asset from the viewpoint of the investor, more so in the case of business angels than family investors. Researchers in the fields of economics and finance have been studying how economic agents allocate investments into risky assets for more than half a century. Portfolio theory has its roots in the seminal paper by Markowitz (1952) who modelled risk and expected returns. After Tobin (1958) introduced the idea of a risk-free asset, Sharpe (1964) extended the model into the now well-known capital asset pricing model (CAPM). Early models of portfolio allocation were driven by interest in asset pricing rather than approaching household wealth as the starting point. Refinements to the theory later allowed researchers to investigate portfolio decisions in more realistic situations, such as multiple-period decision making (Samuelson, 1969), risk preference of household (Jorion and Goetzmann, 1999) and presence of labour income (Merton, 1971).

More recent developments in modelling household portfolios have predicted that various household characteristics have an impact on the allocation of portfolios to risky assets. Among the factors that have been empirically proven include age, financial wealth, income and education (Banks *et al.*, 2002; Cocco, 2000; Guiso *et al.*, 2002). These findings inform our present efforts to identify factors that may affect individuals' propensity to make risky informal investments in entrepreneurial businesses.

Singapore Context for Informal Investment

Informal investment is an important aspect of venture financing in Singapore. In 2004, total informal investment in Singapore amounted to approximately 1.6% of GDP, considerably higher than in many other countries (Figure 1). The relative size of the informal investment market was many times larger than the market for formal VC investments, which amounted to 0.1% of GDP.

The analysis of informal investors presented in this paper is based on a sample of Singaporean adults surveyed in the annual Global Entrepreneurship Monitor (GEM) project (Reynolds *et al.*, 2002) over a five-year period from 2000 to 2004. Informal investors are identified as those individuals who have in the past three years invested in an entrepreneurial business venture started by someone else, excluding the purchase of publicly traded shares or mutual funds. In all, there are 11 019 individual Singaporean adults surveyed in the five-year period, with 276 (2.5%) of them being identified as informal investors. This represents a much larger sample than the 29 business angel investors covered by Hindle and Lee's (2002) study.

The rate of informal investment in Singapore has fluctuated in the past five years and is generally correlated with the rate of entrepreneurial activity, as measured by the total entrepreneurial activity (TEA) rate¹ (Table 1). After falling from 3.6% to 1.6% between 2002 and 2003, the rate of informal investment increased again to 2.7% in 2004. This reflects both the increase in entrepreneurial activities generally and the success of government schemes, such as the Startup Enterprise Development

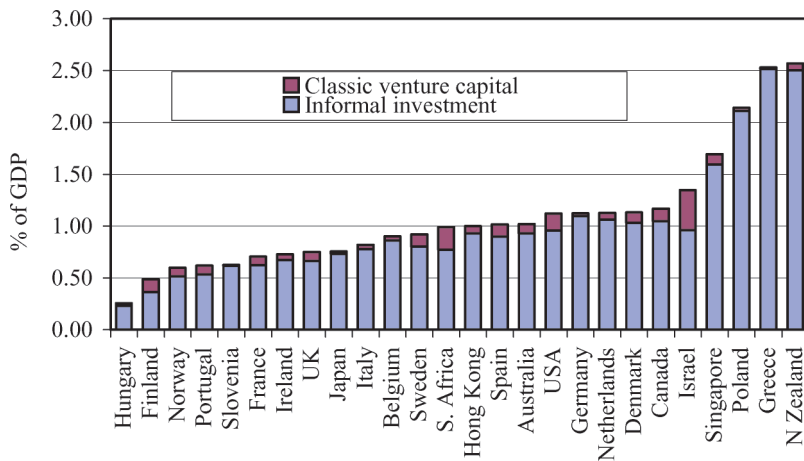


Figure 1. Informal investment and classic VC as % of GDP. *Source:* Bygrave and Hunt (2004)

Table 1. Rate of informal investment in Singapore, 2000–04

Year	Informal investment rate (% of adult population)	Total entrepreneurial activity (TEA) rate (% of adult population)	Number of informal investors in sample
2000	1.3	4.2	30
2001	2.0	6.6	37
2002	3.6	5.9	73
2003	1.6	5.0	31
2004	2.7	5.7	105

Source: Wong *et al.* (2001, 2003, 2004, 2005a).

Scheme (SEEDS), which are aimed at promoting investments in entrepreneurial ventures. While the prevalence of informal investment is on the rise in Singapore, the participation rate is still below that of countries such as USA and other Asian countries such as Taiwan, China, Korea and Thailand (Reynolds *et al.*, 2002).

Wetzel’s (1983) study made an important distinction between ‘business angels’ and other informal investors by emphasizing that business angels are a source of risk capital and therefore excludes the ‘love money’ financing provided by family and friends. For the purposes of this study, these concepts are approximated by separating informal investors who have family ties to the entrepreneurs (termed ‘family investors’) from those who are not related to the entrepreneurs (termed ‘business angels’). It is acknowledged as a limitation of the data that we are not able to identify the individuals who have provided ‘love money’ to friends and

neighbours, and assume that all investments in entrepreneurial firms not owned by family members to be risk capital.

In Singapore, 42% of informal investors are classified as family investors, as they are related to the entrepreneurs whose ventures they invest in (Table 2). The remaining 58% are business angels, with most being friends or neighbours of the entrepreneurs. Only a very small proportion of informal investors, 2%, have invested in ventures owned by entrepreneurs with which they are not personally acquainted.

The typical Singaporean informal investor is likely to be male, in his mid-30s, and possessing a tertiary qualification (Table 3). Consistent with findings from other studies, informal investors tend to be high net value individuals. In Singapore, 41% of informal investors earn incomes that place them among the top one-third of households in the population. The profile of Singapore informal investors is largely consistent with findings from studies such as Aram (1989) and Harrison and Mason (1992).

The value of informal investments ranged from small amounts below S\$5 000 to over S\$1 million. The presence of investors with low value investments suggests that the sample of informal investors in Singapore might include individuals who provide micro-financing in the form of private placements in new firms, as opposed to 'business angels' as categorized by Sørheim and Landström (2001). The majority of informal investments in Singapore were below \$20 000 in value, with median investment value being \$15 740. Family investors invested smaller amounts, with fewer than 5% investing above \$100 000, compared to 10% of business angels. The median investment value for family investors was correspondingly lower at \$14 750, contrasting with a higher median value of \$16 666 for business angels.

In Table 4, the characteristics of Singapore investors covered in the present analysis is compared with the profile arrived at by Hindle and Lee (2002) in their study of 29 business angels in Singapore. With a larger sample, we established that female investors form a significant proportion of the informal investor community, although still outnumbered by men. Unlike Hindle and Lee, we found that 72% of

Table 2. Relationship of entrepreneur to informal investors in Singapore

	%
Related (family investors)	41.7
Close immediate family	31.0
Other relative	10.7
Non-related (business angels)	58.3
Work colleague	5.2
Friend/neighbour	49.6
Stranger	2.4
Other	1.2
Total	100.0

Source: Wong *et al.* (2001, 2003, 2004, 2005a).

