

EC3333 Tutorial 4

1. The Optima Mutual Fund has an expected return of 20% and a volatility of 20%. Optima claims that no other portfolio offers a higher Sharpe ratio. Suppose this claim is true, and the risk-free interest rate is 5%.
 - a. What is Optima's Sharpe Ratio?
 - b. If eBay's stock has a volatility of 40% and an expected return of 11%, what must be its correlation with the Optima Fund?
 - c. If the SubOptima Fund has a correlation of 80% with the Optima Fund what is the Sharpe ratio of the SubOptima Fund?
2. Your investment portfolio consists of \$15,000 invested in only one stock — Amazon. Suppose the risk-free rate is 5%, Amazon stock has an expected return of 12% and a volatility of 40%, and the market portfolio has an expected return of 10% and a volatility of 18%. Under the CAPM assumptions,
 - a. What alternative investment has the lowest possible volatility while having the same expected return as Amazon? What is the volatility of this investment?
 - b. What investment has the highest possible expected return while having the same volatility as Amazon? What is the expected return of this investment?
3. Consider a portfolio consisting of the following three stocks:

	Portfolio Weight	Volatility	Correlation with Market Portfolio
HEC Corp	0.25	12%	0.4
Green Midget	0.35	25%	0.6
AliveAndWell	0.4	13%	0.5

The volatility of the market portfolio is 10% and it has an expected return of 8%. The risk-free rate is 3%.

- a. Compute the beta and expected return of each stock.
- b. Using your answer from part a, calculate the expected return of the portfolio.
- c. What is the beta of the portfolio?
- d. Using your answer from part c, calculate the expected return of the portfolio and verify that it matches your answer to part b.

4. Suppose the market portfolio is equally likely to increase by 30% or decrease by 10%.
 - a. Calculate the beta of a firm that goes up on average by 43% when the market goes up and goes down by 17% when the market goes down.
 - b. Calculate the beta of a firm that goes up on average by 18% when the market goes down and goes down by 22% when the market goes up.
 - c. Calculate the beta of a firm that is expected to go up by 4% independently of the market.

5. Based on the data in Table 10.6 (appended), estimate which of the following investments you expect to lose the most in the event of a severe market down turn:
 - a. a \$2000 investment in Hershey,
 - b. a \$1500 investment in Macy's, or
 - c. a \$1000 investment in Amazon.

Table 10.6 Betas with Respect to the S&P 500 for Individual Stocks (Based on Monthly Data for 2013–2018)

(Source: adopted text, Berk and DeMarzo, Corporate Finance, Pearson, 5e)

Company	Ticker	Industry	Equity Beta
Edison International	EIX	Utilities	0.15
Tyson Foods	TSN	Packaged Foods	0.19
Newmont Mining	NEM	Gold	0.31
The Hershey Company	HSY	Packaged Foods	0.33
Clorox	CLX	Household Products	0.34
Walmart	WMT	Superstores	0.55
Procter & Gamble	PG	Household Products	0.55
McDonald's	MCD	Restaurants	0.63
Nike	NKE	Footwear	0.64
Pepsico	PEP	Soft Drinks	0.68
Williams-Sonoma	WSM	Home Furnishing Retail	0.71
Coca-Cola	KO	Soft Drinks	0.73
Johnson & Johnson	JNJ	Pharmaceuticals	0.73
Macy's	M	Department Stores	0.75
Molson Coors Brewing	TAP	Brewers	0.78
Starbucks	SBUX	Restaurants	0.8
Foot Locker	FL	Apparel Retail	0.83
Harley-Davidson	HOG	Motorcycle Manufacturers	0.88
Pfizer	PFE	Pharmaceuticals	0.89
Sprouts Farmers Market	SFM	Food Retail	0.89
Philip Morris	PM	Tobacco	0.89
Intel	INTC	Semiconductors	0.93
Netflix	NFLX	Internet Retail	0.98
Kroger	KR	Food Retail	1.04
Microsoft	MSFT	Systems Software	1.04
Alphabet	GOOGL	Internet Software and Services	1.06
eBay	EBAY	Internet Software and Services	1.11
Cisco Systems	CSCO	Communications Equipment	1.14
Southwest Airlines	LUV	Airlines	1.15
Apple	AAPL	Computer Hardware	1.24
salesforce.com	CRM	Application Software	1.25
Walt Disney	DIS	Movies and Entertainment	1.29
Marriott International	MAR	Hotels and Resorts	1.32
Amgen	AMGN	Biotechnology	1.37
Toll Brothers	TOL	Homebuilding	1.37
Wynn Resorts Ltd.	WYNN	Casinos and Gaming	1.38
Parker-Hannifin	PH	Industrial Machinery	1.43
Prudential Financial	PRU	Insurance	1.51
Nucor	NUE	Steel	1.57
Amazon.com	AMZN	Internet Retail	1.62
General Motors	GM	Automobile Manufacturers	1.64
Autodesk	ADSK	Application Software	1.72
Hewlett-Packard	HPQ	Computer Hardware	1.77
Tiffany & Co.	TIF	Apparel and Luxury Goods	1.77
Brunswick	BC	Leisure Products	1.84
Chesapeake Energy	CHK	Oil and Gas Exploration	1.85
Netgear	NTGR	Communications Equipment	1.94
Ethan Allen Interiors	ETH	Home Furnishings	2.04
Trimble	TRMB	Electronic Equipment	2.44
Advanced Micro Devices	AMD	Semiconductors	2.83