Comparables

- All the same questions as before:

how do you value projects and firms?

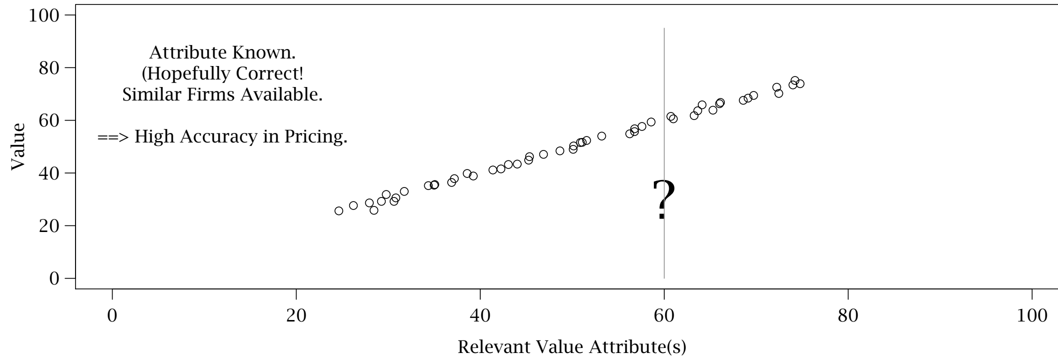
- Can we use comparable firms to avoid a full-blown NPV analysis?
- The Law of One Price in Action!

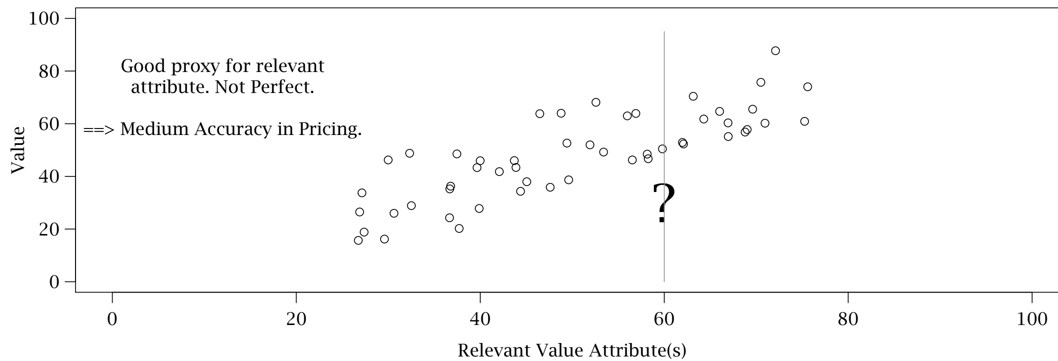
Q1: Does NPV use information from similar firms (comparables)?

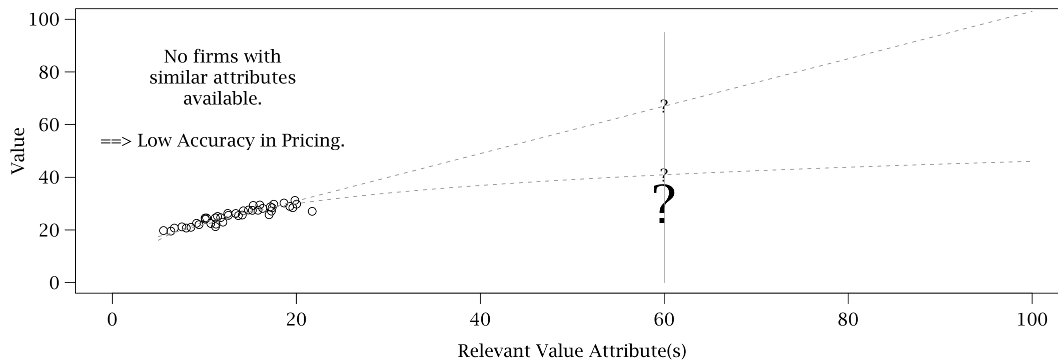
Q2: Do financial markets advertise an NPV for our firm somewhere?

