

# Measures of return: earnings versus cash flows

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- 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).

# Measuring Returns Right: The Basic Principles

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- 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”**

# Setting the table: What is an investment/project?

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- An investment/project can range the spectrum from big to small, money making to cost saving:
  - ▣ Major strategic decisions to enter new areas of business or new markets.
  - ▣ Acquisitions of other firms are projects as well, notwithstanding attempts to create separate sets of rules for them.
  - ▣ Decisions on new ventures within existing businesses or markets.
  - ▣ Decisions that may change the way existing ventures and projects are run.
  - ▣ Decisions on how best to deliver a service that is necessary for the business to run smoothly.
- Put in broader terms, every choice made by a firm can be framed as an investment.

# Here are four examples...

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- Rio Disney: We will consider whether Disney should invest in its first theme parks in South America. These parks, while similar to those that Disney has in other parts of the world, will require us to consider the effects of country risk and currency issues in project analysis.
- New iron ore mine for Vale: This is an iron ore mine that Vale is considering in Western Labrador, Canada.
- An Online Store for Bookscape: Bookscape is evaluating whether it should create an online store to sell books. While it is an extension of their basis business, it will require different investments (and potentially expose them to different types of risk).
- Acquisition of Harman by Tata Motors: A cross-border bid by Tata for Harman International, a publicly traded US firm that manufactures high-end audio equipment, with the intent of upgrading the audio upgrades on Tata Motors' automobiles. This investment will allow us to examine currency and risk issues in such a transaction.



# Earnings versus Cash Flows: A Disney Theme Park

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- The theme parks to be built near Rio, modeled on Euro Disney in Paris and Disney World in Orlando.
- The complex will include a “Magic Kingdom” to be constructed, beginning immediately, and becoming operational at the beginning of the second year, and a second theme park modeled on Epcot Center at Orlando to be constructed in the second and third year and becoming operational at the beginning of the fourth year.
- The earnings and cash flows are estimated in nominal U.S. Dollars.

# Key Assumptions on Start Up and Construction

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- Disney has already spent \$0.5 Billion researching the proposal and getting the necessary licenses for the park; none of this investment can be recovered if the park is not built. This expenditure has been capitalized and will be depreciated straight line over ten years to a salvage value of zero.
- Disney will face substantial construction costs, if it chooses to build the theme parks.
  - The cost of constructing Magic Kingdom will be \$3 billion, with \$ 2 billion to be spent right now, and \$1 Billion to be spent one year from now.
  - The cost of constructing Epcot II will be \$ 1.5 billion, with \$ 1 billion to be spent at the end of the second year and \$0.5 billion at the end of the third year.
  - These investments will be depreciated based upon a depreciation schedule in the tax code, where depreciation will be different each year.

# Key Revenue Assumptions

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- Revenue estimates for the parks and resort properties (in millions)

Year	Magic Kingdom	Epcot II	Resort Properties	Total
1	\$0	\$0	\$0	\$0
2	\$1,000	\$0	\$250	\$1,250
3	\$1,400	\$0	\$350	\$1,750
4	\$1,700	\$300	\$500	\$2,500
5	\$2,000	\$500	\$625	\$3,125
6	\$2,200	\$550	\$688	\$3,438
7	\$2,420	\$605	\$756	\$3,781
8	\$2,662	\$666	\$832	\$4,159
9	\$2,928	\$732	\$915	\$4,575
10	\$2,987	\$747	\$933	\$4,667

□

# Key Expense Assumptions

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- The operating expenses are assumed to be 60% of the revenues at the parks, and 75% of revenues at the resort properties.
- Disney will also allocate corporate general and administrative costs to this project, based upon revenues
  - ▣ The G&A allocation will be 15% of the revenues each year.
  - ▣ It is worth noting that a recent analysis of these expenses found that only one-third of these expenses are variable (and a function of total revenue) and that two-thirds are fixed.

