Corporate Finance I.

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Subject requirements

- Aim: to show and to demonstrate the tasks and duties of a financial manager in a large corporate
- Teaching book: Brealey/Myers: Principles of Corporate Finance Part 1.
- Suggested readings: Bozsik Sándor: Pénzügyi számítások I-II.
- Condition of signature: Writing and solving a small case study from investment appraisal (Excel, Word)
- Exam: written exam (70% examples, 30% theoretical questions)

Content of case study

- A brief technical description of the proposed project
- Give financial data about the capital outlay (considering the potential opportunities)
- Forecast the future cash inflows (saved expenses) and cash outflows (lost revenues) of project
- Estimate the scrap value of project
- Make the NPV analysis

The Objective in Corporate Finance

„If you don’t know where you are going, it does not matter how you get there”

Aswath Damodaran

Stern School of Business

Different corporate goals

- Profit maximization
- Revenue maximization
- Size of business
- Market share
- EVA

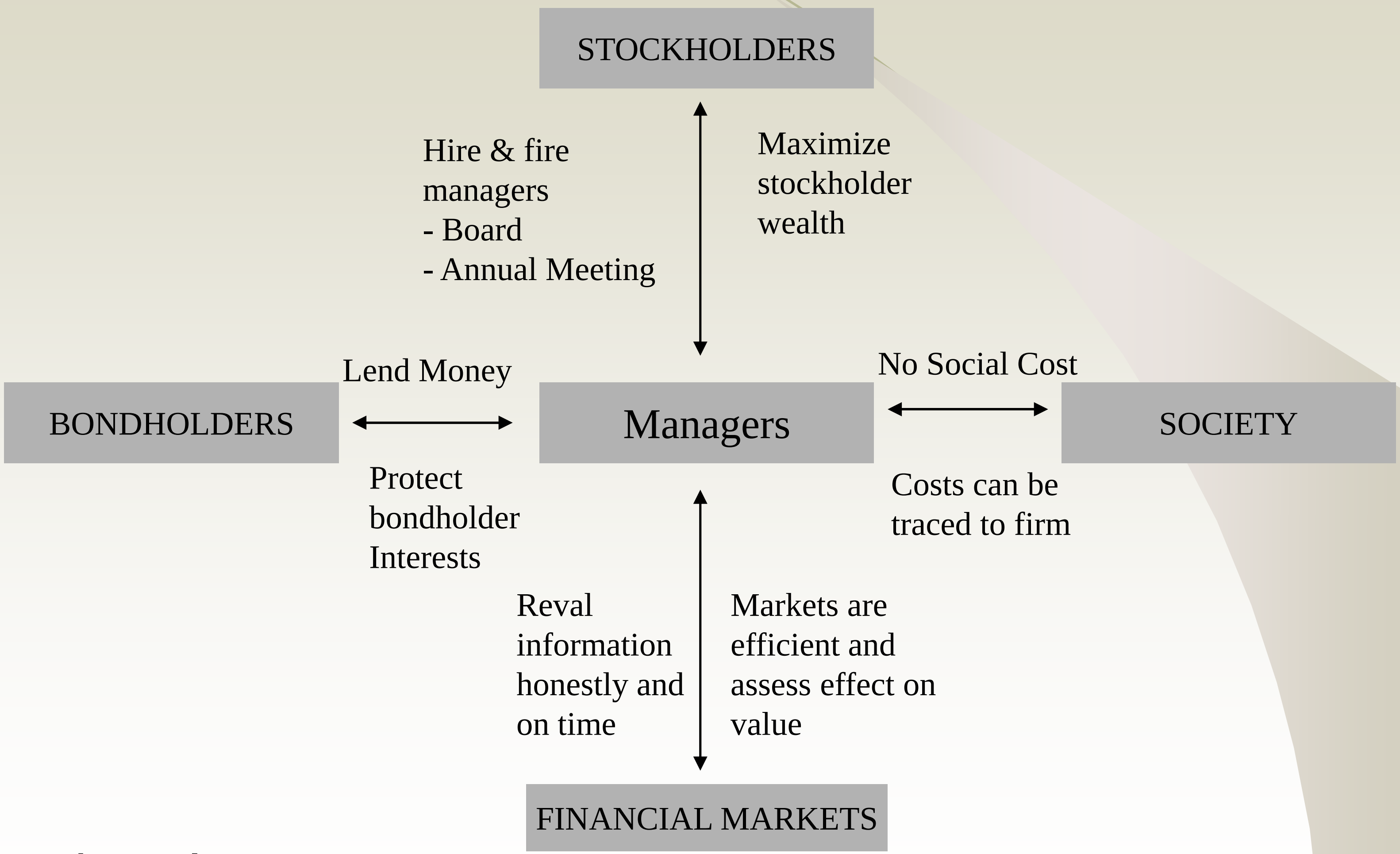
The Classical Viewpoint

- **Van Horne**: „In this book, we assume that the objective of the firm is to maximize its value to its stockholders"
- **Brealey & Myers**: „Success is usually judged by value: Shareholders are made better off by any decision which increases the value of their stake in the firm… The secret of success in financial management is to increase value."
- **Copeland & Weston**: The most important theme is that the objective of the firm is to maximize the wealth of its stockholders."
- **Brigham and Gapenski:**Throughout this book we operate on the assumption that the management's primary goal is stockholder wealth maximization which translates into maximizing the price of the common stock.

Why not profit increase?

- The value is sensitive to the risk of profit, too.
- The profit reflects the past record, the value is depend on the long term growing prospects.
- The accounting profit can be easily manipulated and a wrong indicator of company performance.
- The shareholders are interested in their personal wealth.
- Data on profit are available only occasionally.

The Classical Objective Function



Aswath Damodaran

Comparison of the two typical financial system

Points	Anglo-Saxon	Continental
Main money supplier	Financial markets	Financial intermediaries
Main investors	Financial	Strategic
How to measure company performance	Financial indicators	Financial and non-financial indicators
Prefers	Capital flows among sectors, takeovers and mergers	Long term investments

Tasks of financial manager, accountant and controller

Financial manager
- Bank connections
- Cash management
- Financing
- Dividend policy
- Insurance
- Investments

Accountant
- Book keeping
- Financial statements
- Internal supervision
- Payroll
- Credit/Debtor administration
- Taxation

Controller
- Budgeting
- Management information system
- Measuring
- Acting

Task of a financial manager

Balance sheet item	Assets	Source of funds
Daily	Working capital management (liquidity)	
Occasi-onally	Investment decision (excess value)	Financing decisions (risk reduction)

Parts of Financial Statements

- Balance sheet
- Income statement
- Cash flow statement
- (Changes in Shareholders' Equity)
- Notes to Financial Statements
- Report of Independent Auditor

Structure of balance sheet of a mobile company (Mobimak)

Assets	Liabilities and shareholders' equity
Inventories	Interest-bearing borrowings
Accounts receivable	Other current liabilities
Prepayments	**Total current liabilities**
Cash and cash equivalents	Interest-bearing borrowings
Total current assets	Other non-current liabilities
Share Capital not Paid-in	**Total non-current liabilities**
Intangible assets	**Minority interest**
Property, plant and equipment	Share capital
Deferred tax	Retained earnings
Investment in Mobimak foundation	Reserves
Total non-current assets	**Total shareholders' equity**
Total assets	**Total liabilities and shareholders' equity**

Valuation of assets

<u>At cost minus depreciation and impairment or at net realisable value</u>

At cost means – sum of all cash outflow till the time of activation or warehousing.

Depreciation – writing off the value of the assets due to physical or economic usage.

Impairment – physical or economic damage in value of stocks or receivables.

Net realisable value – market value of goods minus transaction cost of the deal

Way of depreciation

Depreciation period – economic useful time

Shape of depreciation

- by performance
- by plan
  - by gross value
  - by net value

linear
degressive
(progressive)

How can we analyze the balance sheet? (Mobimak)

Consolidated balance sheet

Assets	2001	2002	% of total 2001	% of total 2002	Liabilities and shareholders' equity	2001	2002	% of total 2001	% of total 2002
Inventories	360	284	5,35%	3,67%	Interest-bearing borrowings	401	169	5,97%	2,18%
Accounts receivable	781	819	11,62%	10,57%	Other current liabilities	1 954	847	29,07%	10,93%
Prepayments	114	15	1,69%	0,19%	**Total current liabilities**	**2 355**	**1 016**	**35,04%**	**13,11%**
Cash and cash equivalents	372	902	5,54%	11,64%	Interest-bearing borrowings	828	423	12,31%	5,46%
Total current assets	**1 627**	**2 021**	**24,21%**	**26,07%**	Other non-current liabilities	0	0	0,00%	0,00%
Share Capital not Paid-in	**204**		**3,04%**	**0,00%**	**Total non-current liabilities**	**828**	**423**	**12,31%**	**5,46%**
Intangible assets	770	1 096	11,45%	14,14%	**Minority interest**	**0**	**0**	**0,00%**	**0,00%**
Property, plant and equipment	4 093	4 609	60,88%	59,45%	Share capital	2344	2344	34,88%	30,24%
Deferred tax	28	27	0,42%	0,34%	Retained earnings	1195	3765	17,77%	48,57%
Investment in Mobimak foundation	0	0	0,00%	0,00%	Reserves	0	203	0,00%	2,62%
Total non-current assets	**4 891**	**5 732**	**72,75%**	**73,93%**	**Total shareholders' equity**	**3 539**	**6 313**	**52,65%**	**81,43%**
Total assets	***6 722***	***7 752***	***100,00%***	***100,00%***	***Total liabilities and shareholders' equity***	***6 722***	***7 752***	***100,00%***	***100,00%***

How can we analyze the balance sheet? (Cosmote)

Consolidated balance sheet

Assets	2000	2001	% of total 2000	% of total 2001	Liabilities and shareholders' equity	2000	2001	% of total 2000	% of total 2001
Cash and cash equivalents	20 442	10 694	7,42%	2,53%	Loans and other borrowings		130 864	0,00%	31,01%
Accounts receivables	30 961	48 219	11,23%	11,43%	Accounts payable	42 254	57 918	15,33%	13,73%
Due from related companies	5 440	4 569	1,97%	1,08%	Deferred revenue	3 731	6 426	1,35%	1,52%
Inventories	2 426	3 178	0,88%	0,75%	Other current liabilities	15 531	31 587	5,63%	7,49%
Deferred income taxes	2 441	438	0,89%	0,10%	Installment due to Albanian State	16 077			
Other current assets	9 120	7 640	3,31%	1,81%	**Total current liabilities**	**77 593**	**226 795**	**28,15%**	**53,74%**
Total current assets	**70 830**	**74 738**	**25,69%**	**17,71%**	Loans and other borrowings	77 012	0	27,94%	0,00%
Property, plant and equipment	164 143	257 256	59,54%	60,96%	Deferred income taxes		2 928	0,00%	0,69%
Cellural licences	14 202	65 131	5,15%	15,43%	Other non-current liabilities	249	12 497	0,09%	2,96%
Goodwill	25 530	23 768	9,26%	5,63%	**Total non-current liabilities**	**77 261**	**15 425**	**28,03%**	**3,66%**
Other non-current assets	975	1 094	0,35%	0,26%	**Minority interest**	**2 716**	**4 542**	**0,99%**	**1,08%**
Total non-current assets	**204 850**	**347 249**	**74,31%**	**82,29%**	Share capital	52 800	52 850	19,15%	12,52%
Total assets	***275 680***	***421 987***	***100,00%***	***100,00%***	Paid in surplus	51 279	53 227	18,60%	12,61%
					Legal reserve	793	3 212	0,29%	0,76%
					Retained earnings	13 526	65 155	4,91%	15,44%
					Deferred Compensation and other comprehensive income	-288	781	-0,10%	0,19%
					Total shareholders' equity	**118 110**	**175 225**	**42,84%**	**41,52%**
					Total liabilities and shareholders' equity	***275 680***	***421 987***	***100,00%***	***100,00%***

Income statement of Mobimak

	2001	2002	% of revenue in 2001	% of revenue in 2002
Operating revenues	3 241	7 390	100,00%	100,00%
Operating costs	-1 890	-4 137	-58,32%	-55,99%
Operating profit	**1 351**	**3 252**	**41,68%**	**44,01%**
Interest received	4	33	0,12%	0,45%
Interest paid and other bank charges	-67	-97	-2,06%	-1,32%
Net foreign exchange gains	1	-26	0,03%	-0,35%
Net financial expenses	**-62**	**-90**	**-1,91%**	**-1,21%**
Profit on ordinary activities	**1 289**	**3 163**	**39,77%**	**42,80%**
Income taxes	-94	-389	-2,91%	-5,26%
Net income	***1 195***	***2 774***	***36,86%***	***37,53%***
Dividend	0	0	0,00%	0,00%
Retained earnings	***1 195***	***2 774***	***36,86%***	***37,53%***
Depreciation	270	642	8,33%	8,69%

Income statement of Cosmote

	2000	2001	% of revenue in 2000	% of revenue in 2001
Operating revenues	207 152	315 833	100,00%	100,00%
Cost of services and handsets	-79 729	-109 961	-38,49%	-34,82%
Gross profit	**127 423**	**205 872**	**61,51%**	**65,18%**
Provision for doubtful accounts	-3 827	-7 412	-1,85%	-2,35%
Selling, general and administrative expenses	-80 993	-96 185	-39,10%	-30,45%
Operating income	**42 603**	**102 275**	**20,57%**	**32,38%**
Net interest and other charges	-9 201	-2 767	-4,44%	-0,88%
Profit before provision for income taxes and minority interests	**33 402**	**99 508**	**16,12%**	**31,51%**
Provision for income taxes	-13 580	-38 241	-6,56%	-12,11%
Minority interest	-119	-1 938	-0,06%	-0,61%
Net income	***19 703***	***59 329***	***9,51%***	***18,78%***
Dividend		-5 280	0,00%	-1,67%
Retained earnings	***19 703***	***54 049***	***9,51%***	***17,11%***
Depreciation	20 628	36 880	9,96%	11,68%

Uses and Sources of Funds

Sources	Uses
Decrease in assets	Increase in assets
Increase in liabilities	Decrease in liabilities
Increase in Shareholders’ Equity	Decrease in Shareholders’ Equity

