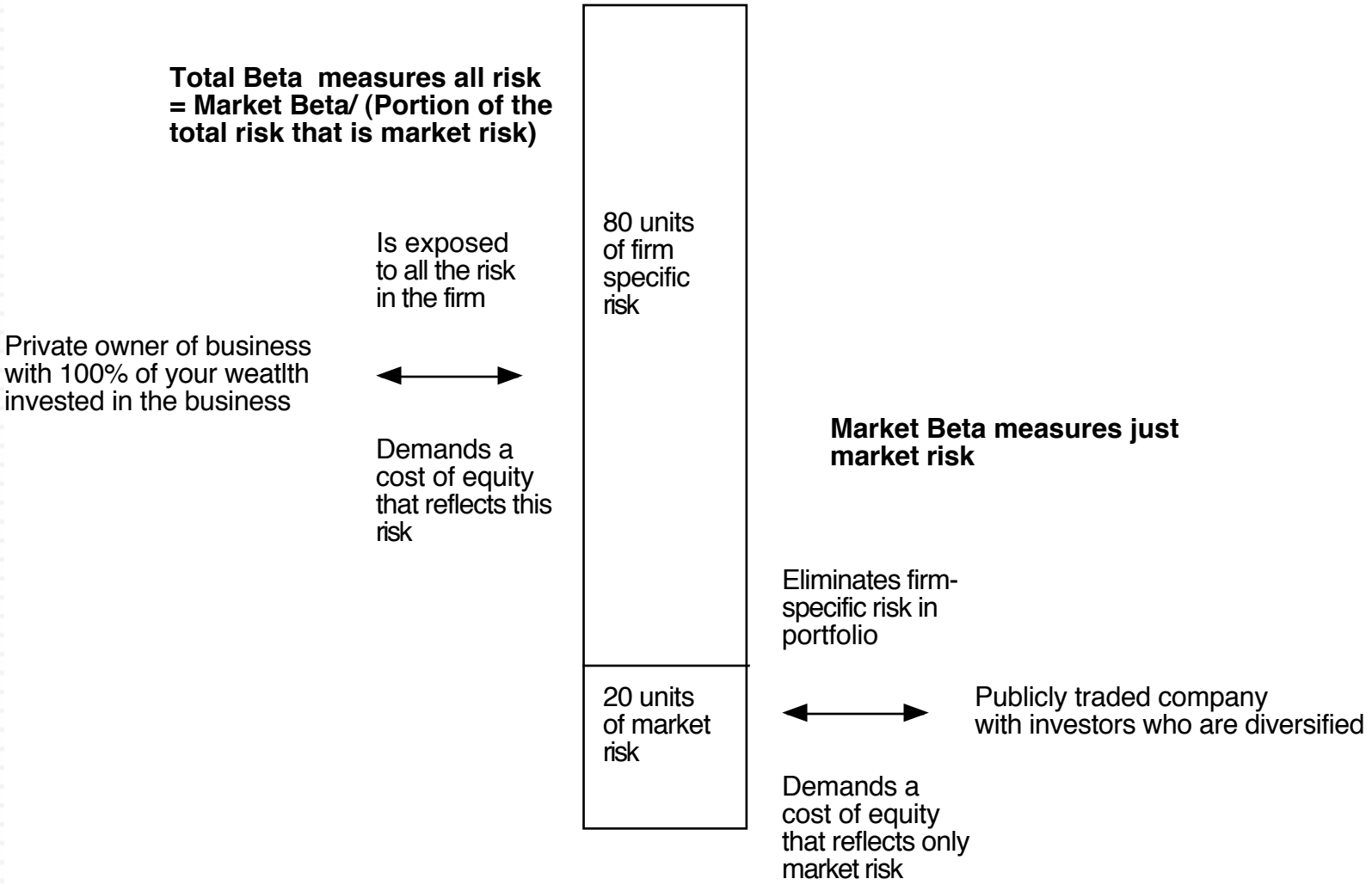
Private Owner versus Publicly Traded Company Perceptions of Risk in an Investment



Estimating a total beta

- To get from the market beta to the total beta, we need a measure of how much of the risk in the firm comes from the market and how much is firm-specific.
- Looking at the regressions of publicly traded firms that yield the bottom-up beta should provide an answer.
  - The average R-squared across the high-end retailer regressions is 25%.
  - Since betas are based on standard deviations (rather than variances), we will take the correlation coefficient (the square root of the R-squared) as our measure of the proportion of the risk that is market risk.
- Total Unlevered Beta

  = Market Beta/ Correlation with the market

  = 1.18 / 0.5 = 2.36

The final step in the beta computation: Estimate a Debt to equity ratio and cost of equity

