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**Are Angel Networks Different from Individual Angels?  
Evidence from an Emerging Economy**

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by G.Sabarinathan, PhD<sup>1</sup>

ABSTRACT

Angel investments have been growing in volume and importance as a source of funding for startups in India and elsewhere in the world. The emergence of angel investment networks has released more data on the investment activities of angels. This paper draws on two key strands that have appeared in recent research relating to angel investments. One, the importance of examining angel investments at the country level has been recognized in view of the differences in institutions across countries and their influence on investment outcomes. Second, it is being recognized that angel networks may be different from individual angels. This paper examines the latter proposition with reference to the Indian market. It finds support for the view that angel networks experience different outcomes in their portfolios in terms of time taken to raise venture capital funding and have higher rates of exits from their investments. While the evidence does not support the hypothesis that angel networks are more likely to provide follow-on financing to their portfolio companies or raise more rounds of venture capital funding for their portfolio enterprises or that angel networks fund more developed enterprises the study finds that these may be due to the recent vintage of these portfolios and may be worth following up on in future.

Keywords: Angel Investments, Angel Networks, Venture Capital, Startup Financing

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## Are Angel Networks Different from Individual Angels? Evidence from an Emerging Economy.

by G.Sabarinathan, PhD<sup>2</sup>

Angel investors are an important source of financing that startups raise capital from. According to Sohl (1999) angels fund ten times as many enterprises in the USA as venture capital funds, a source of funding that has been researched far more extensively. The structure and development of venture capital markets is expected to vary a lot, depending on the institutional and macro-economic context of the country. Lerner et al (2015) which examines angel investment in thirteen countries notes that there are significant differences in the financial and regulatory environments across the countries covered in the study. These differences relate to the level of development of public capital markets, the level of development of the formal venture capital sector and various administrative burdens that affect the ease of starting up enterprises and for investors to fund enterprises. Similar differences have been known to exist in the venture capital market according to Jeng and Wells (2000) and Hazarika et al (2009). It thus makes sense to understand the functioning of the angel investment market as it prevails in India.

In the eighties and nineties a number of country level studies surveyed the investment activities of angels in their respective countries.<sup>3</sup> These studies however did not examine data on the investments of the angels, with the exception of Wiltbank (2009). Instead they were mostly based on surveys of angels, the limitations of which have been pointed out in .... More recent studies such as Chemmanur (2014), Kerr et al (2014), Hellman et al (2013), Hellman and Thiele (2015) have focused instead on the investment processes of angels and tried to develop a connection between them and the portfolio outcomes. This current paper attempts a similar effort to understand the investment outcomes of angel investors in India, a market on which the literature is limited, if not sparse.<sup>4</sup>

The angel investment markets comprises two types of investors, namely angels who invest as individuals (referred to hereafter as “Lone wolf”, a term that we borrow from May (2002) and angels who invest as a group or networks, (referred to hereafter as “Angel networks”). [Ibrahim

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<sup>3</sup>Examples of such studies are Dansons et al (2006) comparing Poland and Scotland, Hindle and Wenban (1999) relating to Australia, Landstrom (1999) relating to Sweden, Mason and Harrison (2000) relating to the UK, Sohl (1999) relating to the USA, Sorheim and Landstrom (2000) relating to Norway, Stedler and Peters (2003) and Brette (2003) relating to Germany, Tashiro (1999) relating to Japan. This is not a comprehensive review and is meant to indicate the breadth of country level studies.

<sup>4</sup>The only articles available on angel activities in India are Sabarinathan (2014a), Sabarinathan (2014b) and Rajan (2016).

(2010), Roach (2010), Payne and Macarty (2002)]. Business angel networks are believed to be a low cost solution to match founders and investors according to Aernoudt and Erikson (2002). They further note that there are regulatory restrictions to the formation of business angel networks in certain European countries. Ibrahim (2008), Roach (2010) and Payne and Macarty (2002) note that there are differences in the approach of these two different types of angels. This paper examines whether differences in their investment styles reflect the kind of investment portfolios the two types of investors create respectively.

Sabarinathan (2014b) presents a stylized view of the investment activity of angels in India. This paper extends that picture by comparing the investment activity of individual angels and angel networks. While angel investors have been active in India for a long period data on their investment activities have been reported only during the past fifteen years or so. Available data show that as of June 2016, 839 investments have been made in 756 enterprises.

The paper finds that while there are differences in terms of the outcomes of the portfolios created by angel networks and Lone wolf investors, at the current state of the evolution of the two types of investor groups the differences are statistically different in terms of the time taken by them to raise follow on venture capital as well as in terms of the extent of exits achieved by them. These results point out to the fact that the two groups acquire different investment portfolios, which in turn possibly point out to different investment preferences, investment evaluation processes as well as styles of post-financing engagement with the enterprises in the portfolio. Those results that are not statistically significant also point to the need for revisiting those hypotheses at a later point in time with the benefit of having been able to observe the development of the enterprises for a longer period of time.

The paper is organized as follows. The first section reviews the existing literature on angel investing and on the distinction between the two types of angel investors. The second section discusses the data source and the methodology. It also presents some key descriptive statistics about the angel investment market in India and some key institutional features. The third section develops a set of hypotheses about the important distinctions that could be expected between portfolios of Lone wolf investors and angel networks respectively. The fourth section discusses the results, suggests implications of the same and presents a few possibilities for further research. The fifth section concludes.

### Literature Review

Angel investors are considered to be the first source of external capital for start-up enterprise after founders and members of their families and their friends. (Sahlman et al (1999) and Timmons and Spinelli (2008).) They are considered to fund a lot many more enterprises than

venture capital according to Bhide (2003) and Sohl (2002). Shane (2009) defines an angel as “a person who provides capital in the form of debt or equity, from his own funds to a private business owned and operated by someone else who is neither a friend nor a family member.” Van Osnabrugge and Robinson (2000) find that the investment processes followed by angels is similar to that of institutional venture capital investors. At the same time Prowse (1998) notes that individual angels vary a lot in terms of their financial sophistication and entrepreneurial background. A similar view was noted in Macht and Robinson (2009). In general, both practitioners as well as academic researchers have pointed out that in comparison to venture capital funds, angel investors invest in smaller and earlier stage ventures, work with minimal due diligence although the process they follow is similar to that of venture capitalists, prefer to invest in ventures that are located in proximity to the investor’s geographical area of business, use simple contracts or even none at all occasionally, care less about exit and are satisfied with lower rates of return. Possibly due to the differences in their styles Shane (2009) and Wiltbank et al (2009) report lower risk adjusted rates of return by angel investors in comparison to venture capital investors.