# Depreciation and Capital Maintenance

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<i>Year</i>	<i>Depreciation as % of Book Value</i>	<i>Capital Maintenance as % of Depreciation</i>
1	0.00%	0.00%
2	12.50%	50.00%
3	11.00%	60.00%
4	9.50%	70.00%
5	8.00%	80.00%
6	8.00%	90.00%
7	8.00%	100.00%
8	8.00%	105.00%
9	8.00%	110.00%
10	8.00%	110.00%

- The capital maintenance expenditures are low in the early years, when the parks are still new but increase as the parks age.

# Other Assumptions

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- Disney will have to maintain non-cash working capital (primarily consisting of inventory at the theme parks and the resort properties, netted against accounts payable) of 5% of revenues, with the investments being made at the end of each year.
- The income from the investment will be taxed at Disney's marginal tax rate of 36.1%.

# Laying the groundwork: Book Capital, Working Capital and Depreciation

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	0	1	2	3	4	5	6	7	8	9	10
<i>Book Value of Pre-project inv</i>	\$500	\$450	\$400	\$350	\$300	\$250	\$200	\$150	\$100	\$50	\$0
Depreciation: Pre-Project		\$50	\$50	\$50	\$50	\$50	\$50	\$50	\$50	\$50	\$50
Magic Kingdom	\$2,000	\$1,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Epcot Rio	\$0	\$0	\$1,000	\$500	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Capital Maintenance		\$0	\$188	\$252	\$276	\$258	\$285	\$314	\$330	\$347	\$350
- Depreciation on fixed assets		\$0	\$375	\$419	\$394	\$322	\$317	\$314	\$314	\$316	\$318
<i>Book Value of new Fixed Assets</i>	<i>\$2,000</i>	<i>\$3,000</i>	<i>\$3,813</i>	<i>\$4,145</i>	<i>\$4,027</i>	<i>\$3,962</i>	<i>\$3,931</i>	<i>\$3,931</i>	<i>\$3,946</i>	<i>\$3,978</i>	<i>\$4,010</i>
Book Value of Working Capital			\$63	\$88	\$125	\$156	\$172	\$189	\$208	\$229	\$233
Total Capital Invested in Project	\$2,500	\$3,450	\$4,275	\$4,582	\$4,452	\$4,368	\$4,302	\$4,270	\$4,254	\$4,257	\$4,243

12.5% of book  
value at end of  
prior year  
(\$3,000)

# Step 1: Estimate Accounting Earnings on Project

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	0	1	2	3	4	5	6	7	8	9	10
Magic Kingdom - Revenues		\$0	\$1,000	\$1,400	\$1,700	\$2,000	\$2,200	\$2,420	\$2,662	\$2,928	\$2,987
Epcot Rio - Revenues		\$0	\$0	\$0	\$300	\$500	\$550	\$605	\$666	\$732	\$747
Resort & Properties - Revenues		\$0	\$250	\$350	\$500	\$625	\$688	\$756	\$832	\$915	\$933
<b>Total Revenues</b>			<b>\$1,250</b>	<b>\$1,750</b>	<b>\$2,500</b>	<b>\$3,125</b>	<b>\$3,438</b>	<b>\$3,781</b>	<b>\$4,159</b>	<b>\$4,575</b>	<b>\$4,667</b>
Magic Kingdom – Direct Expenses		\$0	\$600	\$840	\$1,020	\$1,200	\$1,320	\$1,452	\$1,597	\$1,757	\$1,792
Epcot Rio – Direct Expenses		\$0	\$0	\$0	\$180	\$300	\$330	\$363	\$399	\$439	\$448
Resort & Property – Direct Expenses		\$0	\$188	\$263	\$375	\$469	\$516	\$567	\$624	\$686	\$700
<b>Total Direct Expenses</b>			<b>\$788</b>	<b>\$1,103</b>	<b>\$1,575</b>	<b>\$1,969</b>	<b>\$2,166</b>	<b>\$2,382</b>	<b>\$2,620</b>	<b>\$2,882</b>	<b>\$2,940</b>
Depreciation & Amortization		\$50	\$425	\$469	\$444	\$372	\$367	\$364	\$364	\$366	\$368
Allocated G&A Costs		\$0	\$188	\$263	\$375	\$469	\$516	\$567	\$624	\$686	\$700
<b>Operating Income</b>		<b>-\$50</b>	<b>-\$150</b>	<b>-\$84</b>	<b>\$106</b>	<b>\$315</b>	<b>\$389</b>	<b>\$467</b>	<b>\$551</b>	<b>\$641</b>	<b>\$658</b>
Taxes		-\$18	-\$54	-\$30	\$38	\$114	\$141	\$169	\$199	\$231	\$238
<b>Operating Income after Taxes</b>		<b>-\$32</b>	<b>-\$96</b>	<b>-\$54</b>	<b>\$68</b>	<b>\$202</b>	<b>\$249</b>	<b>\$299</b>	<b>\$352</b>	<b>\$410</b>	<b>\$421</b>



