Corporate Finance

FINA4330

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Class website: go to http://www.bauer.uh.edu/nlangberg/ and then click on the Corporate Finance 4330 link at the bottom

What material can be found online?

- Syllabus
- *Outline* of lecture notes
- Homework assignments and due dates
- Announcements
- other handouts

Grading

- **Homework and Class Participation (30%)**
  - To be submitted at the beginning of class
  - Can be done in groups of up to four students

- **Quiz 1 (20%)**
  - in class
- **Quiz 2 (20%)**
  - in class
- **Quiz 3 (30%)**
  - in class

What are we going to learn?

- **The goal of the corporation**
  - What do corporations do? Who makes the decisions? Who owns the corporation? Who are the stakeholders? Do only stockholders matter?
- **The time value of money and its applications**
  - *is a payment today preferred over the same payment tomorrow? What about inflation? What about taxes? What about risk?*
- **How inflation/taxes/and risk are factored into the valuation of future cash flows**
  - *do investors prefer safe payoffs over risky ones? In what cases will the answer be NO? should all investors invest in the stock market? Should all investors hold the same stocks in their portfolio?*
- **How to apply basic financial concepts to various financial decisions**
  - *adopting a project, refinancing a mortgage, taking a loan to buy a car, renting or buying a home, delaying investments in states of uncertainty*
- **How to calculate and predict cash flows based on accounting information, and value equity**
  - why do we car about cash-flows and not “earnings”? How do we calculate cash-flows from financial reports? How can we predict future cash-flows? What is the “right price” for a stock?

Course outline

- Time value of money – discounting
- Bond valuation
- Stock valuation
- Capital budgeting – figuring our cash flows
- Risk and return – figuring out discount rate
- Capital budgeting (with risk)
- Firm's payout policy – dividends
- Firms' financing policy – capital structure

Introduction

- What kind of businesses exist?
- Financial decisions – the financial manager?
- Separation of ownership and control
- Time value of money
- The single price principle and the no-arbitrage principle

What kind of businesses exist?

- **Private**
  - **sole proprietorships/partnerships (***mostly small or young firms)*
  - **closely held corporations (***mostly small or young firms)*
- **Public**
  - *mostly large firms*
  - *shares are traded via NASDAQ, NYSE or AMEX*

What do you think? – ***Private or Public…?***

Public*…39,700 employees*

Private*….19,600 employees*

Public*…1,200,000 employees*

Private*…8,850 employees*

Public*…71,000 employees*

Private*…7,000 employees*

Financial decisions – the financial manager

Where to raise funds?

How to raise funds?

Where to invest?

When to invest?

How to distribute earnings?

Where to raise funds?

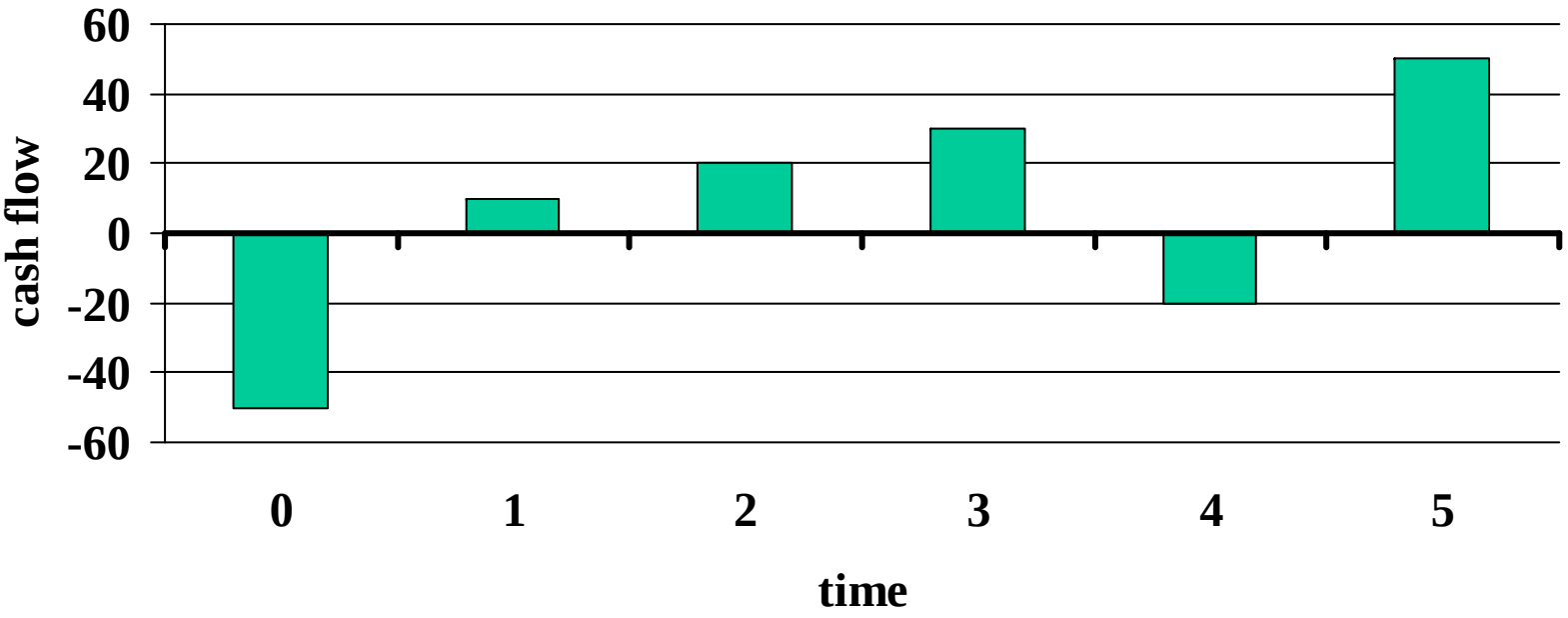
- Private
  - Savings, friends, family
  - Local banks, credit cards, financing companies
  - Venture Capital, corporations, Angel investors
- Public
  - bond and equity markets

How to raise funds?

- Debt
  - Short-term versus Long-term
  - Fixed versus floating rate
  - Secured versus non-secured debt
  - Seniority and Debt covenants
  - Straight versus Convertible (also warrants)
- Equity
  - With or without voting rights? – dual class stock
  - Who are the investors? – institutional, active, or/and passive
  - Public or private equity? – Initial Public Offering and seasonal equity offering)

How to identify a worthy investment?