Over time individual angels constituted themselves into groups or networks. The emergence of angel networks has been noted for a while from the time of Van Osnabrugge (2000) and Sohl (2002). These groups vary in terms of the way they are constituted and the way they function, aspects that I discuss later in this note. Angel networks emerged in response to the issues faced by individual angel investors. The most significant among these were the problem of search and information costs in terms of investors and entrepreneurs finding each other as noted in Prowse (1998). Mason and Harrison (2002) suggest that angel networks help individual angels by augmenting their business networks and thus enable them to participate in transactions if they have smaller sums to invest or if they operate from geographically remote locations. Van Osnabrugge and Robinson (2000) add that angel networks allocate a part of their investible funds for follow-on investment. In that sense they are more similar to VC funds.

Payne and Macarty (2002) describe the working of Tech Coast Angels, an association of three regional networks. They note that angel networks differ from individual angels in that the former resemble venture capital funds “with respect to their investment style.” They further posit that angel networks bring efficiencies to the deal sourcing and investment evaluation processes which are normally considered to be “notoriously inefficient.” Roach (2010) notes that as angel groups interact with counterparts in different geographies they should be able to overcome the limitation of having to invest in enterprises that are geographically nearby and generate better deal flows in the process. Kaufmann (2002) notes that angel networks have evolved in response to several factors such as (i) the need to attract higher quality and more profitable deals (ii) the emergence of an opportunity for “pooled investments” because of the

emerging gap between individual and institutional venture capital investors (iii) legal and economic complexity of these investments. They further note that angel networks use several routes for investing such as creating a fund out of their pooled capital, or investing directly into the funded enterprises in their individual capacity (using the network for merely sourcing and evaluating deals) and investing into an enterprise that has been created specifically for funding a chosen enterprise. These different approaches indicate that although angel networks function in a structured manner, they allow themselves enough flexibility when it comes to channeling their funds.

### Angels and Angel Networks in India

Angel investment of the kind defined by Shane (2009) has been in vogue in India for a fairly long time. These angel investors have partly filled the gap that existed in the capital market until the development of the venture capital and private equity industries. Sabarinathan (2014) provides an overview of the angel investment activity in India and finds that angel investors may be said to comprise two broad types, namely individual angel investors and angel networks. The former make investments and manage their portfolio based on their own individual effort or acting in informal groups that may be formed *ad hoc* on a deal by deal basis. In line with some of the practitioner literature through the rest of this paper I will refer to them former as “lone wolf angels” or “lone wolf investors” and to the investments they make as “lone wolf investments”. I will refer to the latter as “angel network investors” and the investments they make as “angel network investments”.

A formal definition of an angel network does not seem to be available in academic literature. I define an angel network as a formal association of individual angels and corporate investors who are bound by a formal structured arrangement governing the sourcing of investment opportunities, evaluating investment opportunities, engaging with portfolio enterprises and exiting from investments at the appropriate time. These activities are usually managed by a secretariat. While bound by broad rules of engagement members of these associations may also enjoy the liberty to choose enterprises that they invest in and the amount of funds that they provide to a given enterprise, subject to certain upper and lower limits that may be part of the rules of engagement of the enterprise.

A number of angel networks have come into existence in India in the past decade. Since there is no formal registration requirement or regulatory oversight governing angel networks a single source of information on the angel networks in business is not available. In the dataset provided by Venture Intelligence I find fifteen angel investment groups that correspond to our definition

of an angel investment network.<sup>5</sup> However, based on data on their investment activity and press stories Indian Angel Network (IAN, hereafter), Mumbai Angels, Chennai Angels, Hyderabad Angels, Calcutta Angels, (BITS) Spark Angels, Chandigarh Angels, Native Angel Network and CIO Angel Network appear to be among the more active networks, measured in terms of the number of investments made by them.

In recent times a few online networks have emerged, challenging the business model of the older type of angel networks. In the latter, older type of networks, the intermediation between the entrepreneur and investors is managed by a process with a significant human engagement whereas in the online networks a larger part of the intermediation is conducted online. I will refer to the older type of angel network as an offline angel network or simply angel network to distinguish it from the more recent and less common online angel network.

I present an overview of the way the IAN is organized and functions as an illustration of the working of an offline angel network in India.<sup>6</sup> There appear to be many similarities between the IAN and the other networks in terms of their functioning, as evident from their respective website,<sup>7</sup> although they may differ in their scale of activity.

Established in 2006, IAN had 478 members as of December 2016. These are drawn from a cross section of individuals such as serving corporate executives, professionals such as lawyers, former entrepreneurs who have cashed out of their previous ventures and so on. The network sources deals, evaluates them, structures deals, puts out term sheets, manages a common set of documentation, oversees the performance of individual investee enterprises and exits from the investments. While members of the IAN are involved across the entire sequence of activities, the network has a secretariat that supports the members in these activities as well as in the process of managing the mobilization of capital from investors for each of the deals that the

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<sup>5</sup>These are (BITS) Spark Angel Network, Calcutta Angel Network, Chandigarh Angel Network, Chennai Angel Network, CIO Angel Network, Cross Border Angel Network, Hyderabad Angel Network, Indian Angel Network, Mumbai Angels, Native Angel Network, Rajasthan Angel Investment Network, Stanford Angel and Entrepreneurs Network. All of these appear to be organized as associations of investors with each of them having the choice of investing in individual transactions of interest to them. In addition a few groups appear to be organized as investment firms. These are CCube Angels, GSF Super Angels and Silicon Valley Angels. There is a third category that seems to be made up of a single investment entity or vehicle, although it invests under a name that suggests it is a network. An example of this is Singapore Angel Network, which appears to be the investment arm of a business group headquartered in Singapore. For the purpose of our analyses we treat the first and second categories as angel networks since our research is focused on the results of collective investment activity of a formally structured group as opposed to the investment actions of individual angel investors, whether acting as individuals or as corporates.