# And the Accounting View of Return

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Year	After-tax Operating Income	BV of pre-project investment	BV of fixed assets	BV of Working capital	BV of Capital	Average BV of Capital	ROC(a)	ROC(b)
0		500	2000	0	\$2,500			
1	-\$32	\$450	\$3,000	\$0	\$3,450	\$2,975	-1.07%	-1.28%
2	-\$96	\$400	\$3,813	\$63	\$4,275	\$3,863	-2.48%	-2.78%
3	-\$54	\$350	\$4,145	\$88	\$4,582	\$4,429	-1.22%	-1.26%
4	\$68	\$300	\$4,027	\$125	\$4,452	\$4,517	1.50%	1.48%
5	\$202	\$250	\$3,962	\$156	\$4,368	\$4,410	4.57%	4.53%
6	\$249	\$200	\$3,931	\$172	\$4,302	\$4,335	5.74%	5.69%
7	\$299	\$150	\$3,931	\$189	\$4,270	\$4,286	6.97%	6.94%
8	\$352	\$100	\$3,946	\$208	\$4,254	\$4,262	8.26%	8.24%
9	\$410	\$50	\$3,978	\$229	\$4,257	\$4,255	9.62%	9.63%
10	\$421	\$0	\$4,010	\$233	\$4,243	\$4,250	9.90%	9.89%
Average							4.18%	4.11%

(a) Based upon average book capital over the year

(b) Based upon book capital at the start of each year

# What should this return be compared to?

- The computed return on capital on this investment is about 4.18%. To make a judgment on whether this is a sufficient return, we need to compare this return to a “hurdle rate”. Which of the following is the right hurdle rate? Why or why not?
  - a. The riskfree rate of 2.75% (T. Bond rate)
  - b. The cost of equity for Disney as a company (8.52%)
  - c. The cost of equity for Disney theme parks (7.09%)
  - d. The cost of capital for Disney as a company (7.81%)
  - e. The cost of capital for Disney theme parks (6.61%)
  - f. None of the above

# Should there be a risk premium for foreign projects?

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- The exchange rate risk should be diversifiable risk (and hence should not command a premium) if
  - the company has projects in a large number of countries (or)
  - the investors in the company are globally diversified.
  - For Disney, this risk should not affect the cost of capital used. Consequently, we would not adjust the cost of capital for Disney's investments in other mature markets (Germany, UK, France)
- The same diversification argument can also be applied against some political risk, which would mean that it too should not affect the discount rate. However, there are aspects of political risk especially in emerging markets that will be difficult to diversify and may affect the cash flows, by reducing the expected life or cash flows on the project.
- For Disney, this is the risk that we are incorporating into the cost of capital when it invests in Brazil (or any other emerging market)

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# Estimating a hurdle rate for Rio Disney

