

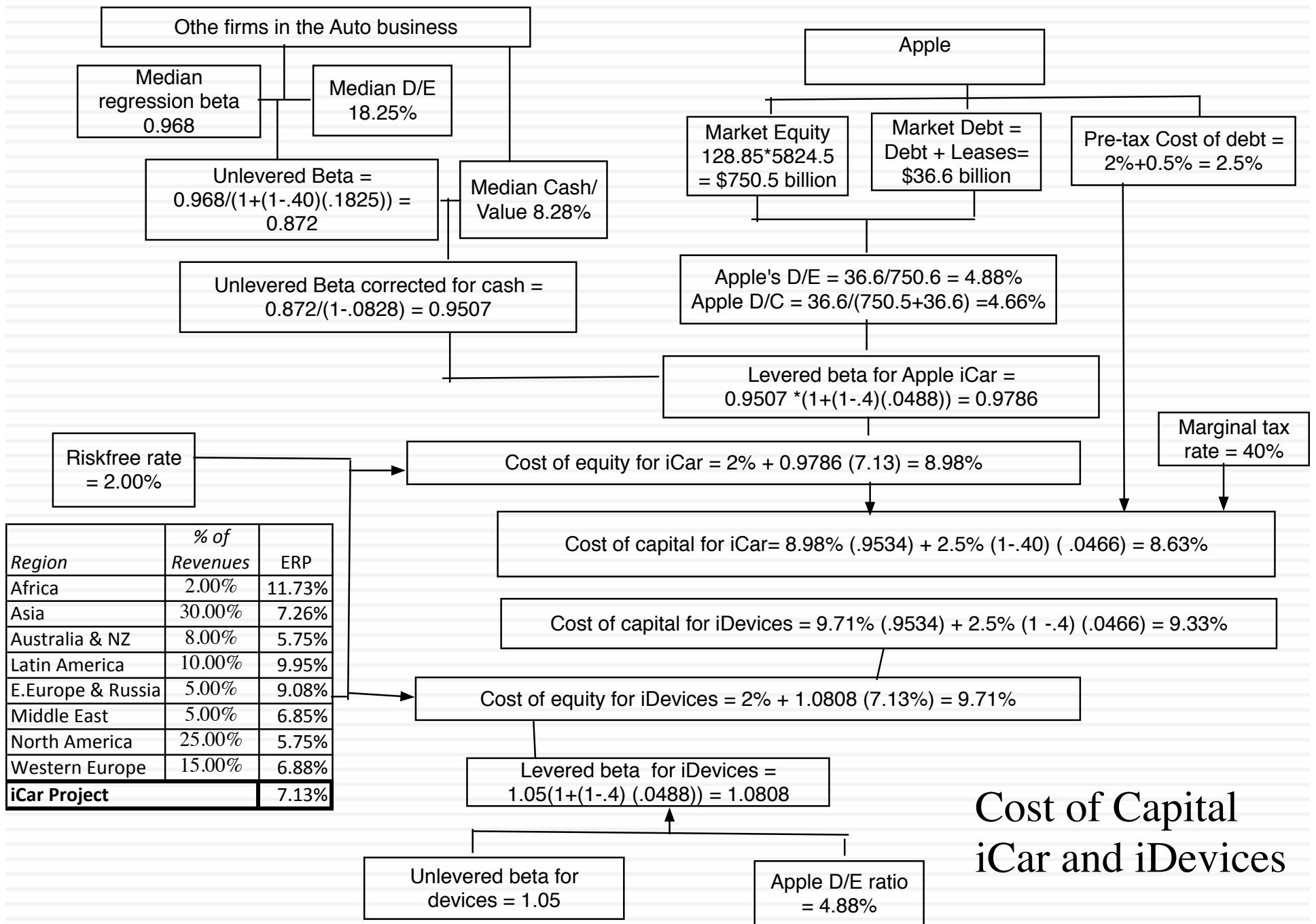


APPLE iCar : “MY” ANALYSIS,
NOT NECESSARILY “THE” ANALYSIS

Aswath Damodaran

Executive Summary

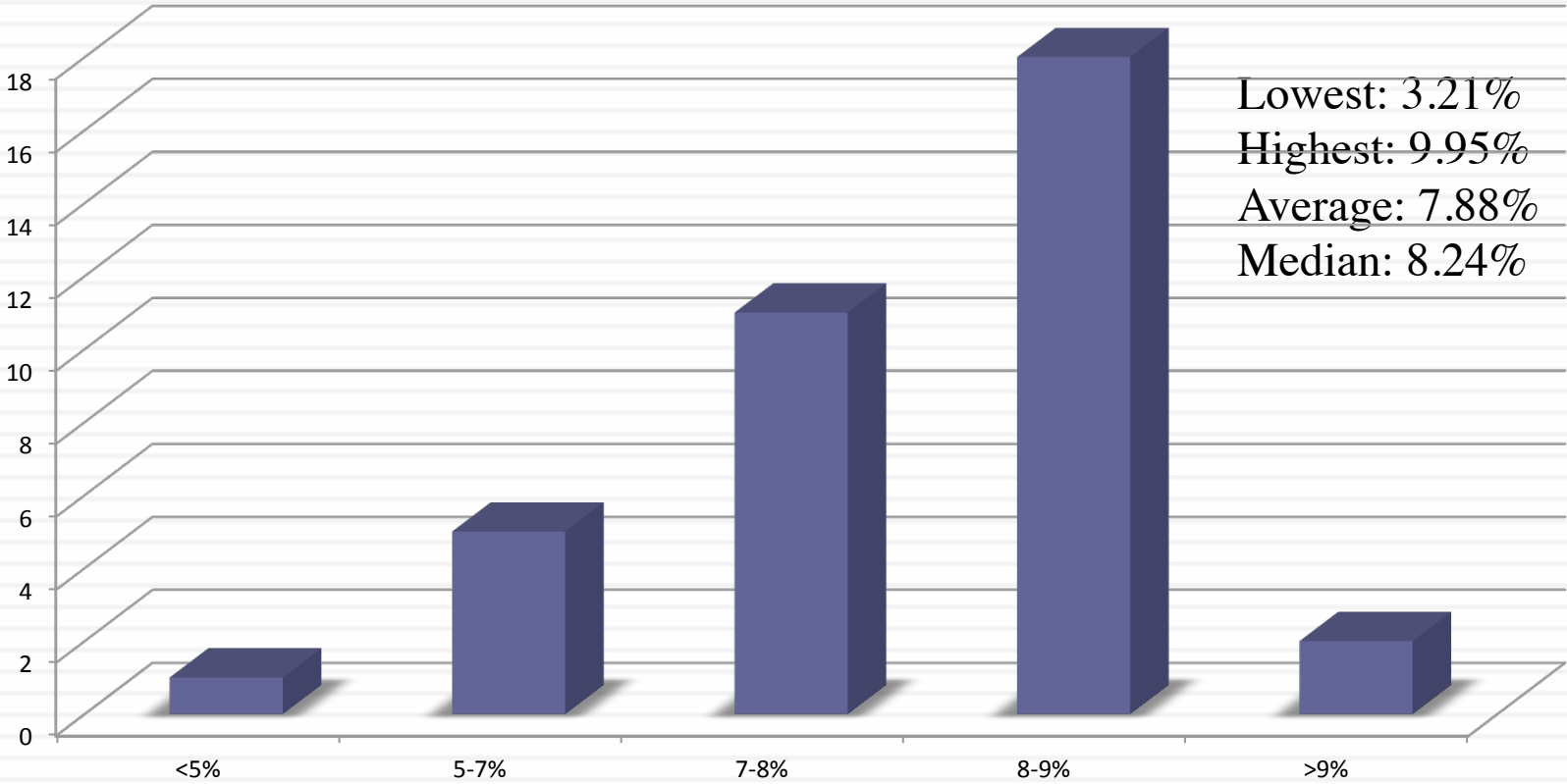
- On a stand-alone basis, this project is a good project but mostly because of synergy.
 - The average return on capital, in the finite life case, is 17.08%, partly because of very high returns in later years. This is higher than the cost of capital of 8.63%.
 - The net present value of the cash flows on iCar, using a cost of capital of 8.63%
 - Is -\$1.52 billion, under the finite life assumption of a of 10 years. Adding the \$5.36 billion in present value of increased sales in iDevices increases it to \$3.84 billion
 - Is \$4.4 billion, under the assumption of an infinite life. Adding the present value of \$10.2 billion of increased sales in iDevices increases it to \$14.6 billion.
 - The IRR exceeds the cost of capital in both cases, but only if the increased sales from iDevices is included in the cash flows.
- I would reject the investment. The value added comes from iDevice sales in the finite life case (and I am not sure that it is exclusive to iCars) and the perpetual life case will put Apple into a market where both technology and customer behavior are changing.