<sup>6</sup>This is based on Sabarinathan (2014), with data updated appropriately.

<sup>7</sup>We examined the websites of all the fifteen angel networks that we mention above. We analysed their process for entrepreneurs to submit business plans, the network's process for the evaluation of investment opportunities and the style of engagement of each of these networks with the entrepreneurial community and the ecosystem. We notice many striking similarities across the networks. These networks have well-populated websites that provide information on their activity. We notice many striking similarities across the networks, across all the aspects of their functioning.

network decided to support. Members are governed by a membership agreement which governs the functioning of the members *inter se* and ensures that there are no conflicts among members or between individual members who invest in various enterprises and the investee enterprise itself. Members pay an annual cash membership fee to the network, while the entity that manages the network also receives some compensation by way of equity from the investee enterprise.

IAN thus typifies the offline angel networks that are active in India. It is an association of angels formed to take advantage of scale economies in deal generation, evaluation and documentation of deals. It allows its members to invest in enterprises across a larger geography across the country and outside. Even though the members work together as a collective they have the freedom to choose the enterprises in which they invest.

#### Overview of Angel Investment Activity

Table 1 below presents the investment activity of angels over the years. It may be seen from the table that the number of transactions investments remained relatively small at less than twenty five per year from 2000 to 2008. It increased to less than sixty per year from 2009 to 2011 and then further sharply to about 90 per year or more from 2012 onwards. In particular, the last two years, namely 2015 and 2016, have witnessed a sharp increase.

Table 1

	2000-08	2009	2010	2011	2012	2013	2014	2015	2016	Total
No of deals - Lone Wolf	53	19	21	43	57	64	71	141	117	586
No of deals - Angel Network	26	11	14	14	38	29	43	52	42	269
Total	79	30	35	57	95	93	114	193	159	855

It may be mentioned that deals by angel networks began to be reported only from 2007. Investments by Lone Wolf angels as well as by angel networks have both have grown at more or similar compounded annual growth rates with the lone wolf portfolio growing at 46% from 2000 and the network portfolio growing at 44% from 2007, the first year that investments by angel network deals were reported. The year on year additions to their respective portfolios may have grown at different rates as may be observed from the table above. Given the short period over which I observe the differing year on year growth rates it may not be possible to make any statistically meaningful inferences about the investment activities of the two types of angels.



The sectoral break up of deals in Table 2 indicates that online services<sup>8</sup> accounted for 36% of all deals done while information technology (IT) products accounted for 18%, mobile value added services for 13%, food and food delivery for 5% and the rest of the deals were accounted for by the eleven other sectors. Year on year analysis of the sectorwise break up (details not presented in this paper) do not indicate an investment trend that is very different from the cross sectional break up above.

Table 2

Industry Sector	Lone wolf		Network	
	Nos	%	Nos	%
BPO & Analytics	11	1.9%	1	0.4%
E commerce	18	3.1%	4	1.5%
Education	20	3.4%	9	3.3%
Energy	5	0.9%	2	0.7%
Financial Services	7	1.2%	2	0.7%
Food and Food Delivery	39	6.7%	7	2.6%
Healthcare & Biotech	17	2.9%	10	3.7%
IT Hardware	4	0.7%	3	1.1%
IT Products	99	16.9%	54	20.1%
IT Services	24	4.1%	9	3.3%
Media-Content	9	1.5%	6	2.2%
Mobile VAS	76	13.0%	35	13.0%
Online Services	214	36.5%	102	37.9%
Other Services	29	4.9%	13	4.8%
Others	14	2.4%	12	4.5%
	586	100.0%	269	100.0%

The sectoral analysis below presents a mixed picture of similarity in portfolio composition in certain sectors and difference in certain others. Thus while lone wolf investors and angel network investors seem to have focused more or less to the same degree on mobile value added services, online services, education and other services, the former seems to have picked up more

<sup>8</sup>Venture Intelligence follows a narrower categorization of deals. We reclassify the deals into a broader category for the following reasons. First, broader classifications minimize the risk of wrong classification. Second, it also makes the resultant analysis more tractable. On the flip side, using a broader classification makes the comparison of different portfolios less accurate.

investments in ecommerce and food and food delivery while networks seem to have focused more on IT products.

Networks appear to be strategic in building a portfolio as can be seen from the sectoral preferences stated in their website. The portfolio built by Lone wolf angels is the result of their individual preferences. Since those preferences have not been articulated anywhere it would not be possible to even assume that there is a conscious preference towards any sector. Literature suggests that angels seem to be driven as much by considerations such as familiarity with the founders and the proximity of the location of the enterprise as they are by the attractiveness of the sector to the investor as pointed out in Wong et al (2009) and Lerner et al (2015). Sectoral differences may also be due to the preference for certain industries at certain points in time. Thus BPO and Analytics were a preferred sector in the early years of the new millennium when lone wolf angels were actively investing in those businesses. This may explain a larger presence of this sector in the lone wolf portfolio.

The regionwise breakup in Table 3 indicates that the Southern Region led with 39.7% of the investments while the west accounted for 28.7%, the north for 26.2%, east for 1.1% and international investments accounted for 4.3%. A similar concentration was noticed with Bangalore accounting for 27.5% of the investments, followed by the National Capital Region of Delhi comprising Delhi, Gurugram and Noida accounting for 24.9% and Mumbai for 20.1%. Pune, the city with the fourth largest number of deals accounted for a mere 5%. The spatial distribution of angel investments suggests a strong agglomeration affect in contrast to the corresponding distribution noted in Wong et al (2009) in the USA.