We view financial projects as streams of cash flows



What is a "*financial project*"?

- Mergers and Acquisitions, expansions, capital and labor investments
- Investment in public securities such as government bonds, corporate bonds, corporate equity, mutual funds, hedge funds
- Purchasing a house – mortgages, purchasing a car – loans, saving for retirement – pension account, going to school – student loans

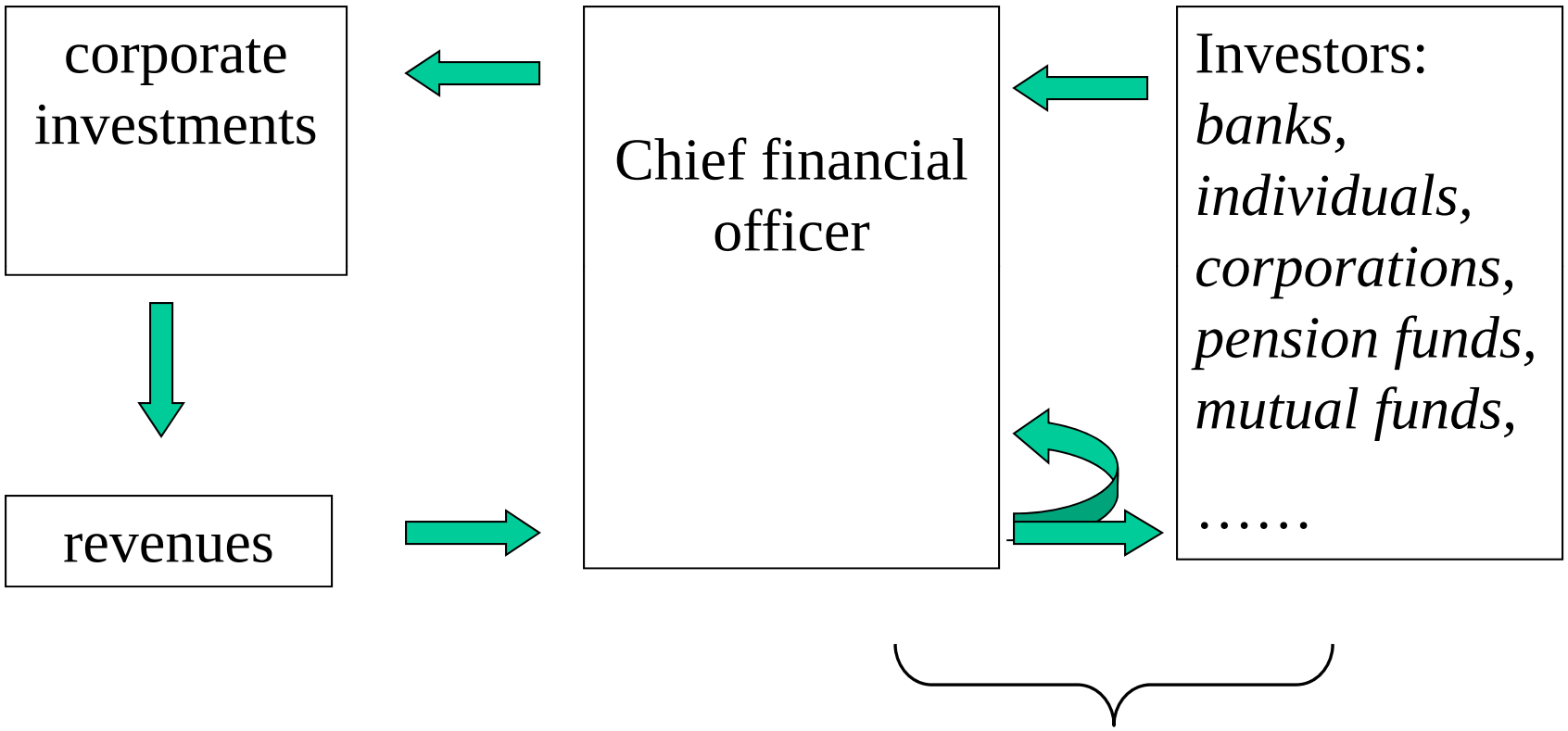
How about?

- Marriage, vacation…
  - Here we need to take into account the *utility* of individuals instead of cash-flows, but besides that no big difference.

What do firms do with their profits?

- Pay back to investors… dividends to share holders and coupon payments to debt holders
- Save earnings in the firm…retain earnings
- Start new projects and expand the existing projects…

