

Solutions Manual

Corporate Finance

Ross, Westerfield, and Jaffe
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CHAPTER 1

INTRODUCTION TO CORPORATE FINANCE

Answers to Concept Questions

1. In the corporate form of ownership, the shareholders are the owners of the firm. The shareholders elect the directors of the corporation, who in turn appoint the firm's management. This separation of ownership from control in the corporate form of organization is what causes agency problems to exist. Management may act in its own or someone else's best interests, rather than those of the shareholders. If such events occur, they may contradict the goal of maximizing the share price of the equity of the firm.
2. Such organizations frequently pursue social or political missions, so many different goals are conceivable. One goal that is often cited is revenue minimization; i.e., provide whatever goods and services are offered at the lowest possible cost to society. A better approach might be to observe that even a not-for-profit business has equity. Thus, one answer is that the appropriate goal is to maximize the value of the equity.
3. Presumably, the current stock value reflects the risk, timing, and magnitude of all future cash flows, both short-term *and* long-term. If this is correct, then the statement is false.
4. An argument can be made either way. At the one extreme, we could argue that in a market economy, all of these things are priced. There is thus an optimal level of, for example, ethical and/or illegal behavior, and the framework of stock valuation explicitly includes these. At the other extreme, we could argue that these are non-economic phenomena and are best handled through the political process. A classic (and highly relevant) thought question that illustrates this debate goes something like this: "A firm has estimated that the cost of improving the safety of one of its products is \$30 million. However, the firm believes that improving the safety of the product will only save \$20 million in product liability claims. What should the firm do?"
5. The goal will be the same, but the best course of action toward that goal may be different because of differing social, political, and economic institutions.
6. The goal of management should be to maximize the share price for the current shareholders. If management believes that it can improve the profitability of the firm so that the share price will exceed \$35, then they should fight the offer from the outside company. If management believes that this bidder or other unidentified bidders will actually pay more than \$35 per share to acquire the company, then they should still fight the offer. However, if the current management cannot increase the value of the firm beyond the bid price, and no other higher bids come in, then management is not acting in the interests of the shareholders by fighting the offer. Since current managers often lose their jobs when the corporation is acquired, poorly monitored managers have an incentive to fight corporate takeovers in situations such as this.

7. We would expect agency problems to be less severe in other countries, primarily due to the relatively small percentage of individual ownership. Fewer individual owners should reduce the number of diverse opinions concerning corporate goals. The high percentage of institutional ownership might lead to a higher degree of agreement between owners and managers on decisions concerning risky projects. In addition, institutions may be better able to implement effective monitoring mechanisms on managers than can individual owners, based on the institutions' deeper resources and experiences with their own management.
8. The increase in institutional ownership of stock in the United States and the growing activism of these large shareholder groups may lead to a reduction in agency problems for U.S. corporations and a more efficient market for corporate control. However, this may not always be the case. If the managers of the mutual fund or pension plan are not concerned with the interests of the investors, the agency problem could potentially remain the same, or even increase since there is the possibility of agency problems between the fund and its investors.
9. How much is too much? Who is worth more, Ray Irani or Tiger Woods? The simplest answer is that there is a market for executives just as there is for all types of labor. Executive compensation is the price that clears the market. The same is true for athletes and performers. Having said that, one aspect of executive compensation deserves comment. A primary reason executive compensation has grown so dramatically is that companies have increasingly moved to stock-based compensation. Such movement is obviously consistent with the attempt to better align stockholder and management interests. In recent years, stock prices have soared, so management has cleaned up. It is sometimes argued that much of this reward is simply due to rising stock prices in general, not managerial performance. Perhaps in the future, executive compensation will be designed to reward only differential performance, i.e., stock price increases in excess of general market increases.
10. Maximizing the current share price is the same as maximizing the future share price at any future period. The value of a share of stock depends on all of the future cash flows of company. Another way to look at this is that, barring large cash payments to shareholders, the expected price of the stock must be higher in the future than it is today. Who would buy a stock for \$100 today when the share price in one year is expected to be \$80?

