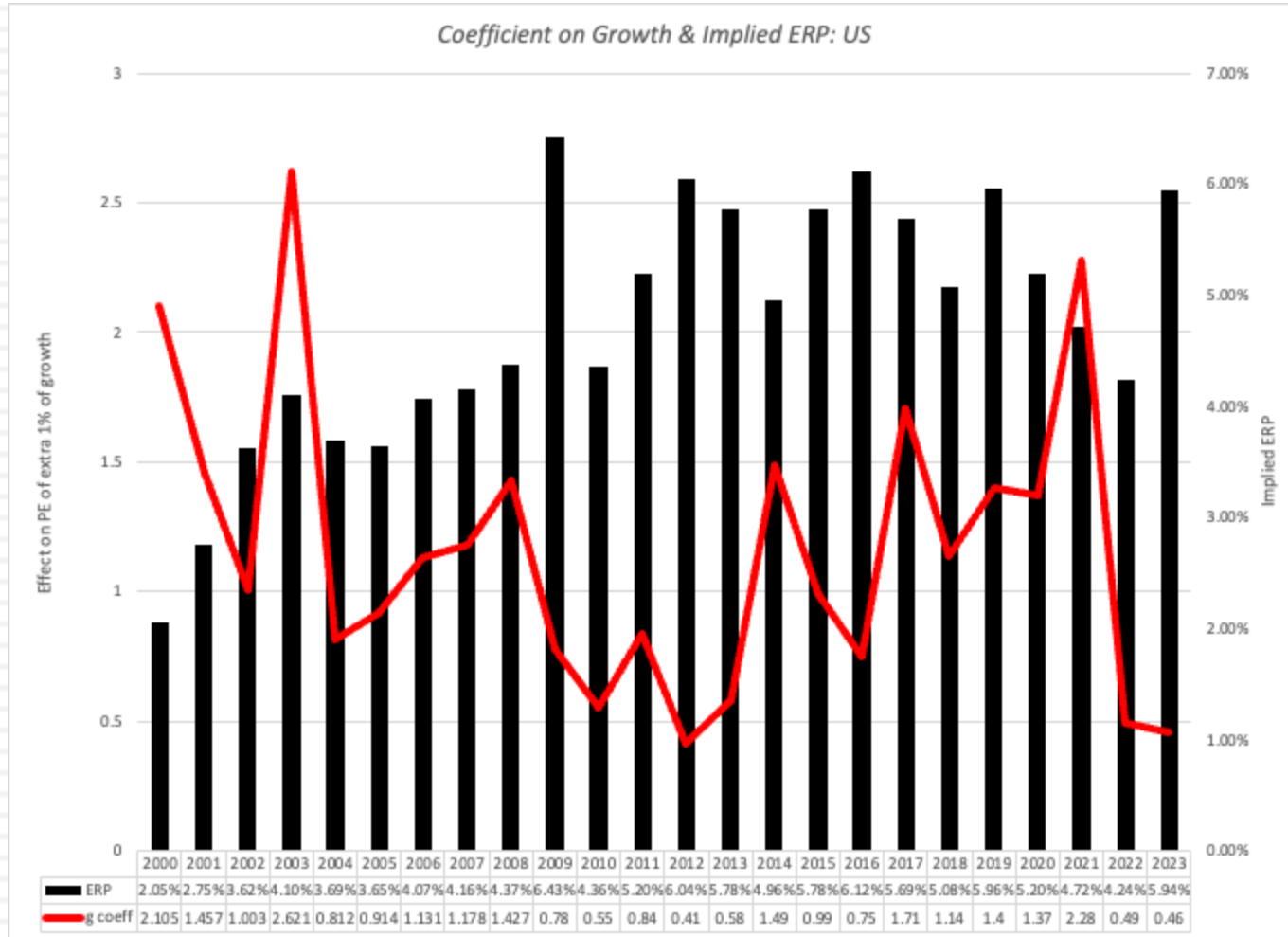
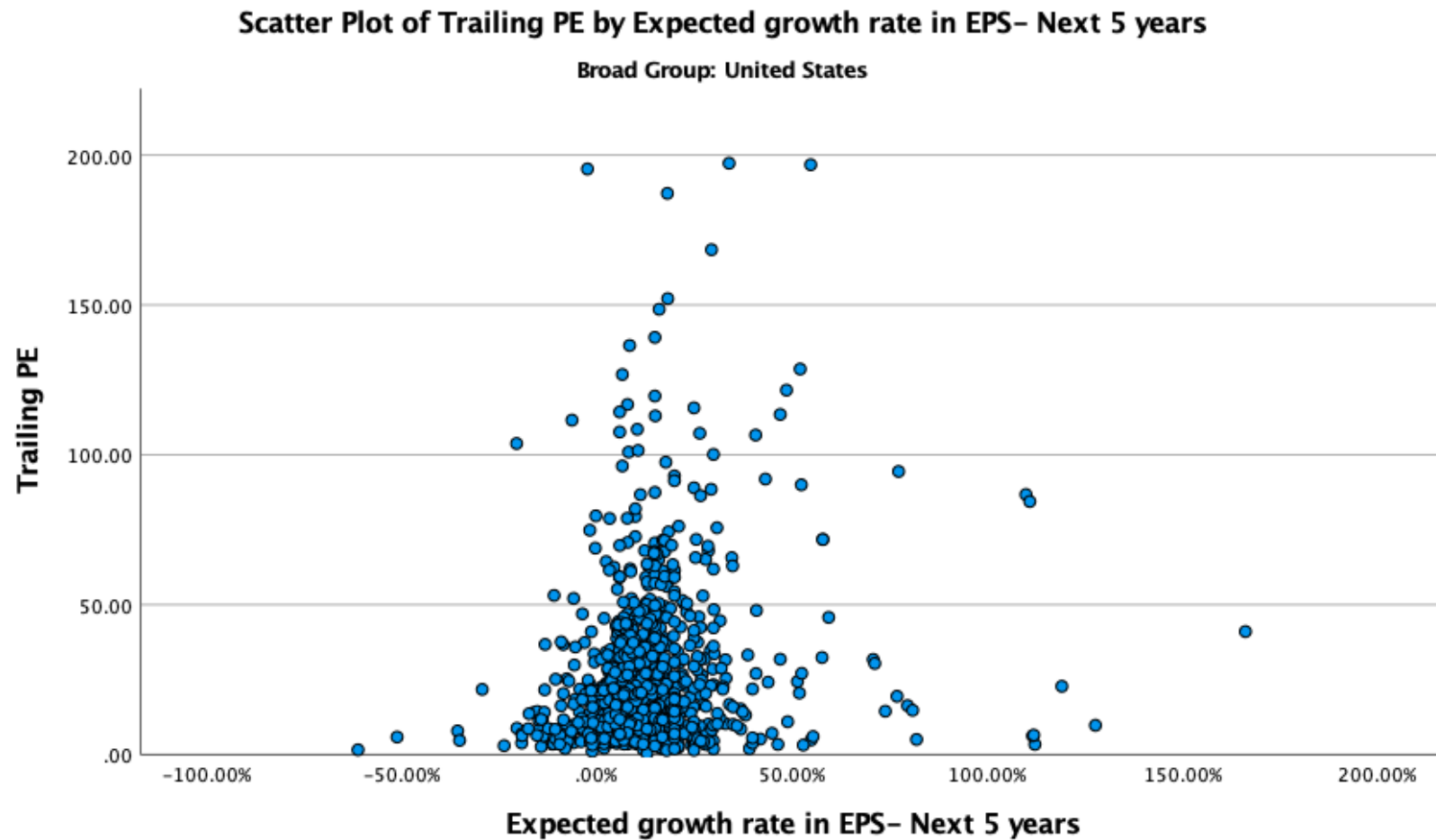


