B. Project Synergies

- A project may provide benefits for other projects within the firm. Consider, for instance, a typical Disney animated movie. Assume that it costs $ 50 million to produce and promote. This movie, in addition to theatrical revenues, also produces revenues from
  - the sale of merchandise (stuffed toys, plastic figures, clothes ..)
  - increased attendance at the theme parks
  - stage shows (see "Beauty and the Beast" and the "Lion King")
  - television series based upon the movie
- In investment analysis, however, these synergies are either left unquantified and used to justify overriding the results of investment analysis, i.e,, used as justification for investing in negative NPV projects.
- If synergies exist and they often do, these benefits have to be valued and shown in the initial project analysis.

Case 1: Adding a Café to a bookstore: Bookscape

- Assume that you are considering adding a café to the bookstore. Assume also that based upon the expected revenues and expenses, the café standing alone is expected to have a net present value of -$87,571.
- The cafe will increase revenues at the book store by $500,000 in year 1, growing at 10% a year for the following 4 years. In addition, assume that the pre-tax operating margin on these sales is 10%.

		1	2	3	4	5
Increased Revenues		$500,000	$550,000	$605,000	$665,500	$732,050
Operating Margin		10.00%	10.00%	10.00%	10.00%	10.00%
Operating Income		$50,000	$55,000	$60,500	$66,550	$73,205
Operating Income after Taxes		$30,000	$33,000	$36,300	$39,930	$43,923
PV of Additional Cash Flows		$27,199	$27,126	$27,053	$26,981	$26,908
PV of Synergy Benefits		$135,268				

- The net present value of the added benefits is $135,268. Added to the NPV of the standalone Café of -$87,571 yields a net present value of $47,697.

Case 2: Synergy in a merger..

- We valued Harman International for an acquisition by Tata Motors and estimated a value of $ 2,476 million for the operating assets and $ 2,678 million for the equity in the firm, concluding that it would not be a value-creating acquisition at its current market capitalization of $5,248 million. In estimating this value, though, we treated Harman International as a stand-alone firm.
- Assume that Tata Motors foresees potential synergies in the combination of the two firms, primarily from using its using Harman's high-end audio technology (speakers, tuners) as optional upgrades for customers buying new Tata Motors cars in India. To value this synergy, let us assume the following:
  - It will take Tata Motors approximately 3 years to adapt Harman's products to Tata Motors cars.
  - Tata Motors will be able to generate Rs 10 billion in after-tax operating income in year 4 from selling Harman audio upgrades to its Indian customers, growing at a rate of 4% a year after that in perpetuity (but only in India).

Estimating the cost of capital to use in valuing synergy..

- Business risk: The perceived synergies flow from optional add-ons in auto sales. We will begin with the levered beta of 1.10, that we estimated for Tata Motors in chapter 4, in estimating the cost of equity.
- Geographic risk: The second is that the synergies are expected to come from India; consequently, we will add the country risk premium of 3.60% for India, estimated in chapter 4 (for Tata Motors) to the mature market premium of 5.5%.
- Debt ratio: Finally, we will assume that the expansion will be entirely in India, with Tata Motors maintain its existing debt to capital ratio of 29.28% and its current rupee cost of debt of 9.6% and its marginal tax rate of 32.45%.
  - Cost of equity in Rupees = 6.57% + 1.10 (5.5%+3.60%) = 16.59%
  - Cost of debt in Rupees = 9.6% (1-.3245) = 6.50%
  - Cost of capital in Rupees = 16.59% (1-.2928) + 6.50% (.2928) = 13.63%