Putting it all together…

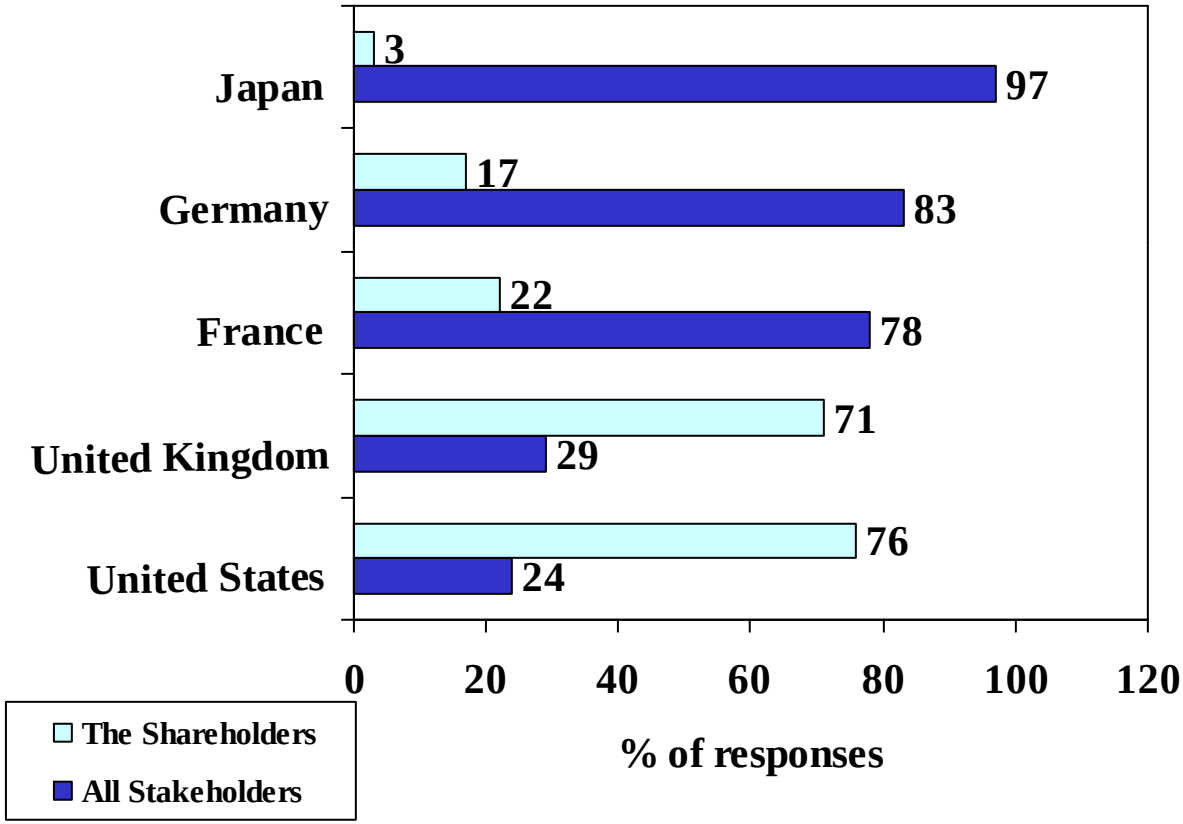


What do you think?

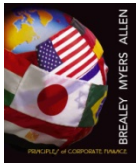
- What should the CFO care about the most
  a. Maximizing firm sales
  b. Paying employees high wages
  c. Paying high dividends
  d. Earning high profits
  e. Her own pay and job security
  f. All/some of the above

Who's company is it?

** Survey of 378 managers from 5 countries

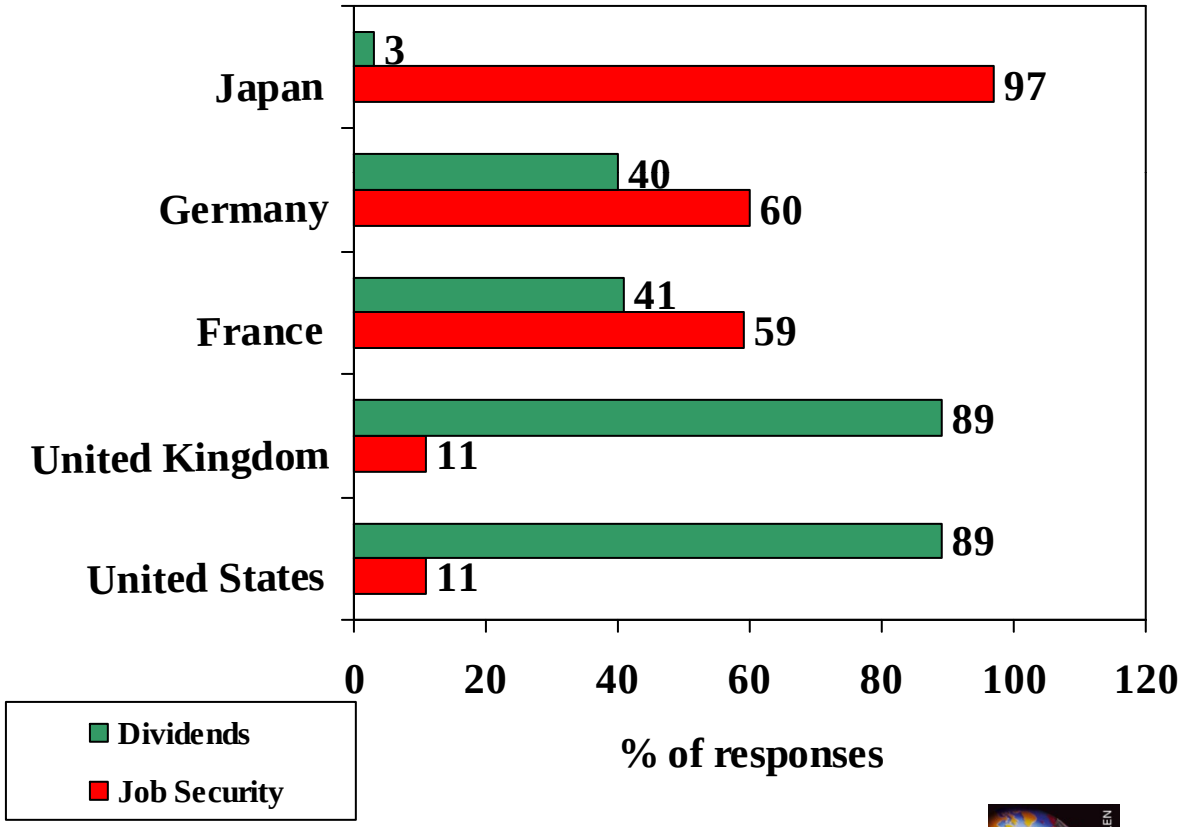


Source: Chapter 2, Brealey, Myers and Allen 8/e



What is more important dividends or jobs?

** Survey of 399 managers from 5 countries. Which is more important...jobs or paying dividends?



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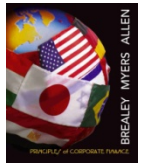


So what does the CFO maximize?

In our class we assume that

The CFO operates in the best interest of ***investors*** *to* ***maximizes value***

- What is VALUE?
- Is that what CFOs do in practice?

Corporate Governance…”how can investors make sure that the manager acts in their best interest?”

- **Board of directors**
  - replacement of management
- **Market for corporate control**
  - mergers and acquisitions
- **Disclosure and monitoring**
  - accounting reports, auditing firms
- **Manager’s compensation schedule**
  - firm equity
  - vesting options
- **Debt covenants**

What is the **VALUE** of a used car?

Hint…

- By value we mean *market value* or *price*
  - *If you have just bought a car for $10,000 but you can only resell it for $7,000 then the current value of the car is $7,000.*
- Crucial concepts:
  - *Law of one price ("No Arbitrage"): two projects that produce identical payoffs must have the same price*
  - *Value additivity: the value of a pool of assets exactly equals the sum of values of the individual assets that make up the pool of assets.*

Present and Future Value

Present Value

Value today of a future cash flow.