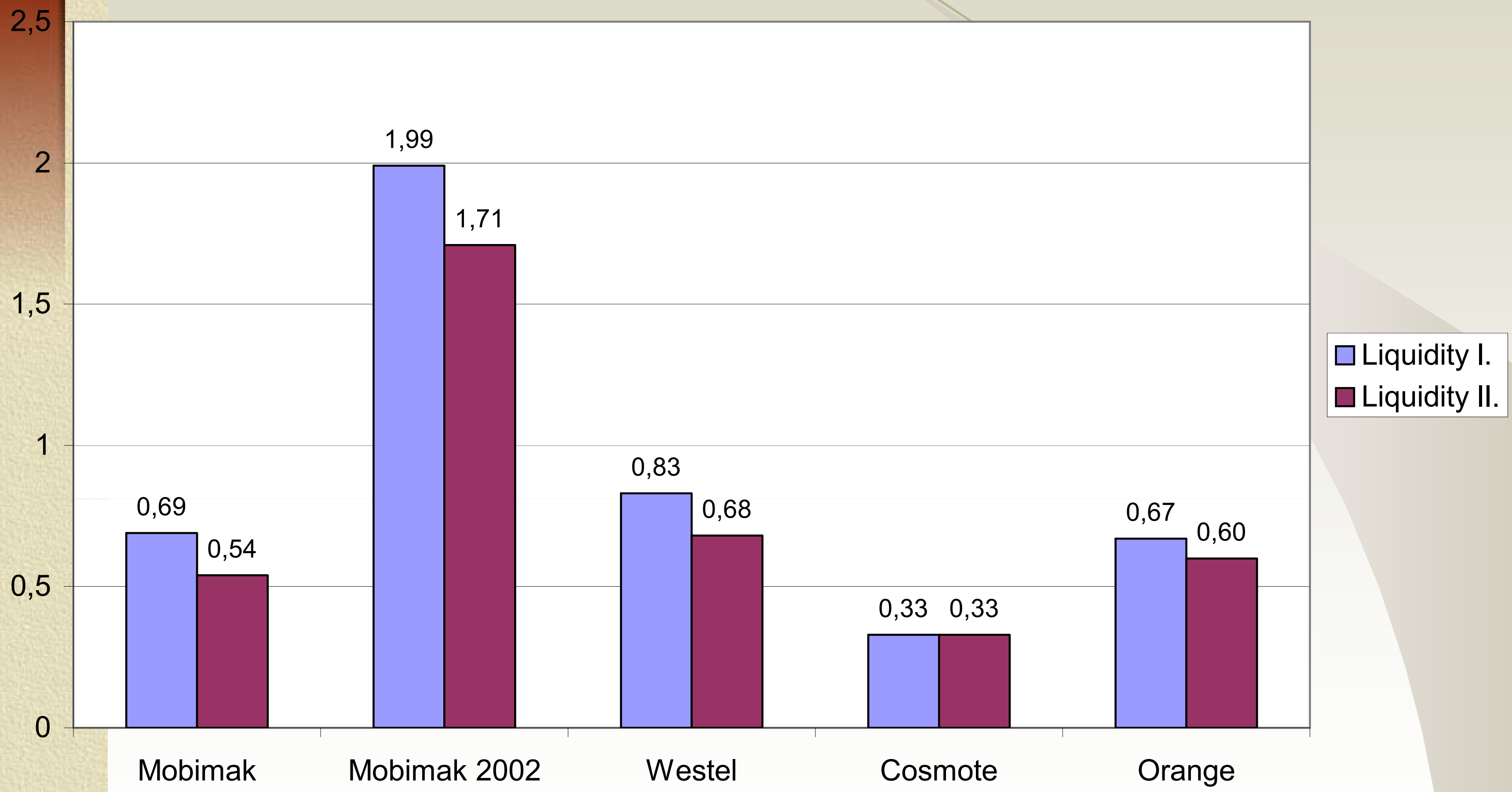
Cash flow statement

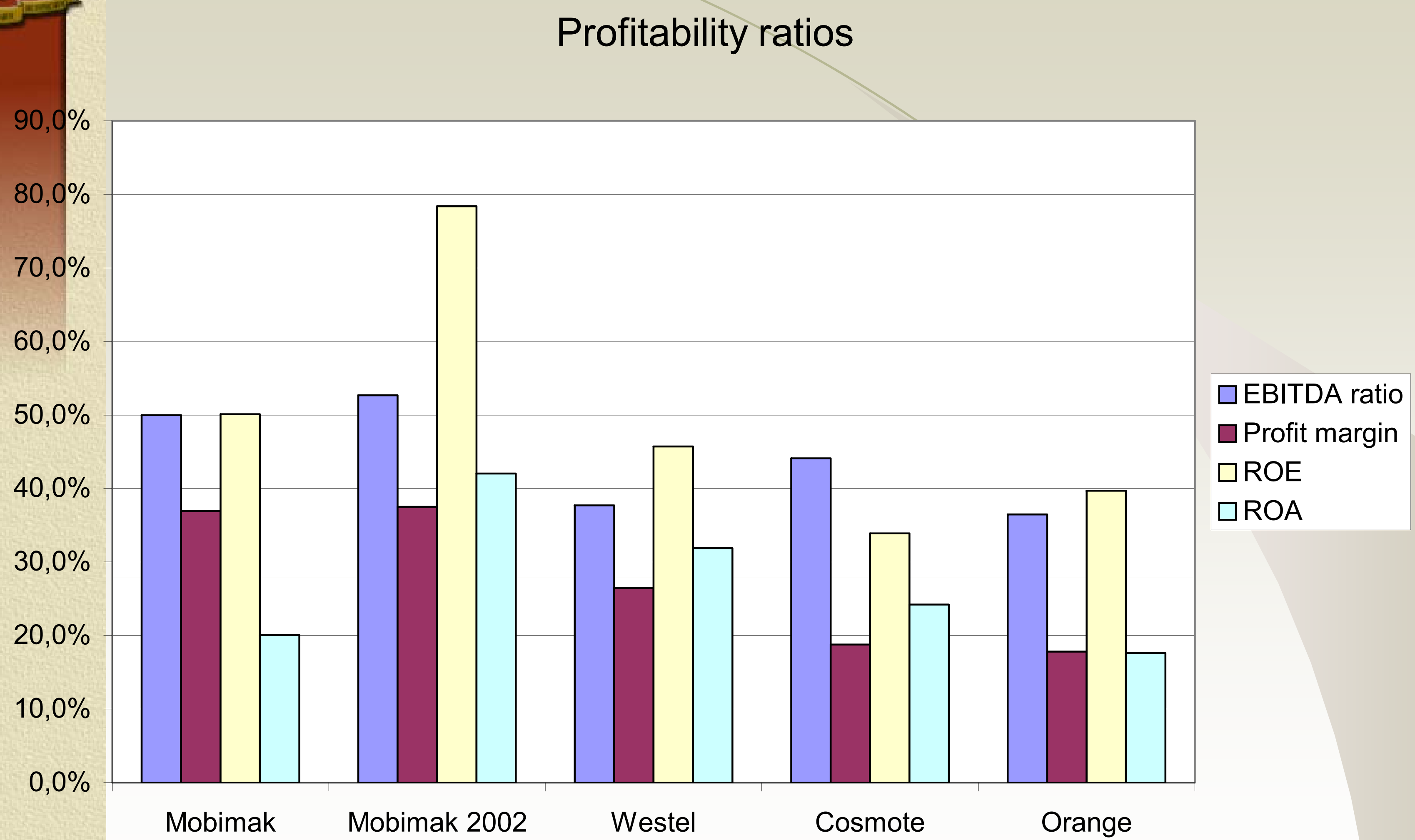
• Cash flow produced by the operation	±	• Cash flow from working cycle	=	• Operating cash flow
• Cash inflow from selling fixed assets	-	• Cash outflow from purchasing fixed assets	=	• Cash flow from investing activities
• Cash inflow from raising loans and capital	-	• Cash outflow from financing (dividend, interest, financial charges, instalments)	=	• Cash flow from financing
		• Change in cash and cash equivalents	=	Total cash flow

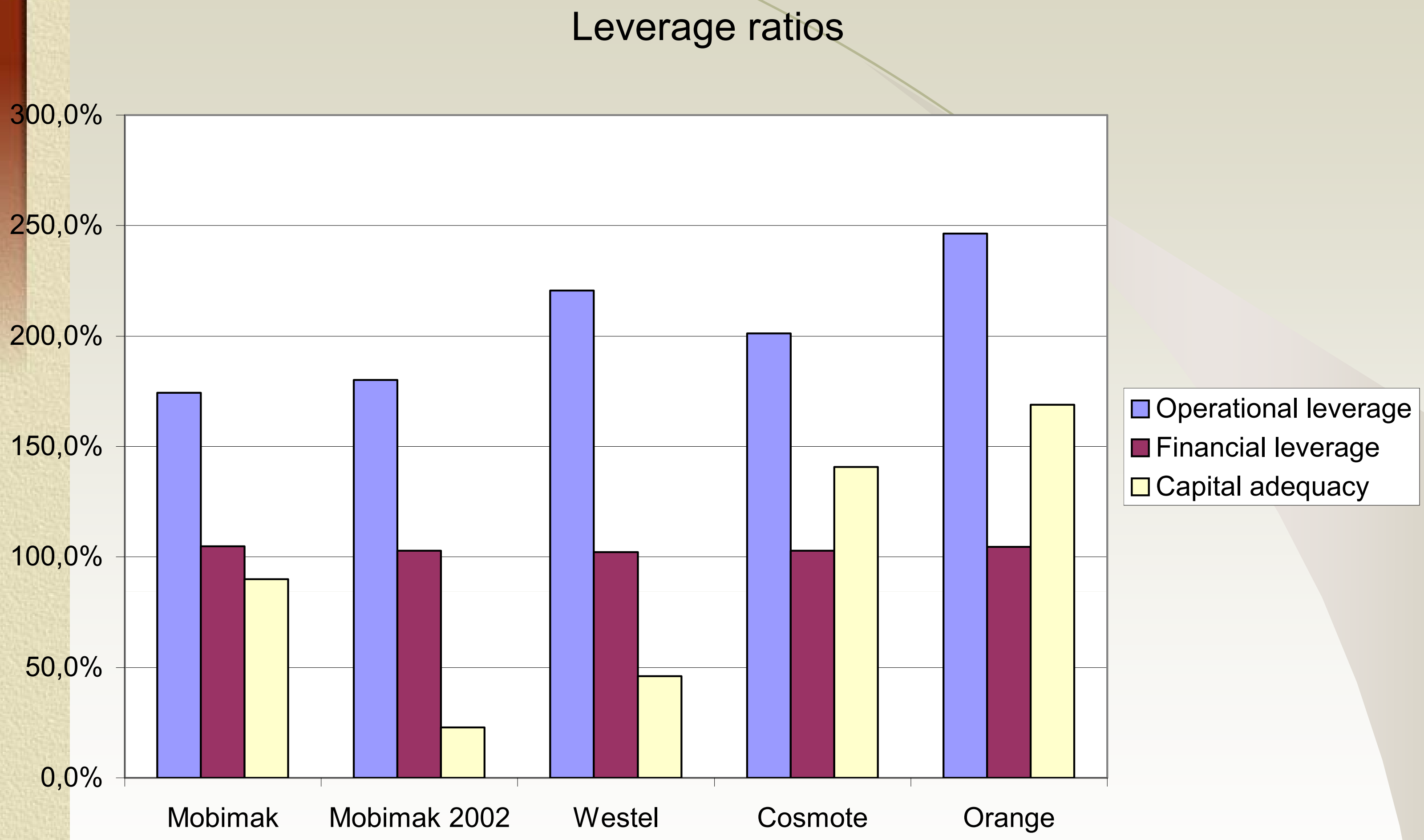
The financial principles of corporates

- Profitability -> maximise the shareholders' wealth
- Liquidity -> keep the solvency
- Security -> don't make too risky businesses
- Flexibility -> be able to utilise any unexpected opportunity and to defend any unexpected threat
- Independency -> follow the corporate's own interest

Liquidity ratios




Profitability ratios
90,0%
80,0%
70,0%
60,0%
50,0%
40,0%
30,0%
20,0%
10,0%
0,0%
Mobimak
Mobimak 2002
Westel
Cosmote
Orange
EBITDA ratio
Profit margin
ROE
ROA


Leverage ratios
300,0%
250,0%
200,0%
150,0%
100,0%
50,0%
0,0%
Mobimak
Mobimak 2002
Westel
Cosmote
Orange
Operational leverage
Financial leverage
Capital adequacy

Measuring Investment Returns

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First Principles

- Invest in projects that **yield a return greater** than the minimum acceptable hurdle rate.
  - The hurdle rate should be higher for riskier projects and reflect the financing mix used – owners' funds (equity) or borrowed money (debt)
  - **Returns on projects should be measured based on cash flows generated and the timing of these cash flows; they should also consider both positive and negative side effects of these projects.**
- Choose a financing mix that minimizes the hurdle rate and matches the assets being financed.
- If there are not enough investments that earn the hurdle rate, return the cash to stockholders.
  - The form of returns – dividends and stock buybacks – will depend upon the stockholders' characteristics.

Objective. Maximize the Value of the Firm

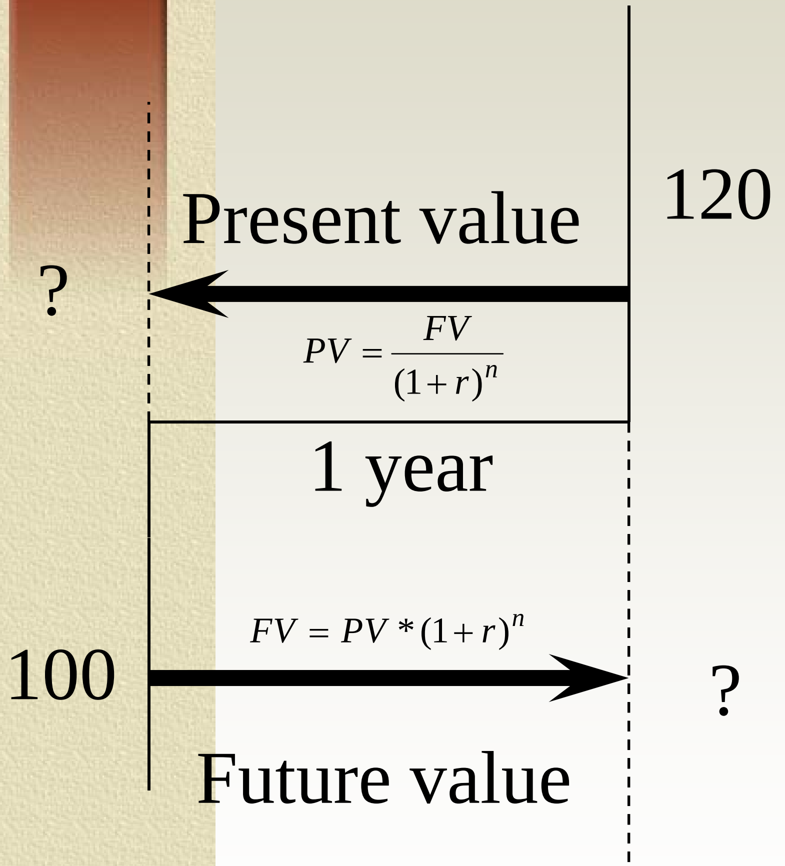
Time value of money

- Why should we know the time value?
- Future value
- Present value, net present value
- Perpetuity
- Annuity
- Exercises

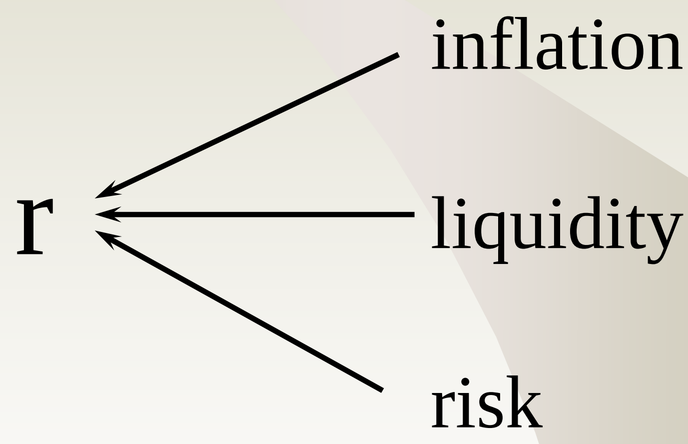
Rules of calculation

- Two unit of money values more than one.
- Present unit of money values more than future one.
- A certain unit of money values more than an uncertain (more risky) one.