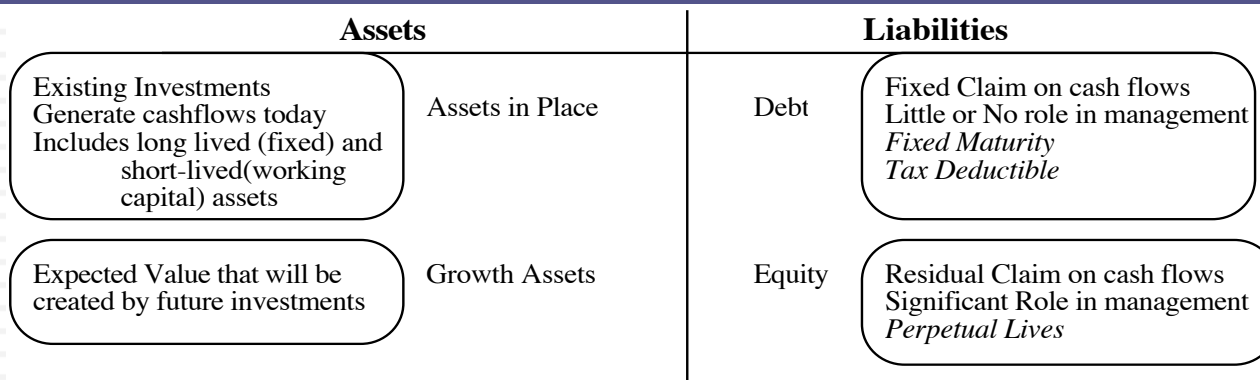
- We did estimate a cost of capital of 6.61% for the Disney theme park business, using a bottom-up levered beta of 0.7537 for the business.
- This cost of equity may not adequately reflect the additional risk associated with the theme park being in an emerging market.
- The only concern we would have with using this cost of equity for this project is that it may not adequately reflect the additional risk associated with the theme park being in an emerging market (Brazil). We first computed the Brazil country risk premium (by multiplying the default spread for Brazil by the relative equity market volatility) and then re-estimated the cost of equity:
  - Country risk premium for Brazil = 5.5% + 3% = 8.5%
  - Cost of Equity in US\$ = 2.75% + 0.7537 (8.5%) = 9.16%
- Using this estimate of the cost of equity, Disney's theme park debt ratio of 10.24% and its after-tax cost of debt of 2.40% (see chapter 4), we can estimate the cost of capital for the project:
  - Cost of Capital in US\$ = 9.16% (0.8976) + 2.40% (0.1024) = 8.46%

# Would lead us to conclude that...

- Do not invest in this park. The return on capital of 4.18% is lower than the cost of capital for theme parks of 8.46%; This would suggest that the project should not be taken.
- Given that we have computed the average over an arbitrary period of 10 years, while the theme park itself would have a life greater than 10 years, would you feel comfortable with this conclusion?
  - ▣ Yes
  - ▣ No

