

# Firm Valuation

# Objectives

- You now have all the tools to value a firm or just about any asset for that matter

$$Value = \sum_{t=1}^{\infty} \frac{FCF \text{ to firm}_t}{(1 + r_{WACC})^t}$$

- Two critical ingredients are needed to estimate value:
  - An estimate of the WACC
  - An estimate of expected future free cash flows
- I want to spend time implementing our discounted cash flow methodology in actual business scenarios

# Free cash flow valuation in practice

- Has different names: FCF valuation, DCF valuation, WACC valuation
- In practice, cash flows are forecasted only for the next 5 years or so
- For the remaining cash flows, typically a constant growth rate is assumed
  - Think about a reasonable growth rate
  - The PV of those cash flows at the end of the precise forecasting period is called **terminal value**
- This gives us the **enterprise value**
  - Enterprise value: equity plus debt, without cash holdings

# How to calculate the enterprise value?

- Calculate the enterprise value as:

$$EV_0 = \frac{FCF_1}{1 + r_{WACC}} + \frac{FCF_2}{(1 + r_{WACC})^2} + \frac{FCF_3}{(1 + r_{WACC})^3} + \dots + \frac{FCF_T + TV_T}{(1 + r_{WACC})^T}$$

- The terminal value ( $TV_T$ ) is calculated as:

$$TV_T = \frac{FCF_{T+1}}{r_{WACC} - g_{FCF}} = \frac{FCF_T(1 + g_{FCF})}{r_{WACC} - g_{FCF}}$$

# How to find the price per share?

1. Calculate the enterprise value
2. Subtract the value of debt
  - Ideally, the market value of debt
  - If not available, then the book value of debt
3. Result is the equity value
  - Side note: We're implicitly assuming that the firm has no excess cash
  - We will maintain this assumption throughout the course
4. Divide by the number of outstanding shares
5. Done!

# Now it's your time to value a firm!

- Consider a company with the following projected free cash flows for the next three years:

Year	1	2	3
FCF	\$5.4mn	\$8.9mn	\$8.6mn

- After the third year, analysts expect a growth rate in free cash flows of 2% per year.
- If the WACC of this firm is 7.5%, what is the enterprise value?
- If the market value of debt is \$30m, what is the equity value?
- How much is the equity value per share if there are 2mn shares outstanding?

# Capturing Synergies

- Synergies can be difficult to realize
- If synergies exist, the value of the combined firm should be greater than the sum of the values of the two firms, operating independently.

$$V(AB) > V(A) + V(B)$$

- KPMG examined whether synergy shows up in acquisitions. 82% of managers thought that their acquisitions had succeeded, but only 17% created value.
- Large number of acquisitions are reversed within fairly short time periods. About 20.2% of the acquisitions made between 1982 and 1986 were divested by 1988.

## PAIRED UP

### Merger Challenge: Unite Toothbrush, Toothpaste

*P&G and Gillette Find Creating Synergy Can Be Harder Than It Looks*

By ELLEN BYRON

Among all the products brought together in Procter & Gamble Co.'s 2005 acquisition of Gillette, two carried particularly high expectations because of their natural fit: the world's No. 1 toothbrush and the world's No. 2 toothpaste.

But putting together Gillette's Oral-B and P&G's Crest turned out to be more complicated than it looked.

A corporate structure featuring dual presidents proved so unwieldy that the senior president finally stepped aside. A forced move for Oral-B employees from Boston to Crest's Cincinnati home led to an exit of talent. Then there were culture

Why the Wal-Mart greeter is really smiling.



