

**Returns on Angel Investments:
A Synthesis of Returns and Rationale in Early Stage Equity Investment**

By

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Abstract: Research on angel investors is sparse because data are sparse. Definitions of angel investors and estimates of returns on angel investments vary dramatically. What can we make of this wide range of reported returns? We survey the literature and find that the calculations of reported results are quite vague. Most researchers do not explicitly report whether their estimates are equal-weighted or value-weighted, for example, nor do they say whether the results are weighted by the duration of the investment.

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I. Introduction

Angel investors have long been a part of capitalism. The concept of a newcomer seeking financing and guidance from an experienced insider is a logical and intuitive idea used by many young businessmen to help start and grow their ventures. One example of this occurred in 1903 when five angel investors placed their faith and a total of \$41,500 with a young man and his fledgling manufacturing business. By 1918 this investment was worth \$145 million. That young man was Henry Ford, and the company was the Ford Motor Company (Gaston, 1989).

We know a fair amount about angel investors and their investments. For example, we have an idea of the average age of angels, the stage of the company's existence during which they invest, their preferred industries for investment, their process for investing, and even what makes a geographic region fertile ground for angel investing (DeGennaro, forthcoming; and Shane, 2009).

In contrast, we know relatively little about *returns* on angel investments. The reason is simple: we have very little good data (Fenn and Liang, 1998, Prowse 1998, Wiltbank, 2007). Virtually every author who studies returns on any sort of entrepreneurial investment is forced to acknowledge the data limitations that limit his results. This is true in the case of studies on venture capital returns, private equity returns, and returns to entrepreneurial endeavors, but perhaps the worst data of all is found in the area of angel investments. Yet even the most flawed data have value, especially when they are all that are available to a researcher. In the case of angel investments, while it is relatively simple to get data on the characteristics of the average entrepreneur, or on an angel's traits, actual inflows and outflows of capital have not been

collected in a systematic way. Compared to angel investments, even bank loans to small businesses offer a wealth of data (See Peterson and Rajan, 1994).

Despite this lack of data, or perhaps because of it, angel investing is surrounded by uncertain facts and rigid beliefs. Scott Shane in his book *Fool's Gold* cites a survey suggesting that 42 percent of business angels believed angel investing was the most lucrative form of investing possible (Shane, 2009). The unfortunate truth is that angel investing may or may not be the most lucrative type of investment; we just do not know either way. In fact, virtually the only solid and reliable facts that we have come from the Angel Investor Performance Project (AIPP), and these facts give only an idea of what returns may be; approximately 0.2% of angel investments end in an IPO, around 1% of angel investments end in an acquisition, and perhaps most tellingly, 19.2% is the average rate of return on angel investments for high net worth business angels who were willing to give an estimated return and who were associated with angel groups (Shane 2009). Of course all of these statistics are rife with selection bias errors, but they offer a starting point for the inquiring researcher.

II. Potential Pitfalls in Estimating Expected Returns

Before discussing what returns to angel investments are according to various researchers, a definition for the term 'angel investor' must be established. Definitions are important. A formalized definition enables us to not only properly include or exclude the returns achieved by various individuals, but also to subcategorize angel investors when necessary. So, what is an angel investor?

Though it is an inexact definition, angel investors can most broadly be thought of as early stage investors in a company and the riskiest and earliest equity investors in a company after the entrepreneur himself (Mason and Harrison, 2002, Goldfarb, et. al., 2008). These early investors

typically take on the most risk by investing earliest in the company and generally with only minimal protections (Wong, 2010). Generally angel investors invest before a company is cash flow positive and has achieved some measure of stability, but after the company has achieved positive revenues. Thus generally angel investors do not invest in ideas; instead they invest in businesses, these businesses have yet to prove themselves, but they are businesses nonetheless.

One of the problems with estimating returns is due to the definition of an angel investor. As broad as the definition above is, it is not the only definition. In fact the definition of an angel investor varies widely. Common definitions in the literature include; informal private investors, colorfully described as "friends, family and fools" (Bygrave and Hunt; 2007, 2008); wealthy individuals who provide capital for startup companies (Sohl, 2003); and a person who provides capital to a private business, owned and operated by someone else who is not a friend or family member (Shane, 2009).

As one would expect given the many definitions, reported returns on angel investments vary widely. In fact, there is no reason to expect that angels defined in different ways would have comparable expected or realized returns. Therefore, if we say angels earn a return of 28%, we must define the class of investors to which that applies.

The classification of investors can be done on the basis of the stage of company life at which investment occurs, the type of investment, (either some form of debt or equity, or a combination of the two), whether angel invests individually or as part of a group or any number of other classifications. The point is that in order to compare research studies, it is not only important to be sure that the basic definition of an angel investor is consistent across the studies, but also that each researcher is not examining a subcategory of angel investors.

We also find that many reported estimates of angel investment returns are based on surveys (e.g. Wong 2009; Wiltbank and Boeker, 2007; Cooper et al, 1988, etc.) . In addition to the well-known limitations of surveys, we find other inconsistencies and omissions in research using survey data. For example, researchers rarely report whether a return is equally weighted or value weighted. This is particularly important in angel data, which is highly skewed. Another issue is whether returns are conditioned on success. When investors say they expect a return of 40% annually for example, do they mean they expect to earn that return if the business is successful, or do they mean they expect to earn 40% without conditioning on success? For that matter, do angels even bother to estimate expected returns?

Angel investing is forever in flux, and the modern communications have caused many changes and opened new opportunities across the alternative investments space including in angel investing. However, the consensus among researchers is that angel investors and any associated networks that support their activities remain by and large highly localized and segmented in their investing activities. As a result of this, and a natural desire to avoid the costs associated with formally reporting results of investments, the angel markets generally operate in obscurity and thus “facts and figures” on the industry are often as much myth as fact.