Cost of Capital iCar and iDevices

Your findings on iCar cost of capital

Cost of Capital across Groups



iCar: Setting the table

<i>Year</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>
Total Market	5200.00	5408.00	5624.32	5849.29	6083.26	6326.60	6579.66	6842.85	7116.56	7401.22
Market Share	2.00%	4.00%	6.00%	8.00%	10.00%	10.00%	10.00%	10.00%	10.00%	10.00%
Units sold	104.00	216.32	337.46	467.94	608.33	632.66	657.97	684.28	711.66	740.12
a. Outside retailers	83.20	173.06	269.97	374.35	486.66	506.13	526.37	547.43	569.32	592.10
b. Apple Stores	20.80	43.26	67.49	93.59	121.67	126.53	131.59	136.86	142.33	148.02
Price per unit	\$75,000.00	\$76,125.00	\$77,266.88	\$78,425.88	\$79,602.27	\$80,796.30	\$82,008.24	\$83,238.37	\$84,486.94	\$85,754.25
Variable cost per unit	\$50,000.00	\$50,750.00	\$51,511.25	\$52,283.92	\$53,068.18	\$53,864.20	\$54,672.16	\$55,492.25	\$56,324.63	\$57,169.50
Marketing cost per unit (retail)	\$7,500.00	\$7,612.50	\$7,726.69	\$7,842.59	\$7,960.23	\$8,079.63	\$8,200.82	\$8,323.84	\$8,448.69	\$8,575.42
Marketing cost per unit (Apple)	\$3,750.00	\$3,806.25	\$3,863.34	\$3,921.29	\$3,980.11	\$4,039.82	\$4,100.41	\$4,161.92	\$4,224.35	\$4,287.71

Apple iCar: Operating Income

	1	2	3	4	5	6	7	8	9	10
Revenues	\$7,800,000	\$16,467,360	\$26,074,418	\$36,698,874	\$48,424,164	\$51,116,548	\$53,958,628	\$56,958,727	\$60,125,633	\$63,468,618
- Production Costs	\$5,200,000	\$10,978,240	\$17,382,945	\$24,465,916	\$32,282,776	\$34,077,698	\$35,972,418	\$37,972,485	\$40,083,755	\$42,312,412
- Marketing Costs (Retail stores)	\$624,000	\$1,317,389	\$2,085,953	\$2,935,910	\$3,873,933	\$4,089,324	\$4,316,690	\$4,556,698	\$4,810,051	\$5,077,489
- Marketing Costs (Apple stores)	\$78,000	\$164,674	\$260,744	\$366,989	\$484,242	\$511,165	\$539,586	\$569,587	\$601,256	\$634,686
- Deprec'n (including capacity)	\$2,500,000	\$2,500,000	\$2,500,000	\$2,761,420	\$2,761,420	\$2,761,420	\$2,761,420	\$2,761,420	\$2,475,572	\$2,475,572
- Allocated G&A	\$1,287,500	\$1,882,475	\$2,539,656	\$3,264,122	\$4,061,324	\$4,281,774	\$4,514,212	\$4,759,292	\$5,017,703	\$5,290,172
- Advertising Exp.	\$1,260,000	\$1,323,000	\$1,389,150	\$1,458,608	\$1,531,538	\$1,608,115	\$1,688,521	\$1,772,947	\$1,861,594	\$1,954,674
Operating Profit	\$(3,149,500)	\$(1,698,417)	\$(84,031)	\$1,445,911	\$3,428,932	\$3,787,052	\$4,165,781	\$4,566,299	\$5,275,701	\$5,723,613
Taxes	\$(1,259,800)	\$(679,367)	\$(33,612)	\$578,364	\$1,371,573	\$1,514,821	\$1,666,312	\$1,826,520	\$2,110,281	\$2,289,445
EBIT(1-t)	\$(1,889,700)	\$(1,019,050)	\$(50,418)	\$867,546	\$2,057,359	\$2,272,231	\$2,499,469	\$2,739,779	\$3,165,421	\$3,434,168

Some Thoughts on Operating Income...

- There are a number of allocation mechanisms that can be used to compute operating income, and the return on capital is affected by decisions on allocation.
- Your choices on depreciation have large effects on return on capital. Using a more accelerated depreciation method would raise your return on capital substantially.
- Note that the operating income is computed after marginal taxes (Why?) and does not include the tax savings due to interest expenses (Why?)