Estimating the value of synergy… and what Tata can pay for Harman

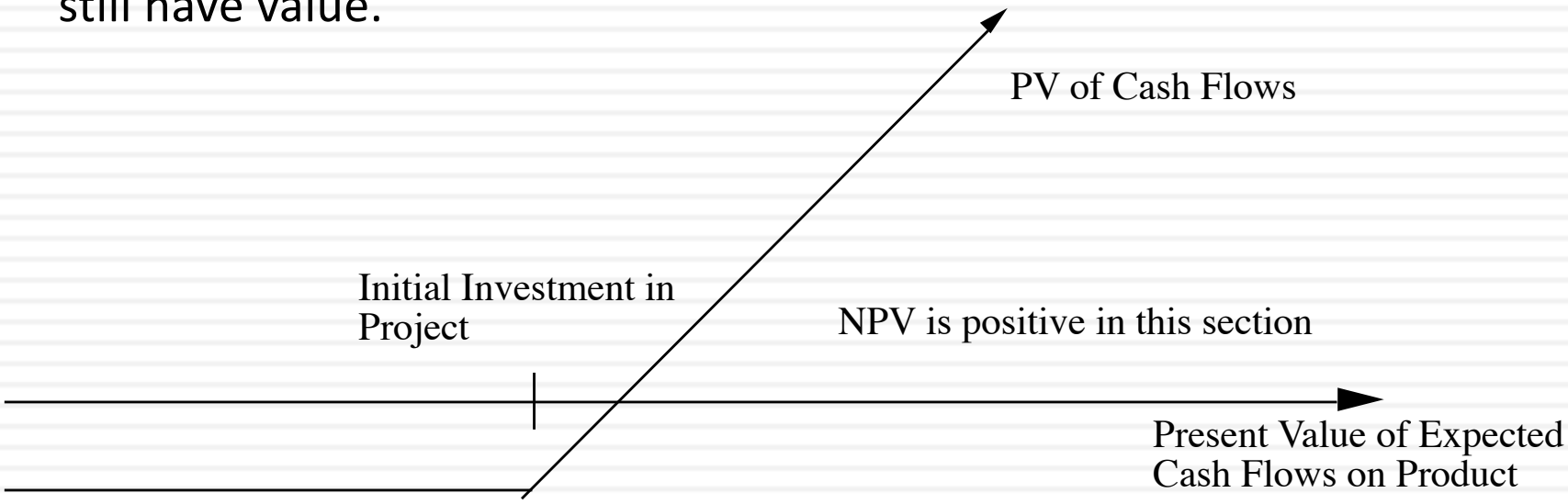
- Value of synergy$_{\text{Year 3}}$ = $\frac{\text{Expected Cash Flow}_{\text{Year 4}}}{(\text{Cost of Capital - g})} = \frac{10{,}000}{(.1363-.04)} = \text{Rs } 103{,}814 \text{ million}$
- Value of synergy today = $\frac{\text{Value of Synergy}_{\text{year 3}}}{(1+\text{Cost of Capital})^3} = \frac{103{,}814}{(1.1363)^3} = \text{Rs } 70{,}753 \text{ million}$
- Converting the synergy value into dollar terms at the prevailing exchange rate of Rs 60/$, we can estimate a dollar value for the synergy from the potential acquisition:
  - Value of synergy in US $ = Rs 70,753/60 = $ 1,179 million
- Adding this value to the intrinsic value of $2,678 million that we estimated for Harman's equity in chapter 5, we get a total value for the equity of $3,857 million.
  - Value of Harman = $2,678 million + $1,179 million = $3,857 million
- Since Harman's equity trades at $5,248 million, the acquisition still does not make sense, even with the synergy incorporated into value.

III. Project Options

- One of the limitations of traditional investment analysis is that it is static and does not do a good job of capturing the options embedded in investment.
  - The first of these options is the option to delay taking a project, when a firm has exclusive rights to it, until a later date.
  - The second of these options is taking one project may allow us to take advantage of other opportunities (projects) in the future
  - The last option that is embedded in projects is the option to abandon a project, if the cash flows do not measure up.
- These options all add value to projects and may make a "bad" project (from traditional analysis) into a good one.

The Option to Delay

- When a firm has exclusive rights to a project or product for a specific period, it can delay taking this project or product until a later date. A traditional investment analysis just answers the question of whether the project is a "good" one if taken today. The rights to a "bad" project can still have value.