- With publicly traded firms, we re-lever the beta using the market D/E ratio for the firm. With private firms, this option is not feasible. We have two alternatives:
  - Assume that the debt to equity ratio for the firm is similar to the average market debt to equity ratio for publicly traded firms in the sector.
  - Use your estimates of the value of debt and equity as the weights in the computation. (There will be a circular reasoning problem: you need the cost of capital to get the values and the values to get the cost of capital.)
- We will assume that this privately owned restaurant will have a debt to equity ratio (14.33%) similar to the average publicly traded restaurant (even though we used retailers to the unlevered beta).
  - Levered beta = 2.36 (1 + (1-.4) (.1433)) = 2.56
  - Cost of equity =4.25% + 2.56 (4%) = 14.50%

  (T Bond rate was 4.25% at the time; 4% is the equity risk premium)

Estimating a cost of debt and capital

- While the firm does not have a rating or any recent bank loans to use as reference, it does have a reported operating income and lease expenses (treated as interest expenses)

  Coverage Ratio = Operating Income/ Interest (Lease) Expense
  = 400,000/ 120,000 = 3.33

  Rating based on coverage ratio = BB+ Default spread = 3.25%

  After-tax Cost of debt = (Riskfree rate + Default spread) (1 – tax rate)
  = (4.25% + 3.25%) (1 - .40) = 4.50%

- To compute the cost of capital, we will use the same industry average debt ratio that we used to lever the betas.
  - Cost of capital = 14.50% (100/114.33) + 4.50% (14.33/114.33) = 13.25%
  - (The debt to equity ratio is 14.33%; the cost of capital is based on the debt to capital ratio)

Step 2: Clean up the financial statements

	Stated	Adjusted	
Revenues	$1,200	$1,200	
- Operating lease expenses	$120		Leases are financial expenses
- Wages	$200	$350	! Hire a chef for $150,000/year
- Material	$300	$300	
- Other operating expenses	$180	$180	
Operating income	$400	$370	
- Interest expnses	$0	$69.62	7.5% of $928.23 (see below)
Taxable income	$400	$300.38	
- Taxes	$160	$120.15	
Net Income	$240	$180.23	

Debt	0	$928.23	! PV of $120 million for 12 years @7.5%

Step 3: Assess the impact of the "key" person

- Part of the draw of the restaurant comes from the current chef. It is possible (and probable) that if he sells and moves on, there will be a drop off in revenues. If you are buying the restaurant, you should consider this drop off when valuing the restaurant. Thus, if 20% of the patrons are drawn to the restaurant because of the chef's reputation, the expected operating income will be lower if the chef leaves.
  - Adjusted operating income (existing chef) = $ 370,000
  - Operating income (adjusted for chef departure) = $296,000
- As the owner/chef of the restaurant, what might you be able to do to mitigate this loss in value?

Step 4: Don't forget valuation fundamentals

- To complete the valuation, you need to assume an expected growth rate. As with any business, assumptions about growth have to be consistent with reinvestment assumptions. In the long term,

  Reinvestment rate = Expected growth rate/Return on capital

- In this case, we will assume a 2% growth rate in perpetuity and a 20% return on capital.

  Reinvestment rate = g/ ROC = 2%/ 20% = 10%

- Even if the restaurant does not grow in size, this reinvestment is what you need to make to keep the restaurant both looking good (remodeling) and working well (new ovens and appliances).

Step 5: Complete the valuation

- Inputs to valuation
  - Adjusted EBIT = $ 296,000
  - Tax rate = 40%
  - Cost of capital = 13.25%
  - Expected growth rate = 2%
  - Reinvestment rate (RIR) = 10%
- Valuation

Value of the restaurant = Expected FCFF next year / (Cost of capital –g)

= Expected EBIT next year (1- tax rate) (1- RIR)/ (Cost of capital –g)

= 296,000 (1.02) (1-.4) (1-.10)/ (.1325 - .02)

= $1.449 million

Value of equity in restaurant = $1.449 million - $0.928 million (PV of leases) b= $ 0.521 million

Step 6: Consider the effect of illiquidity

- In private company valuation, illiquidity is a constant theme. All the talk, though, seems to lead to a rule of thumb. The illiquidity discount for a private firm is between 20-30% and does not vary across private firms.
- But illiquidity should vary across:
  - Companies: Healthier and larger companies, with more liquid assets, should have smaller discounts than money-losing smaller businesses with more illiquid assets.
  - Time: Liquidity is worth more when the economy is doing badly and credit is tough to come by than when markets are booming.
  - Buyers: Liquidity is worth more to buyers who have shorter time horizons and greater cash needs than for longer term investors who don't need the cash and are willing to hold the investment.