Table 3. Profile of informal investors in Singapore, 2000–04

	Family investors	Business angels	Informal investors
Age profile of informal investors			
24 and below	9.5	7.5	8.3
25 to 34	31.4	41.5	37.3
35 to 44	27.6	21.8	24.2
45 to 54	21.0	23.1	22.2
55 and above	10.5	6.1	7.9
	100.0	100.0	100.0
Median age	37.5	34.8	35.7
Gender profile of informal investors			
Male	57.1	77.6	69.0
Female	42.9	22.4	31.0
	100.0	100.0	100.0
Educational profile of informal investors			
No formal education	2.1	1.5	1.8
Some secondary	12.6	6.8	9.3
Secondary degree	33.7	34.1	33.9
Post secondary	40.0	43.2	41.9
Grad experience	11.6	14.4	13.2
	100.0	100.0	100.0
Income profile of informal investors			
Lowest 33% tile of households	29.6	26.7	27.9
Middle 33% tile of households	29.6	30.8	30.3
Upper 33% tile of households	40.7	42.5	41.8
	100.0	100.0	100.0
Employment status of informal investors			
Working either full or part time	76.6	82.4	80.0
Not working	10.6	9.2	9.8
Retired or student	12.8	8.4	10.2
	100.0	100.0	100.0
Investment value S\$			
Less than \$5 000	21.7	22.6	22.2
\$5 000 to \$20 000	40.2	34.6	36.9
\$20 000 to \$100 000	33.7	33.1	33.3
\$100 000 to \$1 million	3.3	7.5	5.8
More than \$1 million	1.1	2.3	1.8
	100.0	100.0	100.0
Median investment value	\$14 750	\$16 666	\$15 740

Source: Wong *et al.* (2001, 2003, 2004, 2005a).

investors are not current entrepreneurs. We also found the average value of informal investment to be much lower than the average amount of \$350 000 reported by Hindle and Lee. The disparity between the two sets of profiles should be viewed in light of the difference between the samples used; Hindle and Lee’s earlier study focused on high-value business angel investors while the present study includes a broader group of informal investors.

Table 4. Summary of characteristics of Singapore informal investors

	GEM Singapore 2000–04			Hindle and Lee, 2002
	Overall	Family investors	Business angels	
Median age	36	38	35	40–49
% Male	69%	57%	78%	90%
% Managing own business	29%	28%	30%	72%
Average investment	\$15 740	\$14 750	\$16 666	\$350 000

Source: Wong *et al.* (2001, 2003, 2004, 2005a); Hindle and Lee (2002).

Research Questions and Hypotheses

Besides providing a statistical profile of informal investors in Singapore, this paper seeks to investigate the key determinants of informal investment propensity. In particular, we seek to empirically test if the determinants of informal investing propensity identified in Maula *et al.* (2005) for Finland and Wong *et al.* (2005b) for 17 countries similarly explain informal investing propensity in Singapore. In addition, we seek to investigate if the determinants are different under different conditions of risk perception. Two situations of higher and lower risks are contrasted: family investments (lower risk) versus business angel investment (higher risk) and low value investment (lower risk) versus high value investment (higher risk).

Determinants for Informal Investing Propensity

Entrepreneurial and managerial experience. Following Ajzen (1991), having relevant entrepreneurial and managerial experience confers upon the investor a greater sense of perceived behavioural control. The investor will have a stronger belief in his own ability to target good investments and contribute to company performance. This corresponds to descriptive findings that business angels typically have managerial or entrepreneurial experience (Freear *et al.*, 1994; Landström, 1993; Mason and Harrison, 2000b).

Hypothesis 1: Individuals with entrepreneurial and managerial experience have a higher propensity to become informal investors.

Skills to start a new business. A significant proportion of informal investors are value-added investors as they contribute their personal skills to help young businesses in the early-stage processes (Freear and Wetzel, 1989; Freear *et al.*, 1995; Mason and Harrison, 1996). For some investors, this is a motivation for becoming angel investors (Van Osnabrugge and Robinson, 2000). Applied to the theory of planned behaviour, having start-up skills gives the investor a stronger sense of belief in his ability to contribute to a new venture.

Hypothesis 2: Individuals with skills to start a new business have a higher propensity to become informal investors.

Knowing entrepreneurs personally. Researchers such as Delmar and Gunnarsson (2000), among others, have shown that vicarious experience increases the likelihood of individuals engaging in entrepreneurial activity. Vicarious experience also moderates planned behaviour (Ajzen, 1988) of informal investors by influencing the *subjective norm* surrounding the investment behaviour. Knowing entrepreneurs personally helps investors to see informal investment in entrepreneurial activities as acceptable by others. Furthermore, Aldrich and Zimmer (1986) shows that social networks play an important role in the opportunity discovery process by diffusing new and different ideas and providing a wider frame of reference. Informal personal and business networks have been found to be the main sources of information for business angels when identifying investment opportunities (Mason and Harrison, 1994, 2000b; Gaston, 1989; Landström, 1993). For potential informal investors, social networks involving entrepreneurs provide resources to facilitate the identification, evaluation and exploitation of opportunities.

Hypothesis 3: Individuals who know entrepreneurs personally have a higher propensity to become informal investors.

Education. The theory of planned behaviour suggests that education increases the likelihood of informal investing. Higher levels of education are associated with higher levels of self-efficacy and perceived behavioural control. Empirical evidence from portfolio studies shows that households with higher education allocate more to risky assets (Guiso *et al.*, 2002). The typical business angel has also been found to be highly educated (Aram, 1989; Freear *et al.*, 1994), as was similarly observed in Singapore, as shown earlier in Table 3.

Hypothesis 4: Individuals who have a higher level of education have a higher propensity to become informal investors.

Work status. In the household portfolio literature, Merton (1971) found that having an income from steady employment pushed financial portfolios further into risky assets. Being employed reflects income security and this is associated with greater propensity to make risky investments (Gollier, 2002) as well as reduced perception of risk.

Hypothesis 5: Individuals who are employed have a higher propensity to become informal investors.

Income. Similar to work status, income level is also an indication of security and reduced risk perception. Various studies on household portfolios (Guiso *et al.*, 2002, 2003) have found household wealth to be a major determinant of allocation towards risky assets. This corresponds with findings in the entrepreneurship literature (Freear *et al.*, 1994; Harrison and Mason, 1992) that business angels are typically high net worth individuals with high income levels. Earlier in this paper, it was also

established that informal investors in Singapore earn higher than average incomes compared to the general population.

Hypothesis 6: Individuals who earn a higher level of income have a higher propensity to become informal investors.