# A Tangent: From New to Existing Investments: ROC for the entire firm

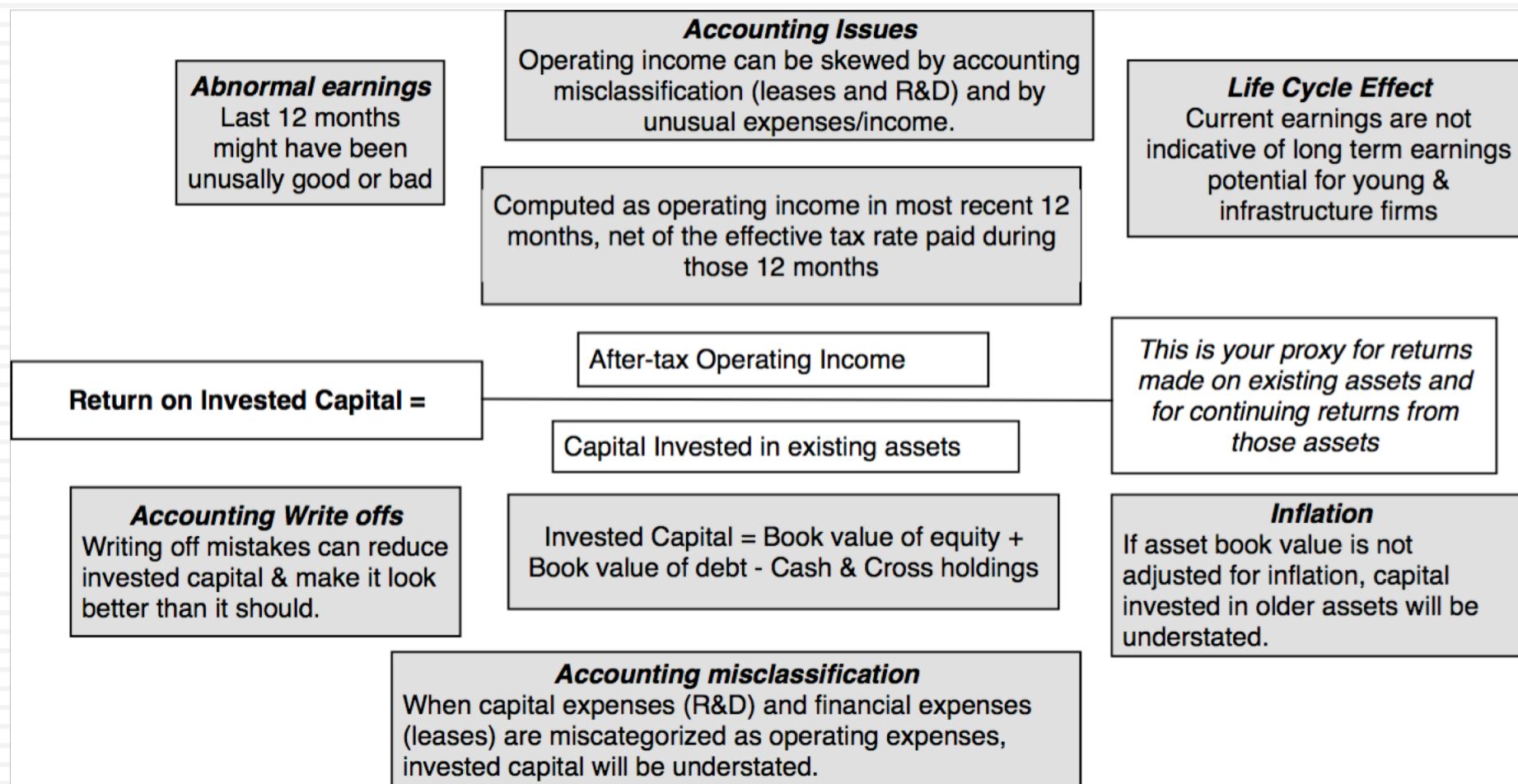
How “good” are the existing investments of the firm?



Measuring ROC for existing investments..

Company	EBIT (1-t)	BV of Debt	BV of Equity	Cash	BV of Capital	Return on Capital	Cost of Capital	ROC - Cost of Capital
Disney	\$6,920	\$16,328	\$41,958	\$3,387	\$54,899	12.61%	7.81%	4.80%
Vale	\$12,432	\$49,246	\$75,974	\$5,818	\$119,402	10.41%	8.20%	2.22%
Baidu	¥9,111	¥13,561	¥27,215	¥10,456	¥30,320	30.05%	12.42%	17.63%
Tata Motors	120,905₹	471,489₹	330,056₹	225,562₹	575,983₹	20.99%	11.44%	9.55%
Bookscape	\$1,775	\$12,136	\$8,250	\$1,250	\$19,136	9.28%	10.30%	-1.02%

