

CHAPTER 1: THE INVESTMENT ENVIRONMENT

PROBLEM SETS

1. Ultimately, it is true that real assets determine the material well being of an economy. Nevertheless, individuals can benefit when financial engineering creates new products that allow them to manage their portfolios of financial assets more efficiently. Because bundling and unbundling creates financial products with new properties and sensitivities to various sources of risk, it allows investors to hedge particular sources of risk more efficiently.
2. Securitization requires access to a large number of potential investors. To attract these investors, the capital market needs:
 - (1) a safe system of business laws and low probability of confiscatory taxation/regulation;
 - (2) a well-developed investment banking industry;
 - (3) a well-developed system of brokerage and financial transactions, and;
 - (4) well-developed media, particularly financial reporting.

These characteristics are found in (indeed make for) a well-developed financial market.

3. Securitization leads to disintermediation; that is, securitization provides a means for market participants to bypass intermediaries. For example, mortgage-backed securities channel funds to the housing market without requiring that banks or thrift institutions make loans from their own portfolios. As securitization progresses, financial intermediaries must increase other activities such as providing short-term liquidity to consumers and small business, and financial services.
4. Financial assets make it easy for large firms to raise the capital needed to finance their investments in real assets. If General Motors, for example, could not issue stocks or bonds to the general public, it would have a far more difficult time raising capital. Contraction of the supply of financial assets would make financing more difficult, thereby increasing the cost of capital. A higher cost of capital results in less investment and lower real growth.

Chapter 01 - The Investment Environment

5. Even if the firm does not need to issue stock in any particular year, the stock market is still important to the financial manager. The stock price provides important information about how the market values the firm's investment projects. For example, if the stock price rises considerably, managers might conclude that the market believes the firm's future prospects are bright. This might be a useful signal to the firm to proceed with an investment such as an expansion of the firm's business.

In addition, the fact that shares can be traded in the secondary market makes the shares more attractive to investors since investors know that, when they wish to, they will be able to sell their shares. This in turn makes investors more willing to buy shares in a primary offering, and thus improves the terms on which firms can raise money in the equity market.

6. a. Cash is a financial asset because it is the liability of the federal government.
b. No. The cash does not directly add to the productive capacity of the economy.
c. Yes.
d. Society as a whole is worse off, since taxpayers, as a group will make up for the liability.
7. a. The bank loan is a financial liability for Lanni. (Lanni's IOU is the bank's financial asset.) The cash Lanni receives is a financial asset. The new financial asset created is Lanni's promissory note (that is, Lanni's IOU to the bank).
b. Lanni transfers financial assets (cash) to the software developers. In return, Lanni gets a real asset, the completed software. No financial assets are created or destroyed; cash is simply transferred from one party to another.
c. Lanni gives the real asset (the software) to Microsoft in exchange for a financial asset, 1,500 shares of Microsoft stock. If Microsoft issues new shares in order to pay Lanni, then this would represent the creation of new financial assets.
d. Lanni exchanges one financial asset (1,500 shares of stock) for another (\$120,000). Lanni gives a financial asset (\$50,000 cash) to the bank and gets back another financial asset (its IOU). The loan is "destroyed" in the transaction, since it is retired when paid off and no longer exists.

Chapter 01 - The Investment Environment

8. a.

<i>Assets</i>		<i>Liabilities & Shareholders' equity</i>	
Cash	\$ 70,000	Bank loan	\$ 50,000
Computers	<u>30,000</u>	Shareholders' equity	<u>50,000</u>
Total	\$100,000	Total	\$100,000

Ratio of real assets to total assets = $\$30,000/\$100,000 = 0.30$

b.

<i>Assets</i>		<i>Liabilities & Shareholders' equity</i>	
Software product*	\$ 70,000	Bank loan	\$ 50,000
Computers	<u>30,000</u>	Shareholders' equity	<u>50,000</u>
Total	\$100,000	Total	\$100,000

*Valued at cost

Ratio of real assets to total assets = $\$100,000/\$100,000 = 1.0$

c.