While truly accurate and universal facts on angel investors are hard to come by, a number of general truisms regarding who angels are and how they invest have emerged from the research done in the past two decades. Angel investors are wealthy individuals who are not the entrepreneur themselves, and they are individuals who invest private capital into a business. Generally angels represent the second round of funding for a business and their investment occurs after an entrepreneur has used all of his own money (that he is willing risk of course), and the available money of family and friends, but before he approaches a venture capital firm.

Angels frequently have a background in small business and are often entrepreneurs or former entrepreneurs themselves. The angel's investment in a firm as an angel usually gives them a large (greater than 5%) ownership stake, and often they take on an advisory role in the small business either formally or informally (Prowse, 1998).

The total size of the angel investment market is unclear, in part because of a lack of reporting requirements, and in part because of overlap with other investment markets such as the venture capital market, and the private placement market. However, while the exact size of the market remains unclear, it is almost certainly large; on the order of perhaps \$35-\$40 billion. We can arrive at that approximate estimate based on two past researcher's estimates. Freear et al. in 1996 estimated the angel investment market at around 250,000 individuals investing in 30,000 companies annually with total investments of \$10-\$20 billion. Sohl (2003) provides an updated estimate stating that "between 300,000 and 350,000 angels invest approximately \$30 billion every year in close to fifty thousand ventures in the USA." This research, done in 1996 and then 2003, gives us an idea what recent average growth rates were like. While some researchers (Shane, 2009) feel this numbers are biased high, nevertheless it is certain that angel investment represents a major pillar in early stage funding for small businesses. Further given that Sohl and Freer's studies were done several years ago, and given the diminishing level of venture capital available to small businesses today (McDonald, WP), we can be fairly confident that angels today are likely even more significant than they were when those studies were done. Both Sohl and Freer use a similar definition for angel investors, defining them as "informal investors" which would exclude family and friends investments. This is a perspective that many, though not all, researchers take.

In order to address the wide range of characteristics surrounding the investing mechanisms of angel investors, their motivations and investment objectives, the size of their investments, and other characteristics, Prowse (1998) partitions angels into “Active” angels and “Passive” angels. Active angels monitor the firms they invested in and often advise them in some capacity. In contrast, passive angels only provide investment to the business, and no guidance, advice, or time. Thus all other things equal, in an efficient market, we would expect that active angels would earn a greater return on their investment than passive angels because of the time and advice they are contributing to the firm. In reality of course, this will only hold so long as the advice is perceived to have value, and the angel’s time is used productively. (This may not always be the case however; it is easy to imagine a business where an angel invests money and then shows up every day to harass the owner and employees and “inspect” the business, all the while loudly distributing advice to anyone who will listen. In this case, the angel’s efforts would actually be counter-productive, and the need for investment would be only reason he is tolerated. However, we should assume that this type of scenario is the exception rather than the rule, because we are frequently dealing with wealthy investors who presumably are wise enough to recognize when their actions are detrimental to their pocketbook.)

According to Prowse, active angels generally share several characteristics; they are frequently older ex-business owners who have considerable experience founding and operating small companies, or running larger ones. These active angels are also much more likely to put in place sophisticated contractual agreements to mitigate moral hazard problems and provide at least a modicum of protection from poor firm performance. The sophistication of these contracts can rival those of private equity firms and venture capital firms.

Yet as Ibrahim (2008) points out, because angels make almost all of their money from homeruns, it is perfectly rational to tailor contracts to make it easy to sell the company to an interested venture capital firm. A fairly common definition of a homerun in the literature is a project that returns more than a 100% IRR (Wiltbank, 2005). These homeruns contribute significantly to the overall returns that angel investors earn, and while these projects are very risky, those that do payoff help to make up for the projects that result in a loss (Sohl, 2003). Thus a contract needs to ameliorate moral hazard problems and yet not be so restrictive as to prevent profitable future investments from outside parties. Angels do not want a venture capitalist (VC) to pass on a deal because it is too costly to unwind the angels. This argues for simple terms -- common stock rather than preferred, for example. It is also less costly, which makes sense for smaller investments. Individual angels are perhaps even closer to the entrepreneur than members of an angel group, making implicit social contracts stronger. Angel groups are a different matter. They have enough invested to make costly contracts worthwhile, and they can tailor their contract terms to match VC.

While some angel investors may use sophisticated contracting mechanisms to protect their investments, there seems to be no evidence of any angels using a similarly sophisticated search process to locate potential investment targets. Numerous past researchers such as Wong et al (2010) and Acs and Tarpley (1998) have noted that angels generally rely on informal networks of family and friends in order to locate investments. While past research has advanced the theory that the reason for this lack of a sophisticated search mechanism is that the economic incentives for the search are insufficient (Wong, 2010), there is an alternate possibility. It is entirely possible that the angel market is characterized not by a search for investments, but by a search for investors. There is evidence to support this view in the venture capital markets, and as such it

is entirely possible that new and existing businesses seek out angels, rather than angels seeking the businesses. For example, Freear et al (1998) say that "perhaps 300,000 growing companies and about 50,000 start-ups need equity capital each year", they then later note that angels invest in perhaps 30,000 companies per year. This would imply then that only 1 out of 10 companies that could use an equity investment actually get one from angels. If this "search for investors" hypothesis is accurate, then lack of a sophisticated matching process could be explained by either insufficient sophistication on the part of businesses which are at the angel investment stage, or by a lack of economic incentive for the businesses to look beyond local funding sources. Since angels usually invest in early stage firms which have not yet developed sophisticated infrastructure and support systems, the first hypothesis is certainly possible. However, if most angels provide advice and guidance (intangible investments) of a similar value, and most angels would value the company at approximately the same amount (perhaps due to a commonly used heuristic such as a commonly accepted price to sales multiple), then a wide search would yield very little in the way of benefits, and a business would be largely indifferent as to which angels invested in it. A final explanation as to why angels largely invest locally is that geographic proximity has some great advantages in allowing an angel to achieve better returns perhaps through a more thorough upfront investigative process (such as touring the businesses facilities), or through better monitoring (such as being able to show up in person periodically to check on the business).