How much are you willing to pay now for a promised payment in the future?

How much are you willing to repay in the future for a payment today?

Future Value

Amount to which an investment will grow after earning interest

What could affect the present value?

- Interest rate
- inflation
- tax
- risk

Time value of money

- If we put $100 into a saving account for one year at an interest rate of 2% then at the end of the year we will have $102 in our account.

  - $1 today is worth $1.02 delivered in one year from today ("*future value*")
  - *The future value of $1 invested for one year at interest rate of 2% is $1.02.*

Future value definition

- The future value is what a certain dollar amount today will be worth to you at some time in the future

<u>Example</u>: assume you have $100 and you can invest at 8% per year

  - The value in 1 year: $100(1.08)=$108
  - The value in 2 years: $100(1.08)^2=$116.6
  - The value in “n” years: $100(1.08)^n

Future Value

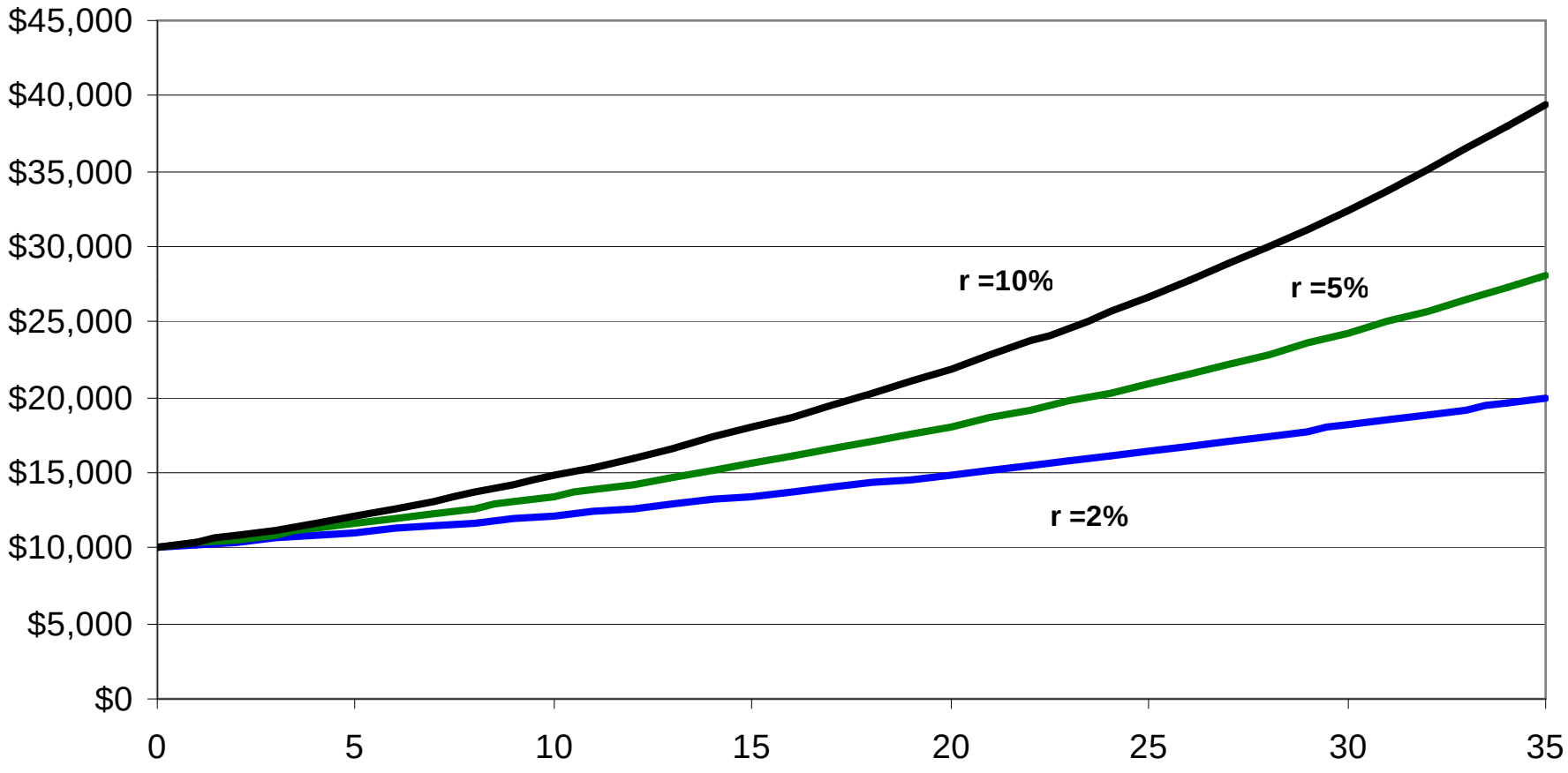
- FV – future value at the end of year n
- CF – cash flow invested at time 0
- r – annual interest rate

$$FV = CF(1+r)^n$$

Notice…

- The higher the interest rate, the higher the future value
- The longer the time until the cash flow, the higher the future value.

Future Value of $10,000 after “n” years



Number of years - “n”

Time value of money

- If we put $98 into a saving account for one year at an interest rate of 2% then at the end of the year we will have $100 in our account

  - $1 delivered in one year from today is worth $0.98 today ("*present value*")
  - *The present value of $1 delivered one year from now, when interest rate is 2%, is $0.98.*

Present value definition

- The present value of a certain future cash flow is the amount you would need to invest today in order to build up to that amount

<u>Example</u>: you will receive $100 in ten years from now, the interest rate is 8% per year

- The present value is $\$100(1.08)^{-10}=\$46.32$

- What is the future value of $46.32 in ten years from now if the interest rate is 8% pre year?