The value of growth



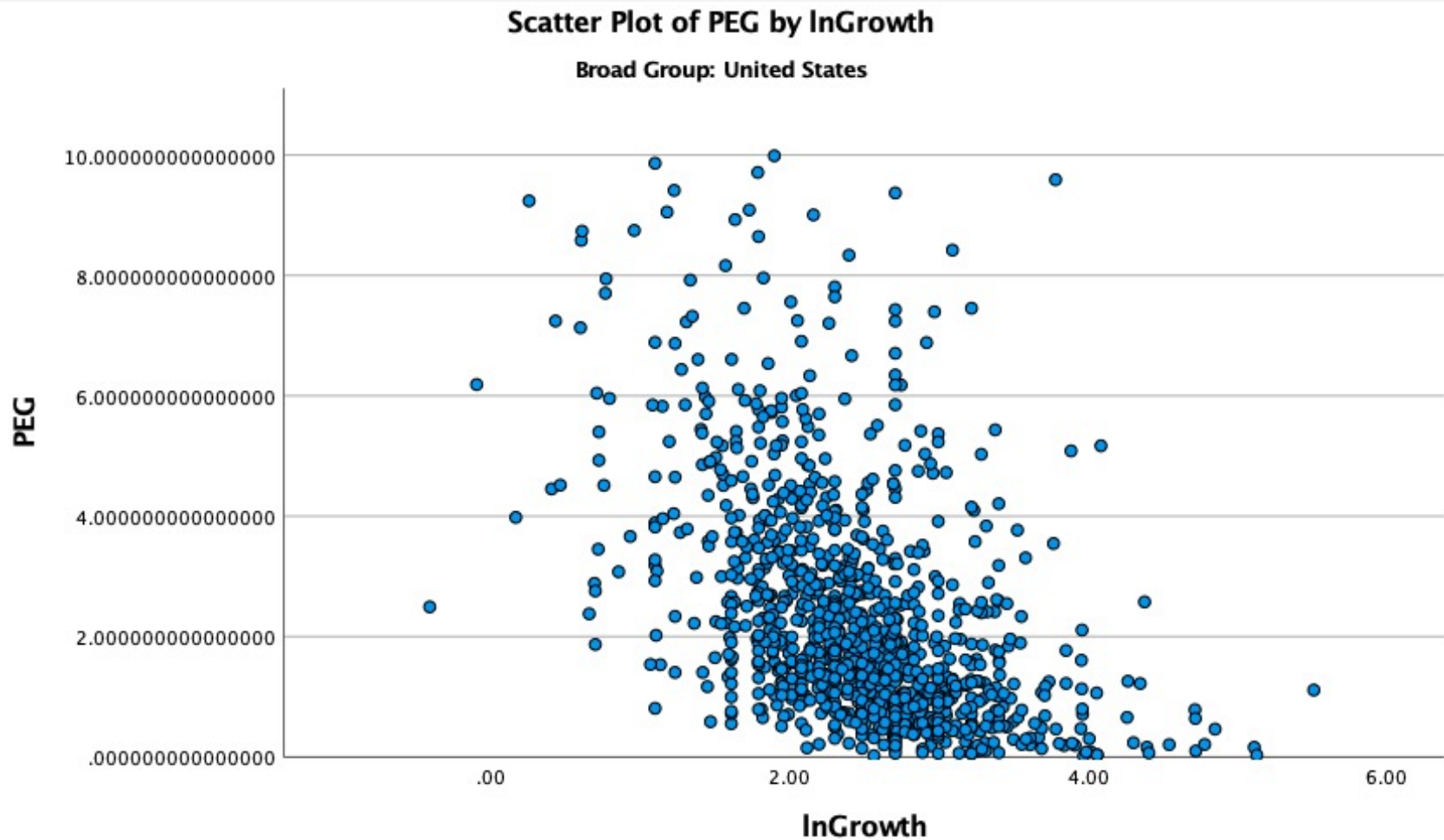
II. PEG Ratio versus the market PEG versus Growth

95



PEG versus In(Expected Growth)