The size of investments for all angels acting individually (rather than as part of a group of angels), generally starts at \$50,000 and rises to as much as \$1 million (Prowse, 1998). However, with deals where larger amounts are invested, it is more common for a group of angels to be involved rather than a single individual. When large amounts of money are invested, staging, or

giving investments in lump amounts over time or as certain milestones are reached, is common. Several authors have noted that this staging process enables investors to more efficiently allocate funds to firms that are meeting certain milestones while limiting investment in those firms that are not. Ibrahim (2008) mentions the same advantages to staging that others give, but adds one: Beyond preserving the option to abandon, it aligns incentives. An entrepreneur who knows he's going to need more money is less likely to shirk.

Wong et al mention that one of the reasons that shirking and investment expropriation isn't a big problem for angels is that the entrepreneur retains a large fraction of the equity. As a result, the separation of ownership and control is not as large as it is for venture capitalists. When angels and entrepreneurs make deals, in general, the entrepreneur holds such a large fraction of the value of the firm that it would be rare for angles to want to force him out. This of course makes sense given that most angels would view the entrepreneur to be an integral part of the firm.

However, not all of the research is consistent on the actions angels take. Wong et al defines an angel investor as a "high net-worth individual who typically invests in small, private firms on his or her own account." This is more expansive than Shane (2009), or Prowse (1998). The interesting focus is on control. Many angels are not particularly sophisticated investors and as such they do not use traditional control mechanisms such as board seats, staging of investments, or "contractual provisions to protect against expropriation" (covenants). Instead, they invest in firms close by. This makes expropriation less likely. The angel can judge the entrepreneur much better than he can judge managers in a public company, and it is probably emotionally harder for an entrepreneur to expropriate someone he knows than to expropriate from a relative stranger. Angels also form "syndicates," which Wong et al use to mean several

angels invest in each project. This probably protects against expropriation because several individuals must have judged the entrepreneur to be sufficiently trustworthy.

As a result of the informal search process that characterizes many angel investments, one of the primary mechanisms that angels use to evaluate the merits of a business investment is the existence of a previous investment relationship either with the angel himself or a trusted friend or family member. This relationship component appears to be very important in part because of the frequent lack of governance mechanisms, but also because of the lack of formal investment and valuation models used by angels. Perhaps because there are few proven mathematical models for valuing early stage and start up firms, angels tend to rely on rules of thumb or even “gut instincts” to value firms (Prowse, 1998). The result of this informality is a lack of defined goals for investment returns which is alien to almost every other investment sphere of which we are aware. In that sense, angel investments are almost similar to so-called “hobby investments” such as weekend ranches, classic car investments, or collectibles. Despite this commonality, many researchers continue to assume that the sole goal of angel investors is financial remuneration. Perhaps this is because there is no obvious reason why an angel investor should enjoy a non-pecuniary benefit from simply making an investment in another individual’s firm, whereas hobby investments obviously convey non-pecuniary benefits that may in many cases be greater than any expected financial ones. While it would likely be impossible to get meaningful data on non-pecuniary benefits, a theoretical model of the idea could be very beneficial and is a fertile area for future research.

III. What Have Past Researchers Found?

To begin to answer this question, we need to start by establishing a framework by which we can categorize the various types of papers that have been written to date. While there are many

valid ways to organize this structure, and few papers truly fall into one and only one category, the exercise is useful nevertheless as it gives us a mechanism for identifying the perspective that different researchers have taken, and it helps to illuminate where future research opportunities may lie. But, given the relatively small amount of research done in the angel investments arena, a simple model that distinguishes between individual and group investors and between debt and equity investments seems logical.

If we think of angel investing research as falling into one side of each of these questions, then we can break the research library down into a conceptual framework. A diagram of this framework is shown below.

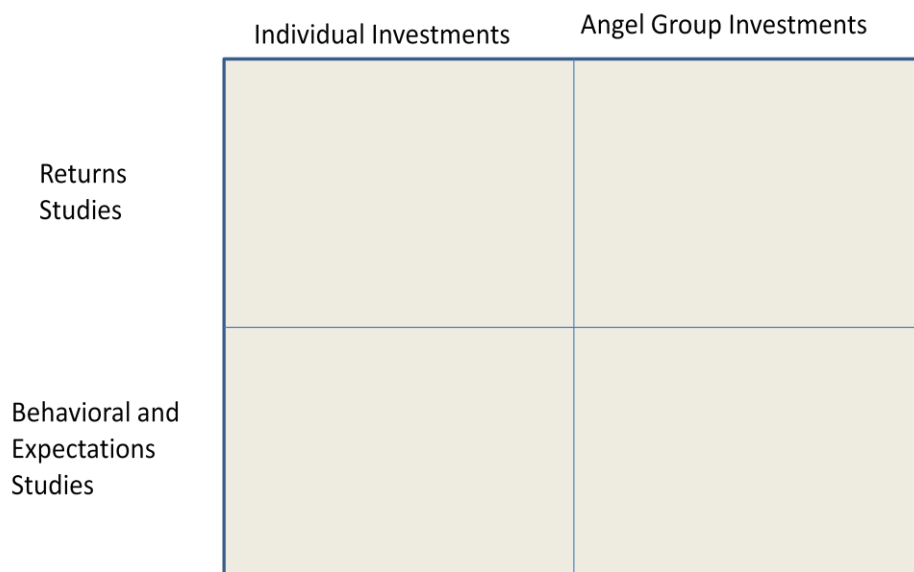


Figure 1: A basic model to classify angel investment research

Based upon this model we can break down past research into each of the four categories above. Thus for example, Wong 2010 would fall into the category of studying individual angels who make equity investments in firms. Figure 2 below breaks down many of the most prominent recent papers into one of these four categories.