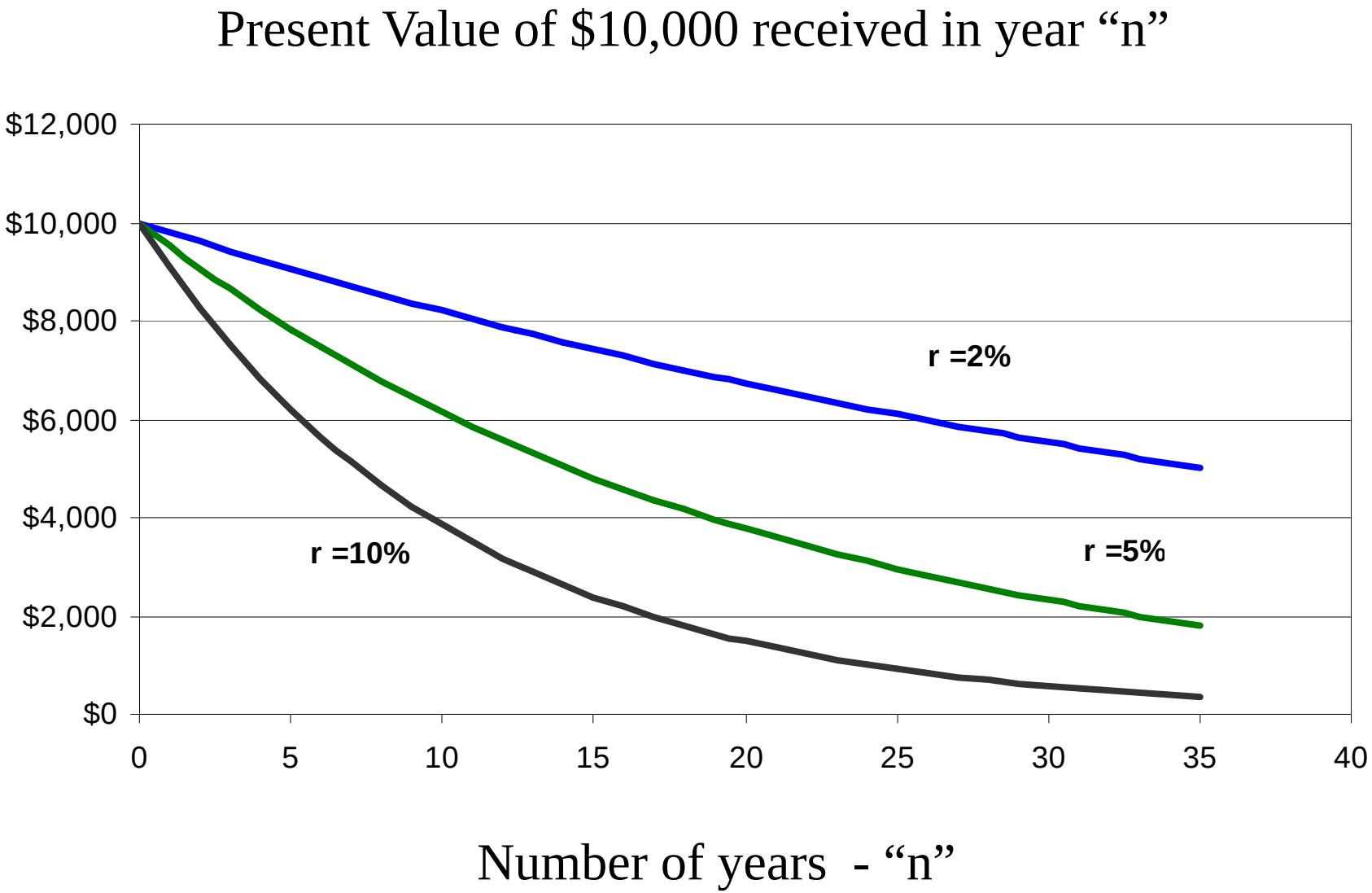
Present Value

- PV – present value
- CF – cash flow received at the end of year n
- r – annual interest rate

$$PV = \left[\frac{1}{(1+r)^n} \right] CF$$

Notice…

- The higher the interest rate, the lower the present value
- The longer the time until the cash flow, the lower the present value.


Present Value of $10,000 received in year “n”
$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$0
0
5
10
15
20
25
30
35
40
r =2%
r =5%
r =10%
Number of years - “n”

Value additivity

- Projects often yield a stream of cash flows over several periods.
- To calculate the PV of the stream of cash flows, add up the PV's of each cash flow
- To calculate the FV of the stream of cash flows, add up the FV's of each cash flow

Example: starting 1 year from now deposit $2000/year in a retirement account for 30 years. If the rate of interest is 6%, how much will you have saved in 30 years?

Example (cont'd)

Year	deposit	Value in 30 years
1	\$2,000	$\$2{,}000(1.06)^{29}=\$10{,}837$
2	\$2,000	$\$2{,}000(1.06)^{28}=\$10{,}223$
3	\$2,000	$\$2{,}000(1.06)^{27}=\$9{,}645$
	….	….
30	\$2,000	\$2,000
	Total	\$158,116

Discount Factors and Rates

Discount Rate/Interest Rate

Interest rate used to compute present values of future cash flows.

Discount Factor

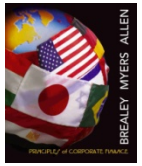
Present value of a $1 future payment.

Discount factor

- We discount future cash flows using a “discount factor” e.g. 0.98

$$\textit{present value} = (\textit{discount factor}) \times (\textit{cash flow})$$

- We already know how to calculate the “discount factor”…it depends on
  - the time we receive the cash flow
  - the discount rate

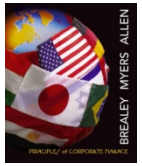


Discount Factor - definition

- Given two dollars, one received a year from now and the other two years from now, the value of each is commonly called the Discount Factor. Assume $r_1 = 20\%$ and $r_2 = 7\%$.