Apple iCar: Return on Capital

<i>Year</i>	<i>iCar</i>	<i>Devices</i>	<i>Total</i>	<i>Average BV</i>	<i>ROC</i>
1	-\$1,889,700	\$800,000	-\$1,089,700	\$26,680,249	-4.08%
2	-\$1,019,050	\$812,000	-\$207,050	\$24,880,768	-0.83%
3	-\$50,418	\$824,180	\$773,762	\$23,156,310	3.34%
4	\$867,546	\$836,543	\$1,704,089	\$22,506,444	7.57%
5	\$2,057,359	\$849,091	\$2,906,450	\$20,506,838	14.17%
6	\$2,272,231	\$861,827	\$3,134,058	\$18,166,708	17.25%
7	\$2,499,469	\$874,755	\$3,374,223	\$15,838,375	21.30%
8	\$2,739,779	\$887,876	\$3,627,655	\$13,522,493	26.83%
9	\$3,165,421	\$901,194	\$4,066,615	\$11,276,924	36.06%
10	\$3,434,168	\$914,712	\$4,348,880	\$5,682,964	76.52%
Average=					19.81%

Average

ROC on just iCar = 13.95%

ROC included iDevices = 19.81%

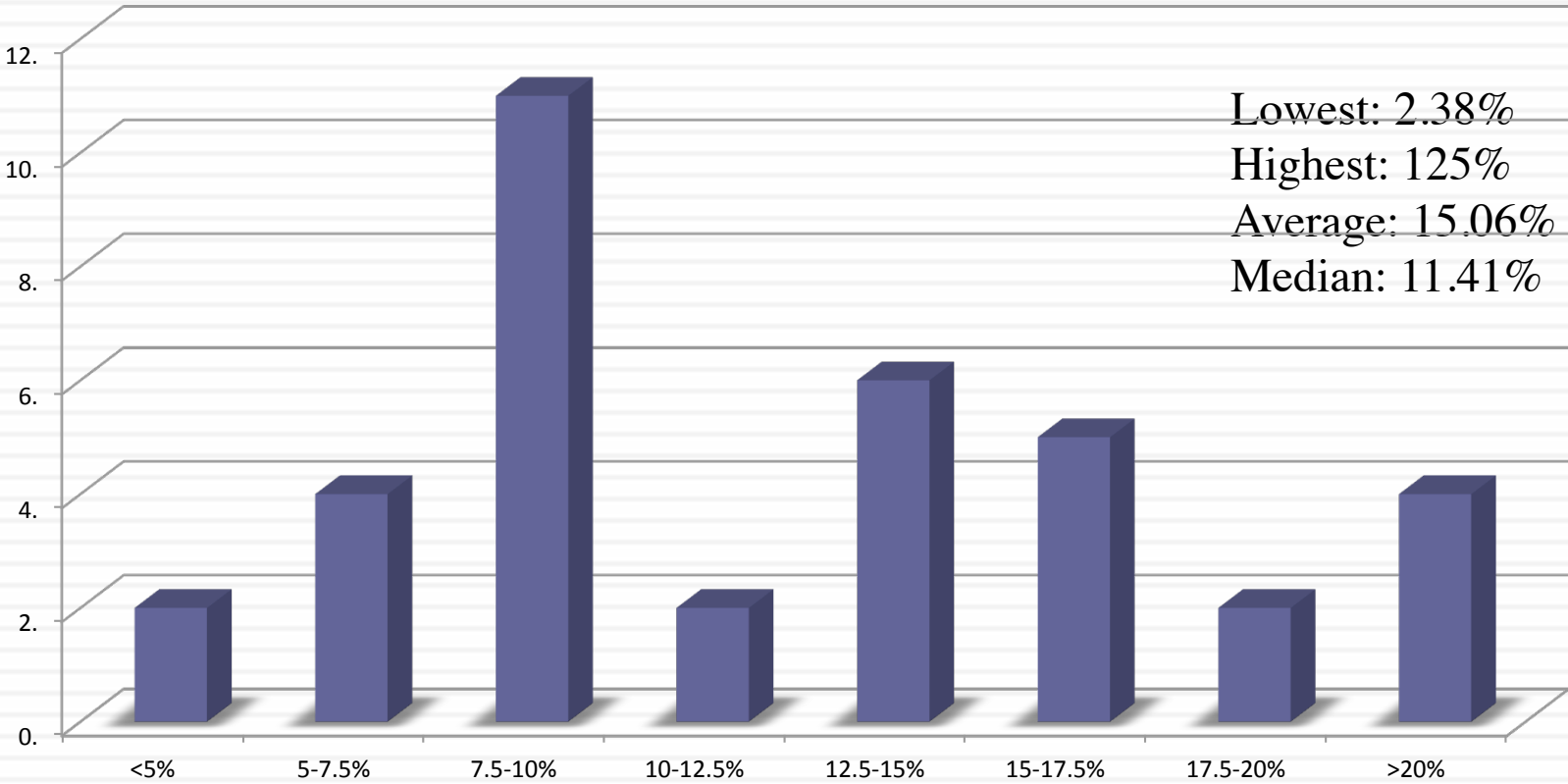
Aggregate

ROC on just iCar = 7.73%

ROC with iDevices= 13.95%

Your findings on Return on Capital

Return on Capital Across Groups



Apple iCar: After-tax Cash Flows

	Now	1	2	3	4	5	6	7	8	9	10
EBIT(1-t)		\$(1,889,700)	\$(1,019,050)	\$(50,418)	\$867,546	\$2,057,359	\$2,272,231	\$2,499,469	\$2,739,779	\$3,165,421	\$3,434,168
+ Deprec'n		\$2,500,000	\$2,500,000	\$2,500,000	\$2,761,420	\$2,761,420	\$2,761,420	\$2,761,420	\$2,761,420	\$2,475,572	\$2,475,572
+ Fixed Allocated Exp (1-t)		\$472,500	\$496,125	\$520,931	\$546,978	\$574,327	\$603,043	\$633,195	\$664,855	\$698,098	\$733,003
- Cap Ex	\$27,000,000		\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-
- Opp. Cost of Capacity				\$5,228,392		\$-	\$-		\$(5,716,950)	\$-	\$-
- Chg in WC	\$598,000	\$664,498	\$736,541	\$814,542	\$898,939	\$206,416	\$217,893	\$230,008	\$242,796	\$256,296	\$(4,865,927)
+ Salvage Value											\$2,000,000
After-tax Cashflow	\$(27,598,000)	\$418,302	\$1,240,533	\$(3,072,421)	\$3,277,005	\$5,186,689	\$5,418,801	\$5,664,076	\$11,640,208	\$6,082,795	\$13,508,670

Observations on Expansion Capacity

- To analyze what happens to capacity, we considered the two scenarios - with Apple iCar versus without Apple iCar.