Enter	4	11%	\$800		
	N	I/Y	PV	PMT	FV
Solve for					\$1,214.46

Enter	3	11%	\$900		
	N	I/Y	PV	PMT	FV
Solve for					\$1,230.87

Enter	2	11%	\$900		
	N	I/Y	PV	PMT	FV
Solve for					\$1,108.89

Enter	1	11%	\$1,000		
	N	I/Y	PV	PMT	FV
Solve for					\$1,110.00

So, at Year 5, the value is: $\$1,348.05 + \$1,214.46 + \$1,230.87 + \$1,108.89 + \$1,110.00 + \$1,000 = \$7,012.26$

At Year 65, the value is:

Enter	59	7%	\$7,012.26		
	N	I/Y	PV	PMT	FV
Solve for					\$379,752.76

The policy is not worth buying; the future value of the policy is \$379,752.76 but the policy contract will pay off \$350,000.

68. Effective six-month rate = $(1 + \text{Daily rate})^{180} - 1$
 Effective six-month rate = $(1 + .09/360)^{180} - 1$
 Effective six-month rate = .0460 or 4.60%

Enter	40	4.60%		\$750,000	
	N	I/Y	PV	PMT	FV
Solve for			\$13,602,152.32		

Enter	1	4.60%			\$13,602,152.32
	N	I/Y	PV	PMT	FV
Solve for			\$13,003,696.50		

Value of winnings today = $\$13,003,696.50 + \$2,000,000$
 Value of winnings today = \$15,003,696.50

In order to calculate the equivalent annual cost, set the NPV of the equipment equal to an annuity with the same economic life. Since the project has an economic life of three years and is discounted at 12 percent, set the NPV equal to a three-year annuity, discounted at 12 percent.

$$EAC = -\$50,693.37 / (PVIFA_{12\%,3})$$

$$EAC = -\$21,106.13$$

20. We will calculate the aftertax salvage value first. The aftertax salvage value of the equipment will be:

$$\text{Taxes on salvage value} = (BV - MV)t_c$$

$$\text{Taxes on salvage value} = (\$0 - 80,000)(.34)$$

$$\text{Taxes on salvage value} = -\$27,200$$

Market price	\$80,000
Tax on sale	<u>-27,200</u>
Aftertax salvage value	\$52,800

Next, we will calculate the initial cash outlay, that is, the cash flow at Time 0. To undertake the project, we will have to purchase the equipment. The new project will decrease the net working capital, so this is a cash inflow at the beginning of the project. So, the cash outlay today for the project will be:

Equipment	-\$450,000
NWC	<u>90,000</u>
Total	-\$360,000

Now we can calculate the operating cash flow each year for the project. Using the bottom up approach, the operating cash flow will be:

Saved salaries	\$140,000
Depreciation	<u>90,000</u>
EBT	\$50,000
Taxes	<u>17,000</u>
Net income	\$33,000

And the OCF will be:

$$OCF = \$33,000 + 90,000$$

$$OCF = \$123,000$$

Now we can find the NPV of the project. In Year 5, we must replace the saved NWC, so:

$$NPV = -\$360,000 + \$123,000(PVIFA_{12\%,5}) + (\$52,800 - 90,000) / 1.12^5$$

$$NPV = \$62,279.19$$

25. To calculate the unit sales for each scenario, we multiply the market sales times the company's market share. We can then use the quantity sold to find the revenue each year, and the variable costs each year. After doing these calculations, we will construct the pro forma income statement for each scenario. We can then find the operating cash flow using the bottom up approach, which is net income plus depreciation. Doing so, we find:

	<u>Pessimistic</u>	<u>Expected</u>	<u>Optimistic</u>
Units per year	27,300	37,500	46,200
Revenue	\$3,822,000.00	\$5,437,500.00	\$6,930,000.00
Variable costs	2,784,600.00	3,675,000.00	4,342,800.00
Fixed costs	1,015,000.00	950,000.00	900,000.00
Depreciation	366,666.67	350,000.00	333,333.33
EBT	-\$344,266.67	\$462,500.00	\$1,353,866.67
Tax	-137,706.67	185,000.00	541,546.67
Net income	-\$206,560.00	\$277,500.00	\$812,320.00
OCF	\$160,106.67	\$627,500.00	\$1,145,653.33

Note that under the pessimistic scenario, the taxable income is negative. We assumed a tax credit in the case. Now we can calculate the NPV under each scenario, which will be:

$$\text{NPV}_{\text{Pessimistic}} = -\$1,600,000 + \$160,106.67(\text{PVIFA}_{13\%,6})$$

$$\text{NPV} = -\$1,559,965.63$$

$$\text{NPV}_{\text{Expected}} = -\$2,100,000 + \$627,500(\text{PVIFA}_{13\%,6})$$

$$\text{NPV} = \$408,462.49$$

$$\text{NPV}_{\text{Optimistic}} = -\$2,000,000 + \$1,145,653.33(\text{PVIFA}_{13\%,6})$$

$$\text{NPV} = \$2,579,806.24$$

The NPV under the pessimistic scenario is negative, but the company should probably accept the project.

Challenge

26. a. Using the tax shield approach, the OCF is:

$$\text{OCF} = [(\$245 - 220)(55,000) - \$520,000](0.62) + 0.38(\$1,700,000/5)$$

$$\text{OCF} = \$659,300.00$$

And the NPV is:

$$\text{NPV} = -\$1,700,000 - 600,000 + \$659,300(\text{PVIFA}_{13\%,5}) + [\$600,000 + 300,000(1 - .38)]/1.13^5$$

$$\text{NPV} = \$445,519.88$$

b. The aftertax cost of debt is:

$$R_D = .0633(1 - .35) = .0412 \text{ or } 4.12\%$$

c. The aftertax rate is more relevant because that is the actual cost to the company.

6. The book value of debt is the total par value of all outstanding debt, so:

$$BV_D = \$60,000,000 + 80,000,000 = \$140,000,000$$

To find the market value of debt, we find the price of the bonds and multiply by the number of bonds. Alternatively, we can multiply the price quote of the bond times the par value of the bonds. Doing so, we find:

$$MV_D = 1.08(\$60,000,000) + .73(\$80,000,000) = \$123,200,000$$

The YTM of the zero coupon bonds is:

$$P_Z = \$730 = \$1,000(PVIF_{R\%,14})$$

$$R = 2.273\%$$

$$YTM = 2 \times 2.273\% = 4.55\%$$

So, the aftertax cost of the zero coupon bonds is:

$$R_Z = .0455(1 - .35) = .0296 \text{ or } 2.96\%$$

The aftertax cost of debt for the company is the weighted average of the aftertax cost of debt for all outstanding bond issues. We need to use the market value weights of the bonds. The total aftertax cost of debt for the company is:

$$R_D = .0412(\$64.8/\$123.2) + .0296(\$58.4/\$123.2) = .0357 \text{ or } 3.57\%$$

7. Using the equation to calculate the WACC, we find:

$$WACC = .70(.15) + .30(.08)(1 - .35) = .1206 \text{ or } 12.06\%$$

8. Here we need to use the debt-equity ratio to calculate the WACC. Doing so, we find:

$$WACC = .17(1/1.45) + .10(.45/1.45)(1 - .35) = .1374 \text{ or } 13.74\%$$

9. Here we have the WACC and need to find the debt-equity ratio of the company. Setting up the WACC equation, we find:

$$WACC = .0980 = .15(E/V) + .0750(D/V)(1 - .35)$$

Rearranging the equation, we find:

$$.0980(V/E) = .15 + .0750(.65)(D/E)$$

Now we must realize that the V/E is just the equity multiplier, which is equal to:

After the rights offer, the share price will fall, but the shareholder will also hold the rights, so:

$$\text{Portfolio value} = (1,000 \text{ shares})(\$32.87) + (1,000 \text{ rights})(\$1.13) = \$34,000$$

3. Using the equation we derived in Problem 2, part *c* to calculate the price of the stock ex-rights, we can find the number of shares a shareholder will have ex-rights, which is:

$$P_X = \$70.25 = [N(\$75) + \$50]/(N + 1)$$

$$N = 4.263$$

The number of new shares is the amount raised divided by the per-share subscription price, so:

$$\text{Number of new shares} = \$15,000,000/\$50 = 300,000$$

And the number of old shares is the number of new shares times the number of shares ex-rights, so:

$$\text{Number of old shares} = 4.263(300,000) = 1,278,947$$

4. If you receive 1,000 shares of each, the profit is:

$$\text{Profit} = 1,000(\$8) - 1,000(\$5) = \$3,000$$

Since you will only receive one-half of the shares of the oversubscribed issue, your profit will be:

$$\text{Expected profit} = 500(\$8) - 1,000(\$5) = -\$1,000$$

This is an example of the winner's curse.

5. Using *X* to stand for the required sale proceeds, the equation to calculate the total sale proceeds, including flotation costs is:

$$X(1 - .08) = \$35,000,000$$

$$X = \$38,043,478 \text{ required total proceeds from sale.}$$

So the number of shares offered is the total amount raised divided by the offer price, which is:

$$\text{Number of shares offered} = \$38,043,478/\$31 = 1,227,209$$

6. This is basically the same as the previous problem, except we need to include the \$900,000 of expenses in the amount the company needs to raise, so:

$$X(1 - .08) = \$35,900,000$$

$$X = \$39,021,739 \text{ required total proceeds from sale.}$$

$$\text{Number of shares offered} = \$39,021,739/\$31 = 1,258,766$$

7. We need to calculate the net amount raised and the costs associated with the offer. The net amount raised is the number of shares offered times the price received by the company, minus the costs associated with the offer, so:

5. The average daily collections are the number of checks received times the average value of a check, so:

$$\text{Average daily collections} = \$108(8,500)$$

$$\text{Average daily collections} = \$918,000$$

The present value of the lockbox service is the average daily receipts times the number of days the collection is reduced, so:

$$\text{PV} = (2 \text{ day reduction})(\$918,000)$$

$$\text{PV} = \$1,836,000$$

The daily cost is a perpetuity. The present value of the cost is the daily cost divided by the daily interest rate. So:

$$\text{PV of cost} = \$225/.00016$$

$$\text{PV of cost} = \$1,406,250$$

The firm should take the lockbox service. The NPV of the lockbox is the cost plus the present value of the reduction in collection time, so:

$$\text{NPV} = -\$1,406,250 + 1,836,000$$

$$\text{NPV} = \$429,750$$

The annual savings excluding the cost would be the future value of the savings minus the costs, so:

$$\text{Annual savings} = \$1,836,000(1.00016)^{365} - 1,836,000$$

$$\text{Annual savings} = \$110,406.05$$

And the annual cost would be the future value of the daily cost, which is an annuity, so:

$$\text{Annual cost} = \$225(\text{FVIFA}_{365,.016\%})$$

$$\text{Annual cost} = \$84,563.46$$

So, the annual net savings would be:

$$\text{Annual net savings} = \$110,406.05 - 84,563.46$$

$$\text{Annual net savings} = \$25,842.59$$

6. a. The average daily float is the sum of the percentage each check amount is of the total checks received times the number of checks received times the amount of the check times the number of days until the check clears, divided by the number of days in a month. Assuming a 30 day month, we get:

$$\text{Average daily float} = [.60(5,300)(\$55)(2) + .40(5,300)(\$80)(3)]/30$$

$$\text{Average daily float} = \$28,620$$

On average, there is \$28,620 that is uncollected and not available to the firm.