Valuation

August 2018

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Investment process

Type of Analysis	Economy	Asset Class =>	Philosophy / Process =>	Sector =>	Industry =>	Company Analysis =>			Trading =>	Performance Evaluation
						Business	Financial	Valuation		
Who Does It (Some Overlap)	Economist	Strategist	Strategist	PM / Strategist	PM / Strategist	Analyst / PM	Analyst / PM	Analyst / PM	Trader	Operations
Value Added (i.e., Importance)	Highest									High
Difficulty	Very Difficult									Less Difficult

- ## You may find a great business with great financial health, but be a poor stock because it is overvalued

Steps in valuation

- Four steps to determining value

  1. Understand key industry and business drivers

  2. Forecast financial statements

  3. Select and utilize one or more valuation approaches

     - Multiples or relative value

     - Absolute or intrinsic value

 4. Make conclusions

Valuation methods

- Types
  - Multiples and relative value (relative worth)
    - The value of an asset relative to other options
    - The value of an asset relative to its history
  - Absolute or Intrinsic value (underlying worth)
    - Discounted value of cash flows
   - Residual income
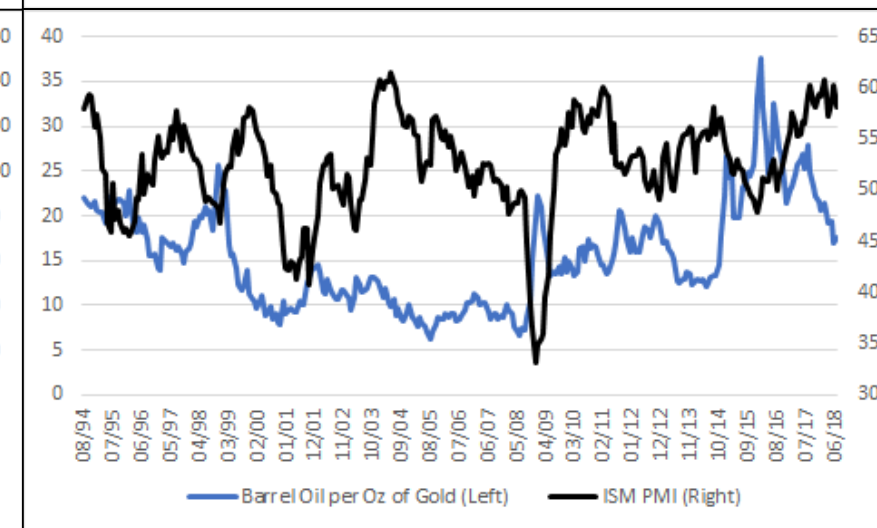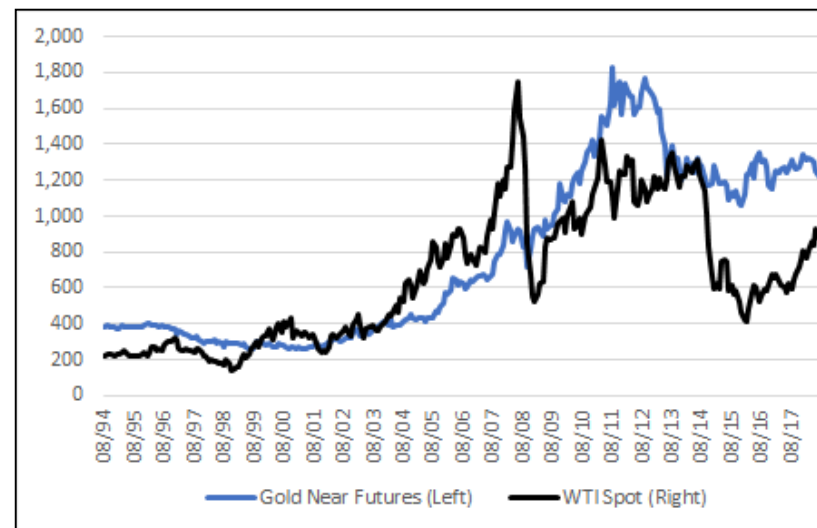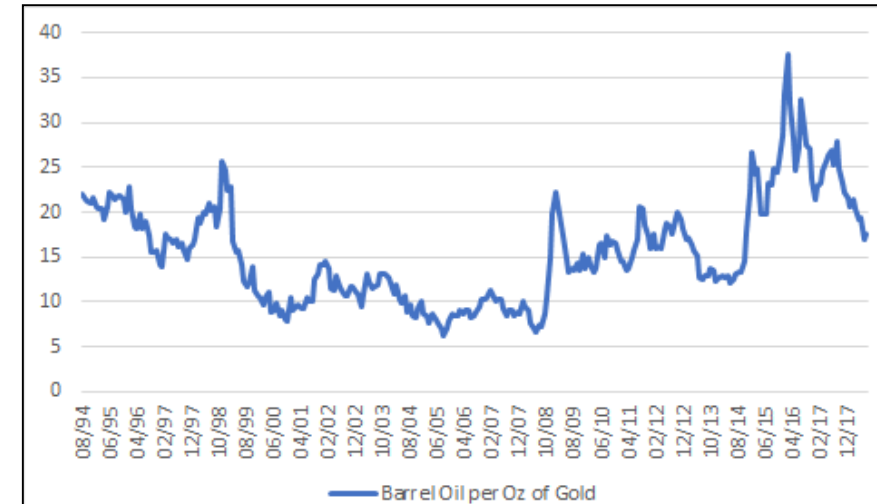
Source: Spellman, FactSet.

Valuation matters

- ## Return of a stock is a function of earnings growth, yield, and **changes in P/E**

  - P/E * E = Price, so percent change in price is (1+ percent change in P/E) * (1 + % change in E) - 1

- ## Valuation is inversely correlated with returns (low value = high returns)

  - Valuation measures expectations, and one should buy when expectations are low
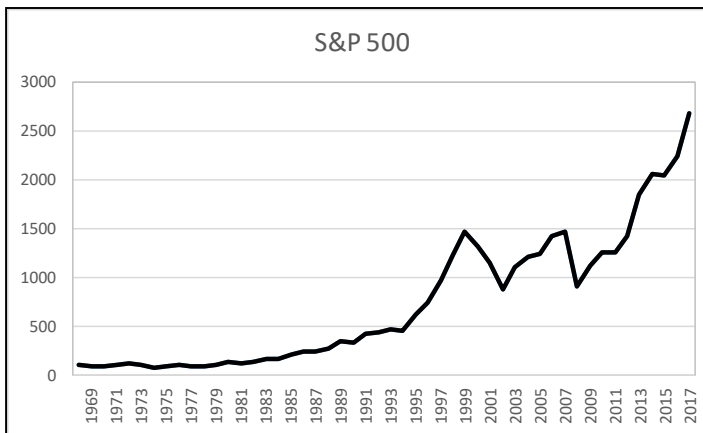
Spellman, FactSet.
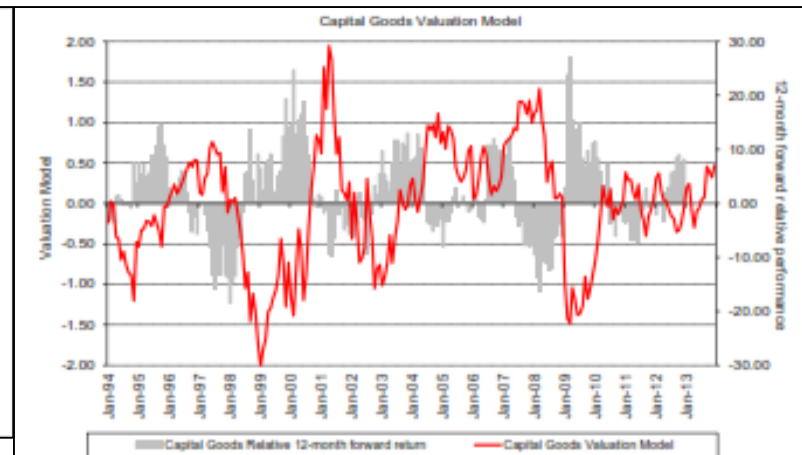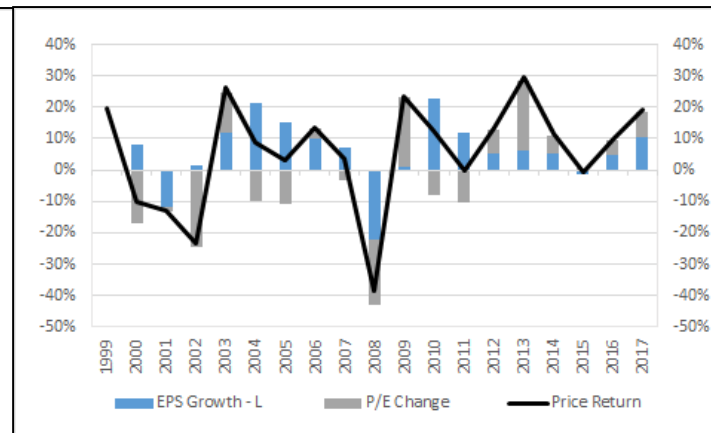
Source: Bloomberg, Haver Analytics, FactSet, and Citi Research - US Equity Strategy
Based on Price/EBITDA, Price/Book, Price/Sales, Enterprise Value, FY1 estimated
earnings, estimated Cash Flow/Share

Levkovich, Tobias, "Monday Morning Musings: A More
Cyclical SIGN in January," Citigroup, January 10, 2014.

Earnings growth is your friend unless…

- Do you believe firms with high earnings growth should do well?

Source: Spellman, FactSet.
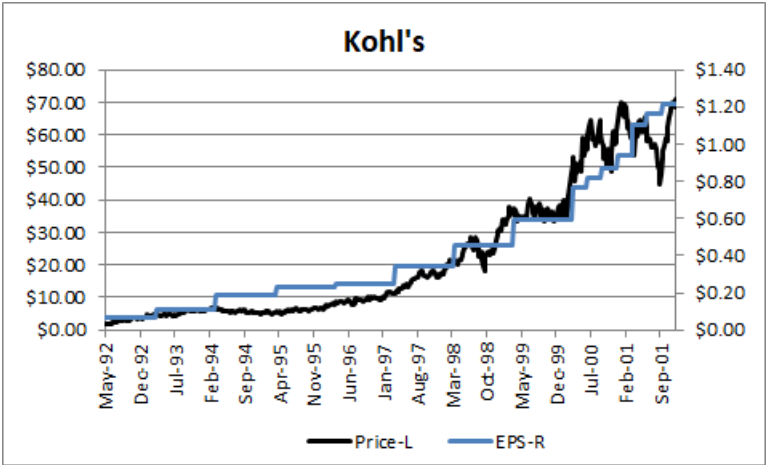
- You are right as long as you do not overpay!

Source: Spellman, FactSet.

Kohl's 2017 FactBook.pdf
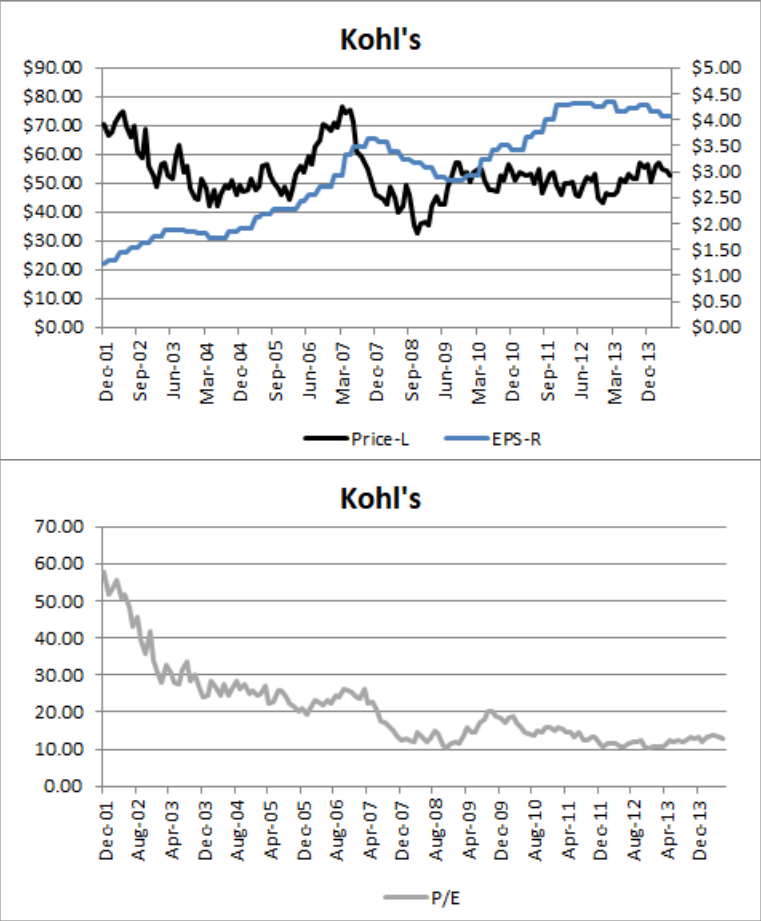
Good company is not necessarily a good security, but it could be

- ## Every security is a "buy" at the right price
  - ### What is that right price?
    - #### A price sufficiently below its intrinsic "value"
      - ##### How far below?
        - ✓ Depends on volatility
        - ✓ Depends on confidence in estimates
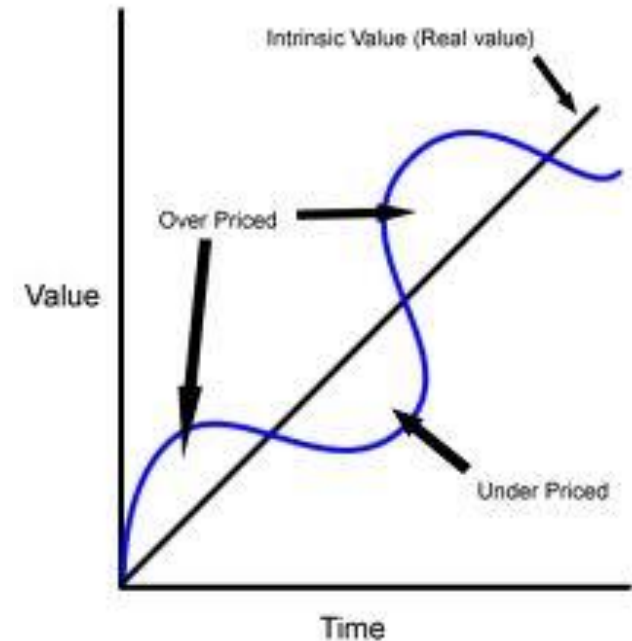
"Price is what you pay. Value is what you get."
- Warren Buffett

Q: When do you normally get a good deal?
A: When conditions are not good, but performance may revert

A goal of a firm is to create intrinsic value

- An asset's value = sum of all the *future expected* free cash flows when converted into today's dollars (they are *discounted*):

$$\text{Value}_0 = \frac{FCF_1}{(1 + k)^1} + \frac{FCF_2}{(1 + k)^2} + \ldots \frac{FCF_\infty}{(1 + k)^\infty}$$

  - A firm can create intrinsic value by
    - Producing cash flow (earlier cash flow is more valuable)
    - Growing cash flow
    - Reducing risk of cash flow

The Dividend Discount Model (DDM) is theoretically sound

- An intrinsic valuation method

- Ultimately, dividends are what investors receive for owning a stock
  - Stock should appreciate, holding risk, interest rates, and other factors constant, as the firm's dividends per share increase

- Dividends are received in the future, so we must discount these dividends to determine their value today
  - The dividend discount model shows how we do this

- DDM requires **three inputs**:
  - Estimate of the stock's **future cash flows**
    - Dividends (or free cash flow to equity)
    - Future price
  - Dividend **growth rate**, g
  - **Required return** on equity or cost of equity, k

DDM equations

- There are three main formulas

$$(1) \ \text{Value}_0 = \frac{D_1}{(1+k)^1} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \ldots + \frac{D_\infty}{(1+k)^\infty}$$

- If constant growth, this simplifies to the **Gordon Growth Model (Constant Growth) (Infinite Period) model**

$$(2) \ \text{Value}_0 = \frac{D_0(1+g)}{k - g} = \frac{D_1}{k - g}$$

- Normally growth not constant, so equation takes the form of the **supernormal growth model** where there are two or more stages ("multi-period model") with P_n, the terminal value, is determined in an extra step

$$(3) \ \text{Value}_0 = \frac{D_1}{(1+k)^1} + \ldots + \frac{D_n}{(1+k)^n} + \frac{P_n}{(1+k)^n}$$

Note: to the discounted cash flows, we should also add the value of non operating assets to determine value, but in practiced this is normally ignored.

