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Buzz Article: Of Angel Investors, NPV and IRR

by Peter Economy and Joseph Bartlett, 7/6/2006

Who's Who of Angels[1]

Other than "having a high net worth," no one-size-fits-all description of an angel investor exists. The levels of experience and particular interests of angel investors vary widely. But certain overall classifications can be useful if you're hoping to match your capital needs with the right kind of investor.

Wondering what kind of angel is right for your kind of investment opportunity? Here's a guide to the many different types of angels:

Serial angels are perhaps the most productive angel type to the sense that these angels often add significant value to the companies in which they invest. A serial angel has done it before - he or she has put money on the table for an investment in an early-stage opportunity, cashed out (or "harvested," as they say) the investment, and then put the profits into the next opportunity.

A subset of serial angles (also known as *celebrity angels*) consists of former entrepreneurs - people like Netscape's Jim Clark and Microsoft's Paul Allen. Although their fortunes take them way beyond typical angels, entrepreneurs who have built major companies and sold them usually retain their appetite for the game.

Tire kickers are the opposite of serial agents. They lack a genuine commitment to angel investing - at least at present - but they're using the process as a means of educating themselves.

Trailblazer angels are experienced investors, typically partners in investment banks and venture capital firms. Although their firms may not trouble themselves with any deal worth less than $50 million (the breakpoint for the VCs these days is a round of more than $8 million, which means a premoney valuation between $12 and $20 million), the individual partners, usually with the blessing of their employers, are often interested in incubating deals that show exceptional promise, with an eye on keeping a link to the company until it reaches adolescence and becomes a desirable client for the angels' host organization.

Some venture capital firms and investment banks have rules against this practice because conflicts of interest can get tricky. For example, the VC firm and individual partner may invest in the same enterprise but a different price levels. However, many banks and firms encourage angel investing as a way to keep the pipeline flowing.

These angels are often the most desirable because of the so-called chaperone rule, which states that the odds of a startup company succeeding are significantly enhanced when the company has a *chaperone* from the get-go, an

experienced guide on the trip from the embryo to the IPO.

Retired angels (the "Godfathers") are a common phenomenon. A number of business executive have been able to generate enough personal capital to enable them to quit their jobs and "retire." As a group, they are vigorous, in full possession of their faculties, sometimes young (in their late 40s or early 50s), and perfectly capable of keeping up in the so-called rat race.

Often restless and looking for something to do - charitable and other pro bono activities soak up only a portion of their energy - many naturally turn to angel investing, but with a distinct point of view. They aren't looking to become passive investors; they're looking t add their skills and experience to the companies in which they invest, often serving on their boards and, in most cases, at least as advisors.

Socially responsible angels are investors who are interested in double-*bottom-line investing* - that is, doing well by doing good. Many of these individuals can be contacted through the Community Development Venture Capital Alliance, a prestigious nonprofit organization based in New York. (www.cdvca.org.)

Angel syndicates are groups who episodically invest together, joining their capital for more influence in more material deals. The best-known syndicate, the Band of Angels in Palo Alto, California, has 120 members, averages $600,000 per investment, and has invested close to $50 million total. Syndicates such as the Band of Angels have helped legitimize this particular form of collective investing.

Within the various categories of angels, angel investors have earned a variety of nicknames. These nicknames, coined by Robert J. Gaston in his book, *Finding Private Venture Capital for Your Firm: A Complete Guide* (John Wiley & Sons, 1989), tend to indicate more precisely the motivation that drives the angels to invest their hard-earned money if often-risky ventures:

Daddy Warbucks: Because these are the wealthiest angels - comprising about 39 percent of all angel deals and investing 68 percent of all angel funds - they are perhaps the most important angels of all. If you're a smart seeker of angel investment funds, you'll direct much of your search efforts toward locating a Daddy Warbucks.

Cousin Randy: These angels typically invest only in business opportunities presented by their own relatives - if you're not related to Cousin Randy, chances are that he (or she) isn't going to write you a check anytime soon.

Dr. Kildare: These angels tend to be doctors, lawyers, and accountants. If they hear about your opportunity, it's likely to have been through their professional colleagues - other doctors, lawyers and accountants.

The typical angel:

Unfortunately, you can't identify angel investors simply by looking at their nametags or by sizing up the cars they drive. Angels are male or female, they're young and they're retired, and they come from all walks of life. The majority of angel investors do, however, share some general characteristics. According to studies on the topic:

Angels are predominantly male (around 97 percent).

The average age of an angel is 48 to 50.

Anywhere from 80 percent to 94 percent of angels have college degrees, of which 42 percent to 56 percent have graduate educations.

Around 87 percent of business angel investors have moderate to substantial general business experience.