Gender. In many countries, informal investors have been found to be predominantly male, including the UK (Harrison and Mason, 1992) and Japan (Tashiro, 1999). In the case of Singapore, two-thirds of informal investors are male, as described earlier in this paper. It may be speculated that in such a male-dominated arena, being a female would likely affect the subjective norm of investment behaviour; making such behaviour by females appear socially unusual, if not actually unacceptable. Females may also perceive less behavioural control in an environment where female participation is under-represented.

Hypothesis 7: Individuals who are male have a higher propensity to become informal investors.

Age. Maula *et al.* (2005) predict an inverted U-shaped relationship between age and propensity to make informal investments. Perceived behavioural control is expected to be low among young people and those of advanced years, as they should feel less adequately prepared to make proper investment decisions and contribute to the start-up process of new ventures. This is consistent with the descriptive evidence that business angels are typically middle-aged, between 40 to 60 years of age (Freear *et al.*, 1994; Harrison and Mason, 1992; Landström, 1993).

Hypothesis 8: Individuals who are middle-aged have a higher propensity to become informal investors than individuals who are younger and older.

Determinants for Angel Investing in Ventures in Higher Risk Perception versus Lower Risk Perception Situations

Family investors (lower risk perception) versus business angels (higher risk perception). Harrison *et al.* (1997), Dibben *et al.* (1999) and Dibben (2000) found that CSQ reliance-based trust is more important than familiarity-based trust in the context of informal investments. However, it was also found that CSQ-based trust is more difficult to develop in the informal investor–investee relationship. In our stylized representation, we may equate angel investing to a situation requiring high CSQ-based trust, whereas family investing requires a lower level of CSQ-based trust, in the presence of inherent familiarity-based trust. The primary difference between the two types of informal investment is the degree of CSQ-based trust required for an investment decision to be made. Following Wong *et al.* (2005b), we operationalize antecedents of CSQ-based trust and associated decision criteria and posit that these will be of greater importance as determinants of propensity to become business angels compared to family investors.

It is envisaged that the criterion for self-efficacy is higher for investments by business angels than for investments by family investors. Because the investor is not

related to the investee, he would need to rely much more on his own abilities to develop a sufficient degree of trust in the viability of the business proposal. This is also in line with the idea that such arms-length investments are likely to be motivated by economic gains and investors would as such be mostly concerned with objective assessment of risk potential. Here, we operationalize self-efficacy using managerial experience, the level of education and having start-up skills. In addition to conferring a higher degree of self-efficacy in assessing proposed investments, perception of start-up skills also increases the degree of confidence that a business angel has in his ability to influence the performance of the venture he invests in. Unlike family investors, business angels are more likely to desire to contribute their personal skills to a new venture (Freer and Wetzel, 1989) and thereby have greater control over the degree of risk assumed in their investment.

Hypothesis 9: Managerial experience is a stronger determinant of propensity to become angel investors than to become family investors.

Hypothesis 10: Higher educational level is a stronger determinant of propensity to become angel investors than to become family investors.

Hypothesis 11: Having skills to start a new business is a stronger determinant of propensity to become angel investors than to become family investors.

Another way in which an investment commitment may be made is that investors lower their cooperation threshold so that the required level of CSQ-based interpersonal trust is lowered. This may happen in the case of investors who are in the position to be more risk-seeking. We posit that angel investors are likely to have higher risk tolerance, operationalized by having a higher sense of security in the form of secured employment and higher income levels.

Hypothesis 12: Employment status is a stronger determinant of propensity to become angel investors than to become family investors.

Hypothesis 13: Higher income level is a stronger determinant of propensity to become angel investors than to become family investors.

Low value investment (lower risk perception) versus high value investment (higher risk perception). High value investments are associated with a higher level of perceived risk. Factors that enable individuals to take on more risk will discriminate between the propensities to make high value investments versus low value investments. Higher risk tolerance is operationalized first by a higher degree of perceived behavioural control or self-efficacy. Potential investors with higher risk tolerance believe themselves to be able to make informed decisions regarding higher-risks investments, following the theory of planned behaviour. Such belief in their own abilities is manifested by managerial experience, education and perception of entrepreneurial skills.

Hypothesis 14: Managerial experience is a stronger determinant of propensity to make high value investment than low value investment.

Hypothesis 15: Higher educational level is a stronger determinant of propensity to make high value investment than low value investment.

Hypothesis 16: Having skills to start a new business is a stronger determinant of propensity to make high value investment than low value investment.

Higher risk tolerance would also be exhibited by individuals with income security and greater wealth. In the literature on household portfolios, individuals with income from steady employment allocate larger portions of their portfolios to risky assets (Merton, 1971). Guiso *et al.* (2002, 2003) also found that household wealth affected the allocation towards risky assets. As such, we expect that employment status and income level to be two factors that will feature more prominently as determinants of high value investment propensity compared to low value investment propensity.

Hypothesis 17: Employment status is a stronger determinant of propensity to make high value investment than low value investment.

Hypothesis 18: Higher income level is a stronger determinant of propensity to make high value investment than low value investment.

Data and Analysis Methodology

Hypothesis testing is done using data from a pooled sample of Singaporean adults that were surveyed as part of the Global Entrepreneurship Monitor (GEM) research project from 2000 to 2004. Wong *et al.* (2001, 2003, 2004, 2005a) provide detailed information on the GEM research framework, and benchmark indicators on Singapore's entrepreneurial development in each year that Singapore participated in GEM. In all, there are 11 019 individual Singaporean adults surveyed in the five-year period. The measures used for all dependent and independent variables are drawn from the GEM Adult Population Questionnaire administered to Singaporean adults as part of the GEM research process. Descriptions of the measures used follow, with descriptive statistics of all dependent and independent variables being presented in Appendix Table A.

Estimation Equation

The estimation equation used for hypothesis testing closely follows the framework proposed in Maula *et al.* (2005) and Wong *et al.* (2005b). A measure of risk aversion used in the Finnish study is not adopted by Wong *et al.* and is similarly dropped here. The binary variable for risk aversion in the Finnish study gauged whether individuals agree that fear of failure would prevent them from starting a business. This is omitted as it is a relatively weak proxy for risk aversion in the context of making a risky informal investment. Additionally, we have also excluded a measure of opportunity perception that was used by both Maula *et al.* (2005) and Wong *et al.* (2005b). The measure of opportunity perception assessed if individuals felt that there will be, in the next six months, good opportunities to start a business in the area where they live. This is a measure of entrepreneurial opportunities more directly applicable to potential entrepreneurs and is not of direct relevance to potential informal investors.

The estimation equation is as follows:

$$\begin{aligned} \text{Informal investment} = & \alpha + \beta_1 \text{ entrepreneurial experience} + \beta_2 \text{ start-up skills} \\ & + \beta_3 \text{ know entrepreneurs} + \beta_4 \text{ educational level} \\ & + \beta_5 \text{ work status} + \beta_6 \text{ income level} + \beta_7 \text{ gender} \\ & + \beta_8 \text{ age} + \beta_9 \text{ age}^2 \end{aligned}$$

Dependent Variables

Three different types of informal investments are investigated and are alternated as the dependent variable in the estimation equation. In all cases, the measure of informal investment is a binary variable, taking on a value of zero if the individual did not make any informal investment.