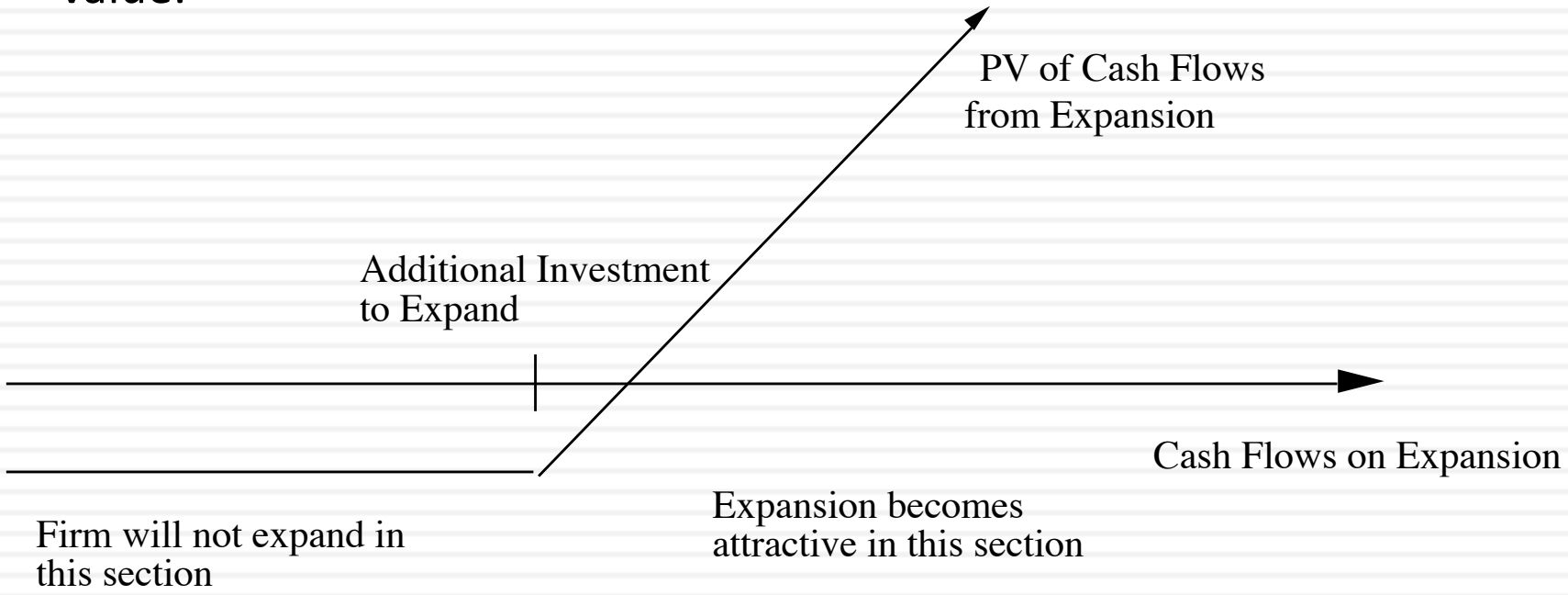


Insights for Investment Analyses

- Having the exclusive rights to a product or project is valuable, even if the product or project is not viable today.
- The value of these rights increases with the volatility of the underlying business.
- The cost of acquiring these rights (by buying them or spending money on development - R&D, for instance) has to be weighed off against these benefits.