	Individual Investments	Angel Group Investments
Returns Studies	Wong (2010) Wiltbank et al (2008) Lumme et al (1998) Mason & Harrison (2002) Sohl (2003) Bygrave & Hunt (2007) Shane (2008, 2009)	DeGennaro & Dwyer (2009) Wiltbank & Boeker (2007) Shane (2009) Goldfarb et al. (2008)
Behavioral and Expectations Studies	Ibrahim(2008) Ball et al. (WP-2008) Preston (2007)	

Figure 2: Characterization of Prominent Studies By Topic

This breakdown of angel investments is incomplete in that it does not mention of the much larger but related field of venture capital finance. This area is important to angel research because many of the data methodologies and problems are similar. There are far more papers that study venture capital finance at least in part because venture capital data is far easier to obtain than angel investments data. Further, because of the obvious similarities between venture capitalists and angel investors (or angel groups investing together for that matter), much of the research that is done in venture capital investing, is also applicable to angel investing. Thus papers like Cumming (2008), Cumming and Johan (2008), Cochrane (2005), and many others, are also worthy of note for those doing research in angel investments.

In examining research that has been done in the field of angel investing, one thing that becomes obvious immediately is that very little research has been done on the behavioral motivations and theoretical underpinnings for angel investor group's performance. While several authors do deal with the idea of groups of angels investing in projects together, most of that research is focused on the returns that these groups achieve. In contrast, very little work has been

done discussing the rationale behind investing as part of a group and even less work has been done analyzing the similarities and differences between groups of angel investors and venture capital investors. In particular, if a well funded and organized group of angels is experienced in investing and each member of the group is delegated specific tasks, then the angel investment group begins to be a much different investment form than a single angel investor. The idea is not moot because a number of such well structured and organized groups do exist, and an interesting question might be why these groups do not simply form venture capital firms? One possible answer is that angel investors prefer to be the first ones investing in a firm and the informal nature of their investments enables this. However several other explanations are also readily conceivable and this question is not one that the authors are prepared to explore at this time. Suffice it to say however, that if angel investing continues to become more structured and professional, analysis of groups of angels rather than individuals may well be where the future of the field lies.

So what are the returns on angel investments?

Clearly we would expect this question to depend upon whether the angel is a passive or active one, and of course upon the sophistication of the angel and his ability to pick profitable investments. While there are plenty of anecdotal stories of highly successful angel investors, and there are undoubtedly many very unsuccessful angels, very little research has been done on the differences between these two groups and what their respective returns look like. If there are, for example, 250,000 angels in the U.S., we have no idea whether 100,000 of them are very unsuccessful and 150,000 are successful, or whether most achieve some minimal degree of success while a very few excel. This lack of study can almost certainly be attributed to a lack of data rather than a lack of interest in the topic.

In addition to considering whether angels are active or passive investors, and what the skewness of the returns looks like, we must also consider what type of statistic we are reporting when considering returns. Are we reporting a value-weighted measure, or an equal weighted measure? What is the duration and amount of the investment? These and many other questions make comparing results obtained by different researchers very difficult.

Wiltbank (2005) examined the idea of the shape of the distribution of returns and provides the following figure:

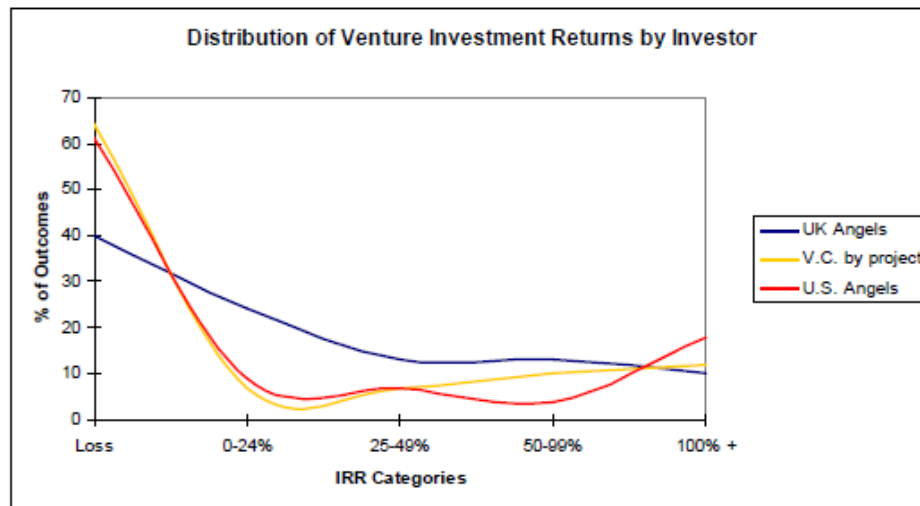


Figure 3: Relative Rates of Return for Angel Investors, Taken from Wiltbank’s *At the Individual Level: Outline Angel Investing in the United States*

This figure, while helpful, also represents the epitome of the limits to examining returns to angel investments collectively. For example, what is the duration of these investments? Surely a 20% IRR on a 5-year project should be treated differently than a 25% IRR on a 1-year project. What is the amount of the investment and does average IRR differ with investment amount?

While one can ask many questions about Wiltbank’s results (the answers to which are rarely provided in this or any other paper due to data limitations), in general his results suggest that

most angels have IRRs between 0% and 24%, and that only a relatively small percentage enjoy the phenomenal returns which attract so much attention in the popular press. He finds that on average angel investors earn an IRR of 14%, which while better than many traditional investments during the sample period, is not particularly appealing given the level of risk inherent in the investments.