Overall informal investment propensity. This dependent variable is used to test the first eight hypotheses. The measure of overall informal investment takes on a value of one if the individual respondent had in the past three years personally provided funds for a new business started by someone else, excluding the purchase of publicly traded shares or mutual funds. The owner of the new business may be a family member, relative, friend, acquaintance, work colleague or a total stranger.

Business angel investment propensity. This dependent variable, in conjunction with family investment propensity, is used to test Hypotheses 9 to 13. This measure takes on a value of one if the individual had in the past three years provided funds for a new business started by a friend, colleague, other acquaintance or total stranger.

Family investment propensity. This measure takes on a value of one if the individual had in the past three years provided funds for a new business started by a close family member or relative.

High value investment propensity. This dependent variable, in conjunction with low value investment propensity, is used to test Hypotheses 14 to 18. This variable takes on a value of one if the individual had in the past year made an informal investment valued above the median investment value of S\$15 740, described earlier in Table 3.

Low value investment propensity. This variable takes on a value of one if the individual had in the past year made an informal investment valued below the median investment value of S\$15 740.

Independent Variables—Predictors

Entrepreneurial experience. This is a binary variable that takes on the value of one if the individual is an owner of a company that he helps to manage.

Start-up skills. This is a binary variable that takes on the value of one if the respondent assessed himself to have the knowledge, skill and experience required to start a new business.

Know entrepreneurs. This is a binary variable that takes on the value of one if the individual personally knows someone who has started a business in the past two years.

Educational level. This is a binary variable given the value of one if the respondent has received post-secondary education.

Work status. This is a binary variable that takes on the value of one if the respondent is employed full time.

Income level. This is a binary variable that takes on the value of one if the respondent's household income places him among the top one-third of the national household income distribution.

Independent Variables—Control

Gender. This is a binary variable that takes on the value of one if the respondent is female.

Age and age squared. These variables are measured using absolute age in years and age in years squared. The squared term is included to test the hypothesis that age is related to investment propensity in the shape of an inverted U curve. A respondent's age is computed on the basis of his year of birth.

Data Analysis Methodology

As all the dependent variables are in binary form, we utilize logistic regression to assess the strength and significance of the coefficients on the proposed determinants. The share of informal investors in the total sample is minute, at only 276 out of 11 019 valid cases in the dataset spanning five years. Statistical estimation of binary dependent variable models in such a case is problematic, resulting in biased estimates of coefficients. We apply the correction proposed by King and Zeng (2000), using their procedure for rare events logistic regression.

To test Hypotheses 9 to 13 and Hypotheses 14 to 18, comparing strength of determinants for different types of informal investments, we alternate the dependent variable and compare the size of the estimated coefficients across the different equations using the Wald chi-squared statistic.

Data Limitations

There are several limitations associated with the GEM dataset that should be kept in mind when interpreting the analysis and results. The nature of the GEM individual-level data collection methodology is to optimize the estimation of aggregate

measures at the country level in order to allow for cross-country comparisons and analysis. Hence, most constructs are measured in dichotomous 'Yes/No' terms. Using these GEM constructs necessarily limits the extent to which the hypothesized concepts can be fully operationalized. For example, the entrepreneurial skills level is measured by whether or not a respondent perceives himself or herself to possess such skills, and does not address the actual skill level or whether or not these skills have been proven in actual entrepreneurial settings. The social capital construct is measured by whether or not a respondent is acquainted with entrepreneurs, thus only accounting for the presence of entrepreneurs in the social network, while the social networks formed by informal investors with other parties are not represented, including relationships with other informal investors, banks and providers of debt capital, institutional venture capitalists and strategic partners (Sørheim, 2003).

Other limitations of the GEM data pertain to the definitions of the dependent variables. As mentioned earlier, in the group of investors who provided financing to friends and acquaintances, it is not possible to distinguish between actual angel investors who invested capital with the sole expectation of positive returns and those who are merely providers of 'love money'. The mutually exclusive categorization of informal investors into 'family investors' versus 'business angels' and 'high value investors' and 'low value investors' is also a function of data constraints. In reality, it is entirely possible for any single individual to be both a family investor and a business angel and to have made multiple investments of vastly different values. However, the GEM methodology does not capture the complete investment history of informal investors. Detailed information is only solicited on the most recent investment made by an informal investor. The lack of data on the full investment history also means that categorization on the basis of factors such as investment activity (Sørheim and Landström, 2001) is not possible.

Results

The logistic regression results for informal investment propensity are presented in the first three columns in Table 5. Of the set of Hypotheses 1 to 7, only Hypotheses 1 (entrepreneurial experience), 2 (start-up skills) and 3 (knowing entrepreneurs) are supported. As Maula *et al.* (2005) and Wong *et al.* (2005b) found, knowing entrepreneurs personally was the factor with the strongest influence. The significance of having start-up skills and entrepreneurial experience as explanatory factors emphasizes the importance of self-efficacy in making informal investment decisions. Unlike the other two studies, the results for Singapore did not find support for demographic factors such as age, gender, income and educational levels that were proposed in Hypotheses 4 to 7.

Table 5 also compares the determinants of business angel investment propensity and family investment propensity. For both, knowing entrepreneurs personally was the most important explanatory factor. This was followed by perception of having start-up skills for business angel investing, while for family investors, managerial experience was the second most important factor. The bias towards male investors is less apparent for family investments, where gender was not

Table 5. Logistic regression: informal investment in Singapore

Dependent variable →	Informal investment propensity			Business angel vs. family investors			High vs. low value investments					
	B	Sig	Difference	Business angel investment propensity	Family investment propensity	Difference	High value investment propensity	Low value investment propensity	Difference			
Controls												
Constant	-5.957	0.000		-6.959	0.000	-5.838	0.000	-11.197	0.000	-3.872	0.001	**
Age	0.057	0.224		0.048	0.435	0.019	0.792	0.208**	0.017	-0.052	0.412	*
Age squared	-0.001	0.230		-0.001	0.418	0.000	0.886	-0.002**	0.039	0.000	0.682	ns
Male gender	0.258	0.153		0.534**	0.032	0.001	0.996	0.550*	0.070	0.079	0.752	ns
Predictors												
Post secondary education	0.144	0.427		0.243	0.302	0.152	0.601	0.580**	0.041	-0.050	0.847	*
High income	-0.050	0.788		-0.118	0.618	-0.047	0.875	-0.176	0.538	-0.067	0.801	ns
Employed	-0.101	0.589		0.100	0.691	-0.325	0.264	-0.233	0.435	-0.017	0.949	ns
Start-up skills	0.815**	0.000		1.132**	0.000	0.433	0.148	1.078**	0.001	0.756**	0.004	ns
Know entrepreneur	1.744**	0.000		1.884**	0.000	1.690**	0.000	1.855**	0.000	1.624**	0.000	ns
Have entrepreneurial experience	0.798**	0.000		0.743**	0.003	0.796**	0.019	0.807**	0.005	0.646**	0.037	ns
Nagelke R sq (Model)	0.174			0.198		0.101		0.203		0.124		

Notes: **significant at 5%, *significant at 10%.

