



FIN 366: INVESTMENTS
EFFICIENT DIVERSIFICATION
CRITICAL THINKING & CONCEPTUAL QUESTIONS

1. What type of risk can be effectively eliminated when we invest? What type of risk is always present? Provide examples of each type of risk.
2. Diversification entails spreading our portfolio over many risky assets. Why diversify in the first place? Shouldn't we just hold the asset with the highest possible Sharpe ratio?
3. Your friend tells you "I think my financial advisor is trying to mislead me. He keeps telling me that I can lower my overall risk if I add some stocks to my bond portfolio. But stocks are riskier than bonds...there's just no way that this is true!" What do you tell your friend?
4. The expected return of a portfolio is a weighted average of the component assets. Why, then, is the risk of a portfolio *not* just a weighted average of the individual asset standard deviations?
5. If you want to better diversify, should you buy portfolios of securities that are negatively correlated or highly correlated with what you already own?
6. Do portfolios *have* to be negatively correlated or uncorrelated to offer the benefit of reduced risk through diversification?
7. A client of yours has a portfolio consisting of stocks that tend to move together. What would you recommend to her to help in reducing the risk of her portfolio?
8. Can you draw and label an investment opportunity set (IOS) of 2 risky securities?
9. How many different portfolios are there on the IOS that consists of 2 risky securities?
10. Where is the minimum variance portfolio on the IOS?
11. Why shouldn't we always hold the minimum variance portfolio on the IOS if it has the lowest level of risk?
12. How does the IOS shape change as the correlation between assets increases and decreases?
13. Explain how the straight line IOS of perfectly correlated portfolios shows that overall portfolio risk increases when a riskier asset is added to the less risky asset.
14. What would be the shape of the IOS if two risky securities had a correlation coefficient of -0.9? What if they had a correlation of +0.9?
15. Do we expect that perfect positive and perfect negative correlations between different assets exist in practice?
16. A portfolio has an expected return of 11% and a standard deviation of 3%. Is this preferable to a portfolio that has an expected return of 10% and a standard deviation of 5%? What about relative to a portfolio that has an expected return of 11% and a standard deviation of 5%?
17. **CHALLENGE** Ten investors, each with identical levels of wealth, hold the *Vanguard S&P 500 Index Fund* and the *Vanguard Total Bond Market Index Fund*. They hold no other

assets, not even cash or risk-free securities. Given these investors each hold the same two funds, is it possible for them to have different levels of risk? Why or why not?

18. **CHALLENGE** How would you define **efficient diversification**? What might be diversifying *inefficiently*?
19. **CHALLENGE Inverse ETFs** are funds that move in the opposite direction as a benchmark. For example, if the Vanguard S&P 500 ETF rises 1.8% in a day, the ProShares Short S&P 500 ETF will fall 1.8% that day. Why can't these seemingly *perfectly negatively* correlated funds be combined in such a way that their combination generates risk-free returns as shown in the top right diagram in Figure 2 of the lecture notes?
20. **CHALLENGE** Show how even a very high positive correlation between two assets offers a benefit when building a diversified portfolio. Hint: plug in $\rho = 0.99$ and $\rho = 1$ instead of 0.2 for the portfolio standard deviation problem in the lecture notes. Compare these results to a simple weighted average of the bond and stock funds' standard deviations of 8% and 19%.
21. **CHALLENGE Harry Markowitz** won the Nobel Memorial Prize in Economic Sciences for developing **Modern Portfolio Theory**, also known as **mean-variance optimization**. What is a mean-variance optimized portfolio? How does this relate to the lecture notes?