The theoretical intrinsic value Gordon Growth Model (DDM) is poor!!!

- This is despite the fact that my first name is Gordon!
  - *Sorry!*

- Issues
  - Few firms (maybe only utilities) pay out as much in dividends as they can
  - Small changes in estimates lead to widely varying targets so you can easily justify any price by just tweaking a number
    - Plus, a growth rate greater than cost of equity leads to a negative value!
  - No companies grow at the same rate forever (this applies to the single stage or even two stage model)
  - **Result:** nobody uses the single stage Gordon Growth Model and even the multi-period model with a terminal Gordon Growth Model is flawed!

Use FCF instead of dividends!

- Problems
  - Companies may not pay dividends
  - Companies may not pay as much in dividends as they are capable of paying
  - Share buybacks are dividend-like but not counted as dividends
  - So DDM understates value!

- Solution: discount free cash flow to equity instead of dividends
  - FCFE measures a firm's dividend paying capability (i.e. money that is left over that can be paid to shareholders)
    - FCFE = Net income – new NWC – new net fixed assets + changes in debt
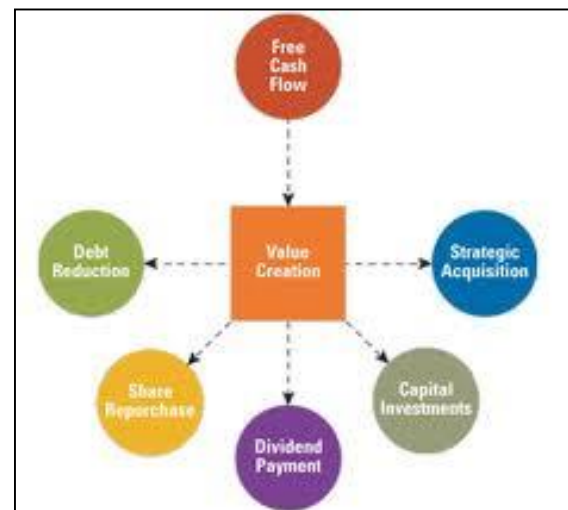
* The traditional definition of free cash flow is after capital investments; the definition to the right is for FCF to firm (FCFF)

http://myinvestingnotes.blogspot.com/2010/07/value-created-by-free-cash-flow.html.

Application to Kohl's (ticker KSS)

- ## KSS is utilized for the next series of examples
  - Assumptions:
    - Dividends – KSS pays a dividend, but perhaps better to discount FCFE
      - FCFE is the cash flow that the firm has left over to pay dividends, etc. so it is often a better cash flow to discount than dividends
    - Cost of equity:
      - Use 11.0% from the CAPM approach (the DDM approach is less reliable)
      - $k = r_f$ rate + beta * $(r_m - r_f$ rate)
        - » r_f rate = 3.10%
        - » beta = 1.15 (Be careful! Use industry averages and adjust based on company specifics as individual betas are often problematic!)
        - » r_m = 10.0%
    - Growth
      - Use 1.0% (low as brick and mortar retail environment has been tough)

Kohl's intrinsic value grows at rate of cash flow growth

- 2019 and 2020 expected FCFE are $5.47 and $4.89, expected long-term growth is 1.0%, and cost of equity capital is 11.0%. What is the value of the stock at the beginning of fiscal 2019? fiscal 2020?

$$\text{Value}_0 = \frac{\text{FCFE}_1}{k - g}$$

$$\text{Value}_{\text{BOFY 2019}} = \frac{\$5.47}{.110-.010} = \mathbf{\$54.74}$$

$$\text{Value}_{\text{BOFY 2020}} = \frac{\$4.89}{.110-.010} = \$48.89$$

Note: down 10.7% which is the rate of 2020 FCFE growth!

Intrinsic value with Gordon Growth Model highly variable based on assumptions!

- **Problem:** Small change in growth rate and k lead to wide variation in value

Value as Growth Rate Changes
k = 11.0%, $FCFE_1$ = 5.47

Value as Cost of Capital Changes
g = 1.0%, $FCFE_1$ = 5.47

Source: Spellman, FactSet.
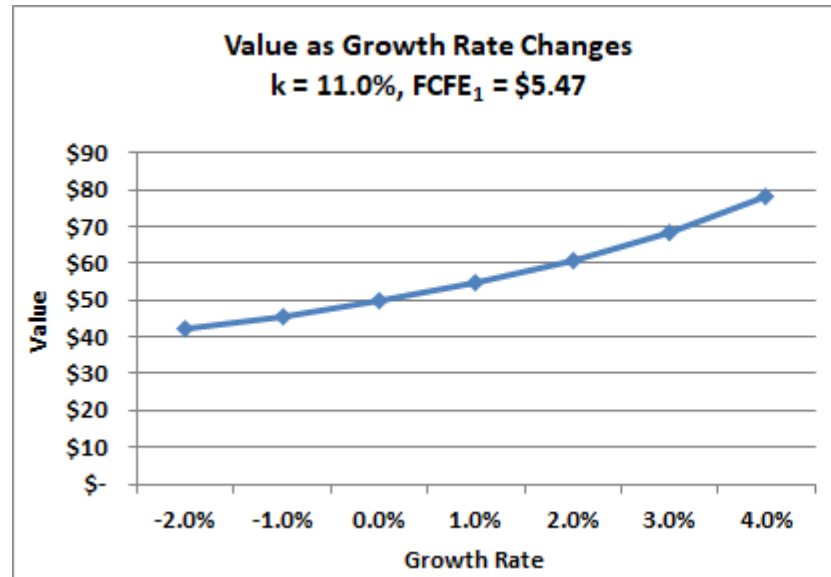
What happens when a high growth stock falters? Does the stock fall more or less than the decline associated with a mishap for a low growth stock? (e.g. think internet stocks in 2000)
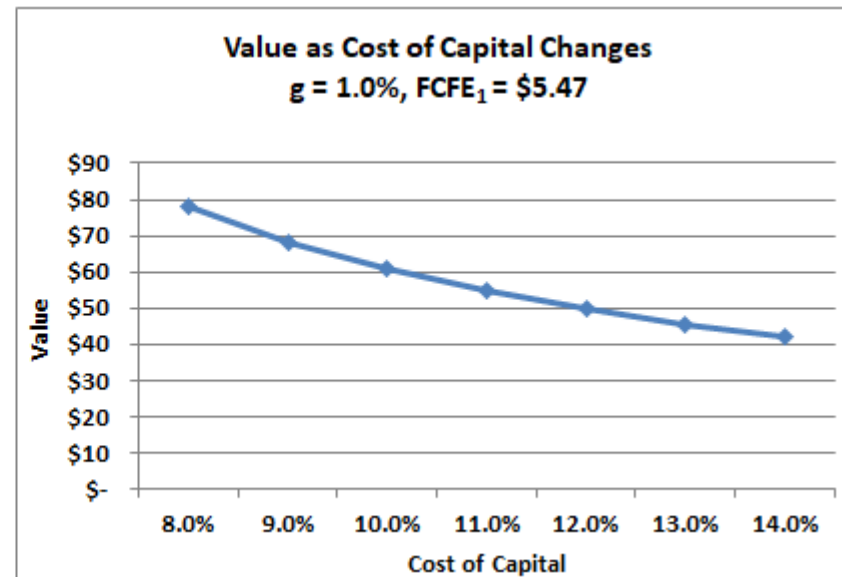
What happens when interest rates fall from a very high level (e.g. 1981 – 2000)? Stocks rise substantially!

KSS growth and k

Note: As the growth rate approaches the required return, the stock price increases dramatically because the denominator (k-g) of the equation approaches zero.

How many companies grow at a constant rate? Probably none!

- Very very few (none?) companies grow at a constant rate
- And very few (none?) grow at a high rate forever

Source: Spellman, FactSet.

Growth estimates are inflated!

High growth estimates are common, as the average consensus long-term rate is likely 10% in the US...does this make sense if the economy grows 5%?
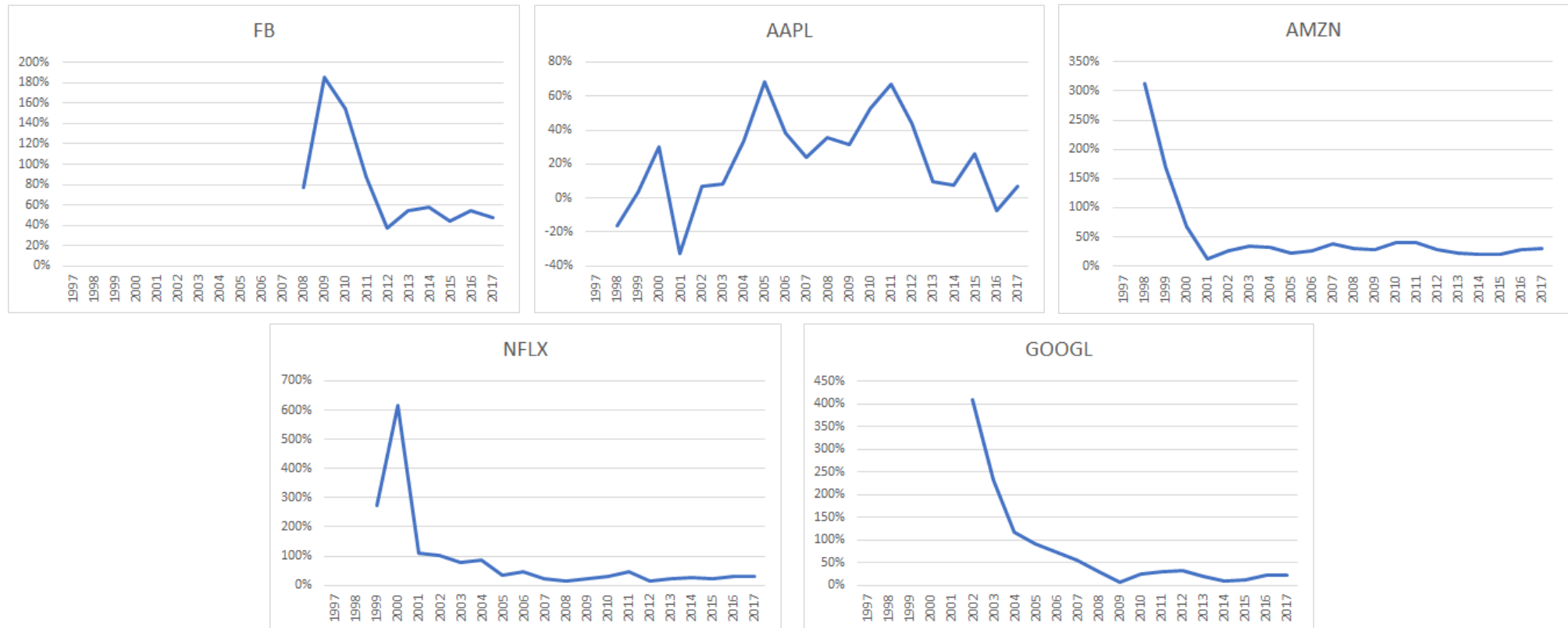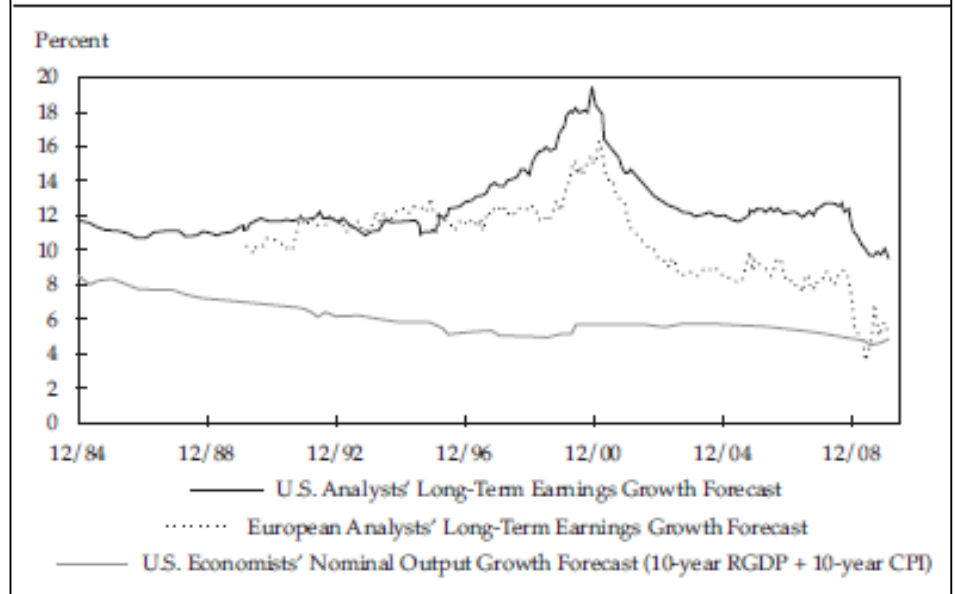
...and it is just as likely for a high growth firm and a low growth firm to have future growth between 5-10% and 10-15% ?

... and if the average growth rate is about 6% ?

Ilmanen, Antti ,"*Expected Returns on Major Asset Classes,*" Research Foundation of the CFA Institute, Wiley, 2012.

Exhibit 2.20. Analyst Forecasts of Long-Term Earnings Growth Are Overoptimistic (but Less Than in 2000)

— U.S. Analysts' Long-Term Earnings Growth Forecast
········ European Analysts' Long-Term Earnings Growth Forecast
— U.S. Economists' Nominal Output Growth Forecast (10-year RGDP + 10-year CPI)

Sources: Citigroup, Credit Suisse, *Blue Chip Economic Indicators.*

EXHIBIT 5.10 Revenue Growth Decay Analysis

Revenue growth in year 1 (percent)
- —·— >20
- — 15–20
- ········ 10–15
- – – 5–10
- — <5

Number of years following portfolio formation
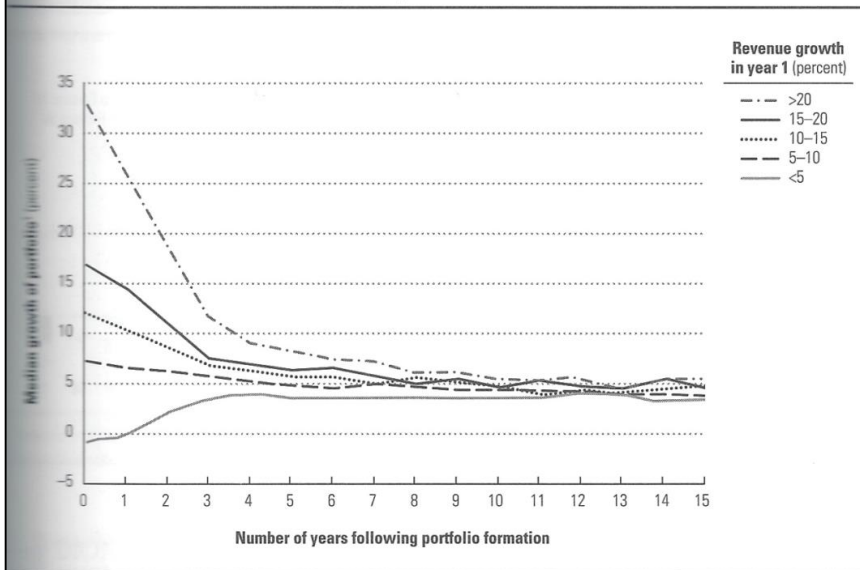
companies are grouped into one of five portfolios, based on revenue growth.
Compustat, McKinsey Corporate Performance Center analysis.