<i>Assets</i>		<i>Liabilities & Shareholders' equity</i>	
Microsoft shares	\$120,000	Bank loan	\$ 50,000
Computers	<u>30,000</u>	Shareholders' equity	<u>100,000</u>
Total	\$150,000	Total	\$150,000

Ratio of real assets to total assets = $\$30,000/\$150,000 = 0.20$

Conclusion: when the firm starts up and raises working capital, it is characterized by a low ratio of real assets to total assets. When it is in full production, it has a high ratio of real assets to total assets. When the project "shuts down" and the firm sells it off for cash, financial assets once again replace real assets.

9. For commercial banks, the ratio is: $\$107.5/\$10,410.9 = 0.010$

For non-financial firms, the ratio is: $\$13,295/\$25,164 = 0.528$

The difference should be expected primarily because the bulk of the business of financial institutions is to make loans; which are financial assets for financial institutions.

10. a. Primary-market transaction

b. Derivative assets

c. Investors who wish to hold gold without the complication and cost of physical storage.

Chapter 02 - Asset Classes and Financial Instruments

7. The total before-tax income is \$4. After the 70% exclusion for preferred stock dividends, the taxable income is: $0.30 \times \$4 = \1.20
Therefore, taxes are: $0.30 \times \$1.20 = \0.36
After-tax income is: $\$4.00 - \$0.36 = \$3.64$
Rate of return is: $\$3.64/\$40.00 = 9.10\%$
8. a. General Dynamics closed today at \$74.59, which was \$0.17 higher than yesterday's price. Yesterday's closing price was: \$74.42
b. You could buy: $\$5,000/\$74.59 = 67.03$ shares
c. Your annual dividend income would be: $67.03 \times \$0.92 = \61.67
d. The price-to-earnings ratio is 16 and the price is \$74.59. Therefore:
 $\$74.59/\text{Earnings per share} = 16 \Rightarrow \text{Earnings per share} = \4.66
9. a. At $t = 0$, the value of the index is: $(90 + 50 + 100)/3 = 80$
At $t = 1$, the value of the index is: $(95 + 45 + 110)/3 = 83.333$
The rate of return is: $(83.333/80) - 1 = 4.17\%$
b. In the absence of a split, Stock C would sell for 110, so the value of the index would be: $250/3 = 83.333$
After the split, Stock C sells for 55. Therefore, we need to find the divisor (d) such that:
 $83.333 = (95 + 45 + 55)/d \Rightarrow d = 2.340$
c. The return is zero. The index remains unchanged because the return for each stock separately equals zero.
10. a. Total market value at $t = 0$ is: $(\$9,000 + \$10,000 + \$20,000) = \$39,000$
Total market value at $t = 1$ is: $(\$9,500 + \$9,000 + \$22,000) = \$40,500$
Rate of return = $(\$40,500/\$39,000) - 1 = 3.85\%$
b. The return on each stock is as follows:
 $r_A = (95/90) - 1 = 0.0556$
 $r_B = (45/50) - 1 = -0.10$
 $r_C = (110/100) - 1 = 0.10$
The equally-weighted average is:
 $[0.0556 + (-0.10) + 0.10]/3 = 0.0185 = 1.85\%$

Chapter 02 - Asset Classes and Financial Instruments

4.
 - a. The taxable bond. With a zero tax bracket, the after-tax yield for the taxable bond is the same as the before-tax yield (5%), which is greater than the yield on the municipal bond.
 - b. The taxable bond. The after-tax yield for the taxable bond is:
$$0.05 \times (1 - 0.10) = 4.5\%$$
 - c. You are indifferent. The after-tax yield for the taxable bond is:
$$0.05 \times (1 - 0.20) = 4.0\%$$

The after-tax yield is the same as that of the municipal bond.
 - d. The municipal bond offers the higher after-tax yield for investors in tax brackets above 20%.
5. If the after-tax yields are equal, then: $0.056 = 0.08 \times (1 - t)$
This implies that $t = 0.30 = 30\%$.