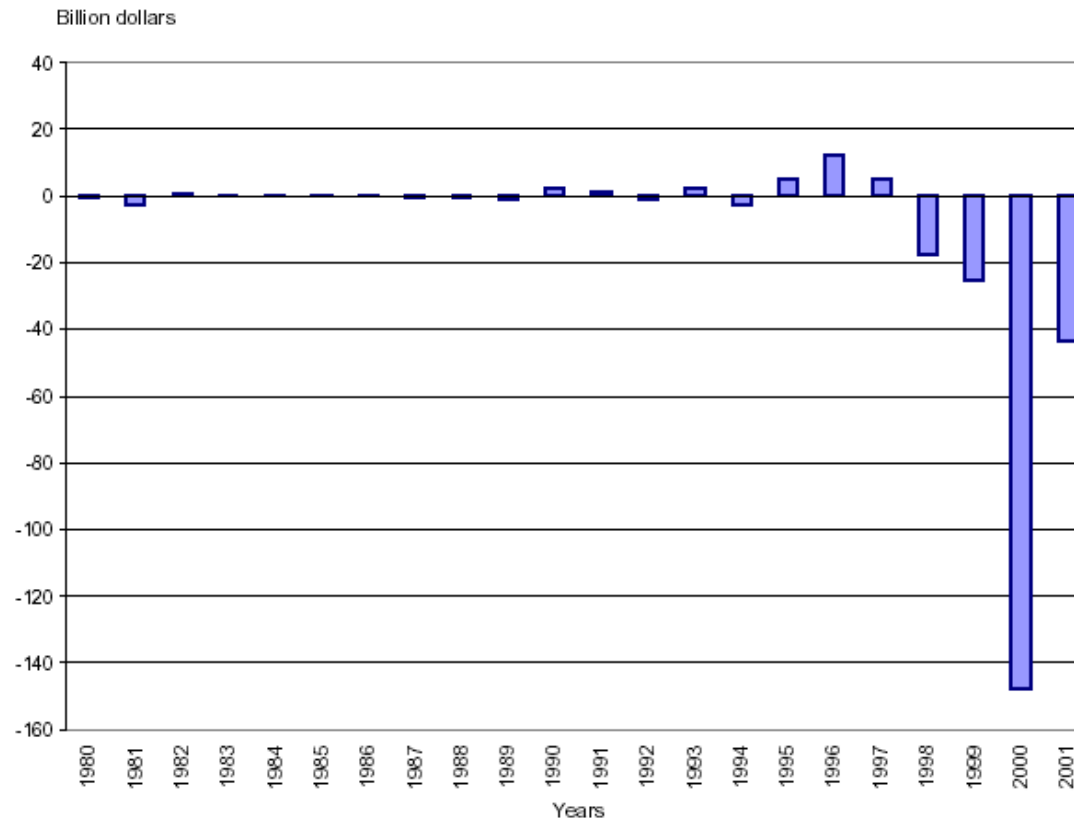
A Wal-Mart store display features Oral-B and Crest products together.

# Valuation with synergies

- Calculate the value of the target company as a stand-alone entity
- Calculate the value of all synergies (sales, costs, etc.)
- Total value = stand-alone value + value of synergies