EXHIBIT 5.12 Revenue Growth Transition Probability

Probability that company's growth rate[1] will be in given group from 2004 to 2007, percent

1994–1997 growth rate[1]	<5	5–10	10–15	>15
<5	55	21	9	15
5–10	50	21	9	19
10–15	47	27	10	16
>15	44	20	11	25
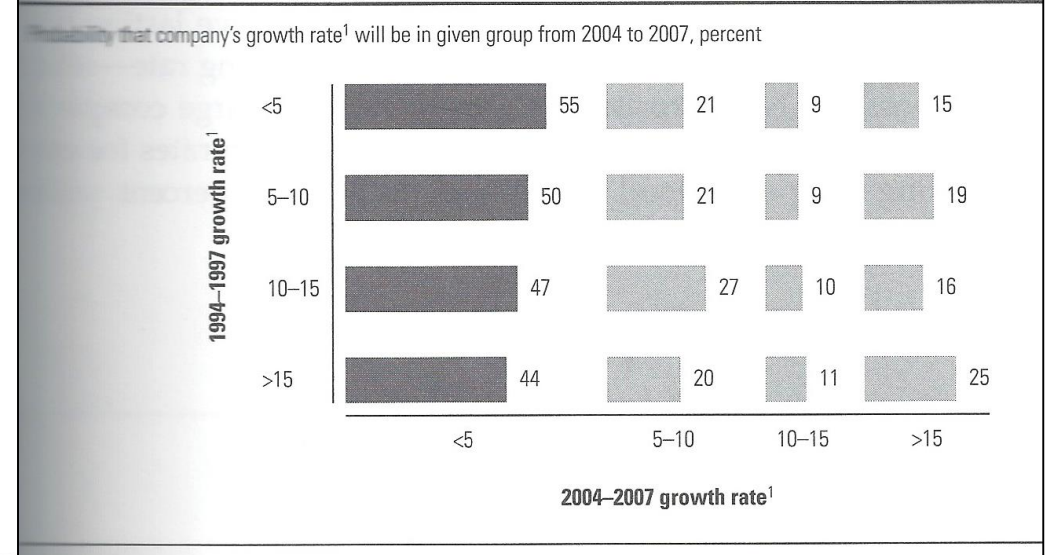
2004–2007 growth rate[1]

Compound annual growth rate.
Compustat, McKinsey Corporate Performance Center analysis.

High growth slows!

- ## "Good" firms may get worse and "bad" ones may get better?
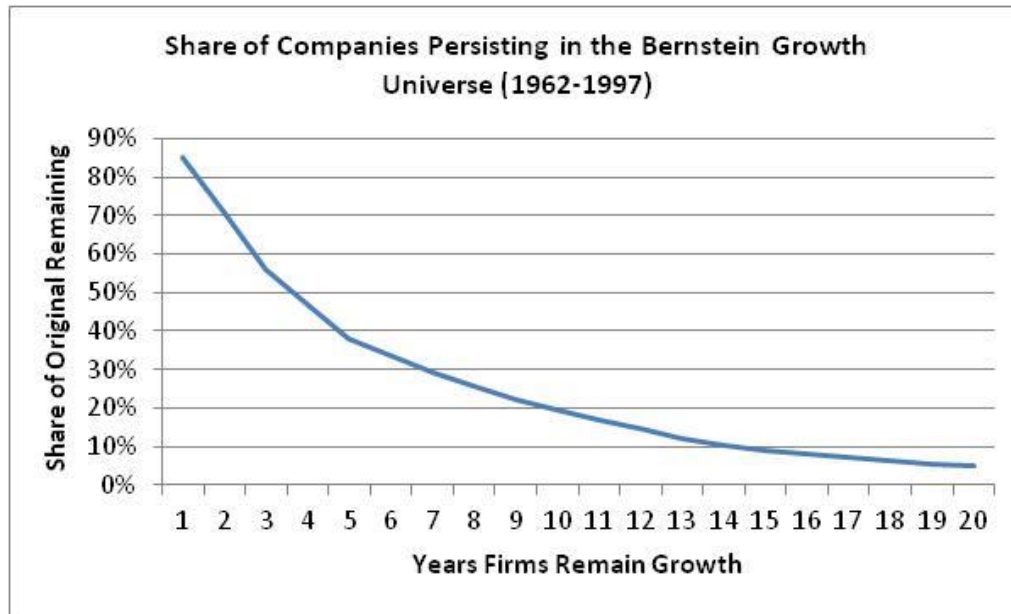
Source: Valuing Growth Stocks: The Theory and the Reality," Bernstein

Share of Companies Persisting in the Bernstein Growth Universe (1962-1997)

(chart: Share of Original Remaining (%) vs. Years Firms Remain Growth, 1–20; curve declining from ~85% at year 1 to ~5% at year 20)

Why?

Type	Today	Tomorrow
Good	High ROE	Competition lead to falling margins
	Good management	Management lured away
	High growth	Products mature, share growth with competition
Bad	Low ROE	Restructure, reorganize, new products
	Bad Management	Replaced
	Low growth	Cycle rebounds, new initiatives / strategy

- 1962-1997 – 2000 "growth" firms, average 370 out of 1500 in any one year
- High growth short-lived
  - Growth status maintained about four years
  - < 1/5 maintain status for decade
  - Only 12 growth for 35 years

Instead of Gordon Growth Model, use multiples!

- Determine price by forecasting earnings in year n and then multiply those earnings by a P/E ratio → E * P/E = P
  - What determines the P/E? = price per dollar earned (higher = more expensive)
    - The P/E ratio is derived from the Gordon Growth Model so it is theoretically sound

$$\text{Value}_0 = P_0 = \frac{D_0(1+g)}{k - g} \text{ , where } = D_0 = E_0 * \text{(payout ratio)}$$

$$P_0 = \frac{E_0 * \text{(payout ratio)}(1+g)}{k - g}$$

Higher dividends received today (early years) higher P/E

$$\frac{P_0}{E_0} = \frac{\text{(payout ratio)}(1+g)}{k - g}$$

Higher risk lower P/E

Higher growth higher P/E

Note: Payout ratio = dividends per share / earnings per share

The price per car or earnings depends on…

- ## The price people pay for <u>a car</u> is higher for
    - A <u>fast</u> car or a <u>slow</u> car (the <u>speed</u>)?
    - A <u>reliable</u> car (low <u>risk</u>) or an <u>unreliable</u> car (a lot of <u>risk</u>)?
    - Of course, the fast/reliable car!

- ## The price investors pay for <u>earnings</u> (P/E) is higher for
    - A firm with <u>high earnings growth</u> (<u>high speed</u>)
    - <u>Low earnings risk</u> (<u>high reliability</u>)

Great stocks have …

- Accelerating fundamentals (growth rate rising)
- Beating expectations (positive earnings surprise)
- Growth
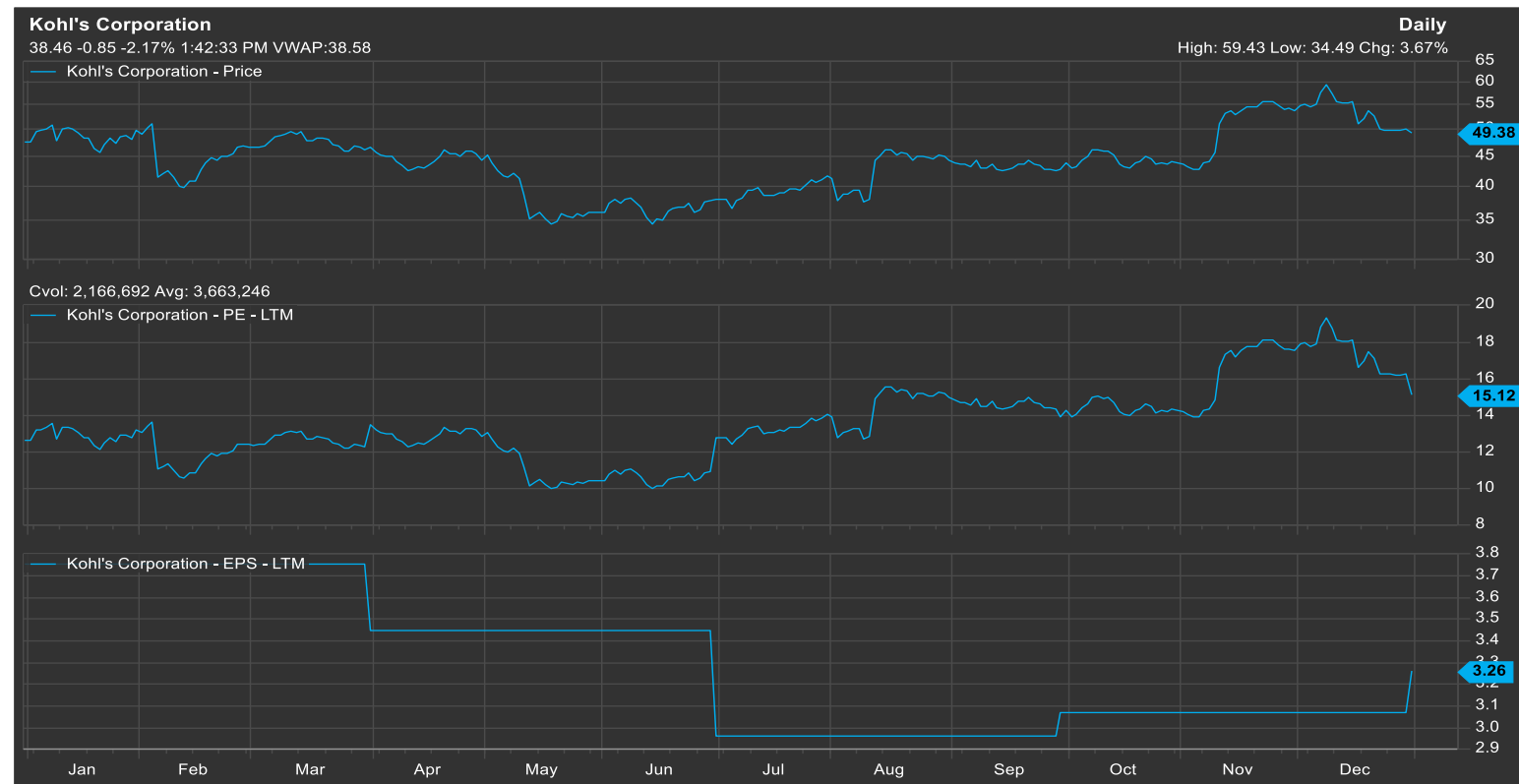- Low expectations
  - Expectations quantified by….

P/E !!!

Keep your expectations LOW …and you will never be disappointed

Change in P/E and EPS drive change in price

% Price change = (1 + % change in P/E) * (1 + % change in EPS) - 1

- Kohl's stock up 3.7% from $47.63 to $49.38
  - P/E rose from 12.68 to 15.12, or 19.2%
  - EPS down from $3.76 to $3.26, or 13.3%
  - (1+0.192) * (1 - 0.133) - 1 = 0.037, or up 3.7%
    - Difference due to rounding of P/E and EPS
  - **Why has P/E risen?**

Kohl's Corporation
38.46 -0.85 -2.17% 1:42:33 PM VWAP:38.58

Daily
High: 59.43 Low: 34.49 Chg: 3.67%

— Kohl's Corporation - Price

Cvol: 2,166,692 Avg: 3,663,246

— Kohl's Corporation - PE - LTM

— Kohl's Corporation - EPS - LTM

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Source: FactSet, 2016 data.

P/E, P/B, and P/S depend on …

- If cash flow is dividends

$$P_0 = PV = \frac{D_0(1+g)}{r - g} = \frac{D_1}{r - g}$$

A:

$$P_0 = \frac{E_0 * \text{payout ratio} * (1+g)}{r - g}$$

B: Divide A by E_0

$$\frac{P_0}{E_0} = \frac{\text{payout ratio} * (1+g)}{r - g}$$

C: Divide A by B_0

$$\frac{P_0}{B_0} = \frac{E_0/B_0 * \text{payout ratio} * (1+g)}{r - g} = \frac{ROE_0 * \text{payout ratio} * (1+g)}{r - g}$$

D: Divide A by S_0

$$\frac{P_0}{S_0} = \frac{E_0/S_0 * \text{payout ratio} * (1+g)}{r - g} = \frac{NPM_0 * \text{payout ratio} * (1+g)}{r - g}$$

Theory: What is in a multiple?

- Multiple (e.g. P/E) tells you how much you pay (P) per share per amount of something (e.g. earnings per share) received
  - You want to pay less and get more (e.g. lower P/E)
  - Ok to pay more if get more, i.e. what you get has less risk, more growth, and if you receive more of the something in earlier years

Higher dividends received today (early years) higher P/E

$$\frac{P_0}{E_0} = \frac{(\text{payout ratio})(1+g)}{k-g}$$

Higher risk lower P/E

Higher growth higher P/E

Higher ROE higher P/B

Higher dividends received today (early years) higher P/B

$$\frac{P_0}{B_0} = \frac{ROE_0(\text{payout ratio})(1+g)}{k-g}$$

Higher risk lower P/B

Higher growth higher P/B

Higher NPM higher P/S

Higher dividends received today (early years) higher P/S

$$\frac{P_0}{S_0} = \frac{NPM_0(\text{payout ratio})(1+g)}{k-g}$$

Higher risk lower P/S

Higher growth higher P/S

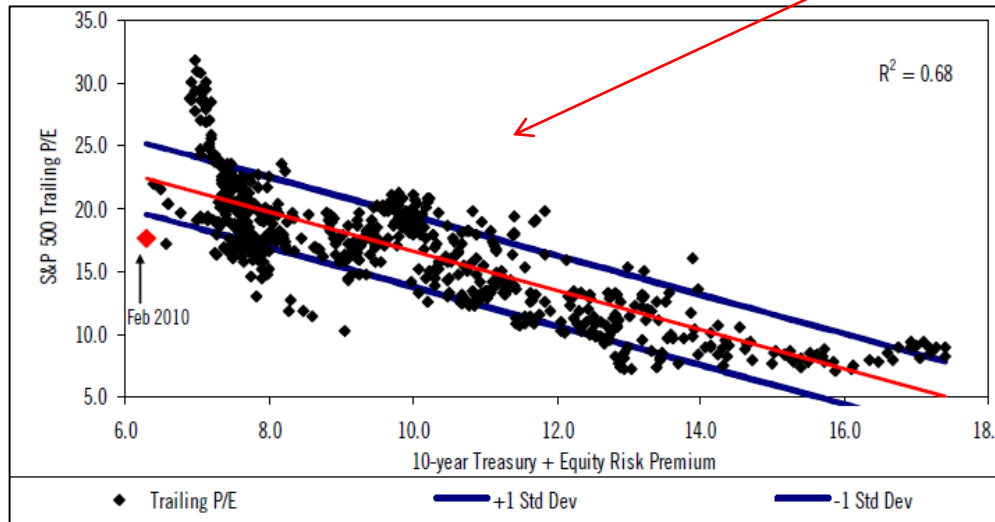# Empirical Evidence: Growth and k drive P/E