Angel investors tend to invest locally, often no more than an hour or so from their homes or offices.

Angels are significantly more entrepreneurial than venture capitalists, with 75 percent to 83 percent having operational start-up experience, compared with only about a third of venture capitalists. One study found that the average number of entrepreneurial investments made by business angels during the last five years was 2.45, while two West Coast studies claim that angels typically make two or three investments every three years.

Around 75 percent of angels claim that their principal source of wealth is their own past business, while the remaining 25 percent earned it from quoted investments. The size of angel investments ranges as follows: 20 percent of less than $25,000; 40 percent of $25,000 to $99,000; 25 percent of $100,000 to $250,000; and 15 percent of more than $250,000.

Discounted Cash Flow - The Basics[2]

So what is $10,000 after taxes a year from now actually worth to you today? How much less would you take today instead of waiting a year to get your $10K? In other words, what is its *present value (PV)* to you today? The answer depends on estimates of inflation during the next year, how certain you are that you'll actually receive $10,000 in a year (in other words, the risk you're taking), and your opportunity costs (in other words, what else you could do with the money if you had it now). Money has a value that changes with time - not surprisingly that's called the *time value of money*.

Broadly speaking, this is a fairly common business problem. In fact, these sorts of questions arise anytime that you're making a decision or comparing alternative options that involve costs and/or benefits that stretch over a period of time. A technique called *discounted cash flow (DCF)* analysis is used to make the rational and quantifiable part of your decision. It takes a number of forms. We'll show you two of the more common ones here - *net present value* (*NPV*) and *internal rate of return* (*IRR*). Whether you're trying to value an investment opportunity, deciding to purchase or lease a new piece of equipment, or evaluating the launch of a new product or marketing campaign, a form of DCF analysis quantifies your options. You're then left only with the qualitative aspects to assess in your decision.

Figure out, for example, the best that you can do if today you had put the money into a certificate of deposit that earns a guaranteed 5 percent during the next year. What amount of money invested today at 5 percent becomes $10,000 in a year? That ought to be the PV for the $10K, or $10,000 ÷ (1+0.05), which is $9,523.81. Check your work: $9,523.81 - ($9,523.81 x 0.05, or $476.19) = $10,000. Thus, the present value (PV) of $10,000 received a year from now *discounted* at 5 percent is $9,523.81. *Discounting* is the inverse of *compounding*.

So having today invested $9,523.81 in a 5 percent CD is equivalent to getting $10,000 in cash in a year - right? Yes, but not really! Don't forget that Uncle Sam will tax away some of your interest. Because we care only about the net cash we'll receive, we must take taxes into account. So, if your federal plus state marginal income tax rate is 40 percent, that means you'll have to send 40 percent interest to Uncle and his Nephew. You'll really earn only 3 percent (60 percent of the 5 percent interest you earned). Thus, the *after tax PV* for the $10,000 will be $9,714.57 or $10,000 ÷ (1 ÷ 0.03)! So investing $9,714.57 in a 5 percent CD today is equivalent to getting $10K a year from now.

Nevertheless, perhaps you have a better alternative investment that is risk free and earns 10 percent. Because you'll keep only 60 percent of your earnings after taxes (taxes eat up the other 40 percent), your after-tax *discount rate* is 6 percent. With these assumptions, the PV for the $10,000 equals $10,000 ÷ (1 ÷ 0.06) or $9,433.96. So you'd prefer receiving any a mount that is greater than $9,433.96 today to receiving $10,000 in one year if you know you can ear 10 percent (pretax) on your money now. The effect of using a higher discount factor is to decrease the PV of the expected *future value* (*FV*) - you need less now because you can earn more.

All this assumes that receiving the $10,000 in one year carries no risk. In reality, however, at least some risk almost

always accompanies such an investment. To account for this, investors and decision makers often increase their discount factors to much higher percentages - even as high as 30 percent or 40 percent in venture capital scenarios. The $10,000 return discounted at 30 percent and a marginal tax rate of 40 percent has a PV to the investor of $10,000 ÷ [1 ÷ 0.3 x (1 - 0.4)] = $8,474.58. after considering taxes, the Investor in this case is expecting an 18 percent (60 percent of 30 percent) *risk-adjusted rate of return.*

Modifying the example to say that you'll receive the $10K in two years rather than one and expect to earn an *after-tax risk-adjusted rate of return* of 12 percent on alternative investments, how much would you pay for the $10K offer now? Here's where *compounding* comes in. you earn income on the money you receive after the first year during the second year and so forth. So now the calculation is $10,000 ÷ [(1 ÷ 0.12) x (1÷ 0.12)] = $7,971.94 Check it on your calculator by multiplying $7,971.94 by 1.12 twice. Given the choice then, you'd prefer to have $7,971.95 today (one penny more than the PV) than to get $10,000 in two years. Actually the DCF analysis in this case would be too close to call a winner. You'd have to consider other qualitative factors and carefully review your assumptions - even a slight change in assumptions in a DCF analysis can significantly affect the result, and by much more than mere pennies.