Difference between estimated coefficients from separate regression results is ascertained using the Wald chi-squared statistic.

a significant explanatory factor. The estimated coefficients on education, income, employment status and skills perception, were found to be higher for business angel propensity than family investing propensity. However, only skills perception emerged as significantly different between the two types of informal investment propensity, lending support only to Hypothesis 11 of the set of Hypotheses 9 to 13.

The difference between determinants of high and low value investment propensities are shown in the last few columns of Table 5. In both cases, knowing entrepreneurs personally was again the factor with the strongest influence, followed by possession of start-up skills and entrepreneurial experience. We also observe that having post-secondary education is a significant determinant of high value investment propensity, but not for low value investment propensity, lending support to Hypothesis 15. However, the analysis did not support the other hypotheses differentiating high and low investment propensities. The determinants of high and low value investment propensities mainly differ in the demographic factors. The propensity to make high value investment is related to age in the shape of an inverted U-shaped curve. On the other hand, age is not a significant factor for low value investment propensity. Women are much less likely to make high value investments compared to their male counterparts, in contrast to the scenario of low value investments where the gender bias is statistically not significant.

Discussion and Conclusion

Our empirical findings on informal investing propensity in Singapore show that the influencing factors differ from those in the global sample of 17 countries studied by Wong *et al.* (2005b) and bore more similarities to the Finnish sample of Maula *et al.* (2005). In the global study, almost all the hypotheses were supported, while in the Finnish study, hypotheses based on household portfolio theories were not as strongly supported. While knowing entrepreneurs personally was the most important factor in Singapore, as was also found in the other two studies, factors such as age, education and gender were found to be insignificant. Even omitting family investors and comparing the findings for Singapore business angel propensity with business angel propensity in Finland and the global sample, the Singapore findings are notable for the lack of significance of the demographic variables. Informal investing in Singapore appears to be less influenced by demographic factors and more by entrepreneurial networks, experience and skills. This may imply a negative circular effect in Singapore, as the level of informal investment is dependent on the level of entrepreneurial capacity and vice versa. The fact that there has been a relatively low level of entrepreneurial propensity in Singapore in recent years may have constrained the propensity of informal investing, which in turn may lead to low entrepreneurial propensity in the future.

Wong *et al.* (2005b) distinguished the determinants of angel investing into ventures owned by acquainted entrepreneurs versus strangers. The findings supported the idea that certain angel investors may be prepared to invest in a venture even if they are not personally acquainted with the entrepreneurs, provided they are able to evaluate the worth and risk of the investment, hence establishing the required level of

CSQ-based trust. However, as observed earlier in Table 2, very few informal investors (2.4%) in Singapore made such investments. This suggests that entrepreneurs and business angels in Singapore are strongly reliant on social networks for identifying opportunities and forming business relationships. Familiarity-based trust, rather than CSQ-based trust, governs the business angel – investee link in Singapore.

The dominance of familiarity-based trust also in part explains why the determinants of business angel propensity and family investing propensity do not significantly differ in Singapore, unlike in Finland. Business angel investment in Singapore appears to be still largely driven by friendship and presumably less by business or economic concerns, emphasizing the similarities of angel investments to family investment. This is borne out by the relatively small difference in the average size of investments made by family investors (S\$14 750) and by business angels (\$16 666). The main difference between the two types of informal investors is that having start-up skills is a more important factor for business angels than family investors. It is also similarly observed that the determinants of high versus low value investment propensity do not significantly differ, except in terms of age and education profiles. These findings suggest that informal investing in Singapore is still largely undeveloped in terms of professionalism and the ability to make higher risk investments.

To boost business angel investment as a source of risk capital for entrepreneurs, as distinct from ‘love money’ provided by family investors, there is a need to boost the level of professional expertise in the business angel community in Singapore. This would entail developing skills such as doing due diligence, structuring investment deals and mentoring. As social networks have emerged as an important factor, one way to accelerate the development of the angel investment community in Singapore is through the formation of business angel investment groupings like the Band of Angels and the Common Angels in the US. A positive step in this direction is the establishment of Business Angel Network (Southeast Asia) in 2001 as a forum for professional exchange and educational development among the business angel investment community in Singapore (www.bansea.org).

The finding on the importance of personal familiarity with other entrepreneurs as a determinant of angel investing propensity is consistent with the growing literature on the role of social networks in facilitating angel investing (Van Osnabrugge and Robinson, 2000). In particular, it implies that entrepreneurs seeking to raise informal capital should try to seek the help of other entrepreneurs who are known or connected to the potential investors to provide introduction, i.e. they should try to exploit indirect ties to potential investors as well as direct ties (Zhang *et al.*, 2003a). Our findings also suggest that they should also target potential investors with prior managerial experience and start-up skills, as not only are they more likely to invest, but these investors are likely to provide the often much-needed mentoring and coaching.

The findings on the importance of social networks also lend support for the potential efficacy of policy measures that promote the matching of entrepreneurs and potential investors through the creation of angel networks targeted at higher net worth individuals with entrepreneurial/managerial experience and start-up skills. By increasing social networking between entrepreneurs and the potential investors,

such angel networks help to facilitate the likelihood of angel investing in ventures started by people who are otherwise strangers to the potential investors. An increase in angel investment in ventures where the investors and entrepreneurs are not family-related would also mean an increase in the involvement of people with managerial experience in advising and helping the operations of new businesses. This could contribute to partially alleviate the problems of high failure rates in new inexperienced start-ups.

As in the study by Wong *et al.* (2005b), the Singapore results show that women are much less likely to become business angels, in contrast to investing in family-related ventures where the gender bias is less pronounced. This could be related to the fact that knowing entrepreneurs is a key determinant to angel investment propensity, and the fact that male entrepreneurs outnumber female entrepreneurs by two to one in Singapore (Wong *et al.*, 2004, 2005a). This suggests that educational and social networking-based policy measures should be actively targeted to women in particular in order to tap the whole potential pool of informal venture capital.

In conclusion, this study contributes to the literature on angel investing by providing new empirical evidence on several key determinants of angel investing propensity in a small, fast developing economy like Singapore. Additionally, this study has contrasted the determinants of investment propensity in situations with low versus high risk perception, allowing several implications to be drawn on the policy needs to boost angel investment in Singapore.