- ## Multiple (e.g. P/E) tells you…

Higher dividends received today (early years) higher P/E

$$\frac{P_0}{E_0} = \frac{(\text{payout ratio})(1+g)}{k - g}$$

Higher growth higher P/E

Higher risk lower P/E

Tobias Levkovich, Monday Morning Musings: The Correlation Quarterly, Citigroup, 26 March 2010
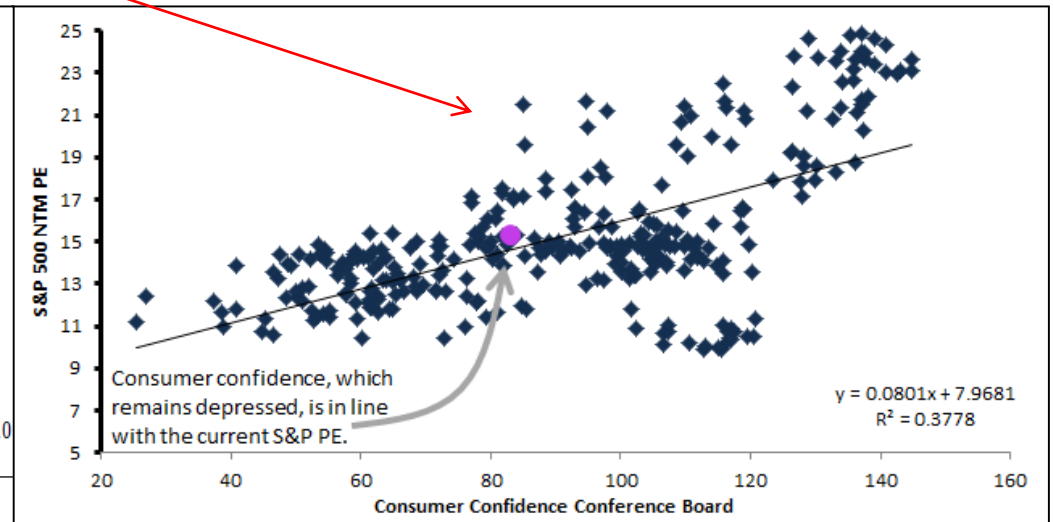
Dennis DeBusschere, daily email, ISI Group, 29 May 2014

Empirical Evidence: P/E with growth, P/B with ROE, P/S with net margin

P/E positively related to growth*
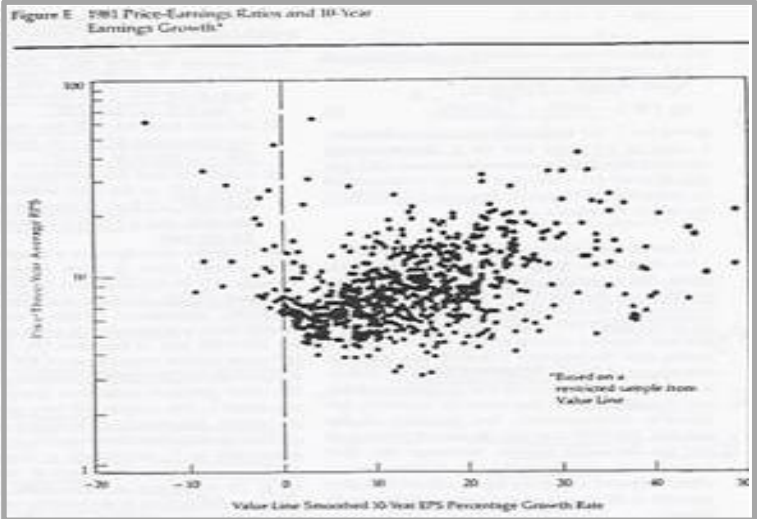
Why less correlation between P/E and growth than other relationships?

P/B positively related to ROE*
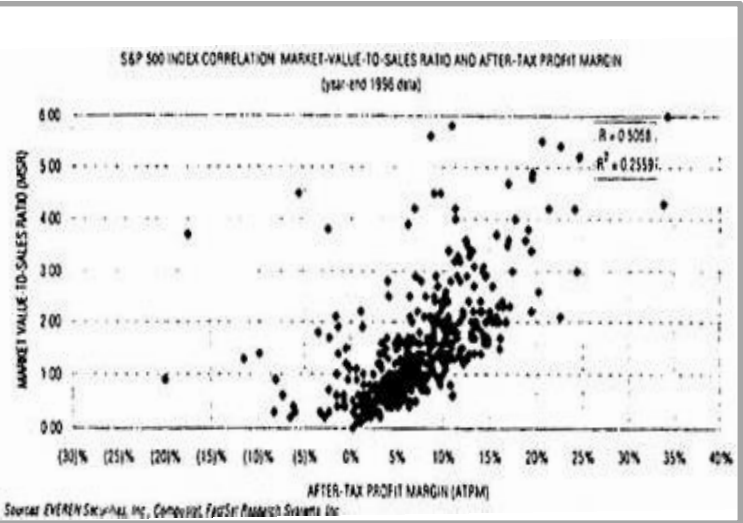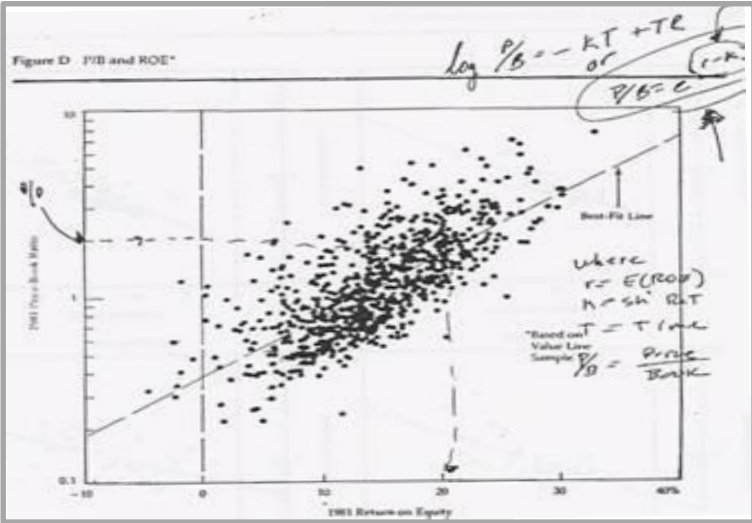
P/S positively related to NPM**

* The P/B-ROE Valuation Model, Wilcox
** EPS Growth Rate is Not a Good Predictor of P/E, Everen Securities

Empirical Evidence: P/E with growth, P/B with ROE, P/S with net margin

P/E positively related to growth?
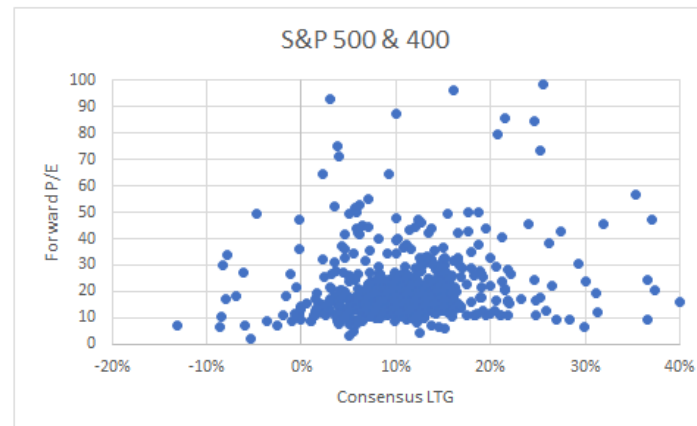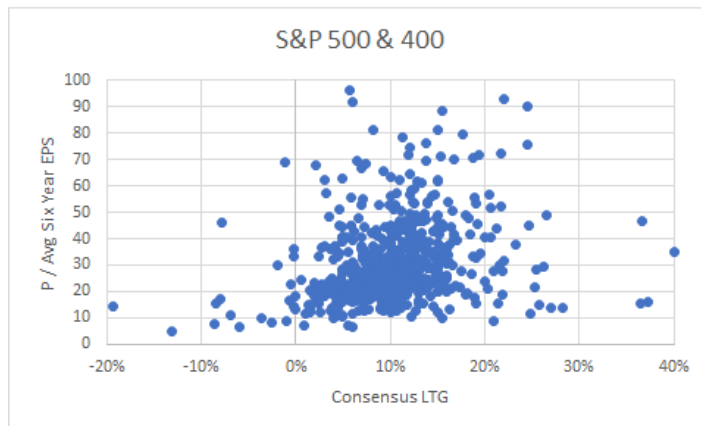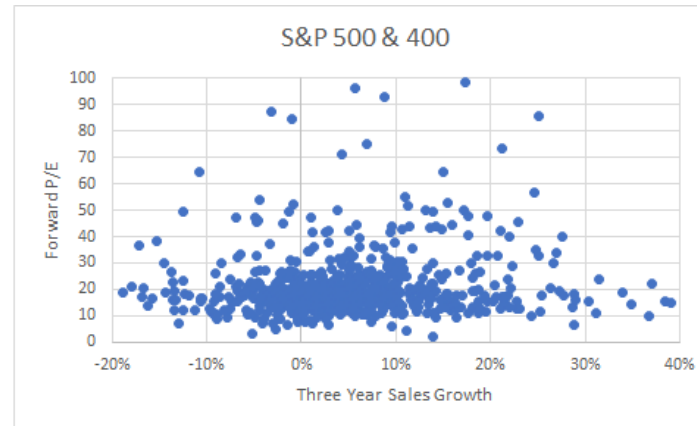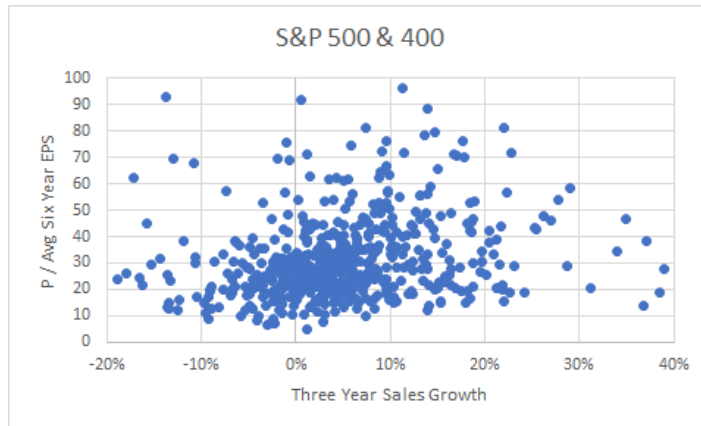
P/B positively related to ROE
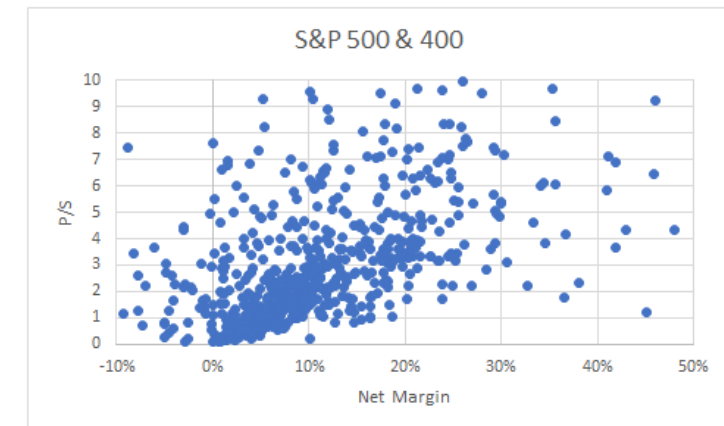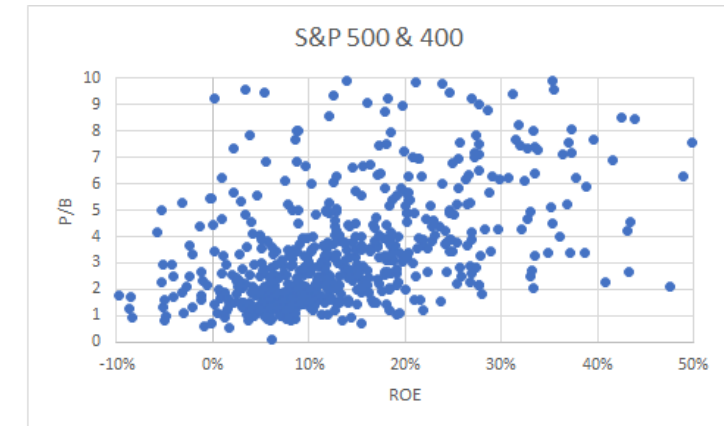
Source: Spellman, FactSet.

- ## Relationships, especially P/B to ROE and P/S to NM, work better within sectors than across market

P/S positively related to NPM

Source: Spellman, FactSet, 2/20/18, data for S&P 500 and S&P 400 companies that had complete data for long-term consensus growth rate, three-year trailing sales growth rate, normalized P/E (using six years of EPS), forward P/E, ROE, net profit margin, P/B, and P/S, 685 stocks.

P/E estimated by …

- What determines the P/E?
  - May want to consider **historical** stock P/Es
    - If the firm's prospects are better than the past record then it may command a higher P/E than in the past
   - For example, if the current P/E of Kroger is 15, but its 5-year average P/E is 20
        - » May be reasonable if Kroger is expected to have higher risk, a lower payout, and/or lower growth in the future than it has in the past
  - May want to consider **competitor's** P/E
    - Your firm is better than competitors so it deserves a higher P/E ratio than competitors command
      - For example, what if the P/E of Kroger is less than P/E of Safeway
        - » May be reasonable if Kroger has a lower ROE, lower growth, lower payout, and/or higher risk than Safeway
  - *A stock could be <u>undervalued</u> even it is at the <u>same or higher</u> multiple than it has been in the past and its peers if it is better now than it was in the past and its peers, respectively*

Is the P/E cheap, expensive, or just right?

- Is KSS priced right?
  - Earnings rebounded
  - P/E is low

Kohl's
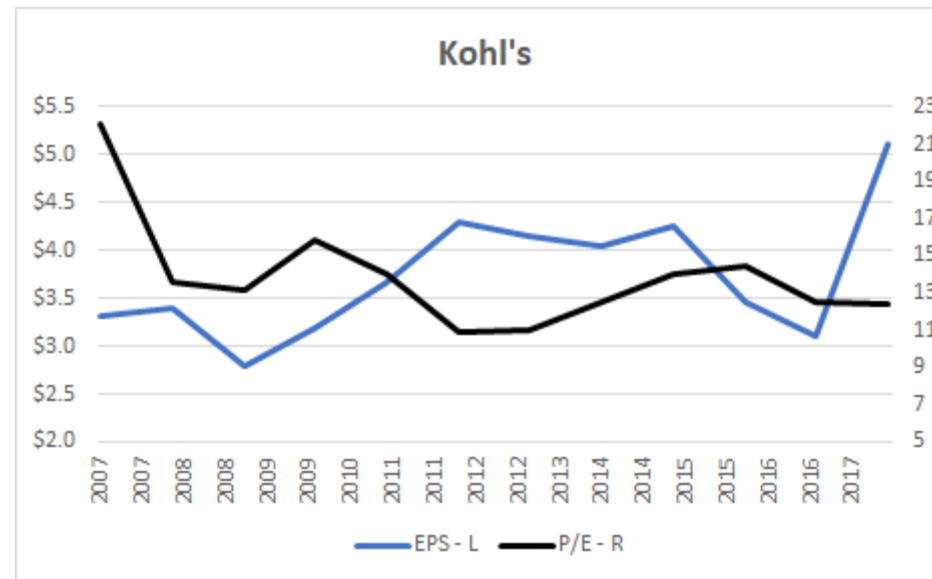
Source: Spellman, FactSet.