 - If you invest in Apple iCar, you run out of capacity in year 4. (Invest \$5.228 billion in year 3)
 - If you don't invest in Apple iCar, you run out of capacity in year 9. (Invest \$5.717 billion in year 8)

	<i>Last year</i>	1	2	3	4	5	6	7	8	9	10
Capacity used by Devices	40.00%	44.80%	50.18%	56.20%	62.94%	70.49%	78.95%	88.43%	99.04%	110.92%	124.23%
Capacity used by iCar		10.40%	21.63%	33.75%	46.79%	60.83%	63.27%	65.80%	68.43%	71.17%	74.01%
Total capacity used	40.00%	55.20%	71.81%	89.94%	109.74%	131.33%	142.22%	154.22%	167.47%	182.09%	198.25%
Expansion Investment				\$5,228,392					\$5,716,950		
Depreciation (iCar)					\$261,420	\$261,420	\$261,420	\$261,420	\$261,420	\$261,420	\$261,420
Depreciation (w/o iCar)										\$285,847	\$285,847
Incremental depreciation					\$261,420	\$261,420	\$261,420	\$261,420	\$261,420	-\$24,428	-\$24,428

Assumed straight line depreciation over 20 years

Apple iCar: NPV and IRR

Value of iCar

Year	0	1	2	3	4	5	6	7	8	9	10
Cash Flow from iCar	\$(27,598,000)	\$418,302	\$1,240,533	\$(3,072,421)	\$3,277,005	\$5,186,689	\$5,418,801	\$5,664,076	\$11,640,208	\$6,082,795	\$13,508,670
PV of Cash Flows from iCar	\$(27,598,000)	\$385,062	\$1,051,211	\$(2,396,641)	\$2,353,099	\$3,428,421	\$3,297,220	\$3,172,595	\$6,001,877	\$2,887,156	\$5,902,290
Net Present Value of iCar	\$(1,515,709) (Discount rate = Cost of capital for iCar of 8.63%)										

Value of side-benefit (synergy) for iDevices

Incremental Revenues		\$2,000,000	\$2,030,000	\$2,060,450	\$2,091,357	\$2,122,727	\$2,154,568	\$2,186,887	\$2,219,690	\$2,252,985	\$2,286,780
After-tax operating income (CF)		\$800,000	\$812,000	\$824,180	\$836,543	\$849,091	\$861,827	\$874,755	\$887,876	\$901,194	\$914,712
PV of cash flows		\$731,746	\$679,356	\$630,716	\$585,559	\$543,635	\$504,713	\$468,577	\$435,028	\$403,882	\$374,965
PV of iDevice synergy =	\$5,358,178 (Discount rate = Cost of capital for iDevices of 9.33%)										