Table 3

Regionwise break up of angel investments

Region	No of Cos	
East	9	1.1%
North	220	26.2%
Overseas	36	4.3%
South	333	39.7%
West	241	28.7%
Total	839	100.0%

The angel portfolio also witnessed considerable follow-on funding activity during the period. 76 enterprises raised two or more rounds of financing from angels, 237 enterprises went on to raise

one or more rounds of venture capital funding and angel investors exited from 62 enterprises during the period of this analysis. These activities are what motivate the study, *inter alia*, to see if there is a difference in the level of post-funding activity between the two types of investors.

### Data and Methodology

A significant challenge in research into the investment activities of angels is availability of data. Angels have been known to prefer to remain anonymous according to Van Osnabrugge and Robinson (2000). This is so presumably because they invest their own proprietary capital and as such their investment activities are not subject to any regulatory oversight. Most research on angel investing therefore has tried to unravel the investment preferences of angels through surveys of angel investors. Several online and print media provide news stories of investments in startups as put out by the investors or the by the investee enterprises. These narratives however do not provide consistent transaction related data. Starting the mid-nineties though there has been some welcome departure from these “informal” and “secretive” ways as noted in Wong et al (2009).

I rely on transaction related data provided by Venture Intelligence (VI), an independent source that specializes in providing data relating to angel investments, venture capital and private equity transactions. VI provides the name of the enterprise, the names of the investing entities, brief description of the business of the enterprise, sectoral classification of the investee enterprise, month and year in which the transaction is reported in the media, the amount of funding, data on valuation or pricing of the investment where such information is available, whether the enterprise has raised follow on financing from angels or from venture capital investors and the month and year of raising such funding, whether angel investors exited from the investment, details of the website and a few other additional items of data that are available about the transaction from the data in the public domain. VI is a widely used data source by investment managers, consultants and academics and is the oldest among the data providers in this field in India with data going back up to 1999.

Most academic research relating to private equity and venture capital look at the amount of funding and the performance of the investment measured in terms of the rate of return.<sup>9</sup> This requires accurate and reliable data on the amount of funding, price paid for the investment

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<sup>9</sup>The early stage of investment industry, especially the VC industry, measures rate of return at the level of individual investments, portfolio or the return to the fund investor. (See Metrick and Yasuda (2011), for example. While the industry does not seem to formally adjust for risk, academic research uses various measures of risk. (See Gompers and Lerner (2006), for example.)

including all mechanisms available to the entrepreneur and the investor to affect the price such as options, ratchets and warrants and accurate details on the exit or divestment process.

For this paper I use nearly all transaction related data available with VI, except that on the amount of funding and valuation. Given the regulatory regime governing early stage equity investment activity, the institutional environment and the practices followed in issuance of term sheets and release of funding I believe that the funding amount and the valuation data available in the public domain cannot be used reliably for academic research.<sup>10</sup>

In the absence of reliable data for calculating the financial performance this paper attempts to answer a more limited question: Is there a difference between the style of investment of lone wolf angels and angel networks? Have those differences in style resulted in the differences in the rate of development of the enterprises they supported in terms of some simple proxies such as their ability to raise follow on funding from an independent source and their ability to provide an exit to the angel investor.

In the absence of any systematic academic insights into the investment activities of angel investors, measuring and analyzing investor activity in terms of number of enterprises supported rather than the amount of capital invested would be a reasonable proxy to answer basic questions such as the rate of funding support to new enterprises over time, sectors to which capital has been allocated, spatial distribution of investment activity and the extent to which those enterprises have survived to be able to raise further funding and offer an exit to investors. More importantly it helps us form a view on whether it is more effective for investors to function in formally organized networks or as individual investors, given the argument that literature appears to put for in favour of angel investors organizing themselves as angel networks.

Early stage enterprises evolve through many rounds of funding. Each of these rounds of funding may be provided by investors who had funded the enterprise in the previous round or a fresh set of investors who have not funded the enterprise previously or some combination of the latter and the former sets of investors. At each of these subsequent rounds the enterprise reveals a new set of information. Thus each of these rounds of funding is treated as a new Investment transaction even though it is in the same enterprise. This poses another interesting problem as to whether it is the enterprise or the transaction should be the unit of measuring investment activity.

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<sup>10</sup>One example of the difficulty in using details of the funding amount or the valuation is that the amounts are often inaccurate. Secondly, most of the deals are structured as convertible instruments. The valuation details provided often assume base case conversion pricing whereas the actual conversion may be very different, with an element of optionality often thrown in. Thirdly the funding offer may often be staged with an option for the investor to abandon. This may result in the actual funding amount being different from the amount announced in available the public domain.

In this paper I use the number of enterprises to measure investment actions that are important at the enterprise level such as exits and the instances of enterprises receiving follow on funding. I use the number of investment transactions or deals to measure the distribution of activity across sectors and regions since this is a better proxy for the extent of capital allocation. For example, exit relates to the event where a liquidity path is created for the shareholders for the first time in the evolution of a given enterprise. So the effectiveness of an investor in terms of achieving exits is ideally measured as a ratio of the number of exits to the total number of enterprises in the portfolio. Certain other activities such as the allocation of capital to various sectors or regions or the composition of the portfolio of a fund or the level of investment activity in a year are measured in terms of the rounds of financing. The idea here is that each round of financing may be viewed as similar to new or fresh investment commitment.<sup>11</sup>

The standard approach to measuring the rates of return is to compare the valuation at the time of making the investment with the valuation at the time of disposal of the investment (or at the time of the analysis as the case may be), measure the return implicit in these valuations after adjusting for interim cashflows such as dividends and compare the same with the return on a reference benchmark adjusted for the risk of the portfolio in question. As noted earlier, in the private market for securities information on valuation is not readily available. Hence it is necessary to look for other performance proxies. Similar approaches, due to paucity of data, have been made in Hochberg et al (2007) and in Lerner et al (2015). The latter study observes that due to the challenges in gathering data the study focuses on a “relatively modest set of outcomes not seeking to gather information that would be perceived as proprietary.”

While the scope of the questions sought to be answered in this paper is limited they provide a starting view of the investment activity of angel investors over the past fifteen years or so. More importantly, I explore likely differences between the two types of angels, namely, lone wolf angels and angel networks. In turn these answers may provide a basis and impetus for further academic research.