  - P/E sometimes varies inversely with EPS – why?
  - Determine P/E, determine EPS in forecast year, and multiply to determine target!
    - 12 LTM P/E * $5.29 EPS in 2019 = $63.48 target at end of 2019 (round to $63 as value is not exact science!)
      - To determine value at start of year, discount $63.48 at 1+k to the 1 power

Comparing Multiples to Comps (Competitors)

Ticker	2017 P/E	2018 EPS G
KSS	12.9	25%
TGT	13.9	12%
TJX	19.3	22%
M	6.7	-4%
JWN	16.3	18%
DDS	12.5	21%

Ticker	P/B	2017 ROE
KSS	1.96	13.0%
TGT	3.38	21.8%
TJX	10.44	48.4%
JCP	0.66	5.0%
M	1.61	20.3%
JWN	8.52	49.6%
DDS	1.20	7.9%

Ticker	2017 P/S	2017 NPM
KSS	0.56	3.7%
TGT	0.54	3.5%
TJX	1.50	6.9%
JCP	0.07	0.6%
M	0.37	4.6%
JWN	0.54	3.1%
DDS	0.32	2.1%

P/E weakly positively related to growth

$y = 29.719x + 8.8886$
$R^2 = 0.5452$

P/B positively related to ROE

$y = 20.599x - 0.9143$
$R^2 = 0.9359$

P/S positively related to NPM

$y = 19.946x - 0.1432$
$R^2 = 0.7894$
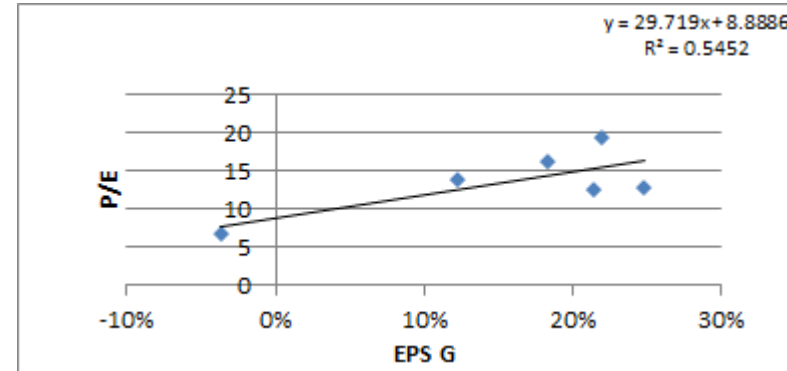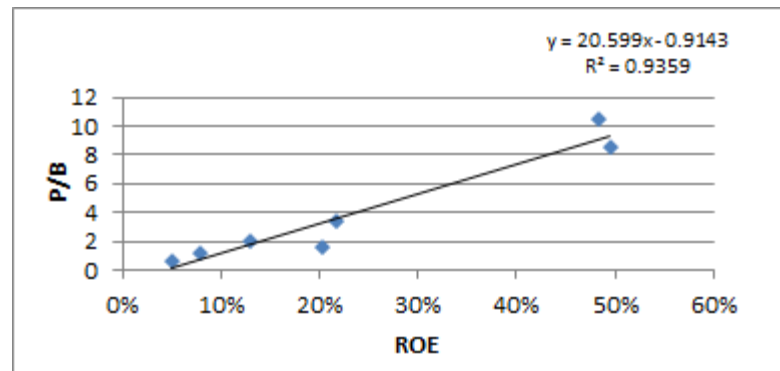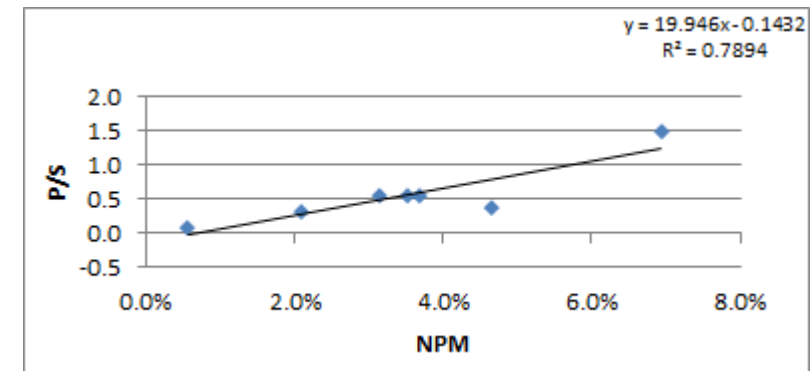
Source: Spellman, FactSet.

Target based on comps

- ## Comparison shopping is the way it is done

  - ### KSS is under the line so is it undervalued?

    - #### What other reason could lead you to a different conclusion?

  - ### Appropriate P/B = 20.599 * KSS ROE of 13.0% - 0.9143 = 1.76

    - #### 10.1% lower than current 1.96 multiple

    - #### *Current* target price

      - ##### Current price of $63.19 * (1+- .101) = $56.78

      - ##### 1.76 P/B * $32.30 BVPS = $56.78

Ticker	P/B	2017 ROE
KSS	1.96	13.0%
TGT	3.38	21.8%
TJX	10.44	48.4%
JCP	0.66	5.0%
M	1.61	20.3%
JWN	8.52	49.6%
DDS	1.20	7.9%

$y = 20.599x - 0.9143$
$R^2 = 0.9359$
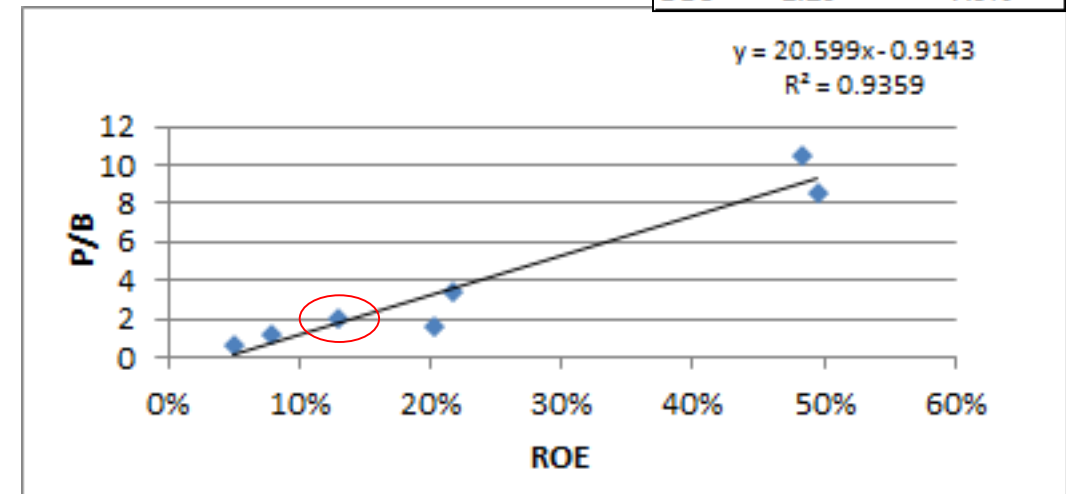
1-year target price: determine appropriate P/B from equation in the chart (forecast ROE and plug in for X), and then multiply the forecasted P/B by forecasted book value of equity per share (BVPS)**

* Conclusions assume all else equal and that P/B and ROE are the appropriate metrics to evaluate these companies; one should consider several measures of relative valuation. Assumes investors only care about current statistics (e.g. current ROE and not future ROE).
** Shareholder equity ("book value") per share.

Scenario analysis and comps

- ## Comparison shopping is the way it is done

  - ### What if ROE rises to 20% while ROEs of comps are unchanged, is stock still overvalued?

  - ### What if investors seek safety and pay even more (even higher P/B) for firms that have higher ROE (slope of line increases), is stock still overvalued?

$y = 20.599x - 0.9143$
$R^2 = 0.9359$

$y = 20.599x - 0.9143$
$R^2 = 0.9359$

* Conclusions assume all else equal and that P/B and ROE are the appropriate metrics to evaluate the firms; one should consider several measures of relative valuation.

Is Nike great (early 2018)?

- Accelerating fundamentals (revisions are up)

- Beating expectations

- Solid growth

- Low expectations???
  - Not really

Source: Spellman, FactSet, 2/23/18.

Is Nike "that" much better than Kohl's?

- NKE had > 50% higher P/E (NKE 27.2 vs KSS 17.4 early 2018)
- NKE better past growth, but KSS good allocator of capital to dividends and share buyback
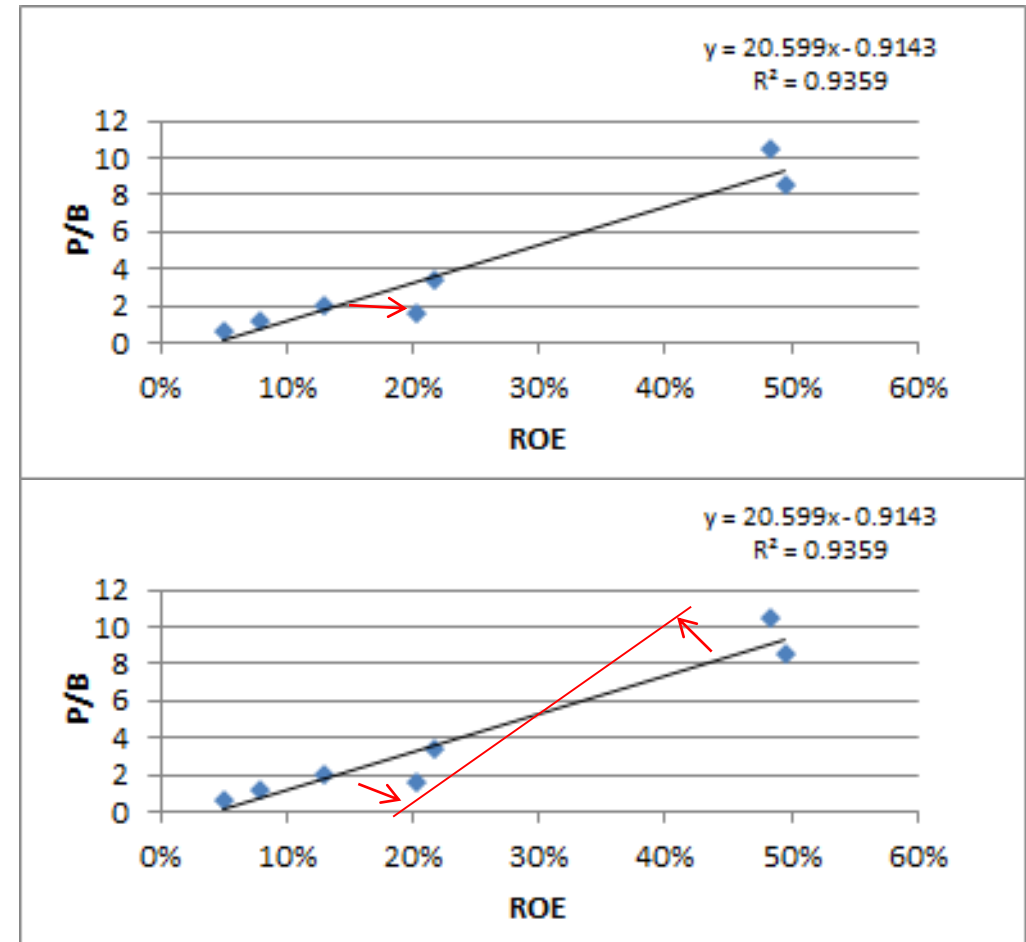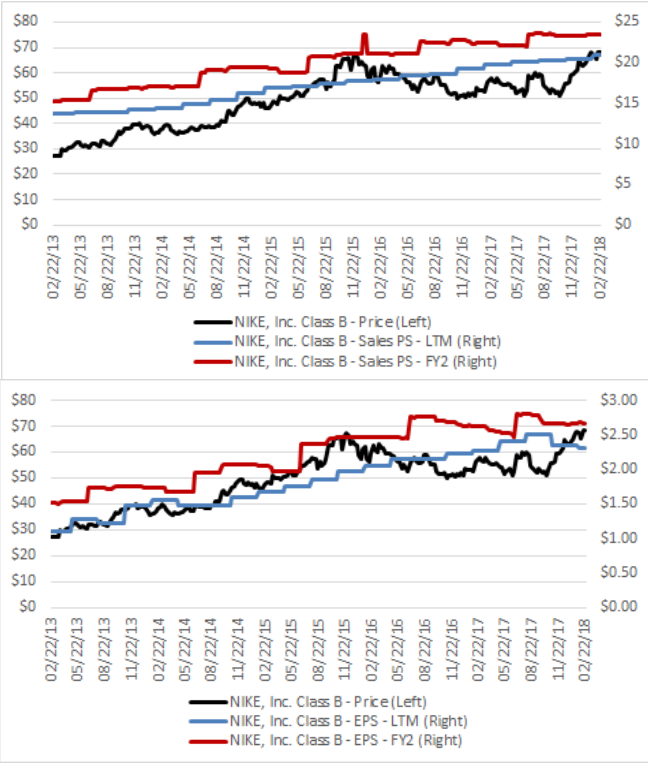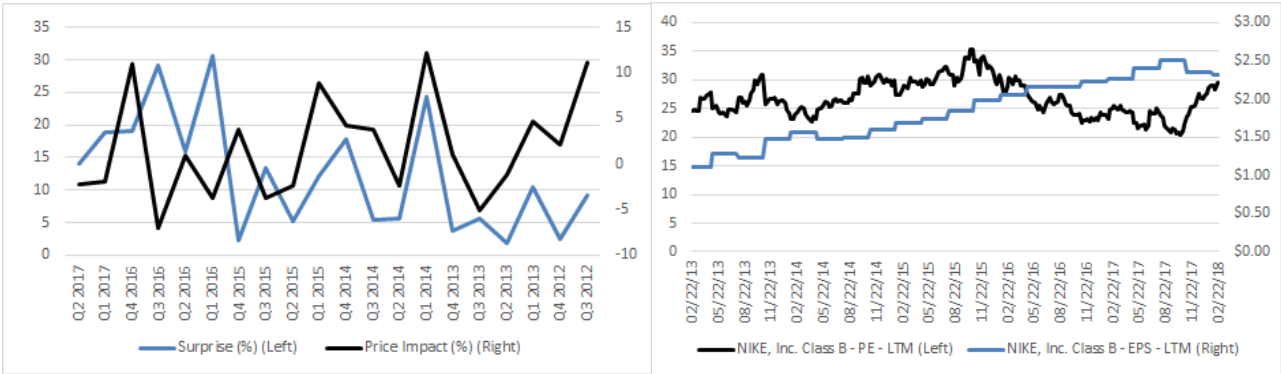- All else equal, NKE needs 18% better growth future growth for next 14 years to justify premium
 - Is this possible?
    - Maybe, but maybe not

Source: Spellman, FactSet, 2/23/18.