In most situations you'll be considering an investment followed by varying returns over a number of years. The same techniques are applied. The cash flow elements listed in Table 12-1 and its general format need to be used to define the assumptions in almost all DCF problems. the numbers here can apply to many business problems ranging from a company valuation to budgeting for capital equipment. Estimating your cash flows can be the most challenging part of a DCF analysis. Here's some background (corresponding to lettered items) on the example in Table 12-1:

A. Of the initial $12K investment, $10K goes into equipment that will be depreciated over five years at $2K per year; inventory and receivables less payables and payroll (in other words, working capital) will require an other $5K of cash after the first year as sales ramp up.

B. The operating cash flow is the *net change* in your overall cash flow after making the investment; don't consider noncash items such as depreciation here.

C. Ending value (often called *terminal value*) is the residual value of the investment at the end of your planning horizon; here we assumed that we'd sell the equipment after five years.

D. Considering taxes is best done in a table like this; here we've assumed a 40 percent marginal tax rate and $2,000/year tax deduction from cash flow for depreciation. (For example, in Year 2 taxes are 40 percent of $6,000 operating cash flow less $2,000 in depreciation, which equals $4,000 x 40 percent.)

Table 12-1 | **DCF Analysis**

Cash Flow Elements	Note Years:	0	1	2	3	4	5	Total
Investments	(A)	(12,000)		(5,000)				(17,000)
Operating Cash	(B)	5,000	6,000	8,000	7,000	Flow	6,000	32,000
Terminal Value (salvage)	(C)					2,000	2,000	
Taxes	(D)		(1,200)	(1,600)	(2,400)	(2,000)	(2,400)	(9,600)
Net Cash Flow		(12,000)	(1,200)	(4,400	5,600	5,000	5,600	7,400

So, is this a good investment or not? If your decision criterion is that you want to make at least 10 percent after

taxes, it is. You can determine this by calculating the *net present value* (*NPV*), which is the sum of the present values of the *net cash flows* using, in the example depicted in Table 12-2, your target 10 percent discount rate. Use this general formula: PV = FV ÷ (1 + target discount rate) Number of years. For example, the PV for the $5,600 FV (future value) in year three is $5,600 ÷ (1 +0.10)3= $5,600 ÷ 1.331 = $4207.36.

The NPV of $1,645.05 is the sum of the PVs (discounted FVs) in Table 12-2. In this example you'd beat your 10 percent investment criterion by that much. Positive NPVs are good. they mean you'll earn more than the amount you set for your goal rate of return. If the NPV is negative, you're looking at an investment that earns less than your target. Each PV amount in the table can be calculated by hand - a little tedious - or you can use the NPV function in a spreadsheet program such as Microsoft Excel. Just enter the Net Cash Flow amounts from Table 12-1 into your spreadsheet and let it calculate the NPVs for future cash flows (FVs) for years one through five. Once those are discounted to PV's, net their total that against year 0 PM aamount.

Table 12-2 **Net Present Value**

Element	Rate	Year: 0	1	2	3	4	5	NPV
Discounted Cash Flow	10%	(12,000)	(1,090.91)	3,636.36	4,207.36	3,415.07	3,477.16	1,645.04

But sometimes folks (investors, for example) want to know the rate of return on an investment. That's called the internal rate of return (IRR). Generally IRR, the compounded rate of return , has to be calculated by *iteration* - trial and error. For our example, you'd create something like Table 12-3.

IRR is the discount factor that yields zero NPV. As is true of the NPV's shown in Table 12-3, you can see that the IRR must be slightly below 14 percent because the NPV at 14 percent is slightly less than zero. The precise IRR (12.95 percent in our example) can be calculated as with the NPV in a spreadsheet program by entering the amounts from Table 12-1. NPV and IRR decision rules are interrelated. If your target discount rate (often called the *hurdle rate*) had been 14 percent rather than 10 percent in Table 12-2, the NPV (-$18) and IRR (13.95 percent) would miss your goal.

3Table 12-1 **Internal Rate of Return**

Element	Rate	Year: 0	1	2	3	4	5	NPV
Discounted Cash Flow	12%	(12,000)	(1,071.43)	3,507.65	3,985.97	3,177.59	3,177.59	777.37
Discounted Cash Flow	14%	(12,000)	(1,052.63)	3,385.66	3,779.84	2,960.40	2,908.46	(18.27)
Discounted Cash Flow	16%	(12,000)	(1,034.48)	3,269.92	3,587.68	2,761.46	2,656.23	749.19)
Discounted Cash Flow	18%	(12,000)	(1,016.95)	3,160.01	3,408.33	2,578.94	2,447.81	(1,421.85)

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[1] Bartlett & Economy, *Raising Capital for Dummies,*" p. 50 (Wiley 2002). Reprinted with permission.

