

Chapter 8

8-1

- a. Such estimation errors would be offset if the investor held other retail firms in the same industry
- b. Geographical diversification would help against such natural disasters.
- c. Again, holding other stocks in the same industry would offset the losses to this firm.
- d. Holding stock in other stock, such as that of the firm owning the manufacturing plant would help diversify this risk.
- e. This risk could not be diversified because it would be market risk.
- f. If such an action is, in fact, suboptimal from the point of view of the economy, it would be a negative shock that the investor could not protect himself/herself against.
- g. This risk cannot be diversified.

Hence sources of risk e, f, and g would need to be considered as part of an investment analysis.

8-2

If you were a small private company that held other stores, risk source a. could be diversified away; similarly d. and e. However, risk sources b and c not be diversifiable..

8-3

a. The Limited is a U.S. company and the marginal investor is probably an American investor. Since the analysis is being done in U.S. dollars, the appropriate riskfree rate is the U.S. riskfree rate, which is the Treasury bond rate of 7%. It is not appropriate to adjust this rate by the premium earned on Brady bonds.

If we assume that country risk is diversifiable (to the Limited's stockholders), the market risk premium is still 5.5%

The cost of equity, therefore, can be computed as $7\% + 1.4(5.5\%) = 14.7\%$

If country risk is not diversifiable, you should probably use a larger risk premium to reflect the country risk (such as the 7.5%).

b. If the analysis were being done in the local currency, then we would need to compute the riskfree rate that would be appropriate for the local situation. If the marginal investor were in the South American country, again, the analysis would be different.

8-4

Since the plant is independently financed, the debt-equity ratio to be used is 60/40.

a. The cost of equity in U.S. dollars is $7\% + 0.8(5.5) = 11.4\%$

b. The cost of capital is $0.4(11.4) + (0.6)(4.5) = 7.26\%$

c. If the analysis were being done in the local currency, we would need to use the local currency risk free rate.

8-5

a. The levered beta for the multimedia business is 1.3; the average D/E ratio is 0.5, and the tax rate is 0.4. Hence the unlevered beta is computed using the formula:

$\beta_{levered} = \beta_{unlevered} [1 + (1 - t)D / E]$ to obtain an unlevered beta of 1.

b. If the phone company uses the same debt/equity ratio as the rest of its business, i.e. 1.0, it would have a levered beta of 1.6; hence the cost of equity would be $7 + 1.6(5.5) = 15.8\%$

c. If the debt/equity ratio used is 0.4, the levered beta is 1.24; hence the cost of equity capital is $7 + 1.24(5.5) = 13.82$

8-6

a. Computer chips used in automobiles would qualify as automobile components, especially if they could not be used for other purposes. Hence the appropriate beta would be the beta used for such firms. Their levered beta is 0.9 and their D/E ratio is 0.4; hence the unlevered beta is 0.726, using the formula $\beta_{levered} = \beta_{unlevered} [1 + (1-t)D/E]$. If the joint venture uses a debt/equity ratio is 30/70, the levered beta is 0.912.

b. the cost of equity capital is $7 + 5.5(0.912) = 12.016\%$. The cost of capital is $0.7(12.016) + 0.3(7.5)(1-0.4) = 9.7612\%$

c. If Intel used its current cost of equity and capital, the hurdle rate would probably be too high, given its traditional beta of 1.5. The final hurdle rate would be higher than warranted, and desirable projects would be rejected.

8-7

a. The cost of equity would be $7.5 + 0.95(5.5) = 12.725$ if the usual debt/equity ratio were used. However, it sounds as if Hershey believes that the current project would support a higher debt/equity ratio. In this case, we must compute a new cost of equity capital. First we compute Hershey's unlevered beta, which works out to 0.8782. Using the new debt/equity ratio of 20/80, the modified levered beta is 1.01. Hence the cost of equity is $7.5 + 1.01(5.5) = 13.055$. The cost of capital is $(0.8)(13.055) + (0.2)(1-0.4)(8) = 11.404\%$

b. No premium is charged for exchange rate risk because exchange rate risk is assumed to be diversifiable.

c. No premium was charged for political risk as well, since we assume that this risk is also diversifiable risk.

d. If Hershey had been held privately, the international risk might have been more difficult to diversify away, and it would have been appropriate to charge a risk premium.