Further Research

This study has provided a first attempt at understanding the factors that determine informal investing propensity in Singapore and, by extension, the characteristics and behaviour of informal investors under different conditions of risk perception. However, the limitations of the GEM dataset have restricted our ability to more thoroughly operationalize the concepts that have been theoretically postulated to shape the expectations and behaviours of informal investors. This may partially explain the lack of support for the majority of the proposed hypotheses, especially those pertaining to factors that differentiate between different types of informal investment propensity. In order to more fully examine and test these theoretical concepts, it would be desirable to conduct more in-depth data collection. We have begun to do this by seeking permission from informal investors identified in the GEM Singapore survey to be re-contacted for a more detailed follow-up survey. Two cohorts of informal investors have been identified from the GEM 2003 and GEM 2004 surveys and another cohort will be added after the completion of the GEM 2005 survey. The survey instrument would be designed to capture a more complete investing history of informal investors in the past three years, the nature and characteristics of their investments, the nature and origin of resources utilized during the pre-investment and investment stages, the motivations for investing and post-investment contributions and involvement in portfolio firms. This would allow for more accurate operationalization of not only the explanatory variables, but also more detailed categorization of informal investors in the dependent variable, along the lines of studies such as Landström (1992) and Sørheim and Landström (2001).

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Note

- 1 The Total entrepreneurial rate (TEA) rate was developed by the GEM project (Reynolds *et al.*, 2002) and measures the proportion of a nation's adult population that is engaging in entrepreneurial activities in one of two ways: in the process of starting up a business or running a newly formed business less than 3.5 years old with significant ownership.

References

- Ajzen, I. (1988) *Attitudes, Personality and Behaviour* (Chicago: Dorsey).
- Ajzen, I. (1991) The theory of planned behaviour, *Organisational Behaviour and Human Decision Processes*, 50(2), pp. 179–211.
- Ajzen, I. (2002) Perceived behavioral control, self-efficacy, locus of control and the theory of planned behaviour, *Journal of Applied Social Psychology*, 32, pp. 1–20.
- Aldrich, H. and Zimmer, C. (1986) Entrepreneurship through social networks, in: D. Sexton and R. Smilor (Eds) *The Art and Science of Entrepreneurship*, pp. 3–24 (Cambridge, MA: Ballinger).
- Aram, J. D. (1989) Attitudes and behaviours of informal investors toward early-stage investments, technology-based ventures and coinvestors, *Journal of Business Venturing*, 4(5), pp. 333–347.
- Autio, E., Wong, P. K. and Reynolds, P. D. (2003) National factors influencing the prevalence of 'high-potential' start-ups, Working Paper, NUS Entrepreneurship Centre Research.
- Baier, A. (1986) Trust and antitrust, *Ethics*, 96(2), pp. 231–260.
- Bandura, A. (1977) Self-efficacy: toward a unifying theory of behavioral change, *Psychological Review*, 84, pp. 191–215.
- Bandura, A. (1989) Human agency in social cognitive theory, *American Psychologist*, 44, pp. 1175–1184.
- Bandura, A. (1997) *Self-efficacy: The Exercise of Control* (New York: Freeman).
- Banks, J., Blundell, R. and Smith, J. P. (2002) Wealth portfolios in the UK and the US, Working Paper 9128, National Bureau of Economic Research, Cambridge, MA.
- Benjamin, G. A. and Margulis, J. (1996) *Finding Your Wings: How to Locate Private Investors to Fund Your Venture* (New York: Wiley).
- Boisot, M. (1987) *Information and Organizations: The Manager as Anthropologist* (London: Fontana).
- Boon, S. D. and Holmes, J. G. (1991) The dynamics of interpersonal trust: resolving uncertainty in the face of risk, in: R. A. Hinde and J. Goebel (Eds) *Cooperation and Prosocial Behaviour*, pp. 190–211 (Cambridge: CUP).
- Burt, R. S. (1992) *Structural Holes: The Social Structure of Competition* (Cambridge, MA: Harvard University Press).
- Bygrave, W. D. and Hunt, S. A. (2004) *GEM 2004 Financing Report* (Wellesley, MA: Babson College and London Business School).
- Bygrave, W. D., Hay, M., Ng, E. and Reynolds, P. (2002) A study of investing in 29 nations composing the Global Entrepreneurship Monitor. Paper presented at the Babson – Kauffman Entrepreneurship Research Conference, Boulder, CO, 6–8 June.
- Chen, C. C., Greene, P. G. and Crick, A. (1998) Does entrepreneurial self-efficacy distinguish entrepreneurs from managers?, *Journal of Business Venturing*, 13(4), pp. 295–316.
- Clark, M. C. and Payne, R. L. (1997) The nature and structure of workers' trust in management, *Journal of Organisational Behaviour*, 18, pp. 205–224.
- Cocco, J. (2000) Portfolio choice in the presence of housing, Working Paper, London Business School.
- Coveney, P. and Moore, K. (1998) *Business Angels: Securing Start-Up Finance* (Chichester: Wiley).