The Standard Approach: Illiquidity discount based on illiquid publicly traded assets

- Restricted stock: These are stock issued by publicly traded companies to the market that bypass the SEC registration process but the stock cannot be traded for one year after the issue.
- Pre-IPO transactions: These are transactions prior to initial public offerings where equity investors in the private firm buy (sell) each other's stakes.
- In both cases, the discount is estimated the be the difference between the market price of the liquid asset and the observed transaction price of the illiquid asset.
  - Discount Restricted stock = Stock price – Price on restricted stock offering
  - Discount_{IPO} = IPO offering price – Price on pre-IPO transaction

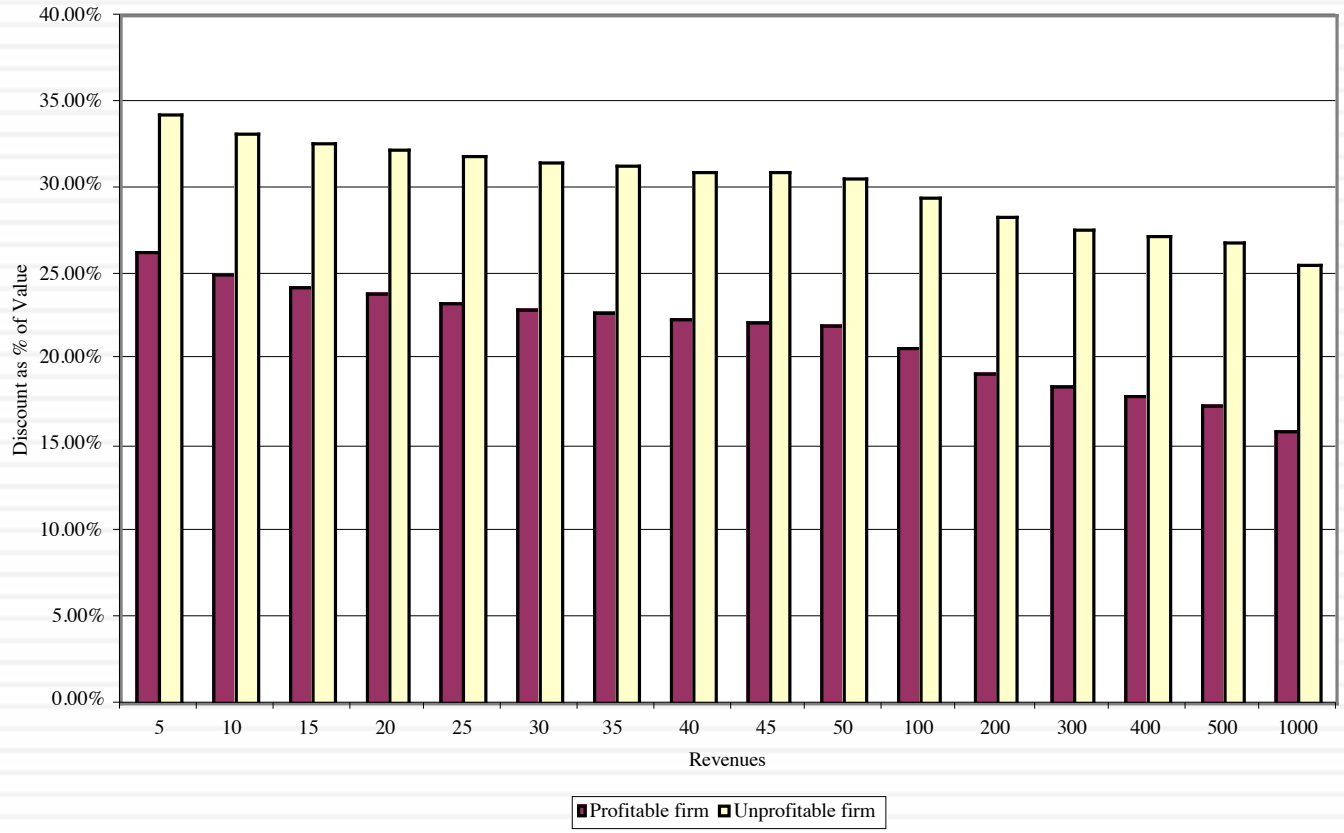
The Restricted Stock Discount

- Aggregate discount studies
  - Maher examined restricted stock purchases made by four mutual funds in the period 1969-73 and concluded that they traded an average discount of 35.43% on publicly traded stock in the same companies.
  - Moroney reported a mean discount of 35% for acquisitions of 146 restricted stock issues by 10 investment companies, using data from 1970.
  - In a study of restricted stock offerings from the 1980s, Silber (1991) finds that the median discount for restricted stock is 33.75%.
- Silber related the size of the discount to characteristics of the offering:

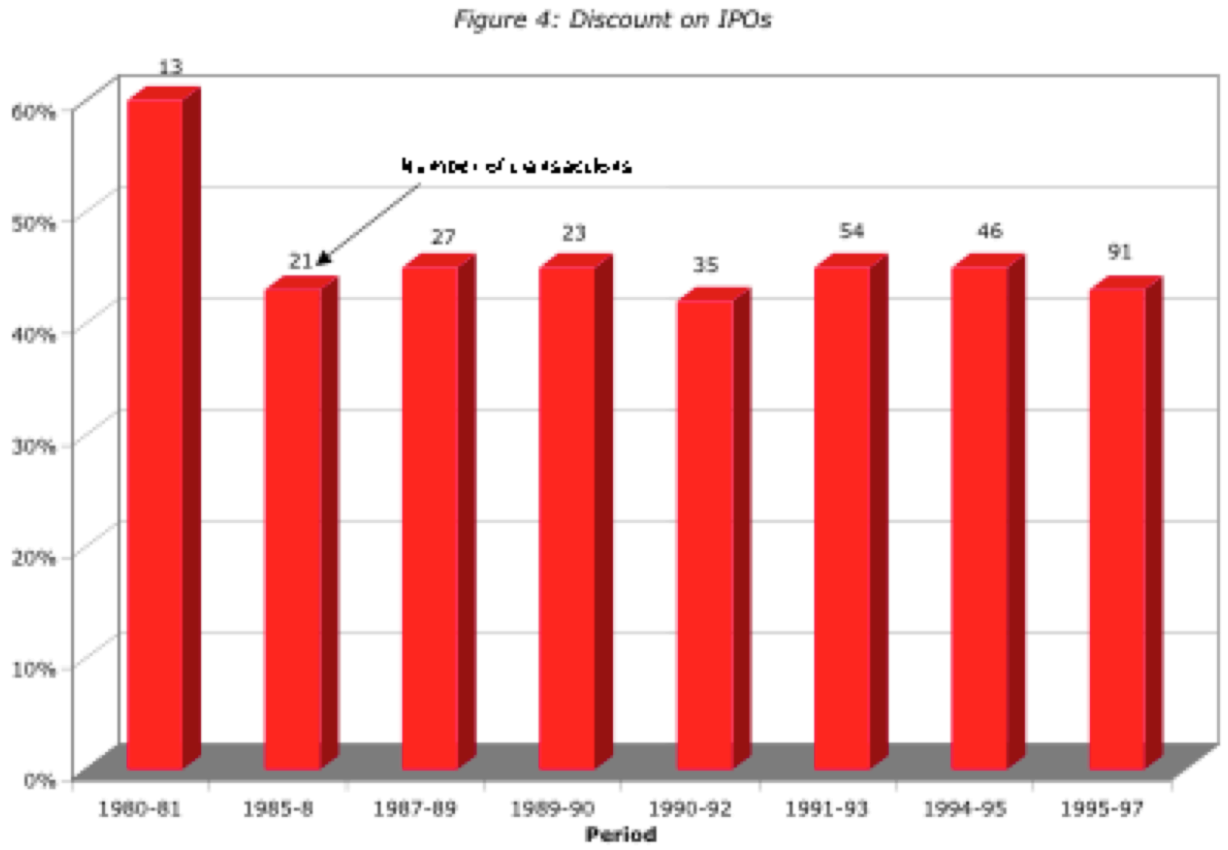
  LN(RPRS) = 4.33 +0.036 LN(REV) - 0.142 LN(RBRT) + 0.174 DERN + 0.332 DCUST
  - RPRS = Relative price of restricted stock (to publicly traded stock)
  - REV = Revenues of the private firm (in millions of dollars)
  - RBRT = Restricted Block relative to Total Common Stock in %
  - DERN = 1 if earnings are positive; 0 if earnings are negative;
  - DCUST = 1 if there is a customer relationship with the investor; 0 otherwise;

Cross sectional differences in Illiquidity: Extending the Silber regression

Figure 24.1: Illiquidity Discounts: Base Discount of 25% for profitable firm with $ 10 million in revenues



The IPO discount: Pricing on pre-IPO transactions (in 5 months prior to IPO)



The "sampling" problem

- With both restricted stock and the IPO studies, there is a significant sampling bias problem.
  - The companies that make restricted stock offerings are likely to be small, troubled firms that have run out of conventional financing options.
  - The types of IPOs where equity investors sell their stake in the five months prior to the IPO at a huge discount are likely to be IPOs that have significant pricing uncertainty associated with them.
- With restricted stock, the magnitude of the sampling bias was estimated by comparing the discount on all private placements to the discount on restricted stock offerings. One study concluded that the "illiquidity" alone accounted for a discount of less than 10% (leaving the balance of 20-25% to be explained by sampling problems).