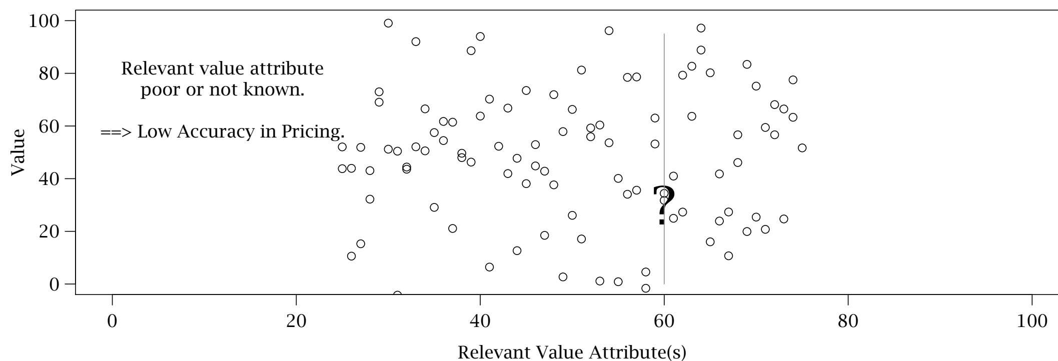
Professor Ivo Welch's lecture notes, ©Ivo Welch, 2008. Based on textbook *Corporate Finance: An Introduction* (Welch, 2008).

Please Value the Following Firms









NPV Problems

Q3: Does NPV have any conceptual problems?

Q4: Does NPV have any real-world application problems?

Q5: Is there a subjective factor in NPV?

IMPORTANT:

- **Valuation by Comparable relies on finding good comparable projects, for which we can find an already existing, accurate valuation.**
- **Comparables also play a role in NPV, but less heavily so. This role appears through the "opportunity cost of capital" in the denominator.**
- **Valuation and Comparables are as much art and common sense judgment, as they are formulae!**
- **Comparables are often a good sanity check for an NPV analysis.**

Q6: Where would valuation by comp work? Where would it fail? Is it better or worse than NPV?

The P/E Ratios

- A P/X ratio of a comparable is multiplied by **our** X to arrive at P.
- The most common and probably best X is Earnings.
- For example,

$$\left(\frac{P}{E}\right)_{\text{Comparable}} = 20, \qquad (E)_{\text{us}} = \$5,$$

$$\Rightarrow \qquad P_{\text{us}} = \left(\frac{P}{E}\right)_{\text{Comparable}} \cdot (E)_{\text{us}}$$

$$= 20 \cdot \$5 = \$100$$

- .

Q7: Why not cash flows instead of earnings?

- Earnings Yield is $1/(P/E) = E/P$.

Intuitive Causes for P/E Ratios

- Reflects Growth, long-term and short-term
- (Reflects Leverage. See later.)

The economic climate is such that firms have to pay about a 10% cost of capital. Assume all firms last forever.

Q8: A firm has a growth rate of 5%. What is its P/E ratio?

Q9: A firm has a growth rate of 0%. What is its P/E ratio?

Q10: A firm has a growth rate of 9%. What is its P/E ratio?

Q11: A firm has a growth rate of –10%. What is its P/E ratio?

Important: P/E ratios are ______ for faster growing companies.

$\mathcal{E}(r)$ and $\mathcal{E}(g)$ have opposite meaning in the formula. So, P/E ratios drop if the cost of capital increases.

PVGO

Without making any assumption, let us presume that the firm consists of two parts (the latter will be anything we wish):

$$\mathsf{PV} \equiv \mathsf{PV} \text{ of constant stuff} + \mathsf{PV} \text{ of growing stuff}$$

If a firm has no growth, its value should be just the first term.

Q12: Where do we get the first part from?