Style		Kohl's	Nike
	Price	$66.47	$68.16
	Investing	$1,000	$1,000
	P/E	17.36	27.16
	ROE	12.87%	33.38%
	Payout	52.2%	27.8%
	Growth rate (ROE * retention)	6.2%	24.1%
	P/B	2.2	9.1
	Disc Rate	10%	10%

5-Yr Growth				
Firm	Sales	SPS	Income	EPS
Nike	7.3%	9.5%	13.8%	16.8%
Kohl's	-0.6%	8.5%	-13.8%	-2.3%

Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Earnings	Kohl's	$58	$61	$65	$69	$73	$78	$82	$88	$93	$99	$105	$111	$118	$125	$133
	Nike	$37	$46	$57	$70	$87	$108	$135	$167	$207	$257	$319	$396	$492	$610	$757
Growth	Kohl's		6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%	6.2%
	Nike		24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%	24.1%
Cum Earn	Kohl's	$58	$119	$184	$253	$326	$403	$486	$573	$666	$765	$870	$981	$1,099	$1,224	$1,357
	Nike	$37	$83	$139	$210	$297	$405	$540	$707	$914	$1,171	$1,491	$1,887	$2,378	$2,989	$3,746
BOY BV	Kohl's	$448	$475	$504	$535	$568	$603	$640	$680	$722	$766	$813	$863	$916	$972	$1,032
	Nike	$110	$137	$170	$211	$262	$325	$403	$500	$621	$771	$956	$1,187	$1,473	$1,828	$2,269
Dividends	Kohl's	$30	$32	$34	$36	$38	$41	$43	$46	$49	$51	$55	$58	$62	$65	$69
	Nike	$10	$13	$16	$20	$24	$30	$37	$46	$58	$71	$89	$110	$137	$169	$210
Disc Div	Kohl's	$27	$26	$25	$25	$24	$23	$22	$21	$21	$20	$19	$18	$18	$17	$17
	Nike	$9	$10	$12	$13	$15	$17	$19	$22	$24	$28	$31	$35	$40	$45	$50
Cum Div	Kohl's	$30	$62	$96	$132	$170	$211	$254	$299	$348	$399	$454	$512	$574	$639	$708
	Nike	$10	$23	$39	$58	$82	$113	$150	$196	$254	$325	$414	$524	$661	$830	$1,041
Disc Cum Div	Kohl's	$27	$54	$79	$104	$128	$150	$173	$194	$214	$234	$253	$272	$290	$307	$324
	Nike	$9	$20	$32	$45	$60	$77	$96	$118	$142	$170	$201	$236	$276	$320	$371
EOY BV	Kohl's	$475	$504	$535	$568	$603	$640	$680	$722	$766	$813	$863	$916	$972	$1,032	$1,096
	Nike	$137	$170	$211	$262	$325	$403	$500	$621	$771	$956	$1,187	$1,473	$1,828	$2,269	$2,816

Relative value history of consumer staples

- Relative value history determined by comparing multiple of asset to another asset over time
    - Relative multiple changes as business environment varies
- Staples is trading at a discount to S&P 500
    - It is a relatively safe sector, and the economy has been robust based on the ISM PMI reading
    - Also, CPI of food/beverage has recently lagged PPI food manufacturing
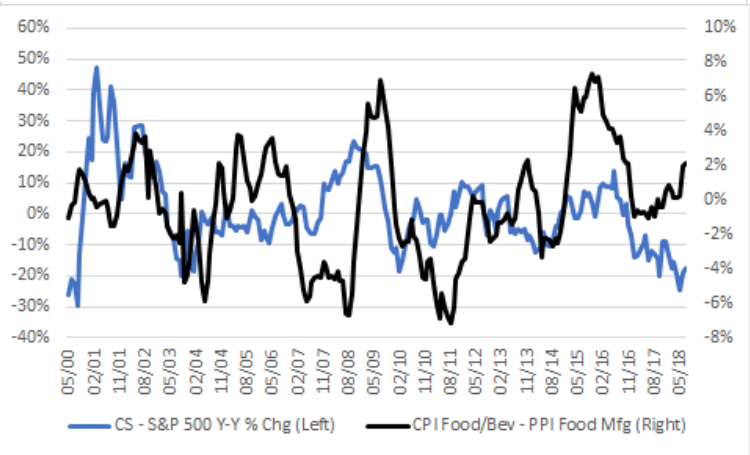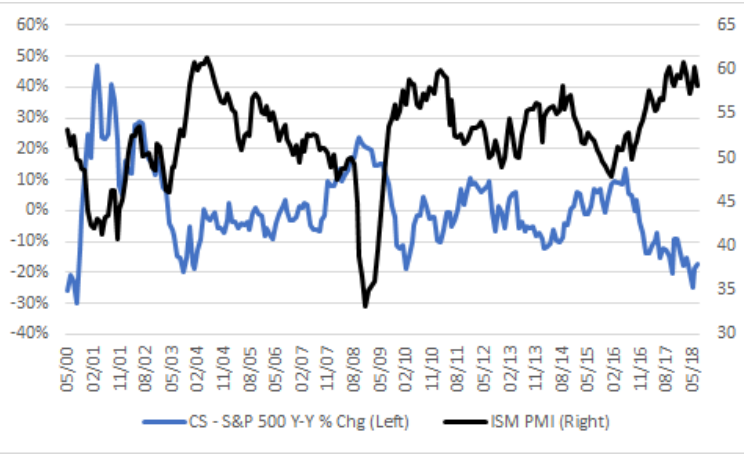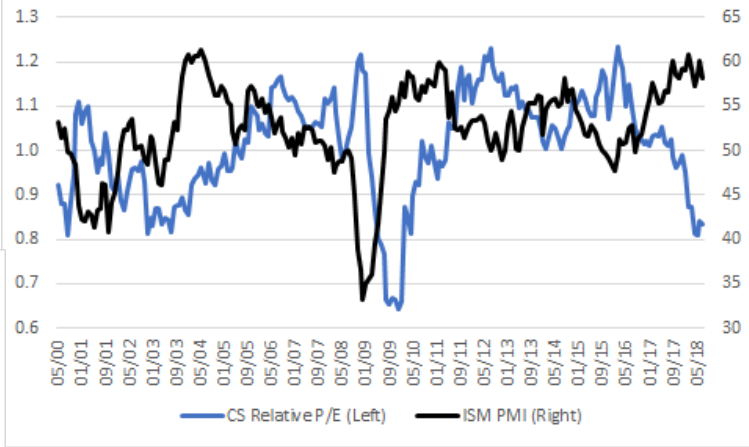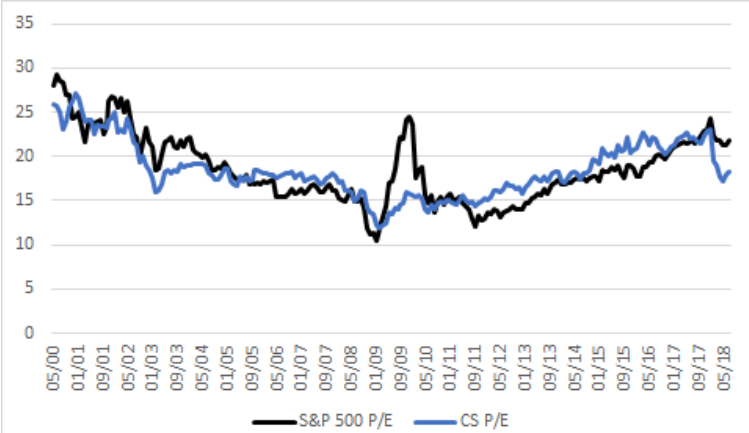
Source: Spellman, FactSet.

Takeaways for Road

- Valuation is an art, not a science
  - No one precise value
  - Many methods of valuation

- Price does not necessarily equal value

- Be wary of high estimates!

- *Markets can be wrong!*

Appendices

- [Growth does not = ROE * retention ratio](#)

- [Higher margin firms should have higher P/E, all else equal](#)

- [Using multiples in a three-stage DCF where terminal is determined with P/E](#)

- [Determining implied growth](#)

- [Creating earnings versus creating value](#)

- [P/E, E, and S&P Returns](#)

- [Relative value history](#)

- [Can one really justify a 50 P/E?](#)

- [Methods of valuation](#)

- [Specific uses of P/E, P/B, P/S, P/CF, EV/EBITDA, and PEG ratios](#)

Recall ROE * retention ratio = growth rate, maybe… likely NOT!

- But only if retained earnings generates same ROE as existing investments!

Scenario where ROE on New Investments is Same as ROE on Initial Equity						
Time	0	1	2	3	4	5
Earnings		$10.00	$10.60	$11.24	$11.91	$12.62
Growth rate			6.0%	6.0%	6.0%	6.0%
Equity	$100.00	$106.00	$112.36	$119.10	$126.25	$133.82
ROE Overall		10.0%	10.0%	10.0%	10.0%	10.0%
ROE on Initial Equity		10%	10%	10%	10%	10%
Payout		40%	40%	40%	40%	40%
Retention Ratio		60%	60%	60%	60%	60%
Retained		$6.00	$6.36	$6.74	$7.15	$7.57
Cumulative Retained Earnings		$6.00	$12.36	$19.10	$26.25	$33.82
ROE on Retained Earnings			10%	10%	10%	10%
Dividends		$4.00	$4.24	$4.49	$4.76	$5.05
Growth rate			6.0%	6.0%	6.0%	6.0%

Growth = ROE * Retention Ratio

Scenario where ROE on New Investments is Lower than ROE on Initial Equity						
Time	0	1	2	3	4	5
Earnings		$10.00	$10.30	$10.61	$10.93	$11.26
Growth rate			3.0%	3.0%	3.0%	3.0%
Equity	$100.00	$106.00	$112.18	$118.55	$125.10	$131.85
ROE Overall		10.0%	9.7%	9.5%	9.2%	9.0%
ROE on Initial Equity		10%	10%	10%	10%	10%
Payout		40%	40%	40%	40%	40%
Retention Ratio		60%	60%	60%	60%	60%
Retained		$6.00	$6.18	$6.37	$6.56	$6.75
Cumulative Retained Earnings		$6.00	$12.18	$18.55	$25.10	$31.85
ROE on Retained Earnings			5%	5%	5%	5%
Dividends		$4.00	$4.12	$4.24	$4.37	$4.50
Growth rate			3.0%	3.0%	3.0%	3.0%

Growth does NOT = ROE * Retention Ratio

Note: 1-dividend payout = retention ratio, and dividend payout is dividends / earnings. ROE = earnings / equity.

Source: Spellman, FactSet.

Go back to appendix home page.

Kroger versus Nike

ROE	=	Net profit margin	X	Total asset turnover	X	Equity multiplier
$\dfrac{\text{Net income}}{\text{Average total equity}}$	=	$\dfrac{\text{Net income}}{\text{Sales}}$	X	$\dfrac{\text{Sales}}{\text{Average total assets}}$	X	$\dfrac{\text{Average total assets}}{\text{Average total equity}}$

- ## According to DuPont equation, higher margins should drive up ROE

  - Assuming all else is equal, a firm with a higher margin has a higher ROE and higher growth so P/E, P/B, and P/S should be higher for the higher margin firm

Firm	ROE	Margin	Turns	Leverage	P/E	P/B	P/S
Kroger (KR)	28.98%	1.69%	3.19	5.36	16.5	3.9	0.2
Nike (NKE)	34.38%	12.36%	1.52	1.83	29.3	9.3	3.2
Source: Spellman, FactSet, 2/21/18 data for valuation, Jan 17 for KR ROE data, May 17 for NKE ROE data							

  Source: Spellman, FactSet.

  - Of course, all else is <u>rarely</u> equal
    - While KR has close to the same ROE as NKE (28.98% is 84% of 34.38%), its P/B is only 42% of NKE's (3.9/9.3 is 42%)
      - But its margin is way lower than Nike's!
      - KR has more debt (risky); however it has better asset utilization (a good thing)
      - P/E of NKE is nearly double despite similar ROEs
        - » Maybe their growth rates differ? Will AMZN get more into food? Is food growth slower than NKE's growth?

[Go back to appendix home page.](#)

KSS: 3-Stage Multi-Stage Growth Model with Terminal Value Determined by P/E

See tab StockDCF_Mult: What is the value of the stock at the beginning of fiscal 2019?

- First Stage: Forecasted FCFE
  - $FCFE_1 = FCFE_{2019} = \$5.47$ and
  - $FCFE_2 = FCFE_{2020} = \$4.89$
- Second Stage: 5 years, 2021 -7.3% growth and 2021-2024 growth about -1.2%
  - Sales growth of 1%, but falling margins
- Third Stage: Terminal P/E
  - Value based on estimated 12.94 P/E times estimated earnings in fiscal year 2025 (fiscal 2020 earnings ($5.20) grows about -1.0% each year after 2021
  - P/E = 12.94; if firm has more long-term growth than the market and normal market P/E is 15-16 ... Does firm have more or less growth than the market post 2025?
- Cost of capital = 11.0%
  - Based on r_f = 3.10%, RP_m = 6.90%, beta = 1.15

Note: 2021 growth differs from other years in second stage because of impact of forecasting these 5 years based on growth rates which can impact the sales / capital change ratios in initial year (sales/capital growth in other years is constant).

Go back to appendix home page.

KSS: 3-Stage Multi-Stage Growth Model with Terminal Value Determined by P/E

Find the value of the expected FCFE and the expected future stock price (also called terminal value)

$$\text{Value}_0 = \frac{FCFE_1}{(1+k)^1} + \frac{FCFE_2}{(1+k)^2} + \frac{FCFE_3}{(1+k)^3} + \frac{FCFE_4}{(1+k)^4} + \frac{FCFE_5}{(1+k)^5} +$$

First Stage: fiscal 2019 and 2020   Second Stage: 2021-2025 based on growth rate

$$\frac{FCFE_6}{(1+k)^6} + \frac{FCFE_7}{(1+k)^7} + \frac{P_7}{(1+k)^7} \text{ , where } P_7 = E_7 * (P/E)_7$$

Terminal Value: Based on estimated P/E in 2025 times 2025 estimated earnings

Note: Give how the model is set up for forecasting a constant growth rate in stage 2, $FCFE_3$ does not necessarily rise at the same constant rate as the other 4 years.
Note: the spreadsheet allows you to override the constant growth rate assumption by inputting individual numbers for various items that result in FCFE.

Go back to appendix home page.

KSS: 3-Stage Multi-Stage Growth Model with Terminal Value Determined by P/E

Find the value of the expected FCFE and the expected future stock price (also called terminal value)

$$\text{Value}_{1/1/2018} = \frac{\$5.47}{(1+0.110)^1} + \frac{\$4.89}{(1+0.110)^2} + \frac{\$4.53}{(1+0.110)^3} + \frac{\$4.48}{(1+0.110)^4} + \frac{\$4.43}{(1+0.110)^5} +$$

$$\frac{\$4.37}{(1+0.110)^6} + \frac{\$4.32}{(1+0.110)^7} + \frac{P_7}{(1+0.110)^7},$$

where $P_7 = \$64.22 = E_7 * (P/E)_7$

and E_7 = approx. $4.96

and $(P/E)_7$ = 12.94

Value$_{\text{BOFY 2019}}$ **= \$53.06**

Go back to appendix home page.

KSS Example: 3-Stage Multi-Stage Growth Model with Terminal Value Determined by P/E

- From tab StockDCF_Mult

There is a toggle to allow you to include debt or not and also NWC or NOWC – both set to off here

		Year					
	1	2	3	4	5	6	7
First Stage		**Second Stage**					
	2019	2020	2021	2022	2023	2024	2025
Terminal value P/E							
Net income	$872	$803	$796	$789	$782	$775	$767
% of sales	4.6%	4.2%	4.1%	4.0%	4.0%	3.9%	3.8%
EPS	$5.47	$5.20	$5.15	$5.11	$5.06	$5.01	$4.96
Growth		-5.1%	-0.8%	-0.9%	-0.9%	-1.0%	-1.0%
Terminal P/E							12.94
* Terminal EPS							$4.96
Terminal value							$64.22
* Discount factor							0.48
Discounted terminal value							$30.86
Summary							
First stage	$8.90	Present value of first 2 year cash flow					
Second stage	$13.30	Present value of year 3-7 cash flow					
Third stage	$30.86	Present value of terminal value P/E					
Value (P/E)	$53.06	= value at beg of fiscal yr		2019			

The discount factor is 1 / (1+r)^the appropriate number of years to discount the future cash flows
Go back to appendix home page.