Total Net Present Value =

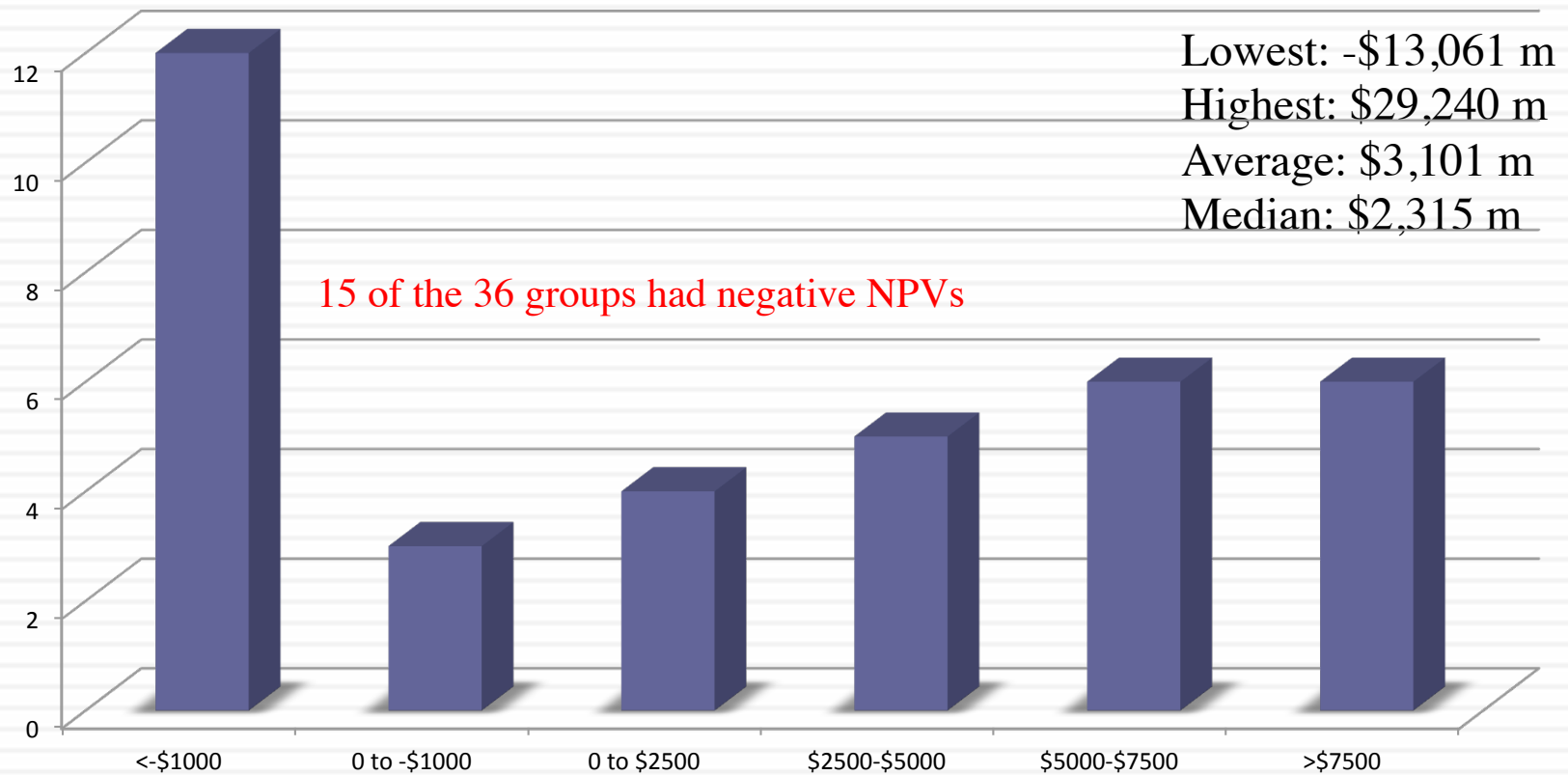
\$3,842,469

Internal Rate of Return =

10.75%

Your findings on NPV – Finite Life

NPV in Finite Life Across Groups



Apple iCar: Longer Life

	Now	1	2	3	4	5	6	7	8	9	10	
EBIT(1-t)		\$(1,889,700)	\$(960,400)	\$48,422	\$989,290	\$2,185,274	\$2,389,542	\$2,603,859	\$2,828,840	\$3,236,634	\$3,484,893	\$3,678,248
+ Deprec'n		\$2,500,000	\$2,402,250	\$2,335,265	\$2,558,513	\$2,548,228	\$2,565,902	\$2,587,436	\$2,612,986	\$2,356,884	\$2,391,029	\$2,426,895
+ Fixed Allocated Exp (1-t)		\$472,500	\$496,125	\$520,931	\$546,978	\$574,327	\$603,043	\$633,195	\$664,855	\$698,098	\$733,003	\$743,998
- Cap Ex	\$27,000,000	\$1,522,500	\$1,732,401	\$1,953,549	\$2,194,246	\$2,463,542	\$2,519,820	\$2,581,517	\$2,649,022	\$2,722,768	\$2,803,237	\$2,816,510
- Opp. Cost of Capacity				\$5,228,392		\$-	\$-		\$(5,716,950)			
- Chg in WC	\$598,000	\$664,498	\$736,541	\$814,542	\$898,939	\$206,416	\$217,893	\$230,008	\$242,796	\$256,296	\$147,073	\$149,279
+ Terminal Value											\$54,446,945	
After-tax Cashflow	\$(27,598,000)	\$(1,104,198)	\$(530,967)	\$(5,091,864)	\$1,001,596	\$2,637,870	\$2,820,773	\$3,012,965	\$8,931,812	\$3,312,552	\$58,105,561	\$3,883,351

Observations on Infinite Life & Capital Maintenance

- You cannot extend the project life without putting money back to preserve existing investments. In the earlier years, I allow the capital maintenance to be less than depreciation but as the assets age, the depreciation schedule kicks up and reflects inflation. Thus, to replace the assets that are depleted in year 9 (captured in the depreciation in that year of \$2,381 million), I assume that capital maintenance has to be \$ 2,723 million.... ($\$2,381 \text{ million} * 1.015^9$)