An alternative approach: Use the whole sample

- All traded assets are illiquid. The bid ask spread, measuring the difference between the price at which you can buy and sell the asset at the same point in time is the illiquidity measure.
- We can regress the bid-ask spread (as a percent of the price) against variables that can be measured for a private firm (such as revenues, cash flow generating capacity, type of assets, variance in operating income) and are also available for publicly traded firms.
- Using data from the end of 2000, for instance, we regressed the bid-ask spread against annual revenues, a dummy variable for positive earnings (DERN: 0 if negative and 1 if positive), cash as a percent of firm value and trading volume.

  Spread = 0.145 – 0.0022 ln (Annual Revenues) -0.015 (DERN) – 0.016 (Cash/ Firm Value) – 0.11 ($ Monthly trading volume/ Firm Value)

  You could plug in the values for a private firm into this regression (with zero trading volume) and estimate the spread for the firm.

Estimating the illiquidity discount for the restaurant

Approach used	Estimated discount	Value of restaurant
Bludgeon (Fixed discount)	25%	$0.521 (1- .25) = $0.391 million
Refined Bludgeon (Fixed discount with adjustment for revenue size/ profitability)	28.75% (Silber adjustment for small revenues and positive profits to a base discount of 25%)	$0.521 (1-.2875) = $0.371 million
Bid-ask spread regression	= 0.145 – 0.0022 ln (1.2) -0.015 (1) – 0.016 (.05) – 0.11 (0)= 12.88%	$0.521 (1-.1288) = $0.454 million

II. Private company sold to publicly traded company

- The key difference between this scenario and the previous scenario is that the seller of the business is not diversified but the buyer is (or at least the investors in the buyer are). Consequently, they can look at the same firm and see very different amounts of risk in the business with the seller seeing more risk than the buyer.
- The cash flows may also be affected by the fact that the tax rates for publicly traded companies can diverge from those of private owners.
- Finally, there should be no illiquidity discount to a public buyer, since investors in the buyer can sell their holdings in a market.

Revisiting the cost of equity and capital: Restaurant Valuation

	Private	Public
Unlevred beta	2.36	1.18
Debt to equity ratio	14.33%	14.33%
Tax rate	40%	40%
Pre-tax cost of debt	7.50%	7.50%
Levered beta	2.56	1.28
Riskfree rate	4.25%	4.25%
Equity risk premium	4%	4%
Cost of equity	14.5%	9.38%
After-tax cost of debt	4.50%	4.50%
Cost of capital	13.25%	8.76%

Revaluing the restaurant to a "public" buyer

	Private	*Public*
Adjusted EBIT =	*370*	*370*
Key person discount =	*20%*	*20%*
EBIT =	296	296
Expected growth rate =	2%	2%
Return on capital =	20%	20%
Reinvestment rate =	10.00%	10.00%
FCFF next year =	$163.04	$163.04
Cost of capital =	13.25%	8.76%
Value of business=	$1,449.22	$2,411.79
- Debt	$928.23	$928.23
Value of equity =	$520.99	$1,483.56
- Illiquidity discount	12.88%	0.00%
Value of equity	$453.88	$1,483.56

So, what price should you ask for?

- Assume that you represent the chef/owner of the restaurant and that you were asking for a "reasonable" price for the restaurant. What would you ask for?

a. $ 454,000

b. $ 1.484 million

c. Some number in the middle

- If it is "some number in the middle", what will determine what you will ultimately get for your business?

- How would you alter the analysis, if your best potential bidder is a private equity or VC fund rather than a publicly traded firm?

III. Private company for initial public offering

- In an initial public offering, the private business is opened up to investors who clearly are diversified (or at least have the option to be diversified).
- There are control implications as well. When a private firm goes public, it opens itself up to monitoring by investors, analysts and market.
- The reporting and information disclosure requirements shift to reflect a publicly traded firm.