### Development of Hypotheses

In early stage enterprises staging of funding has been noted to be a common practice. Sahlman (1990) observes that venture capital investors use staging as a governance mechanism to ensure that the venture progresses. As the venture develops the new information about the progress of the venture that unravels is reflected in the valuation of the new round. Thus continued fund

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<sup>11</sup>Investors stage their commitment, *inter alia*, to give themselves the option to abandon continued funding of the enterprise. [CITE] Hence every round may be viewed as a fresh commitment by the investor. Thus it is appropriate to view successive individual rounds of funding as an instance of fresh capital commitment by an investor.

raising by a venture may be considered to be an indicator of its longevity or survival. In particular if the venture is funded by an arm's length investor who is not part of any of the previous financing rounds of financing such funding could be considered to be a validation of the prospects for and the value of the enterprise.

Similarly the creation of an exit path for an incumbent investor is seen as important and as a success outcome as noted in Black and Gilson (1998). The willingness of an arm's length buyer to acquire the shares of the enterprise held by an incumbent shareholder is seen as an indicator of the firm's prospects or value in the case of positive exits.

I measure the success of the investment strategies of the two types of angel investors in terms of their ability to raise follow on funding from venture capital (VC) investors, their ability to raise follow on funding from angel investors, the average number of rounds of VC financing they raise and the fraction of the portfolios that they exit from respectively. These results are summarized in the tables below.

Wong et al (2009) finds that individual angels do not provide follow-on funding only where VC funding is not available. On the contrary, VCs provide follow -on funding as part of their staged funding strategy. Venture capitalists' preference for staged funding has been noted in a number of scholarly articles, including Gompers (1995) and Sahlman (1990) who note that staging is an important means of controlling opportunistic behaviour of entrepreneurs. To the extent that angel networks function more like VCs as noted in Ibrahim (2008) they would be expected to engage in more of follow on funding than lone wolf angels. Angel networks are believed to set aside a portion of their investible capital for follow-on funding. Further, given their level and style of engagement with portfolio enterprises, they are more likely to support their portfolio enterprises with follow-on funding. Investors who have the capacity to continue to continue to infuse funds to support enterprises in their portfolio are likely to be able to choose the timing for raising VC for those enterprises.

Thus angel networks are likely to support a higher fraction of the enterprises in their portfolio with follow-on financing than lone wolf angel investors.

*H1<sub>0</sub>: The fraction of enterprises in angel network portfolio that raise follow-on angel financing is less than or equal to the fraction of enterprises raising follow-on angel financing in lone wolf portfolios.*

*H1<sub>a</sub>: The fraction of enterprises in angel network portfolio that raise follow-on angel financing is greater than the fraction of enterprises raising follow-on angel financing in lone wolf portfolios.*

Table 4

	Total Enterprises	Funded enterprises	% funded
Lone Wolf	502	87	17.3%
Angel Network	243	45	18.5%
Total	745	132	17.7%

Table 4 provides summary statistics. The table suggests that angel network investors have raised follow on funding for a higher fraction of their portfolio enterprises than lone wolf investors. I find from the data that at a 5% significance level the inclination of the two sets of investors to provide follow on financing is not different. This could be on account of two reasons. It may be noted from Table I that a large bulk of funding activity has occurred more recently in 2015 and 2016. The data indicates that the mean time elapsed between follow-on funding and standard deviation for the two types of investors are as below. Thus fewer enterprises may have received follow-on funding because many of them may have received the first round of funding recently. Yet another likely reason is that the network's members do not have the propensity to provide follow-on funding. This in turn may be a result of the evaluation and decision making process at various angel networks which differ in many significant ways from venture capital firms. Most importantly, for a follow-on funding to go through a large number of individual members who participated in the initial round would need to be convinced of the business case for follow on funding.

Table 5

	Total Enterprises	VC funded enterprises	% VC funded to Total
Lone Wolf Investments	502	129	25.7%
Network Investments	243	78	32.1%
Total	745	207	27.8%

On the demand side for funding, VC investors are considered to be the next stage in the evolution of an enterprise after founders, family and friends, commonly referred to as 3Fs, and angels. VC investors are highly sought after by entrepreneurs because of the post financing value they add according to Bronwyn and Lerner (2009). Further, they provide certification value to an enterprise (Megginson and Weiss (1990)). VC investors are known to be highly selective and are known to look for enterprises that have the potential to be huge successes according to Bhide (2003) and Shane (2009). Ibrahim (2008) notes that angel networks have

investment processes that are closer to those followed by VC investors. This has been further borne out by the processes followed by various angel networks documented in Roach (2010), Payne and Macarty (2002), Hellman et al (2015) and Sabarinathan (2014). Thus angel networks are more likely to have selected enterprises that VC investors might find attractive. Further, as noted earlier, angel networks are formed so as to enable angels to pool their resources and have larger investible funds. Given their relatively larger base of funds and their consequent ability to provide follow-on financing angel networks are more likely to be able to better prepare their portfolio enterprises for raising VC. In terms of their investment philosophy and strategy angel investors are likely to be more aligned to that of VCs which also implies that enterprises funded by angel networks are more likely to attract VC's investment interest than those enterprises that have been funded by lone wolf angels.