96



PEG Ratio Regression - US stocks

January 2022

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Model Summary^a

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .754 ^b | .568 | .566 | 209.277240 |

a. Broad Group = United States

b. Predictors: (Constant), Payout ratio, lnGrowth, Beta

Coefficients^{a,b,c}

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|--------------|-----------------------------|------------|---------------------------|---------|-------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 6.706 | .242 | | 27.753 | <.001 |
| | lnGrowth | -1.566 | .082 | -.546 | -19.042 | <.001 |
| | Beta | -.770 | .135 | -.169 | -5.717 | <.001 |
| | Payout ratio | .012 | .002 | .224 | 7.711 | <.001 |

a. Broad Group = United States

b. Dependent Variable: PEG

c. Weighted Least Squares Regression - Weighted by Market Cap (in US \$)

I. PE ratio regressions across markets

98

| Region | Regression – January 2023 | R ² |
|-----------------------|--|----------------|
| US | PE = 8.63 + 2.23 Beta + 46.20 g _{EPS} + 19.30 Payout | 25.0% |
| Europe | PE = 1.59 + 2.33 Beta + 41.50 g _{EPS} + 27.00 Payout | 36.6% |
| Japan | PE = 0.17 + 1.38 Beta + 123.20 g _{EPS} + 28.10 Payout | 55.4% |
| Emerging Markets | PE = 10.88 + 1.76 Beta + 43.90 g _{EPS} + 6.90 Payout | 17.6% |
| Australia, NZ, Canada | PE = 14.38 – 9.42 Beta + 66.50 g _{EPS} + 16.10 Payout | 26.9% |
| Global | PE = 8.17 + 0.98 Beta + 50.80 g _{EPS} + 18.20 Payout | 23.6% |

g_{EPS} = Expected Growth: Expected growth in EPS or Net Income: Next 5 years (decimals)

Beta: Regression or Bottom up Beta

Payout ratio: Dividends/ Net income from most recent year. Set to zero, if net income < 0

II. PEG ratio regressions across markets

99

| Region | Regression – January 2023 | R ² |
|-----------------------|--|----------------|
| US | PEG = 6.71 + 1.20 Payout – 1.57 ln(gEPS) -0.77 Beta | 56.6% |
| Europe | PEG = 4.50 + 0.50 Payout – 1.19 ln(gEPS) + . 0.176 Beta | 30.1% |
| Japan | PEG = 4.30 + 1.40 Payout – 1.24 ln(gEPS) + 1.90 Beta | 25.9% |
| Emerging Markets | PEG = 3.40 + 0.60 Payout – 0.55 ln(gEPS) - 0.268 Beta | 21.5% |
| Australia, NZ, Canada | PEG = 5.98 + 0.80 Payout – 1.69 ln(gEPS) - 0.39 Beta | 47.2% |
| Global | PEG = 4.99 + 1.00 Payout – 1.16 ln(gEPS) - 0.262 Beta | 36.6% |

g_{EPS}=Expected Growth: Expected growth in EPS or Net Income: Next 5 years (decimals)

Beta: Regression or Bottom up Beta

Payout ratio: Dividends/ Net income from most recent year. Set to zero, if net income < 0

99

III. Price to Book Ratio: Fundamentals hold in every market

100

| Region | Regression – January 2023 | R ² |
|-----------------------|--|----------------|
| US | $PBV = 2.32 + 4.60 g_{EPS} - 1.33 \text{ Beta} + 8.90 \text{ ROE} + 0.80 \text{ Payout Ratio}$ | 36.9% |
| Europe | $PBV = -0.04 + 4.10 g_{EPS} + 0.07 \text{ Beta} + 9.60 \text{ ROE} + 1.80 \text{ Payout Ratio}$ | 28.5% |
| Japan | $PBV = -0.10 + 7.30 g_{EPS} + 0.18 \text{ Beta} + 12.40 \text{ ROE} + 2.00 \text{ Payout Ratio}$ | 34.4% |
| Emerging Markets | $PBV = 0.87 + 3.10 g_{EPS} + 0.23 \text{ Beta} + 6.00 \text{ ROE} + 1.00 \text{ Payout Ratio}$ | 28.0% |
| Australia, NZ, Canada | $PBV = 2.26 + 5.00 g_{EPS} - 1.53 \text{ Beta} + 5.10 \text{ ROE} + 0.50 \text{ Payout Ratio}$ | 25.4% |
| Global | $PBV = 1.09 + 3.60 g_{EPS} - 0.16 \text{ Beta} + 7.50 \text{ ROE} + 0.80 \text{ Payout Ratio}$ | 28.1% |

g_{EPS} = Expected Growth: Expected growth in EPS/ Net Income: Next 5 years

Beta: Regression or Bottom up Beta

Payout ratio: Dividends/ Net income from most recent year. Set to zero, if net income < 0

ROE: Net Income/ Book value of equity in most recent year.

IV. EV/EBITDA across markets

101

| Region | Regression – January 2023 | R squared |
|------------------------|---|-----------|
| United States | $EV/EBITDA = 23.93 + 25.40 g - 8.20 DFR - 34.40 \text{ Tax Rate}$ | 5.3% |
| Europe | $EV/EBITDA = 19.78 + 8.00 g - 9.90 DFR - 13.60 \text{ Tax Rate}$ | 8.8% |
| Japan | $EV/EBITDA = 19.94 + 1.40 g - 0.60 DFR - 23.00 \text{ Tax Rate}$ | 3.5% |
| Emerging Markets | $EV/EBITDA = 30.93 + 4.90 g - 17.30 DFR - 40.40 \text{ Tax Rate}$ | 11.9% |
| Australia, NZ & Canada | $EV/EBITDA = 29.10 + 8.10 g - 14.90 DFR - 49.70 \text{ Tax Rate}$ | 13.3% |
| Global | $EV/EBITDA = 25.62 + 9.20 g - 11.40 DFR - 32.70 \text{ Tax Rate}$ | 7.5% |

g = Expected Revenue Growth: Expected growth in revenues: Near term (2 or 5 years)