Earnings-Price Ratios: $PPS = \text{EPS}/r + PVGO - PS$, where PPS is price per share today, EPS is (next year's expected) earnings per share, r is the company-appropriate discount rate, and PVGO-PS is the per-share present value of growth opportunities.

$$\Longleftrightarrow \left(\frac{\text{EPS}}{PPS}\right) = r \cdot \left[1 - \frac{\text{PVGO-PS}}{PPS}\right]$$

- Stable Company: If $PVGO = 0$, then $E/P = r$.
- Dying Company: If $PVGO < 0$, then $E/P > r$.
- Growth Company: If $PVGO > 0$, then $E/P < r$.

Usage:

1. Extract PVGO from public stock market price and E/P.
2. Assume PVGO, and determine suitable price.

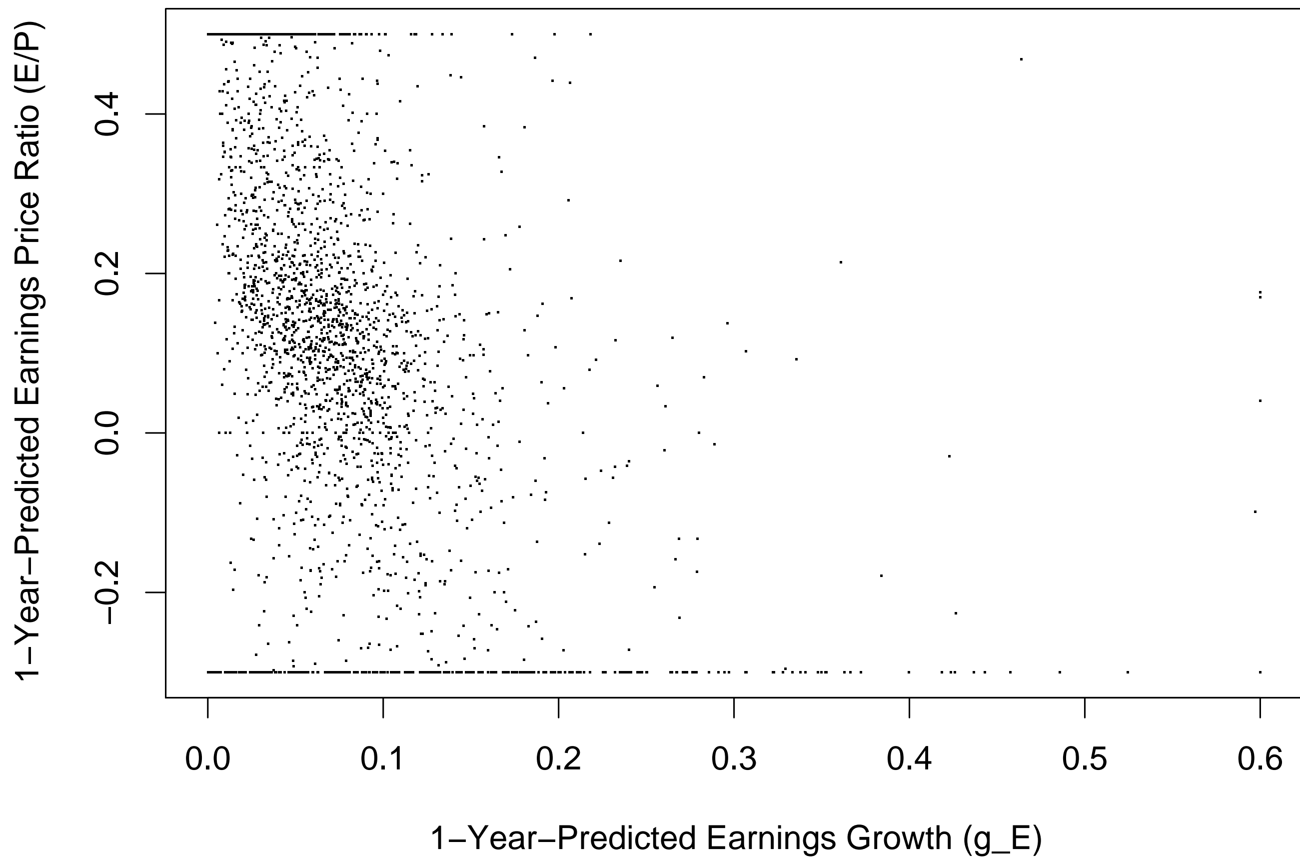
Current Relationships

Out of the WSJ (or Yahoo), what are the P/E ratios of

1. Microsoft:
2. Sun:
3. Procter and Diapers:
4. Coca-Cola:
5. Philip Morris:
6. ...

Q13: If Philip-Morris was "like Microsoft," what should its price be?

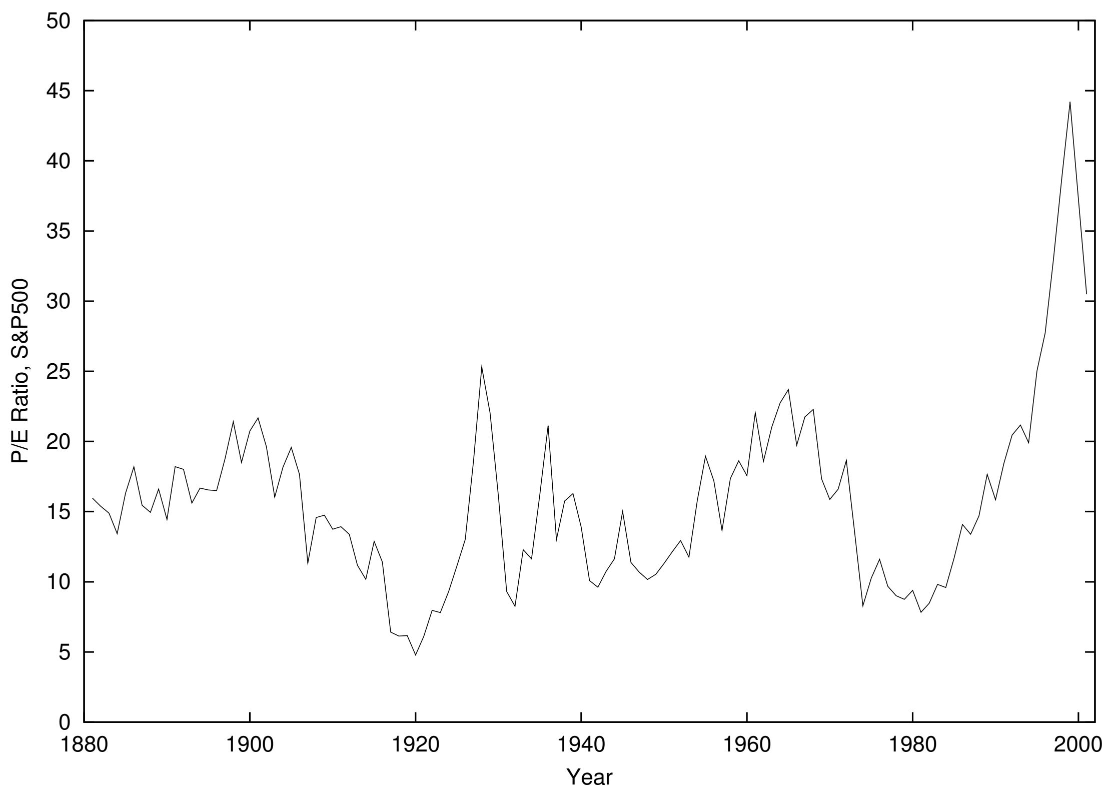
Empirical Relationship, Dec 2000



IMPORTANT: **This relationship is not time stable! It differs over the business cycle.**

Implied Comparables on S&P500

The Bob Shiller argument...



Updating Source: http://www2.standardandpoors.com/spf/xls/index/SP500EPSEST.XLS

Return to 1999. Reading from the graph, P/E was 44.