Starting numbers

Twitter Pre-IPO Valuation: October 5, 2013

	2012	Trailing 2013
Revenues	$316.9	$448.2
Operating Income	-$77.1	-$92.9
Adj Op Inc		$4.3
Invested Capital		$549.1
Operating Margin		0.96%
Sales/Capital		0.82

Revenue growth of 55% a year for 5 years, tapering down to 2.7% in year 10

Pre-tax operating margin increases to 25% over the next 10 years

Sales to capital ratio of **1.50** for incremental sales

Stable Growth
g = 2.7%; Beta = 1.00;
Cost of capital = 8%
ROC= **12**%;
Reinvestment Rate=2.7%/12% = 22.5%

Terminal Value$_{10}$= 1433/(.08-.027) = $27.036

	1	2	3	4	5	6	7	8	9	10
Revenues	$ 694.7	$ 1,076.8	$ 1,669.1	$ 2,587.1	$ 4,010.0	$ 5,796.0	$ 7,771.3	$ 9,606.8	$10,871.1	$11,164.6
Operating Income	$ 23.3	$ 62.0	$ 136.3	$ 273.5	$ 520.3	$ 891.5	$ 1,382.2	$ 1,939.7	$ 2,456.3	$ 2,791.2
Operating Income after taxes	$ 23.3	$ 62.0	$ 136.3	$ 265.3	$ 364.2	$ 614.2	$ 937.1	$ 1,293.8	$ 1,611.4	$ 1,800.3
Reinvestment	$ 164.3	$ 254.7	$ 394.8	$ 612.0	$ 948.6	$ 1,190.7	$ 1,316.8	$ 1,223.7	$ 842.8	$ 195.7
FCFF	$ (141.0)	$ (192.7)	$ (258.5)	$ (346.6)	$ (584.4)	$ (576.5)	$ (379.7)	$ 70.0	$ 768.5	$ 1,604.6

Operating assets	$9,611
+ Cash	375
+ IPO Proceeds	1000
- Debt	207
Value of equity	10,779
- Options	805
Value in stock	9,974
/ # of shares	574.44
Value/share	$17.36

Terminal year (11)

EBIT (1-t)	$1,849
- Reinvestment	$ 416
FCFF	$1,433

Cost of capital = 11.32% (.983) + 5.16% (.017) = 11.22%

Cost of capital decreases to 8% from years 6-10

Cost of Equity
11.32%

Cost of Debt
(2.7%+5.3%)(1-.40)
= 5.16%

Weights
E = 98.31% D = 1.69%

Riskfree Rate:
Riskfree rate = 2.7%

+

Beta
1.40

90% advertising (1.44) + 10% info svcs (1.05)

D/E=1.71%

x

Risk Premium
6.15%

75% from US(5.75%) + 25% from rest of world (7.23%)

The twists in an initial public offering

- Valuation issues:
  - Use of the proceeds from the offering: The proceeds from the offering can be held as cash by the firm to cover future investment needs, paid to existing equity investors who want to cash out or used to pay down debt.
  - Warrants/ Special deals with prior equity investors: If venture capitalists and other equity investors from earlier iterations of fund raising have rights to buy or sell their equity at pre-specified prices, it can affect the value per share offered to the public.
- Pricing issues:
  - Institutional set-up: Most IPOs are backed by investment banking guarantees on the price, which can affect how they are priced.
  - Follow-up offerings: The proportion of equity being offered at initial offering and subsequent offering plans can affect pricing.

A. Use of the Proceeds

- The proceeds from an initial public offering can be
  - Taken out of the firm by the existing owners
  - Used to pay down debt and other obligations
  - Held as cash by the company to cover future reinvestment needs
- How you deal with the issuance will depend upon how the proceeds are used.
  - If taken out of the firm -> Ignore in valuation
  - If used to pay down debt -> Change the debt ratio, which may change the cost of capital and the value of the firm
  - If held as cash to cover future reinvestment needs -> Add the cash proceeds from the IPO to the DCF valuation of the company.

The IPO Proceeds: Twitter

- **How much?** News stories suggest that the company is planning on raising about $1 billion from the offering.
- **Use**: In the Twitter prospectus filing, the company specifies that it plans to keep the proceeds in the company to meet future investment needs.
  - In the valuation, I have added a billion to the estimated value of the operating assets because that cash infusion will augment the cash balance.
- How would the valuation have been different if the owners announced that they planned to withdraw half of the offering proceeds?

B. Claims from prior equity investors

- When a private firm goes public, there are already equity investors in the firm, including the founder(s), venture capitalists and other equity investors. In some cases, these equity investors can have warrants, options or other special claims on the equity of the firm.
- If existing equity investors have special claims on the equity, the value of equity per share has to be affected by these claims. Specifically, these options need to be valued at the time of the offering and the value of equity reduced by the option value before determining the value per share.