DFR = Debt Ratio : Total Debt / (Total Debt + Market value of equity)

Tax Rate: Effective tax rate in most recent year ROIC = Return on Capital

V. EV/Sales Regressions across markets...

102

| Region | Regression – January 2023 | R Squared |
|------------------------|---|-----------|
| United States | EV/Sales = 2.32 + 2.60 g + 10.60 Oper Margin -1.40 DFR- 3.50 Tax rate | 30.6% |
| Europe | EV/Sales = 2.20 + 2.60 g + 5.10 Oper Margin + 3.90 DFR- 4.90 Tax rate | 15.9% |
| Japan | EV/Sales = 1.21 + 4.00 g + 9.30 Oper Margin -1.00 DFR- 2.90 Tax rate | 44.7% |
| Emerging Markets | EV/Sales = 3.22 + 1.60 g + 4.40 Oper Margin + 1.50 DFR- 2.80 Tax rate | 5.6% |
| Australia, NZ & Canada | EV/Sales = -0.35 + 12.03 g+ 5.34 Operating Margin + 13.95 DFR- 2.60 Tax rate | 36.3% |
| Global | EV/Sales = 2.68 + 2.50 g + 8.10 Oper Margin + 2.10 DFR- 5.10 Tax rate | 17.8% |

g = Expected Revenue Growth: Expected growth in revenues: Near term (2 or 5 years)

Tax Rate: Effective tax rate in most recent year; Operating Margin: Operating Income/ Sales

VI. EV/Invested Capital

103

| Region | Regression – January 2023 | R Squared |
|------------------------|--|--------------|
| United States | $EV/IC = 3.53 + 1.30 g + 7.30 ROIC - 4.20 DFR$ | 56.7% |
| Europe | $EV/IC = 3.10 + 1.90 g + 6.00 ROIC - 3.20 DFR$ | 55.9% |
| Japan | $EV/IC = 2.14 + 3.30 g + 7.80 ROIC - 2.80 DFR$ | 53.6% |
| Emerging Markets | $EV/IC = 2.80 + 1.20 g + 4.00 ROIC - 2.90 DFR$ | 58.4% |
| Australia, NZ & Canada | $EV/IC = 3.11 - 2.90 DFR + 1.10 g + 2.50 ROIC$ | 44.5% |
| Global | $EV/IC = 3.01 + 1.40 g + 6.40 ROIC - 3.20 DFR$ | 56.1% |

g = Expected Revenue Growth: Expected growth in revenues: Near term (2 or 5 years)

DFR: Debt Ratio

ROIC = Return on Invested Capital

The Pricing Game: Choices

| Measure | Choices | Considerations/ Questions |
|----------------------|--|--|
| Value | Enterprise, Equity or Firm Value? | <ol style="list-style-type: none"> 1. Is this a financial service business? 2. Are there big differences in leverage? |
| Scalar | Revenues, Earnings, Cash Flows or Book Value? | <ol style="list-style-type: none"> 1. How are you measuring value? 2. Is the scaling number positive? 3. How (and how much) do accounting choices affect the scaling measure? |
| Timing & Normalizing | Current, Trailing, Forward or Really Forward? | <ol style="list-style-type: none"> 1. Where are you in the life cycle? 2. How much cyclicalities is there in the number? 3. Can you get forecasted values? |
| Comparable | What is your peer group? (Global or local? Similar size or all firms? ...) | <ol style="list-style-type: none"> 1. How much do companies share in common globally? 2. Does company size affect business economics? 3. How big a sample of firms do you need? 4. How do you plan to control for differences? |

Relative Valuation: Some closing propositions


105

- Proposition 1: In a relative valuation, all that you are concluding is that a stock is under or over valued, relative to your comparable group.
 - Your relative valuation judgment can be right and your stock can be hopelessly over valued at the same time.
- Proposition 2: In asset valuation, there are no similar assets. Every asset is unique.
 - If you do not control for fundamental differences in risk, cash flows and growth across firms when comparing how they are priced, your valuation conclusions will reflect your flawed judgments rather than market misvaluations.
- Bottom line: Relative valuation is pricing, not valuation.

Reviewing: The Four Steps to Understanding Multiples

106

- Define the multiple
 - ▣ Check for consistency
 - ▣ Make sure that they are estimated uniformly
- Describe the multiple
 - ▣ Multiples have skewed distributions: The averages are seldom good indicators of typical multiples
 - ▣ Check for bias, if the multiple cannot be estimated
- Analyze the multiple
 - ▣ Identify the companion variable that drives the multiple
 - ▣ Examine the nature of the relationship
- Apply the multiple



A DETOUR: ASSET BASED VALUATION

Value assets, not cash flows?

What is asset-based valuation?

108

- In intrinsic valuation, you value a business based upon the cash flows you expect that business to generate over time.
- In relative valuation, you value a business based upon how similar businesses are priced.
- In asset-based valuation, you value a business by valuing its individual assets. These individual assets can be tangible or intangible.

Why would you do asset-based valuation?

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- Liquidation: If you are liquidating a business by selling its assets piece meal, rather than as a composite business, you would like to estimate what you will get from each asset or asset class individually.
- Accounting mission: As both US and international accounting standards have turned to “fair value” accounting, accountants have been called upon to redo balance sheet to reflect the assets at their fair rather than book value.
- Sum of the parts: If a business is made up of individual divisions or assets, you may want to value these parts individually for one of two groups:
 - Potential acquirers may want to do this, as a precursor to restructuring the business.
 - Investors may be interested because a business that is selling for less than the sum of its parts may be “cheap”.

How do you do asset-based valuation?

110

- Intrinsic value: Estimate the expected cash flows on each asset or asset class, discount back at a risk adjusted discount rate and arrive at an intrinsic value for each asset.
- Relative value: Look for similar assets that have sold in the recent past and estimate a value for each asset in the business.
- Accounting value: You could use the book value of the asset as a proxy for the estimated value of the asset.