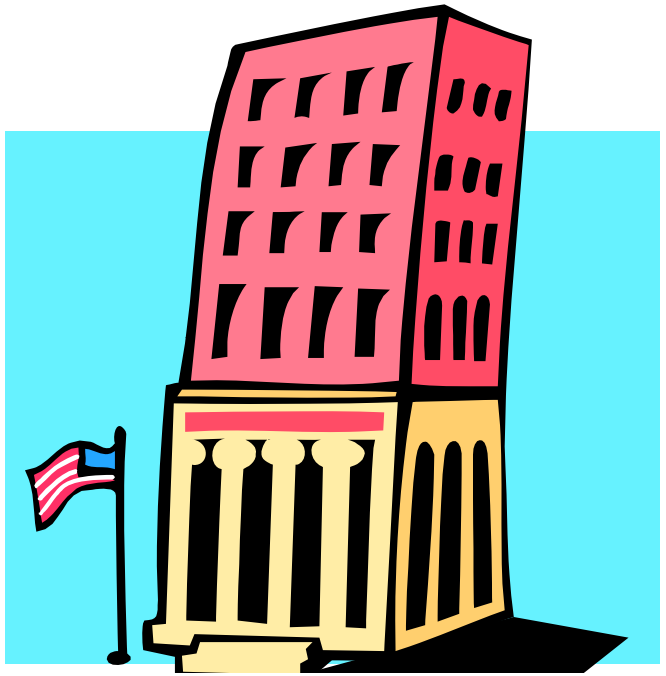
$$DF_1 = \frac{1.00}{(1+.20)^1} = .83$$

$$DF_2 = \frac{1.00}{(1+.07)^2} = .87$$

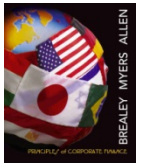


Example

Assume that the cash flows from the construction and sale of an office building is as follows. Given a 5% required rate of return, create a present value worksheet.



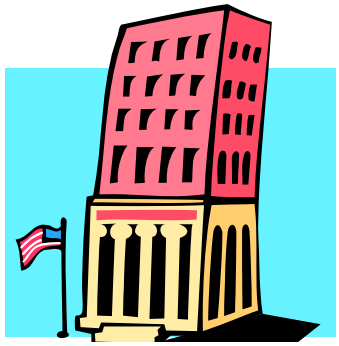
Year 0	Year 1	Year 2
−170,000	−100,000	+320,000



Example – continued (using discount factors)

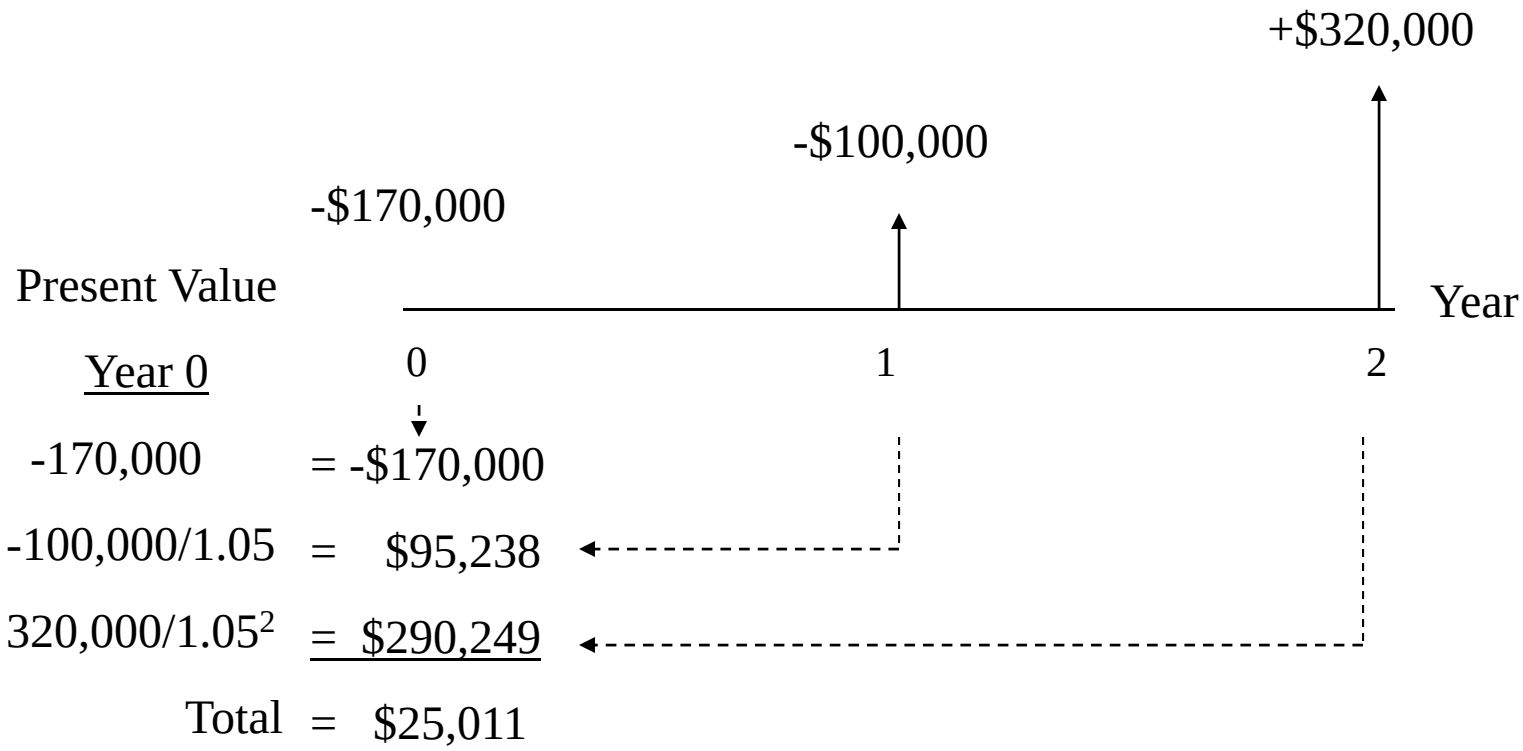
Assume that the cash flows from the construction and sale of an office building is as follows. Given a 5% required rate of return, create a present value worksheet.

Period	Discount Factor	Cash Flow	Present Value
0	1.0	−170,000	−170,000
1	$\frac{1}{1.05} = .952$	−100,000	−95,238
2	$\frac{1}{(1.05)^2} = .907$	+320,000	+290,249
		Total =	$25,011



Example – continued (using interest rates)

Assume that the cash flows from the construction and sale of an office building is as follows. Given a 5% required rate of return, create a present value worksheet.