Way of calculation



Factors determining the „r”



r – the return of investments with similar risk and liquidity

Example for future value calculation

Our company is investing 100 million MKD in medium term. By our survey we can choose between two options:

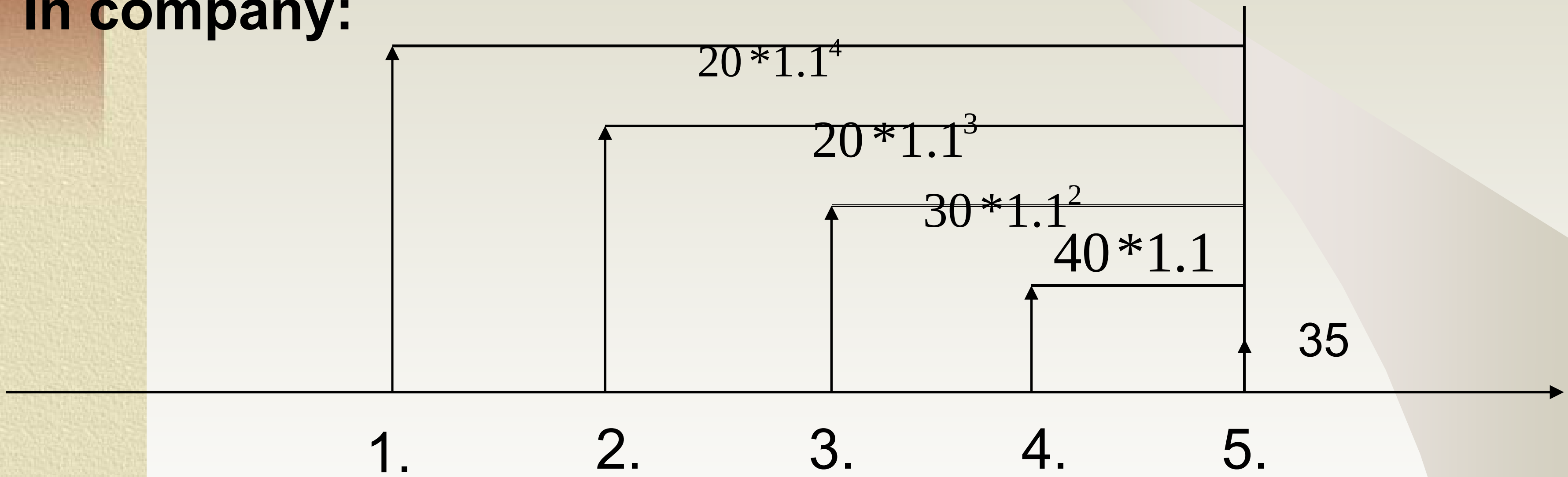
1. We buy a company, which earn an annual 20, 20, 30, 40 and 35 million MKD net cash flow respectively.
2. We put the 100 million in deposit with a guaranteed interest of 10%. The interests are added to the initial sum.

If the company ask you to appraise the two options, which one are you willing to offer?

Example for future value calculation - Solution

In bank: $100*1.1^5 = 100*1{,}6105 = 161{,}1$ million MKD

In company:



$$F = 20*1.1^4 + 20*1.1^3 + 30*1.1^2 + 40*1.1 + 35 =$$

$20*1.464 + 20*1.331 + 30*1.210 + 40*1.1 + 35 = 171.2$ million MKD

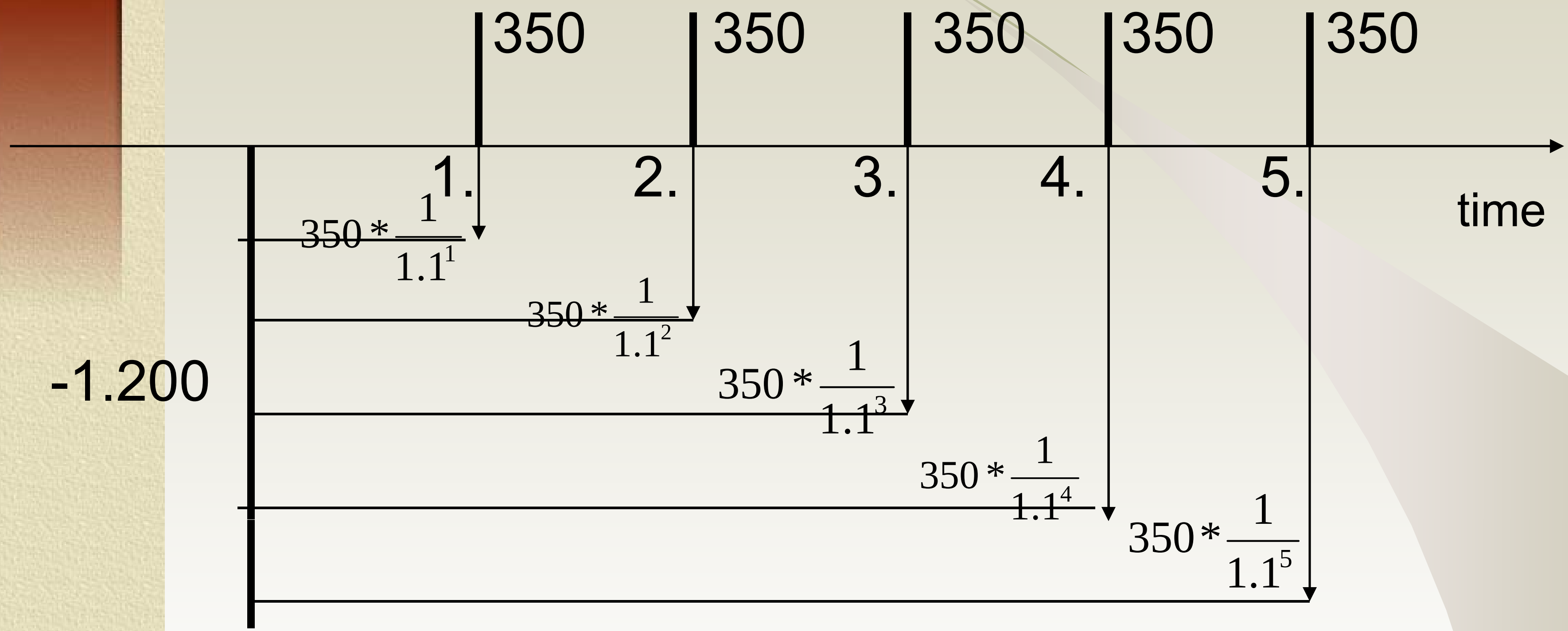
Example for present value calculation

The Tele-Macedonia Plc. are considering to introduce a new service – the digital voice post. The purchase of modern digital gadgets required to the introduction costs altogether 1,2 billion MKD.

The required cash is available. By the pro forma calculation the new service may earn 350 million MKD annually in the next 5 years.

A member of the company's Board of Directors ask you for an advice: Is it worth investing this money into this project, if the market yield of investments with similar risk is about 10%?

Example for present value calculation - Solution



$$NPV = -1{,}200 + \frac{350}{1.1} + \frac{350}{1.1^2} + \frac{350}{1.1^3} + \frac{350}{1.1^4} + \frac{350}{1.1^5} =$$

$$-1{,}200 + 350 * (0.9091 + 0.8264 + 0.7513 + 0.6830 + 0.6209) =$$

$$-1{,}200 + 350 * 3.7907 = +126.745$$ million MKD

The present value of special cash flows

Name of cash flow	Perpetuity	Annuity
Definition	Flow of fixed amounts at stated intervals up to infinity	Flow of fixed amounts at stated intervals up to a certain date
Formula	$P = \frac{C}{r}$	$P = C * \frac{(1+r)^n - 1}{(1+r)^n * r}$
Appearance	Preferred shares, perpetuity bond, real estate rents	Leasing fees, instalments of home loans, fixed rate bonds

Where: P – present value; C – future cash flow; r – expected return; n – term of flows

Table of discount factors

$$\frac{1}{(1+r)^n} = DF(n,r)$$

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%
1	0,990	0,980	0,971	0,962	0,952	0,943	0,935	0,926	0,917	0,909	0,901	0,893	0,885	0,877	0,870	0,862	0,855
2	0,980	0,961	0,943	0,925	0,907	0,890	0,873	0,857	0,842	0,826	0,812	0,797	0,783	0,769	0,756	0,743	0,731
3	0,971	0,942	0,915	0,889	0,864	0,840	0,816	0,794	0,772	0,751	0,731	0,712	0,693	0,675	0,658	0,641	0,624
4	0,961	0,924	0,888	0,855	0,823	0,792	0,763	0,735	0,708	0,683	0,659	0,636	0,613	0,592	0,572	0,552	0,534
5	0,951	0,906	0,863	0,822	0,784	0,747	0,713	0,681	0,650	0,621	0,593	0,567	0,543	0,519	0,497	0,476	0,456
6	0,942	0,888	0,837	0,790	0,746	0,705	0,666	0,630	0,596	0,564	0,535	0,507	0,480	0,456	0,432	0,410	0,390
7	0,933	0,871	0,813	0,760	0,711	0,665	0,623	0,583	0,547	0,513	0,482	0,452	0,425	0,400	0,376	0,354	0,333
8	0,923	0,853	0,789	0,731	0,677	0,627	0,582	0,540	0,502	0,467	0,434	0,404	0,376	0,351	0,327	0,305	0,285
9	0,914	0,837	0,766	0,703	0,645	0,592	0,544	0,500	0,460	0,424	0,391	0,361	0,333	0,308	0,284	0,263	0,243
10	0,905	0,820	0,744	0,676	0,614	0,558	0,508	0,463	0,422	0,386	0,352	0,322	0,295	0,270	0,247	0,227	0,208
11	0,896	0,804	0,722	0,650	0,585	0,527	0,475	0,429	0,388	0,350	0,317	0,287	0,261	0,237	0,215	0,195	0,178
12	0,887	0,788	0,701	0,625	0,557	0,497	0,444	0,397	0,356	0,319	0,286	0,257	0,231	0,208	0,187	0,168	0,152
13	0,879	0,773	0,681	0,601	0,530	0,469	0,415	0,368	0,326	0,290	0,258	0,229	0,204	0,182	0,163	0,145	0,130
14	0,870	0,758	0,661	0,577	0,505	0,442	0,388	0,340	0,299	0,263	0,232	0,205	0,181	0,160	0,141	0,125	0,111
15	0,861	0,743	0,642	0,555	0,481	0,417	0,362	0,315	0,275	0,239	0,209	0,183	0,160	0,140	0,123	0,108	0,095

	18%	19%	20%	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%	31%	32%	33%	34%
1	0,847	0,840	0,833	0,826	0,820	0,813	0,806	0,800	0,794	0,787	0,781	0,775	0,769	0,763	0,758	0,752	0,746
2	0,718	0,706	0,694	0,683	0,672	0,661	0,650	0,640	0,630	0,620	0,610	0,601	0,592	0,583	0,574	0,565	0,557
3	0,609	0,593	0,579	0,564	0,551	0,537	0,524	0,512	0,500	0,488	0,477	0,466	0,455	0,445	0,435	0,425	0,416
4	0,516	0,499	0,482	0,467	0,451	0,437	0,423	0,410	0,397	0,384	0,373	0,361	0,350	0,340	0,329	0,320	0,310
5	0,437	0,419	0,402	0,386	0,370	0,355	0,341	0,328	0,315	0,303	0,291	0,280	0,269	0,259	0,250	0,240	0,231
6	0,370	0,352	0,335	0,319	0,303	0,289	0,275	0,262	0,250	0,238	0,227	0,217	0,207	0,198	0,189	0,181	0,173
7	0,314	0,296	0,279	0,263	0,249	0,235	0,222	0,210	0,198	0,188	0,178	0,168	0,159	0,151	0,143	0,136	0,129
8	0,266	0,249	0,233	0,218	0,204	0,191	0,179	0,168	0,157	0,148	0,139	0,130	0,123	0,115	0,108	0,102	0,096
9	0,225	0,209	0,194	0,180	0,167	0,155	0,144	0,134	0,125	0,116	0,108	0,101	0,094	0,088	0,082	0,077	0,072
10	0,191	0,176	0,162	0,149	0,137	0,126	0,116	0,107	0,099	0,092	0,085	0,078	0,073	0,067	0,062	0,058	0,054
11	0,162	0,148	0,135	0,123	0,112	0,103	0,094	0,086	0,079	0,072	0,066	0,061	0,056	0,051	0,047	0,043	0,040
12	0,137	0,124	0,112	0,102	0,092	0,083	0,076	0,069	0,062	0,057	0,052	0,047	0,043	0,039	0,036	0,033	0,030
13	0,116	0,104	0,093	0,084	0,075	0,068	0,061	0,055	0,050	0,045	0,040	0,037	0,033	0,030	0,027	0,025	0,022
14	0,099	0,088	0,078	0,069	0,062	0,055	0,049	0,044	0,039	0,035	0,032	0,028	0,025	0,023	0,021	0,018	0,017
15	0,084	0,074	0,065	0,057	0,051	0,045	0,040	0,035	0,031	0,028	0,025	0,022	0,020	0,017	0,016	0,014	0,012