Wiltbank (2005) studied the investment activities of 121 angel investors self-reporting on 1,038 investments totaling \$218 million invested. Approximately 75% of the angels were members of 12 angel investor groups in nine US states and 25% were reached through a survey of 150 members of an online investment network, NVST. In all, 600 angels were contacted and 121 usable replies were received. Wiltbank examined the returns from 414 investments (of the 1,038 ventures) that had been exited; he found that the angels lost money on 61.5% of their investments; earned an IRR between 0% and 24% on 8%; 25%-49% on 7%; 50%-99% on 3.5%; and 100% or more on 20%. Also, Wiltbank's response rate was only 23%, of which 11% were incomplete. Another factor that might have biased Wiltbank's returns upward is that his business angel returns were calculated from only deals that had been exited (39.9% of the total), whereas venture capitalists report the overall return on all their investments, both exited and un-exited, with bias.

Shane details a similar IRR of 19.2% in his book *Fool's Gold*, and he makes clear that this figure is if anything, too high, because it is based upon data from angels who were willing to talk about their investment returns, and who were high net worth individuals and members of an angel investment group. Shane suggests that because these angels are members of a group, they are likely more sophisticated than most angels, and as such his figure of 19.2% is likely biased upwards.

Cumming, in a series of papers and articles (2003, 2008, 2009, and 2010), finds early stage venture capital IRRs between 2.2% and 21.9%. And while his data are relatively good, it nevertheless is focused on the venture capital side of the investment arena rather than on the angel investment side. However, it is probably a reasonable assumption to suggest that venture capital returns should be similar to (and arguably better than), angel returns particularly when talking about early stage venture capitalists who sometimes invest in successful firms soon after angels do.

Sohl (2003) states that angel returns “hover in the 20% and 40% range”. However, he does not make it clear if this statistic based upon equal-weighted returns, time-weighted returns, or some other type of return calculation, nor does he specify the holding period available to investors or the penalty imposed on angels if they need to recover their investment before the holding period has elapsed. The Center for Venture Research at the University of New Hampshire reports that angel investors expect an average annual return of 26% at the time they invest, and they believe that about one-third of their investments are likely to result in a substantial capital loss."

Mason and Harrison (1999) examined the returns on angel investments using data from 128 exited investments gathered from a survey of 127 angel investors in the United Kingdom. Like other researchers, they found that the distribution of returns was highly skewed, with 34% of exits at a total loss, 13% at a partial loss or break-even, and 23% showing an IRR of at least 50%. Again however, their research lacks the descriptive data which would allow readers to discern what these returns truly are including investment duration, and the method used to calculate these returns.

Wainwright (2005) found that business angels expect an IRR of 15% to 25% with a payback time between 5 and 7 years. According to an MIT interview series described by Wainwright (2005) of 22 business angels found that they expected returns of between 3X and 10X on their investments, and that actual returns ranged from losses on 32% of their investments to higher than 10X on 23%. Here again, inquiring readers are left to guess at what the mathematical methodology was for calculating these returns.

Bygrave and Hunt (2007, 2008), in what is probably the largest major study of angel investors to date, break down entrepreneurs by gender and whether they have former entrepreneurial experience. They find that returns range from 0% to 12.8%. Unfortunately, even in the case of this exhaustive study, there is no mention of duration, or the type of weighting used to calculate these returns. These results and others are summarized in the figure below.

Author(s)/Year	Results	Data Examined
Bygrave & Hunt (2007, 2008)	Ex-entrepreneur angels return: 12.8%. Non-entrepreneurs: 0%. Male Angels: 7.2%. Females 0%. Return on investments in a business run by a close family member: 0%. Investments in companies operated by others: 14%.	A large study of 5,551 (3,501 male, 2,050 female) survey responses from informal investors in 35 countries that participated in the Global Entrepreneurship Monitor (GEM) in 2004 and Authors examine expected returns, not actual returns.
Mason & Harrison (2002)	Distribution of returns is highly skewed; 34% of investments are a total loss. 13% are a partial loss or break-even. 23% have an IRR of 50%+	Data is from 327 investments made by 127 respondents to a postal survey of over 1000 business angels who were registered with business angel networks in the UK. Attempts to correct for bias by polling angels registered with a variety of business angel networks.
Moskowitz & Vissing-Jorgensen (2002)	12.6-23.0% for all proprietorships and partnerships depending on time period. 12.0-21.4% for S and C corporations varying again over time.	Examines risk and returns for the entire nonpublic equity market including venture capital, entrepreneurial returns, and angel investors. Uses data from the Survey of Consumer Finances and the National Product and Income Accounts. Identifies the Private Equity Premium Puzzle.

Shane (2008)	19.2% Average Annual Rate of Return	Reports the results of a study of the Angel Capital Association's 2007 survey of its membership. A total of 127 groups responded to the survey request.
Sohl (2003)	Returns in the 20-40% ranges in the late 1990s.	Defines angel investors as wealthy individuals who provide capital for startups. Source of returns estimates not directly given.
Wiltbank (2005)	8% of sample return: 0 to 24%, 7%: 25-49%, 3.5%:50-99% 20%: 100%+	Reports the results of a survey of 414 exited angel group investments, which is just under 40 percent of the entire sample. The results are almost surely biased high compared to all angel investments because they rely on survey data and because they are all exited projects from angel groups.
Wiltbank and Boeker (2007)	Average Returns of 2.6X after 3.5 years. 52% of projects had returns <1X. 7% had returns >10X	Reports the results of a survey of 276 angel groups. Members of 86 groups completed the survey with a response rate of 13 percent of the members in those 86 groups. Investments were made between 1990 and 2007.

Figure 4: The chart above summarizes some of the rates of return to angel investment found in major studies.

Perhaps more than anything else, what these results show is the level of difficulty an inquiring researcher has in trying to determine any sort of consensus estimate of ex-ante expected returns to angel investing. Virtually none of the studies on angel investing make any attempt to reconcile their results with other researcher’s results, and the lack of data availability makes it very difficult to do even basic analysis of returns data. But perhaps the most troubling difficulty in establishing a consensus is that virtually none of research tells readers explicitly how returns are calculated, and what the duration of those investments are. This makes it nearly impossible to back out a comparable return statistic for comparison. A simple example will perhaps illustrate this. Let’s imagine that we are faced with three different projects all with the same \$5000 payoff and all requiring an investment of \$500 and a 5 year exit. Given only this data what would be the correct rate of return? Figure 5 below illustrates three different ways of thinking about this problem and three different approximate rates of return. The point here is that

calculating a rate of return is difficult even if one accurately knows the exit time frame, the initial investment, and the final payout.