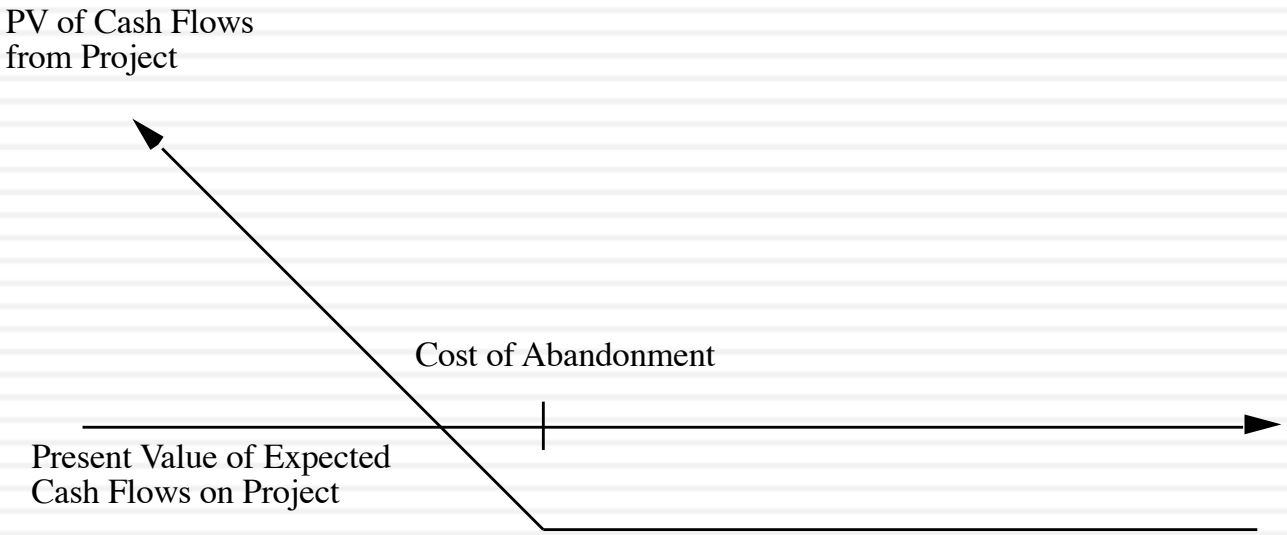
The Option to Expand/Take Other Projects

- Taking a project today may allow a firm to consider and take other valuable projects in the future. Thus, even though a project may have a negative NPV, it may be a project worth taking if the option it provides the firm (to take other projects in the future) has a more-than-compensating value.



The Option to Abandon

- A firm may sometimes have the option to abandon a project, if the cash flows do not measure up to expectations.
- If abandoning the project allows the firm to save itself from further losses, this option can make a project more valuable.

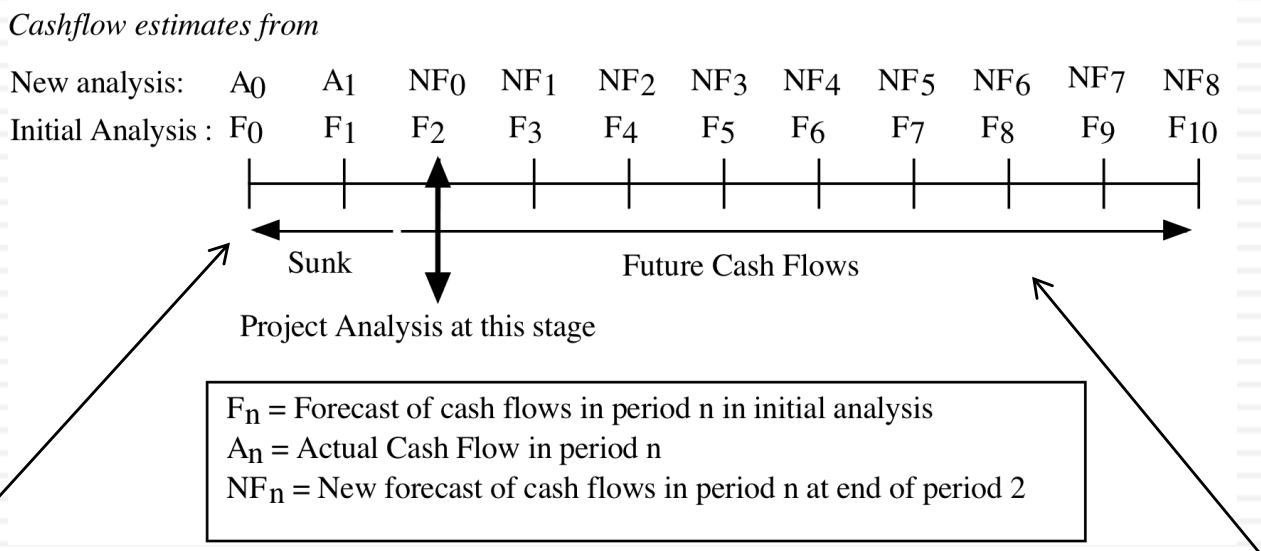


IV. Assessing Existing or Past investments…

- While much of our discussion has been focused on analyzing new investments, the techniques and principles enunciated apply just as strongly to existing investments.
- With existing investments, we can try to address one of two questions:
  - Post –mortem: We can look back at existing investments and see if they have created value for the firm.
  - What next? We can also use the tools of investment analysis to see whether we should keep, expand or abandon existing investments.