Table of future value

$$(1+r)^n$$

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%
1	1,010	1,020	1,030	1,040	1,050	1,060	1,070	1,080	1,090	1,100	1,110	1,120	1,130	1,140	1,150	1,160	1,170
2	1,020	1,040	1,061	1,082	1,103	1,124	1,145	1,166	1,188	1,210	1,232	1,254	1,277	1,300	1,323	1,346	1,369
3	1,030	1,061	1,093	1,125	1,158	1,191	1,225	1,260	1,295	1,331	1,368	1,405	1,443	1,482	1,521	1,561	1,602
4	1,041	1,082	1,126	1,170	1,216	1,262	1,311	1,360	1,412	1,464	1,518	1,574	1,630	1,689	1,749	1,811	1,874
5	1,051	1,104	1,159	1,217	1,276	1,338	1,403	1,469	1,539	1,611	1,685	1,762	1,842	1,925	2,011	2,100	2,192
6	1,062	1,126	1,194	1,265	1,340	1,419	1,501	1,587	1,677	1,772	1,870	1,974	2,082	2,195	2,313	2,436	2,565
7	1,072	1,149	1,230	1,316	1,407	1,504	1,606	1,714	1,828	1,949	2,076	2,211	2,353	2,502	2,660	2,826	3,001
8	1,083	1,172	1,267	1,369	1,477	1,594	1,718	1,851	1,993	2,144	2,305	2,476	2,658	2,853	3,059	3,278	3,511
9	1,094	1,195	1,305	1,423	1,551	1,689	1,838	1,999	2,172	2,358	2,558	2,773	3,004	3,252	3,518	3,803	4,108
10	1,105	1,219	1,344	1,480	1,629	1,791	1,967	2,159	2,367	2,594	2,839	3,106	3,395	3,707	4,046	4,411	4,807
11	1,116	1,243	1,384	1,539	1,710	1,898	2,105	2,332	2,580	2,853	3,152	3,479	3,836	4,226	4,652	5,117	5,624
12	1,127	1,268	1,426	1,601	1,796	2,012	2,252	2,518	2,813	3,138	3,498	3,896	4,335	4,818	5,350	5,936	6,580
13	1,138	1,294	1,469	1,665	1,886	2,133	2,410	2,720	3,066	3,452	3,883	4,363	4,898	5,492	6,153	6,886	7,699
14	1,149	1,319	1,513	1,732	1,980	2,261	2,579	2,937	3,342	3,797	4,310	4,887	5,535	6,261	7,076	7,988	9,007
15	1,161	1,346	1,558	1,801	2,079	2,397	2,759	3,172	3,642	4,177	4,785	5,474	6,254	7,138	8,137	9,266	10,539
	18%	**19%**	**20%**	**21%**	**22%**	**23%**	**24%**	**25%**	**26%**	**27%**	**28%**	**29%**	**30%**	**31%**	**32%**	**33%**	**34%**
1	1,180	1,190	1,200	1,210	1,220	1,230	1,240	1,250	1,260	1,270	1,280	1,290	1,300	1,310	1,320	1,330	1,340
2	1,392	1,416	1,440	1,464	1,488	1,513	1,538	1,563	1,588	1,613	1,638	1,664	1,690	1,716	1,742	1,769	1,796
3	1,643	1,685	1,728	1,772	1,816	1,861	1,907	1,953	2,000	2,048	2,097	2,147	2,197	2,248	2,300	2,353	2,406
4	1,939	2,005	2,074	2,144	2,215	2,289	2,364	2,441	2,520	2,601	2,684	2,769	2,856	2,945	3,036	3,129	3,224
5	2,288	2,386	2,488	2,594	2,703	2,815	2,932	3,052	3,176	3,304	3,436	3,572	3,713	3,858	4,007	4,162	4,320
6	2,700	2,840	2,986	3,138	3,297	3,463	3,635	3,815	4,002	4,196	4,398	4,608	4,827	5,054	5,290	5,535	5,789
7	3,185	3,379	3,583	3,797	4,023	4,259	4,508	4,768	5,042	5,329	5,629	5,945	6,275	6,621	6,983	7,361	7,758
8	3,759	4,021	4,300	4,595	4,908	5,239	5,590	5,960	6,353	6,768	7,206	7,669	8,157	8,673	9,217	9,791	10,395
9	4,435	4,785	5,160	5,560	5,987	6,444	6,931	7,451	8,005	8,595	9,223	9,893	10,604	11,362	12,166	13,022	13,930
10	5,234	5,695	6,192	6,727	7,305	7,926	8,594	9,313	10,086	10,915	11,806	12,761	13,786	14,884	16,060	17,319	18,666
11	6,176	6,777	7,430	8,140	8,912	9,749	10,657	11,642	12,708	13,862	15,112	16,462	17,922	19,498	21,199	23,034	25,012
12	7,288	8,064	8,916	9,850	10,872	11,991	13,215	14,552	16,012	17,605	19,343	21,236	23,298	25,542	27,983	30,635	33,516
13	8,599	9,596	10,699	11,918	13,264	14,749	16,386	18,190	20,175	22,359	24,759	27,395	30,288	33,460	36,937	40,745	44,912
14	10,147	11,420	12,839	14,421	16,182	18,141	20,319	22,737	25,421	28,396	31,691	35,339	39,374	43,833	48,757	54,190	60,182
15	11,974	13,590	15,407	17,449	19,742	22,314	25,196	28,422	32,030	36,062	40,565	45,587	51,186	57,421	64,359	72,073	80,644

Table of the present value of annuity

$$\frac{1}{r}-\frac{1}{r\times(1+r)^{n}}$$

	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%	16%	17%
1	0,990	0,980	0,971	0,962	0,952	0,943	0,935	0,926	0,917	0,909	0,901	0,893	0,885	0,877	0,870	0,862	0,855
2	1,970	1,942	1,913	1,886	1,859	1,833	1,808	1,783	1,759	1,736	1,713	1,690	1,668	1,647	1,626	1,605	1,585
3	2,941	2,884	2,829	2,775	2,723	2,673	2,624	2,577	2,531	2,487	2,444	2,402	2,361	2,322	2,283	2,246	2,210
4	3,902	3,808	3,717	3,630	3,546	3,465	3,387	3,312	3,240	3,170	3,102	3,037	2,974	2,914	2,855	2,798	2,743
5	4,853	4,713	4,580	4,452	4,329	4,212	4,100	3,993	3,890	3,791	3,696	3,605	3,517	3,433	3,352	3,274	3,199
6	5,795	5,601	5,417	5,242	5,076	4,917	4,767	4,623	4,486	4,355	4,231	4,111	3,998	3,889	3,784	3,685	3,589
7	6,728	6,472	6,230	6,002	5,786	5,582	5,389	5,206	5,033	4,868	4,712	4,564	4,423	4,288	4,160	4,039	3,922
8	7,652	7,325	7,020	6,733	6,463	6,210	5,971	5,747	5,535	5,335	5,146	4,968	4,799	4,639	4,487	4,344	4,207
9	8,566	8,162	7,786	7,435	7,108	6,802	6,515	6,247	5,995	5,759	5,537	5,328	5,132	4,946	4,772	4,607	4,451
10	9,471	8,983	8,530	8,111	7,722	7,360	7,024	6,710	6,418	6,145	5,889	5,650	5,426	5,216	5,019	4,833	4,659
11	10,368	9,787	9,253	8,760	8,306	7,887	7,499	7,139	6,805	6,495	6,207	5,938	5,687	5,453	5,234	5,029	4,836
12	11,255	10,575	9,954	9,385	8,863	8,384	7,943	7,536	7,161	6,814	6,492	6,194	5,918	5,660	5,421	5,197	4,988
13	12,134	11,348	10,635	9,986	9,394	8,853	8,358	7,904	7,487	7,103	6,750	6,424	6,122	5,842	5,583	5,342	5,118
14	13,004	12,106	11,296	10,563	9,899	9,295	8,745	8,244	7,786	7,367	6,982	6,628	6,302	6,002	5,724	5,468	5,229
15	13,865	12,849	11,938	11,118	10,380	9,712	9,108	8,559	8,061	7,606	7,191	6,811	6,462	6,142	5,847	5,575	5,324

	18%	19%	20%	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%	31%	32%	33%	34%
1	0,847	0,840	0,833	0,826	0,820	0,813	0,806	0,800	0,794	0,787	0,781	0,775	0,769	0,763	0,758	0,752	0,746
2	1,566	1,547	1,528	1,509	1,492	1,474	1,457	1,440	1,424	1,407	1,392	1,376	1,361	1,346	1,331	1,317	1,303
3	2,174	2,140	2,106	2,074	2,042	2,011	1,981	1,952	1,923	1,896	1,868	1,842	1,816	1,791	1,766	1,742	1,719
4	2,690	2,639	2,589	2,540	2,494	2,448	2,404	2,362	2,320	2,280	2,241	2,203	2,166	2,130	2,096	2,062	2,029
5	3,127	3,058	2,991	2,926	2,864	2,803	2,745	2,689	2,635	2,583	2,532	2,483	2,436	2,390	2,345	2,302	2,260
6	3,498	3,410	3,326	3,245	3,167	3,092	3,020	2,951	2,885	2,821	2,759	2,700	2,643	2,588	2,534	2,483	2,433
7	3,812	3,706	3,605	3,508	3,416	3,327	3,242	3,161	3,083	3,009	2,937	2,868	2,802	2,739	2,677	2,619	2,562
8	4,078	3,954	3,837	3,726	3,619	3,518	3,421	3,329	3,241	3,156	3,076	2,999	2,925	2,854	2,786	2,721	2,658
9	4,303	4,163	4,031	3,905	3,786	3,673	3,566	3,463	3,366	3,273	3,184	3,100	3,019	2,942	2,868	2,798	2,730
10	4,494	4,339	4,192	4,054	3,923	3,799	3,682	3,571	3,465	3,364	3,269	3,178	3,092	3,009	2,930	2,855	2,784
11	4,656	4,486	4,327	4,177	4,035	3,902	3,776	3,656	3,543	3,437	3,335	3,239	3,147	3,060	2,978	2,899	2,824
12	4,793	4,611	4,439	4,278	4,127	3,985	3,851	3,725	3,606	3,493	3,387	3,286	3,190	3,100	3,013	2,931	2,853
13	4,910	4,715	4,533	4,362	4,203	4,053	3,912	3,780	3,656	3,538	3,427	3,322	3,223	3,129	3,040	2,956	2,876
14	5,008	4,802	4,611	4,432	4,265	4,108	3,962	3,824	3,695	3,573	3,459	3,351	3,249	3,152	3,061	2,974	2,892
15	5,092	4,876	4,675	4,489	4,315	4,153	4,001	3,859	3,726	3,601	3,483	3,373	3,268	3,170	3,076	2,988	2,905

Answer the following questions
(Use the time value tables)

1. The Maktel puts 100 million MKD to a deposit with 12% annual interest. The interest is credited quarterly. How much money would the company get in 1 year, if the interest rate remains the same, and the interests are added to the deposit?
2. The Maktel has got a claim of 10 million MKD against the Macedonian Tax Office. The terms of payment is 180 days. The overdraft rate of Maktel is 16% p.a. paid quarterly. A factoring company offers 9.5 million for this claim. Do you accept its bid or not?
3. The Maktel is considering to lease an advanced secondary exchange. The exchange costs 100 million MKD, which you can buy from bank loan with 4% quarterly interest. By the bid of the leasing company, you must pay 10 million MKD through 3 years at the end of every quarter. In addition to you must pay 5 million MKD at the end of contract period, as a scrap value. Do you accept the bid of the leasing company, or buy the exchange from bank loan?

Discounted payback period

Calculation:

$$n \Rightarrow P_0 := \sum_{i=1}^{n} \frac{CF_i}{(1+r)^i}$$

n – payback period
CF_i – cash flow in year i
P_0 – capital outlay
r – hurdle rate

Advantage:

- is unavoidable, if the liquidity is vital
- takes consider the time value of money

Disadvantage:

- does not take into account cash flows after the payback period
- encourages the risky investments

Application:

- a query rule among investments

Net Present Value

Calculation: $$NPV = -P_0 + \sum_{i=1}^{n} \frac{CF_i}{(1+r)^i}$$

n – payback period
CF_i – cash flow in year i
P_0 – capital outlay
r – hurdle rate

Advantage:

- takes into account all relevant information
- is directly linked to the final aim of a company – to increase the shareholders' wealth.
- the NPV is additive.

Disadvantage:

- shows the absolute change in shareholders' wealth not the relative one.

Application:

- is offered to evaluate all meaningful information.

Internal Rate of Return

Calculation: $$NPV := 0 = -P_0 + \sum_{i=1}^{n} \frac{CF_i}{(1+IRR)^i}$$

Advantage:

- shows, how much is the yield of investment, if the cash flows of project can be reinvested with the IRR.
- gives the same result in most cases as the NPV

Disadvantage:

- gives misleading result in case of mutually exclusive projects
- mustn't apply in case of abnormal cash flows
- is very hard to calculate.

Application:

- filling credit claims
- evaluating financial investments

An Alternative to IRR with Capital Rationing

- The problem with the NPV rule, when there is capital rationing, is that it is a dollar value. It measures success in absolute terms.
- The NPV can be converted into a relative measure by dividing by the initial investment. This is called the profitability index.
  - Profitability Index (PI) = NPV/Initial Investment
- In the example described, the PI of the two projects would have been:
  - PI of Project A = $467,936/1,000,000 = 46.79%
  - PI of Project B = $1,358,664/10,000,000 = 13.59%

  Project A would have scored higher.

NPV, IRR and the Reinvestment Rate Assumption

- The NPV rule assumes that intermediate cash flows on the project get reinvested at the hurdle rate (which is based upon what projects of comparable risk should earn).
- The IRR rule assumes that intermediate cash flows on the project get reinvested at the IRR. Implicit is the assumption that the firm has an infinite stream of projects yielding similar IRRs.
- Conclusion: When the IRR is high (the project is creating significant surplus value) and the project life is long, the IRR will overstate the true return on the project.

Why NPV and IRR may differ..

- The NPV is a dollar surplus value, whereas the IRR is a percentage measure of return. The NPV is therefore likely to be larger for „large scale” projects, while the IRR is higher for „small-scale” projects.
- The NPV assumes that intermediate cash flows get reinvested at the „hurdle rate”, which is based upon what you can make on investments of comparable risk, while the IRR assumes that intermediate cash flows get reinvested at the „IRR”.
- A project can have only one NPV, whereas it can have more than one IRR.

Choosing Between Mutually Exclusive Projects

- The net present values of mutually exclusive projects with different lives cannot be compared, since there is a bias towards longer-life projects.
- To do the comparison, we have to
  - replicate the projects till they have the same life (or)
  - convert the net present values into annuities

Profitability index

Calculation: $$PI = \frac{GPV}{P_0}$$

PI – Profitability index
GPV – Gross Present Value
P_0 – capital outlay

Advantage:

- shows the relative change in shareholders' wealth

Disadvantage:

- gives misleading result in case of mutually exclusive projects

Application:

- can be applied, if there is capital constraint and the investments can be split.

Capital Rationing, Uncertainty and Choosing a Rule

- If a business has limited access to capital, has a stream of surplus value projects and faces more uncertainty in its project cash flows, it is much more likely to use IRR as its decision rule.

  Small, high-growth companies and private businesses are much more likely to use IRR.

- If a business has substantial funds on hand, access to capital, limited surplus value projects, and more certainty on its project cash flows, it is much more likely to use NPV as its decision rule

  As firms go public and grow, they are much more likely to gain from using NPV.

Which equipment shall I choose?

The problem:

- Several equipments meet the requirements
- They differ in
  - Price
  - Life time
  - Operation cost
  - Reliability

Solution

Let’s suppose, that I lease the equipments! Which equipment has got the lowest rental and operational cost?

Annual cost of equipment = Annuity cost + Operational cost =

Initial capital outlay/Annuity factor + Operational cost

Which air conditioner?

- We are considering to buy a special air conditioner to ensure stabile climatic environment for our new special digital exchange which routes the calls between Kumanovo and Skopje. Four bid arrived to the tender, and the technical details contain the table below:

in thousand MKD

Type of exchange	Purchasing price	Installation cost	Energy cost	Annual maintenance	Life time
A	200 000	20 000	300 000	20 000	10
B	400 000	40 000	230 000	30 000	15
C	700 000	45 000	200 000	10 000	20
D	1 200 000	50 000	180 000	5 000	30

Expected return 10%

Type of exchange	Capital outlay	Annuity factor	Annuity	Operational cost	Total
A		6,14			
B			57 848		
C	745 000	8,51			
D				185 000	

Solution

Type of exchange	Capital outlay	Annuity factor	Annuity	Operational cost	Total
A	220 000	6,14	35 804	320 000	355 804
B	440 000	7,61	57 848	260 000	317 848
C	**745 000**	**8,51**	**87 507**	**210 000**	**297 507**
D	1 250 000	9,43	132 599	185 000	317 599

Measures of return: earnings versus cash flows

- Principles Governing Accounting Earnings Measurement
  - Accrual Accounting: Show revenues when products and services are sold or provided, not when they are paid for. Show expenses associated with these revenues rather than cash expenses.
  - Operating versus Capital Expenditures: Only expenses associated with creating revenues in the current period should be treated as operating expenses. Expenses that create benefits over several periods are written off over multiple periods (as depreciation or amortization)
- To get from accounting earnings to cash flows:
  - you have to add back non-cash expenses (like depreciation)
  - you have to subtract out cash outflows which are not expensed (such as capital expenditures)
  - you have to make accrual revenues and expenses into cash revenues and expenses (by considering changes in working capital).