# The return on capital is an accounting number, though, and that should scare you.

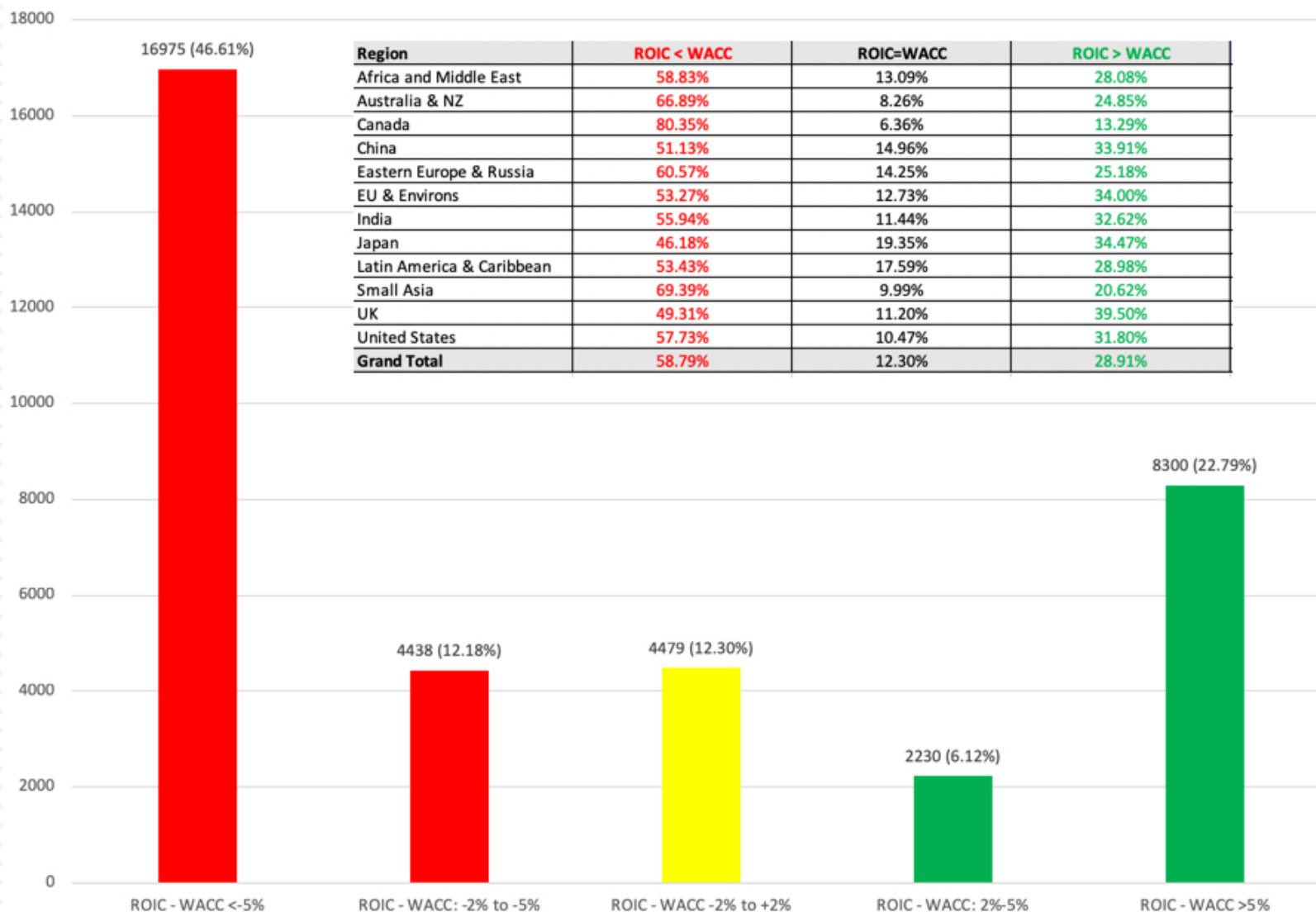




# Return Spreads Globally....

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*Excess Returns (ROIC - Cost of Capital) Globally - January 2019 update*