		Year					
	1	2	3	4	5	6	7
First Stage		**Second Stage**					
Cash flows	2019	2020	2021	2022	2023	2024	2025
Sales Growth	0.0%	0.5%	1.0%	1.0%	1.0%	1.0%	1.0%
NOPAT / S	5.8%	5.4%	5.3%	5.2%	5.2%	5.1%	5.0%
S / NWC	12.75	12.75	12.75	12.75	12.75	12.75	12.75
S / NFA (EOY)	2.38	2.38	2.38	2.38	2.38	2.38	2.38
S / IC (EOY)	2.01	2.01	2.01	2.01	2.01	2.01	2.01
ROIC (EOY)	11.6%	10.8%	10.7%	10.5%	10.4%	10.2%	10.0%
ROIC (BOY)		10.9%	10.8%	10.6%	10.5%	10.3%	10.1%
Share Growth		-2.9%	0.0%	0.0%	0.0%	0.0%	0.0%
Sales	$19,095	$19,190	$19,382	$19,576	$19,772	$19,970	$20,169
NOPAT	$1,101	$1,033	$1,029	$1,024	$1,019	$1,014	$1,008
Growth		-6.2%	-0.4%	-0.5%	-0.5%	-0.5%	-0.5%
- Change in NWC	0	7	15	15	15	16	16
NWC EOY	1498	1505	1521	1536	1551	1567	1582
Growth NWC		0.5%	1.0%	1.0%	1.0%	1.0%	1.0%
- Chg NFA	0	40	80	81	82	83	84
NFA EOY	8,009	8,049	8,130	8,211	8,293	8,376	8,460
Growth NFA		0.5%	1.0%	1.0%	1.0%	1.0%	1.0%
Total inv in op cap	0	48	96	97	97	98	99
Total net op cap	9507	9555	9650	9747	9844	9942	10042
FCFF	$1,101	$986	$933	$927	$921	$915	$909
% of sales	5.8%	5.1%	4.8%	4.7%	4.7%	4.6%	4.5%
Growth		-10.5%	-5.3%	-0.6%	-0.6%	-0.7%	-0.7%
- Interest (1-tax rate)	230	230	232	234	237	239	242
Growth		0.0%	1.0%	1.0%	1.0%	1.0%	1.0%
+ Net new debt	0	0	29	30	30	30	30
Debt	2923	2923	2952	2982	3012	3042	3072
Debt / tot net op capital	30.7%	30.6%	30.6%	30.6%	30.6%	30.6%	30.6%
FCFE w/o debt	$872	$756	$701	$693	$685	$676	$668
% of sales	4.6%	3.9%	3.6%	3.5%	3.5%	3.4%	3.3%
Growth		-13.3%	-7.3%	-1.1%	-1.2%	-1.2%	-1.3%
/ No Shares	159.2	154.6	154.6	154.6	154.6	154.6	154.6
FCFE	$5.47	$4.89	$4.53	$4.48	$4.43	$4.37	$4.32
Growth		-10.7%	-7.3%	-1.1%	-1.2%	-1.2%	-1.3%
* Discount factor	0.90	0.81	0.73	0.66	0.59	0.53	0.48
Discounted FCFE	$4.93	$3.97	$3.31	$2.95	$2.62	$2.33	$2.08

Determining implied growth is useful!

- Using the Gordon Growth formula, one can solve for growth

    - Recall: $P_0 = (E_1 * payout) / (r - g)$

        Therefore, $g = r - (E_1 * payout) / P_0$

    - If know cost of equity, price, and next year's earnings and payout, one can solve for g

What is growth?

X = ?

X = Implied Growth

- Decision making: if your estimate for growth is higher (lower) than the implied growth rate, buy (sell) the stock!

    - One can also solve for a combination of earnings, cost of equity, payout, and growth rates (and terminal P/E if applicable)

Go back to appendix home page.

Earnings growth can destroy value!

- A firm can grow earnings and destroy value if earnings growth is accompanied by negative EVA

- Using the assumptions

  - $E_1 = (EBIT_1 - I_0 - new\ I) * (1 - tax\ rate)$
    - New I = New capital $(IC_1 - IC_0)$ * B-T cost of debt
      - New I = $300 * 6\% = \$18.0$
    - $E_1 = (\$40 - \$7.5 - \$18.0) * (1 - 0.20) = \$11.60$, or 16% rise!

  - $EVA_1 = (ROIC_1 - WACC) * IC_1$
    - $ROIC_1 = NOPAT_1 / IC_1$
      - NOPAT = EBIT * (1 − tax rate)
      - $\$40 * (1 - 0.20) / \$500 = 6.4\%$, down from 8.0%
    - $EVA_1 = (6.4\% - 8.0\%) * \$500 = $ -$8, down from $0!

Take Home:

Growth in earnings does not necessarily create value!

Assumptions	
Item	**$/%**
WACC	8%
B-T cost of new debt	6%
$Sales_0$	$100
$Sales_1$	$200
IC_0	$200
IC_1	$500
$EBIT_0$	$20
$EBIT_1$	$40
I_0	$7.5
E_0	$10
$ROIC_0$	8%
Tax rate	20%

New capital financed by debt

ROE, k, and value

- If the return on equity is not greater than the cost of equity (k) then no market value is created (stock price should not rise) even if dividend growth is positive

  - This is logical. Why? No EVA (ROE-k) is created!

  - Recall: Value = D_1 / (k – g)

                 ROE * (1-payout) = growth

                 k = cost of equity capital

                 $ROE_{investment}$ = return on a new project

Growth with ROE > k creates value!

Scenario 1: payout = 100%

$$E_1 = \$5$$
$$k = 12.5\%$$
$$ROE_{investment} = 15\%$$

$D_1 = \$5 * 100\% = \$5$

Growth = 15% * (1-1.0) = 0%

Value = $5 / (0.125 − 0) = $40

ROE is > k, so it would make sense to retain some earnings to invest in growth

Scenario 2: payout = 40%

$$E_1 = \$5$$
$$k = 12.5\%$$
$$ROE_{investment} = 15\%$$

$D_1 = \$5 * 40\% = \$2$

Growth = 15% * (1-0.4) = 9%

Value = $2 / (0.125 − 0.09) = $57.14

Value Rises!

No growth price = $40, with growth = $57.14

Value = no growth component + PV$_{growth\ opportunities}$

E_1 / k + PVGO

$40 + 17.14

Growth with ROE < k destroys value!

- On the other hand, if ROE = k, then investing for growth has no value
  - If $ROE_{investment}$ = 12.5% = k, then Growth = 12.5% (1-0.4) = 7.5% and P_0 = \$2 / (0.125 – 0.075) = \$40, which is the same price as under no growth and paying out all earnings in dividends
  - Under this scenario, payout does not matter
- And if ROE is < k, the stock would decline so no value is obtained by investing for growth (PVGO is negative!)
  - If $ROE_{investment}$ = 8.0% < k, then Growth = 8.0% (1-0.4) = 4.8% and P_0 = \$2 / (0.125 – 0.048) = \$25.97, which is lower than the value with no growth!

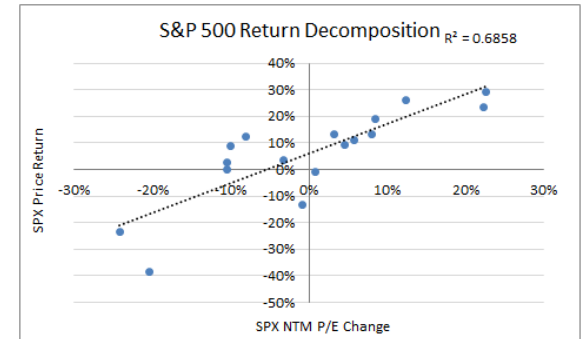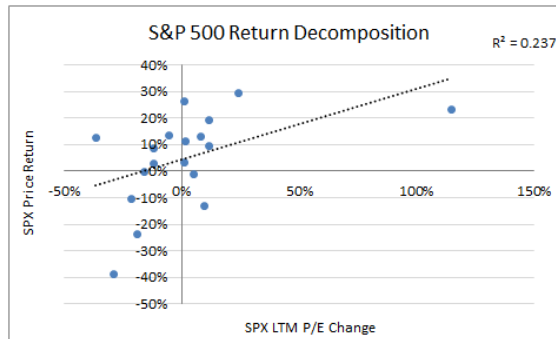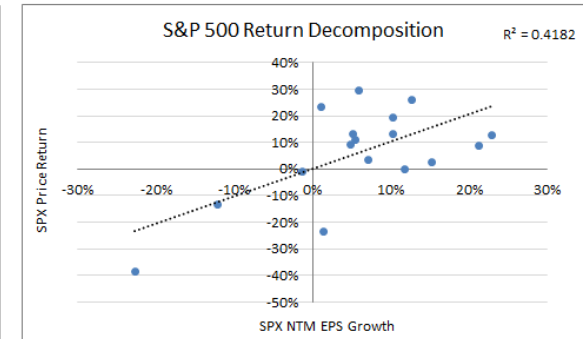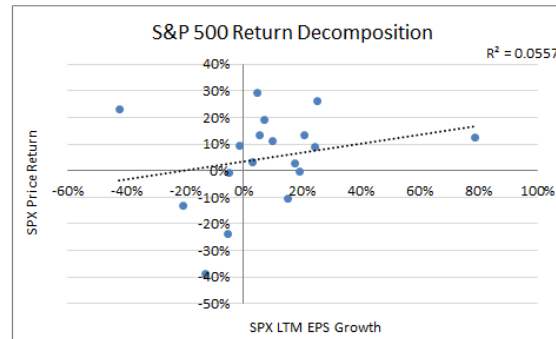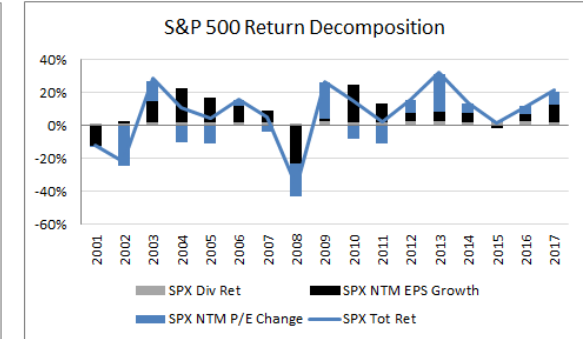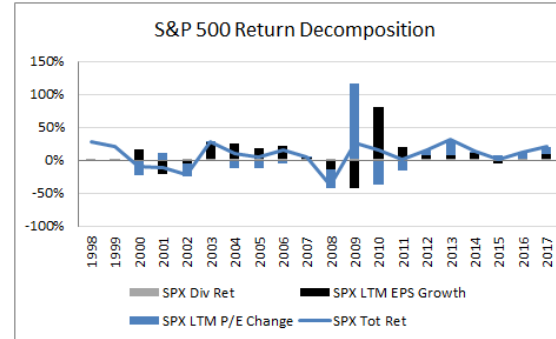Go back to appendix home page.

Historical S&P 500 return drivers

- The percent of return driven by earnings and P/E change varies over time

$$\text{EPS} \times \frac{P}{E} = \text{Price}$$

- And P/E is more important than E

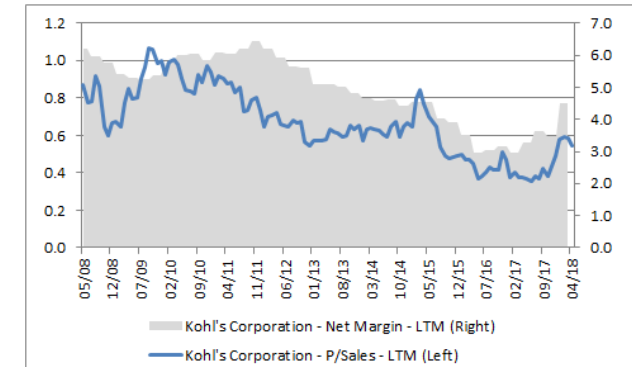- And expectations are more important than the past

Source: Spellman, FactSet.

Relative value history

- ## Comparison shopping is the way it is done

  - Multiples can change because of fundamentals (e.g. P/S moves up and down because of NPM) and general market movements (e.g. a higher risk free rate and market risk premium drives multiples down (see earlier slide)

  - To remove the impact of general market movements from valuation, determine target by comparing valuation and fundamental history of stock to its comps (or market)

  - For instance

    - Divide top chart (KSS's P/S and NPM) by second chart (comp group's P/S and NPM) to create bottom chart (KSS's relative P/S and relative NPM)

    - It is clear that KSS's relative P/S (KSS's P/S divided by comp's P/S) is related to KSS's relative NPM (KSS's NPM divided by comp's NPM)
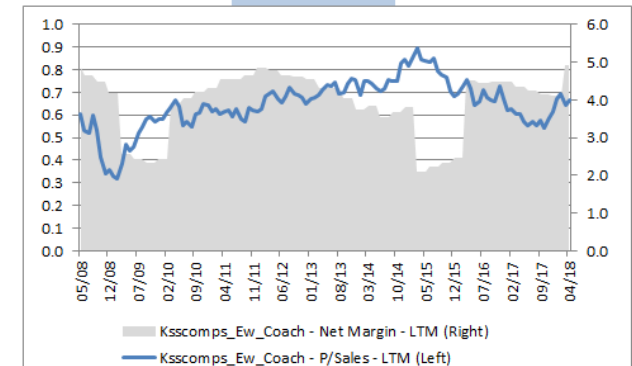

Source: Spellman, FactSet.

[Go back to appendix home page.](#)

Relative value history

- ## Comparison shopping is the way it is done

  - P/S rises with NPM

  - KSS P/S is 0.36, or 0.64 times comps of 0.56, and its NPM is 3.26%, or 0.77 times comps of 4.22%

  - Is KSS undervalued?

    - Valuation implies that the market expects (1) KSS's growth to be lower, and/or (2) risk to be higher
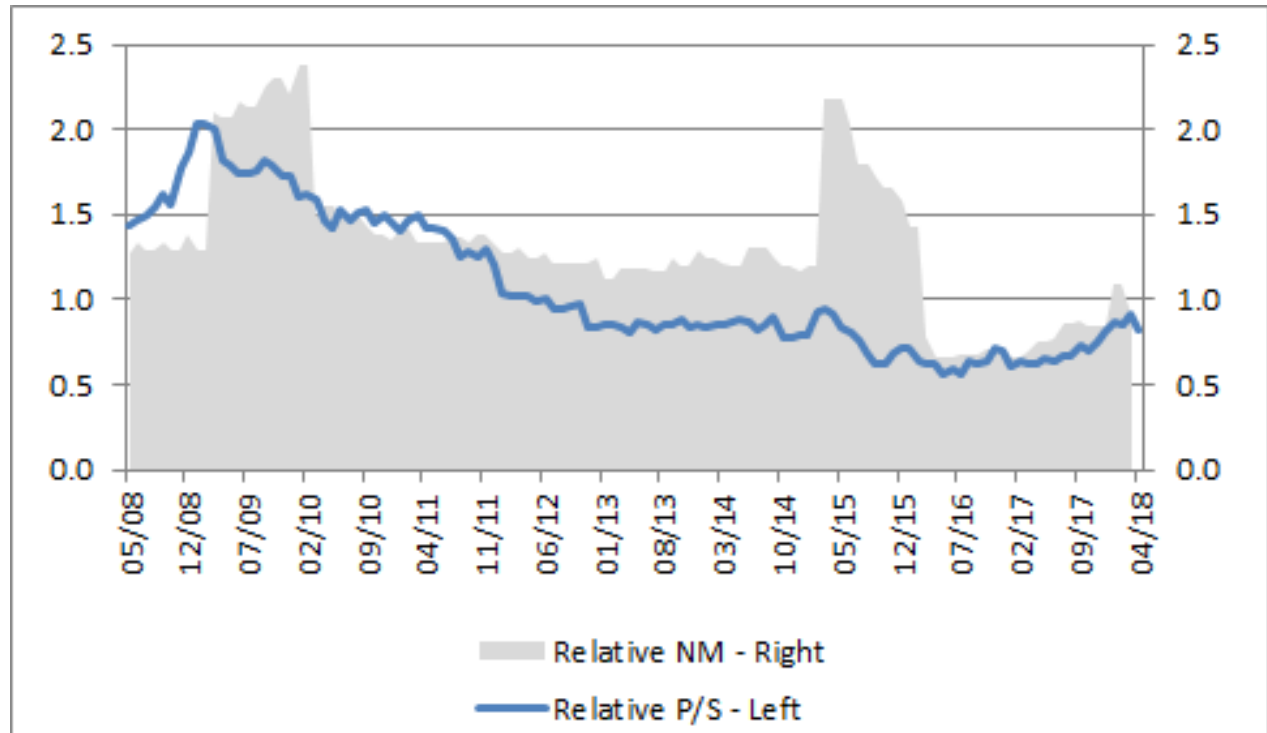
Source: Spellman, FactSet.