Angel networks are therefore expected to have a higher proportion of enterprises in their portfolio raising VC than enterprises funded by lone wolf angels. It leads us to hypothesise as follows:

*H2<sub>0</sub>: The fraction of enterprises in angel network portfolios that raise venture capital financing is less than or equal to the fraction of enterprises raising venture capital financing in lone wolf portfolios.*

*H2<sub>a</sub>: The fraction of enterprises in angel network portfolios that raise venture capital financing is greater than the fraction of enterprises raising venture capital financing in lone wolf portfolios.*

From Table 5 it appears that Network investors have been more successful in helping their portfolio enterprises raise follow on VC financing. However, here again, I find that the difference between the proportion of the enterprises that raise venture capital across the two groups is not statistically significant at the 5% probability level. The implication of this result is that enterprises backed by angel networks are not more likely, on average, to raise venture capital than those enterprises that are backed by lone wolf investors. As in the case of follow-on financing, the sharp increase in enterprises funded by angel networks in 2015 and 2016 may mean that given more time in future many of the enterprises that were recently funded by angel networks may go on to raise VC funding and thus increase the fraction of angel network funded enterprises raising VC. Further, the academic evidence on the impact of angel funding on the ability of an enterprise to raise VC appears to be somewhat mixed at present. While Hellman et al (2015) find that prior angel funding reduces the probability of an enterprise raising VC, Lerner et al (2015) explain that result as possibly a country specific idiosyncrasy. They go on to note that in the countries covered in their study angel groups "are more sophisticated and



experiences investors in their respective countries” and that in countries outside the USA they have an important gatekeeper or accreditation role. The mean time required for angel funded enterprises to raise venture capital, which I present in Table 7, also appears to suggest that many more angel funded enterprises that have not yet raised venture capital may do so in the months to come. All these considerations point out that this is a question that may need to be revisited in the years to come.

Successful enterprises go through many rounds of funding before they reach a critical mass where they can be either acquired or they can make an initial public offering (IPO). *Ceteris paribus*, a firm that raises more rounds of funding may be considered to be building more value for its investors than one from which the investors exit early. Gompers (1996) points to the possibility of firms making an IPO or getting acquired prematurely because of grandstanding by investors. Hellman et al (2013) note that funding by a venture capitalist may be considered to be a “sign of company quality and associated with greater prestige.” Given the deep connection between the VC fund managers in India and the American VC industry this observation may be extended to funding by VC professional fund managers in India as well. Extending this line of reasoning further, continued financing by VC investors over multiple rounds may be looked upon as a repetitive validation of the prospects for the enterprise.

Thus a portfolio that has a higher average of number of rounds of funding across its portfolio may be considered to be more successful than one that raises lower average number of rounds.

According to Roach (2010) angel networks seek members who bring professional capabilities to the network. Sabarinathan (2014b) notes that angel networks have among their members professionals with diverse business and functional backgrounds. Given our expectations about the ability of angel networks to engage in more serious due diligence, given their preference for slightly more evolved enterprises (IAN, for example, prefers to fund enterprises that are beyond the proof of concept stage, according to their website) and their ability to engage with their portfolio enterprises at the post financing stage it is expected that companies funded by angel networks are likely to be of better quality. As such they are expected to be able to raise more rounds of VC funding so as to fund their continued expansion, than enterprises that have been funded by lone wolf investors.

*H3<sub>0</sub>: The average number of rounds of VC funding raised by enterprises in angel network portfolios is less than or equal to the average number of rounds of VC funding raised by enterprises in lone wolf portfolios.*

*H3<sub>a</sub>: The average number of rounds of VC funding raised by enterprises in angel network portfolios is greater than the average number of rounds of VC funding raised by enterprises in lone wolf portfolios.*

Table 6a measures the mean number of rounds of VC funding raised by enterprises funded by lone wolf angels and angel networks respectively.

Table 6a

No of rounds of VC financing mobilized

No of transactions (n)	Lone Wolf	Network
Mean	1.81	1.81
SD	1.14	1.16
Median	1.00	1.00
Max	7.00	7.00
Min	1.00	1.00

Given how venture capitalists use staged financing to increase their funding commitment to enterprises as new information unravels about their performance, as suggested in Clayton et al (1999) the number of rounds of VC financing indicates the durability of an enterprise in its early stage. This is so because institutional investors who provide funding at the early stage of an enterprise would not continue to pour in capital if they did not believe the quality of the management team and the prospects for realizing an adequate risk-adjusted rate of return on the given investment.

The table above suggests that the number of rounds of financing mobilized by the two portfolios is quite similar. In order to arrive at the number of rounds of funding raised by an enterprise I classify investments that are made within a period of three months as part of the same round. This is in line with the approach followed in Hellman et al (2015). Not surprisingly the null hypothesis cannot be rejected at the 5% level of significance. This result is further borne out by the remarkable similarity in the distribution of number of firms raising various numbers of rounds of financing in Table 6b.

Table 6b

Distribution of enterprises raising VC funding

Round	No of firms	
	Lone Wolf	Network
1	63	33
2	37	17
3	13	6
4	7	5
5	3	0
7	1	1
	124	62

Startups that grow rapidly are expected to look for equity funding soon after they commence business. The only exception to this expectation would be businesses that start throwing off cash flow early in their development. Most startups however experience cash flow deficit in the early stages, a phenomenon that has been often described variously as the “J curve”, or “hockey stick”, referring to the negative cash flow in the initial years followed by steep profitability as scale economies kick in. Startups that are promising are likely to receive funding from angels and VC investors fairly quickly. Startups with less attractive prospects may have to wait longer till they reach a level of development that will excite professional investors to fund them or may have to try for a long time before they can persuade an investor to put in capital.

In our earlier discussion I noted that angel networks invest in relatively better quality startups. Further, I noted that angel networks also support more developed enterprises. At the same time the size of the funding provided by angel networks is larger than that provided by lone wolf angels. This has been put forth as one of the reasons for individual angels to come forth and form groups of networks. Consequently, enterprises funded by angel networks could defer their approach to VC investors for longer than enterprises funded by lone wolf angels. The more developed nature of enterprises funded by angel networks and their better quality due to the due diligence and value adding capabilities of angel networks thus points to the possibility that they take a shorter period of time to raise their first round of VC from the time they raise their first round of angel funding. The relatively larger funding provided by angel networks suggests that on the contrary that they may be able to manage for a longer period of time without raising institutional venture capital. Thus it appears to be an empirical issue as to whether at the margin a given enterprise that has been funded by an angel network might take more or less time to raise VC, than an enterprise that has been funded by lone wolf angels.