When is asset-based valuation easiest to do?

111

- Separable assets: If a company is a collection of separable assets (a set of real estate holdings, a holding company of different independent businesses), asset-based valuation is easier to do. If the assets are interrelated or difficult to separate, asset-based valuation becomes problematic. Thus, while real estate or a long-term licensing/franchising contract may be easily valued, brand name (which cuts across assets) is more difficult to value separately.
- Stand alone earnings/ cash flows: An asset is much simpler to value if you can trace its earnings/cash flows to it. It is much more difficult to value when the business generates earnings, but the role of individual assets in generating these earnings cannot be isolated.
- Active market for similar assets: If you plan to do a relative valuation, it is easier if you can find an active market for “similar” assets which you can draw on for transactions prices.

I. Liquidation Valuation

112

- In liquidation valuation, you are trying to assess how much you would get from selling the assets of the business today, rather than the business as a going concern.
- Consequently, it makes more sense to price those assets (i.e., do relative valuation) than it is to value them (do intrinsic valuation).
 - For assets that are separable and traded (example: real estate), pricing is easy to do.
 - For assets that are not, you often see book value used either as a proxy for liquidation value or as a basis for estimating liquidation value.
- To the extent that the liquidation is urgent, you may attach a discount to the estimated value.

II. Accounting Valuation: Glimmers from FAS 157

113

- The ubiquitous “market participant”: Through FAS 157, accountants are asked to attach values to assets/liabilities that market participants would have been willing to pay/ receive.
- Tilt towards relative value: “The definition focuses on the price that would be received to sell the asset or paid to transfer the liability (an exit price), not the price that would be paid to acquire the asset or received to assume the liability (an entry price).” The hierarchy puts “market prices”, if available for an asset, at the top with intrinsic value being accepted only if market prices are not accessible.
- Split mission: While accounting fair value is tilted towards relative valuation, accountants are also required to back their relative valuations with intrinsic valuations. Often, this leads to reverse engineering, where accountants arrive at values first and develop valuations later.

III. Sum of the parts valuation

114

- You can value a company in pieces, using either relative or intrinsic valuation. Which one you use will depend on who you are and your motives for doing the sum of the parts valuation.
- If you are long term, passive investor in the company, your intent may be to find market mistakes that you hope will get corrected over time. If that is the case, you should do an intrinsic valuation of the individual assets.
- If you are an activist investor that plans to acquire the company or push for change, you should be more focused on relative valuation, since your intent is to get the company to split up and gain the increase in value.

Let's try this:

United Technologies: Raw Data - 2009

115

| <i>Division</i> | <i>Business</i> | <i>Revenues</i> | <i>EBITDA</i> | <i>Pre-tax Operating Income</i> | <i>Capital Expenditures</i> | <i>Depreciation</i> | <i>Total Assets</i> |
|---------------------|-----------------------|-----------------|---------------|---|---------------------------------|---------------------|-------------------------|
| Carrier | Refrigeration systems | \$14,944 | \$1,510 | \$1,316 | \$191 | \$194 | \$10,810 |
| Pratt & Whitney | Defense | \$12,965 | \$2,490 | \$2,122 | \$412 | \$368 | \$9,650 |
| Otis | Construction | \$12,949 | \$2,680 | \$2,477 | \$150 | \$203 | \$7,731 |
| UTC Fire & Security | Security | \$6,462 | \$780 | \$542 | \$95 | \$238 | \$10,022 |
| Hamilton Sundstrand | Manufacturing | \$6,207 | \$1,277 | \$1,099 | \$141 | \$178 | \$8,648 |
| Sikorsky | Aircraft | \$5,368 | \$540 | \$478 | \$165 | \$62 | \$3,985 |

The company also had corporate expenses, unallocated to the divisions of \$408 million in the most recent year.

United Technologies: Relative Valuation Median Multiples

116

| <i>Division</i> | <i>Business</i> | <i>EBITDA</i> | <i>EV/EBITDA for sector</i> | <i>Value of Business</i> |
|---------------------------------------|-----------------------|---------------|-----------------------------|--------------------------|
| Carrier | Refrigeration systems | \$1,510 | 5.25 | \$7,928 |
| Pratt & Whitney | Defense | \$2,490 | 8.00 | \$19,920 |
| Otis | Construction | \$2,680 | 6.00 | \$16,080 |
| UTC Fire & Security | Security | \$780 | 7.50 | \$5,850 |
| Hamilton Sundstrand | Industrial Products | \$1,277 | 5.50 | \$7,024 |
| Sikorsky | Aircraft | \$540 | 9.00 | \$4,860 |
| Sum of the parts value for business = | | | | \$61,661 |

United Technologies: Relative Valuation Plus Scaling variable & Choice of Multiples

117

| Division | Business | Revenues | EBITDA | Operating Income | Capital Invested |
|---------------------|-----------------------|----------|---------|------------------|------------------|
| Carrier | Refrigeration systems | \$14,944 | \$1,510 | \$1,316 | \$6,014 |
| Pratt & Whitney | Defense | \$12,965 | \$2,490 | \$2,122 | \$5,369 |
| Otis | Construction | \$12,949 | \$2,680 | \$2,477 | \$4,301 |
| UTC Fire & Security | Security | \$6,462 | \$780 | \$542 | \$5,575 |
| Hamilton Sundstrand | Industrial Products | \$6,207 | \$1,277 | \$1,099 | \$4,811 |
| Sikorsky | Aircraft | \$5,368 | \$540 | \$478 | \$2,217 |
| Total | | \$58,895 | \$9,277 | \$8,034 | \$28,287 |

| Business | Best Multiple | Regression | R ² |
|-----------------------|---------------|--|----------------|
| Refrigeration systems | EV/EBITDA | $EV/EBITDA = 5.35 - 3.55 \text{ Tax Rate} + 14.17 \text{ ROC}$ | 42% |
| Defense | EV/Revenues | $EV/Revenues = 0.85 + 7.32 \text{ Pre-tax Operating Margin}$ | 47% |
| Construction | EV/EBITDA | $EV/EBITDA = 3.17 - 2.87 \text{ Tax Rate} + 14.66 \text{ ROC}$ | 36% |
| Security | EV/Capital | $EV/ \text{Capital} = 0.55 + 8.22 \text{ ROC}$ | 55% |
| Industrial Products | EV/Revenues | $EV/Revenues = 0.51 + 6.13 \text{ Pre-tax Operating Margin}$ | 48% |
| Aircraft | EV/Capital | $EV/ \text{Capital} = 0.65 + 6.98 \text{ ROC}$ | 40% |