[2] Bartlett & Economy, *Raising Capital for Dummies,*" p. 182 (Wiley 2002). Reprinted with permission.

In the old days in this business, returns from harvested investments were calculated quite simply. You put a dollar in

- got two dollars back, that's a 100 percent return. Adjust for the time value of money *i.e.*, apply an appropriate discount rate, and you have the answer. In the 70s and 80s, however, the calculations became more sophisticated. The measurement on one's rate of return now takes into account not only the time value of money but also the possibility of interim distributions and dividends … and the notional returns as those distributions are reinvested. There are various primers on IRR calculations. One can use the Hewlett Packard calculator, which will do the math for you.[1] Even more labor saving, you can take advantage of a small promotional handout (a wallet sized card) by one of the leading funds investing in secondary positions, Coller Capital. With the permission of Coller Capital, the information is reproduced here.[2]

The point is that investment pros talk IRR … the language everybody uses since the IIR calculation enables the investment business to work with 'apples to apples' comparisons. The Coller Capital "cheat sheet" enables the lay person to speak "IRR" knowledgeably, alongside the professionals.

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[1] By Calculator (Hewlett Packard 12C):
Assume that you are being offered 25% of a company valued at $1,000,000 for a $75,000 equity investment. You want to evaluate your annual rate of return on that investment.
Assume you plan to exit from the deal in 5 years.
Assume that no cash payments (e.g., dividend) are paid before you exit from the deal. (Dividends would be cash flows each year.
Calculate the nominal amount of the $75,000 investment in year 5 by multiplying the percent ownership by the company's estimated value: .25 * $1,000,000 = $250,000
This means that the cash flows are as follows: -75,000 in Year 0 (before the investment makes any returns), 0 for Years 1 through 4of the investment, and 250,000 in Year 5 when you exit from the deal.

Keystrokes:
fREG Clears register
75000 CHS g CFo Initial cash outlay
0 CHS g CFj First cash flow
0 CHS g CFj Second cash flow
0 g CFj Third cash flow
0 g CF j Fourth cash flow
250000 g CFj Fifth cash flow
f IRR Internal rate of return
This calculation should equal 27%.

[2] Coller Capital's cue card also matches the exit result, as a function of initial investment, with the product of compound interest:

COMPOUND INTEREST											
Rate	**2%**	**4%**	**6%**	**8%**	**10%**	**15%**	**20%**	**25%**	**30%**	**35%**	**40%**
Year 2	1.04	1.08	1.12	1.17	1.21	1.31	1.44	1.56	1.69	1.82	1.96
3	1.06	1.12	1.19	1.26`	1.33	1.52	1.73	1.95	2.20	2.46	2.75
4	1.08	1.17	1.26	1.36	1.46	1.75	2.07	2.44	2.86	3.32	3.84
5	1.10	1.22	1.34	1.47	1.61	2.01	2.49	3.05	3.71	4.48	5.38

7.5	1.16	1.34	1.55	1.78	2.04	2.85	3.93	5.33	7.15	9.50	12.47
10	1.22	1.48	1.79	2.16	2.59	4.0	6.2	9.3	13.8	20.1	28.9
15	1.35	1.80	2.40	3.17	4.18	8.1	15.4	28.4	51.2	90.2	155.6
20	1.49	2.19	3.\21	4.66	6.73	16.4	38.3	86.7	190.0	404.3	836.7
25	1.64	2.67	4.29	6.85	10.83	32.9	95.4	264.7	705.6	1,812	4,500
30	1.81	3.24	5.74	10.06	17.45	66.2	237.4	807.8	2,620	8,129	24,201

IRR

Multiple	**1.25x**	**1.5x**	**1.75x**	**2x**	**2.5x**	**3x**	**3.5x**	**4x**	**5x**	**6X**	**8x**	**10x**
Year 2	12	22	32	41	58	73	87	100	124	145	182	216
3	8	14	21	26	36	44	52	59	71	82	100	115
4	6	11	15	19	26	32	37	41	50	57	68	78
5	5	8	12	15	19	25	28	32	38	43	52	58
6	4	7	10	12	16	20	23	26	31	35	41	47
7	3	6	8	10	14	17	20	22	26	29	35	39
8	3	5	7	9	12	15	17	19	22	25	30	33
9	3	5	6	8	11	13	15	17	20	22	26	29
10	2	4	6	7	10	12	13	15	17	20	23	26