The Capital Expenditures Effect

- Capital expenditures are not treated as accounting expenses but they do cause cash outflows.
- Capital expenditures can generally be categorized into two groups
  - New (or Growth) capital expenditures are capital expenditures designed to create new assets and future growth
  - Maintenance capital expenditures refer to capital expenditures designed to keep existing assets.
- Both initial and maintenance capital expenditures reduce cash flows
- The need for maintenance capital expenditures will increase with the life of the projects. In other words, a 25-year project will require more maintenance capital expenditures than a 2-year asset.

Measuring Returns Right: The Basic Principles

- Use cash flows rather than earnings. You cannot spend earnings.
- Use „incremental” cash flows relating to the investment decision, i.e., cashflows that occur as a consequence of the decision, rather than total cash flows.
- Use „time weighted” returns, i.e., value cash flows that occur earlier more than cash flows that occur later.

The Return Mantra: „Time-weighted, Incremental Cash Flow Return”

Relevant cash flows

Relevant

- Incremental cash inflow and outflow
- Opportunity cost/benefit

Irrelevant

- Sunk cost
- Fix costs allocated to the project

To Time-Weighted Cash Flows

- Incremental cash flows in the earlier years are worth more than incremental cash flows in later years.
- In fact, cash flows across time cannot be added up. They have to be brought to the same point in time before aggregation.
- This process of moving cash flows through time is
  - discounting, when future cash flows are brought to the present
  - compounding, when present cash flows are taken to the future
- The discounting and compounding is done at a discount rate that will reflect
  - Expected inflation: Higher Inflation -> Higher Discount Rates
  - Expected real rate: Higher real rate -> Higher Discount rate
  - Expected uncertainty: Higher uncertainty -> Higher Discount Rate

Sunk Costs

- Any expenditure that has already been incurred, and cannot be recovered (even if a projects is rejected) is called a sunk cost
- When analyzing a project, sunk costs should not be considered since they are incremental
- By this definition, market testing expenses and R&D expenses are both likely to be sunk costs before the projects that are based upon them are analyzed. If sunk costs are not considered in project analysis, how can a firm ensure that these costs are covered?

Allocated Costs

- Firms allocate costs to infividual projects from a centralized pool (such as general and administrative expenses) based upon some characteristic of the project (sales is a common choice)
- For large firms, these allocated costs can result in the rejection of projects
- To the degree that these costs are not incremental (and would exist anyway), this makes the firm worse off.
- Thus, it is only the incremental componenet of allocated costs that should show up in project analysis.
- How, looking at these pooled expenses, do we know how much of the costs are fixed and how much are varialbe?

The tax shield of depreciation (1)

+ Revenue (R)

- Operating costs (OC)

- Depreciation (D)

Earnings before taxation (PP)

- Corporate tax (18%) (T)

Earnings after taxation (AP)

+ Depreciation

Operational cash flow after taxation (CF)

Tax shield of depreciation (2)

$$CF = (R - OC - D)*(1 - T_C) + D$$

$$CF = (R - OC)*(1-T_C) - D + T_C*D + D$$

$$CF = (R - OC)*(1-T_C) + T_C*D$$

The size of shield depends on:

- the size of depreciation
- the actual rate of corporate tax
- the profitability of company

Effect of inflation

<u>Real value model:</u>

- Real cash flow discounted by real rate of return

<u>Nominal value model:</u>

- Nominal cash flow discounted by nominal rate of return

Linkage between the real and the nominal value model

Suppose, that a project has got the following cash flows in real terms:

Year	0	1	2
Cash flow	-15	+10	+10

Annual inflation: 10%; Nominal hurdle rate: 20%

Appraise the project with real value model and nominal value model! Use the discount table!

Solution

Nominal value model

$$NPV = -15 + 10 * 1.1 * \frac{1}{1.2^1} + 10 * 1.1^2 * \frac{1}{1.2^2} =$$

$$-15 + 11 * 0.8333 + 12.1 * 0.6944 = +2.57$$

Real value model

$$NPV = -15 + 10 * \frac{1}{1.091} + 10 * \frac{1}{1.091^2} = 2.57$$

Conditions of using real value model:

- No (corporate) tax
- General inflation

Working capital

Elements of working capital:

+ Account receivables
+ Inventories
(+ Cash)
- Account payables

Working capital is generally a function of revenue.

The change of working capital has got a reverse effect on the cash flow.

The Working Capital Effect

- Intuitively, money invested in inventory or in accounts receivable cannot be used elsewhere. It, thus, represents a drain on cash flows
- To the degree that some of these investments can be financed using suppliers credit (accounts payable) the cash flow drain is reduced.
- Investments in working capital are thus cash outflows
  - Any increase in working capital reduces cash flows in that year
  - Any decrease in working capital increases cash flows in that year
- To provide closure, working capital investments need to be salvaged at the end of the project life.
- **Proposition 1:** The failure to consider working capital in a capital budgeting project will overstate cash flows on that project and make it look more attractive than it really is.
- **Proposition 2:** Other things held equal, a reduction in working capital requirements will increase the cash flows on all projects for a firm.

The examined life time of project cash flow

- Technical life time of purchased equipment
- Economic life time of purchased equipment
- Forecasting ability of product market
- Availability of financing sources
- Others
  - Stability of suppliers
  - State regulation
  - Tax allowances
  - etc.

Project scrap value

- + Forecasted market price of project assets (R)
- - Book value of project assets (D)
- Earnings before tax (PP)
- - Tax (T)
- Net Income (NI)
- + Book value of project assets (D)
- + Closing balance of working capital in the previous year

Principle: Suppose, that all assets created by the project will be sold at the current market price.

Closure on Cash Flows

- In a project with a finite and short life, you would need to compute a **salvage value**, wihich is the expected proceeds from selling all of the investment in the project at the end of the project life. It is usually set equal to book value of fixed assets and working capital.
- In a project with an infinite or very long life, we compute cash flows for a reasonable period, and then compute a **terminal value** for this project, which is the present value of all cash flows that occur after the estimation period ends.
- Assuming the project lasts forever, and that cash flows after year 9 grow 3% (the inflation rate) forever, the present value at the end of year 9 of cash flows after that can be written as:
  - Terminal Value = CF in year 10/(Cost of Capital – Growth Rate)
    = 822/(.1232-.03) = $ 8,821 million

Salvage value of a project

- + Market value of invested assets (R)
- - Net book value of invested assets (D)
- Pre tax profit (PP)
- - Taxes (18%) (T)
- Net income (NI)
- + Net book value of invested assets (D)
- + Closing balance of working capital in previous year

Principle: Suppose, that all of the assets created by the project will be sold at current market price.

Project cash flow

Should not be taxed

- Capital outlay
- Change in working capital
- Contribution in kind
- NPV of opportunity investments

Should taxed

- Incremental revenues
- Incremental operational costs
- Scrap value of project assets
- Opportunity costs/benefits

WACC

Average cost of capital

With formula:

$$WACC = r_e * \frac{E}{D+E} + r_d * \frac{D}{D+E}$$

Where,

D – total debt

E – total equity

r_d – interest rate of debt

r_e – expected yield of equity

Project cash flow

Shouldn’t be taxed

- Capital outlay
- Change in working capital
- Contribution in kind
- NPV of opportunities

Should be taxed

- Incremental revenue
- Incremental expenditures
- Asset selling price
- Scrap value
- Missed revenue/expenditure

NPV model

Képlet	Sorszám	Evek	0 1 ..	n
	1	Beruházási kiadás+opportunity cost		
	2	Forgótőke állománya		
(2-1)-(2)	3	Forgótőke állomány-változása		Előző évi forgótőke
(1)+(3)	**4**	**Tőkekiadás összesen**		
	5	Árbevétel+Elmaradt költség		Eszközök piaci értéke
	6	Működési költség+elmaradt árbevétel		
	7	Amortizáció		Maradványérték
(5)+(6)+(7)	*8*	*Adózás előtti eredmény*		
(8)*-0,18	9	Adó		
(8)+(9)	*10*	*Adózott eredmény*		
(10)-(7)	**11**	**Működési pénzáram**		
(11)+(4)	***12***	***Beruházás pénzárama***		
(12)/(1+r)^i	13	Diszkontált pénzáram		
(13-1)+(13)	14	Kumulált diszkontált pénzáram		NPV

Picking the Right Projects: Investment Analysis

Aswath Damodaran

First Principles

- Invest in projects that yield a return greater than the **minimum acceptable hurdle rate.**
  - **The hurdle rate should be higher for riskier projects and reflect teh financing mix used – owners' funds (equity) or borrowed money (debt)**
  - Returns on projects shold be measured based on cash flows generated and the timing of these cash flows; they should also consider both positive and negative side effects of these projects.
- Choose a financing max that minimizes the hurdle rate and matches the assets being financed.
- If there are not enough investments that earn the hurdle rate, return the cash to stockholders.
  - The form of returns – dividends and stock buyback – will depend upon the stockholders' characteristics.

Yield calculation

	Share	
	Date	Price
Purchasing price	02.08.27	19 000
Selling price	03.01.07	20 000
Term yield	133	5,26%
Nominal yield	14,44%	
Effective yield	15,12%	
Continous yield	14,08%	

$$r_n = \left[\frac{P_1}{P_0} - 1\right] \times \frac{1}{t} \qquad r_{eff} = \left[\frac{P_1}{P_0}\right]^{\frac{1}{t}} - 1 \qquad r_{\mathrm{int}} = \frac{\ln\left[\frac{P_1}{P_0}\right]}{t}$$

What is Risk?

- Risk, in traditional terms, is viewed as a ‘negative’. Webster’s dictionary, for instance, defines risk as „exposing to danger or hazard”. The Chinese symbols for risk, reproduced below, give a much better description of risk
- The first symbol is the symbol for „danger”, while the second is the symbol for „opportunity”, making risk a mix of danger and opportunity.

Yield and risk of a portfolio

Yield

$$r_p = \sum_{i=1}^{n} w_i \times r_i$$

Risk

$$s_p = \sqrt{\sum_{i=1}^{n}\sum_{j=1}^{n} w_i \times w_j \times s_i \times s_j \times R_{ij}}$$

Correlation

$$R_{ij} = \frac{\frac{1}{n-1}\sum_{i=1}^{n}\left(x_i - \bar{x}\right) \times \left(y_i - \bar{y}\right)}{s_x \times s_y}$$

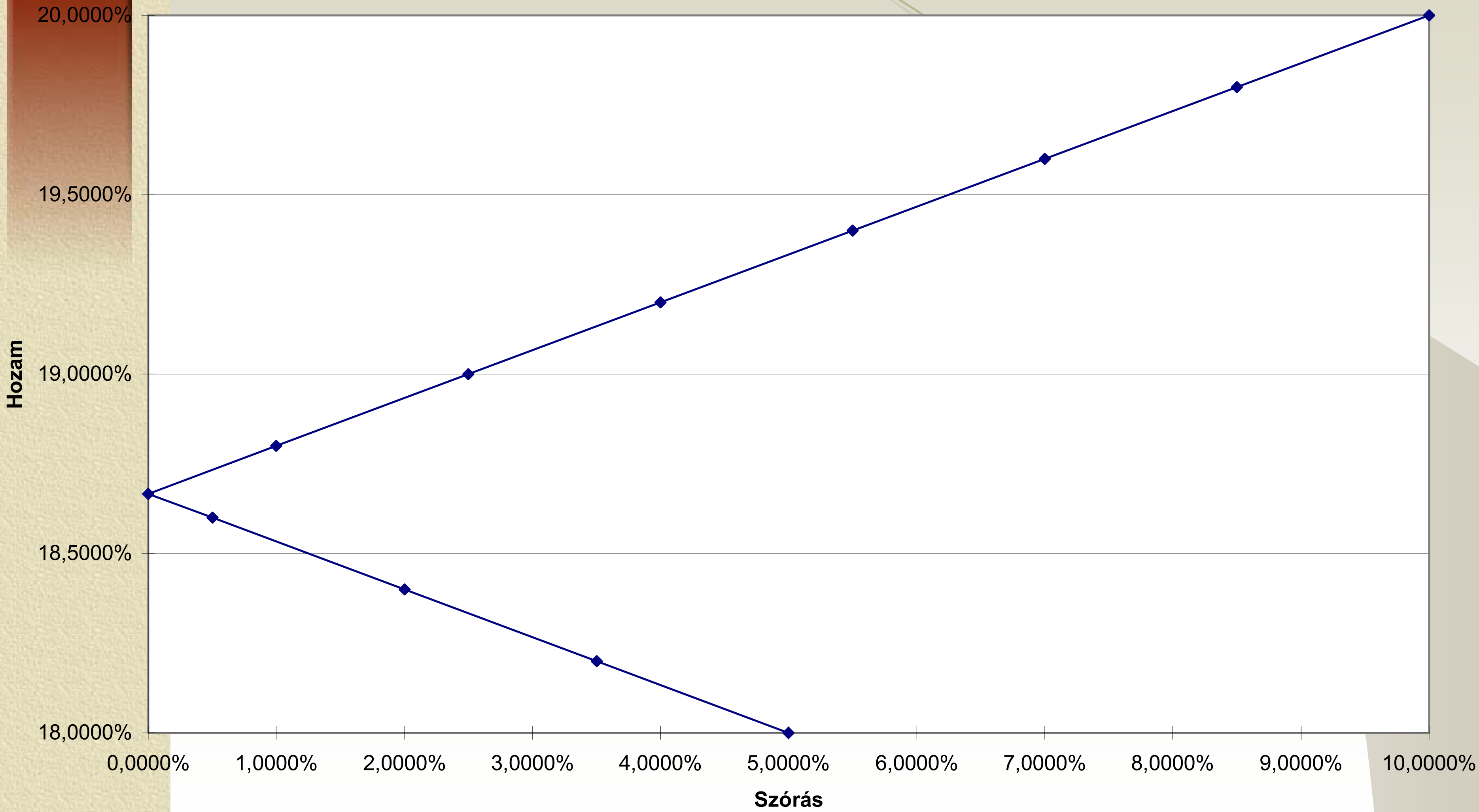
Case	Share A	Share B
1	10%	13%
2	20%	18%
3	30%	23%
Yield		
Std. Dev.		

Correlation

Portfolio yield

Portfolio std. Dev.