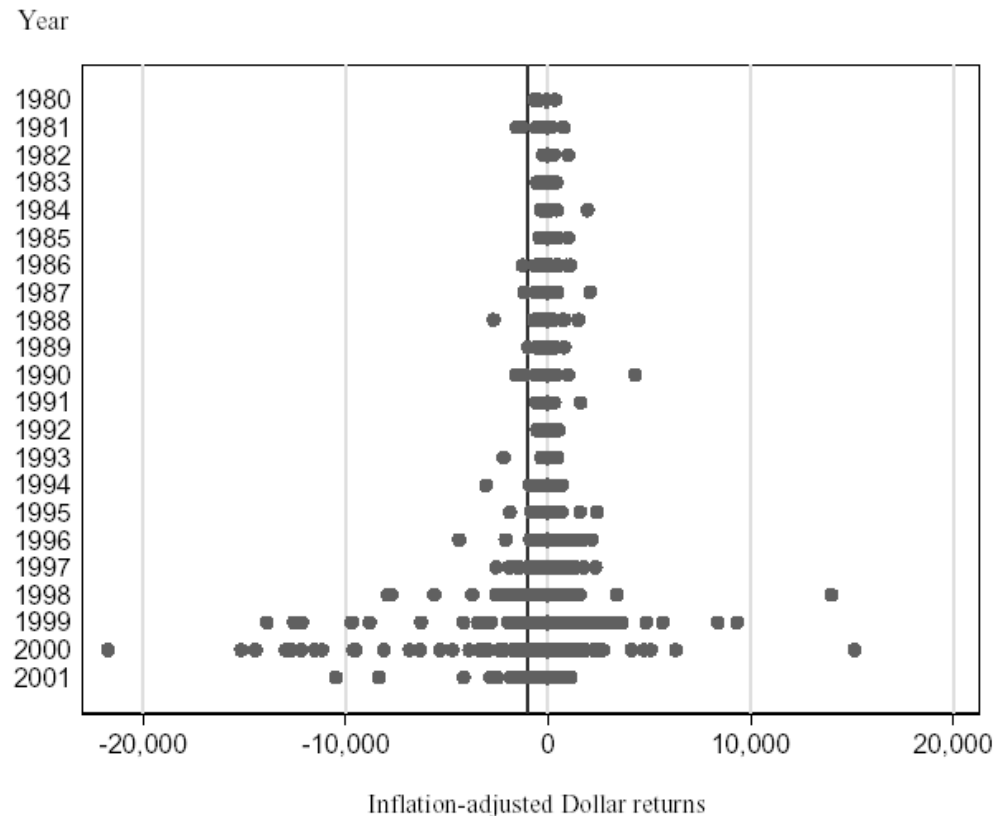
# Wealth Destruction of Acquisitions



**Figure 1. Yearly aggregate dollar return of acquiring-firm shareholders (1980 to 2001).** Data are from the SDC Mergers and Acquisitions Database. The graph shows the aggregate dollar return associated with acquisition announcements for each sample year. The aggregate dollar return is defined as the sum of the product of the abnormal return of each announcement multiplied by the equity capitalization of the acquirer.

\*From Stulz, Schlingemann, and Moeller (2005)

# Wealth Destruction of Acquisitions, Continued



**Figure 2. Box plot of the dollar return of acquiring-firm shareholders (1980 to 2001).** Data from the SDC Mergers and Acquisitions Database. The graph shows the box plot of the inflation adjusted dollar returns (in 2001 million dollars) associated with acquisition announcements by year. These returns are calculated by subtracting the market value of publicly traded equity at the close of event day +1 minus the market value on the close of event day -2. The solid line represents a billion dollar return loss so large loss deals are to the left of the line.

\* From Stulz, Schlingemann, and Moeller (2005)

# Acquisitions in the long-run

- In the long run, the shareholders of acquiring firms experience below average returns.
- Cash-financed mergers are different than stock-financed mergers.
- Acquirers can be friendly or hostile. The shares of hostile cash acquirers outperformed those of friendly cash acquirers. One explanation is that unfriendly cash bidders are more likely to replace poor management.

# Summary

- We can value acquisition targets using our standard discounted cash flow methodology
  - It's a very versatile tool
- It's extremely important to conduct a sensitivity analysis
- Here the motive for the acquisition was synergies between the acquirer and the target
  - Traditionally, synergies are very difficult to capture
  - Organizational issues can be very important

# Alternative valuation techniques

## 1. The **WACC** approach

- What we use in this course
- Cash flows: FCF, which is independent of leverage
- Discount rate: WACC; accounts for effect of leverage on firm value
- Result: enterprise value; subtract debt to get equity value

## 2. The **Flow to Equity** (FTE) approach

- Cash flows: cash flow to equity holders of the levered firm
- Discount rate: cost of equity
- Result: equity value

## 3. The **Adjusted Present Value** (APV) approach

- Separates firm value in two parts: unlevered firm value, and the present value of financing effects
- Financing effects include effects of leverage on firm value
- Result: enterprise value; subtract debt to get equity value