The claims on Twitter's equity

- The overall value that we estimate for Twitter's equity is $10,779 million. There are multiple claims on this equity.
  - The owners of the company own the common shares in the company
  - Twitter has seven classes of convertible, preferred stock on the company (from different VCs).
  - Twitter has 86 million restricted stock units that it has used in employee compensation.
  - Twitter has 44.16 million units of employee options, also used in compensation contracts. (Strike price=$1.82, life = 6.94 years)
  - Twitter has agreed to pay MoPub stockholders with 14.791 million shares.
- The convertible preferred shares will be converted at the time of the offering and the common shares outstanding will be 472.61 million, not counting RSUs and options. In the valuation:
  - Number of commons shares= 574.44 million (all but options)
  - Option value = $805 million (with maturity set to 3.47 years)

C. The Investment Banking guarantee…

- Almost all IPOs are managed by investment banks and are backed by a pricing guarantee, where the investment banker guarantees the offering price to the issuer.
- If the price at which the issuance is made is lower than the guaranteed price, the investment banker will buy the shares at the guaranteed price and potentially bear the loss.

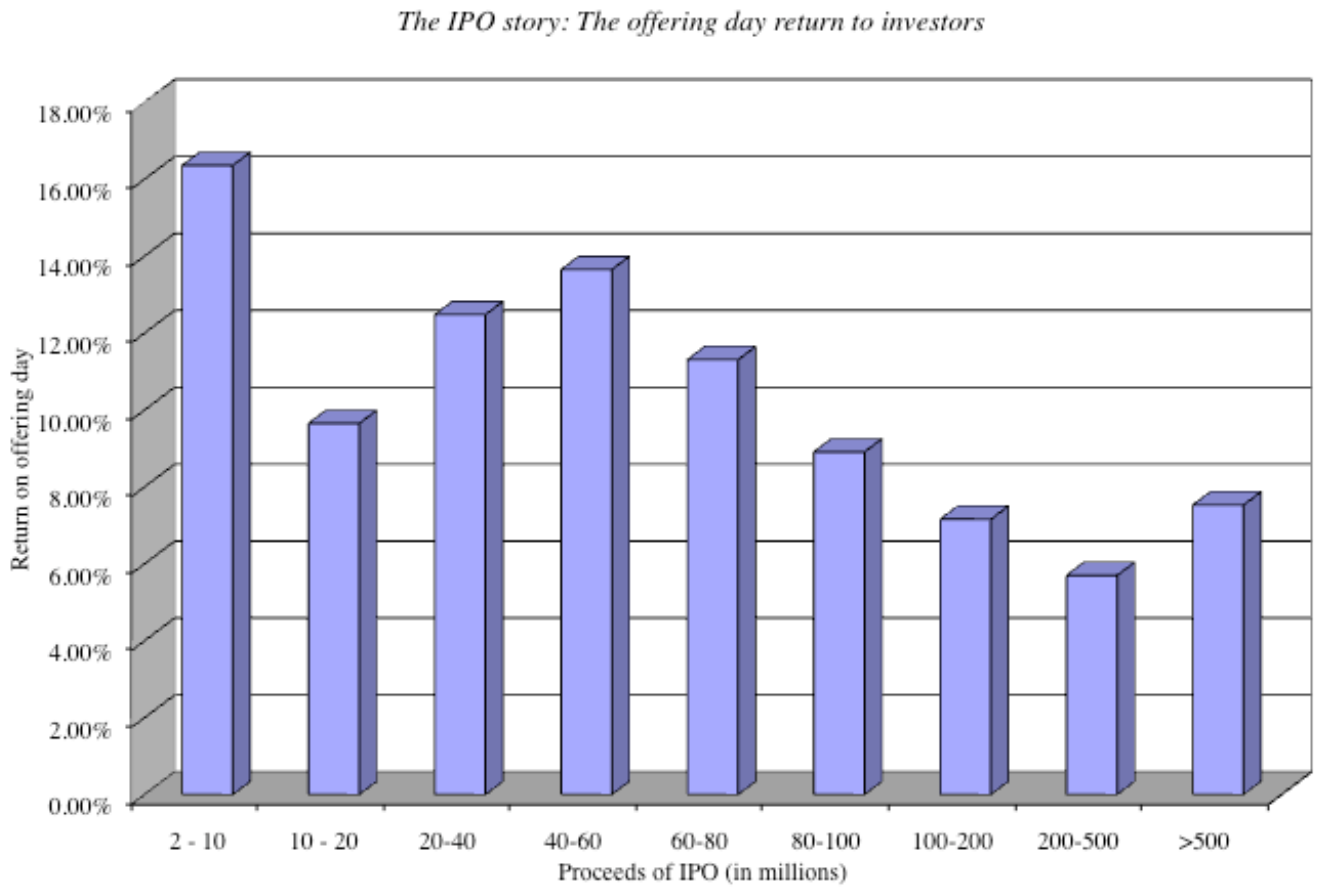
Pricing versus Value

- Earlier I assessed the value of equity at Twitter to be $9.97 billion (with a value per share of $17.36/share).
- Assume, however, that the market appetite for social media stocks is high and that you pull up the valuations of other publicly traded stocks in the market:

Company	*EV*	*Market Cap*	*Sales*	*Users*	*EV/Sales*	*Market Cap/User*
Facebook	$100,017.00	$107,909.00	$6,118.00	1110	16.35	$97.22
LinkedIn	$28,448.50	$29,321.90	$1,244.00	225	22.87	$130.32
FB+LNKD	$128,465.50	$137,230.90	$7,362.00	1335	17.45	$102.79
Twitter	?	?	$483.00	215		

- What would you base your offer price on? How would you sell it?

The evidence on IPO pricing



An investment opportunity?

- Assume that investment banks try to under price initial public offerings by approximately 10-15%. As an investor, what strategy would you adopt to take advantage of this behavior?

- Why might it not work?

D. The offering quantity

- Assume now that you are the owner of Twitter and were offering 100% of the shares in company in the offering to the public? If investors are willing to pay $20 billion for the common stock, how much do you lose because of the under pricing (15%)?

- Assume that you were offering only 10% of the shares in the initial offering and plan to sell a large portion of your remaining stake over the following two years? Would your views of the under pricing and its effect on your wealth change as a consequence?

IV. An Intermediate Problem
Private to VC to Public offering…

- Assume that you have a private business operating in a sector, where publicly traded companies have an average beta of 1 and where the average correlation of firms with the market is 0.25. Consider the cost of equity at three stages (Riskfree rate = 4%; ERP = 5%):
- Stage 1: The nascent business, with a private owner, who is fully invested in that business.

  Perceived Beta = 1/ 0.25 = 4

  Cost of Equity = 4% + 4 (5%) = 24%
- Stage 2: Angel financing provided by specialized venture capitalist, who holds multiple investments, in high technology companies. (Correlation of portfolio with market is 0.5)

  Perceived Beta = 1/0.5 = 2

  Cost of Equity = 4% + 2 (5%) = 14%
- Stage 3: Public offering, where investors are retail and institutional investors, with diversified portfolios:

  Perceived Beta = 1

  Cost of Equity = 4% + 1 (5%) = 9%

To value this company…

Assume that this company will be fully owned by its current owner for two years, will access the technology venture capitalist at the start of year 3 and that is expected to either go public or be sold to a publicly traded firm at the end of year 5.

	1	2	3	4	5	Terminal year
E(Cash flow)	$100	$125	$150	$165	$170	$175
Market beta	1	1	1	1	1	1
Correlation	0.25	0.25	0.5	0.5	0.5	1
Beta used	4	4	2	2	2	1
Cost of equity	24.00%	24.00%	14.00%	14.00%	14.00%	9.00%
Terminal value					$2,500	
Cumulated COE	1.2400	1.5376	1.7529	1.9983	2.2780	2.4830
PV	$80.65	$81.30	$85.57	$82.57	$1,172.07	

Growth rate 2% forever after year 5

175/ (.09-.02)

Value of firm	$1,502	(Correct value, using changing costs of equity)

Value of firm	$1,221	(using 24% as cost of equity forever. You will undervalue firm)

Value of firm	$2,165	(Using 9% as cost of equity forever. You will overvalue firm)

Implications

- Proposition 1: The value of a private business that is expected to transition to a publicly traded company will be higher than the value of an otherwise similar private business that does not expect to make this transition.
  - Private businesses in sectors that are "hot" in terms of going public (social media in 2014) will be worth more than private businesses in less sexy sectors.
  - As IPOs boom (bust) private company valuations will increase (decrease).
  - Private companies in countries that have easy access to public markets will have higher value than companies in countries without that access.
- Proposition 2: The value of a private business that expects to make the transition to a public company sooner will be higher than the value of an otherwise similar company that will take longer.
  - Private businesses will be worth more if companies are able to go public earlier in their life cycle.

Private company valuation: Closing thoughts

- The value of a private business will depend on the potential buyer.
- If you are the seller of a private business, you will maximize value, if you can sell to
  - A long term investor
  - Who is well diversified (or whose investors are)
  - And does not think too highly of you (as a person)
- If you are valuing a private business for legal purposes (tax or divorce court), the assumptions you use and the value you arrive at will depend on which side of the legal divide you are on.
- As a final proposition, always keep in mind that the owner of a private business has the option of investing his wealth in publicly traded stocks. There has to be a relationship between what you can earn on those investments and what you demand as a return on your business.