# Application Test: Assessing Investment Quality

- For the most recent period for which you have data, compute the after-tax return on capital earned by your firm, where after-tax return on capital is computed to be
- $\text{After-tax ROC} = \text{EBIT} (1 - \text{tax rate}) / (\text{BV of debt} + \text{BV of Equity-Cash})_{\text{previous year}}$
- For the most recent period for which you have data, compute the return spread earned by your firm:
- $\text{Return Spread} = \text{After-tax ROC} - \text{Cost of Capital}$
- For the most recent period, compute the EVA earned by your firm

$$\text{EVA} = \text{Return Spread} * ((\text{BV of debt} + \text{BV of Equity-Cash})_{\text{previous year}})$$

# The cash flow view of this project..

	0	1	2	3	4	5	6	7	8	9	10
After-tax Operating Income		-\$32	-\$96	-\$54	\$68	\$202	\$249	\$299	\$352	\$410	\$421
+ Depreciation & Amortization	\$0	\$50	\$425	\$469	\$444	\$372	\$367	\$364	\$364	\$366	\$368
- Capital Expenditures	\$2,500	\$1,000	\$1,188	\$752	\$276	\$258	\$285	\$314	\$330	\$347	\$350
- Change in non-cash Work Capital		\$0	\$63	\$25	\$38	\$31	\$16	\$17	\$19	\$21	\$5
Cashflow to firm	(\$2,500)	(\$982)	(\$921)	(\$361)	\$198	\$285	\$314	\$332	\$367	\$407	\$434

To get from income to cash flow, we

- I. added back all non-cash charges such as depreciation. Tax benefits:
- II. subtracted out the capital expenditures
- III. subtracted out the change in non-cash working capital

# The Depreciation Tax Benefit

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- While depreciation reduces taxable income and taxes, it does not reduce the cash flows.
- The benefit of depreciation is therefore the tax benefit. In general, the tax benefit from depreciation can be written as:
- $\text{Tax Benefit} = \text{Depreciation} * \text{Tax Rate}$
- Disney Theme Park: Depreciation tax savings (Tax rate = 36.1%)

	1	2	3	4	5	6	7	8	9	10
Depreciation	\$50	\$425	\$469	\$444	\$372	\$367	\$364	\$364	\$366	\$368
Tax Bendfits from Depreciation	\$18	\$153	\$169	\$160	\$134	\$132	\$132	\$132	\$132	\$133

- Proposition 1: The tax benefit from depreciation and other non-cash charges is greater, the higher your tax rate.
- Proposition 2: Non-cash charges that are not tax deductible (such as amortization of goodwill) and thus provide no tax benefits have no effect on cash flows.

# Depreciation Methods

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- Broadly categorizing, depreciation methods can be classified as straight line or accelerated methods. In straight line depreciation, the capital expense is spread evenly over time, In accelerated depreciation, the capital expense is depreciated more in earlier years and less in later years. Assume that you made a large investment this year, and that you are choosing between straight line and accelerated depreciation methods. Which will result in higher net income this year?
  - ▣ Straight Line Depreciation
  - ▣ Accelerated Depreciation
- Which will result in higher cash flows this year?
  - ▣ Straight Line Depreciation
  - ▣ Accelerated Depreciation

# The Capital Expenditures Effect

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- 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 project. In other words, a 25-year project will require more maintenance capital expenditures than a 2-year project.

# To cap ex or not to cap ex?

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- Assume that you run your own software business, and that you have an expense this year of \$ 100 million from producing and distribution promotional CDs in software magazines. Your accountant tells you that you can expense this item or capitalize and depreciate it over three years. Which will have a more positive effect on income?
  - ▣ Expense it
  - ▣ Capitalize and Depreciate it
- Which will have a more positive effect on cash flows?
  - ▣ Expense it
  - ▣ Capitalize and Depreciate it

# The Working Capital Effect

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- 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 supplier 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 incremental cash flows on the project