	Investments					Return	% Return
	Year 1	Year 2	Year 3	Year 4	Year 5		
Venture 1 (Time Weighted)	100	100	100	100	100	5000	333%
Venture 2 (Mean)	500	0	0	0	0	5000	200%
Venture 3 (CAGR)	120	110	100	90	80	5000	190%

Figure 5: Different rates of return given the same total investment, payout, and timeframe.

In addition to the ambiguity surrounding the report of returns, the angel investment literature is plagued by endogeneity, inaccurate data, and biases. Wainwright (2005) notes that an MIT interview series found that business angels were evenly split between IPOs and acquisitions as their preferred exit; none preferred a buyback. In practice, 27% of business angel investments were exited with an IPO, 35% with an acquisition, 5% with a buyback, and 32% were losses. These figures for the percentage of exits that end in an IPO seem very high however, and they are nearly impossible to reconcile with estimates of the size of the existing angel investment market. If we believe past estimates, then somewhere between 30,000 and 50,000 angel investments occur each year. However, in the last decade the number of annual IPOs has been well under 500 each year. This would imply that between 1-2% of angel investments go public assuming that every IPO has an angel investment. While this analysis is probably somewhat inexact, it is nearly impossible to imagine how about one-fourth of tens of thousands of new start-up companies could ever go public. This example illustrates the problems of selection bias that occur in trying to report any sort of results of angel investments.

Biases in examining angel investments usually come in 2 forms that were examined by Malkiel and Saha (2005) in the context of the hedge fund industry. These biases are backfill bias and survivorship bias. While these authors are not the only ones to use these ideas, their exploration of bias in hedge fund returns holds important lessons for the angel investing literature as well.

Backfill bias is a well known concept that centers on people's egos and their desire to impress those around them. The idea is that given a choice, people tend to report only what they want to report and they are most likely to report results that make them look good. In the case of hedge funds, these are data with high returns. This bias is compounded when those who report the data backfill the data on these funds that have done well; those years tend to be good, too. Sometimes this subset of backfill bias is called incubation bias. In the case of the Lipper TASS database referenced by Malkiel and Saha (2005), there's a related bias: Some funds may have reported data to another service previously. When those funds start reporting to TASS they might not report all of the data that they gave to the previous service. Malkiel and Saha (2005) say that the difference between backfilled returns and contemporaneous returns is over 500 basis points, which is statistically significant. Given that the universe of funds in the sample averages 8.82% annually, it is also economically significant.

Survivorship bias is also a well known concept, and it is arguably a more mathematically significant source of error than backfill bias. Essentially the idea is that the only returns that are reported in a database at any time are those of surviving funds. Those that fail do not report data. This biases the returns up (some funds that do not report returns haven't failed, though. They are just not attempting to attract new assets). Malkiel and Saha (2005) get the previous returns from the defunct funds and find that the difference between surviving funds and defunct funds is over

830 basis points (statistically significant). The difference between the returns on all funds and the returns on live funds is 442 basis points. Malkiel and Saha (2005) say that this is about 3.5 times the size of survivorship bias in mutual funds during the period. That's no surprise because hedge funds fail much more frequently than mutual funds. Malkiel and Saha (2005) also say that the 442 basis point difference is higher than others have reported for hedge funds (60 - 360 basis points). They trace the higher estimate to having more defunct funds in the TASS database and using only contemporaneous returns (not backfilled returns) to compute the estimate.

IV. Future Research

Theoretical work is constrained only by the researcher's ability and time; the empiricist needs data before he can attack projects. Fortunately for researchers in the area of entrepreneurial finance, better data is becoming available. While the National Survey of Small Business Finances (starting in 1993) and the Survey of Consumer Finances (starting in 1995 and providing data on household investment decisions among other things) have both been around for a while, a new database focused on angel investment returns may soon be available. The ACEF (Angel Capital Education Foundation) has extensive data gathered from member angel investors and they are currently in the process of compiling that data into a usable format. Once this is done, that database should provide additional material for future studies of angel investment returns.

But in addition, the future of research in angel investing will also involve asking and empirically answering important questions to which we do not yet have answers. What is the implication of the fact that many angels seek nonpecuniary returns? Do those angels take projects that would otherwise not be funded, and what's the implication for society? Does competition *force* those investors to take lower pecuniary returns, or are the angels the scarce resource so they get the nonpecuniary returns in addition to the normal pecuniary returns?

Can we draw on the literature about investments in art or housing, which also offers a consumption dimension or is a better analogy sports teams or race horses in which the evidence suggests investors pay a premium for extreme excellence (DeGennaro, 2003)?

There is also a need for research involving compiling a list of best practices for angels. Because the term angel investor is so loosely defined, productive future research may focus on examining how different classes of angel investors fair against one another in terms of returns, and then trying to learn why one type of angel investor tends to earn better returns than another type. In particular, once we understand what returns are for each group, then we can ask if practices like more formal contracting mechanisms are associated with increased returns, decrease returns, or have no effect, and if there is an effect whether better controls are a causal factor or merely a correlated by-product of something else. After all, if we do not know the returns then how can we determine or measure best practices? In cases where those data are hard to come by, a number of potential proxies are available as substitutes. For example, rather than looking at just returns to investment, one might also examine favorable exits, investment time period, valuation of successful firms in terms of some common benchmark, or even just the number of IPOs resulting from investments. Beyond this, examining the practices of the most elite of angel investors, including those who are members of elite angel investment groups, could yield useful results.