Table 7 provides summary statistics on the mean time taken by enterprises funded by angel networks and lone wolf angels respectively to raise their first round of VC. Table 5 shows that

142 enterprises that had been funded by lone wolf angels and 78 enterprises that had been funded by angel networks had succeeded in raising VC. We measure the time taken to raise VC as the time elapsed between the first day of the month in which the first round of VC funding is reported and the first day of the month in which angel funding had been reported. I find that in a number of instances VC funding is reported earlier than angel funding. This is not entirely uncommon in the Indian early stage equity market where VC investors do occasionally allow angel investors to fund an enterprise which they have already funded, so as to take advantage of exceptional value that certain exceptional angels may bring to the enterprise in question. Some of the instances where we find VC funding precedes angel funding could also be due to issues relating to data capture. Whatever the reason, we drop those data points from our data set where the date of first VC funding precedes the date of first angel funding. We are left with 49 enterprises that had been funded by lone wolf investors and 28 network angel funding transactions respectively in the samples two samples. As in the other instances we exclude those enterprises that were funded prior to 2007, the period for which we do not have data on enterprises funded by angel networks.

The descriptive statistics in Table 7 indicate that enterprises funded by angel networks seem to take a longer period to raise VC than enterprises founded by lone wolf angels. Current research cited in this paper does not prove clearly whether angel investors and VCs are substitutes or complements in the process of developing an enterprise. The evidence from my samples suggests that the discussion has to be perhaps more nuanced in view of the different roles that the two types of angel investors might play in their relationship with VCs.

*In the light of these beliefs startups funded by angel networks are expected to take shorter periods to raise the first round of VC funding after they have been funded by angels.*

*H<sub>0</sub>: The time taken to raise the first round of VC financing by enterprises in the angel network portfolio is greater than or equal to the time taken by enterprises in the portfolios of lone wolf investors.*

*H<sub>a</sub>: The time taken to raise the first round of VC financing by enterprises in the angel network portfolio is less than the time taken by enterprises in the portfolios of lone wolf investors.*

Table 7

Time taken to mobilize VC

	Lone wolf	Network

Mean	471.06	690.81
Median	304.00	487.00
SD	585.14	581.02
Max	3044.00	2526.00
Min	31.00	28.00

The null hypothesis is not accepted at a 5% level of significance, suggesting that on average enterprises funded by angel networks take less time to raise the first round of VC.

The difference in the time taken to mobilise VC funding indicates two possible factors. One, networks are able to better prepare their enterprises to raise VC faster or earlier than their lone wolf counterparts. This may include their facilitating their portfolio enterprises to grow faster which will make them seek out VC funding faster. A second possible reason is that networks invest in enterprises that are more evolved and so at the time of raising angel funding they are already closer to the stage of development at which they will need to raise VC funding. The latter seems to be in line with the investment preference of the more prolific among the networks such as Indian Angel Network and Mumbai Angels. In order to confirm this explanation of course it would be necessary to know the investment preference of Lone wolf angels, which I noted earlier is difficult to discern, given their discreet approach to investing as well as their likely diversity in preferences. Later in this paper I analyse a proxy for this by way of time taken to raise the first round of angel funding by the enterprises in the two portfolios. It would be worth pointing out that Lerner et al (2015) note a similar bias towards more developed enterprises because their study is largely based on investments made by angel networks. A third possible reason may have to do with the sectors in which these enterprises that seek to raise funding operate. In other words certain sectors which have a huge appetite for capital on the demand side and which operate in sectors that attract investor funding on the supply side of capital may mean that they achieve faster success at mobilizing VC funding than sectors that require slower infusion of funding and / or are not fancied by investors. The shifting preference of investors has been noted in the case of public markets in Ritter (1980) and in the case of private markets in annual surveys such as the Moneytree survey by PriceWaterhouseCoopers.

I have noted at several points earlier in this paper that angel networks seem to invest in enterprises at a later stage of their development than lone wolf angels. I examine this

proposition by analyzing the time taken for the enterprises in the two portfolios to raise their first round of funding. I measure the time as the number of days elapsed from the date of incorporation of the enterprise and the first day of the month in which the enterprise raised the first round of angel funding. I obtain the date of incorporation<sup>12</sup> from a commercial data provider, namely, Zaubacorp<sup>13</sup>, which in turn gathers this data from the website maintained by the Ministry of Company Affairs of the Government of India (MCA).<sup>14</sup> I recognize that as noted in Da Rin et al (2011), the date of incorporation is not an accurate estimate of the time of commencement of economic activity in an enterprise, given that the founders of a startup may have commenced the ideation and the initial development of the idea well before the creation of the corporate entity. I use the date of incorporation as a proxy for the date of commencement of business since the exact date of commencement of economic activity cannot be observed easily. Angel investors provide funding primarily as subscription to the equity share capital of an enterprise or to instruments that convert into equity. This means that an enterprise has to be incorporated as an entity before it can raise capital from an angel investor. That constitutes an added justification for considering the date of incorporation as a reference point for estimating the time taken to raise the first round of angel funding.

Descriptive statistics for the time taken by the enterprises in the two samples, namely angel network investments and lone wolf investments are presented in Table 8. Of the 787 angel-funded enterprises for which I had data to begin with, I find that the date of raising the first round of angel funding precedes the date of incorporation in the case of 31 enterprises in the portfolio of angel network investors and 87 enterprises in the lone wolf portfolio. I discard these observations from our analysis since it does not stand to commercial reason that an enterprise can raise angel funding even before it was incorporated, a point that has been noted earlier.

It may be seen from the table that the mean time elapsed is more or less similar between the two portfolios although the median time elapsed is higher in the case of the angel network portfolio. This is in line with our expectation that startups will take longer to raise the first round of angel funding from their time of incorporation.<sup>15</sup> The lower standard deviation in the

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<sup>12</sup>The date of incorporation is the date on which a company receives the approval for the establishment of the corporate entity under Indian corporate law. The corporate entity can commence business only after the receipt of this approval, known as the Certificate of Incorporation.

<sup>13</sup>Accessed from <http://www.zaubacorp.com>

<sup>14</sup>The MCA is the main repository of corporate filings under Indian corporate law, The Companies Act, 2013 and its predecessor statute Indian Companies Act, 1956. It is maintained as a publicly accessible database. We access data through Zaubacorp because of its relative ease of use and access.