- Delmar, F. and Gunnarsson, J. (2000) How do self-employed parents of nascent entrepreneurs contribute?, in: P. D. Reynolds, E. Autio, C. G. Brush, W. D. Bygrave, S. Manigart, H. J. Sapienza and K. G. Shaver (Eds) *Frontiers of Entrepreneurship Research*, pp. 150–162 (Wellesley, MA: Babson College).
- Dibben, M. R. (2000) *Exploring Interpersonal Trust in the Entrepreneurial Venture* (London: Macmillan).
- Dibben, M. R., Harrison, R. T. and Mason, C. M. (1999) The role of trust in informal investors' investment decision: an exploratory analysis, in: M. Wright and K. Robbie (Eds) *Management Buy-outs and Venture Capital: Into the Next Millennium*, pp. 115–138 (Cheltenham: Edward Elgar).
- Dubini, P. and Aldrich, H. (1991) Personal and extended networks are central to the entrepreneurial process, *Journal of Business Venturing*, 6, pp. 305–313.
- Duxbury, L., Haines, G. and Riding, A. (1996) A personality profile of Canadian informal investors, *Journal of Small Business Management*, 34(2), pp. 44–55.
- Farrell, A. E. (1998) Informal venture capital investment in Atlantic Canada: a representative view of angels. Report submitted to Atlantic Canada Opportunities Agency February 1998. Halifax: Saint Mary's University.
- Fiet, J. O. (1995) Reliance upon informants in the venture capital industry, *Journal of Business Venturing*, 10(3), pp. 195–214.
- Fishbein, M. and Ajzen, I. (1975) *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research* (Reading, MA: Addison Wesley).
- Florin, J., Lubatkin, M. and Schulze, W. (2003) A social capital model of high-growth ventures, *Academy of Management Journal*, 46(3), pp. 374–384.
- Freear, J. and Wetzel, W. E. (1989) Equity capital for entrepreneurs, in: R. H. Brockhaus, N. C. Churchill, J. A. Katz, B. A. Kirchoff, K. H. Vesper and W. E. Wetzel Jr. (Eds) *Frontiers of Entrepreneurship Research*, pp. 230–244 (Wellesley, MA: Babson College).
- Freear, J., Sohl, J. E. and Wetzel, W. E. (1994) Angels and non-angels: are there differences?, *Journal of Business Venturing*, 9(2), pp. 109–123.
- Freear, J., Sohl, J. E. and Wetzel, W. E. (1995) Angels: personal investors in the venture capital market, *Entrepreneurship and Regional Development*, 7, pp. 85–94.
- Gaston, R. J. (1989) *Finding Venture Capital for your Firm: A Complete Guide* (New York: John Wiley and Sons).
- Giddens, A. (1990) *Modernity and Self Identity: Self and Society in the Late Modern Age* (Cambridge: Polity).
- Gollier, C. (2002) What does the classical theory have to say about household portfolios?, in: T. Jappelli (Ed.) *Household Portfolios*, pp. 27–54 (Cambridge, MA: MIT Press).
- Guiso, L., Haliassos, M. and Jappelli, T. (Eds) (2002) *Household Portfolios* (Cambridge, MA: MIT Press).
- Guiso, L., Haliassos, M. and Jappelli, T. (2003) Household stockholding in Europe: where do we stand and where do we go?, *Economic Policy*, 36(6), pp. 117–164.
- Harrison, R. T. and Mason, C. M. (1992) International perspectives on the supply of informal venture capital, *Journal of Business Venturing*, 7(6), pp. 459–475.
- Harrison, R. T., Dibben, M. R. and Mason, C. M. (1997) The role of trust in the informal investor's investment decision: an exploratory analysis, *Entrepreneurship Theory and Practice, Special Issue: Informal Venture Capital*, 22(2), pp. 63–81.
- Hindle, K. and Lee, L. (2002) An exploratory investigation of informal venture capitalists in Singapore, *Venture Capital*, 4(2), pp. 169–177.
- Hindle, K. and Wenban, R. (1999) Australia's informal venture capitalists: an exploratory profile, *Venture Capital*, 1(2), pp. 169–186.
- Ho, Y. P. and Wong, P. K. (2005) Impact of sources of financing and regulatory business costs on national entrepreneurial propensity. Paper presented at the 2nd GEM Research Conference, Budapest, Hungary, 25–27 May, forthcoming in *Small Business Economics*.
- Huggins, R. (2000) The success and failure of policy-implemented inter-firm network initiatives: motivations, processes, and structure, *Entrepreneurship Theory and Practice*, 12(2), pp. 111–135.
- Jack, S. L. (2002) The articulation of social capital in entrepreneurial networks: a gene or a lubricant?, *Entrepreneurship and Regional Development*, 13, pp. 193–210.
- Jorion, P. and Goetzmann, W. N. (1999) Global stock markets in the twentieth century, *Journal of Finance*, 54(3), pp. 953–980.

- King, G. and Zeng, L. (2000) Logistic regression in rare events data, *Political Analysis*, 9(2), pp. 1–27.
- Krueger, N. F., Reilly, M. D. and Carsrud, A. L. (2000) Competing models of entrepreneurial intentions, *Journal of Business Venturing*, 15(5–6), pp. 411–432.
- Landström, H. (1992) The relationship between private investors and small firms: an agency theory approach, *Entrepreneurship and Regional Development*, 4, pp. 199–223.
- Landström, H. (1993) Informal risk capital in Sweden and some international comparisons, *Journal of Business Venturing*, 8(6), pp. 525–540.
- Landström, H. (1995) A pilot study on the investment decision-making behaviour of informal investors in Sweden, *Journal of Small Business Management*, 33(3), pp. 67–76.
- Lewicki, R. J. and Bunker, B. B. (1995) Trust in relationships: a model of trust development and decline, in: B. B. Bunker and J. Z. Rubin (Eds) *Conflict, Cooperation and Justice*, pp. 133–173 (San Francisco: Jossey-Bass Publishers).
- Lewicki, R. J. and Bunker, B. B. (1996) Developing and maintaining trust in working relationships, in: R. M. Kramer and T. R. Tyler (Eds) *Trust in Organizations: Frontiers in Theory and Research*, pp. 114–139 (Thousand Oaks, CA: Sage Publications).
- Lin, N. (1999) Social networks and status attainment, *Annual Review of Sociology*, 25, pp. 467–487.
- Loasby, B. J. (1997) Authority and trust. Paper presented at the Scottish Economic Society Conference, Stirling, 8–9 April.
- Markowitz, H. (1952) Portfolio selection, *Journal of Finance*, 7(1), pp. 77–91.
- Mason, C. M. and Harrison, R. T. (1992) The supply of equity finance in the UK: a strategy for closing the gap, *Entrepreneurship and Regional Development*, 4, pp. 357–380.
- Mason, C. M. and Harrison, R. T. (1994) The informal venture capital market in the UK, in: A. Hughes and D. J. Storey (Eds) *Financing Small Firms*, pp. 64–111 (London: Routledge).
- Mason, C. M. and Harrison, R. T. (1996) The UK clearing banks and the informal venture capital market, *International Journal of Bank Marketing*, 14(1), pp. 5–14.
- Mason, C. M. and Harrison, R. T. (2000a) The size of the informal venture capital market in the UK, *Small Business Economics*, 15, pp. 137–148.
- Mason, C. M. and Harrison, R. T. (2000b) Informal venture capital and the financing of emergent growth businesses, in: D. Sexton and H. Landström (Eds) *The Blackwell Handbook of Entrepreneurship*, pp. 221–239 (Oxford: Blackwell).
- Mason, C. M. and Rogers, A. (1996) Understanding the business angel's investment decision, Working Paper 14, Venture Finance Research Project, University of Southampton and Ulster Business School.
- Maula, M., Autio, E. and Arenius, P. (2005) What drives micro-angel investments? An examination of the determinants of family and nonfamily investments, *Small Business Economics*, 25(5), pp. 459–475.
- McKnight, D. H., Cummings, L. L. and Chervany, N. L. (1998) Initial trust formation in new organizational relationships, *Academy of Management*, 23, pp. 473–490.
- Merton, R. C. (1971) Optimum consumption and portfolio rules in a continuous-time model, *Journal of Economic Theory*, 3, pp. 373–413.
- Nahapiet, J. and Ghoshal, S. (1998) Social capital, intellectual capital, and the organisational advantage, *Academy of Management Review*, 23, pp. 242–266.
- Prowse, S. (1998) Angel investors and the market for angel investments, *Journal of Banking and Finance*, 22, pp. 785–792.
- Reynolds, P. D., Bygrave, W. D., Autio, E., Cox, L. W. and Hay, M. (2002) *Global Entrepreneurship Monitor 2002 Executive Report* (Wellesley, MA: Babson College, Ewing Marion Kauffman Foundation and London Business School).
- Riding, A., Dal Cin, P., Duxbury, L., Haines, G. and Safrata, R. (1993) Informal investors in Canada: the identification of salient characteristics. Report submitted to the Federal Department of Industry, Science and Technology Canada and to the Ministry of Economic Development and Trade of the Province of Ontario, Canada.
- Ryan, L. V. and Buchholtz, A. K. (2001) Trust, risk and shareholder decision making: an investor perspective on corporate governance, *Business Ethics Quarterly*, 11(1), pp. 177–193.
- Samuelson, P. (1969) Lifetime portfolio selection by dynamic stochastic programming, *Review of Economics and Statistics*, 51(3), pp. 239–246.