To determine KSS's relative P/S and relative net margin, divide KSS's P/S and net margin by the P/S and net margin of the comps

Go back to appendix home page.

Can one really justify a 50 P/E?

- The low P/E company has slower growth, but more dividends early

- The low P/E company may have more issues so it has a lower ROE and lower P/B

- However, to justify the premium, the high P/E must grow earnings and dividends at 21.3% for 28 years if the low P/E company manages 5.0%

  – This growth rate is very unlikely for the vast majority of companies

Style	Value	Growth
Investing	$1,000	$1,000
P/E	10	50
ROE	10%	25%
Payout	50%	15%
Growth rate (ROE * retention ratio)	5.0%	21.3%
P/B	1.0	12.5
Disc Rate	10%	10%

Source: Spellman, FactSet.

Year		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Earnings	Value	$100	$105	$110	$116	$122	$128	$134	$141	$148	$155	$163	$171	$180	$189	$198	$208	$218	$229	$241	$253	$265	$279	$293	$307	$323	$339	$356	$373
	Growth	$20	$24	$29	$36	$43	$52	$64	$77	$93	$113	$137	$167	$202	$245	$297	$360	$436	$529	$642	$778	$943	$1,144	$1,387	$1,682	$2,039	$2,472	$2,997	$3,634
Growth	Value		5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
	Growth		21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%	21.3%
Cum Earn	Value	$100	$205	$315	$431	$553	$680	$814	$955	$1,103	$1,258	$1,421	$1,592	$1,771	$1,960	$2,158	$2,366	$2,584	$2,813	$3,054	$3,307	$3,572	$3,851	$4,143	$4,450	$4,773	$5,111	$5,467	$5,840
	Growth	$20	$44	$74	$109	$153	$205	$268	$346	$439	$552	$690	$856	$1,058	$1,303	$1,600	$1,960	$2,396	$2,925	$3,567	$4,345	$5,288	$6,432	$7,819	$9,501	$11,539	$14,012	$17,009	$20,644
BOY BV	Value	$1,000	$1,050	$1,103	$1,158	$1,216	$1,276	$1,340	$1,407	$1,477	$1,551	$1,629	$1,710	$1,796	$1,886	$1,980	$2,079	$2,183	$2,292	$2,407	$2,527	$2,653	$2,786	$2,925	$3,072	$3,225	$3,386	$3,556	$3,733
	Growth	$80	$97	$118	$143	$173	$210	$254	$308	$374	$453	$549	$666	$808	$979	$1,188	$1,440	$1,746	$2,117	$2,567	$3,112	$3,773	$4,575	$5,547	$6,726	$8,156	$9,889	$11,990	$14,538
Dividends	Value	$50	$53	$55	$58	$61	$64	$67	$70	$74	$78	$81	$86	$90	$94	$99	$104	$109	$115	$120	$126	$133	$139	$146	$154	$161	$169	$178	$187
	Growth	$3	$4	$4	$5	$6	$8	$10	$12	$14	$17	$21	$25	$30	$37	$45	$54	$65	$79	$96	$117	$141	$172	$208	$252	$306	$371	$450	$545
Disc Div	Value	$45	$43	$41	$40	$38	$36	$34	$33	$31	$30	$29	$27	$26	$25	$24	$23	$22	$21	$20	$19	$18	$17	$16	$16	$15	$14	$14	$13
	Growth	$3	$3	$3	$4	$4	$4	$5	$5	$6	$7	$7	$8	$9	$10	$11	$12	$13	$14	$16	$17	$19	$21	$23	$26	$28	$31	$34	$38
Cum Div	Value	$50	$103	$158	$216	$276	$340	$407	$477	$551	$629	$710	$796	$886	$980	$1,079	$1,183	$1,292	$1,407	$1,527	$1,653	$1,786	$1,925	$2,072	$2,225	$2,386	$2,556	$2,733	$2,920
	Growth	$3	$7	$11	$16	$23	$31	$40	$52	$66	$83	$103	$128	$159	$195	$240	$294	$359	$439	$535	$652	$793	$965	$1,173	$1,425	$1,731	$2,102	$2,551	$3,097
Disc Cum Div	Value	$45	$89	$130	$170	$208	$244	$278	$311	$342	$372	$401	$428	$454	$479	$502	$525	$547	$567	$587	$606	$624	$641	$657	$673	$687	$702	$715	$728
	Growth	$3	$6	$9	$13	$17	$21	$26	$31	$37	$44	$51	$59	$68	$78	$88	$100	$113	$127	$143	$160	$179	$200	$224	$249	$278	$309	$343	$381
EOY BV	Value	$1,050	$1,103	$1,158	$1,216	$1,276	$1,340	$1,407	$1,477	$1,551	$1,629	$1,710	$1,796	$1,886	$1,980	$2,079	$2,183	$2,292	$2,407	$2,527	$2,653	$2,786	$2,925	$3,072	$3,225	$3,386	$3,556	$3,733	$3,920
	Growth	$97	$118	$143	$173	$210	$254	$308	$374	$453	$549	$666	$808	$979	$1,188	$1,440	$1,746	$2,117	$2,567	$3,112	$3,773	$4,575	$5,547	$6,726	$8,156	$9,889	$11,990	$14,538	$17,627

[Go back to appendix home page.](#)

Methods of valuation

- **The approach depends on**
  - Whether interested in relative or absolute valuation
  - Need quick analysis or not
  - Situation
    - Valuing firm or stock
    - Firm type
      - Growth , cyclical, stable
    - Financial condition
      - Earnings/CF or not
      - Amount of debt
      - Asset intensity
      - Dividends or CF
      - Distressed or not

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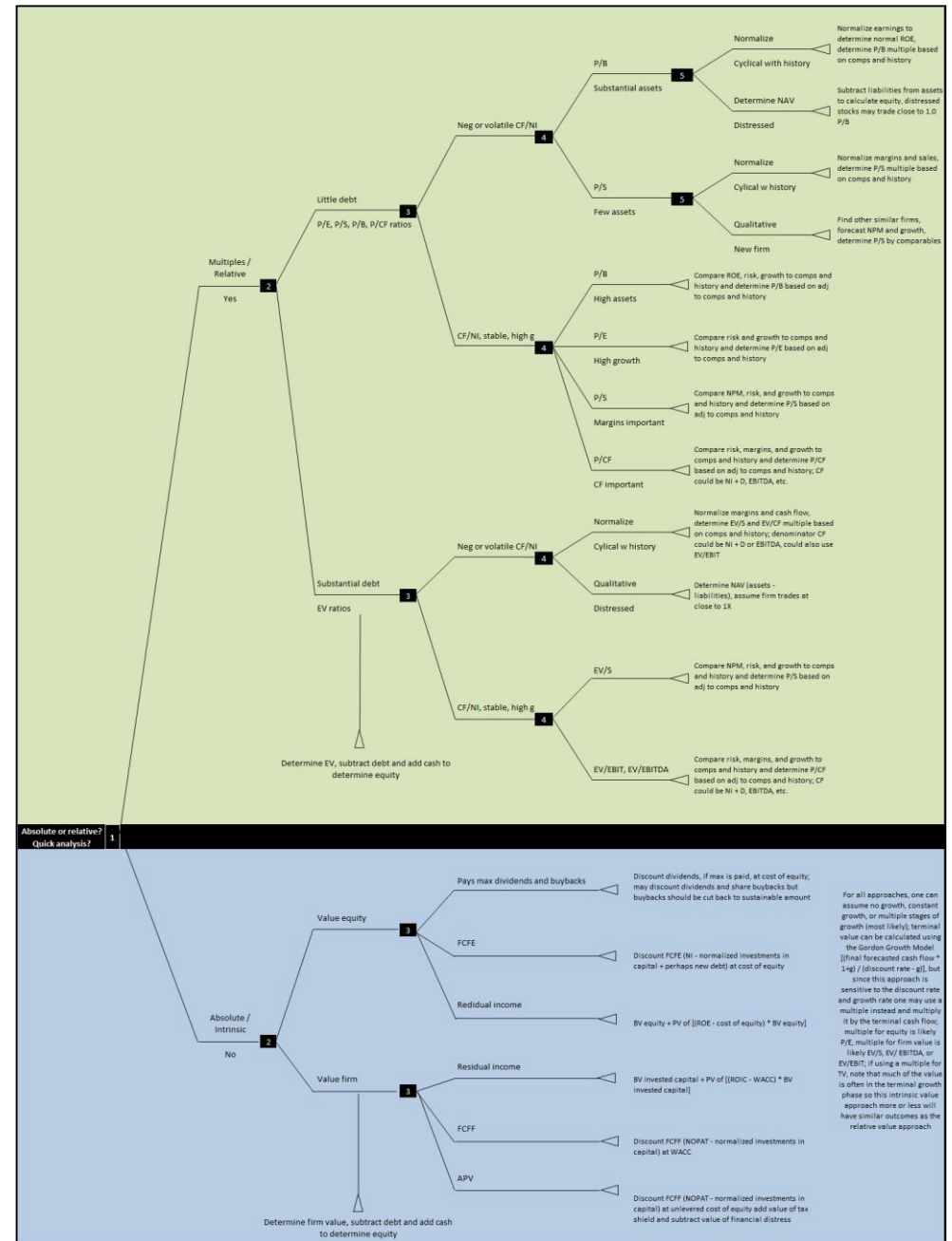
P/E

Pros for using P/Es in valuation:

- **Earnings are a driver** of stock value
- P/Es are **widely used** by investors
- Low P/E stocks may outperform in the long run on a relative basis
- P/E accounts for growth (the ongoing concern) and risk
  - Remember that P/E = [D / (k – g)] / EPS
- **Easy to calculate**

Go back to appendix home page.

P/E

Cons:

- **NM when EPS is negative or low**

- Earnings **subject to manipulation**

- **EPS can be volatile**

Use: Good for stable and growth stocks
Note: P/E has a direct relationship with growth

P/E

Cons continued:

- ## What P/E to use?
  - T4Q, past year, current year, or future year projections?

    Assume: P = $10

    T4Q EPS = $0.50
    FY0 EPS = $0.20
    FY1 EPS = $1.00
    FY2 EPS = $2.00

    P/E_{T4Q} = 20X
    P/E_0 = 50X
    P/E_1 = 10X
    P/E_2 = 5X

  - P/E_1 is probably best in most circumstances: It looks ahead, but not too far (most commonly used by money managers)

P/E

Adjustments when using P/Es:

- **Remove non-recurring** items

- **Normalize earnings** for cyclical firms

- **Adjust for differences in accounting methods and estimates**

P/B

Pros for using P/Bs in valuation:

- **Normally positive** even if EPS is negative

- **More stable** than EPS

- Gauge of **net asset value** for firms holding mostly liquid assets (e.g., banks)

- Useful for firms **going out of business (often B is a floor to the stock)**

- Studies show that P/B ratios are negatively related to long-run average returns

- **Easy to calculate**

P/B

Cons:

- **Not take into account going concern value (i.e. growth)**

- **Not recognize value of non-physical assets like human capital**

- **Misleading when comparing firms with significantly different use of fixed assets**

- **Differences in accounting conventions can obscure true book values** (e.g. write-offs reduce book value)

- **Market values may differ** from book values (historical cost)

Use: Good for valuing cyclical companies with zero or negative earnings and high asset intensive businesses

Note: P/B has a direct relationship with the return on book (i.e. ROE)

P/B

Calculation:

- B = shareholders' equity
- Ratio uses per-share values or aggregate values

Example: Firm X had BV of equity of $4.0 million in 2013 with 5 million shares outstanding. The firm's stock sells for $10 per share. What is the firm's P/B ratio?

BV per share = $4.0 mil/5 mil shares = $0.80/share

P/B = $10.00 / $0.80 = 12.50

Go back to appendix home page.

P/S

Pros for using P/S in valuation:

- **Sales positive even if earnings and book value are not**

- **More difficult to manipulate** than EPS and book value

- **Less volatile** than P/Es

- Very **useful for start-ups** without earnings and firms in mature or cyclical industries with volatile earnings

- Studies find P/S ratios (like P/E and P/BV) **are negatively related to long-run average stock returns**

- **Easy to calculate**

Go back to appendix home page.

P/S

Cons:

- **Sales des not guarantee profit or free cash flow**

- P/S ratios **do not reflect different cost structures** across firms

- While less subject to accounting distortions than EPS and BV, **revenue recognition methods can still distort sales**

Use: Good for valuing cyclical stocks with zero or negative earnings and start up businesses with potential but little earnings; Use EVA/S to value the entire firm
Note: P/S has a direct relationship with the net profit margin

P/CF

Pros for using P/CF in valuation:

- Cash flow is **more difficult to manipulate** than earnings

- **Widely used** by institutional investors

- P/CF is **more stable** than P/E

- Studies suggest that P/CF is negatively related to long-run average stock returns

P/CF

Cons:

- Using free cash flow to equity (**FCFE**) is theoretically preferable to CFO, but FCFE is **more volatile** than CFO

- **Many definitions** (EBITDA, free cash flow, cash flow from operations, etc.) of "cash flow" are used

Use: Good for valuing stocks that are heavy investors in their business (have little earnings) and many other businesses as well; Use EV/EBITDA or EV/EBIT to value the entire firm

Note: P/CF has a direct relationship with the cash flow growth rate

EV/EBIT (or EBITDA)

Pros for using EV/EBIT (or EBITDA) in valuation:

- Measures value from total capital perspective (considers debt)

- Considers operating income (excludes financing and tax decisions) or a cash flow measure (**more difficult to manipulate** than earnings)

- Good if firms have different capital structures because EBIT is before paying "I"

- **Widely used** by in acquisition scenarios

- EV/EBIT (or EBITDA) is **more stable** than P/E

[Go back to appendix home page.](#)
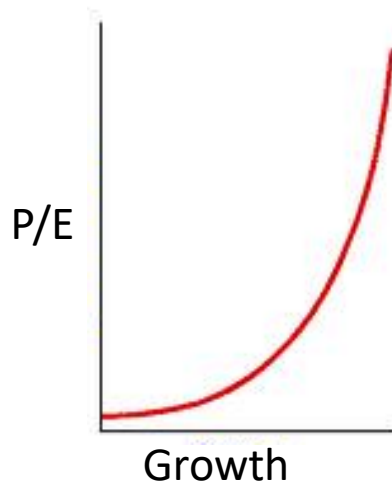
EV/EBIT (or EBITDA)

Cons:

- Not as relevant to firms that have little debt

Use: Good for valuing stocks that have a lot of debt, which are likely capital intensive firms

Note: EV/EBIT (or EBITDA) has a direct relationship with ROIC

Go back to appendix home page.

PEG

- ## While not really a valuation ratio, many people like to use the PEG ratio as a screening tool
  - To calculate, divide P/E ratio by growth rate (in a whole number)
  - Decision rule is the lower the ratio the less one pays for growth (which is a good thing)
- ## A positive of the approach is that PEG assumes that relationship between growth and P/E is linear
  - It is actually exponential, so people pay too little for growth
  - Not paying too much for growth is a good thing, because above average growth hardly ever lasts as long as people think

P/E

Growth