Analyzing an Existing Investment

Figure 6.13: Analysis of Existing Project



In a post-mortem, you look at the actual cash flows, relative to forecasts.

You can also reassess your expected cash flows, based upon what you have learned, and decide whether you should expand, continue or divest (abandon) an investment

a. Post Mortem Analysis

- The actual cash flows from an investment can be greater than or less than originally forecast for a number of reasons but all these reasons can be categorized into two groups:
  - Chance: The nature of risk is that actual outcomes can be different from expectations. Even when forecasts are based upon the best of information, they will invariably be wrong in hindsight because of unexpected shifts in both macro (inflation, interest rates, economic growth) and micro (competitors, company) variables.
  - Bias: If the original forecasts were biased, the actual numbers will be different from expectations. The evidence on capital budgeting is that managers tend to be over-optimistic about cash flows and the bias is worse with over-confident managers.
- While it is impossible to tell on an individual project whether chance or bias is to blame, there is a way to tell across projects and across time. If chance is the culprit, there should be symmetry in the errors – actuals should be about as likely to beat forecasts as they are to come under forecasts. If bias is the reason, the errors will tend to be in one direction.

b. What should we do next?

$$\sum_{t=0}^{t=n} \frac{NF_n}{(1+r)^n} < 0 \quad \text{.....} \quad \text{Liquidate the project}$$

$$\sum_{t=0}^{t=n} \frac{NF_n}{(1+r)^n} < \text{Salvage Value} \quad \text{.....} \quad \text{Terminate the project}$$

$$\sum_{t=0}^{t=n} \frac{NF_n}{(1+r)^n} < \text{Divestiture Value} \quad \text{.....} \quad \text{Divest the project}$$

$$\sum_{t=0}^{t=n} \frac{NF_n}{(1+r)^n} > 0 > \text{Divestiture Value} \quad \text{.....} \quad \text{Continue the project}$$

Example: Disney California Adventure – The 2008 judgment call

- Disney opened the Disney California Adventure (DCA) Park in 2001, at a cost of $1.5 billion, with a mix of roller coaster rides and movie nostalgia. Disney expected about 60% of its visitors to Disneyland to come across to DCA and generate about $ 100 million in annual after-cash flows for the firm.
- By 2008, DCA had not performed up to expectations. Of the 15 million people who came to Disneyland in 2007, only 6 million visited California Adventure, and the cash flow averaged out to only $ 50 million between 2001 and 2007.
- In early 2008, Disney faced three choices:
  - Shut down California Adventure and try to recover whatever it can of its initial investment. It is estimated that the firm recover about $ 500 million of its investment.
  - Continue with the status quo, recognizing that future cash flows will be closer to the actual values ($ 50 million) than the original projections.
  - Invest about $ 600 million to expand and modify the park, with the intent of increasing the number of attractions for families with children, is expected to increase the percentage of Disneyland visitors who come to DCA from 40% to 60% and increase the annual after tax cash flow by 60% (from $ 50 million to $ 80 million) at the park.

DCA: Evaluating the alternatives…

- Continuing Operation: Assuming the current after-tax cash flow of $ 50 million will continue in perpetuity, growing at the inflation rate of 2% and discounting back at the theme park cost of capital in 2008 of 6.62% yields a value for continuing with the status quo

  Value of DCA = $\frac{\text{Expected Cash Flow next year}}{(\text{Cost of capital} - g)} = \frac{50(1.02)}{(.0662 - .02)} = \$1.103 \text{ billion}$

- Abandonment: Abandoning this investment currently would allow Disney to recover only $ 500 million of its original investment.

  Abandonment value of DCA = $ 500 million

- Expansion: The up-front cost of $ 600 million will lead to more visitors in the park and an increase in the existing cash flows from $ 50 to $ 80 million.

  Value of CF from expansion = $\frac{\text{Increase in CF next year}}{(\text{Cost of capital} - g)} = \frac{30(1.02)}{(.0662 - .02)} = \$662 \text{ million}$

First Principles