- Shane, S. and Cable, D. (2002) Network ties, reputation, and the finances of new ventures, *Management Science*, 48(3), pp. 364–381.
- Shane, S. and Venkataraman, S. (2000) The promise of entrepreneurship as a field of research, *Academy of Management Review*, 25(1), pp. 217–226.
- Shapiro, D., Sheppard, P. H. and Cheraskin, L. (1992) Business on a hand-shake, *Negotiation Journal*, 8(4), pp. 365–377.
- Sharpe, W. (1964) Capital asset prices: a theory of market equilibrium under conditions of risk, *Journal of Finance*, pp. 425–442.
- Sørheim, R. (2003) The pre-investment behaviour of business angels: a social capital approach, *Venture Capital*, 5(4), pp. 337–364.
- Sørheim, R. (2005) Business angels as facilitators for further finance: an exploratory study, *Journal of Small Business and Enterprise Development*, 12(2), pp. 178–192.
- Sørheim, R. and Landström, H. (2001) Informal investors – a categorization, with policy implications, *Entrepreneurship and Regional Development*, 1, pp. 351–370.
- Sullivan, M. K. and Miller, A. (1996) Segmenting the informal venture capital market: economic, hedonistic, and altruistic investors, *Journal of Business Research*, 36(1), pp. 25–35.
- Tashiro, Y. (1999) Business angels in Japan, *Venture Capital*, 1(3), pp. 259–273.
- Tobin, J. (1958) Liquidity preference as behavior toward risk, *Review of Economic Studies*, 25(2), pp. 65–86.
- Van Osnabrugge, M. and Robinson, R. J. (2000) *Angel Investing: Matching Start-up Funds with Start-up Companies – the Guide for Entrepreneurs, Individual Investors, and Venture Capitalists* (San Francisco, CA: Jossey-Bass).
- Wetzel, W. E. (1981) Informal risk capital in New England, in: K. H. Vesper (Ed.) *Frontiers of Entrepreneurship Research*, pp. 217–245 (Wellesley, MA: Babson College).
- Wetzel, W. E. (1982) Risk capital research, in: C. A. Kent, D. L. Sexton and K. H. Vesper (Eds) *Encyclopaedia of Entrepreneurship*, pp. 140–164 (Englewood Cliffs, NJ: Prentice Hall).
- Wetzel, W. E. (1983) Angels and informal risk capital, *Sloan Management Review*, 24, pp. 23–34.
- Wetzel, W. E. and Freear, J. (1988) Equity financing for new technology-based firms. Paper presented at Babson Entrepreneurship Research Conference, Calgary, 12–15 May.
- Wong, P. K. and Ho, Y. P. (2003) Business angels in Singapore, in: *Singapore Venture Capital and Private Equity Directory 2004*, pp. 36–42 (Singapore: SVCA).
- Wong, P. K., Foo, M. D. and Wong, F. (2001) *Global Entrepreneurship Monitor – Singapore Country Report 2000* (Singapore: Centre for Management of Innovation and Technopreneurship, National University of Singapore).
- Wong, P. K., Wong, F., Ho, Y. P., Singh, A. and Lee, L. (2003) *Global Entrepreneurship Monitor 2002 – Singapore Report* (Singapore: Entrepreneurship Centre, National University of Singapore).
- Wong, P. K., Wong, F., Ho, Y. P. and Lee, L. (2004) *Global Entrepreneurship Monitor 2003 – Singapore Report* (Singapore: Entrepreneurship Centre, National University of Singapore).
- Wong, P. K., Lee, L., Ho, Y. P. and Wong, F. (2005a) *Global Entrepreneurship Monitor 2004 – Singapore Report* (Singapore: Entrepreneurship Centre, National University of Singapore).
- Wong, P. K., Ho, Y. P. and Autio, E. (2005b) Determinants of angel investing propensity: evidence from the Global Entrepreneurship Monitor Dataset, in: S. A. Zahra, C. G. Brush, P. Davidsson, J. Fiet, P. G. Greene, R. T. Harrison, M. Lerner, C. Mason, G. D. Meyer, J. Sohl and A. Zacharakis (Eds) *Frontiers of Entrepreneurship Research 2004*, pp. 48–62 (Wellesley, MA: Babson College).
- Wright, M., Westhead, P. and Sohl, J. E. (1998) Habitual entrepreneurs and angel investors, *Entrepreneurship Theory and Practice*, 22(4), pp. 5–21.
- Zhang, J., Wong, P. K. and Soh, P. H. (2003a) Network ties, prior knowledge, and resource acquisition in high tech entrepreneurship, in: D. Agao (Ed.) *Best Papers Proceedings of the 2003 Academy of Management Meeting*, Seattle, 1–3 August (New York: Academy of Management).
- Zhang, J., Soh, P. H. and Wong, P. K. (2003b) Human capital, competitive intensity and entrepreneur's propensity to exploit social networks for resource acquisition, Working Paper 2003/05, Entrepreneurship Centre, National University of Singapore.

Appendix

Table A. Pearson correlation coefficients between dependent and independent variables

	Mean	1	2	3	4	5	6	7	8	9	10	11	12	13
1 Informal investor	0.035	1												
2 Business angel	0.013		1											
3 Family investor	0.021			1										
4 High value investment	0.015				1									
5 Low value investment	0.017					1								
6 Age	40.364	-0.010	0.001	-0.011	0.031	-0.046	1							
7 Age squared	1785.2	-0.014	0.000	-0.014	0.026	-0.045	0.988	1						
8 Gender	0.524	0.056	0.015	0.064	0.055	0.022	0.043	0.043	1					
9 Post-secondary education	0.438	-0.042	-0.019	-0.044	-0.043	-0.024	0.236	0.232	-0.044	1				
10 Top 33% household income	0.288	-0.039	-0.017	-0.034	-0.032	-0.016	0.032	0.040	-0.028	0.381	1			
11 Employed	0.611	-0.025	0.002	-0.036	-0.023	-0.009	-0.001	0.027	-0.237	0.171	0.188	1		
12 Skills to start up	0.307	-0.153	-0.068	-0.144	-0.123	-0.091	0.011	0.021	-0.160	0.136	0.124	0.088	1	
13 Know entrepreneurs personally	0.283	-0.198	-0.111	-0.169	-0.137	-0.131	0.130	0.128	-0.095	0.132	0.124	0.077	0.305	1
14 Entrepreneurial experience	0.092	-0.134	-0.067	-0.118	-0.115	-0.063	-0.067	-0.054	-0.134	0.032	0.102	0.115	0.332	0.126