- None of the assets are salvaged in this case, since the project continues forever.

Finite versus Longer Life: The Trade off

Year	Cash flow (finite)	Cash flow (perpetual)	Effect of shift
1	\$418,302	-\$1,104,198	-\$1,522,500
2	\$1,240,533	-\$530,967	-\$1,771,501
3	-\$3,072,421	-\$5,091,864	-\$2,019,443
4	\$3,277,005	\$1,001,596	-\$2,275,409
5	\$5,186,689	\$2,637,870	-\$2,548,819
6	\$5,418,801	\$2,820,773	-\$2,598,028
7	\$5,664,076	\$3,012,965	-\$2,651,111
8	\$11,640,208	\$8,931,812	-\$2,708,395
9	\$6,082,795	\$3,312,552	-\$2,770,243
10	\$13,508,670	\$58,105,561	\$44,596,891

Terminal Value and NPV Calculations

- Value of iCar in year 10 = CF in year 11 / (Cost of capital - g)
 = \$3,883(.0863 - .015) = \$ 54447 million
- Value of IDevices in year 10 = CF in year 11 / (Cost of capital – g)
 = \$ 915 / (.0933 - .02) = \$ 11,861 million

Value of iCar

Year	0	1	2	3	4	5	6	7	8	9	10
Cash Flow from iCar	\$(27,598,000)	\$(1,104,198)	\$(530,967)	\$(5,091,864)	\$1,001,596	\$2,637,870	\$2,820,773	\$3,012,965	\$8,931,812	\$3,312,552	\$58,105,561
PV of Cash Flows from iCar	\$(27,598,000)	\$(1,016,454)	\$(449,934)	\$(3,971,908)	\$719,210	\$1,743,642	\$1,716,378	\$1,687,639	\$4,605,385	\$1,572,280	\$25,387,833
Net Present Value of iCar	\$4,396,072	(Discount rate = Cost of capital for iCar of 8.63%)									