Q14: Assume a suitable $\mathcal{E}(r) = 10\%$. What did market participants expect the growth rate of earnings in the market to be?

Q15: How does this compare to nominal GDP growth?

Q16: In surveys, retail investors often quoted numbers even higher—as high as 20%. What did market participants expect the growth rate of earnings in the market to be?

Problems of P/E Comparables

14-3

14-3A

- What firm is a good comparable?
  - Every project is different.
  - No two firms are the same combinations of projects.

Q17: Are PepsiCo and CocaCola apples and apples, or apples and oranges?

14-3B

- There is not much relation between the P/E ratios of two projects and the merged project P/E ratio. The merged project does *not* have the average of the two P/E ratios.

  Really problematic consequence:
  - You value firm A at $200 million based on comparables.
  - You value firm B at $200 million based on comparables.
  - You merge A and B, and your valuation based on comparables now tells you that AB is worth $300 million or $500 million—without you having done anything.

14-3C

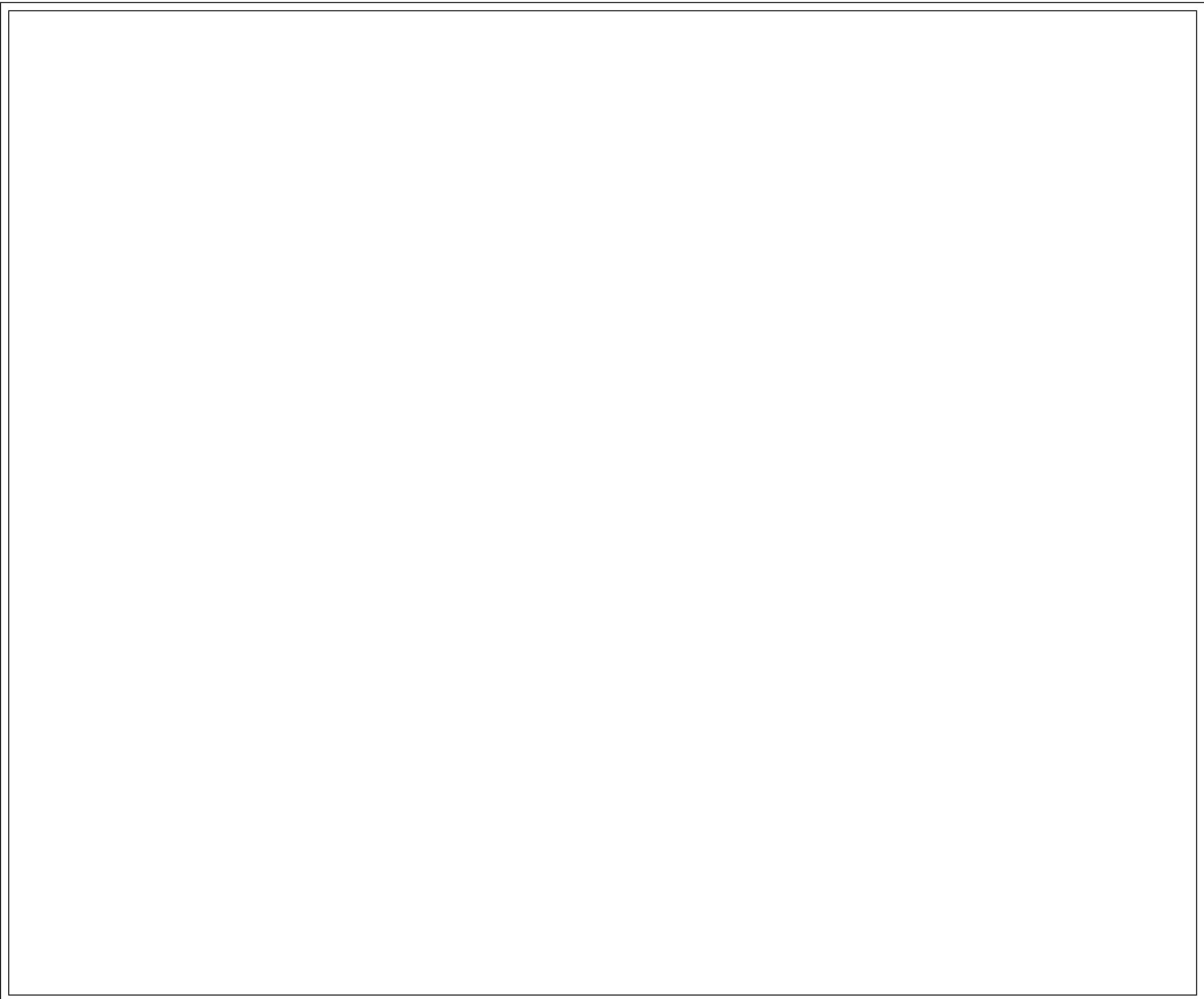
- Accounting methods can be different. Which earnings or cash flows?
- Minor: Need to adjust using Year-To-Date methods. Use TTM (trailing-twelve-months) methods.