United Technologies: Relative Valuation

Sum of the Parts value

118

| Division | Scaling Variable | Current value for scaling variable | ROC | Operating Margin | Tax Rate | Predicted Multiple | Estimated Value |
|---|------------------|------------------------------------|--------|------------------|----------|--|-----------------|
| Carrier | EBITDA | \$1,510 | 13.57% | 8.81% | 38% | $5.35 - 3.55 (.38) + 14.17 (.1357) = 5.92$ | \$8,944.47 |
| Pratt & Whitney | Revenues | \$12,965 | 24.51% | 16.37% | 38% | $0.85 + 7.32 (.1637) = 2.05$ | \$26,553.29 |
| Otis | EBITDA | \$2,680 | 35.71% | 19.13% | 38% | $3.17 - 2.87 (.38) + 14.66 (.3571) = 7.31$ | \$19,601.70 |
| UTC Fire & Security | Capital | \$5,575 | 6.03% | 8.39% | 38% | $0.55 + 8.22 (.0603) = 1.05$ | \$5,828.76 |
| Hamilton Sundstrand | Revenues | \$6,207 | 14.16% | 17.71% | 38% | $0.51 + 6.13 (.1771) = 1.59$ | \$9,902.44 |
| Sikorsky | Capital | \$2,217 | 13.37% | 8.90% | 38% | $0.65 + 6.98 (.1337) = 1.58$ | \$3,509.61 |
| Sum of the parts value for operating assets = | | | | | | | \$74,230.37 |

United Technologies: DCF parts valuation

Cost of capital, by business

119

| Division | Unlevered Beta | Debt/Equity Ratio | Levered beta | Cost of equity | After-tax cost of debt | Debt to Capital | Cost of capital |
|---------------------|----------------|-------------------|--------------|----------------|------------------------|-----------------|-----------------|
| Carrier | 0.83 | 30.44% | 0.97 | 9.32% | 2.95% | 23.33% | 7.84% |
| Pratt & Whitney | 0.81 | 30.44% | 0.95 | 9.17% | 2.95% | 23.33% | 7.72% |
| Otis | 1.19 | 30.44% | 1.39 | 12.07% | 2.95% | 23.33% | 9.94% |
| UTC Fire & Security | 0.65 | 30.44% | 0.76 | 7.95% | 2.95% | 23.33% | 6.78% |
| Hamilton Sundstrand | 1.04 | 30.44% | 1.22 | 10.93% | 2.95% | 23.33% | 9.06% |
| Sikorsky | 1.17 | 30.44% | 1.37 | 11.92% | 2.95% | 23.33% | 9.82% |

United Technologies: DCF valuation

Fundamentals, by business

120

| <i>Division</i> | <i>Total Assets</i> | <i>Capital Invested</i> | <i>Cap Ex</i> | <i>Allocated Reinvestment</i> | <i>Operating income after taxes</i> | <i>Return on capital</i> | <i>Reinvestment Rate</i> |
|---------------------|---------------------|-------------------------|---------------|-------------------------------|-------------------------------------|--------------------------|--------------------------|
| Carrier | \$10,810 | \$6,014 | \$191 | \$353 | \$816 | 13.57% | 43.28% |
| Pratt & Whitney | \$9,650 | \$5,369 | \$412 | \$762 | \$1,316 | 24.51% | 57.90% |
| Otis | \$7,731 | \$4,301 | \$150 | \$277 | \$1,536 | 35.71% | 18.06% |
| UTC Fire & Security | \$10,022 | \$5,575 | \$95 | \$176 | \$336 | 6.03% | 52.27% |
| Hamilton Sundstrand | \$8,648 | \$4,811 | \$141 | \$261 | \$681 | 14.16% | 38.26% |
| Sikorsky | \$3,985 | \$2,217 | \$165 | \$305 | \$296 | 13.37% | 102.95% |

United Technologies, DCF valuation Growth Choices

121

| <i>Division</i> | <i>Cost of capital</i> | <i>Return on capital</i> | <i>Reinvestment Rate</i> | <i>Expected growth</i> | <i>Length of growth period</i> | <i>Stable growth rate</i> | <i>Stable ROC</i> |
|---------------------|------------------------|--------------------------|--------------------------|------------------------|--------------------------------|---------------------------|-------------------|
| Carrier | 7.84% | 13.57% | 43.28% | 5.87% | 5 | 3% | 7.84% |
| Pratt & Whitney | 7.72% | 24.51% | 57.90% | 14.19% | 5 | 3% | 12.00% |
| Otis | 9.94% | 35.71% | 18.06% | 6.45% | 5 | 3% | 14.00% |
| UTC Fire & Security | 6.78% | 6.03% | 52.27% | 3.15% | 0 | 3% | 6.78% |
| Hamilton Sundstrand | 9.06% | 14.16% | 38.26% | 5.42% | 5 | 3% | 9.06% |
| Sikorsky | 9.82% | 13.37% | 102.95% | 13.76% | 5 | 3% | 9.82% |