Regardless of the data that become available however, one thing is clear: angel investing will likely remain a niche area of the broader investment field. While it is true that the popularity of angel investments has grown greatly in the past 20 years, it is unlikely that angel investment will ever surpass any of the more conventional forms of investment in popularity regardless of whether we measure popularity by size of the investment category or number of investors. This

relative unpopularity can perhaps be traced to the fact that angels *want* to be involved with the companies they invest in, and it is entirely possible that some angels *want* extreme returns on small investments and thus they are willing to accept the corresponding risk that accompanies that desire. As such, it is unlikely that angel investing will ever become a mainstream form of investment because both of these characteristics of angel investors are not present in the broader investing public. An interesting possibility, however, is whether angel investing will ultimately grow to a large enough size that a secondary market can be established in it. There are numerous examples of alternative investments ranging from domestic oil field leases to triple net leases which have an active and viable secondary market.

V. Conclusion

Based on all of the data available and all of the major studies done to date, it seems that the returns to private equity investment including angel investing are no larger than returns on public equity portfolios, and in fact they may very well be smaller. As Moskowitz et al (2002) note:

“this is true despite far less diversification and much higher variance of returns. For an investor with a relative risk-aversion coefficient of 2, private equity held the way it is held must return 10% more than public equity portfolios to make it a fair tradeoff. It is nowhere close to that. Perhaps this is why private equity is extremely concentrated. 75% of it is owned by households for which it is at least half of the household's total net worth. Over 86% of private equity is held by people with an active management role in the business”.

All of this leads to the private equity premium puzzle. The private equity premium puzzle suggests that private equity in general pays too little for a given investment. This is the opposite of the public equity premium puzzle which suggests that public equity pays too much for a given investment. These relatively good returns for angel investors and venture capitalists suggest that entrepreneurs must earn less than they would have if they had to give up a smaller stake in the firm to angels and venture capitalists. These relatively “poor” returns suggest that entrepreneurs

must get something else from their investment beyond simple observable financial returns. Further, if based upon the results described previously, if we believe that angels do not earn particularly exceptional risk adjusted returns compared with straight-forward public equity investments, then we are left wondering why either group does what they do. Moskowitz et al (2002) suggest five possibilities for why entrepreneurs do what they do. These same five possibilities may also apply to angel investors who are in some respects proxy entrepreneurs. The five possible explanations of Moskowitz et al. are:

1. *Risk Tolerance.* Entrepreneurs may have high risk tolerance. Entrepreneurial ventures are quite risky, and this taken with a high risk tolerance would imply that this lowers the necessary risk-adjusted return that entrepreneurs must achieve in their entrepreneurial endeavor in order to get a similar level of utility as they would from investment in less risky public equity. However, Moskowitz et al (2002) discuss the fact that entrepreneurs' portfolios excluding their private equity look a lot like risk tolerances of non-entrepreneurs. This fact of course weighs in against the risk-tolerance story.

2. *Other Pecuniary Benefits.* Entrepreneurs may get other pecuniary benefits and costs from running a private firm. Consumption of perquisites and the utility that action provides is not a new idea in economics. Unfortunately, perquisite consumption is much more difficult to measure than other more straight-forward forms of compensation. However, Moskowitz et al. show that perquisite consumption levels would have to be enormous in order to account for the discrepancies in risk adjusted returns from being an entrepreneur versus an equally valuable portfolio of public equity and the median earnings from labor. Some preliminary evidence suggests that the other non-observable pecuniary benefits might amount to 50 basis points, which is well short of the 10% needed to compensate for the lower realized returns.

3. *Nonpecuniary benefits.* According to the 1992 Economics Census Characteristics of Business Owners, over 21% of entrepreneurs cite being their own boss as the main reason for starting the firm. If this is the case, then nonpecuniary benefits may make sense as a possible reason for starting a business because by reasonable calculations, a 10% benefit would capitalize to \$460,000 over a working lifetime. It is certainly conceivable that the nonpecuniary benefits may be this large. In fact it is frequently suggested that academics give up that much or more to be academics rather than private sector workers. However, this theory only makes sense for entrepreneurs who value being their own boss. Given the survey results cited above, there are still 79% of entrepreneurs who do not claim to be entrepreneurs for this benefit.

4. *Skewness preference.* It is possible that entrepreneurs prefer skewness in their investment returns. If the distribution of returns is skewed right, and if entrepreneurs prefer that, then they will be willing to accept a lower mean return. However, Moskowitz et al. note that it is easier and less expensive to obtain skewness in investment returns in the option market or by leveraging public equity. This makes this theory unlikely to be a major motivating force for angels or entrepreneurs.

5. *Overoptimism.* It is entirely possible that entrepreneurs start firms because they are over optimistic about their chances for success, or they may believe that having control of the firm lowers their risk. Moskowitz et al. say that conditioned on survival, the return on private equity is about 24% greater than the return on public equity. Therefore if an entrepreneur is convinced that his firm will survive longer than the average, then he may find that return distribution very attractive. Past research has found that the large majority of entrepreneurs think that the odds of their business succeeding are better than the odds for another business which is otherwise identical to their own. In fact, only 5% think their own odds are worse. Finally, a third

of entrepreneurs believe their chances of surviving and ultimately succeeding is 100% and 72% of entrepreneurs think their chances for success are at least 80%. As an explanation for the behavior of entrepreneurs, this theory is perhaps the most compelling. However, it seems likely that experienced angel investors would have a better and more realistic understanding of the odds of success in entrepreneurial endeavors after having seen many past firms fail.

Additionally, Barton (2000) shows that median earnings are significantly less for an entrepreneur than what would be available as an employee. Entrepreneurs returning to paid employment earn more than other employees with the same observable characteristics.

Moskowitz et al. suggest that "more talented individuals self-select into entrepreneurship." They do not add that this makes the lower returns on private equity even more puzzling.