Using PV calculations to compare business strategies

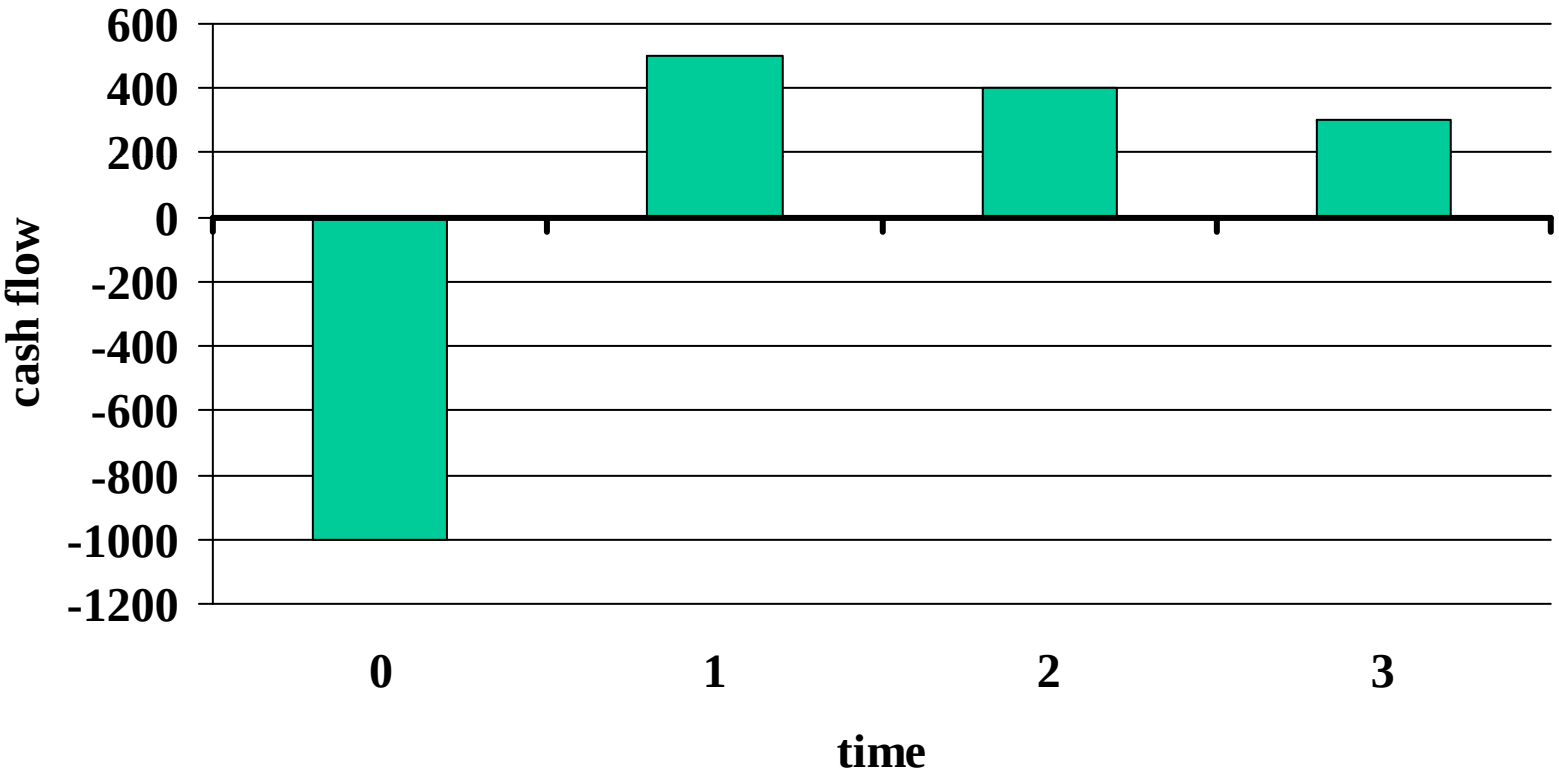
A weapons manufacturer is developing a mine detector device and is considering two alternatives business strategies.

Strategy A: bring product to market in one year, cost $1 billion now, earn $500, $400 and $300 million in years 1,2 and 3, respectively.

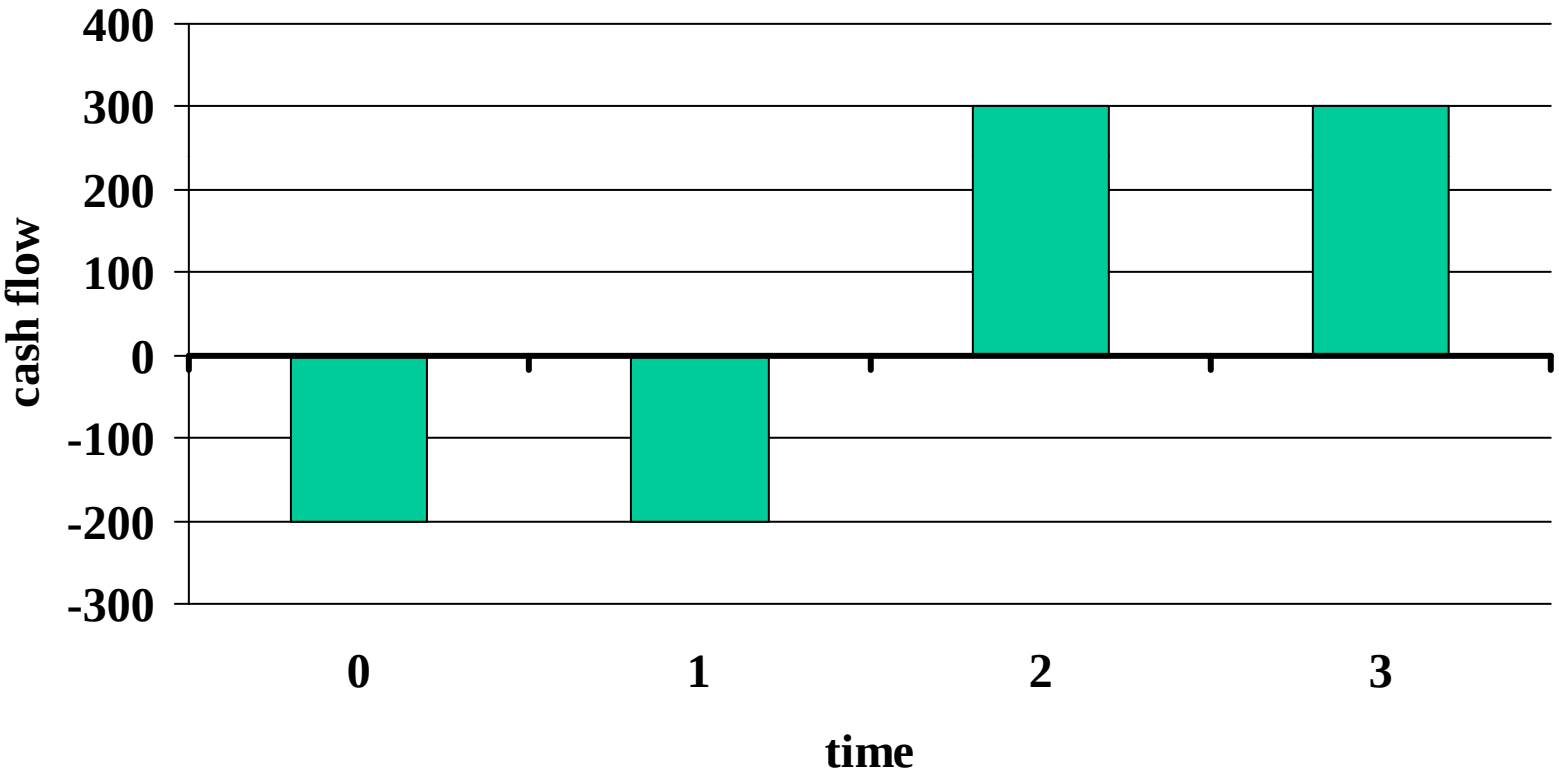
Strategy B: bring product to market in two years, cost $200 million now *and* in year 1, and earn $300 million in years 2 and 3.