Chapter 07 - Optimal Risky Portfolios

Since all standard deviations are equal to 20%:

$$\text{Cov}(r_I, r_J) = \rho_{IJ}\sigma_I\sigma_J = 400\rho \text{ and } w_{\text{Min}}(I) = w_{\text{Min}}(J) = 0.5$$

This intuitive result is an implication of a property of any efficient frontier, namely, that the covariances of the global minimum variance portfolio with all other assets on the frontier are identical and equal to its own variance. (Otherwise, additional diversification would further reduce the variance.) In this case, the standard deviation of $G(I, J)$ reduces to:

$$\sigma_{\text{Min}}(G) = [200(1 + \rho_{IJ})]^{1/2}$$

This leads to the intuitive result that the desired addition would be the stock with the lowest correlation with Stock A, which is Stock D. The optimal portfolio is equally invested in Stock A and Stock D, and the standard deviation is 17.03%.

18. No, the answer to Problem 17 would not change, at least as long as investors are not risk lovers. Risk neutral investors would not care which portfolio they held since all portfolios have an expected return of 8%.
19. No, the answers to Problems 17 and 18 would not change. The efficient frontier of risky assets is horizontal at 8%, so the optimal CAL runs from the risk-free rate through G. The best Portfolio G is, again, the one with the lowest variance. The optimal complete portfolio depends on risk aversion.
20. Rearranging the table (converting rows to columns), and computing serial correlation results in the following table:

Nominal Rates

	Small company stocks	Large company stocks	Long-term government bonds	Intermed-term government bonds	Treasury bills	Inflation
1920s	-3.72	18.36	3.98	3.77	3.56	-1.00
1930s	7.28	-1.25	4.60	3.91	0.30	-2.04
1940s	20.63	9.11	3.59	1.70	0.37	5.36
1950s	19.01	19.41	0.25	1.11	1.87	2.22
1960s	13.72	7.84	1.14	3.41	3.89	2.52
1970s	8.75	5.90	6.63	6.11	6.29	7.36
1980s	12.46	17.60	11.50	12.01	9.00	5.10
1990s	13.84	18.20	8.60	7.74	5.02	2.93
Serial Correlation	0.46	-0.22	0.60	0.59	0.63	0.23

Chapter 12 - Behavioral Finance and Technical Analysis

17. [Note: In order to create the relative strength measure, we first converted the weekly returns for the Fidelity Banking Fund and for the S&P 500 to weekly index values, using a base of 100 for the week prior to the first week of the data set. The graph on the next page shows the resulting Fidelity Banking Fund values and the S&P 500 values, along with the Relative Strength measure (multiplied by 100). The graph on the following page shows the percentage change in the Relative Strength measure over 5-week intervals.]
- The graphs on the next two pages summarize the relative strength data for the Fidelity Banking Fund.
 - Over five-week intervals, relative strength increased by more than 5% twenty-nine times, as indicated in the table below. The Fidelity Banking Fund underperformed the S&P 500 index eighteen times and outperformed the S&P 500 index eleven times in weeks following an increase of more than 5%.

Date of Increase	Performance of Banking Fund in subsequent week
07/21/00	Outperformed
08/04/00	Outperformed
08/11/00	Underperformed
08/18/00	Outperformed
09/22/00	Outperformed
09/29/00	Underperformed
10/06/00	Underperformed
12/01/00	Underperformed
12/22/00	Underperformed
12/29/00	Outperformed
01/05/01	Underperformed
01/12/01	Underperformed
02/16/01	Underperformed
02/23/01	Outperformed
03/02/01	Underperformed
03/09/01	Outperformed
03/16/01	Underperformed
03/30/01	Underperformed
06/22/01	Underperformed
08/17/01	Underperformed
03/15/02	Outperformed
03/22/02	Underperformed
03/28/02	Outperformed
04/05/02	Outperformed
04/12/02	Underperformed
04/26/02	Outperformed
05/03/02	Underperformed
05/10/02	Underperformed
06/28/02	Underperformed