Yield and risk of portfolios from share „A” and „B”



Optimizing portfolios by portfolio weights

- Portfolio with minimal standard deviation

$$w_D = \frac{\sigma_E^2 - Cov(r_D, r_E)}{\sigma_D^2 + \sigma_E^2 - 2 \times Cov(r_D, r_e)} \Rightarrow \frac{\sigma_E^2}{\sigma_D^2 + \sigma_E^2}, \text{ha R = -1}$$

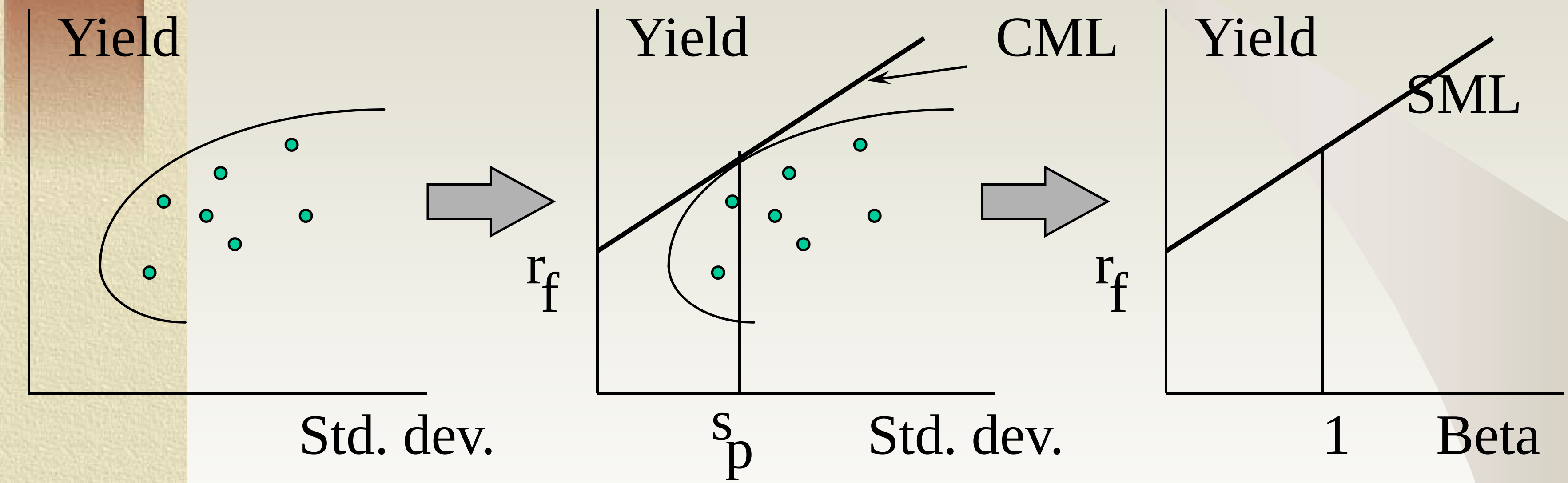
- Portfolio of CAL with maximal slope

$$S = \frac{E(r_P) - r_f}{\sigma_P} \Rightarrow \max \qquad w_D = \frac{[r_D - r_f] * \sigma_E^2 - [r_E - r_f] * Cov(r_D, r_E)}{[r_D - r_f] * \sigma_E^2 + [r_E - r_f] * \sigma_D^2 - [r_D + r_E - 2 * r_f] * Cov(r_D, r_E}$$

Portfolio Theory and CAPM

Efficient portfoliós

Efficient portfolios after introducing risk free investment



CAPM

$$r_i = r_f + \left(r_m - r_f\right) \times \beta_i$$

Beta

$$\beta_i = \frac{COV\left(x, M\right)}{s_M^2}$$

Portfolio beta

$$\beta_p = \sum_{i=1}^{n} w_i \times \beta_i$$

The Capital Asset Princing Model

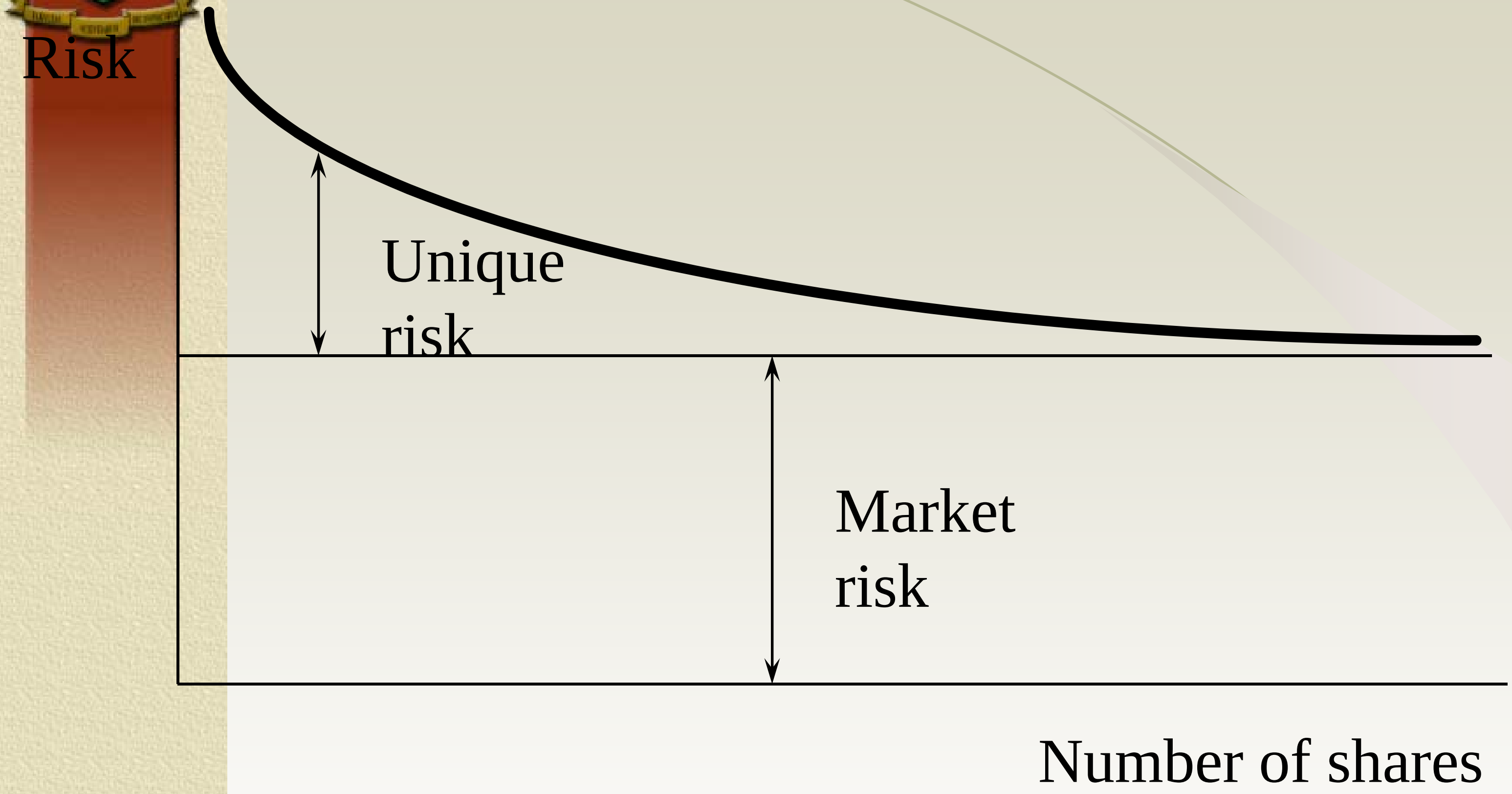
- Uses variances as a measure of risk
- Specifies that a portoin of variance can be diversified away, and that is only the non-diversifiable portion that is rewarded.
- Measures the non-diversifiable risk with beta, which is standardized around one.
- Translates beta into expected return –

  Expected Return = Riskfree rate + Beta * Risk Premium
- Works as well as the next best alternative in most cases.

The Importance of Diversification: Risk Types

- The risk (variance) on any individual investment can be broken down into two sources. Some of the risk is specific to the firm, and is called firm-specific, whereas the rest of the risk is market wide and affects all investments.
- The risk faced by a firm can be fall into the following categories -
  - (1) Project-specific; an individual project may have higher or lower cash flows than expected.
  - (2) Competitive Risk, which is that the earnings and cash flows on a project can be affected by the actions of competitors.
  - (3) Indistry-specific Risk, which covers factors that primarily impact the earnings and cash flows of a specific industry.
  - (4) International Risk, arising from having some cash flows in currencies other than the one in which the earnings are measured and stock is priced
  - (5) Market risk, which reflects the effect on earnings and cash flows of macro economic factors that essentially affect all companies

Effect of diversification



$$\sigma_p^2 = \frac{N}{N^2} \times \bar{\sigma}_i^2 + \frac{\left(N^2 - N\right)}{N^2} \times \overline{Cov_i}$$

The Effects of Diversification

- Firm-specific risk can be reduced, if not eliminated, by increasing the number of investments in your portfolio (i.e., by being diversified). Market-wide risk cannot. This can be justified on either economic or statistical grounds.
- On economic grounds, diversifying and holiding a larger portfolio eliminates firm-specific risk for two reasons-
  - (a) Each investment is a much smaller percentage of the portfolio, muting the effect (positive or negative) on the overall portolio.
  - (b) Firm-specific actions can be either positive or negative. In a large portfolio, it is argued, these effects will average out to zero. (For every firm, where something bad happens, there will be soma other firm, where something good happens.)

The Market Portfolio

- Assuming diversification cost nothing (in terms of transactions cost), and that all assets can be traded, the limit of diversification is to hold a portfolio of every single asset in the economy (in proportion to market value). This portfolio is called the market portfolio.
- Individual investors will adjust for risk, by adjusting their allocations to this market portfolio and a riskless asset (such as a T-Bill)

Preferred risk level	*Allocation decision*
No risk	100% in T-Bills
Some risk	50% in T-Bills; 50% in Market Portfolio;
A little more risk	25% in T-Bills; 75% in Market Portfolio
Even more risk	100% Market Portfolio
A risk hog..	Borrow money; Invest in market portfolio;

- Every investor holds some combination of the risk free asset and the market portfolio.

Limitations of the CAPM

1. The model makes unrealistic assumptions
2. The pareameters of the model cannot be estimated precisely
   - Definition of a market index
   - Firm may have changed during the ‘estimation’ period’
3. The model does not work well
   - If the model is right, there should be
     a linear relationship between returns and betas
     the only variable that should explain returns is betas
   - The reality is that
     the relationship between betas and returns is weak
     Other variables (size, price/book value) seem to explain
     differences in returns better.

The Riskfree Rate and Time Horizon

- On a riskfree asset, the actual return is equal to the expected return. Therefore, there is no variance around the expected return.
- For an investment to be riskfree, i.e., to have an actual return be equal to the expected return, two conditions have to be met –
  - There has to be no default risk, which generally implies that the security has to be issued by the government. Note, however, that not all governments can be viewed as default free.
  - There can be no uncertainty about reinvestment rates, which impliest that it is a zero coupon security with the same maturity as the cash flow being analyzed.

Riskfree Rate in Practice

- The riskfree rate is the rate on a zero coupon government bond matching the time horizon of the cash flow being analyzed.
- Theoretically, this translates into using different riskfree rates for each cash flow – the 1 year zero coupon rate for the cash flow in year 1, the 2-year zero coupon rate for the cash flow in year 2 …
- Practically speaking, if there is substatial uncertainty about expected cash flows, the present value effect of using time varying riskfree rates is small enough that it may not be worth it.

Measurement of the risk premium

- The risk premium is the premium that investors demand for investing in an average risk investment, relative to the riskfree rate.
- As a general proposition, this premium should be
  - greater than zero
  - increase with the risk aversion of the investors in that market
  - increase with the riskiness of the „average” risk investment.

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Estimating Risk Premiums in Practice

- Survey investors on their desired risk premiums and use the average premium from these surveys.
- Assume that the actual premium delivered over long time periods is equal to the expected premium – i.e., use historical data
- Estimate the implied premium in today's asset prices.

The Survey Approach

- Surveying all investors in a market place is impractical.
- However, you can survey a few investors (especially the larger investors) and use these results. In practice, this translates into surveys of money managers' expectations of expected returns on stocks over the next year.
- The limitations of this approach are:
  - there are no constraints on reasonability (the survey could produce negative risk premiums or risk premiums of 50%)
  - they are extremely volatile
  - they tend to be short term; even the longest surveys do not go beyond one year

The Historical Premium Approach

- This is the default approach used by most to arrive at the premium to use in the model
- In most cases, this approach does the following
  - it defines a time period for the estimation (1926-Present, 1962-Present…)
  - it calculates average returns on a stock index during the period
    - it calculates average returns on a riskless security over the period
      - it calculates the difference between the two
      - and uses it as a premium looking forward
- The limitations of this approach are:
  - it assumes that the risk aversion of investros has not changed in a systematic way across time. (The risk aversion may change from year to year, but it reverts back to historical averages)
  - it assumes that the riskiness of the „risky" portfolio (stock index) has not changed in a systematic way across time.

What about historical premiums for other markets?

- Historical data for markets outside the United States tends to be sketch and unreliable.
- Ibbotson, for instance, estimates the following premiums for major markets from 1970-1996

Country	*Stock return*	*Bond Return*	*Equity Risk Premium*
Australia	8.47%	6.99%	1.48%
France	11.51%	9.17%	2.34%
Germany	11.30%	12.10%	-0.80%
Italy	5.49%	7.84%	-2.35%
Japan	15.73%	12.69%	3.04%
Mexico	11.88%	10.71%	1.17%
Singapore	15.48%	6.45%	9.03%
Spain	8.22%	7.91%	0.31%
Switzerland	13.49%	10.11%	3.38%
UK	12.42%	7.81%	4.61%