– What strategy is more profitable to the company?

Cash flows from strategy A (millions of dollars)

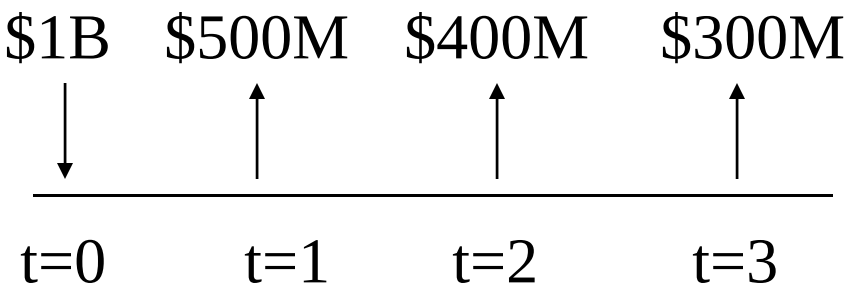


Cash flows from strategy B (millions of dollars)



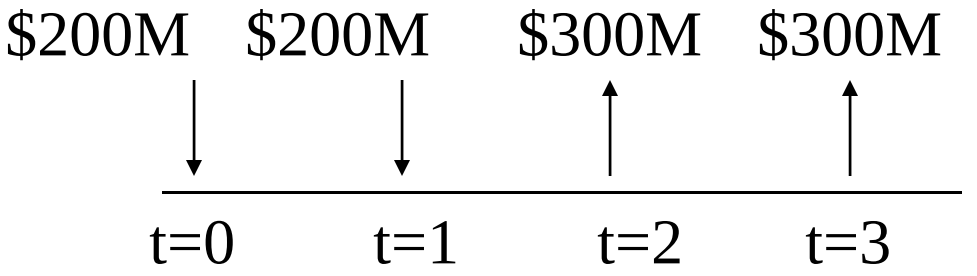
Weapons manufacturer example (cont'd)

- **<u>Strategy A</u>:**



$$-1000+\frac{500}{1.02}+\frac{400}{(1.02)^2}+\frac{300}{(1.02)^3}=157.36$$

- **<u>Strategy B</u>:**



$$-200-\frac{200}{1.02}+\frac{300}{(1.02)^2}+\frac{300}{(1.02)^3}=174.97$$

“No arbitrage” *or* “Law of one price”

We will come back to and use the “no-arbitrage” principle. This will help us value assets by relying on prices of other assets.

Arbitrage is.. “profit with no risk”, “money machine”

Everyone is looking for an arbitrage opportunity…a way to profit for sure by selling and buying assets!

But…arbitrage opportunities quickly disappear from markets and are hard to come by…lets see why.

“No arbitrage” *or* Law of one price

Example: Citibunk (a financial institution) offers a borrowing and lending rate of 7% a year. At the same time, BunkOne (a financial institution also) is offering a note that pays $1,000 in one year for the price of $930. Can one take advantage of BunkOne’s offer?

- *With BunkOne we need to invest $930 in order to accumulate $1000 in one year. Is this the only way to accumulate $1000 in one year?*
- *How much do we need to invest with Citibunk in order to accumulate $1,000 in one year from now?*

- Well…with interest of 7%, if we invest $X today with Citibunk then we will accumulate $X(1.07) in one year from now.

We need to solve: *$X(1.07)=$1,000*

- So…in order to accumulate $1000 we must currently invest $934.58 (which is $1000/1.07).

Is BunkOne's offer more attractive?

- This means that there are essentially two prices for an asset that pays $1000 in one year: $930 & $934.58

First conclusion:

If you want to receive $1000 in one year don't approach Citibunk – it will cost you an additional $4.58. In other words, we can get 7.52% if we invest with BunkOne.

Is there an arbitrage opportunity?

Well…Citibunk also allows us to borrow at a 7% interest rate. So how about borrowing at 7% and investing in 7.52%?

Second conclusion:

We can earn arbitrage profit by borrowing money from Citibunk at 7% and buying the notes offered by BunkOne. Lets see how it would work…

strategy	t=0	t=1
Borrow $930 from Citibunk	*+ $930*	*-$995.1 = -930(1.07)*
Buy 1 note from BunkOne	*-$930*	*+$1,000*
Net position	*$0*	*+$4.9*

Arbitrage of $4.9 in one year from now!

Could this be possible?

Or…

strategy	t=0	t=1
Borrow from Citibunk	*$934.58 =1000/1.07*	*-$1,000*
Buy note from BunkOne	*-$930*	*+$1,000*
Net position	*$4.58*	*$0*

Arbitrage of $4.58 today!

- How much money can one make?
- Will this last for long?
- What will happen to prices?