Chapter 20 - Options Markets: Introduction

- c. Buy the call, sell (write) the put, lend: $\$50/(1.10)^{1/4}$

The payoff is as follows:

Position	Immediate CF	CF in 3 months	
		$S_T \leq X$	$S_T > X$
Call (long)	$C = 5.18$	0	$S_T - 50$
Put (short)	$-P = 4.00$	$-(50 - S_T)$	0
Lending position	$\frac{50}{1.10^{1/4}} = 48.82$	50	50
Total	$C - P + \frac{50}{1.10^{1/4}} = 50.00$	S_T	S_T

By the put-call parity theorem, the initial outlay equals the stock price:

$$S_0 = \$50$$

In either scenario, you end up with the same payoff as you would if you bought the stock itself.

9. a.

Outcome	$S_T \leq X$	$S_T > X$
Stock	$S_T + D$	$S_T + D$
Put	$X - S_T$	0
Total	$X + D$	$S_T + D$

- b.

Outcome	$S_T \leq X$	$S_T > X$
Call	0	$S_T - X$
Zeros	$X + D$	$X + D$
Total	$X + D$	$S_T + D$

The total payoffs for the two strategies are equal regardless of whether S_T exceeds X .

- c. The cost of establishing the stock-plus-put portfolio is: $S_0 + P$
 The cost of establishing the call-plus-zero portfolio is: $C + PV(X + D)$
 Therefore:

$$S_0 + P = C + PV(X + D)$$

This result is identical to equation 20.2.

Chapter 28 - Investment Policy and the Framework of the CFA Institute

- c. The Maclins' investment policy statement should include the following constraints:
- Time horizon: The Maclins have a two-stage time horizon because of their changing cash flow and resource needs. The first stage is the next 18 years. The second stage begins with their retirement and the university education years for their children.
 - Liquidity requirements: The Maclins have one-time immediate expenses (£50,000) that include the deposit on the house they are purchasing and the charitable donation in honor of Louise's father.
 - Tax concerns: The U.K. has a 40 percent marginal tax rate on both ordinary income and capital gains. Therefore there is no preference for investment returns from taxable dividends or interest over capital gains. Taxes will be a drag on investment performance because all expenditures will be after tax.
 - Unique circumstances: The large holding of the Barnett Co. common stock (representing 18 percent of the Maclins' total portfolio) and the resulting lack of diversification is a key factor to be included in evaluating the risk of the Maclins' portfolio and in the future management of the Maclins' assets. The Maclins' desire not to invest in alcohol and tobacco stocks is another constraining factor, especially in the selection of any future investment style or manager.
9. a.
- The cash reserve is too high.
 - The 15 percent (or £185,250) cash allocation is not consistent with the liquidity constraint.
 - The large allocation to a low-return asset contributes to a shortfall in return relative to required return.
 - The 15 percent allocation to Barnett Co. common stock is too high.
 - The risk of holding a 15 percent position in Barnett stock, with a standard deviation of 48, is not appropriate for the Maclins' below-average risk tolerance and -12 percent shortfall risk limitation.
 - The large holding in Barnett stock is inconsistent with adequate portfolio diversification.
 - Shortfall risk exceeds the limitation of -12 percent return in any one year.
 - The Maclins have stated that their shortfall risk limitation is -12 percent return in any one year. Subtracting 2 times the standard deviation from the portfolio's expected return, we find:
$$6.70 \text{ percent} - (2 \times 12.40 \text{ percent}) = -18.10 \text{ percent}$$
This is below their shortfall risk limitation.
 - The expected return is too low (the allocation between stocks and bonds is not consistent with return objective).
 - The portfolio's expected return of 6.70 percent is less than the return objective of 7.38 percent.