<sup>15</sup>Although the difference of 146 days may not appear to be a long period of time, in the life cycle of a startup during the first few days of its activity the development of the enterprise takes place rapidly. Information relating to the prospects for the enterprise also therefore unravels at a very rapid rate. The rate of enterprise development is even more rapid in the case of knowledge and technology intensive sectors such as information technology, online services and e-commerce, unlike in the case of more traditional businesses like manufacturing.

case of angel network portfolios also supports the view that angel networks, on average, invest in enterprises later than lone wolf investors. I test for the equality of the means and I find that at a 5% level I fail to reject null hypothesis that the time take by enterprises funded by angel networks is less than is equal to the time taken by lone wolf angels. This result has to be viewed in the light of the measurement issues that I have noted already. It is reasonable to speculate that if the stage of development of the enterprise at the time of raising the first round of angel funding the results could be different.

Table 8

Mean time taken to raise first round of angel funding

	Network	Lone Wolf
No	219	450
Mean	835	828
Median	598	452
SD	860	1159

The principal goal of most early stage equity investors, except strategic investors or a small subset of angels, is to realise a rate of return on their investment. The investor realizes a rate of return when the investment is sold off. In early stage investment parlance this liquidity event is referred to as an exit. Given the illiquid nature of early stage investments achieving liquidity or exit is in itself a positive outcome. If the exit also results in a positive rate of return it makes the exit even more desirable from the investor’s viewpoint. Given the closely held and illiquid nature of these investments the buyers for such equity shares are bound to be other investors who are knowledgeable about early stage investing in general and about the enterprise and its business in particular. Thus the purchase of the shares of an enterprise by such a buyer may be considered to be a validation of the prospects for the enterprise. However, in line with Hochberg et al (2007) I merely track liquidity events without looking into whether the exit valuations were unattractive or not, due to the limitations of data that I have access to. Practitioners too seem to evaluate the mere process of achieving an exit as a successful outcome and an attractive valuation as an added layer of success on top.

*In the light of the discussion on the attributes of enterprises funded by angel networks it is expected that the portfolios of angel networks will achieve exits from a larger fraction of enterprises in a given period of time.*

*H5<sub>0</sub>: The fraction of the portfolio that angel network investors achieve exit on is less than or equal to the fraction of the portfolio from which lone wolf investors achieve exit.*

*H5<sub>a</sub>: The fraction of the portfolio that angel network investors achieve exit on is greater than the fraction of the portfolio from which lone wolf investors achieve exit.*

Table 9

Exits achieved by angel investors

	Exits	No of Firms	% firms Exited
Lone Wolf	26	502	5.2%
Net Work	24	243	9.9%
Overall	50	745	6.7%

Table 9 presents statistics on exit activity in the angel portfolios. The data suggests that the null hypothesis cannot be accepted at a 5% significance level. This in turn implies that angel network investors are more successful at exiting from their investments on average.

As with mobilization of follow on angel funding and VC funding enterprises that were supported by angel networks appear to have had a better exit record as a fraction of the portfolio.

#### Robustness Check

The various hypotheses about the two types of investors have been tested on samples of investments that have been matched on a common time window for which I have investment data for both types of investors. The time based matching of samples was based on the view that many of the portfolio outcomes such as mobilization of follow-on funding, mobilization of VC funding and exits are dependent on time elapsed from the time the investment was made. An alternate approach would be to compare the entire cross-section of investments in the portfolios of angel networks and lone wolf investors. I ran a robustness check of the robustness check across the two portfolios by including in our sample investments from 2000 to 2007. I had excluded these investments earlier on the ground that data on investments by angel network investors was available only from 2007. I tested all the hypotheses using the expanded cross-section. The results were largely the same except in the case of exits. I find that the rate of exits achieved, measured as a fraction of exited investments to the total portfolio by angel network investors was, on average, no greater than the exits achieved by lone wolf investors.



The change in the outcome on exits must be due to a larger number of exits showing up in the lone wolf investors' portfolio with the inclusion of their older investments in the sample. I find that lone wolf investors had achieved exits from 13 out of the 35 investments that had been added to the sample from the lone wolf portfolios. Indirectly, the robustness tests provide support to the conjecture that many of the portfolio developments may be time dependent.

#### Practical and Policy Implications

Awareness of angel investing is just beginning to emerge in India. As it gathers momentum and more high net worth individuals take to angel investing it would be useful for individual investors to be aware of the pros and cons of being part of a network of angels versus being a lone wolf. As angel networks evolve questions of public policy are likely to emerge about creating framework conditions that will encourage either or both sources of angel funding. OECD (2011) and Wilson (2015) for example observe that angel funding should receive even greater attention from the policy and research community than venture capital because of its even greater importance. This research provides evidence on some of the benefits of individual angels coming together to form networks for the common purpose of building and managing investment portfolios. Further, it highlights the areas in which angel networks could focus in order to be more effective sources of funding for startups.

#### Scope for further research

The questions that I seek to answer in this paper are very rudimentary. They explore the differences in the investment outcomes of two different types of angel investors and thus make a useful contribution to our understanding of the working of angel investors. I could further deepen our understanding of angel investors by examining related aspects of their working. It would also be worth revisiting the results of this analysis in future as more results unravel about the portfolios from the two portfolios. The impact of angel funding on the growth and likelihood of survival would be an interesting area of study. It would be useful to analyse the extent and magnitude of the differences, if any, in the operating and financial performance of the enterprises supported by the two types of angels. For example, Kerr et al (2010), note that angel funded enterprises have a higher likelihood of survival and better growth rates. In the Indian context it would be interesting to see if these results apply equally to enterprises funded by lone wolf angels as well as angel network investors. Angel network investors appear to be more effective in exiting from their investments. It would be interesting to see if this is the result of a different screening process or a post investment engagement, a phenomenon that Da Rin et al (2011) refer to as the screening versus the treatment effects. Research cited in this paper addresses the relationship between angel investors and venture capitalists. That research is

partly based on the premise that differences in institutional context affect investment processes and outcomes. Given the significant institutional differences between the Indian early stage market and the other countries that the aforementioned research is set in it would be worth examining if the results apply to India.

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