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Appendix 1: Summary of Studies of Angel Investors and their Investments

Author(s)	Summary of Findings
Ball, Chiu and Smith (2008)	IPOs are more common when the supply of capital available to growth firms is low. There is no reliable evidence that firms choose IPOs when post-IPO stock returns are low. IPOs are more common when the adverse selection costs of equity issues and the value of private information are low.
Bygrave and Hunt (2007, 2008)	Informal investors who were entrepreneurs have a median expected return of 12.8 percent versus 0 percent for non-entrepreneurs. Males (7.2 percent) have a higher median expected return than females (0 percent). The median expected return on informal investments in a business operated by a close family member is 0 percent versus 14 percent for investments in companies operated by "strangers." Entrepreneurs expect to earn more on money they invest in their own business than they do on money they invest in other businesses (median of 87.7 percent versus 12.8 percent).
Cochrane (2005)	Reported venture capital returns are biased high by a substantial amount. After correcting for this, the distribution of venture capital returns is not too different from that of small, publicly traded firms. The more rounds of venture financing that a firm receives, the more likely it is to have an IPO as the next step. Later rounds are less risky and have lower expected returns.
Cooper, Woo and Dunkelberg (1988)	Entrepreneurs are extremely, perhaps naively, optimistic. Survey respondents see the odds of success as far higher than actual success rates.
Cumming (2008)	If venture capitalists have stronger control rights, then investments are more likely to exit via acquisition and less likely to fail or experience an IPO. Results are strongest if venture capitalists have the right to replace a firm's CEO.
Cumming and Walz (forthcoming)	Private equity funds overvalue nonexited projects. This suggests that nonexited angel investments probably perform poorly compared to a sample of exited investments.
Ibrahim (2008)	Because angels make almost all of their money from a small number of enormously successful investments, they rationally tailor contracts to make selling the company or attracting venture capital easy. This argues for simple terms, such as using common stock rather than convertible preferred stock. Simpler terms are also less costly, which makes sense for smaller investments. Individual angels are much more likely to form bonds with the entrepreneur than are venture capitalists or even angel groups, making implicit social contracts stronger.
Malkiel and Saha (2005)	Backfill bias and survivorship bias in reported hedge fund returns are several hundred basis points annually.
Mason and Harrison (1999)	The distribution of exited informal investments in the UK is roughly the same as in the United States. The distribution of net returns is skewed strongly to the right. The time to exit is about four years.
Moskowitz and Vissing-Jorgensen (2002)	Returns on private equity investments are probably smaller than returns on public equities. This is the opposite of the public equity premium puzzle, which suggests that public equity pays too much. A typical entrepreneur foregoes about \$460,000 during his working life because of his decision to hold so much poorly diversified private equity.
Shane (2005)	This paper reports the results of focus groups of angel investors held at four Federal

	Reserve Banks during the summer of 2005. Most angel investors do not list financial returns as their main reason for investing. They invest to support their communities, to help form and nurture companies, to find a job, to learn, to use their expertise, and for fun. They prefer to find deals through personal contacts. They seek deals with recurring revenues, a sustainable competitive advantage, and which are scalable in a large market. They tend to avoid companies that are in declining markets, require intensive marketing, or involve commodity products or personal services. Good deals involve experienced entrepreneurs known to the angels, who communicate well, and can overcome obstacles.
Shane (2008)	This paper reports the results of a study of the Angel Capital Association's 2007 survey of its membership. A total of 127 groups responded to the survey request. Most angel groups in the sample are organized as limited liability corporations. The size of the groups ranges from three members to 280 members, with a mean of 47.6 and a median of 37. The average number of employees is seven. California groups and older groups tend to be bigger. The more patents in the Metropolitan Statistical Association, the smaller the angel group. Older groups tend to make more investments. California groups and groups with paid managers invest more.
Shane (2009)	The conventional image of angel investors applies only to angels in groups, and then only in part. The typical individual angel investor has no particular skills to improve a new company's prospects.
Sohl (2003)	Defines angel investors as wealthy individuals who provide capital for startups. Using this definition, between 300,000 and 350,000 angels invest about \$30 billion annually in about 50,000 firms in the United States. The typical angel group invests between \$100,000 and \$2 million per project. Exit depends primarily on factors external to the firm.
Wiltbank (2005a)	Reports the results of a survey of 414 exited angel group investments, which is just under 40 percent of the entire sample. Of these 414, 8 percent returned between 0 percent and 24 percent, 7 percent between 25 percent and 49 percent, 3.5 percent between 50 percent and 99 percent, and 20 percent returned at least 100 percent. The results are almost surely biased high compared to all angel investments because they rely on survey data and because they are all exited projects from angel groups.
Wiltbank (2005b)	Using data similar to Wiltbank (2005a), this paper reports that experience has little influence on angel results. Investing in earlier stages and more angel participation after the investment is associated with fewer bad outcomes. Investors who conducted more due diligence had more extreme outcomes. The median time to successful exits is 5.8 years, compared to 3.5 years for negative exits. The overall return was 2.9 times the investment for successful investments.
Wiltbank and Boeker (2007).	Reports the results of a survey of 276 angel groups. Members of 86 groups completed the survey with a response rate of 13 percent of the members in those 86 groups. Investments were made between 1990 and 2007. The paper lists advantages and disadvantages of angel groups, including having access to a diverse skill set, better deal flow and diversification, fewer capital constraints and social benefits.
Wong (2009, 2010)	Angels do not use traditional control mechanisms such as board seats, staging of investments, or contractual provisions to protect against shirking and expropriation. Instead, they invest in firms that are geographically close. This allows the angel to judge the entrepreneur much better and helps to form social bonds that help minimize agency problems. Angels also rely on syndicates, meaning that several angels invest in each project. This helps protect against expropriation because several individuals must have judged the entrepreneur to be sufficiently trustworthy. Angels also tend to take smaller positions in new firms than venture capitalists. This implies that the

	entrepreneur tends to hold a larger position, reducing problems caused by the separation of ownership and control.
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