Finding the Right Financing Mix: The Capital Structure Decision

Aswath Damodaran

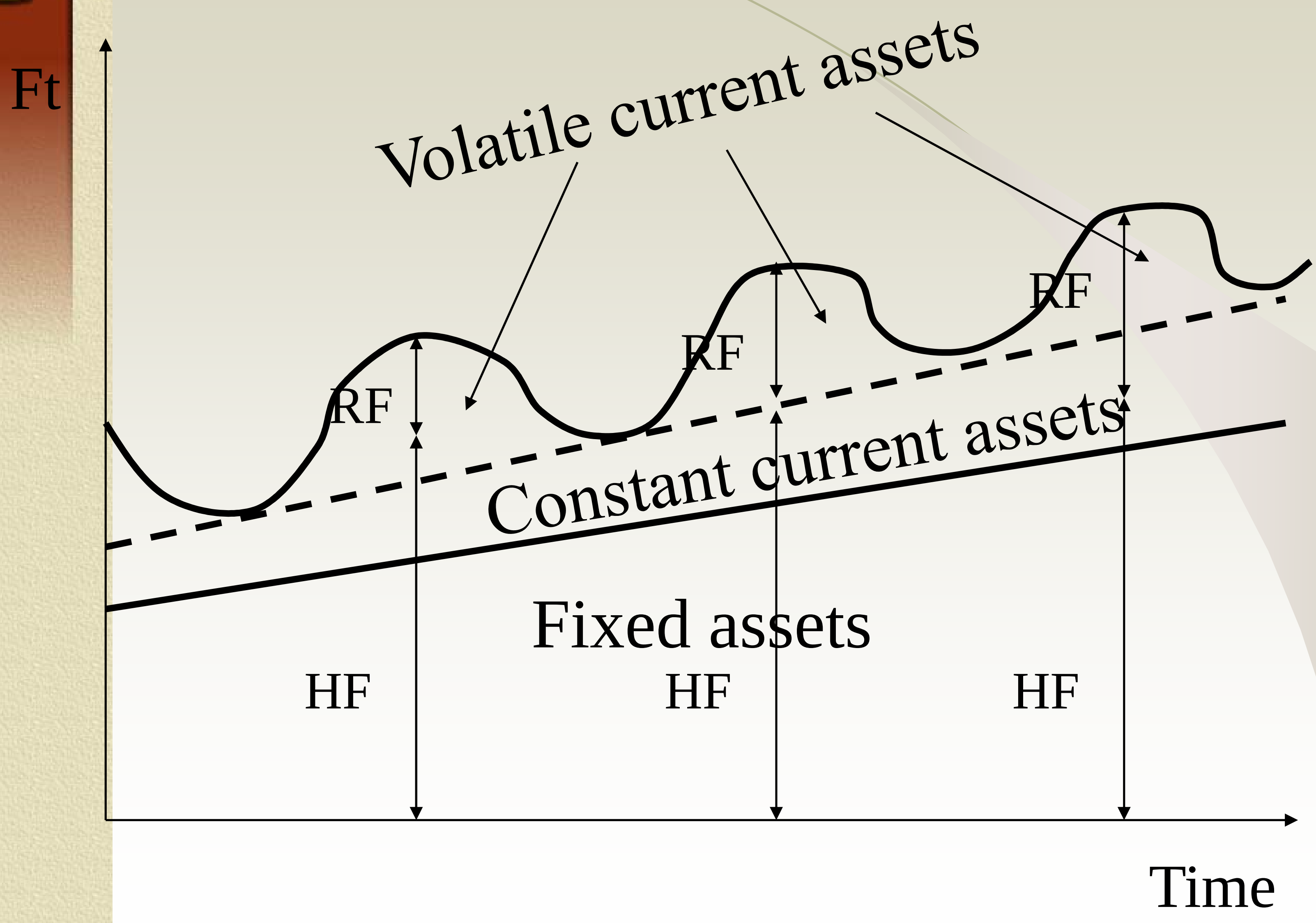
Stern School of Business

First Principles

- Invest in projects that yield a return greater than the minimum acceptable hurdle rate.
  - The hurdle rate should be higher for riskier projects and reflect the financing mix used – owners' funds (equity) or borrowed money (debt)
  - Returns on projects should be measured based on cash flows generated and the timing of these cash flows; they should also consider both positive and negative side effects of these projects.
- Choose a financing mix that minimizes the hurdle rate and matches the assets being financed.
- If there are not enough investments that earn the hurdle rate, return the cash to stockholders.
  - The form of returns – dividends and stock buybacks – will depend upon the stockholders' characteristics.

Objective: Maximize the Value of the Firm

Maturity matching



Currency macthing

You should finance currency producing assets from source of fund raised from that currency.

Assets	Source of funds
Assets producing export goods	Nominated in currency
Assets producing domestic goods	Nomintated in forint

Risk matching

Assets producing volatile cash flow should be financed from safe funds (equity), assets producing safe cash flow should be financed from risky funds (debt).

Cyclical sectors
- Heavy chemicals
- Metallurgy, Engineering
- Pharmaceuticals
- Technology industries

Solid sectors
- Retail
- Utilities
- Services

Leverage effect

Unleveraged firm (Equity of 100 MFT)			
Case	Good	Average	Bad
Operating profit	30	20	10
Interest expenses	-	-	-
Net income	30	20	10
ROE	30%	20%	10%
Leveraged firm (50 MFt debt, 50 MFt equity)			
Operating profit	30	20	10
Interest expenses	10	10	10
Net income	20	10	0
ROE	40%	20%	0%

Equation of leveraged ROE

$$ROE = ROA + (ROA - R_D) \times \frac{D}{E}$$

where,

ROE – return of equity

ROA – return of assets

D – value of debt

E – value of equity

R_D – average rate of debt

The Choices in Financing

- There are only two ways in which a business can make money.
  - The first is debt. The essence of debt is that you promise to make fixed payments in the future (interest payments and repaying principal). If you fail to make those payments, you lose control of your business.
  - The other is equity. With equity, you do get whatever cash flows are left over after you have made debt payments.
- The equity can take different forms:
  - For very small businesses: it can be owners investing their savings
  - For slightly larger businesses: it can be venture capital
  - For publicly traded firms: it is common stock
- The debt can also take different forms
  - For private businesses: it is usually bank loans
  - For publicly traded firms: it can take the form of bonds

How the financial decisions affects on the value of the firm?

$$GPV = \sum_{i=1}^{n} \frac{CF_i}{(1 + WACC)^i}$$

If I can minimize the WACC, I increase the value of the firm.

$$WACC = r_E \times \frac{E}{D+E} + r_D \times \frac{D}{D+E}$$

Two ways to optimize:

- Decrease the expected yield
- Modify the leverage

- A firm has the following capital structure: The firm issued common stock for 600 million USD and preferred stock with 10% coupon rate for 200 million USD. The price of common stock is 400% of nominal value, which contains 20% accumulated dividend due to pay promptly. The expected growth rate of dividend is 10%. The price of preferred stock is 120%, the accumulated dividend is 10%. The issuing cost of stocks is 4% and 3% of the nominal value respectively. The firm raised 300 million USD loan with 15% fixed interest. The handling fee of loan was 2%, which was deducted at granting. Currently the firm can raise loan with 12% fixed rate and 1% handling fee. The amount of issued bonds is 500 million USD, their price is 100% of nominal value. The accumulated interest is 11%, and the issuing cost is 2%. The interest rate of bond is 15%. The corporate tax rate is 16%. Calculate the WACC!

- Our company company is not registered on the SE, but there is a company which operates in the same sector, has got the same size, and has got the same financial structure. („benchmark”) Bechmark’s beta is 2,0. The expected return of the index is 20%, and the risk-free rate 6%. The APR of loan 10%. The company’s net income is 34 mHUF, the amount of loan is 100 mHUF. The benchmark company’s net income is 50 mHUF, number of share isssued is 5 m. The price/earning ratio of benchmark is 7 and we use 20% discount.

The Financing Mix Question

- In deciding to raise financing for a business, is there an optimal mix of debt and equity?
  - If yes, what is the trade off that lets us determine this optimal mix?
  - If not, why not?

Measuring a firm's financing mix

- The simplest measure of how much debt and equity a firm is using currently is to look at the proportion of debt in the total financing. This ratio is called the debt to capital ratio:

  Debt to Capital Ratio = Debt / (Debt + Equity)
- Debt includes all interest bearing liabilities, short term as well as long term.
- Equity can be defined either in accounting terms (as book value of equity) or in market value terms (based upon the current price). The resulting debt ratios can be very different.

Costs and Benefits of Debt

- Benefits of Debt
  - Tax Benefits
  - Adds discipline to management
- Costs of Debt
  - Bankruptcy Costs
  - Agency Costs
  - Loss of Future Flexibility

Tax Benefits of Debt

- When you borrow money, you are alloweed to deduct interest expenses from your income to arrive at taxable income. This reduces your taxes.

  When you use equity, you are not allowed to deduct payment to equity (such as dividends) to arrive at taxable income.
- The dollar tax benefit from the interest payment in any year is a funciton of your tax rate and the interest payment:
  - Tax benefit each year = Tax Rate * Interest Payment
- Proposition 1: Other things being equal, the higher the marginal tax rate of a business, the more debt it will have in its capital structure.

Debt adds discipline to management

- If you are managers of a firm with no debt, and you generate high income and cash flows each year, you tend to become complacent. The complacency can lead to inefficiency and investing in poor projects. There is little or no cost borne by the managers.
- Forcing such a firm to borrow money can be an antidote to the complacency. The managers now have to ensure that the investments they make will earn at least enough return to cover the interest expenses. The cost of not doing so is bankruptcy and the loss of such a job.

Bankruptcy Cost

- The expected bankruptcy cost is a function of two variables --
  - the cost of going bankrupt
    - direct costs: Legal and other Deadweight Costs
    - indirect costs: Costs arising because people perceive you to be in financial
  - the probability of bankruptcy, which will depend upon how uncertain you are about future cash flows
- As you borrow more, you increase the probability of bankruptcy and hence the expected bankruptcy cost.

The Bankruptcy Cost Proposition

- Proposition 2: Other things being equal, the greater the indirect bankruptcy cost and/or probability of bankruptcy in the operating cashflows of the firm, the less debt the firm can afford to use.

Agency Cost

- An agency cost arises whenever you hire someone else to do something for you. It arises because your interests (as the principal) may deviate from those of the person you hired (as the agent).
- When you lend money to a business, you are allowing the stockholders to use that money in the course of running that business. Stockholders interests are different from your interests, because
  - You (as lender) are interested in getting your money back
  - Stockholders are interested in maximizing your wealth
- In some cases, the clash of interests can lead to stockholders
  - Investing in riskier projects than you would want them to
  - Paying themselves large dividends when you would rather have them keep the cash in the business.
- Proposition 3: Other things being equal, the greater the agency problems associated with lending to a firm, the less debt the firm can afford to use.

Loss of future financing flexibility

- When a firm borrows up to its capacity, it loses the flexibility of financing future projects with debt.
- Proposition 4: Other things remaining equal, the more uncertain a firm is about its future financing requirements and projects, the less debt the firm will use for financing current projects.

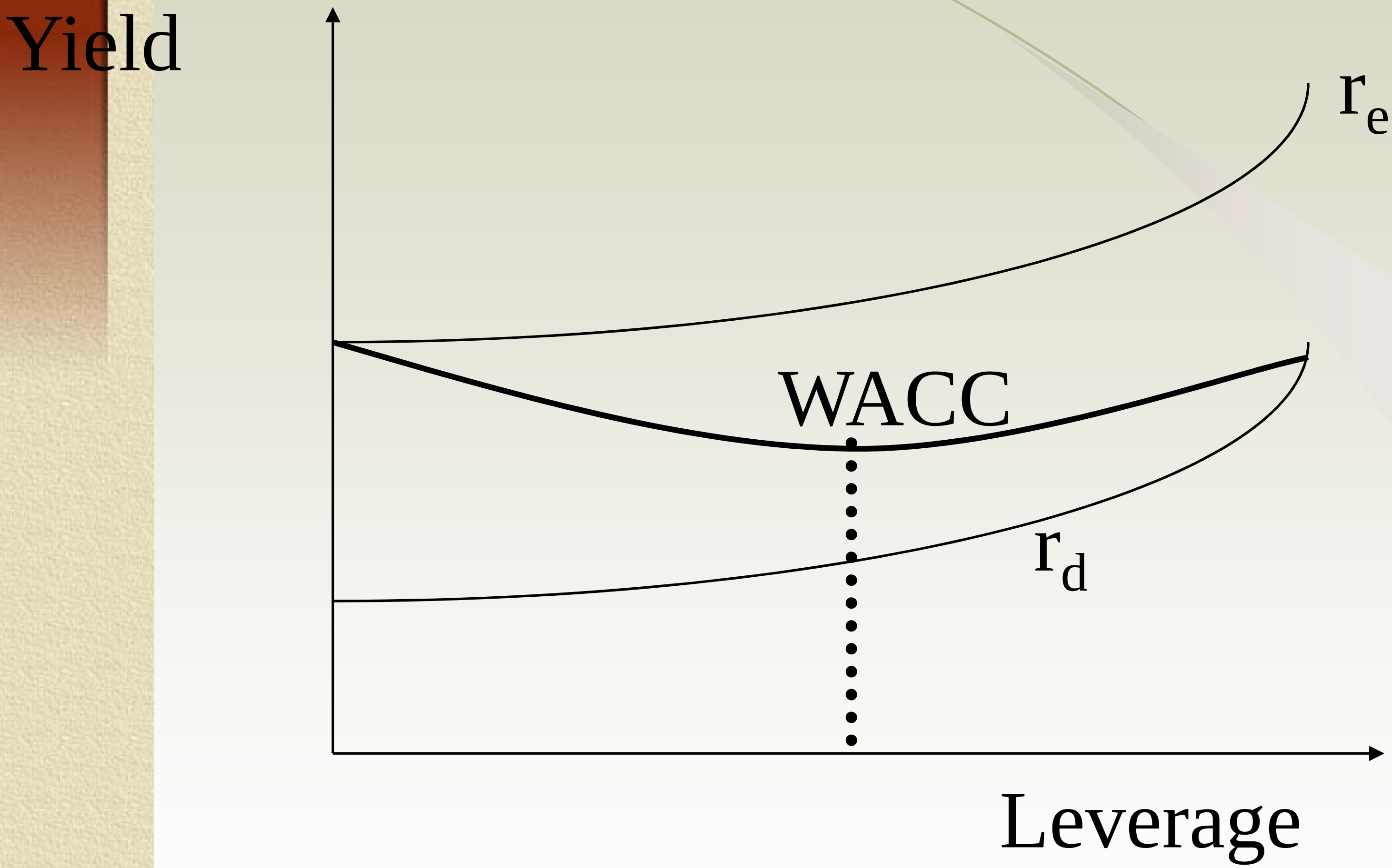
Debt: Summarizing the Trade Off

Advantages of Borrowing	Disadvantages of Borrowing
1. Tax Benefit:	*1. Bankruptcy Cost:*
Higher tax rates --> Higher tax benefit	Higher business risk --> Higher Cost
2. Added Discipline:	*2. Agency Cost:*
Greater the separation between managers and stockholders --> Greater the benefit	Greater the separation between stockholders & lenders --> Higher Cost
	3. Loss of Future Financing Flexibility:
	Greater the uncertainty about future financing needs --> Higher Cost

The Miller-Modigliani Theorem

- In an environment, where there are no taxes, default risk or agency costs, capital structure is irrelevant.
- The value of a firm is independent of its debt ratio.

Net Income Approach



Implications of MM Theorem

- Leverage is irrelevant. A firm's value will be determinde by its project cash flows.
- The cost of capital of the firm will not change with leverage. As a firm increases its leverage, the cost of equity will increase just enough to offset any gains to the leverage.