	0	1	2	3	4	5	6	7	8	9	10
After-tax Operating Income		-\$32	-\$96	-\$54	\$68	\$202	\$249	\$299	\$352	\$410	\$421
+ Depreciation & Amortization	\$0	\$50	\$425	\$469	\$444	\$372	\$367	\$364	\$364	\$366	\$368
- Capital Expenditures	\$2,500	\$1,000	\$1,188	\$752	\$276	\$258	\$285	\$314	\$330	\$347	\$350
- Change in non-cash Working Capital		\$0	\$63	\$25	\$38	\$31	\$16	\$17	\$19	\$21	\$5
Cashflow to firm	(\$2,500)	(\$982)	(\$921)	(\$361)	\$198	\$285	\$314	\$332	\$367	\$407	\$434
+ Pre-project investment (sunk)	\$500										
- Pre-project Depreciation * tax rate		\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18	\$18
+ Non-incremental Allocated Expense (1-t)		\$0	\$80	\$112	\$160	\$200	\$220	\$242	\$266	\$292	\$298
Incremental Cash flow to the firm	(\$2,000)	(\$1,000)	(\$860)	(\$267)	\$340	\$467	\$516	\$555	\$615	\$681	\$715

\$ 500 million has already been spent & \$ 50 million in depreciation will exist anyway

2/3rd of allocated G&A is fixed.  
Add back this amount (1-t)  
Tax rate = 36.1%

# A more direct way of getting to incremental cash flows

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	0	1	2	3	4	5	6	7	8	9	10
Revenues		\$0	\$1,250	\$1,750	\$2,500	\$3,125	\$3,438	\$3,781	\$4,159	\$4,575	\$4,667
Direct Expenses		\$0	\$788	\$1,103	\$1,575	\$1,969	\$2,166	\$2,382	\$2,620	\$2,882	\$2,940
Incremental Depreciation		\$0	\$375	\$419	\$394	\$322	\$317	\$314	\$314	\$316	\$318
Incremental G&A		\$0	\$63	\$88	\$125	\$156	\$172	\$189	\$208	\$229	\$233
Incremental Operating Income		\$0	\$25	\$141	\$406	\$678	\$783	\$896	\$1,017	\$1,148	\$1,175
- Taxes		\$0	\$9	\$51	\$147	\$245	\$283	\$323	\$367	\$415	\$424
Incremental after-tax Operating income		\$0	\$16	\$90	\$260	\$433	\$500	\$572	\$650	\$734	\$751
+ Incremental Depreciation		\$0	\$375	\$419	\$394	\$322	\$317	\$314	\$314	\$316	\$318
- Capital Expenditures	\$2,000	\$1,000	\$1,188	\$752	\$276	\$258	\$285	\$314	\$330	\$347	\$350
- Change in non-cash Working Capital		\$0	\$63	\$25	\$38	\$31	\$16	\$17	\$19	\$21	\$5
Cashflow to firm	(\$2,000)	(\$1,000)	(\$859)	(\$267)	\$340	\$466	\$516	\$555	\$615	\$681	\$715

# Sunk Costs

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- What is a sunk cost? Any expenditure that has already been incurred, and cannot be recovered (even if a project is rejected) is called a sunk cost. A test market for a consumer product and R&D expenses for a drug (for a pharmaceutical company) would be good examples.
- The sunk cost rule: When analyzing a project, sunk costs should not be considered since they are not incremental.
- *A Behavioral Aside: It is a well established finding in psychological and behavioral research that managers find it almost impossible to ignore sunk costs.*

# Test Marketing and R&D: The Quandary of Sunk Costs

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- A consumer product company has spent \$ 100 million on test marketing. Looking at only the incremental cash flows (and ignoring the test marketing), the project looks like it will create \$25 million in value for the company. Should it take the investment?
  - ▣ Yes
  - ▣ No
- Now assume that every investment that this company has shares the same characteristics (Sunk costs > Value Added). The firm will clearly not be able to survive. What is the solution to this problem?

# Allocated Costs

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- ❑ Firms allocate costs to individual projects from a centralized pool (such as general and administrative expenses) based upon some characteristic of the project (sales is a common choice, as is earnings)
- ❑ For large firms, these allocated costs can be significant and 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 component of allocated costs that should show up in project analysis.