Biggest (Avoidable) Error: 1/X Problem

14-3B

IMPORTANT: **Never work with P/E ratio averages. Always work with E/P ratio averages instead (then invert); or with sums-of-V divided by sums-of-E, instead.**

Q18: Why?



Remedies to 1/X

- Median, not mean.
- Ignore Small and Neg Earnings Firms
- Average E/P, then invert
- Work with sums.

Leverage and P/E ratios

The economic climate is such that firms have to pay about a 10% cost of capital. All firms last forever.

Q19: A firm has a growth rate of 0%. What is its P/E ratio?

Q20: In addition, the firm now refinances to a debt ratio of 50%. Its debt has a cost of capital of 5%, equity of 15%. What is its P/E ratio?

Important: P/E ratios are not invariant with leverage.

Other Ratios

- Price/Dividend ratio is similar to the price/earnings ratio, except that it focuses on earnings actually paid out. Firms have a lot of discretion over how much of the earnings are paid out (one firm may pay zero, the other all its earnings), and usually use this discretion to "smooth" the payouts.

- Ratios like Price/Sales have the problem that sales accrue to all owners of the company, both debtholders and equityholders. So, you probably want to use Price-of-Firm (incl. debt), not Price-of-Equity in such ratio comparisons.

- So, what are the definite ratios? This depends on the industry, and firm by firm, and no one really knows. As a result, many financial information providers report everything under the sun. For example

  Go to `http://finance.yahoo.com`. Type in a company symbol and click "Get". Ask for the company's "Profile." Once you have the Profile page showing, there is a column with snapshot information running down the left side of the screen. Go all the way to the bottom of this column to the heading "More From Market Guide." Click "Ratio Comparisons." This will provide all ratio data for the company you looked up, compared to the Industry, Sector and S&P 500 ratios. [via M.Thomlinson]

The book also offers a plethora of other financial ratios, that are often used to judge a firm intuitively. Some of these can be useful, others are more misleading. It sometimes troubles me how frequently they are used as if they were the gospel.

If you want to learn more about many of these other ratios, get a book on the subject. The problem with Welch is that he just does not believe in many of them. Many ratios seem arbitrary or more like voodoo to him. There are practitioners who swear by them.

Comps or NPV?

- In this class, we have only limited time to talk about "comps" ["comparables"] valuation techniques, sometimes also called "multiples."
- Comps have similarly bad or worse problems as NPV approximations, but their problems are different. So, they can sometimes help to backup and/or triangulate on a reasonable valuation estimate.
- Comparable firms can also help directly in estimation of appropriate discount factors or future cash flows.

Q21: What is easier: Coming up with good comparables or coming up with an estimate of cash flows in 15 years?

Q22: What is triangulation?

IMPORTANT: **In the real world, multiple methods are often used to "triangulate" on reasonable answers.**

Homework Assignment

1. Reread Chapter 14.
2. Read Chapter 15.
3. Hand in all Chapter 14 end-of-chapter problems, due in 7 days.