8-8

The Gap should use numbers relevant for the cosmetics industry. The levered beta for this industry is 1.75, and given the debt/equity ratio, its unlevered beta is 1.651. If the Gap chooses not to use any debt for this project, it would use the unlevered beta of 1.651 for this project as well, and its cost of equity would be $7 + 1.651(5.5) = 16.0805\%$

8-9

a. b. The certainty equivalent factors and the equivalent riskless cash flows can be computed as $[(1 + \text{riskfree rate}) / (1 + \text{risky rate})]^n$

| Year | Flows (in million) | Certainty equivalent factor | Certainty equivalent |
|------|--------------------|-----------------------------|----------------------|
| 0 | -10 | 1 | -10 |
| 1 | 3.5 | 0.921774 | 3.226209 |
| 2 | 4 | 0.849668 | 3.39867 |

| | | | |
|---|-----|----------|----------|
| 3 | 4.5 | 0.783202 | 3.524407 |
| 4 | 5 | 0.721935 | 3.609674 |
| 5 | 5 | 0.665461 | 3.327304 |

8-10

a. The beta for this project should be 1.15, since there is no reason for the Yankees not to use the relevant industry debt-equity ratio as well. (However, if the debt cannot be structured as no-recourse, then the debt-equity ratio might have to be the same as the average debt-equity ratio of the Yankees.) The cost of equity would, therefore, be $7 + 1.15(5.5) = 13.325\%$

b. The cost of equity should be higher because the Yankees are privately held. The owners may, therefore, not have the same level of diversification as the average stockholder in the US markets.

8-11

a. I would use the same cost of capital at both stores. The cost of equity is $7 + 1.4(5.5) = 14.7$. The debt/equity ratio is 70%; hence the debt/capital ratio is 7/17. The cost of capital is $(7/17)(5.5) + (10/17)(14.7) = 10.91\%$

b. You would not charge a higher cost of capital for the New York store because estimation errors are diversifiable.

8-12

a. Unless the project is very large, Compaq would probably use its debt/equity ratio to finance this project. Hence the unlevered beta (computed from the levered beta of 1.2 for firms in the industry) is 1.07, and the appropriate levered beta (using Compaq's debt to capital ratio of 10%) is 1.14. Hence the cost of equity is $7\% + 1.14(5.5) = 13.27\%$, and the cost of capital is $(.9)13.27\% + (0.1)(5.5) = 12.49\%$

b. No because the average investor would diversify across firms in the same industry. Hence competition risk would not be borne by the average investor.

8-13

a. If Philip Morris desires to use its own debt ratio of 25% for all its business, then the computation of the levered beta to be used for its tobacco business is as follows: the unlevered beta for firms in the tobacco business is 0.982; lever up this using Philip Morris' debt to equity ratio of 33% (25%/75%) to get 1.1784. Hence the cost of equity is $7 + 1.1784(5.5) = 13.481$. The cost of capital is $(0.75)(13.481) + (0.25)8(1-0.4) = 11.31\%$

b. The cost of capital for the food business is computed similarly. The unlevered beta for firms in the food business is 0.645; lever up this using Philip Morris' debt to equity ratio of 33% to get 0.774. The cost of equity is $7 + 0.774(5.5) = 11.257\%$. The cost of capital is $(0.75)(11.257) + (0.25)8(1-0.4) = 9.643\%$

c. It would make no sense to compute Philip Morris' firm cost of capital, since it is an arbitrary mix of different businesses. However, we could compute the average cost of equity for Philip Morris as $7 + 0.95(5.5) = 12.225$, and the cost of capital as $(0.25)(8)(1-0.4) + (0.75)(12.225) = 10.369\%$

8-14

Litigation risk is diversifiable, and should not affect the cost of equity. It might have an effect on the cost of debt because it affects default risk.

8-15

a. If debt is allocated to the two firms in proportion to market value, both divisions will end up with the same debt ratio as Philip Morris prior to the split up. Consequently, their costs of capital will be very similar to those estimated in 8-13. The only reason there might be a difference is because the costs of debt for the two divisions may now be different, because of their different risk profiles.

b.

If all of the debt is allocated to the tobacco division, its debt ratio will be 66.66% while the food division's debt ratio will be 0%. (Note that the divisions are assumed to have equal value. Consequently,

Beta for tobacco division = $0.982 (1 + (1-.4)(25/37.5)) = 1.37$

Beta for food division = 0.645 (Unlevered beta)

Cost of equity for tobacco division = $7\% + 1.37 (5.5\%) = 14.53\%$

Cost of equity for food division = $7\% + 0.645 (5.5\%) = 10.55\%$

Cost of capital for tobacco division = $14.53\% (0.6666/1.0000) + 10\% (1-.4) (25/62.5) = 11.12\%$

Cost of capital for food division = 10.55%

8-16

a. The cost of equity of the three divisions should be $7 + 1.05(5.5) = 12.775$ for the commercial banking business, $7 + 0.7(5.5) = 10.85$ for the real estate division and $7 + 1.4(5.5) = 14.7$ for the investment banking division.

b. If the global beta were used, then, the real estate business would turn good projects, while the other divisions would end up taking on negative NPV businesses.