Measuring Cost of Capital

- It will depend upon:
  - (a) the components of financing: Debt, Equity or Preferred stock
  - (b) the cost of each component
- In summary, the cost of capital is the cost of each component weighted by its relative market value.

$$WACC = k_e\,(E/(D+E)) + k_d\,(D/(D+E))$$

Recapping the Measurement of cost of capital

- The cost of debt is the market interest rate that the firm has to pay on ist borrowing. It will depend upon three components

  (a) The general level of interest rates

  (b) The default premium

  (c) The firm's tax rate

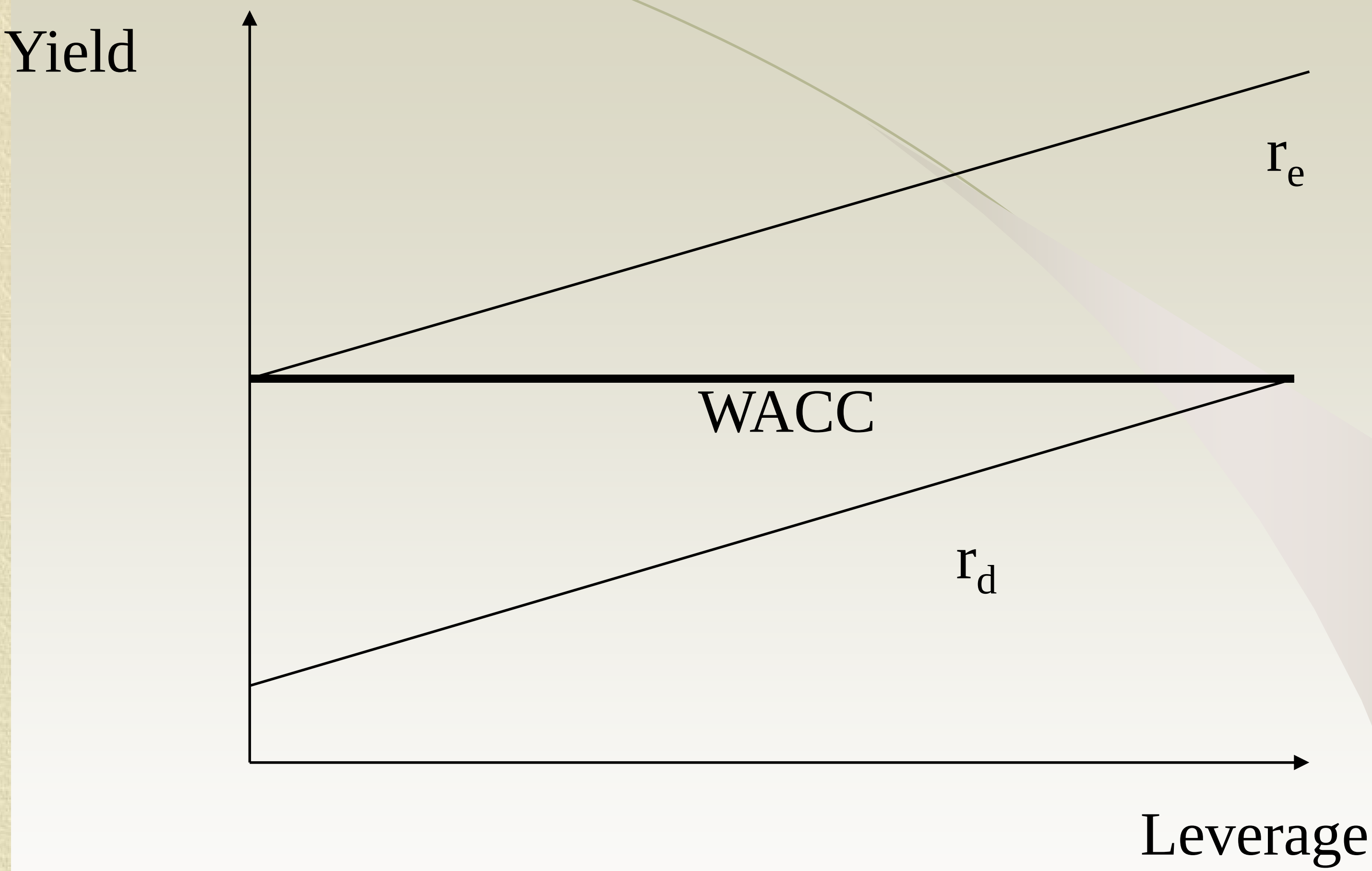
- The cost of equity is

  1. the required rate of return given the risk

  2. inclusive of both dividend yield and price appreciation

- The weights attached to debt and equity have to be market value weights, not book value weights.

WACC in word of MM-I.



Determinants of Optimal Debt Ratios

- Firm Specific Factors
  - 1. Tax Rate
  - Higher tax rates --> Higher Optimal Debt Ratio
  - Lower tax rates --> Lower Optimal Debt Ratio
  - 2. Pre-Tax Returns on Firm = (Operating Income) / MV of Firm
  - Higher Pre-tax Returns --> Higher Optimal Debt Ratio
  - Lower Pre-tax Returns --> Lower Optimal Debt Ratio
  - 3. Variance in Earnings [Shows up when you do 'what if' analysis]
  - Higher Variance --> Lower Optimal Debt Ratio
  - Lower Variance --> Higher Optimal Debt Ratio
- Macro-Economic Factors
  - 1. Default Spreads

    Higher --> Lower Optimal Debt Ratio

    Lower --> Higher Optimal Debt Ratio

⌛ Application Test: Your firm's optimal financing mix

- Using the optimal capital structure spreadsheet provided:
  - Estimate the optimal debt ratio for your firm
  - Estimate the new cost of capital at the optimal
  - Estimate the effect of the change in the cost of capital on firm value
  - Estimate the effect on the stock price
- In terms of the mechanics, what would you need to do to get to the optimal immediately?

The APV Approach to Optimal Capital Structure

- In the adjusted present value approach, the value of the firm is written as the sum of the value of the firm without debt (the unlevered firm) and the effect of debt on firm value
- Firm Value = Unlevered Firm Value + (Tax Benefits of Debt – Expected Bankruptcy Cost from the Debt)
- The optimal dollar debt level is the one that maximizes firm value

Implementing the APV Approach

- Step 1: Estimate the unlevered firm value. This can be done in one of two ways:
  - Estimating the unlevered beta, a cost of equity based upon the unlevered beta and valuing the firm using this cost of equity (which will also be the cost of capital, with an unlevered firm)
  - Alternatively, Unlevered Firm Value = Current Market Value of Firm – Tax Benefits of Debt (Current) + Expected Bankruptcy cost from Debt
- Step 2: Estimate the tax benefits at different levels of debt. The simplest assumption to make is that the savings are perpetual, in which case
  - Tax benefits = Dollar Debt * Tax Rate
- Step 3: Estimate a probability of bankruptcy at each debt level, and multiply by the cost of bankruptcy (including both direct and indirect costs) to estimate the expected bankruptcy cost.

A Framework for Getting to the Optimal

Is the actual debt ratio greater than or lesser than the optimal debt ratio?

- Actual > Optimal
  Overleved
  - Is the firm under bankruptcy theat?
    - Yes
      - Reduce Debt quickly
        1.Equity for Debt swap
        2.Sell Assets; use cash to pay off debt
        3. Renegotiate with lenders
    - No
      - Does the firm have good Projects?
        ROE > Cost of Equity
        ROC > Cost of Capital
        - Yes
          Take good projects with new equity or with retained earnings.
        - No
          1. Pay off debt with retained earnings.
          2. Reduce or eliminate dividends.
          3. Issue new equity and pay off Debt.
- Actual < Optimal
  Underlevered
  - Is the firm a takeover target?
    - Yes
      - Increase leverage quickly
        1. Debt/Equity swaps
        2. Borrow money & buy shares.
    - No
      - Does the firm have good projects?
        ROE > Cost of Equity
        ROC > Cost of Capital
        - Yes
          Take good projects with debt.
        - No
          - Do you stockholders like dividends?
            - Yes
              Pay Dividends
            - No
              Buy back stock

Returning Cash to The Owners: Dividend Policy

Aswath Damondaran

First Principles

- Invest in projects that yield a return greater than the minimum acceptable hurdle rate.
  - The hurdle rate should be higher for riskier projects and reflect the financing mix used – owners' funds (equity) or borrowed money (debt)
  - Returns on projects should be measured based on cash flows generated and the timing of these cash flows; they should also consider both positive and negative side effects of these projects.
- Choose a financing mix that minimizes the hurdle rate and matches the assets being financed.
- **If there are not enough investments that earn the hurdle rate, return the cash to stockholders.**
  - **The form of returns – dividends and stock buybacks – will depend upon the stockholders' characteristics.**

Objective: Maximize the Value of the Firm

Measures of Dividend Policy

- Dividens Payout:
  - measures the percentage of earnings that the company pays in dividends
  - Dividends / Earnings
- Dividend Yield :
  - measures the return that an investor can make from dividends alone
  - = Dividends / Stock Price

Three Schools Of Thought On Dividends

- 1. If
  - (a) there are no tax disadvantages associated with dividends
  - (b) companies can issue stock, at no cost, to raise equity, whenever needed
  - **Dividends do not matter, and dividend policy does not affect value.**
- 2. If dividends have a tax disadvantage,
  - **Dividends are bad, and increasing dividends will reduce value**
- 3. If stockholders like dividends, or dividends operate as a signal of future prospects,
  - **Dividends are good, and increasing dividends will increase value**

The balanced viewpoint

- If a company has excess cash, and few good projects (NPV > 0), returning money to stockholders (dividends or stock repurchases) is GOOD.
- If a company does not have excess cash, and/or has several good projects (NPV > 0), returning money to stockholders (dividends or stock repurchases) is BAD.

Why do firms pay dividends?

- The Miller-Modigliani Hypothesis: **Dividends do not affect value**
- Basis:
  - If a firm's investment policy (and hence cash flows) don't change, the value of the firm cannot change with dividend policy. If we ignore personal taxes, investors have to be indifferent to receiving either dividends or capital gains.
- Underlying Assumptions:
  - (a) There are no tax differences between dividends and capital gains.
  - (b) If companies pay too much in cash, they can issue new stock, with no flotation costs or signaling consequences, to replace this cash.
  - (c) If companies pay too little in dividends, they do not use the excess cash for bad projects or acquisitions.

The Tax Response: Dividends are taxed more than capital gains

- Basis:
  - Dividends are taxed more heavily than capital gains. A stockholder will therefore prefer to receive capital gains over dividends.
- Evidence:
  - Examining ex-dividend dates should provide us with some evidence on whether dividends are perfect substitutes for capital gains.

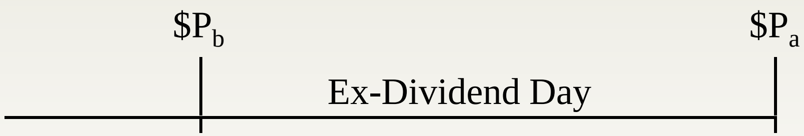
Price Behavior on Ex-Dividend Date

Let P_b = Price before the stock goes ex-dividend

P_a = Price after the stock goes ex-dvidend

D = Dividends declared on stock

t_o, t_{cg} = Taxes paid on ordinary income and capital gains respectively



Cashflows from Selling around Ex-Dividend Day

- The cash flows from selling before then are-

$$P_b - (P_b - P)\, t_{cg}$$

- The cash flows from selling after the ex-dividend day are-

$$P_a - (P_a - P)\, t_{cg} + D(1-t_o)$$

Since the average investor should be indifferent between selling before the ex-dividend day and selling after the ex-dividend day –

$$P_b - (P_b - P)\, t_{cg} = P_a - (P_a - P)\, t_{cg} + D(1-t_o)$$

Moving the variables around, we arrive at the following:

Price Change, Dividends and Tax Rates

$$\frac{P_b - P_a}{D} = \frac{(1 - t_o)}{(1 - t_{cg})}$$

If	$P_b - P_a = D$	then	$t_o = t_{cg}$
	$P_b - P_a < D$	then	$t_o > t_{cg}$
	$P_b - P_a < D$	then	$t_o < t_{cg}$

Dividend Arbitrage

- Assume that you are a tax exempt investor, and that you know that the price drop on the ex-dividend day is only 90% of the dividend. How would you exploit this differential?
- ❑ Invest in the stock for the long term
- ❑ Sell short the day before the ex-dividend day, buy on the ex-dividend day
- ❑ Buy just before the ex-dividend day, and sell after.
- ❑ ____

The wrong reasons for paying dividends
The bird in the hand fallacy

- **Argument:** Dividends now are more certain than capital gains later. Hence dividends are more valuable than capital gains.
- **Counter:** The appropriate comparison should be between dividends today and price appreciation today. (The stock price drops on the exdividend day.)

The excess cash hypothesis

- **Argument:** The firm has excess cash on its hands this year, no investment projects this year and wants to give the money back to stockholders.
- **Counter:** So why not just repurchase stock? If this is a one-time phenomenon, the firm has to consider future financing needs.

  Consider the cost of issuing new stock:

The Cost of Raising Funds

- Issuing new equity is much more expensive than raising new debt for companies that are already publicly traded, in terms of transactions costs and investment banking fess.
- Raising small amounts is much more expensive than raising large amounts, for both equity and debt. Making a small equity issue (say S 25-S 50 million might be prohibitively expensive).

A clientele based explanation

- **Basis:** Investors may form clienteles based upon their tax bracktest. Investors is high tax brackets may invest in stocks which do not pay dividends and those in low tax bracktes may invest in dividend paying stocks.
- **Evidence:** A study of 914 investors' porfolios was carried out to see if their porfolio positions were affected by their tax brackets. The study found that
  - (a) Older investors were more likely to hold high dividend stocks and
  - (b) Poorer investors tended to hold high dividend stocks

Dividend Policy and Clientele

- Assume that you run a phone company, and that you have historically paid large dividends. You are now planning to enter the telecommunications and media markets. Which of the following paths are you most likely to follow?
- ❑ Courageously announce to your stockholders that you plan to cut dividends and invest in the new marketes.
- ❑ Continue to pay the dividends that you used to, and defer investment in the new markets.
- ❑ Continue to pay the dividends that you used to, make the investments in the new markets, and issue new stock to cover the shortfall
- ❑ Other

Management Beliefs about Dividend Policy

- A firm's dividend payout ratio affects its stock price.
- Dividend payments operate as a signal to financial markets.
- Dividend announcements provide information to financial markets.
- Investors think that dividends are safer than retained earnings.
- Investors are not indifferent between dividends and price appreciation.
- Stockholders are attracted to firms that have dividend policies that they like.

Determinants of Dividend Policy

- *Investment Opportunities:* More investment opportunities - > Lower Dividends
- *Stability in earnings:* More stable earnings - > Higher Dividends
- *Alternative sources of capital:* More alternative sources - > Higher Dividends
- *Constraints:* More constraints imposed by bondholders and lenders - > Lower Dividends
- *Signaling Incentives:* More options to supply information to financial markets – Lower need to pay dividends as signal
- *Stockholder characteristics:* Older, poorer stockholders - > Higher dividends

A Measure of How Much a Company Could have Afforded to Pay out: FCFE

- The Free Cashflow to Equity (FCFE) is a measure of how much cash is left in the business after non-equity claimholders (debt and preferred stock) have been paid, and after any reinvestment needed to sustain the firm's assets and future growth.

Net Income
+ Depreciation & Amortization
= Cash flows from Operations to Equity Investors
- Preferred Dividends
- Capital Expenditures
- Working Capital Needs
- Principal Repayments
+ Proceeds from New Debt Issues
= Free Cash flow to Equity

A Practical Framework for Analyzing Dividend Policy

How much did the firm pay out? How much could it have afforded to pay out?

What it could have paid out	*What it actually paid out*
Net Income	Dividends
- (Cap Ex – Depr'n) (1-DR)	+ Equity Repurchase
- Chg Working Capital (1-DR)	
= FCFE	

Firm pays out too little
FCFE > Dividends

Do you trust managers in the company with your cash?
Look at past project choice:
Compare ROE to Cost of Equity
ROC to WACC

Firm has history of good project choice and good projects in the future

Give managers the flexibility to keep cash and set dividends

Firm has history of poor project choice

Force managers to justify holding cash or return cash to stockholders

Firm pays out too much
FCFE < Dividends

What investment opportunities does the Firm have?
Look at past project choice:
Compare ROE to Cost of Equity
ROC to WACC

Firm has good projects

Firm should cut dividends and reinvest more

Firm has poor projects

Firm should deal with its investment problem firs and then cut dividends