United Technologies, DCF valuation

Values of the parts

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| <i>Business</i> | <i>Cost of capital</i> | <i>PV of FCF</i> | <i>PV of Terminal Value</i> | <i>Value of Operating Assets</i> |
|---------------------|------------------------|------------------|-----------------------------|----------------------------------|
| Carrier | 7.84% | \$2,190 | \$9,498 | \$11,688 |
| Pratt & Whitney | 7.72% | \$3,310 | \$27,989 | \$31,299 |
| Otis | 9.94% | \$5,717 | \$14,798 | \$20,515 |
| UTC Fire & Security | 6.78% | \$0 | \$4,953 | \$4,953 |
| Hamilton Sundstrand | 9.06% | \$1,902 | \$6,343 | \$8,245 |
| Sikorsky | 9.82% | -\$49 | \$3,598 | \$3,550 |
| <i>Sum</i> | | | | \$80,250 |

United Technologies, DCF valuation

Sum of the Parts

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Value of the parts = \$80,250

Value of corporate expenses

$$= \frac{\text{Corporate Expenses}_{\text{Current}} (1-t)(1+g)}{(\text{Cost of capital}_{\text{Company}} - g)} = \frac{408(1-.38)(1.03)}{(.0868 - .03)} = \$ 4,587$$

Value of operating assets (sum of parts DCF) = \$75,663

Value of operating assets (sum of parts RV) = \$74,230

Value of operating assets (company DCF) = \$71,410

Enterprise value (based on market prices) = \$52,261

GE in 2018: The Parts

124

| <i>Business</i> | <i>Revenues- 2017</i> | <i>Revenue Growth in 2017</i> | <i>EBIT before G&A</i> | <i>EBIT after G&A</i> | <i>EBIT Margin</i> | <i>Invested Capital</i> | <i>ROIC in 2017</i> | <i>ROIC: 2013-2017</i> | <i>Cost of capital</i> |
|------------------|-----------------------|-------------------------------|----------------------------|---------------------------|--------------------|-------------------------|---------------------|------------------------|------------------------|
| Power | \$ 36.00 | -1.64% | \$ 2.80 | \$ 1.69 | 4.68% | \$328.34 | 3.85% | 9.28% | 4.91% |
| Renewable Energy | \$ 10.30 | 14.44% | \$ 0.70 | \$ 0.41 | 4.00% | \$49.91 | 6.19% | 8.00% | 6.88% |
| Oil & Gas | \$ 17.20 | 33.33% | \$ 0.20 | \$ (0.31) | -1.78% | \$275.95 | -0.83% | 3.71% | 8.82% |
| Aviation | \$ 27.40 | 4.18% | \$ 6.60 | \$ 5.80 | 21.19% | \$192.73 | 22.59% | 20.27% | 8.52% |
| Healthcare | \$ 19.10 | 4.37% | \$ 3.40 | \$ 2.86 | 15.00% | \$132.81 | 16.18% | 15.07% | 7.97% |
| Transportation | \$ 4.20 | -10.64% | \$ 0.80 | \$ 0.70 | 16.56% | \$20.73 | 25.17% | 26.67% | 7.49% |
| Lighting | \$ 2.00 | -58.33% | \$ 0.10 | \$ 0.03 | 1.59% | \$3.34 | 7.16% | 9.66% | 8.50% |
| Capital | \$ 9.10 | -16.51% | \$ (6.80) | \$ (7.04) | -77.40% | \$723.38 | -7.30% | -2.81% | 3.64% |
| Total | \$ 125.30 | 1.29% | \$ 7.80 | \$ 4.15 | 3.31% | \$1,727.18 | 1.80% | 4.50% | 6.23% |

GE: Value of the Parts

125

| Business | Revenues in 2017 | Average EBIT Margin before G&A, 2013-17 | Normalized EBIT before G&A | Normalized EBIT (with corporate expenses allocated) | Normalized EBIT (1-t) | Cost of Capital | ROIC - Next 5 years | Expected growth next 5 years | Value of Business | |
|---------------------|------------------|---|----------------------------|---|-----------------------|-----------------|---------------------|------------------------------|---------------------------------|--------------|
| Power | \$ 35,990.00 | 14.34% | \$ 5,161.92 | \$ 4,061.80 | \$ 3,046.35 | 4.91% | 9.28% | 6.10% | \$ 73,138.18 | |
| Renewable Energy | \$ 10,280.00 | 8.24% | \$ 847.46 | \$ 532.70 | \$ 399.53 | 6.88% | 8.00% | 16.34% | \$ 6,455.88 | |
| Oil & Gas | \$ 17,231.00 | 10.97% | \$ 1,890.80 | \$ 1,365.19 | \$ 1,023.89 | 8.82% | 3.71% | -0.13% | \$ 11,924.66 | |
| Aviation | \$ 27,375.00 | 22.09% | \$ 6,046.58 | \$ 5,209.28 | \$ 3,906.96 | 8.52% | 20.27% | 4.55% | \$ 52,849.35 | |
| Healthcare | \$ 19,116.00 | 17.01% | \$ 3,251.87 | \$ 2,668.20 | \$ 2,001.15 | 7.97% | 15.07% | 0.99% | \$ 26,233.80 | |
| Transportation | \$ 4,178.00 | 20.71% | \$ 865.41 | \$ 737.06 | \$ 552.80 | 7.49% | 26.67% | -6.62% | \$ 6,075.26 | |
| Lighting | \$ 1,987.00 | 5.24% | \$ 104.14 | \$ 43.03 | \$ 32.27 | 8.50% | 9.66% | -24.94% | \$ 280.49 | |
| Total (non-capital) | \$ 116,157.00 | 15.35% | \$ 17,829.69 | \$ 17,551.60 | \$ 13,163.70 | | | | \$ 176,957.62 | |
| GE Capital Business | \$ 9,070.00 | 3.00% | \$ 272.10 | \$ (5.98) | \$ (4.49) | 6.23% | 0.00% | -4.25% | \$ 27,080.96 | |
| Value of businesses | | | | | | | | | \$ 204,038.59 | |
| | | | | | | | | | - GE Debt | \$ 83,568.00 |
| | | | | | | | | | - GE Capital Debt | \$ 51,023.00 |
| | | | | | | | | | - Minority Interests | \$ 17,723.00 |
| | | | | | | | | | + Cash | \$ 43,299.00 |
| | | | | | | | | | Value of equity | \$ 95,023.59 |
| | | | | | | | | | - Options | \$ 218.94 |
| | | | | | | | | | Value of equity in common stock | \$ 94,804.65 |
| | | | | | | | | | Value per share | \$ 10.92 |