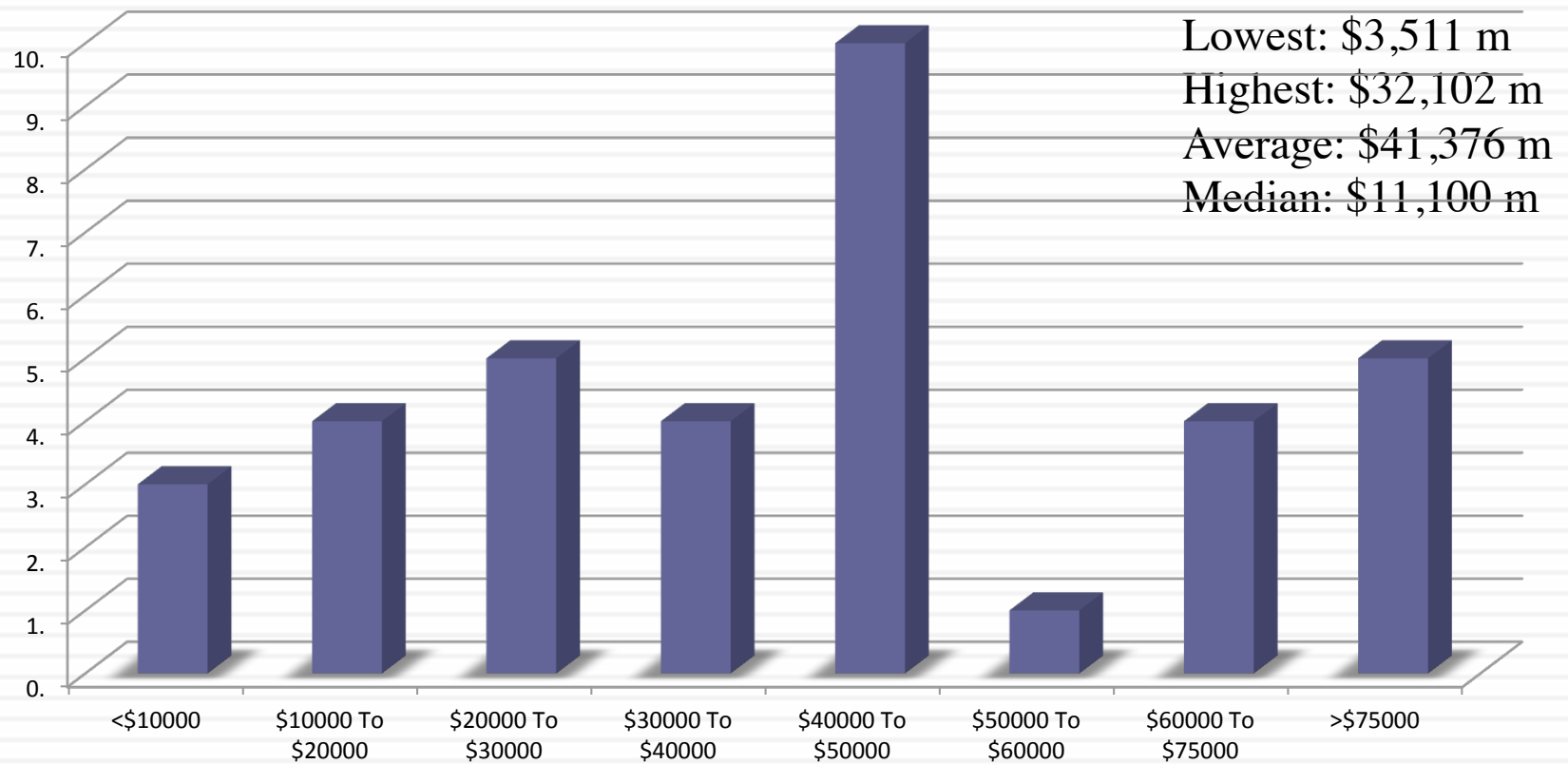
Value of side-benefit (synergy) for iDevices

Incremental Revenues		\$2,000,000	\$2,030,000	\$2,060,450	\$2,091,357	\$2,122,727	\$2,154,568	\$2,186,887	\$2,219,690	\$2,252,985	\$2,286,780
After-tax operating income (CF)		\$800,000	\$812,000	\$824,180	\$836,543	\$849,091	\$861,827	\$874,755	\$887,876	\$901,194	\$914,712
											\$11,861,193
PV of cash flows		\$731,746	\$679,356	\$630,716	\$585,559	\$543,635	\$504,713	\$468,577	\$435,028	\$403,882	\$5,237,189
PV of iDevice synergy =	\$10,220,402	(Discount rate = Cost of capital for iDevices of 9.33%)									

Total Net Present Value =	\$14,616,474
Internal Rate of Return =	16.39%

NPV – Longer Life

Longer Life NPV Across Groups



Consistency in growth and investment assumptions

<i>In terminal year</i>	<i>Capital Maintenance</i>	<i>Consequence</i>
Project ends	No or very low capital maintenance, especially towards project end.	Book value of capital will decline over time
Infinite life, growth rate = 0%	Capital Maintenance = Depreciation	Maintain invested capital at base level through life
Infinite life, g = Inflation	Capital Maintenance > Depreciation	Capital invested roughly maintained for project life & then grows at inflation rate
Infinite life, g > Inflation	Capital Investment to increase capacity, Capital maintenance > Depreciation	Capital invested has to grow to reflect real growth

The final decision...

- My rationale for not investing in iCar
 - The NPV is positive in finite life case, but only because of the synergy benefits from iDevices, which don't seem exclusive to iCars.
 - The NPV is positive without the synergy benefits in the longer life case, but it will require Apple to stay long term in a business where it is not clear what the future holds in terms of technology and customer behavior.
- Of the 37 groups (with summary sheets):
 - 28 suggested accepting the investment, most because the longer life analysis yielded such a high NPV.
 - 4 suggested rejecting the investment
 - 5 either picked other or made a conditional judgment.