GE: Pricing the Parts

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| <i>Business</i> | <i>Revenues in 2017</i> | <i>Normalized EBIT, using average margin (2013-17)</i> | <i>DA in 2017</i> | <i>EBITDA</i> | <i>Peer Group EV/EBITDA</i> | <i>Estimated Pricing</i> |
|---------------------|-------------------------|--|-------------------|---------------|-------------------------------------|--------------------------|
| Power | \$ 35,990.00 | \$ 4,061.80 | \$1,358.00 | \$5,419.80 | 10.55 | \$ 57,179 |
| Renewable Energy | \$ 10,280.00 | \$ 532.70 | \$ 259.00 | \$ 791.70 | 15.13 | \$ 11,978 |
| Oil & Gas | \$ 17,231.00 | \$ 1,365.19 | \$1,026.00 | \$2,391.19 | 12.15 | \$ 29,053 |
| Aviation | \$ 27,375.00 | \$ 5,209.28 | \$ 979.00 | \$6,188.28 | 6.56 | \$ 40,595 |
| Healthcare | \$ 19,116.00 | \$ 2,668.20 | \$ 806.00 | \$3,474.20 | 10.97 | \$ 38,112 |
| Transportation | \$ 4,178.00 | \$ 737.06 | \$ 135.00 | \$ 872.06 | 11.22 | \$ 9,785 |
| Lighting | \$ 1,987.00 | \$ 43.03 | \$ 86.00 | \$ 129.03 | 12.8 | \$ 1,652 |
| Total (non-capital) | \$ 116,157.00 | \$ 17,551.60 | | | | \$ 188,353 |
| GE Capital Business | \$ 9,070.00 | \$ (5.98) | \$2,343.00 | \$2,337.02 | 10.13 | \$ 23,674 |
| | | | | | Pricing of Business | \$ 212,027.44 |
| | | | | | - GE Debt | \$ 83,568.00 |
| | | | | | - GE Capital Debt | \$ 51,023.00 |
| | | | | | - Minority Interests | \$ 17,723.00 |
| | | | | | + Cash | \$ 43,299.00 |
| | | | | | Pricing of Equity | \$ 103,012.44 |
| | | | | | - Options | 218.94 |
| | | | | | Pricing of Equity in common stock | \$ 102,793.50 |
| | | | | | Estimating Pricing per share | \$11.84 |



PRIVATE COMPANY VALUATION

Aswath Damodaran

Process of Valuing Private Companies

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- The process of valuing private companies is not different from the process of valuing public companies. You estimate cash flows, attach a discount rate based upon the riskiness of the cash flows and compute a present value. As with public companies, you can either value
 - ▣ The entire business, by discounting cash flows to the firm at the cost of capital.
 - ▣ The equity in the business, by discounting cashflows to equity at the cost of equity.
- When valuing private companies, you face two standard problems:
 - ▣ There is not market value for either debt or equity
 - ▣ The financial statements for private firms are likely to go back fewer years, have less detail and have more holes in them.

1. No Market Value?

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- Market values as inputs: Since neither the debt nor equity of a private business is traded, any inputs that require them cannot be estimated.
 1. Debt ratios for going from unlevered to levered betas and for computing cost of capital.
 2. Market prices to compute the value of options and warrants granted to employees.
- Market value as output: When valuing publicly traded firms, the market value operates as a measure of reasonableness. In private company valuation, the value stands alone.
- Market price based risk measures, such as beta and bond ratings, will not be available for private businesses.

2. Cash Flow Estimation Issues

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- Shorter history: Private firms often have been around for much shorter time periods than most publicly traded firms. There is therefore less historical information available on them.
- Different Accounting Standards: The accounting statements for private firms are often based upon different accounting standards than public firms, which operate under much tighter constraints on what to report and when to report.
- Intermingling of personal and business expenses: In the case of private firms, some personal expenses may be reported as business expenses.
- Separating “Salaries” from “Dividends”: It is difficult to tell where salaries end and dividends begin in a private firm, since they both end up with the owner.

Private Company Valuation: Motive matters..

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- You can value a private company for
 - ▣ 'Show' valuations
 - Curiosity: How much is my business really worth?
 - Legal purposes: Estate tax and divorce court
 - ▣ Transaction valuations
 - Sale or prospective sale to another individual or private entity.
 - Sale of one partner's interest to another
 - Sale to a publicly traded firm
 - ▣ As prelude to setting the offering price in an initial public offering
- You can value a division or divisions of a publicly traded firm
 - ▣ As prelude to a spin off
 - ▣ For sale to another entity
 - ▣ To do a sum-of-the-parts valuation to determine whether a firm will be worth more broken up or if it is being efficiently run.

Private company valuations: Four broad scenarios

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1. Private to private transactions: You can value a private business for sale by one individual to another.
2. Private to public transactions: You can value a private firm for sale to a publicly traded firm.
3. Private to IPO: You can value a private firm for an initial public offering.
4. Private to VC to Public: You can value a private firm that is expected to raise venture capital along the way on its path to going public.

I. Private to Private transaction

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- In private-to-private transactions, a private business is sold by one individual to another. There are three key issues that we need to confront in such transactions:
 - Neither the buyer nor the seller is diversified. Consequently, risk and return models that focus on just the risk that cannot be diversified away will seriously under estimate the discount rates.
 - The investment is illiquid. Consequently, the buyer of the business will have to factor in an “illiquidity discount” to estimate the value of the business.
 - Key person value: There may be a significant personal component to the value. In other words, the revenues and operating profit of the business reflect not just the potential of the business but the presence of the current owner.